Bundesanstalt für BA awi Agrarwirtschaft

AGRICULTURE AFTER JOINING THE EU

SECTORAL ANALYSES FOR AUSTRIA

DIE ÖSTERREICHISCHE LANDWIRTSCHAFT NACH DEM BEITRITT ZUR EU SEKTORALE ANALYSEN

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Vorwort

Der Beitritt zur EU brachte für die österreichische Landwirtschaft einschneidende Veränderungen in Form niedrigerer Preise und eines neuen Stützungssystems. Wie hat sie darauf reagiert? Welche Erwartungen wurden erfüllt, und in welchen Bereichen traten Probleme auf? Diese Fragen bewegten auch die anderen neuen Mitgliedstaaten, und wir wollten sie gemeinsam mit ihnen und Partnern aus Norwegen und Dänemark beantworten. Da das FAIR-Programm die beabsichtigte Kooperation nicht finanzierte, entstanden in den drei neuen Mitgliedstaaten einzelne Studien, die bei der 264. von der Nordic Association of Agricultural Scientists organisierten Tagung in Alnarp, Schweden, am 6.-8. Juni 1996 präsentiert und von Prof. *Lauri Kettunen* veröffentlicht wurden[1].

In diesem Heft finden Sie jene vier Beiträge aus diesem Tagungsband, die Österreich betreffen. Sie wurden nur in minimalem Umfang überarbeitet. Mit dieser Veröffentlichung tragen wir unserer Überzeugung Rechnung, daß die Leistungen der Landwirtschaft Würdigung verdienen und einer kritischen Beurteilung standhalten, daß aber auch große Anstrengungen gemacht wurden und notwendig sind, um ihre Wettbewerbsfähigkeit zu stärken und ihre Funktionen in der Gesamtwirtschaft zu erhalten. Die vorliegenden Beiträge können naturgemäß nicht alles abdecken, was in diesen Bereichen denkbar ist; sie enthalten jedoch Fakten und Anregungen, die als Diskussionsgrundlage Beachtung verdienen.

HR Dipl.-Ing. Dr. Hubert Pfingstner, Direktor Wien, August 1996

Preface

Accession to the EU brought about significant changes for Austrian agriculture as producer prices dropped and a new support system was introduced. How did it respond to these changes? What expectations were met and which areas are creating problems? The other joining countries encountered these questions, too, and we intended to answer them in tandem with them and partner institutes in Norway and Denmark. However, since the FAIR-program did not finance the proposed cooperative effort, individual studies were undertaken in the new member countries; they were presented at the 264. NJF-seminar of the Nordic Association of Agricultural Scientists in Alnarp, Sweden, on June 6-8, 1996 and published by Prof. *Lauri Kettunen*[1].

In this booklet you will find a collection of those four papers from the conference proceedings which concern Austria, with very minor revisions. By publishing these paper we ware demonstrating our conviction that the services provided by agriculture deserve recognition and are going to benefit from critical evaluation, but also that substantial efforts have been undertaken and are required to improve the competitiveness of the sector and to maintain its performance levels for society as a whole. The contributions in this booklet naturally can't cover or touch everything that comes to mind in this context; however, they do bring forward facts and ideas which may use as a basis for further discussions and analyses.

HR Dipl.-Ing. Dr. Hubert Pfingstner, head Vienna, August 1996

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[1] Integration of agriculture and food industries of the new member countries in the EU - a review, problems and prospects. ISSN 0333-1350, 1996.

Executive Summary

When Austria, Finland and Sweden joined the EU In 1995, prospects were that this move would entail gains in economic efficiency, growth, and welfare in the joining countries and in the EU as a whole, at least in the long term. These effects are primarily attributable to a reduction of transaction costs (brought about most notably by the elimination of barriers to trade and common standards), increased specialization and economies of scale in larger markets. Additional arguments for integrating European countries are increased bargaining power in international negotiations, greater efficiency of common institutions in foreign policy and security matters, and, last but not least, the realisation that an increasing number of problems cannot be solved in an isolated domestic setting.

In the short term, in order to achieve the expected gains, the new member countries are facing adjustment problems in some sectors of their economy, and of varying intensity. In the case of Austria, a substantial step to adjust to EU standards was already taken by joining the European Economic Area (EEA) in 1994. Since agriculture was by and large excluded from this agreement, it was to be one of the sectors most seriously affected by EU accession.

The current collection of papers explores various aspects of the adjustment process facing agriculture in Austria and its impact on market participants and policy objectives; it also addresses adjustments and changes in the general economy and wether these are or are not related to accession. The initial intention was to perform these analyses for all new member countries along common lines with financial support from the EU's FAIR programme. As it was not granted, this research is somewhat limited in scope and time, and certainly is not conclusive. However, we are reviewing a period of radical shifts in the economic and institutional environment for agriculture, which raises issues that might be interesting to persue in more detail in the future and which might prove to be useful for countries intending to join the EU at a later stage.

The first paper examines observed changes of agricultural policies and output, food processing and retail prices in 1995. Up until 1994, the gap in producer prices and the support regime for agricultural products between Austria and the EU had increased substantially. Farmers became increasingly reluctant to embrace EU membership and pressed for an extended period of adjustment and payments which would have enabled them to maintain high environmental standards and to deliver public goods and services at the same rate as before. Although this did not materialise and the accession treaty called for immediate implementation of the common market, it provided - or so it seemed - for sufficient benefits: compliance with GATT commitments, deregulation of the processing sectors, free trade within the union, increased productivity and lower consumer prices. Farmers were offered apparently adequate compensations in the form of increased supplementary income payments in disadvantaged regions, CAP payments for crops and livestock, degressive compensation payments over the first four years of membership, and substantially increased payments for environmental services.

Almost as forecast by comparison of the prices in Austria in 1994 and those expected in the EU in 1995, final output of agriculture decreased by 16 bill. ATS or 25 %. 22 % of this

reduction were due to (expected) price decreases which led farmers to decrease production[1]. The sectors most affected by accession were cereals, milk, poultry, eggs and vegetables. Net subsidies for agricultural services increased by almost 14 bill. ATS in 1995, nearly compensating farmers for their loss in revenue from the sale of agricultural produce. Clearly there are differences between types of farmers[2] and agricultural subsectors. In addition, if markets are efficient, reductions in producer prices should be transmitted downstream to consumer prices and vice versa. In the dairy sector, consumers saved at least 3.7 bill. ATS but processing and marketing margins increased.

Since retail prices in general responded rather little to declining producer prices, price transmission in the beef and pork sectors were analysed more thoroughly. Retail prices are expected to follow the movemets of producer prices, although there may be lags of adjustment and retailers may prefer to keep prices in the retail market constant or even to increase them. If that were possible, retailers would be able to set prices and pocket monopoly rents from consumers while denying pig producers additional sales.

Cointegration analysis of the movements of monthly producer and retail prices of beef and pork for 1981 - 1994 in Austria confirmed that these claims are not justified: prices in the beef and pork marketing chain were found to be integrated, and the cointegration vector adheres to hypotheses which are valid only if the related markets are characterized by competitive behavior of the market participants. Specifically, the movement of any one of the four prices examined was accompanied by corresponding movements of the other three prices in the long run, and it led to partial adjustments to longrun equilibrium in the short run. Whereas marketing margins in absolute terms (price spreads) have remained stable, percentage margins have increased. The impact of EU-membership on meat prices was estimated by comparing the ex-post forecasts of the model for 1995 (prices in the absence of EU membership) with observed prices. Contrary to expectations, membership increased the spread between producer and retail prices by 10-12 ATS/kg in 1995; wether this is a temporary phenomenon or a structural break remains to be seen.

Another problem area is the change in environmental policies as a consequence of EU accession. Payments for particular production methods and ecologically desirable actions under the Austrian Program for an Environmantally Sound Agriculture (ÖPUL) account for a substantial part of revenue offered to farmers. The abolition of the fertilizer taxes and the impact of the serious producer price changes is another matter. Although important data for 1995 are still missing and it will take more time to see the reaction of market participants to the new situation, some environmental consequences of Austria's participation in the Common Agricultural Policy can already be sketched.

Firstly, let us consider areas where the nitrate-contamination of groundwater exceeds thresholds: to tackle this problem, grain production and animal stocks should be reduced in these areas. The data available so far indicate that the pressure on groundwater quality is continuing. On the other hand, biological farming is taking a highly positive development, in

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[1] Notable exception to that was milk deliveries which increased as the voluntary supply restraint scheme was abolished. Some of this supply response could be attributed to unfavorable weather conditions or business cycles.

[2] The farm accountancy network reported an increase in farm profit per self-employed labor unit of 22 %. However, it excludes small farms whose standard gross margin is less than 90.000 ATS (i.e. farms with less than approximately 7 ha agricultural area. Also, part of this increase is due to the fact that labor input of this type in agriculture decreased by 6.2 % in 1995).

in particular in the western part of the country. These are also the areas in which the measures aiming at extensive grassland farming and renunciation of yield-increasing inputs have been more successful. In order to prevent further concentration of intensive agricultural practices, attention should focus on the eastern provinces and certain crops, with the aim to diversify and extensify production.

With respect to agricultural chemicals, no data on sales are available yet; recent price developments are likely to slow down the trend to decreasing application rates. With respect to fertilizers, a lack of data on actual application rates will most probably prevent analyses of nutrient flows, now and also in the future. This shortcoming must be overcome if a maximum of 30 mg NO_3/l drinking-water is to be attained, as foreseen by July 1, 1999. Also, more effective policy measures to improve ground water quality will have to be elaborated.

Although EU accession had a substantial effect on agriculture, the food industry and the agricultural budget, its short term effects at the macroeconomic level beyond these sectors have been quite modest. Outstanding among those are Austria's financial net contributions to the EU budget which weigh on the current account at the negative side, and the effect of these contributions and vastly enlarged government payments for agriculture and the food industry on the public budgets. The latter result from the shift in agricultural support from elevated market prices (paid by the buyers of agricultural products and finally by consumers) to payments from the federal and provincial budgets (paid by taxpayers). Government payments may be more easily targeted to achieve specific policy goals.

The adjustment process for agriculture has just begun. Considerable pressure is expected due to a progressive decrease of temporary compensation payments and their discontinuation in 1999. Austrian agriculture will thus be put at an equal footing with its competitors in other EU member countries, and will have to increase its efficiency to remain competitive. This formidable challenge is, however, not unique to agriculture. The attempts to increase competitiveness and to utilize the chances provided by the European market are showing first results, as exemplified, f.i., by the positive development of net foreign direct investments. However, the full range of dynamic integration effects, being the outstanding effect of joining the EU, will take more time to materialise. Hence, supporting this process is one of the primary tasks of public and private decision makers in the upcoming years.

Dipl.-Ing. Karl Michael Ortner

The Austrian farm sector's adjustment to the CAP in 1995

Karl Michael Ortner [1]

1 Introduction

The role of government in the agricultural sector traditionally has been pervasive in Austria, in particular in the dairy and cereals sectors where marketing boards administered prices and production. In addition, equity considerations and environmental concerns remain strong, and politicians committed themselves to let per capita farm income not fall behind the level of income growth in the overall economy, to maintain the small-scale structure of farming (family farms), and to give farmers in disadvantaged (mountainous) regions the opportunity to stay viable through supplementary income payments. However, these direct payments were counterbalanced by producer and fertilizer levies and thus accounted only for a minor fraction of support given to the agricultural sector (measured by the Producer Subsidy Equivalent; OECD 1995, *Ortner* 1996). The major policy instrument was market price support through border protection and administered prices which led farmers to increase production, and which led the government to grant export subsidies and/or to introduce quantitative restrictions on production in order to clear markets.

EU accession was seen as an opportunity for liberalisation and more reliance on market forces to improve economic efficiency. Austrian farmers and processors could regain their competitiveness vis-a-vis the EU member countries. There, agricultural producer prices had been lowered following the reform of the Common Agricultural Policy (CAP) in 1992, and EU food products had gained a competitive edge in the Austrian market. On the global level, the conclusion of the GATT Uruguay Round had obliged Austrian agriculture and food sectors to reduce subsidised exports, export subsidies, internal support and border protection.

These challenges put farmers and their representatives under considerable pressure, and accession to the EU was seen as a solution to some of these problems, for the following reasons:

- accession would bring producer prices down to EU levels, thereby lowering internal support and reducing the costs of the processing sectors.
- It would open the EU market for Austrian suppliers of agricultural products, thereby eliminating the need to entertain subsidies for exports to these countries and reducing the volume of subsidized exports.
- It would free the processing sectors from public strings and allow them to cut costs and seek profits by meeting demand and operating on an equal footing with their competitors in the EU.
- And it would let consumers take advantage of lower food prices and more variety by the removal of border protection and stronger competition, possibly increasing demand for agricultural products.

On the other hand, it was obvious that farmers and the processing industry would have to shoulder a heavy burden of adjustment and would need sufficient support to be able to live up to the tasks ahead and maintain financial viability.

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[1] Federal Institute of Agricultural Economics, Vienna

In the following, I will shed some light on these issues. Having at hand the provisional sectoral data for 1995[2] on the agricultural sector, it is too early to come to a final verdict as to whether these adjustments were sufficiently smooth and what their implications have been or will be in the near future. For agriculture, 1995 was the year when the CAP was introduced; in 1996 through 1999, the financial consequences of adopting the CAP will become more bearing and lead to economic adjustments which may prove to be no less challenging.

The paper is organised as follows: at the start, I intend to show which policy objectives existed before accession, what policy measures were involved and how they were integrated into the CAP or had to be scrapped. I will do this by presenting developments in the dairy sector in more detail[3] covering the farm and processing stages and estimating the benefit of consumers due to retail price changes. I will then sketch major developments in the main agricultural product markets in terms of changes of producer prices, production and the value of final output. Finally, I will discuss the most relevant support measures which have been implemented under the CAP and conclude with the preliminary results of the agricultural accounts for 1995.

Data for this analysis are coming from the sources given in the reference section. For those (major) agricultural commodities for which the OECD calculates producer and consumer subsidy equivalents (PSE/CSEs) I followed its procedures to calculate prices, and the results may thus slightly differ from those of *Schneider* (1995) who produces the official agricultural accounts for the Austrian Statistical Office (ÖSTAT). They also differ for fruits, but the data for agriculture (total) are the official ones, although one ought to consider that these are still subject to revision.

2 Milk production

The number of milk producers in Austria declined by 3.8 % p.a. in the last decade (1984-1994). In 1994, 81 902 farmers held 809 977 dairy cows and delivered an average of 26.8 t of milk per year to processing plants; only 896 farmers delivered in excess of 100 t per year, and only 470 farmers held more than 30 dairy cows; these figures underline the precedence of small-scale farming in Austria. 62 % of the dairy cows were held in disadvantaged areas. Only 69 % of production was delivered to processing plants, the remainder being consumed on farm, sold off farm and fed to calves and other livestock.

Small-scale farming and the location of production in disadvantaged areas are key factors which put Austrian agriculture high on an ecological scale but also make for high production costs. Prices received[4] by milk producers for delivered milk were administered at an even higher level, evidenced by the fact that individual farm quotas had to be applied to keep production within acceptable limits. Administered producer prices were increased by an average of 2.8 % p.a. over the last decade, i.e. by as much as the consumer price index, although production costs decreased during this period due to technological progress, f.i. an increase of average milk yields per cow of 0.7 % p.a.[5]. The dairy sector had thus become the

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[2] Data on external trade are not yet available for 1995.

[3] Milk production is the most important sector of Austrian agriculture, with a share in final output of 23 %; it is closely related with the beef and veal sector which accounted for another 15 % of final output in 1994 (see also figure 1).

[4] „Erlös der Milchlieferanten" (AMA 1994, p. 146)

[5] Average milk yield per cow in Austria was 4048 kg (the EU average was 5330 kg) in 1994, reflecting low intensity of production.

livestock sector most supported within Austrian agriculture; in 1993, it claimed 34 % of the Aggregate Measure of Support[6] for agriculture.

Austria introduced individual farm quotas for deliveries well in advance of the EU, in 1978. The quotas resulted in a temporary reduction of deliveries which attained a new peak in 1983. In that year, an upper limit of 30 cows per holding was introduced. A significant reduction of deliveries was achieved in 1987 with a quota buyout scheme and, in 1988, with the introduction of a voluntary supply restraint scheme which was in effect until the end of 1994 and in which more than 30 000 farmers participated annually. Through supply restraint, farmers qualified for higher producer prices (*Galleto* 1995).

Since 1989, individual farm quotas have been tradable subject to a) a loss of 15 % of the quota upon trade and b) regional boundaries[7]. In preparation for accession, in 1994 the upper limit of cows per holding was raised to 75. Farmers were allowed to choose their favored processing firms, and these were allowed to sell nationwide. More importantly, the producer price at the farm level was allowed to vary between farms in accordance with transport costs to the gate of the processing plant; at that location the producer price was still set administratively[8].

The size of the change in producer prices (net of levies) upon joining the EU was much higher than expected (-31 %). The value of delivered milk decreased by 4.0 bill. ATS, and the revenue obtained for it by milk producers by 3.4 bill. over the previous year (see table 1). Taking into account that the voluntary supply restraint was discontinued in 1995, the total loss of milk producers amounted again to 4.0 bill. ATS (32 %).

Table 1

Developments of production and prices in the Austrian dairy sector						
item	unit	1993	1994	1995	change	expected
deliveries	mill. t	2.200	2.206	2.288	+4%	
value	bill. ATS	12.586	12.590	8.565	-32%	
levies	bill. ATS	0.551	0.622	0.025		
net value	bill. ATS	12.035	11.968	8.540	-29%	
price	ATS/t	5.721	5.707	3.744	-34%	
net price	ATS/t	5.470	5.425	3.733	-31%	-26%

In order to allow time for and thereby facilitate the adjustment of farmers to this new situation, the government was authorised to dispense compensation payments during the first four years of membership in degressive installments. For the first year, 1995, their size was supposed to fully compensate the price-induced changes in revenue, but since the price change was higher than anticipated, they amounted to 1.855 bill. ATS and covered barely half of the loss of revenue of milk producers.

I thus conclude - prematurely - that milk producers suffered a loss of 2.1 bill. ATS in 1995 over 1994[9] while at the same time they had to cope with increased production costs for a

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[6] Internal support measured according to GATT rules (*Ortner* 1996).

[7] Both of these limits were abolished by April, 1996.

[8] It was not fixed anymore as processing firms were free to pay up to 4 % less, but that rarely happened because most of them are farmer cooperatives.

[9] i.e. 17.5 % of net revenue received in 1994.

4 % increase of deliveries. However, the possibility to cope with these losses existed, at least for certain types of farmers: a) those who benefitted from reduced prices for feed concentrates, b) those located in disadvantaged regions who qualified for the corresponding supplementary income payments and c) those who volunteered to participate in environmental improvement programs offered under regulation 2078/95 - the Austrian Program for Environmentally Sound Agriculture (APESA). Before looking into these, let us now consider the situation in the dairy processing sector.

3 The dairy industry

Before accession to the EU, not only were producer prices in the dairy sector administered; the bulk of consumer goods prices was administered, too, at least up to the wholesale level. These prices were decreed by the Parity Commission and administered by the Milk Marketing Board, bodies which were under control of the so-called social partners[10]. The system allowed for almost no competition in transport, processing and marketing, and the costs of these services were calculated in a way which resulted in a high level of employment[11] and overcapacity in the dairy processing industry (*Hohenecker* 1995).

Shortly before accession, some of these regulations were relaxed or removed: firms were allowed to buy milk at less than the decreed price, to buy and sell their products everywhere, to introduce new products, to determine more and more prices on their own, and to allocate and invest their incomes freely. Export subsidies were replaced by a GAP-like system of export restitutions, and these restitutions were gradually adjusted and reduced in the direction of EU-levels. As a result of these liberalisation measures, the number of dairy processing firms declined from 184 in 1990 to 117 at the end of 1994. In comparison to other member states, the amount of milk processed per firm was still relatively small (18 800 t per year. Germany in 1991: 72 500. AMA 1995).

Upon accession, the pressure to cut costs and shed employees increased considerably because strong competition from abroad forced firms to lower prices in spite of high production costs. To lower these, an effort to create one strong cooperative firm was launched and failed. The search for viable mergers is still in progress, and two firms are emerging as major players in the market, the larger one commanding a market share of one third of deliveries. The effect of competitive pressures on employment was not yet severe in 1995. Processing firms were obviously able to maintain viability by streamlining production and adjusting the price of milk paid to farmers: raw milk prices decreased to levels prevailing in Bavaria - less transport costs between Austria and Bavaria.

The expectation that Austrian milk might substitute Bavarian milk and dairy products in northern Italy and fetch the same price did not materialize. In addition to high transport and processing costs[12], the following four factors may explain the downward pressure on producer prices: first, the increase in production following the discontinuation of the supply restraint scheme. Second, the increase in supplies of dairy products from EU-member countries at lower prices due to the abolition of import duties. Third, the decrease in export

[10] The social partners are the chambers of agriculture, commerce and labour and the labor union. They held equal shares and had to decide by 4/5 majority (i.e. unanimously).

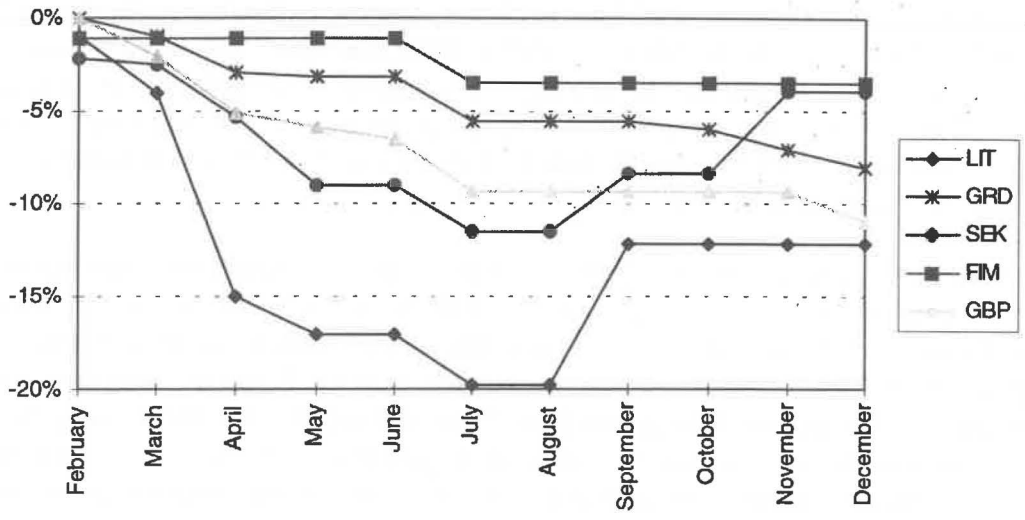
[11] In 1993, the sector employed 6 115 persons, 22.7 % of them in transportation, who handled 2 200 mill. t of milk.

[12] Processing costs in Austria were hypothesised to have been 0.44 ATS/kg milk higher than in Bavaria (*Spitzer* 1996).

subsidies from previous levels which put other EU-producers on an equal standing in third markets where Austrian exports had been strong. And fourth, the devaluation of the Italian LIT relative to the ATS in 1995 diminished export earnings in a market in which Austrian farm products were expected to sell strongly (see figure 1).

Figure 1

Changes in the Green Rate of various currencies (at the start of the respecive months) relative to the Austrian Schilling since January, 1995



4 Retail prices and consumer savings

Savings for consumers were a strong argument in the public debate preceding accession. The government had charged that in the EU retail prices would decrease such that the average Austrian inhabitant would save in excess of 1000 ATS per person per year on consumer goods. I am not in a position to give any details about the szenario according to which this figure was arrived at, and I am reporting it here only to give a benchmark against which to rate my estimate of savings in dairy goods.

The dairy sector should have been a strong contributor to the expected changes in consumer expenditures: the substantial price reduction for its raw product, milk, cut the sectors costs by a huge amount. Deregulation in the domestic market was bound to bring to bear competitive pressures and enforce reduction of processing costs. And the removal of trade barriers with EU member states was bound to do the same for the wholesale and retailing industry. So not only raw milk costs should have been reduced but also processing and marketing margins.

To determine whether this actually happened, I estimated consumer expenditures for dairy products of domestic origin in 1994, using the quantities sold in 1994 and the retail prices which we know from the survey for the consumer price index (see table 2 and for details, table A1 in the annex).

Table 2

Estimated consumer expenditures for dairy products of Austrian origin in 1994 at prices of 1993-1995			
year	expenditures in bill. ATS	change in bill. ATS	change p.c. in ATS
1993	22.689		
1994	22.082	-607	
1995	19.031	-3.051	-380
total		-3.658	-456

Like producer prices, retail prices of dairy products[13] started to decline in 1994 by 2.7 % and by a further 13.8 % in 1995. Most of these price changes can be attributed to EU-accession[14], and they amounted to savings in consumer expenditures of approximately 3.7 bill. ATS or 456 ATS per person (if consumption levels of 1994 had been maintained). Because these savings refer to dairy products of domestic origin only, additional savings can be claimed for imported dairy goods.

Unfortunately, not all foods became cheaper in 1995, and the consumer price index for food and drinks dropped only from 120.0 to 119.3; this amounts to net savings of 1.8 bill. ATS which are due to price changes of food products. Closer inspection reveals that consumer savings of 7.0 bill. ATS obtained from decreased prices of foods - excluding fruits and vegetables - in retail stores. Rising prices for fruits and vegetables, foods away from home and tobacco claimed an increase of consumer expenditures of more than 5 bill. ATS. For certain fruits and vegetables, and for potatoes in particular, we observe that consumer prices increased while producer prices dropped substantially.

5 Dairy processing and marketing margins

Since we know not only consumption but also production levels of the dairy sector, it is easy to estimate the dairy chain's overall revenue, assuming that it sold its consumer goods in Austria and the other EU member countries at the same (retail) prices and that export restitutions covered the price difference for sales to third countries. The basket of dairy goods produced in 1994 was thus estimated[15] to have had a value of 26.3 bill. ATS in 1994[16]. At prices of 1995, the same basket would have sold for 22.8 bill. ATS, or 3.5 less. Comparing this to the cost savings on the acquisition of raw milk (see table 1) which amounted to 4.3 bill. ATS for the quantity processed (delivered) in 1994, I conclude that the processing and marketing sectors for dairy products have been able to increase their revenues by 0.8 bill. ATS[17].

This result is surprising and lends some credence to the claim that the processing and retailing sectors may take undue advantage of cheaper acquisition values of agricultural

[13] Weighted by consumption in 1994

[14] GATT commitments called for a reduction of producer prices net of levies of 11 % from 1993 to 2000 (*Ortner* 1994), but there is no requirement that prices paid by dairies (including levies) have to come down.

[15] Cost estimates were obtained by applying the same procedure as in table A2 for production rather than consumption levels. The data are given in AMA (1994), p. 308. Production differs from consumption only for medium cheese (37 678 t or 9 699 t fat), hard cheese (30 853 t or 10 905 t fat), butter (36 609 tor 30 231 t fat) and total fat (89 439 t).

[16] 22.1 bill. ATS was sold domestically (see table 2).

[17] An additional increase is due to the fact that in 1995 this sector had to handle 4 % more milk delivered by farmers.

products by not decreasing retail prices sufficiently to let consumers benefit from farm price reductions to full extent, at least in the short run. But we shouldn't jump to a conclusion prematurely and, anyway, we are going to return to this question and treat it in a more formal way, with respect to the Austrian meat sectors (*Jumah* 1996). Some arguments can be brought forward to justify the increase in processing and marketing margins and cast some doubt on the evidence given above:

- input costs (of labor, energy, transportation etc.) increased;
- costs of adjustment and restructuring had to be covered;
- the diversity[18] and quality[19] of dairy goods produced in 1995 was higher than in 1994;
- data on producer prices in 1995 are still preliminary, and more exact data will lead to a different result, and certainly to a more reliable one.

Nevertheless, currently available data indicate that the processing and retailing sector was able to generate increased revenues for its services even under the adverse conditions described above.

6 Changes in producer prices

After having screened developments in the Austrian dairy sector which - together with the cereals sector - was affected most seriously by EU accession, I would like to sketch the other sectors more marginally. This I want to do in the context of commenting on the producer price changes that have occurred upon accession and which are shown in table 3.

The cereals sector was - like the dairy sector - heavily administered, and in a similar way: the regulations extended well into the processing level, with the objective to maintain many small mills, scattered around the country, in order to ensure distribution even under martial conditions. Prices were administered at the farm level and, at least for certain varieties of bread, all the way to the retail level. Producer prices were set at levels which induced farmers to grow high quality varieties, for the production of which contracts had to be handed out to farmers in order to keep surplus production and export subsidies in check.

Adoption of EU prices - after these had been lowered close to world market levels prevailing in 1992 - posed a serious problem in itself. An additional problem was that price differentials based on varieties (qualities) and contracts (quotas) were not enforced any more and would be harder to establish and bargain for with buyers. The extent of the drop in producer prices was, more or less, as expected and amounted to 53 % for wheat and 29 % for coarse grains. The lower decrease of the latter occured because the net price of maize had already been decreased by 29 % in 1994 and remained almost unchanged in 1995. The net prices of rye, barley and oats decreased by some 50 %.

Slight producer price changes were also expected for oilseeds, sugar beets, wine and fruits, and they materialised. The extent of the drop of prices for vegetables and potatoes for human consumption was unexpectedly high and amounted to 35 % and 53 %, respectively; potatoes for industrial use also decreased by 53 % (*Schneider* 1996).

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[18] The two dominant retail firms started their own - very successful - brands for „biological" dairy products (using milk from organic farms) and marketed them at higher prices. These additional revenues are not accounted for in the comparison of revenues in 1994 and 1995.

[19] The quality of (say) cheese bought in 1995 may have been different from that bought in 1994.

Table 3

Producer prices (net of levies)					
	1992	1993	1994	1995	1995/1994
commodity	in ATS/kg				change
wheat	3.122	3.238	3.050	1.441	-53%
coarse grains	2.733	2.734	2.388	1.685	-29%
sugar beets	0.684	0.662	0.678	0.616	-9%
oilseeds	1.129	1.640	2.044	1.938	-5%
wine	12.248	13.294	14.422	13.542	-6%
fruits	1.285	1.182	1.120	1.005	-10%
milk deliveries	5.415	5.470	5.425	3.733	-31%
beef and veal	45.274	44.770	46.523	38.489	-17%
pork	26.790	24.479	24.506	19.764	-19%
poultry	21.898	22.493	19.678	13.771	-30%
eggs	19.070	18.890	16.912	13.180	-22%

In the case of **livestock** products, price changes were also remarkable but less than expected, with the exception of milk and poultrymeat. Meat and egg producers could draw some consolation from the fact that they had already been used to price fluctuations and they would benefit from reduced feed prices. On the other hand, limits on the number of animals per farm had inhibited structural change and contributed to the fact that economies of scale could hardly be realized in Austrian agriculture. More importantly, because of these limits and limits on the number of animals per hectare[20], most livestock farmers in Austria also produce feed grains[21] and were thus subject to the changes in cereals prices, instead of benefitting from these changes.

7 Changes in production

This leads us directly to the question of how producers reacted to the - more or less - expected changes in prices and support regimes. This we do not know yet, and production response will only become clear in the following years. In 1995, all we can do is to observe changes in production, keeping in mind that these depend heavily on weather conditions, particularly for industrie crops and to some degree on the state of cycles in the case of livestock products.

Changes in production are given in table 4. The data tell us that 1995 was not the best of years for agricultural production which declined - most notably in the case of fruits, wine and beef. In fact, the whole livestock sector went down. In the case of pork, the cause of the downward movement is a cyclical downturn, and production is forecast to increase by 2 % in 1996. In the case of beef, a further reduction of 4 % is forecast for 1996 (*Handschur* 1996).

Overall, agricultural production declined, and the decline seems to be motivated by reduced profitability, confirming the hypothesis that farmers are responding correctly to economic incentives. Actually, the less than expected decline of the prices for beef and pork may be attributed to supply response in anticipation of lower producer prices. In the case of milk, farmers who had participated in the supply restraint scheme had little choice but to return to

[20] To prevent undue concentration of manure

[21] Maize is frequently used on-farm.

their original levels of deliveries lest they would loose the corresponding quotas - and their values. Future production levels will (in my opinion) critically depend on the success in the consumer market of milk produced by organic farming and similar methods.

Table 4

Production of agricultural commodities in 1991-1995						
	1991	1992	1993	1994	1995	1995/1994
commodity	in 1000 t					change
wheat	1 375	1 325	1 018	1 255	1 301	4%
coarse grains	3 670	2 997	3 188	3 181	3 064	-4%
sugar beets	2 522	2 605	2 994	2 561	2 886	13%
oilseeds	221	287	338	414	360	-13%
wine	309	259	187	265	223	-16%
fruits	4 295	4 561	5 539	4 025	3 114	-23%
milk	3 330	3 287	3 270	3 278	3 148	-4%
beef and veal	256	249	258	235	208	-12%
pork	458	470	485	466	445	-5%
poultry	93	99	102	102	100	-2%
eggs	97	97	98	101	98	-3%

8 Values of agricultural production and final output

As shown in figure 2, the most important sectors of Austrian agriculture in 1994 were milk, cereals, pork and beef, in that order. In 1995, owing to changes in prices and production, the share of the milk and cereal sectors decreased, and the pork, wine and sugar sectors became more important. In particular, as a consequence of the extraordinary decline in cereal prices, the cereal sector dropped to fourth rank and became less important economically than pork and beef. A comparison with the value of feed and waste[22] in figure 2 reveals that a considerable fraction of cereals production is used for feed in Austria[23].

Subtracting feed and waste[24] from production, we get final output of agriculture as given in table 5. Note that the value of this output (in total) had been quite stable over recent years but decreased by 16.1 bill. ATS or 25 % in 1995. According to my own calculations[25], using more recent data, the decline may even have been slightly bigger.

At this point it should be mentioned that the forestry sector was hardly affected at all by EU accession. This statement is relevant because in Austria 71 % of all farmers operate some forests and 49 % of the forests belong to farmers[26]. Taking into account, furthermore, that the forestry area is almost (93 %) as large as the agricultural area[27], we find that the average farmer runs a forestry enterprise on almost a third of his land, and it is not sufficiently clear how he allocates labor, machinery and other inputs between the two enterprises.

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[22] Calculated for wheat, coarse grains (including rye), milk and fruits, using prices for feed quality net of levies.

[23] Final production = value of production - value of feed and waste

[24] Intermediate consumption within the agricultural sector.

[25] See line „sum" in table 5.

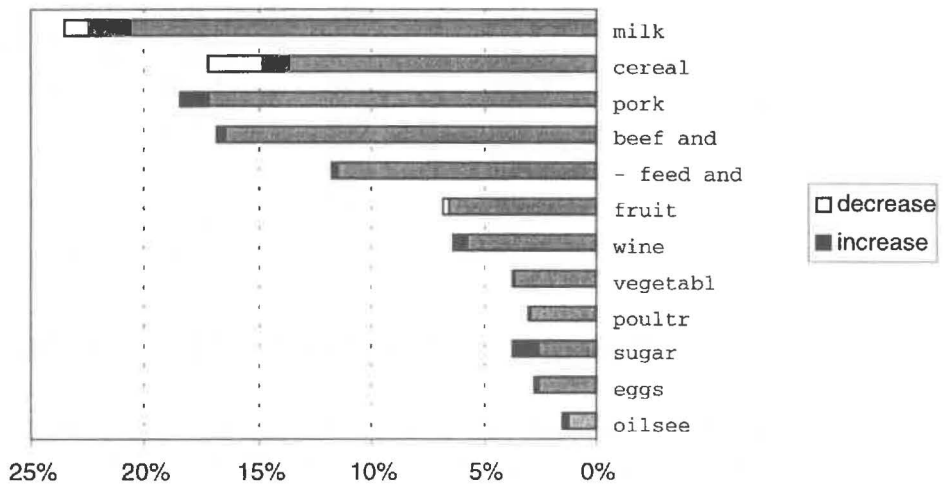
[26] More precisely, to firms with less than 200 ha of land (in 1990) (ÖSTAT 1993).

[27] 3 482 mill. ha (excluding alpine pastures whose size was 24 % of the agricultural area in 1990) (ÖSTAT 1994).

For this reason I will continue our traditional practice to consider agriculture and forestry in combination. According to *Schneider* (1996), final output of agriculture and forestry decreased by 16.0 bill. ATS, and its GDP[28] dropped from 50.5 to 35.5 bill. ATS in 1995. Since these developments had been anticipated (*Schneider* 1994), farmers would not have voted in favor of EU accession had there not been compensating measures in terms of subsidies and government-financed programs - temporary and more permanent. Let us take a look at the latter first.

Figure 2

Value of production in % of the value of final output of Austrian agriculture in 1994 and 1995



Before accession to the EU, mountain farms were classified individually into four groups of hardship defined by climatic conditions, accessibility and steepness of slopes. In 1989, 36 % of the farms in Austria were mountain farms and eligible to receive supplementary income payments. Mountain farms were home to 58 % of the cattle herd, 61 % of the dairy cow herd, 86 % of the suckler cow herd, 62 % of the sheep herd and 11 % of the pig herd.

The amount of income support depended on the level of hardship and decreased with the size of the farm (estimated in terms of area and its fertility). The area component of support depended also on the level of hardship and was proportional to the number of hectares in agricultural use minus two; a maximum of 10 hectares qualified for support.

Income support to farmers in mountainous and disadvantaged regions has changed considerably under the CAP: only the size component is available, and since there is no size limit, most mountain farmers are better off. More farms became eligible because of their location in a disadvantaged area, and the overall amount of support increased substantially from 1.8 (in 1994) to approximately 2.9 bill. ATS[29] (in 1995). This support, however, is less clearly targeted toward farms in need; it is not biased in favor of small farms, as it previously was; it is now more correlated with the services rendered by mountain farmers in the spatial dimension and less with the objectives alluded to by the claim of a „social market economy".

[28] gross domestic product = final output - purchased inputs
[29] of which 0.6 bill. ATS from the EU

Table 5

Value of final output in bill. ATS					
commodity	1991	1992	1993	1994	1995
wheat	2.811	**3.031**	2.658	2.828	1.331
coarse grains	**3.532**	3.043	2.537	2.820	1.558
sugar beets	1.834	1.783	**1.980**	1.737	1.777
oilseeds	0.294	0.324	0.555	0.846	0.697
wine	**3.842**	3.170	2.480	3.817	3.018
fruits	4.750	4.830	**5.417**	3.703	2.426
vegetables	1.532	1.864	2.181	**2.424**	1.770
milk	14.003	14.372	**14.564**	14.558	9.933
beef and veal	**12.116**	11.260	11.553	10.932	7.999
pork	12.220	**12.581**	11.871	11.417	8.788
poultry	2.089	2.158	**2.284**	2.005	1.377
eggs	**1.915**	1.853	1.859	1.711	1.292
sum	***60.937***	*60.268*	*59.940*	*58.799*	***41.967***
others and statist.	6.042	4.007	3.751	6.098	6.861
total agriculture	***66.979***	*64.275*	*63.691*	*64.897*	***48.828***
forestry	11.496	11.774	9.889	**12.629**	12.751
agriculture and forestry	***78.475***	*76.049*	*73.580*	*77.526*	***61.579***

note: italics indicate the maximum in recent years.
sources: own calculations; *Schneider* (1996)

10 The Austrian program for environmentally sound agriculture

While farmers in disadvantaged regions are getting supplementary income payments which are not directly related to services, the Austrian Program for Environmentally Sound Agriculture (APESA) offers payments for specific activities which farmers may undertake, and specific production processes which farmers may subscribe to. Rather than going into details, I would like to refer you to the paper in this volume by Ms. *Neunteufel*. In the context of income accounting, however, some general remarks are necessary.

The participation rate in this voluntary program was considerably higher than expected: 170 000 farmers qualified for elementary support and almost 16 000 farmers qualified for support for organic farming practices[30]. Extraordinary problems arose because more money was required for this program than had been budgeted, exacerbated by the fact that the EU's contribution was fixed beforehand.

Payments under this program in 1995 amounted to 7.3 bill. ATS; since some of these measures were already granted before accession to the EU (see table 8) and are now integrated into this program, the additional revenue provided amounts to 6.0 bill. ATS. These payments are a remuneration for the efforts undertaken to meet the conditions specified under the various measures of the program and a compensation for additional costs which may involve the use of machinery, energy and other farm inputs, and labor. Still, additional costs - relative to the previously employed (market price) support system - may be small

[30] The number of farms (including forestry enterprises) in Austria in 1990 (the latest survey for which data are available) was 273 210.

because farmers can and should devote less effort to production activities whose remuneration declined[31].

11 Changes in subsidies for agriculture

Three major items account for the bulk of subsidies during the accession period (see table 6):

- crop and livestock payments according to the CAP reform of 1992,
- degressive compensation payments and
- payments under the Austrian Program for Environmentally Sound Agriculture (APESA).

A major difference between the APESA and the other two exists because the farmer pays for services which would not be provided in the absence of these payments - at least not to the same extent. APESA payments measure the value of environmental services produced by agricultural firms; they are thus proportional to the quantity of production of these services. In the national accounts, nevertheless, they still appear to be subsidies[32] which - by definition - are payments with no strings attached. Anyway, these payments add to farmers' revenue.

Crop and livestock payments compensate the loss of revenue incurred by reductions of producer prices in the wake of CAP reform in 1992; they amounted to 6.04 bill. ATS[33]. Similar payments were granted to compensate the gap between producer prices in Austria in 1994 and the comparable institutional prices in the EU in 1995; they amounted to 7.09 bill. ATS and are expected to decrease to 60, 40, 15 and 0 % in 1996 through 1999. Other transitory payments include a premium for the revaluation of the ATS in 1995 and premiums for rooting out permanent crops (0.2 and 0.1 bill. ATS, respectively).

Table 6

Subsidies for agriculture in Austria in bill. ATS			
item	1994	1995	*change*
supplementary income payments	2.079	2.889	
environmental payments	1.381	7.329	
temporary compensation payments	-	7.087	
CAP and other payments	6.367	6.419	
total	9.827	23.724	*13.897*
minus indirect taxes	1.425	1.509	*0.084*
net subsidies	8.402	22.215	***13.813***
source: AMA (1996), ÖSTAT (1995), *Schneider* (1996), own calculations			

The slight increase in indirect taxes hides important structural changes, namely the fact that the fertilizer tax was abolished. Nevertheless there was an increase due to a considerable loss of revenue from value added tax of those farmers whose income is not determined by accounting but by the rules of the taxation authorities.

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[31] Farmers who enroll in the program can be expected to provide the corresponding services at costs equal to or lower than the remuneration offered to them. To the extent that costs are lower, the program will dispense producer surplus and enhance income.

[32] Compare the services of the government which are accounted for as output rather than subsidies.

[33] AMA (April 24, 1996)

Summarizing, we observe that the reduction of GDP of agriculture and forestry (15.0 bill. ATS) was not entirely compensated for by increased subsidies and other sources of revenue provided through agricultural policy measures in 1995. The gap, however, was small, and farmers could hope to be beneficiaries of programs of a more general nature to which we now turn.

12 Structural support

Regional disparities within Austria are substantial. Vienna is the richest NUTS II region and scored 153 % of the EU average in 1989-91, while Burgenland, the easternmost state, scored 67 % and was thus recognized as an objective 1 region. 77 % of the land in Austria are mountainous (compared to 28 % in the EU-12), and 42 % of the population live in mountainous areas.

Table 7

Distribution of regional support*	
disadvantaged areas	% of population
objective 1	3.5
objective 2	8.2
objective 5b	29.2
total	40.9

* from the EU Structural Funds for the 1994-1999 programming period

source: *Mayerhofer* (1996)

40.9 % of the population qualifies for support from EU structural funds (see table 6). A minor conflict arises from the fact that areas designated as assisted areas according to EU competition law cover only 35.16 % of the population, and only 34 % are covered by both definitions (*Mayerhofer* 1996). Although this support is not directly aimed at farmers, they may benefit from it, either directly or indirectly.

Table 8

Financial commitments to common structural support in Austria, 1995-1999 programming period, at 1995 prices			
objectives	EU support mill. ECU	% share	overall mill. ECU
objective 1	165.6	10.2	452.7
objective 2	101.4	6.2	290.8
objective 5b	411.0	25.3	1.097.1
regional objectives	*678.0*	*41.8*	*1.840.6*
objectives 3 and 4	395.0	24.3	
oobjective 5a	388.0	23.9	
community initiatives	146.1	9.0	
total	1.623.0	100.0	

source: *Mayerhofer* (1996)

The funds available for spatial objectives are several times more than those previously deployed, and the share deployed on rural areas (objectives 1 and 5b) increased from 63.5

to 85.0 %. Taking also into account the considerable funds designated for objective 5a[34], the new system is weighted far more heavily towards the development of rural areas and restructuring of agriculture and food industries (see table 8).

13 Conclusions

The first year of membership in the EU has been tough on agriculture, food processing enterprises and public services in Austria. New rules had to be formulated, introduced and communicated, new procedures had to be adopted and new forms had to be filed and processed. Hindering regulations had to be replaced by more flexible and voluntary arrangements, and fierce competition had to be met. I would conclude that these formidable challenges were dealt with surprisingly well.

With regard to final output of agriculture, prices dropped considerably and most quantities too, to the effect that the value of final output decreased by some 25 %. The revaluation of agricultural products and the much enhanced reliance on public sector support is something farmers will have to digest. Part of that support is a remuneration for additional services provided under the Austrian Program for Environmentally Sound Agriculture, covering additional costs and to that extent not available to replace lost revenue; other parts are transitory and going to cease in 1999.

But even if we disregard additional costs, the increase in the net amount of government support to agriculture in 1995 was less than 14 bill. ATS (table 6) and thus insufficient to replace the loss of revenue which was in the range of 16 to 17 bill. ATS (table 5). Still the gap in 1995 is tolerable and not out of the range of the changes observed in recent years[35]. However, the decrease in revenue is going to continue: temporary compensation payments will be phased out over the next three years, and this reduction of 7 bill. ATS is not likely to be replaced by additional funds for APESA[36].

The bulk of adjustment is still pending. For farmers and processors alike, it will involve (as it already has) the reduction of costs on the purchase of inputs and investments, technical progress, market orientation and cooperation. It will also require farmers to economise and diversify their use of labor even further[37].

14 References and sources

Agrarmarkt Austria (AMA):

Daten zur Förderungsabwicklung für das Jahr 1995. Stand vom 20. März und 24. April 1996. Wien 1996.

Tätigkeitsbericht für Milch 1994. Wien 1995.

Bundesministerium für Land- und Forstwirtschaft (BMLF):

Ein Jahr EU - Jahresbericht 1995. Abteilung Öffentlichkeitsarbeit. Wien 1996.

Bericht über die Lage der österreichischen Landwirtschaft 1994. Wien 1995.

[34] Adjustment of agricultural production, processing and marketing structures

[35] Income from farming dropped from 38.2 to 33.4 bill. ATS in 1993 before it climbed to 39.1 in 1994.

[36] The national share of APESA payments is already high with 69 %.

[37] Only 30 % of farm (including forestry) enterprises were run by full-time farmers in 1990 (ÖSTAT 1992).

ALFIS (Allgemeines land- und forstwirtschaftliches Informationssystem - on-line data bank).

Galleto, L.:

Il premio per la riduzione della produzione nell'ambito della politica del settore lattiero-caseario in Austria. In: *Rivista di politica agraria* 13 (1995) 4.

Handschur, P.:

Vorschau auf den Rindermarkt. Vorschau auf den Schweinemarkt. In: *Monatsberichte über die österreichische Landwirtschaft* 2/1996, p. 77-89.

Hohenecker, J.:

Sektorplan Milch. In: *Agrarische Rundschau* 6/1995, 28-34.

Jumah, A.:

Market structure, marketing margins and EU-membership: Evidence from the Austrian meat sector. Paper presented at the 264 NJF-seminar on 6-8 June 1996, in Alnarp (S).

Kalm, E.:

Rahmenbedingungen und Entwicklungstendenzen der Milchproduktion in Europa. In: *Betriebswirtschaftliche Mitteilungen der Landwirtschaftskammer Schleswig-Holstein* 490, 1/1996, 21-31).

Mayerhofer, P.:

Austrian regional aid and European cohesion policy. *Austrian Economic Quaterly* 1/1996, 35-44

Neunteufel, M.:

Environmental aspects of EU-integration of Austrian agriculture. Paper presented at the 264 NJF-seminar on 6-8 June 1996, in Alnarp (S).

OECD:

Agricultural policies, markets and trade in OECD countries. Monitoring and outlook 1995. Paris 1995.

Ortner, K. M.:

Internationale Stützungsmaße für die Landwirtschaft: PSE und AMS. In: *Monatsberichte über die Österreichische Landwirtschaft* 43 (1996) 6, 370-376.

Umsetzung der GATT-Verpflichtungen in der Landwirtschaft. Bundesanstalt für Agrarwirtschaft, *unpublished*, Wien 1994.

GATT-Verpflichtungen für die Landwirtschaft. In: *Der Förderungsdienst* 42 (1994) 3, 75-80; 42/4, 113-117; und 42/5, 145-152.

Die österreichischen Agrarproduktenmärkte im internationalen Vergleich. In: BMLF, *Internationalisierung und ihre Folgen für die Landwirtschaft*, Sonderausgabe der Zeitschrift „Der Förderungsdienst", Wien 1992, 24-40.

An outline of the milk quota policy in Austria. In: *Kettunen, L.* (ed.), Supply management by government in agriculture. Vauk, Kiel 1987, 69-75.

Österreichisches Statistisches Zentralamt (ÖSTAT):

Erzeugerpreisstatistik. Wien (monthly)

ISIS (Integriertes statistisches Informationssystem)

Land- und forstwirtschaftliche Betriebszählung 1990. Hauptergebnisse Österreich. Teil Landwirtschaft. Beiträge zur österreichischen Statistik 1.060/10, Wien 1992.

Land- und forstwirtschaftliche Betriebszählung 1990. Hauptergebnisse Österreich. Teil Forstwirtschaft. Beiträge zur österreichischen Statistik 1.060/11, Wien 1993.

Land- und forstwirtschaftliches Volkseinkommen 1994. Wien 1995.

Schneider, M.:

Entwicklung der Land- und Forstwirtschaft 1995/96. *WIFO Lectures.* Österreichisches Institut für Wirtschaftsforschung, Wien 1996.

Folgen der EU-Integration für die Land- und Forstwirtschaft. Österreichisches Institut für Wirtschaftsforschung, Wien 1994.

Spitzer, M.:

Zukunft der österreichischen Milchwirtschaft nach dem Beitritt zur Europäischen Union - Ergebnis einer Delphi-Studie. Diplomarbeit an der Universität für Bodenkultur, Wien 14.2.1996.

15 Annex

Table A1

Retail prices of dairy products in Austria, 1993-1995

	consumption*	retail prices in ATS/kg		
commodity	1994	1993	1994	1995
buttermilk	*14.211*	*14.92*	*14.44*	*14.26*
yoghurt with fruits	*40.735*	*34.00*	*33.72*	*32.33*
milk drinks	54.946	29.07	28.74	27.66
milk		11.60	10.90	9.80
sour cream		44.80	42.80	32.76
cream		80.40	74.80	41.60
evaporated milk		48.60	46.00	36.00
curd		44.80	44.40	39.88
medium cheese		119.65	121.29	110.22
hard cheese		143.75	143.62	126.13
butter		86.00	84.80	69.60

* in 1000 t
source: ÖSTAT (ISIS), AMA (1994, p. 182), *own calculations*

Table A2

Estimation of the effect of price changes in 1994 and 1995 on consumer expenditures for dairy products in Austria					
commodity	consumption (1000 t) product fat		consumer expenditures (bill. ATS)		
	1994		1993	1994	1995
milk drinks	122.770	5.110	3.568	3.528	3.396
milk	444.629	14.910	5.158	4.846	4.357
sour cream	20.949	3.412	0.939	0.897	0.686
cream	21.552	7.755	1.733	1.612	0.897
evaporated milk	17.635	1.225	0.857	0.811	0.635
curd	20.505	0.749	0.919	0.910	0.818
medium cheese	**29.237**	**7.526**	3.498	3.546	3.223
hard cheese	**10.098**	**3.569**	1.452	1.450	1.274
butter	**33.063**	**27.773**	2.843	2.804	2.301
sum	*720.438*	*72.029*	*20.966*	*20.405*	*17.586*
total		77.948	22.689	22.082	19.031
change in expenditures				-0.607	-3.051
change over 1993					-3.658
population (1000)	8 029.7				
change in expenditures per capita (ATS)					-380
change over 1993 (ATS)					-456
sources: AMA (1994), p. 309; OSTAT, Statistische Übersichten 2/1996; own calculations					

Environmental aspects of EU-integration of Austrian agriculture

Marta G. Neunteufel [1]

1 Introduction

As the time elapsed since Austria joined the EU is rather short, the analysis of environmental consequences cannot cover changes by environmental state indicators which show effects of policy changes only with longer time lags. Instead, the investigation has to be restricted to changes in pressure and response indicators of the main environmental issues. These indicators, however, can give some information about which environmental concerns we can expect to change in positive or in negative direction, and in which areas further policy measures have to be taken to improve environmental standards. Accordingly, the structure of this study is as follows: firstly, factual changes and policy measures with relevant environmental impacts are examined, followed by some pressure indicators which could be computed on the basis of data available by 1.4.1996. Secondly, some aspects of the development in biological agriculture are discussed in some detail. A summary of relevant findings completes the study.

2 The facts

The following changes - due to the EU-membership - influence the environmental situation of Austrian agriculture crucially:

- significant price changes of agricultural products and input factors,
- some changes in the legal regulation of imports of agrochemicals,
- the increase of limits on animal stocks, and
- the introduction of a new incentive system for the promotion of environmental objectives.

The environmental effects of modified relative prices and their interconnection with the new incentive system cannot be fully assessed yet, as the price changes which are in some cases dramatic are counterbalanced by transitory degressive support payments. Whether the general trend of the last twenty years - when the share of intensively used arable land increased from 64.7 % to 68.1 % (*Gerhold*, 1995) - will change due to set-a-side supports, cannot be seen yet. There are some hints, however, as it will be shown later in more detail - that in regions, where intensive grain production (mainly maize) is prevailing and linked to intensive animal husbandry (mainly pigs and poultry), the pressure on groundwater quality is still continuing.

Unfortunately, data about actual fertiliser and pesticide application in Austria are not available. Although data about fertiliser sales show a continuos decline between 1990 and 1994 (by about 15 %), the actual application might have declined less because direct imports from the former centrally planned economies and from Germany might have increased. Not only the price differences but also the change of legal regulation of fertiliser imports have enhanced this development: now, there is an obligation to report imports instead of the

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earlier obligation to obtain permission. The fertiliser application in 1995 was also influenced by the abolition of fertiliser levies at the end of 1994, which resulted in a price reduction of about 28 %.

Pesticide sales - similarly to the fertiliser sales - have decreased between 1991 and 1994 (by about 20 % of a.i.). Due to the EU-membership pesticide prices declined at a rate of 9.2 % from 1994 to 1995 but are still slightly higher (by 2.85 % in fall 1995, according to data by the chemical industry) than in Germany. From the environmental point of view the prohibition of atracin as of 1.1.94 was an important step. This was accompanied by the strong reduction of the atracin-threshold in drinking-water, which is 0.1 mg/l since the July 1, 1995. Whether the strong pesticide regulation system can be maintained is the subject of some legal disputes. Although sales figures for 1995 are not available yet, neither for fertilisers nor for pesticides, one can assume that the price decreases will result in increased application rates.

The analysis of environmental effects of agrochemicals is enormously handicapped by the poor data availability. This is even more serious, for 46 % of N-emissions and 24 % of Ph-emissions in Austrian groundwater originate from agricultural sources. (*Tomek*, 1995). Regional data - at least from endangered regions, where the NO_3-content of groundwater exceeds the present threshold of 45mg/l - could help to elaborate targeted policy measures. At present, one could only compute some indirect tentative indicators from the crop production and animal husbandry data for the land use intensity. These are certainly not precise enough to show actual effects on water quality.

To enhance Austrian farmers' competitiveness within the EU, limits on animal stocks were increased by 2.5 times in July 1994. The following data indicate present limits: 1.000 fattened pigs, 125 breeding sows, 325 fattened calves, 75 cows, 250 male fattened cattle and 55 000 fattened chicken. The limit of 3.5 LU/ha, which can be held without permission is still valid. The environmental effects of this regulation can only be assessed when the complete data set of the animal stock statistics of 1995 will be available. At present only some tentative statements - according to a rough regional disaggregation - are possible.

Table 1 (next page) shows the list of various support measures and the corresponding amounts paid to farmers according to the new incentive system introduced 1995 for the promotion of environmental objectives.

The objectives of the incentive system ÖPUL[2] (**Ö**sterreichisches **P**rogramm zur Förderung einer **u**mweltgerechten, extensiven und den natürlichen Lebensraum schützenden **L**andwirtschaft) can be grouped as follows: extensification of production, support of biological respectively integrated production methods, prevention of erosion, stabilisation of crop rotation patterns, maintenance of ecologically sensitive areas and maintenance of biodiversity. The amount of supports paid for all these objectives reached 7308 millions ATS in 1995 (according to the preliminary data of 18.3.96) which was slightly more than a quarter of Austrian agrarian budget of that year.

Although the analysis of the structure and acceptance of the incentive system is not the subject of this study, some general remarks and data are necessary to create an overall picture.

[2] Called APESA (Austrian Program for Environmentally Sound Agriculture) in the previous paper

The vast bulk of support, altogether 38.6 %, was paid for the measures 'elementary support' and for 'stabilisation of crop rotation patterns', measures with general conditions which are relatively easy to fulfil. Accordingly, the majority of farms (64.9 % and 31.4 %, respectively) were able to qualify for these, with areas including 92.3 % and 64.5 % respectively. The acceptance of different other measures with more specific conditions was quite heterogeneous, both according to their volume and to their regional distribution. It is a positive development that almost 10 % of the support was received by farms engaged in biodynamic cultivation and nearly 9 % by farmers renouncing yield-increasing inputs on their whole farm. An almost equally high amount, 8.3 % was paid to farms participating in the measure 'mowing of steep slopes and upland meadows'.

A somewhat different picture about the relevance of different measures can be created if one looks at the areas covered by them. Figure 1 shows the participation in ÖPUL-measures characterised by the included area shares.

Table 1

Distribution of ÖPUL-measures 1995 (preliminary)

Nr.	measure	rank	total, ATS	percent
1	elementary supports	1	1 542 035 358	21.1
2	biodynamic cultivation	3	659 577 493	9.0
3	renunciation of yield-increasing inputs on the whole farm	4	650 195 332	8.9
4	integrated fruit culture	13	71 426 089	1.0
5	integrated viniculture	8	340 076 046	4.7
6	integrated floriculture	22	2 391 978	0.0
7	extensive grassland farming in traditional areas	10	264 299 855	3.6
8	stabilisation of crop rotation patterns	2	1 282 161 416	17.5
9	extensive cereal cropping	6	598 085 597	8.2
10	renunciation of certain yield-increasing inputs on arable areas	9	321 792 321	4.4
11	renunciation of fertilisers and pesticides on grassland areas	7	439 511 993	6.0
12	restraints on cutting terms of hay meadows	16	12 396 004	0.2
13	protection against erosion in fruit cultures	17	9 159 525	0.1
14	protection against erosion in vinicultures	18	7 332 339	0.1
15	protection against erosion in arable farming	24	550 240	0.0
16	raising endangered animal species	15	21 592 900	0.3
17	mowing of steep slopes and upland meadows	5	605 461 199	8.3
18	premium for alpine farming and shepherding	11	261 114 259	3.6
19	maintenance of areas with ecological values	12	141 442 351	1.9
20	cultivation of endangered crop plants	25	73 960	0.0
21	maintenance of abandoned forest areas	21	2 661 440	0.0
22	20-years set-a-side of areas for biotopes	23	1 112 833	0.0
23	allotment of areas for ecological objectives	20	3 029 611	0.0
24	allotment of areas for ecological objectives under set-a-side	19	5 513 385	0.1
25	subsidies for controls on biological farms	14	65 729 180	0.9
	total		7 308 722 703	100.0

source: LFRZ 03/96

As one can expect, the measures 'elementary support' and 'stabilisation of crop rotation patterns' exhibit high rankings according to the area shares included. The high participation in the measures 'integrated fruit cultures' and 'integrated viniculture' is quite remarkable, with 51.9 % and 72.8 % of the corresponding areas, respectively. In addition, protection against

erosion in fruit cultures covered 31 % of the corresponding areas. The striking difference between the ranking of the measure 'biodynamic cultivation' according to the amount received by farmers and according to the area share covered by it can be partly explained by the regional distribution of biological farming in Austria, a topic which will be discussed later in more detail.

Figure 1

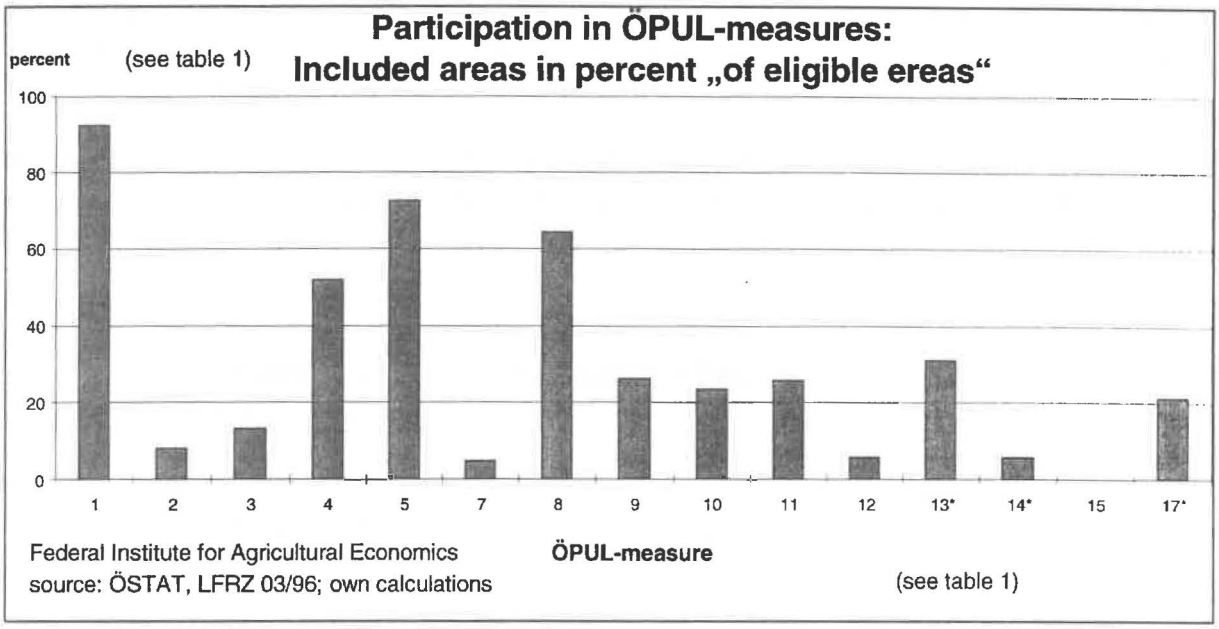


Table 2

Regional distribution of ÖPUL-supports by provinces in 1995										
province	BU	CA	LA	UA	SA	ST	TY	VO	VIE	A
% of total supports	6.92	7.10	36.22	18.39	7.16	13.39	8.02	2.57	0.22	100
1000 ATS/ ha agric.area	2.496	1.483	2.676	2.294	1.601	1.872	1.264	1.469	1.853	2.043

source: ÖSTAT, LFRZ 03/96, own calculations
legend: the Austrian provinces are Burgenland, Carinthia, Lower Austria, Upper Austria, Salzburg, Styria, Tyrol, Vorarlberg and Vienna. They are represented by the first two or three characters of their names. The last column 'A' refers to the whole country. These abbreviations are used throughout in the study.

The regional distribution of ÖPUL-supports (as shown in table 2.) resulted from the different acceptance of the measures according to the regionally specific production structures.

The regional distribution of the acceptance of different ÖPUL-measures could not be analysed in necessary precision yet, however, such analyses will provide ample information about how the further development of ecological supporting measures should be targeted to guide regional policies.

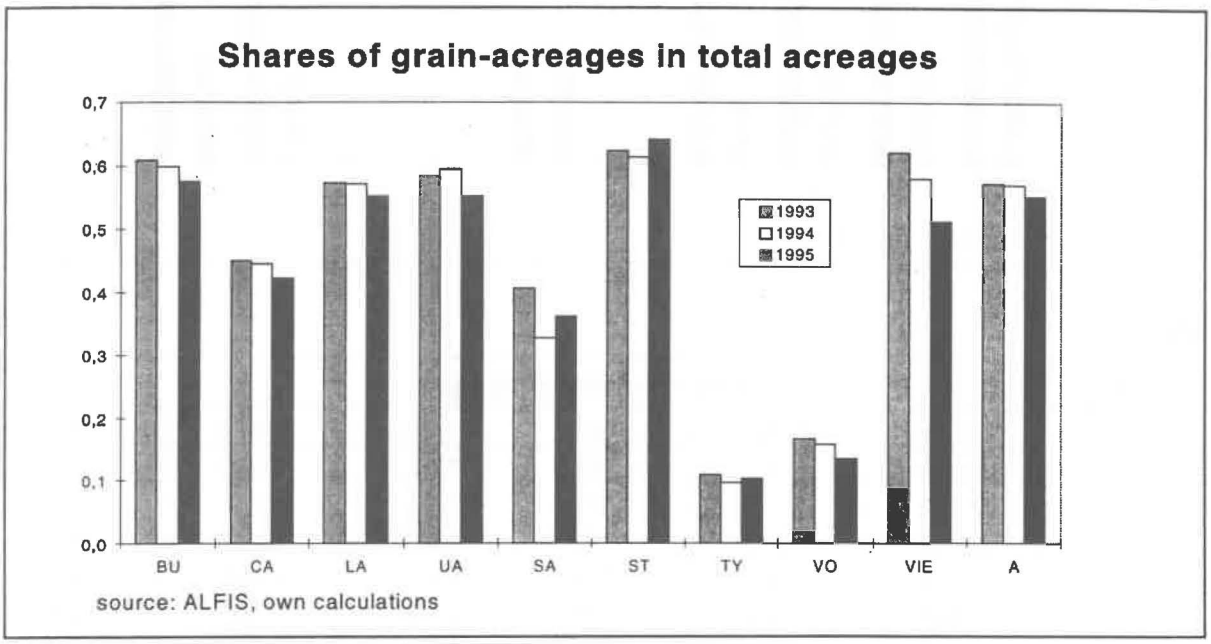
3 Pressure indicators

As already mentioned in the introduction, environmental consequences of price changes due to Austria's EU-membership cannot be assessed yet. The analysis of past trends - if they are

continuing or if there were some relevant changes in them - can give some information about how the situation has changed. Of course, strict causality between eventual changes in trends and the fact of EU-membership is not identifiable. What is important from the environmental point of view is, however, in which direction the development has changed, when further actions will be required.

As a consequence of Austria's efforts to extensify agricultural production and reduce surplus production of grains, land use pattern has changed in the period 1993-1995 as shown in Figures 2a and 2b.

Figure 2a



As the figure shows, the reduction of grain acreage shares is pervasive: with the only exception of Styria this share was smaller in 1995 than in 1993. This tendency is true for the absolute size of grain acreages as well; they decreased by 3 % from 1993 to 1995.

In the same period, as shown in figure 2b, the share of set-a-side areas increased remarkably in most of the provinces, especially in the last year. Again, from the main grain-producing areas of Austria, Styria is the only exception, where fallow areas (at least the supported ones, about which we have data) have even been reduced. Thus we can conclude that these data indicate some extensification in land use for most provinces but not for Styria.

The reduction of grain-acreages, however, was quite heterogeneous for different grains. Acreages of barley, rye and oats were reduced by more than those of wheat and maize. The shares of wheat and maize acreages in total grain acreages have grown by 3 % and by 1 % resp. between 1993 and 1995.

These changes in the composition of grain production are accompanied by shifts in the regional distribution as well. There seems to be a tendency to regional concentration of wheat and maize production during the last three years as shown by their growth rates in figures 3a and 3b for the main grain producing provinces. (The acreages of 1993 are taken as 100 %.)

Figure 2b

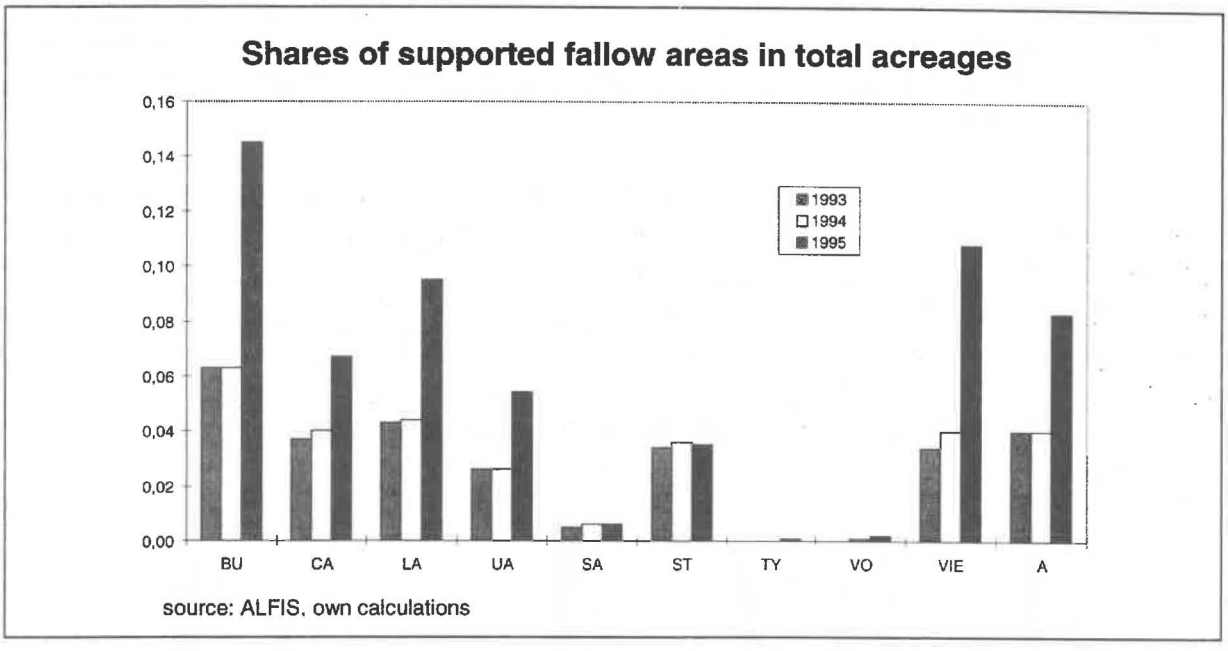


Table 3

Indices of grain acreages						
year	wheat	barley	rye	oats	maize	total
1990	1.000	1.000	1.000	1.000	1.000	1.000
1991	0.974	1.015	0.914	0.985	0.936	0.974
1992	0.883	0.940	0.743	0.883	0.871	0.885
1993	0.866	0.907	0.792	0.853	0.858	0.869
1994	0.866	0.864	0.828	0.797	0.906	0.866
1995	0.920	0.783	0.826	0.658	0.875	0.840
source: ALFIS						

The increase in wheat acreages in Austria is due to the expansions in Burgenland and Lower Austria, where 75 % of total wheat acreages were concentrated in 1995, 1 % more than in 1993. The development of maize acreages is just the opposite to this: while the total area of maize cultivation decreased from 1994 to 1995 and was just 2 % higher than in 1993, acreage reductions took place in all maize producing regions, with the only exception of Styria. The shifts in the structure of grain production resulted in the fact, that Styria's share in the grain acreages is growing (12.6 % in 1995), and especially maize production is further concentrating in this province (37.1 % of total maize acreages in 1995).

We have to pay attention to this development if ground water quality should be improved - which is a continuing task in several districts of the grain-producing provinces. Since actual fertiliser application data are not available, data about cereal production have to be used as indicators for existing pressures on ground water quality. When more regionally disaggregated data will be available, they must be analysed carefully from this aspect.

Similarly, the concentration of grain production to wheat and maize might have adverse effects on landscape amenity and on biodiversity, especially if diversification of varieties should have been impoverished, an issue which needs further investigation.

Figure 3a

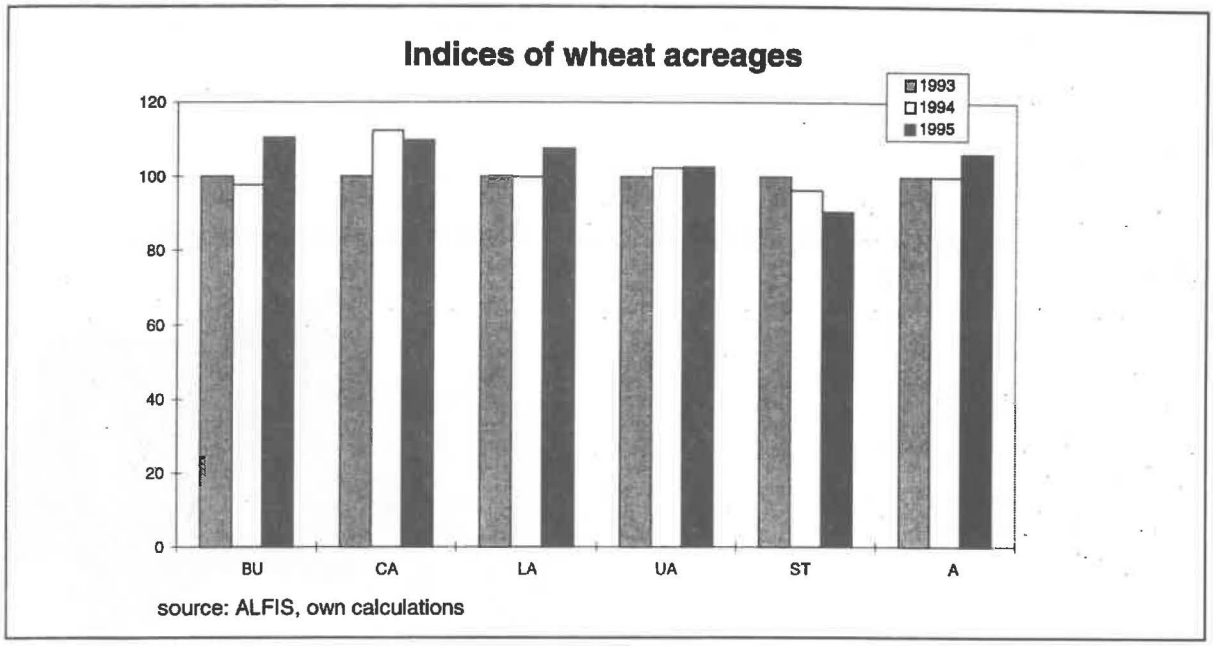
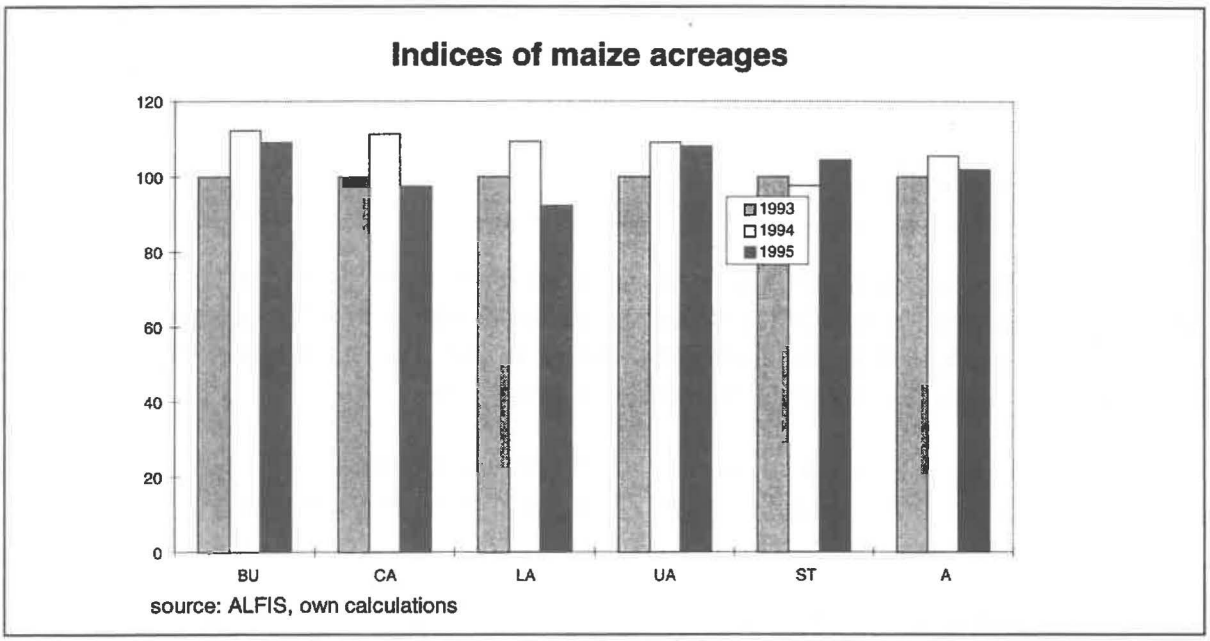


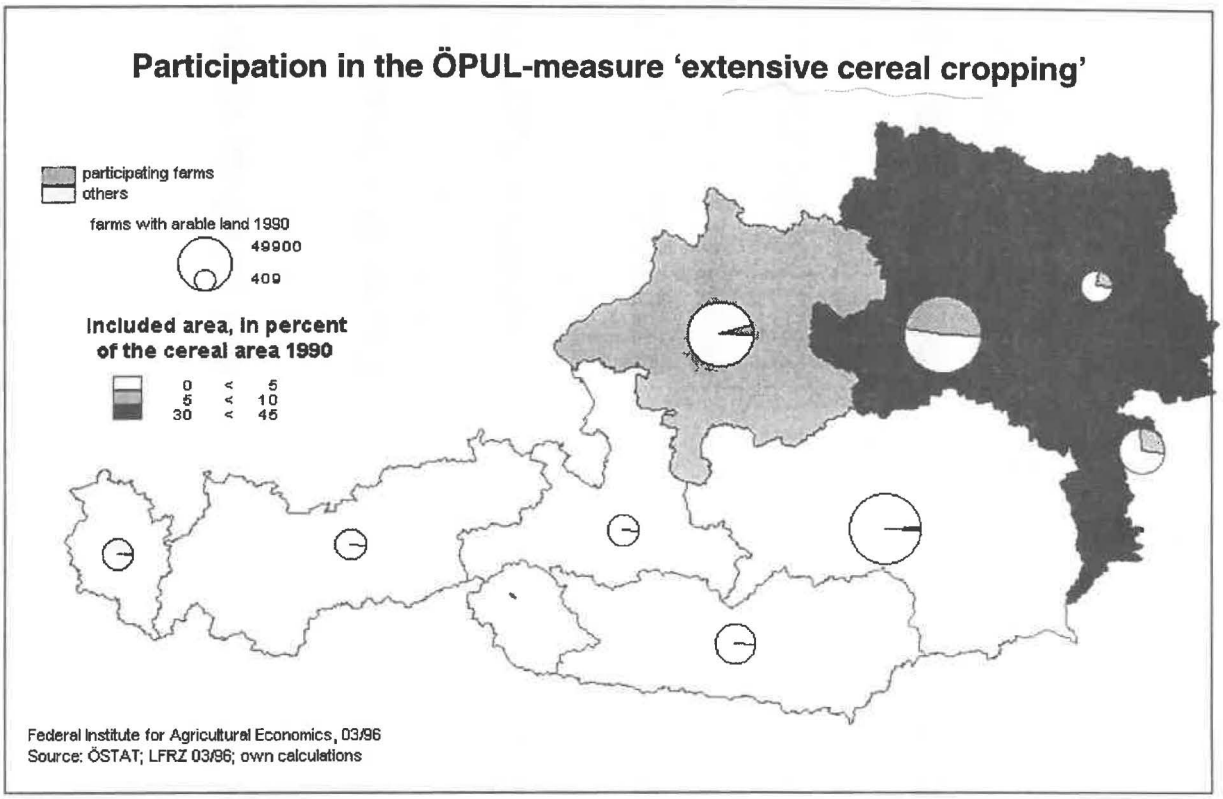
Figure 3b



This development of grain acreages cannot be explained by changes in their price relations: although the prices of wheat, barley and oats fell from 1994 by about 50 % in 1995, the price of the maize stayed practically the same. The changes of wheat and maize acreages were surprisingly just opposite to the price movements. The only exception was, as already mentioned, Styria where acreages of wheat decreased while those of maize increased. One can assume therefore, that the price reactions of producers were extremely strongly influenced by the support system. As a matter of fact, the participation of farmers in the two highly accepted ÖPUL-measures 'elementary supports' and 'stabilisation of crop rotation patterns' was in above the Austrian average in Burgenland, Lower Austria and Upper Austria. Carinthian farmers accepted both measures at the average level, while in Styria 'elementary supports' were accepted at the average level, but 'stabilisation of crop rotation

pattern' was accepted by only about 10 % of farmers, which lies well below the Austrian average. The ÖPUL-measure 'extensive cereal cropping' - as shown in figure 4 - was excepted above the Austrian average only in Burgenland and Lower Austria, while in two of the main grain producing regions, in Styria and Carinthia, the acceptance was very low.

Figure 4



This development will have to be analysed in more detail when both acreage data and data about the acceptance of the ÖPUL-measures will be available at a disaggregated level, e.g. according to political districts, since all regions where the NO_3-content of groundwater exceeds the threshold of 45 mg/l, are located in these areas.

The regional distribution of animal stocks, mainly that of pig and poultry stocks is responsible for the N-problem in these regions as well. The five provinces mentioned above had 97.6 % of Austria's pig and 95.7 % of its poultry stocks.

As tables 4a and 4b show, there is no falling tendency in the growth of pig and poultry stocks in these provinces with the sole exception of Burgenland. In Styria both pig and poultry stocks increased strongly since 1990.

An analysis of data at a more disaggregated level - at the level of districts - shows that in those districts where the NO_3-content of groundwater exceeds the 45mg/l limit, some relevant growth of pig and poultry stocks have occurred, even between 1993 and 1995. The stock increases were accompanied by even stronger increases in the average stock sizes per farm, as figure 6 shows for some regions.

Within these two years, the most relevant stock increases of both pigs and poultry have taken place in the districts around Klagenfurt (Carinthia) - by 16 % and 9 % respectively. Also the growth of average size of pig stocks per farm was the highest there, nearly 48 %

Figure 5

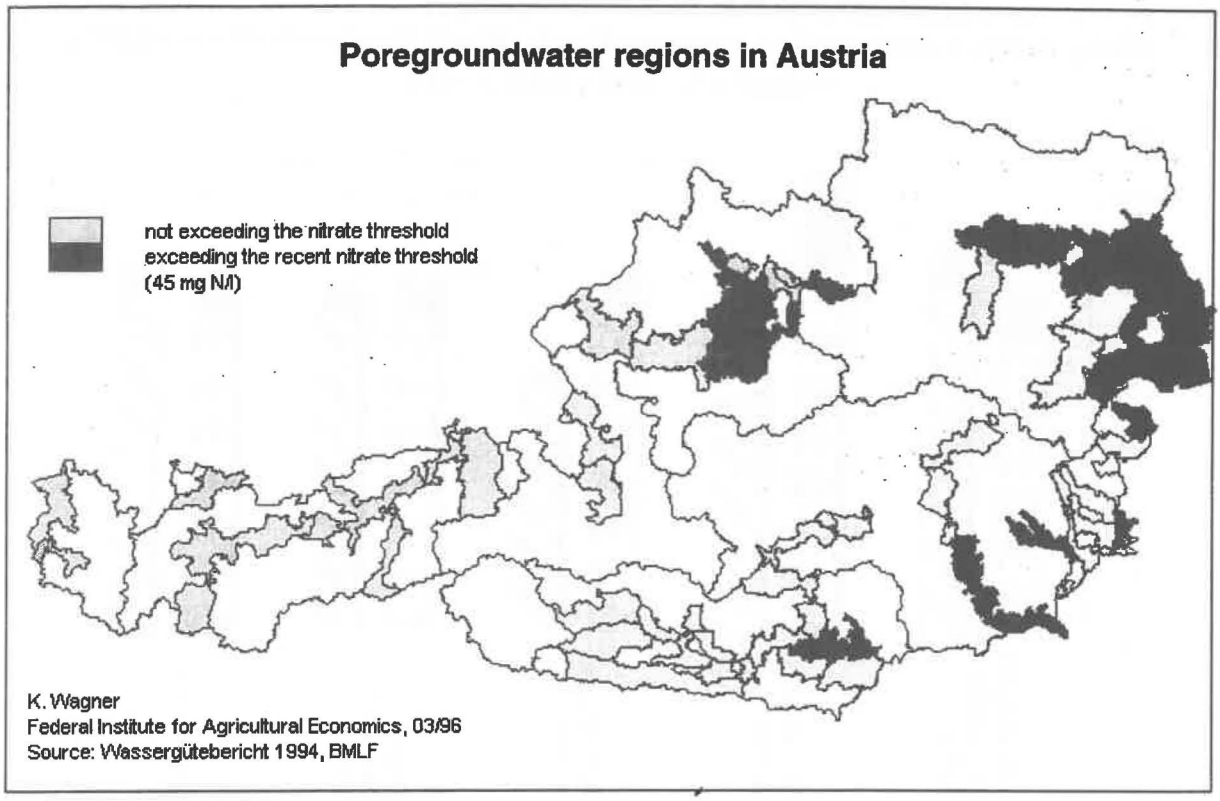


Table 4a

Indices of pig stocks in percent					
year	BU	CA	LA	UA	ST
1990	100.00	100.00	100.00	100.00	100.00
1991	95.41	95.03	98.58	99.32	99.39
1992	93.74	99.96	99.90	102.21	101.91
1993	95.60	101.63	100.84	105.67	106.39
1994	89.69	97.31	96.62	105.11	105.83
1995	89.10	98.20	94.53	104.84	106.68
source: ALFIS					

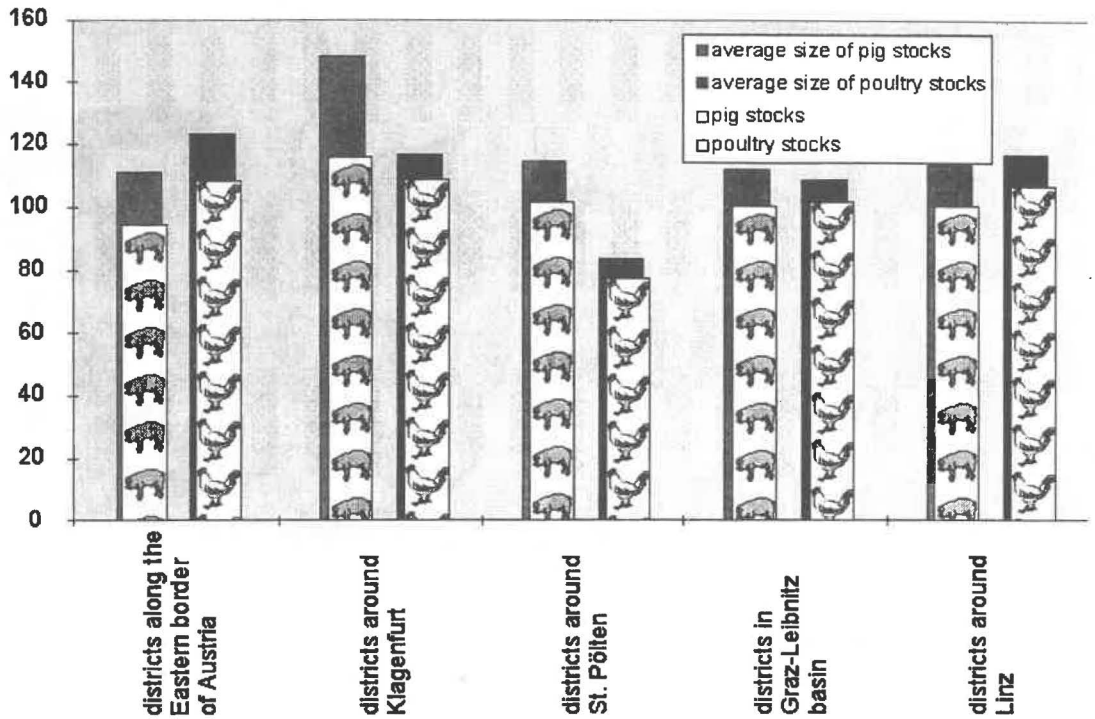
while the average stock size of poultry increased by 16 %. In the districts in the Graz-Leibniz basin (Styria) and in the districts around Linz (Upper Austria) stocks increased only slightly, but the average stock sizes per farm grew significantly, between 9 and 17 %. The data indicate that the concentration process in pig and poultry production in these areas is quite strong.

Table 4b

Indices of poultry stocks in percent					
year	BU	CA	LA	UA	ST
1990	100.00	100.00	100.00	100.00	100.00
1991	93.76	102.38	101.00	103.73	105.57
1992	85.52	116.41	93.27	99.09	99.36
1993	87.05	111.70	101.30	102.59	108.59
1994	83.47	110.71	96.70	103.38	105.18
1995	74.74	124.62	99.86	100.01	104.04
source: ALFIS					

Figure 6

Indices of pig stocks and of average stock size in the districts exceeding N-limits in 1995 (1993 = 100)



source: Allgemeine Viehzählung 1993 and 1995 (preliminary), own calculations

According to data shown in table 5, further disaggregation enables us to demonstrate that in some of the investigated districts growth rates of pig and poultry stocks were extremely high in the period from 1993 to 1995. Increases in the average stock size per farm were in all cases even higher, with the maxima in the Klagenfurt district 134 % for pigs and in Radkersburg district 132 % for poultry.

Table 5

Indices of pig and poultry stocks in 1995 (1993 = 100)		
district	pig stocks	poultry stocks
Mattersburg	105.56	111.63
Klagenfurt-Land	156.80	100.01
Völkermarkt	98.05	114.78
Steyr-Land	101.01	129.58
Fürstenfeld	100.26	134.05
Hartberg	93.94	118.31
Radkersburg	101.93	214.01

source: Allgemeine Viehzählung 1993 and 1995 (preliminary), own calculations

The pressure indicators referring to the grain (and especially to the maize) production and to pig and poultry stocks indicate that the nitrate problem of the concerned districts has not been mitigated. On the contrary, it has most probably even been aggravated by the development patterns of agricultural production. When more data will be available for 1995 (acreage data at district level, actual stock size data and the corresponding agricultural areas, etc.) this issue has to be investigated in more detail to enable the elaboration of

proper strategies to alleviate the ground water problem in these areas. Also the precise definition of proper agricultural practices which are conform to the requirements of water-quality management has to be established.

4 Biological agriculture

The development of biological farming in Austria is highly dynamic and shows an exponential trend from 1978 onwards. The number of biological farms increased from 9 713 in 1993 to 13 321 in 1994 and to 22 875 in 1995, which is an increase by 135 % over the last year. The corresponding shares of biological farms in the total number of farms can be estimated as 3.9, 5.4 and 9.4 % accordingly (*Schneeberger* et al, 1995). This rapid growth has been enabled by the strong supports which were structured before Austria's EU-membership as follows: a certain amount was given per farm if well-specified conditions such as keeping some limits in fertiliser use, maintaining grassland areas, limits of animal units per ha, and time schedules: 5 to 20 years, etc. were fulfilled. In addition to that, different acreage bonuses were awarded, depending on which plants were cultivated. For each farm the maximum amount of supports available was limited.

The support scheme was changed in 1995 according to the ÖPUL measure 'biodynamic cultivation'. The premia paid according to the scheme was as follows: 4.500 (ATS/ha) for cropland, 3.000 for grassland, 6.000 for vegetable and 10. 000 for vineyards, fruits and some other special cultures. The requirements to be fulfilled for receiving this supports must be met by the whole farm.

An overwhelming part of the supported farms is engaged in grassland activities. Therefore, the regional distribution of biological farms shows a tendency to be concentrated on mountainous and hilly areas. It is remarkable that in 1994 only 1.6 % of cropland areas were cultivated according to biological practices, while 12.5 % of grassland areas were under biological farming. The highest share of support was supplied to farms owning 10-15 ha. The regional distribution of supported biological farms has not changed significantly in the last year either: although their share in the total number of farms reached 25.6 % in Salzburg and 20.5 % in Tyrol, in the eastern of Burgenland and Lower Austria these shares accounted only for 0.3 % and 3.8 %, respectively. The area shares of supported biological farms in the two western provinces mentioned above are 30.7 % and 26.6 %, while in the two eastern provinces only 1.6 % and 5.0 %. These data show that the attractiveness of biological farming is still higher in grassland areas than elsewhere - in spite of the abolition of the maximum support limit per farm.

When all final results about the acceptance of ÖPUL-measures will be available, it will be necessary to investigate why the change to biological farming is not profitable for farms with overwhelmingly arable land and why the participation in this measure was small in the eastern provinces.

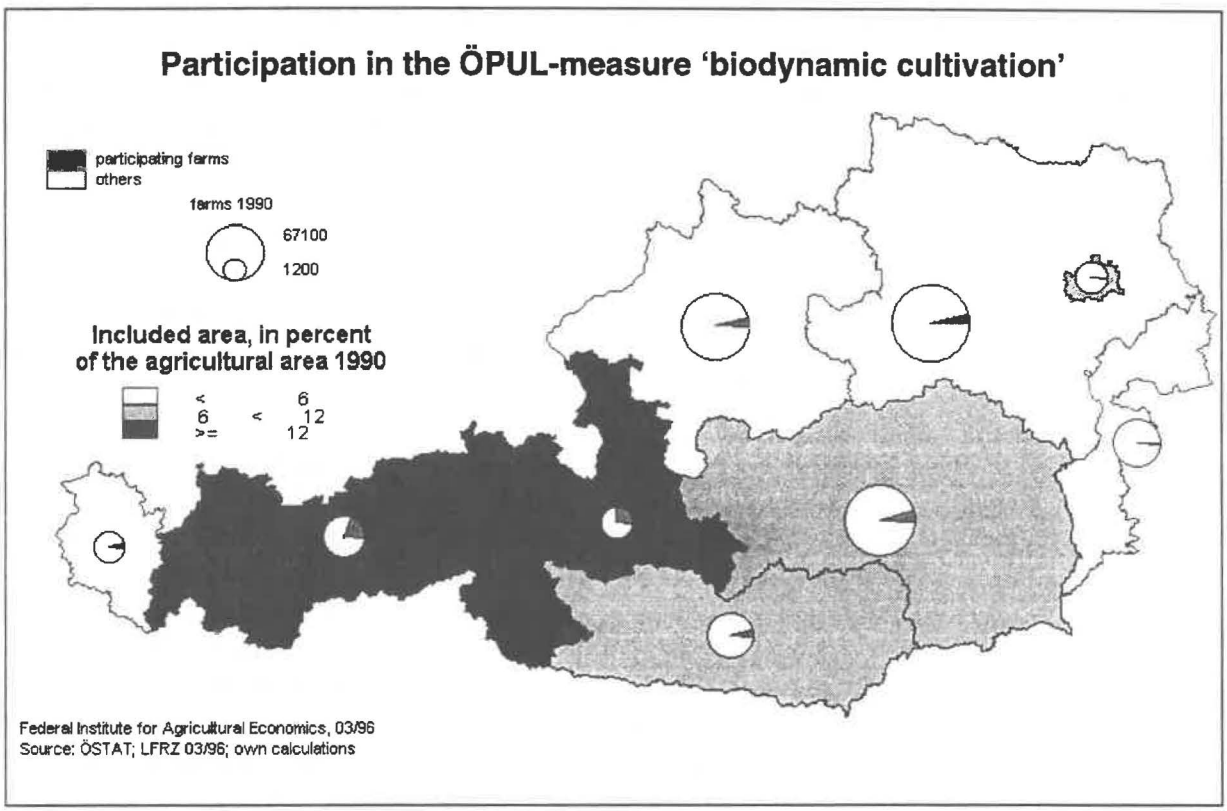
A full assessment of biological farming is hindered by the lack of data about those farms that did not receive support. This problem should be solved when further steps for the promotion of biological farming should be set. And last but not least, marketing strategies and price levels of biological products call for extended research to elaborate on desired modifications of incentive systems.

Table 6

Development of supported biological farms in Austria			
variables	1993*	1994*	1995*
number of farms supported	8 408	11 567	15 844
area supported (1000 ha)	118	158	199
sum of supports mill ATS	156	216	660
support per farm ATS	18 520	18 .660	41 656
support per ha ATS	1 326	1 364	3 316

data for 1995 preliminary
source: *Schneeberger* 1995, ÖPUL (18.3.1996), own calculations

Figure 7



5 Summary

Although data for 1995 are still sparse and the follow-ups of the serious price changes cannot be assessed yet, some consequences of Austria's EU-membership on its agriculture can already be sketched. Particular attention should be paid to the nitrate-contamination of groundwater in areas where thresholds are presently exceeded: data about grain production and animal stocks indicate that the pressures on groundwater quality continue. The highly positive development of biological farming is dominating in the western part of the country. In addition to that, the ÖPUL-measures aiming at extensive grassland farming and renunciation of yield-increasing inputs have been more successful in these areas. If further concentration of intensive agriculture in some regions and to some crops should be prevented, production in the eastern provinces should be diversified and extensified. This calls for further actions.

Although no data on sales of agricultural chemicals are available yet price developments let suspect that the last decreasing trends might be slowed down. Lack of data on actual application of fertilisers will most probably hinder analysis of nutrient flows not only now but also in the future. This shortcoming must be eliminated if the of 30 mg NO_3/l drinking-water should be reached, as foreseen for the 1st of July 1999. This requires that further policy measures for the improvement of the ground water quality must be elaborated.

As many of the environmental consequences of the changed situation will show with a considerable time lag, a more accurate assessment of the development path is still outstanding.

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6 References

Gerhold, S.:

Problemorientierte Umweltindikatoren - ein Erfahrungsbericht. Statistische Nachrichten, Wien, 5/1995.

Schneeberger, W., Lunzer, Ch. und Posch, A.:

Förderung der Biobetriebe in Österreich. Förderungsdienst, Wien, 8/1995.

Tomek, H.:

Nachhaltige Sicherung von Grundwasservorkommen in Österreich. Förderungsdienst, Wien, 3/1995.

Umweltförderung, Österreichisches Programm zur Förderung einer umweltgerechten, extensiven und den natürlichen Lebensraum schützenden Landwirtschaft. (ÖPUL) Bundesministerium für Land- und Forstwirtschaft, Wien, Mai 1995.

Market structure, marketing margins and EU membership: evidence from the Austrian meat sector

Adusei Jumah [1]

1 Introduction

The pioneering work of *Allen* (1963) on two aspects of retail pricing behaviour - levelling and averaging - has frequently been used to analyse the relative movement of producer and retail prices. Levelling is the practice whereby short-run fluctuations in producer (input) prices are absorbed in order to maintain stable retail (output) prices. Averaging, on the other hand, refers to the practice of maintaining a low marketing margin for one product while increasing the margins of close substitutes. As a result of these pricing mechanisms, retailers achieve short-run price stability by absorbing the effects of whatever instability in demand and supply exist in the domestic market.

The concepts of levelling and averaging, however, have been useful in reflecting short-run behaviour or disequilibrium. The two concepts fail to address the long-run tendencies of the relationships between producer and retail prices or margins on the one hand and between the prices or margins of related products on the other hand. Levelling implies an inverse relationship between producer prices and margins while averaging indicates an inverse relationship between the margins of related products. Following *Gardner* (1975) and *Wohlgenant* (1989), if there is substitutability between farm outputs and marketing inputs for the production of the retail product in the short run, then in the long run as the trend of producer price changes, the marketing-margin is expected to change in the same direction to compensate for the short-run negative (substitution) effect. Retail prices are, therefore, expected to follow the same trend as producer prices in the long run (see figure 1). Similarly, substitution between related products causes market arbitrage and hence, we may also expect co-movement of the prices or margins of related products. In effect, levelling and averaging act as error correction mechanisms in long-run relationships between producer and retail prices.

Studies on long-run relationships relate economic variables in situations where any adjustments of the variables to positions of disequilibrium are assumed to have been completed (*Charemza* and *Deadman*, 1992, p. 57). It is, however, important to distinguish between the two types of long-run relationships - static equilibrium where the variables are assumed to be unchanging between periods, and stable equilibrium where all variables are changing at some constant rate. Most previous studies concerning long-run relationships between producer and retail prices have been based on static equilibrium models of firm behaviour (e.g., *Gardner* 1975, *Wohlgenant* 1989, *Griffith* and *Moore* 1991). Recently, *Palaskas* (1995) - among others - has employed a stable equilibrium approach based on the *Engle-Granger* three-stage cointegration technique (*Engle* and *Yoo*, 1987) to analyse the relationships between producer and retail prices of dairy products in seven EU countries.

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Although in the special case of a unique cointegration vector and the assumption of weak exogeneity of the dynamic model, the *Engle-Granger* three-stage cointegration procedure becomes particularly easy to implement and has some claim of being useful to practical work, it has no claim to priority over the *Johansen* maximum likelihood (ML) procedure which is well suited to the issue of price convergence.

The current paper examines stationary relationships between farm and retail prices of red meats in Austria based on the *Johansen* ML cointegration procedure and then provides forecasts for these prices. *Schneider* and *Wüger* (1988) have found certain market structural variables, such as demand elasticities, to be identical for both veal and beef in Austria. The analysis, therefore, excludes the prices of veal (the less important product in terms of market share) in order to improve the stochastic properties of the model (see also *Jumah* and *Kunst*, 1996). The study is of importance because for farmers and the food industry alike to be competitive, it is important for them to be able to adjust promptly to changing market situations. Also, policy makers increasingly rely on information about future market developments in their decision making. In particular, at a time when two of the main elements of Austria's European Union (EU) membership - participation in the Common Agricultural Policy (CAP) and trade liberalization with the EU - are expected to bring about downward co-movements of both producer and retail prices, the absence of long-run downward co-movements of these prices is an indication for the existence of price signal distortion in the Austrian meat market and departure from EU membership objective.

The organization of this paper is as follows: section 1 is a general introduction; section 2 relates some market structural variables to marketing margins; section 3 summarises the *Johansen* ML technique and expounds the model employed in the study; section 4 interprets the empirical results and section 5 concludes.

2 Market structure and marketing margins

In Austria cattle (calves inclusive) and swine together account for about 38 % of the final output of agriculture and for 57 % of the final output of livestock products. Meat accounts for about 20 % of the household budget for food. Thus, policy makers have increasingly shown concern for the price of meat paid by the consumer and that received at other stages in the marketing chain. One major area of concern is that imperfect competition - especially at the retail level - prevent prompt and accurate adjustment in supply and demand conditions from one market level to another.

Data trends indicate that real[2] farm and retail prices of meat in Austria have been falling gradually since the early eighties (see figure 1).

The downward price movements may be explained by improvements in the productivity of breeding stocks and in the performance of feeder livestock (*Jumah* and *Kunst*, 1996). Other factors influencing these price trends are improvements in labour productivity and the efficiency of marketing services.

Price elasticities also play a very important role in explaining these price conducts. The price elasticity of demand for beef was estimated to be about four times of that for pork (*Schneider* and *Wüger*, 1988). Thus at increasing retail prices of all meats one would expect

[2] Real prices are prices deflated by the consumer price index (CPI).

a shift from the more price elastic meat to the less price elastic substitute and this will further raise the price of the latter. *Handschur* (1991) has shown that the demand preferences for meat in Austria have been shifting increasingly from beef and veal to pork and poultry meat[3] since the seventies, and this trend is likely to continue. Pork currently accounts for about 57 % of the total meat consumption in Austria while beef and poultry meat account for 20 % and 14 %, respectively.

Figure 1

Monthly producer and retail prices* of beef and pork in Austria,
deflated by the CPI (1986 = 1), in ATS/kg carcass weight, 1981-1995

* scaled by a factor of 3
lines from top left: retail price of pork/3, retail price beef/3, producer price beef, producer price pork

Figure 2 shows that the percentage margins in the Austrian meat market are high and have been following an upward trend in the first half of the nineties. Arguably, these high percentage margins may be attributed primarily to the high concentration in the meat retail sector. In a sample survey of consumers by *Scheikl* (1989, p. 52) on the Austrian meat market, 44 % of the respondents were found to purchase meat from supermarkets. This was an increase of 15 % from 1987.

In 1994 large chain supermarkets accounted for about 66 % of total meat sales in Austria. Also, the proportion of the Austrian market occupied - in terms of market sales - by the top four chains or supermarkets increased from 75.2 % in 1987 to 80.7 % in 1994, indicating that a high degree of concentration exists for meat retailing in Austria. Empirical studies on the US food market by *Marion* et al. (1986, pp. 319-324) show that percentage margins are typically slightly higher on average in markets where concentration ratios are high.

Also note from table 1 that percentage margins were relatively stable from 1991 to 1994 but were relatively high in 1995. This is because whilst the producer prices of beef and pork fell by 19 % and 21 %, respectively, in response to alignment with the CAP, the respective retail prices fell only by 2 % and 5 %. *Digby* (1989) hypothesizes that with some degree of market

[3] The price elasticity of demand for beef was estimated to be about twice that for poultry (*Schneider* and *Wüger*, 1988).

power, marketing chains and supermarkets may adopt a 'wait and see approach' in the short run and retain all or part of the benefits of cost decreases as added profits while passing on higher costs to consumers and producers. The mean annual margins, however, have remained relatively stable.

Figure 2

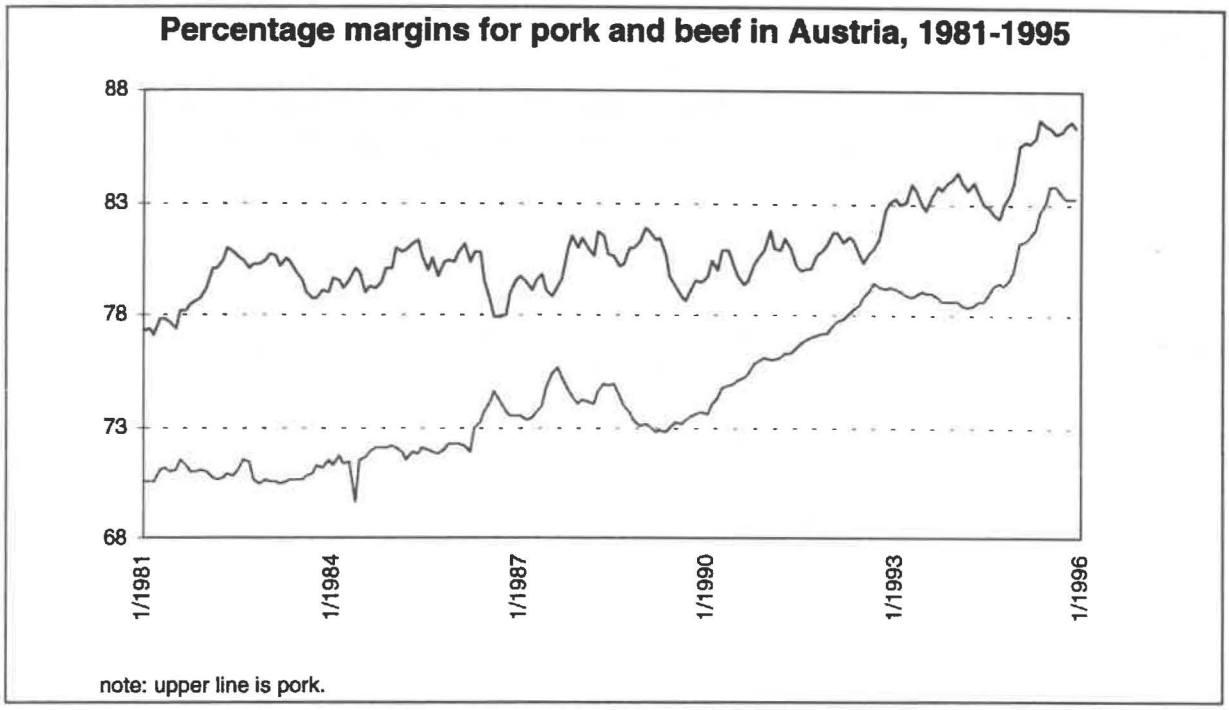

Table 1

Mean values of monthly producer and retail prices of beef and pork in Austria, deflated by the CPI (1986=1), in ATS/kg carcass weight, and marketing margins, 1991-1995

item	1991-94	1991-95	1991	1992	1993	1994	1995
beef producer price	22.17	21.11	24.24	22.20	21.37	20.88	16.86
pork producer price	17.35	16.36	18.97	18.42	16.18	15.81	12.40
margin for beef	79.82	79.95	79.47	81.49	80.38	78.88	80.44
margin for pork	80.27	79.69	79.61	80.95	81.35	79.15	77.40
beef retail price	102.00	101.06	103.67	103.69	101.26	99.37	97.30
pork retail price	97.52	95.98	98.58	99.37	97.53	94.96	89.80
% margin for beef	78.27	79.15	76.62	78.59	78.89	78.99	82.68
% margin for pork	82.94	83.03	80.75	81.45	83.41	83.35	86.20

Pretterhofer et al. (1996) have shown that concentration in the meat wholesale (slaughterhouse) sector is quite high, with 6 % of the firms accounting for about 50 % of total wholesale sales per week in 1995. Similar to the observation of *Hall* et al. (1979) on the US beef market, however, the slaughterhouses face both intra-industry competitive pressures in obtaining livestock and retail competitive pressures due to the existence of substitute supply outlets, such that most of the firms are unable to operate at maximum capacity. For example, *Pretterhofer* et al. (1996) indicate that in the province of Lower Austria, large slaughterhouses are able to utilize only about a half of their capacities. This sector is therefore expected to operate on a very small margin.

The high concentration of the retail sector might be expected to have led to an improvement in the information flow, made possible through the shortening of the marketing chain. However, as already mentioned, this has come alongside the impacts of structural change in the agrifood system. With growing market power, large supermarkets are able to absorb short-run fluctuations in input prices so as to maintain stable retail prices. The effects of this pricing behaviour are expressed in the trend of farm and retail prices of meat.

Table 2

Variabilities of deflated producer and retail prices of beef and pork and their respective marketing margins in Austria, 1991-1995

item	1991-95	1991	1992	1993	1994	I/1995	II/1995
producer price of beef	2,42	1,95	3,44	0,90	2,91	4,21	1,55
producer price of pork	3,06	2,76	3,67	2,86	3,28	4,14	1,36
margin of beef	2,28	1,97	3,19	0,89	2,60	4,01	1,46
margin of pork	3,21	3,01	4,18	2,67	3,76	3,47	1,34
retail price of beef	0,63	0,75	0,58	0,84	0,61	0,35	0,39
retail price of pork	0,78	0,92	0,84	0,81	0,69	0,92	0,38

note: variability was measured by the coefficient of variation = standard deviation * 100 / mean.

As can be seen from table 2, variabilities (as measured by the coefficients of variation) of retail prices were considerably smaller than those of producer prices for both meats. Also, interestingly, marketing margins exhibited almost the same variabilities as producer prices for both meats, confirming the contention that variations in producer prices were (more or less) absorbed into marketing margins. On the other hand, because pork is more price inelastic in demand than beef, variability of pork retail price is higher than that of beef retail price. In the first half of 1995, producer price variabilities increased markedly due to the adjustment processes emanating from EU membership, and in the second half, they returned to unusually low levels of variability.

3 Methodology

3.1 Cointegration [4]

The cointegration analysis is based on the approach initiated by *Johansen* (1988). Consider a vector $\mathbf{z}_t$ of n potentially endogenous variables, modelled as an unrestricted vector autoregression (VAR) - as advocated by *Sims* (1980) - involving up to k-lags of $\mathbf{z}_t$:

$$\mathbf{z}_t = \mathbf{A}_1\mathbf{z}_{t-1} + \ldots + \mathbf{A}_k\mathbf{z}_{t-k} + \mathbf{u}_t \qquad \mathbf{u}_t \sim IN(0, \Sigma) \qquad (1)$$

where $\mathbf{z}_t$ is (n $\times$1) and each $\mathbf{A}_i$ is an (n $\times$ n) matrix of parameters. The system is in reduced form and OLS is thus an efficient way to estimate each equation in (1) since the right-hand side of each equation in the system consists of a common set of (lagged and thus predetermined) regressors.

[4] This section of the paper is based on a summary of *Harris, R.*, Using Cointegration Analysis in Econometric Modelling, Prentice Hall, Hemel Hempstead, pp. 77-97, 1995.

Equation (1) can be respecified into a vector error-correction (VECM) form:

$$\Delta \mathbf{z}_t = \Gamma_1 \Delta \mathbf{z}_{t-1} + \ldots + \Gamma_{k-1} \Delta \mathbf{z}_{t-k+1} + \Pi \mathbf{z}_{t-k} + \mathbf{u}_t \quad (2)$$

where $\Gamma_i = -(\mathbf{I} - \mathbf{A}_1 - \ldots - \mathbf{A}_i)$, $(i = 1, \ldots, k-1)$, and $\Pi = -(\mathbf{I} - \mathbf{A}_1 - \ldots - \mathbf{A}_k)$. The VECM makes it possible to analyse both the short- and long-run adjustment to changes in $\mathbf{z}_t$, via the estimates of Γ_i and Π respectively. In (2), $\Pi = \alpha\beta'$, where α represents the speed of adjustment to disequilibrium, while β is a matrix of long-run coefficients (cointegration vector) such that the term $\beta' \mathbf{z}_{t-k}$ represents up to (n - 1) cointegration relationships in the multivariate model. If $\mathbf{z}_t$ is a vector of I(1) variables, then all the terms in (2) which involve $\Delta \mathbf{z}_{t-i}$ are I(0) while $\Pi \mathbf{z}_{t-k}$ must also be stationary for $\mathbf{u}_t \sim$ I(0) to be 'white noise'.

There are three instances when the requirement that $\Pi \mathbf{z}_{t-k} \sim$ I(0) is met; first, if Π has full rank (i.e., there are r = n linearly independent columns) then the variables in $\mathbf{z}_t$ are I(0), while if the rank of Π is zero there are no cointegration relationships. More usually, Π has reduced rank; that is r ≤ (n - 1) cointegration vectors are present, and testing for the (reduced) rank of Π is equivalent to testing which columns of α are zero. However, this presupposes that it is possible to factorise Π into $\Pi = \alpha\beta'$, where α and β can both be reduced in dimension to (n × r). It is generally not possible to apply ordinary regression techniques to the individual equations comprising the system in (2) since what is obtained is an (n × n) estimate of Π. Rather, *Johansen* (1988) obtains estimates of α and β using the procedure known as reduced rank regression - based on ML estimation techniques and a trace test for the rank of Π.

If there exist other variables that are both weakly exogenous and insignificant in the cointegration space, it will be possible to condition on the set of such I(0) variables, $\mathbf{D}_t$. These variables will only affect the short-run model, so that (2) can be re-written as:

$$\Delta \mathbf{z}_t = \Gamma_1 \Delta \mathbf{z}_{t-1} + \ldots + \Gamma_{k-1} \Delta \mathbf{z}_{t-k+1} + \Pi \mathbf{z}_{t-k} + \Psi \mathbf{D}_t + \mathbf{u}_t \quad (3)$$

Usually the variables in $\mathbf{D}_t$ are included to take account of short-run 'shocks' to the system, such as policy interventions. Such variables often enter as dummy variables, including seasonal dummies when the data are observed more frequently than annually.

It is, however, important to note that the reduced rank regression of the Johansen procedure provides only information on how many unique cointegration vectors span the cointegration space, because $\alpha\beta = \alpha\xi^{-1}\xi\beta = \alpha^*\beta^*$, where ξ is any $r \times r$ non-singular matrix. Thus, if there exists a ξ-matrix that transforms β into β^*, the same unique number of cointegration vectors are still obtained, but the vectors themselves are not unique. This 'warning' enables us to determine unique structural relationships for each cointegration vector (assuming such uniqueness exists).

3.2 The model

A cointegration relationship between farm and retail prices of red meats in Austria is estimated using the *Johansen* ML procedure, and on the basis of the results, forecasts for these variables are provided. Only beef and pork prices are considered; the prices of veal are excluded because *Jumah* and *Kunst* (1996) have found the producer price of calves to be highly correlated with that of bulls in the Austrian market and this is likely to pose problems of multicollinearity or inflated system dimensionality.

A system of the following four variables is estimated:

- producer price of beef (P_b^p)
- retail price of beef (P_b^r)
- producer price of pork (P_p^p)
- retail price of pork (P_p^r).

It takes the following form:

$$\begin{pmatrix} A_{11}(L) & A_{12}(L) \\ A_{21}(L) & A_{22}(L) \end{pmatrix} \begin{pmatrix} \Delta P_{b,t} \\ \Delta P_{p,t} \end{pmatrix} = \mu + \begin{pmatrix} \alpha_{11} & \alpha_{12} \\ \alpha_{21} & \alpha_{22} \end{pmatrix} \beta' \begin{pmatrix} P_{b,t-k-1} \\ P_{p,t-k-1} \end{pmatrix} + \begin{pmatrix} \varepsilon_{1,t} \\ \varepsilon_{2,t} \end{pmatrix} \quad (4)$$

with the 2×1 vector P_{bt} of beef prices, 2×1 vector P_{pt} of pork prices and 2×1 vector ξ_{it} of error terms. The vector m contains a set of I(0) variables: a dummy variable d1 to account for the unusually low value of beef retail price in May 1984 (see figure 1); seasonal dummies; a constant and a linear trend. These I(0) variables were included in order to improve the stochastic properties (especially, autocorrelation) of the model. *Engle*, *Hendry* and *Richard* (1983) have shown that if in equation (4) $\alpha_{ij} = 0$, j=1,...,r, i.e., if DP_{bit} or DP_{pit} does not respond to deviations from the long-run equilibrium, $\beta' \begin{pmatrix} P_{b,t-k-1} \\ P_{p,t-k-1} \end{pmatrix}$, then DP_{bit} or DP_{pit} is said to be weakly exogenous with respect to α and β. This means that when estimating the parameters of (4) there is no loss of information from not modelling the determinants of $\begin{pmatrix} \Delta P_{bi,t} \\ \Delta P_{pi,t} \end{pmatrix}$ and the weakly exogenous variables can enter the right-hand side of (4).

4 Results and discussion

4.1 Cointegration analysis

The analysis was carried out with the CATS programme of *Hansen* and *Juselius* (1994). Monthly producer and retail prices of beef and pork for the period 1981:1 to 1994:12 were used. The retail values of carcass were calculated from price data on a range of cuts, using their respective weights in the consumer price index[5] and scaling these weights such that they add to unity; this should make the resulting retail prices comparable to producer prices[6]. Choice of the lag order was based on model selection criteria. A lag order of two was found to be the most appropriate.

The results of the cointegration analysis are presented in table 3. *Cheung* and *Lai* (1993) suggest that the trace test shows more robustness to both skewness and excess kurtosis in (the residuals) than the maximum eigenvalue (l_{max}) test. Following this proposition, the choice

[5] The factors used were .13 for „Beiried", .198 for „Vorderes" and .398 for „Hinteres" in the case of beef and 0.253 for „Bauchfleisch", 0.305 for „Schnitzel", 0.217 for „Schopfbraten" and 0.299 for „Karree" in the case of pork, according to the weight of these cuts in the consumer price index.

[6] To compute exactly comparable prices, one would need the retail prices for all cuts which are made from carcasses. The cuts for which prices are available were assumed to be representative of those, but by this assumption retail prices are likely to have been overestimated. Since prices are used in logs, however, price levels are not relevant in the current analysis.

of the rank r was based on the trace test. Table 3 shows that only one cointegration vector is obtained at the 95 % confidence level. The cointegration vector presented is in normalised form, i.e. the first element of β' is set equal to unity. The existence of only one cointegration vector suggests that all the variables used in the analysis are I(1).

Before imposing restrictions on the cointegration vector, β, to test for structural economic relationships underlying the long-run model, it is worth mentioning that the t-values associated with each α_{ij} suggest the absence of weak exogeneity for each price variable. Homogeneity restrictions are imposed on β to test for the existence of 'perfect' price transmission (see *Colman*, 1985) in the Austrian meat market, i.e., whether, in the absence of marketing margins, the following conditions are valid in the long run:

$$\frac{P_b^p}{P_p^p} = \frac{P_b^r}{P_p^r} \quad \Rightarrow \quad \frac{P_b^p}{P_b^r} = \frac{P_p^p}{P_p^r} \tag{5}$$

The general hypothesis is that $R'\beta = 0$, where $R' = [1 \quad -1 \quad -1 \quad 1]$. This requires specifying an H_4-test amounting to a test of the same restrictions placed on all the cointegration vectors spanning β (see *Johansen* and *Juselius*, 1992). In our analysis, however, only one cointegration vector was obtained but the conditions to be fulfilled in equation (5) required three restrictions to be placed on the system.

The results of the LR-test based on χ^2-distribution with three $(n-r)$ degrees of freedom are presented in table 3. The hypothesis of the existence of 'perfect' price transmission is not rejected. This means that over an extended period of time, assuming there is input substitutability among farm outputs and marketing inputs, then shifts in primary supply or primary demand will cause equilibrium prices in logs to change by equal amounts at the farm and retail price levels so that marketing margins will remain relatively stable (see table 1). The results also indicate that the respective producer prices and the respective retail prices of both meats are perfectly arbitraged in the long run. The individual meat sectors are, therefore, integrated.

4.2 Model performance

A forecasting system was set up based on the coefficients obtained after imposing homogeneity constraints on the cointegration system. In cointegration, just as in vector autoregression, all variables are assumed to be endogenous, and as a result, all four variables can be forecasted. In order to be able to evaluate the forecasting ability of the model, a historical forecast over the period 1993:1-1994:12 was performed. Summary statistics of the historical forecasts for each of the price variables are presented in table 4. The results show that all the forecasting errors are small in comparison to the mean values of the price variables.

Results of the out-of-sample predictions as compared to actual data for 1995 are presented in tables 5 and 6. Ex-post forecasts for 1995 are assumed to represent the situation in 1995 had Austria not joined the EU in that year; the difference to the actual situation can be attributed to EU accession. Table 5 indicates that EU membership caused a reduction in both producer and retail prices. Reduction for beef and retail prices are lower than for pork and producer prices. Also, price reductions were higher in the second half of 1995. On the other hand, percentage margins increased for both products.

Table 3

Rank tests

Eigenvalues	L-max	Trace	H_0: r =	n-r =
0.2328	44.00	68.67	0	4
0.0858	15.37	24.67	1	3
0.0460	7.81	9.29	2	2
0.089	1.48	1.48	3	1

Normalized (The matrices based on 1 cointegration vector)

β'

P_b^p	P_p^p	P_b^r	P_p^r
1.000	-1.361	-1.841	1.567

	α	t-values for α
ΔP_b^p	0.016	2.024
ΔP_p^p	0.045	2.467
ΔP_b^r	0.010	1.610
ΔP_p^r	-0.023	-3.488

Testing Restrictions on β' : $R'\beta' = 0$

The LR test, $\chi^2(3) = 6.44$, p-value = 0.09

β'

P_b^p	P_b^p	P_b^r	P_p^r
1.000	-1.000	-1.000	1.000

	α	t-values for α
ΔP_b^p	0.015	1.670
ΔP_p^p	0.044	2.210
ΔP_b^r	0.014	2.138
ΔP_p^r	-0.022	-3.068

Table 4

Summary statistics for historical simulation (1993:1-1994:12)*

indicator	P_b^p	P_b^p	P_b^r	P_p^r
mean	3.05	2.77	4.61	4.57
rms error	0.06	0.06	0.02	0.02
rms percent error	3.36	3.60	1.37	0.99
mean error	-0.05	-0.05	0.02	0.02
mean percent error	-1.70	-1.60	-1.57	0.70

* the mean values for P_b^p, P_b^p, P_b^r, P_p^r in the table are in logarithms

Table 5

The effect[1] of EU membership on prices and margins of beef and pork in percent[2]			
mean	I/1995	II/1995	1995
producer price of beef	-7.48	-13.13	-10.22
producer price of pork	-10.57	-14.55	-12.55
margin for beef	1.85	1.33	1.58
margin for pork	-0.08	-1.98	-1.04
retail price of beef	0.03	-1.39	-0.68
retail price of pork	-1.68	-3.92	-2.80

[1] effect = [forecasted price - actual price] x 100 / [forecasted price]
[2] negative sign means reduction

Because accession to the EU was a serious shock to the economic environment, particularly in agricultural markets, it might be expected that markets became more volatile. In order to determine whether this happened, I calculated the price variabilities in various sub-periods and their changes over the previous sub-period. The results in table 6 show that the coefficients of variation[7] in 1995 increased for producer prices - in particular in the first half of 1995 and more so in the beef sector. Since the variability of retail prices - on the contrary - decreased slightly, the variability of producer prices was mirrored by an increase in the variability of processing and marketing margins.

Table 6

The effect[1] of EU membership on price and margin variability[2] of beef and pork[3] in percent			
mean	I/1995	II/1995	1995
producer price of beef	2.51	0.94	3.79
producer price of pork	2.18	-0.98	1.83
margin for beef	0.40	-0.04	-0.01
margin for pork	-0.15	-0.57	0.21
retail price of beef	-0.02	-0.11	0.38
retail price of pork	0.04	-0.21	0.63

[1] effect = (forecasted coefficient of variation - actual coefficient of variation) x 100
[2] variability was measured by the coefficient of variation = (standard deviation/mean) x 100
[3] negative sign means reduction

5 Summary and conclusions

Retail prices are expected to follow the movements of producer prices, although there may be lags of adjustment and retailers may prefer to keep prices in the retail market constant or increase them. Claims that they are adjusting prices only in the prefered direction are frequently voiced by farmers and consumer groups alike. If they were right, retailers would act like oligopolists, being able to set prices and pocket monopoly rents.

[7] The variation coefficient of a variable is its standard deviation dividend by its mean.

Cointegration analysis of the movements of monthly producer and retail prices of beef and pork for 1981 - 1994 in Austria confirmed that these claims are not justified: prices in the beef and pork marketing chain were found to be integrated, and the cointegration vector adheres to hypotheses which are valid only if the related markets are characterized by competitive behavior of the market participants. Specifically, the movement of any one of the four prices examined was accompanied by corresponding movements of the other three prices in the long run, and it led to partial adjustments to long-run equilibrium in the short run. Whereas marketing margins have remained stable in absolute terms, percentage margins have increased. Results from the expost forecasts revealed that in the absence of EU membership meat prices would have been higher than they were in 1995.

6 References

Allen, G. R.:

Evidence to the Committee of Enquiry into Fatstock and Carcase Meat Marketing and Distribution, Farm Economics 10: 153-184, 1963.

Charemza W. W., and *Deadman D. F.:*

New Directions in Econometric Practice: General to Specific Modelling, Cointegration and Vector Autoregression, Edward Elgar, Aldershot 1992.

Cheung, Y.-W. and *Lai K.S.:*

Finite-Sample Sizes of Johansen's Likelihood Ratio Tets for Cointegration, Oxford Bulletin of Economics and Statistics 55:313-28, 1993.

Colman, D.:

Imperfect Transmission of Policy Prices, European Review of Agricultural Economics 12: 171-186, 1985.

Digby, M. P.:

Marketing margins in the Meat Sector, England and Wales 1978-1987, Journal of Agricultural Economics (402:)129-142, 1989.

Engle, R. F. and *Yoo, S. B.:*

Co-integrated Economic Time Series: An Overview with New Results, European Meeting of the Econometric Society in Copenhagen, 24-28 August 1987, 1987.

Gardner, L. B.:

The Farm-Retail Price Spread in a Competitive Food Industry, American Journal of Agricultural Economics 57:339-409, 1975.

Griffith, G. R., and *Moore W. B.:*

Livestock Production Policies and Meat Processing Margins: The Case of New Zealand, 1967-1988, Australian Journal of Agricultural Economics 35(19):21-48, 1991.

Hall, L., Schmitz, A. and *Cothern, J.:*

Beef Wholesale-Retail Marketing Margins and Concentration, Economica 46:265-300 1979.

Handschur, P.:

Markt für Lebendvieh und Fleisch: In Breuer et al. (Hrsg.) Agrarmarketing in Österreich, Service Fachverlag Wien 1991.

Hansen, H. and *Juselius, K.:*

CATS in RATS. Cointegration Analysis of Time Series. Institute of Economics, University of Copenhagen, Estima, Evanston, IL, 1995.

Harris, R.:

Using Cointegration Analysis in Econometric Modelling, Prentice Hall, Hemel Hempstead, pp. 77-97, 1995.

Johansen S.:

Statistical Analysis of Co-integrating Vectors, Journal of Economic Dynamic and Control, 12:231-254, 1988.

Johansen, S. and *Juselius, K.:*

Maximum Likelihood Estimation and Inference on Co-integration - with Applications to the Demand for Money, Oxford Bulletin of Economics and Statistics 12(2):169-210, 1990.

Johansen, S. and *Juselius K.:*

Testing structural hypotheses in a multivariate cointegration analysis of the PPP and the UIP for UK, Journal of Econometrics 53:211-44, 1992.

Jumah, A. and *Kunst R. M.:*

Forecasting Seaonally Cointegrated Systems: Supply Response in Austrian Agriculture, European Review of Agricultural Economics (forthcoming), 1996

Marion, Bruce W.:

et al., (1986) The Organization and Performance of the US Food System, Lexington, Mass., Lexington Books, 1996.

Meulenberg, M.:

(Ed) Food and Agribusiness Marketing in Europe Haworth Press, Binghamton, NY, 1993.

Palaskas, T. B.:

Statiscal Analysis of Transmission in the European Union, Journal of Agricultural Economics 46: (1) 61-69, 1995.

Pretterhofer, G., Stehlik, K. and *Adler, W.:*

Kapazitäten österreichischer Schlachtbetriebe; Unpublished manuscript, Federal Institute of Agricultural Economics, Vienna, 1996.

Scheikl, G.:

Rindfleisch im Verbraucherurteil als Grundlage einer breitangelegten Marketingstrategie - Ergebnisse einer Repräsentativerhebung in Österreich. Diplomarbeit an der Universität für Bodenkultur Wien, 1989.

Schneider, M. and *Wüger, M.:*

Nachfrage nach Nahrungsmitteln und Getränken. Der Förderungsdienst 9s, 1988.

Wohlgenant, M. K.:

Demand for Farm Output in a Complete System of Demand Functions, American Journal of Agricultural Economics 71(2):241-252, 1989.

Macroeconomic development after austria's EU accession - some selected observations

Markus F. Hofreither [1]

1 Introduction

By January 1st, 1995 the EU has three new members: Austria, Finland and Sweden. As one consequence, the enlarged EU in absolute terms became the most powerful economic area in the world[2]. However, measured in per capita terms this enlargement has hardly any effect on economic welfare per capita in the short run[3]. The reason for this is that the average cut through these three countries is very close to the figures related to EU12.

Although all new members face adjustment problems of varying intensity in the short term, the long term expectations are seen as outright positive. This view mainly focuses on main macroeconomic variables, primarily higher economic growth and lower inflation. This paper tries to shed some light on the specific expectations as well as the short term experience of the new member Austria.

2 Motivation for EU membership

2.1 Theoretical expectations and practical steps

In general the integration of formerly separated economic areas is expected to entail gains in economic efficiency, growth, and welfare. The pivotal driving force for these developments is increased competition. In more detail, the elements bringing about these desired results are primarily located in the elimination of transaction costs as well as increased specialization and hence economies of scale through larger markets. More concrete arguments for integrating European countries are summarized in „avoiding an influence deficit", e.g. the increased bargaining power in international negotiations, the greater efficiency of common institutions in foreign policy and security matters, and, last but not least, the increasing number of problems that cannot be solved in an isolated domestic setting[4]. Such considerations led to the goal of a Common European Market within the existing EU, actually established in 1993. A very positive picture of the direction and the magnitude of the economic effects of the Common European Market was conveyed by the so called *'Cecchini-*Report' (*Cecchini*, 1988). Although these effects may spill over also to third countries, the likeliness to participate in this process significantly increases in the case of full integration.

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[2] Due to this last accession the GDP of the EU was raised by 7 %, the population increased by 6.2 %, and the total area got larger by 37 % (*Breuss*, 1995, 106).

[3] Expressed in terms of purchasing power parity the per capita GDP only increases from 14 577 ECU to 14 592 ECU, which accounts for a meagre 0.1 % rise; in current prices the increase is only slightly more impressive, adding 111 ECU to the EU12 average of 15 840 ECU (*Breuss*, 1995, 107).

[4] Prominent examples for such problems can be found in the domain of transport, energy, and the environment, but also concerning the channeling of international labor migration or the combat against crime.

In the case of Austria official membership in the Community for decades was impeded by the „Staatsvertrag" of 1955, embodying quite strict restraints concerning neutrality and economic integration. Nevertheless, already since the 60s Austria followed a path of factual convergence to this economic area, the Free Trade Agreement of 1972 and joining the EEA in 1993 being significant steps in this respect. Starting from the mid-80s nearly all new laws have been designed to be compatible with the „aquis communautaire". The specific form of pegging the ATS to the DEM as well as the Reform of Austrian tax laws in 1992 and 1994 helped to minimize the differences between Austria and the EU.

2.2 Quantitative forecasts of integration effects

Quantitative forecasts of the economic effects of EU accession have been performed by several researchers (*Breuss, Schebeck*, 1989; *Breuss, Kratena, Schebeck*, 1994). During the last 5 years also at our institute several attempts have been made to forecast these effects with a macroeconometric model *(Hofreither/Pruckner/Weiß*, 1991; *Hofreither/ Streicher*, 1995). The following tables show the assumptions as well as the results of a recently published simulation experiment.

Table 1

Assumptions for the EU-simulation	
variable	change
import prices	-5 %[1]
terms of trade	+5 %[1]
gross income of trading partners	+3 %[1]
depreciation	+1 %-point[1]
labor productivity	+1.6 %[1]
public investment	+3.2 bill. 1995-ATS/a[2]
gross Austrian EU-payments	29 bill. 1995-ATS/a[3]
remarks: [1] percentage difference between the base run and the EU-run after a 6 year period [2] flow of EU-funds to measures aiming at structural improvement [3] value in the first year of membership; in following years: + 1 bill 1995-ATS/a	

Table 2

Simulation results - alternative policy scenarios (all figures are averages of annual growth rates in percent during a 6 year period)			
variable	base run (1)	EU accession (2)	change (2)-(1)
GDPR	2.5	2.8	+0.3
employment	0.7	0.9	+0.2
price index (domestic demand)	1.9	1.5	-0.4
household income (real)	3.1	3.8	+0.7
private consumption (real)	2.7	3.2	+0.5
source: *Hofreither/Kniepert/Streicher* (1995).			

The impact of EU accession on the macroeconomy fits into the picture drawn by theory: real GDP and employment are slightly improved against the base run, the same holds for real household income as well as private consumption. Inflation is dampened annually by about 0.4 % during this 6 year adjustment period.

Similar simulation experiments have been performed by other researchers. *Breuss* (1995) reports similar results as shown above: his model reveals a gain in real GDP of 2.96 %[5], the Consumer Price Index is reduced by -0.55 %, and household income is to rise by 3.3 %. *Keuschnigg* and *Kohler* (1996) employ a dynamic general equilibrium model and arrive at results which have to be interpreted as long run differences in levels: real GDP will increase by 1.9 %, the CPI will be lowered by 1.5 %, and overall consumption will rise by 2.8 %, although disposable wage income only rises by 1.3 %.

As always, such simulation runs can only so far be seen as a serious prediction of the real development of the Austrian macroeconomy as the assumptions of the base run correctly mirror the path of the actual environment. There always may be non expected short term influences, perhaps more influential than EU accession itself. Moreover, the adaptation to the new situation hardly occurs along a smooth development path. Not surprisingly, the short term experience is expected to be dominated by adjustment problems, while the positive effects may take more time to materialize. Not only for the ordinary citizen it is often difficult if even not entirely impossible, to distinguish between these different, but simultaneously occurring influences. This difficulty to differentiate between EU impacts and other influences is revealed in repeatedly reported opinion polls, showing quotas of less than 40 % of Austrian citizens being in favour of EU membership in the second year after accession. This paper makes an attempt to make such a differentiation in sticking to the observable facts of macroeconomic development and their possible determinants.

3 Practical experiences in the short run

3.1 Global and national development trends

In the half decade before EU accession Austria experienced quite a positive economic development, mainly caused by the demand pull after the opening up of the iron curtain and the reunion of Germany. By and large, the business cycle of Austria was in conformity with the average of the EU, as the main body of foreign trade (65 %) is done with EU countries.

During the first year of EU membership, the positive trend of the business cycle lost most of its momentum. In Europe mainly the weakness of the US-Dollar as well as the devaluation of the currencies of some member states is responsible for this development. Globally, the pessimistic economic expectations in the US as well as the stagnation like situation in Japan adds to the problem.

EU membership required full harmonization of laws and regulations. Accepting the common tariffs implied the end of domestic trade policy, the same holds for structural and regional policies, as well as most of the other special policy areas. One of the most sensitive areas has been agriculture, as the switch to the CAP brought about immediately fundamental changes concerning rules as well as, in the medium term, of protection levels.

However, bearing in mind the fact mentioned above, namely that a substantial deal of the former differences between EU and EFTA have already been eliminated before joining the European Economic Area (EEA) in 1993, it is not a big surprise that the short term effects of EU accession on the macroeconomic level have been quite modest. So, instead of the

[5] All figures concerning *Breuss* (1995) are expressed as differences in the levels of the variables after an adjustment period of six years.

expected 'big bang', dynamic integration effects in the medium term may be the most influential effect of EU accession. In the following subsections three specific areas of interest are illustrated in a little bit more detail: foreign trade, price development, and the federal budget.

3.2 Balance of payments

With 47 bill. ATS the first year after EU accession saw the biggest deficit in the balance of payments in post-war history of Austria. However, EU membership is only one influencing factor in this respect. As can be seen from table A2 (Appendix) the traditional deficit in the exchange of merchandise decreased by 5.6 bill. ATS, indicating that Austrian firms were successful in taking profit of the improved export chances[6]. This success is even underplayed by this figure, as the real exchange rate of the ATS revalued by 3 % in 1995. Moreover, the external tariff was cut from 5.6 % to 3.7 %. Capital earnings as well as other positions remained quite unchanged. The two fundamentally impaired accounts are found to be tourism surplus and transfers.

Austria experienced quite a bad year concerning incoming tourism, with a 5.7 % decrease in the number of foreign tourists staying overnight. Also foreign exchange earnings fell by 1.9 % (-3 bill. ATS). The main reason is to be seen in the lower incoming activities by German and Dutch tourists by about 6 %, (-4 mill. overnight stays)[7]. However, as these two countries are EU members as well as hard currency countries too, this development can hardly be attributed to EU accession. The main reason is the change of relative prices due to exchange rate changes as well as structural problems of the tourism industry in Austria[8]. At the same time, Austrian inhabitants increased their spending on travelling abroad by 9.7 %[9]. Together this gives the sharp decline in the tourism surplus by 13.3 bill. ATS, which is -31 % (Table A2, Appendix).

The other negative development within the current account occurred in the balance of transfers. Here the financial net contributions to the EU budget are recorded. Initially the gross contribution of Austria has been estimated to be 29 bill. ATS, and EU payments about 17 bill. ATS. Looking back shows a gross contribution of 23 bill. and an unexpectedly low amount of EU payments of only 10 bill., leading to a net contribution of 13 % ATS. This amount caused a sharp decrease in the deficit of the balance of transfers, which would have remained widely unchanged without this influence.

Due to a huge surplus of nearly 58 bill. ATS in the capital balance, mainly being caused by a massive inflow of long term foreign capital to buy domestic bonds, the official reserves of foreign exchange assets have increased by 20 % ATS. However, also this development has barely to do with EU accession. So, with the exception of the net contribution to the EU budget in the transfer balance, there seem to be no significant other detriments in the

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[6] In fact total exports of merchandise to EU countries increased by 11 %, whereas imports only went up by 8.7 %. The relevant figures for total exports of merchandise are 10 rsp. 6 % and can be found in Table A1 in the Appendix.

[7] The remaining 1.2 mill. people are mainly scattered across western European countries, at first blush following a significant exchange rate pattern. Only Japan, Switzerland, and nearly all Eastern European countries showed an increase with a small total of about 300 000 overnight stays.

[8] This argument is highlighted by the fact that high quality suppliers hardly had any problems, whereas the low budget hotels experienced a decline of more than 10 %.

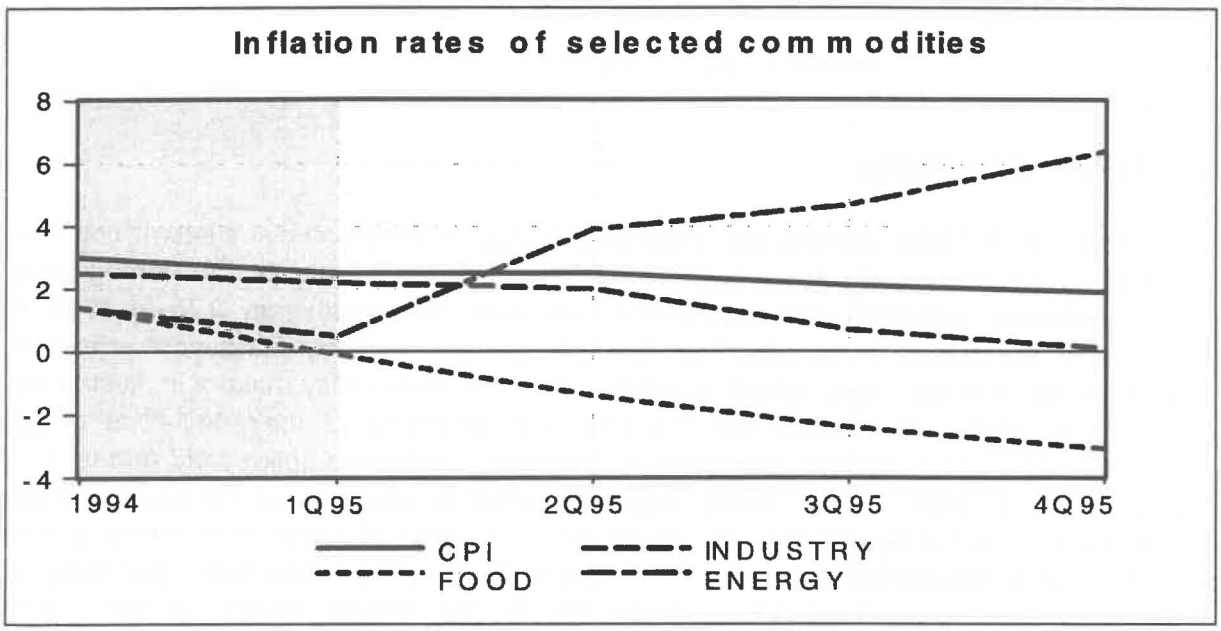
[9] Here primarily the border regions of Germany and Italy, but also the adjacent countries of Eastern Europe took profit from this development.

balance of payments as a consequence of EU accession. The primary force of change in 1995 has been the chance in the external value of the ATS.

3.3 Price development

Concerning the price effects of EU accession the predominant, widely politically fuelled expectation was that most prices of consumer goods would come down quite immediately. Theoretically, this expectation is not entirely wrong, as EU accession intensifies competition at all levels of production and by this efficiency should be improved and price increases dampened, respectively. The open question is the time horizon of this developments. The following figure 1 shows the short term development of inflation rates of selected commodities.

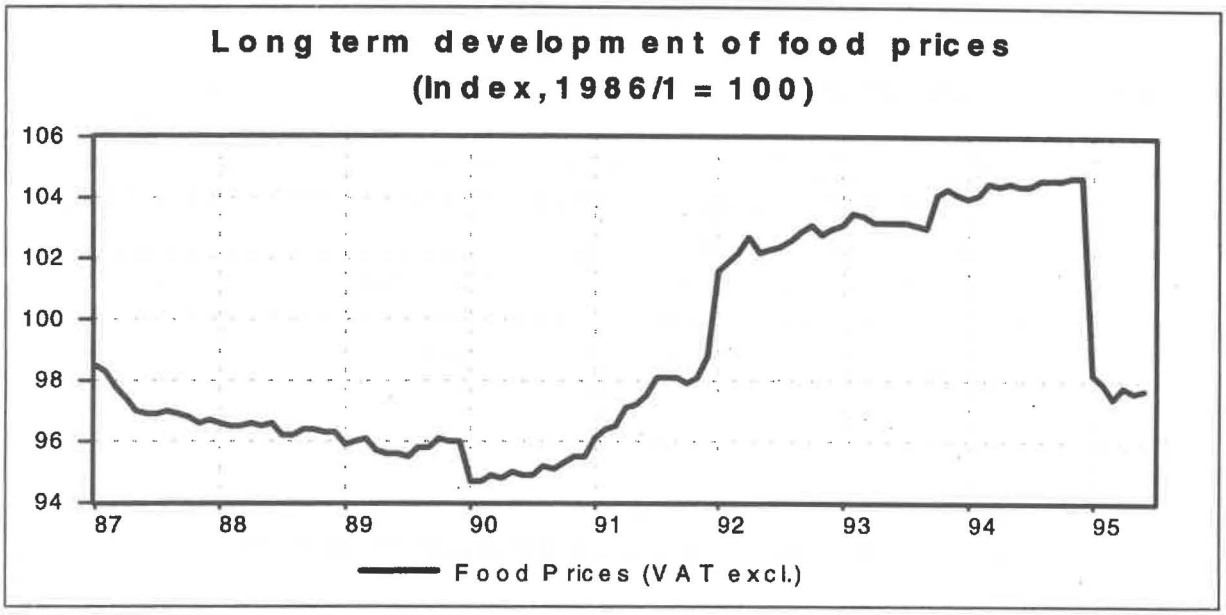
Figure 1



Graph 1 illustrates a steady decrease in the inflation rate of the food commodity segment (FOOD) starting with 1995. Industrial product prices (INDUSTRY) started to decline not before the third quarter of 1995. The CPI, however, exhibits no significant break which is mainly due to rising inflation rates of other commodities. In figure 1 ENERGY is included as one notable example, but also rents as well as services related to housing have risen steeply. So, as the bottom line, the paths of the CPI of Austria and Germany, having been closely related in recent years, also do not show any significant deviation after EU accession. According to *Pollan* (1996) the overall price effect of EU accession is estimated at 0.5 % in the first and 0.75 % in the second half-year of 1995, mainly caused by the drop of food prices.

Figure 2 gives some impression of the only one commodity group experiencing quite a sharp price decline, which is food. Here the drop in producer prices by the begin of 1995 entailed some consequences for consumer prices. However, so far this did not realize in the expected magnitude, hence some of this price declines must be absorbed by downstream industries and retailers.

Figure 2



3.4 Federal budgets

During the last decades, Austria has developed a very elaborate social system, covering nearly all kind of individual risk via public insurance schemes. Moreover, the demographic balance between supported and contributing individuals increased from 0.75 in 1970 to nearly 1.4 in the middle of the 90s. This dramatic change inevitably put severe stress on public budgets. It is also quite safe to say that in the last years policy makers in Austria not always have taken into account the mid term consequences of their decisions in the necessary way. Hence, adverse budgetary implications of individual policies did add up to a sharply impaired deficit situation. Additionally, EU accession brings about the need of gross contributions to the EU budget of nearly 30 bill. ATS[10]. Another additional expenditure comes in the form of compensation payments to farmers and downstream industries. Summing up these numbers gives a total additional burden for the federal budget of more than 40 bill. ATS.

At the same time, the Treaty of Maastricht forces countries to meet strict criteria concerning national budgets to secure convergence within the scheduled Monetary Union. These criteria are not met in the present situation of Austria[11]. Hence, the government took a decision to sharply reduce the budget deficit by cutting back outlays as well as increasing earnings. The so called „Sparpaket" („savings package") adds up to 100 bill. ATS, being readily distributed across all parts of the Austrian population[12].
Theory tells us that a budget consolidation of such a magnitude very likely is to induce consequences for macroeconomic performance of this country. Not very convincingly, Austrian officials take refuge with arguments that other sectors may compensate the drop in demand by increasing their marginal rates of consumption and investment, lessening their

[10] These payments had been projected to be 13.1 bill. ATS (1995), 14.2 bill. ATS (1996), and 17.5 bill. ATS (1997).
[11] Short term projections suggest that already in 1997 the cumulated deficit of all public budgets would reach 7.5 %, which is far beyond the 3 % limit of the Treaty of Maastricht (*Kramer, Lehner*, 1996).
[12] This does not imply, however, that the way the 100 bill. ATS are collected meets basic criteria of efficiency or equity. Understandable from a political-economic point of view, the basic strategy has been to hurt everybody a little bit, as this seemed to be the winning strategy concerning the chance of reaching a consensus across the different interest groups.

savings ratios, etc. Here EU accession could provide a positive contribution via an increase in domestic competitiveness. Another potentially positive EU related aspect comes from adjusting the distribution of tasks between the individual bodies of the public sector, horizontally as well as vertically.

By and large, EU accession had direct effects on public budgets, mainly via the contribution to the EU budget as well as an increase in domestic expenditures for the agricultural sector, but only some indirect effects emerging from changing consumption and production patterns etc. The most important problems are structural deficiencies in the basic construction of the Austrian public sector as well as the social system (*Kramer, Lehner*, 1996), still remaining to be solved.

3.5 Other impacts of EU accession

Looking at foreign direct investment in Austria the significant rise from 12.9 to 17.6 bill. ATS quite safely can be contributed primarily to EU accession (*Weidmann*, 1996). There are also plans to enlarge the production capacities of multinational enterprises (OPEL, BMW, Siemens) within the next years. More than 60 % of the total stock of foreign investment in Austria originates within the EU. Indirectly, the efforts to adapt the Austrian tax system may also have played a positive role, as the expectations related to the opening up of Eastern Europe still may do.

An indirect effect of EU accession is also the boost concerning investment in production equipment to increase competitiveness. So far the consequences for labor markets have been quite modest. However, this has been achieved, at least in part, by an increase in early retirement, which will be not possible in the upcoming years. Together with the above mentioned rationalization of production processes and a significantly decreasing public and private demand as a consequence of the „savings package" a downswing in the labor market may be around the corner. However, as most of the positive integration effects may occur in the medium term a counterbalancing impact may take place. This expectation is supported by the outcome of the mid-term simulation experiment presented above, which is only slightly less optimistic than a recent forecast of the WIFO-Institute, which expects an increase in the growth of the real GDP by 2.8 % and a dampening effect on the CPI of -3.3 % up to the year 2000.

4 Summary and outlook

At the time being, Europe seems to be in the middle of a fundamental change not only concerning economic but also social policy. The major driving force is the restraints as to national budgets, limiting the potential to actively counterbalance adverse economic developments via demand management, as well as to continue the recent volume of social safety. However, oversizing specific social benefits is only one cause for the recent worsening of public budgets, the increasing global competition between the large trading blocks may be the primary force, sometimes out of sight from a purely domestic point of view.

The formation of a closely linked system of European countries, at least in principal, contributes to the necessary increase in global competitiveness. Hence, joining this system makes sense under these general circumstances in the long run. The empirical facts lead to the conclusion that in the case of Austria the short term effects of this step have not been

very substantial. The one notable exception is the agricultural sector, experiencing quite a sharp change of its economic environment. The expected dynamic integration effects in the longer term may be the most influential effect of joining the EU. To energize this potential will be the primary task of public and private decision making processes in the upcoming years.

5 References

Breuss, F.:

Die vierte EU-Erweiterung - um Österreich, Finnland und Schweden. *WIFO-Monatsberichte,* Heft 2, 105-125, 1995.

Breuss, F.:

The Impact of the Uruguay Round on Austria. in: Breuss, F. (Ed.) (1995): The World Economy after the Uruguay Round, Vienna (Service Fachverlag), 367-394, 1995.

Breuss, F., Schebeck, F.:

Die Vollendung des EG-Binnenmarktes. Gesamtwirtschaftliche Auswirkungen für Österreich - Makroökonomische Modellsimulationen. WIFO, Wien, 1989.

Breuss, F., Kratena, K., Schebeck, F.:

Effekte eines Eu-Beitritts für die Gesamtwirtschaft und für die einzelnen Sektoren. *WIFO-Monatsberichte*, Sonderheft, 18-33, 1994.

Cecchini, P.:

The European Challenge 1992. The Benefits of a Single Market. Aldershot, Wildwood House, 1988.

Hofreither, M. F., Kniepert, M., Streicher, G.:

Direct and Indirect Effects of EU Accession for the Austrian Farm Sector. In: Czech University of Agriculture Prague and Czech Ministry of Agriculture (ed.), *Agrarian Prospects IV - Collection of Papers of the Faculty of Farm Economics and Management*, 42 - 52, 1995.

Hofreither, M. F., Pruckner, G., Weiss, Ch. R.:

Ökononomische Interaktionen zwischen Gesamtwirtschaft und Agrarsektor. Kiel (Verlag Vauk Kiel KG), 1991.

Hofreither, M. F., Streicher, G.:

MC_Link - zwei kombinierte makro/agrar-Modelle der österreichischen Wirtschaft. *Forschungsbericht.* Wien, 1995.

Keuschnigg, Ch., Kohler, W.:

Austria in the European Union: dynamic gains from integration and distributional implications, *Economic Policy*, 22, 155-190, 1996.

Kramer, H., Lehner, G.:

Die wirtschaftspolitischen Maßnahmen der neuen Bundesregierung. *WIFO-Monatsberichte,* Heft 3, 163-169, 1996.

Oesterreichische Nationalbank (OeNB),

Zahlungsbilanz im Jahr 1995. Berichte und Studien, Heft 1, 15-21, 1996.

Pollan, W.:

Die Auswirkungen des EU-Beitritts auf die Verbraucherpreise. *WIFO-Monatsberichte*, Heft 1, 45-60, 1996.

Weidmann, M.:

Bilanz: Das erste Jahr Österreichs in der EU. *CA-Quaterly*, Heft 1, 23-28, 1996.

6 Appendix

Table A1

Foreign trade of Austria in 1995						
	exports			*imports*		
region	volume *(bill.ATS)*	share *(in %)*	1994/95 *(in %)*	volume *(bill.ATS)*	share *(in %)*	1994/95 *(in %)*
EU	368.7	65	+11	467.6	70	+9
EFTA	42.0	7	+6	29.8	4	-4
eastern Europe	73.7	13	+5	55.0	8	+4
other Continents	79.4	14	+10	114.2	13	+3
total	563.8	100	+10	666.6	100	+6
source: *Weidmann*, 1996; own calculations						

Table A2

Balance of payments of Austria (bill. ATS)			
item	**1994**	**1995**	**difference**
current account			
merchandise	-78.9	-73.3	5.6
capital earnings	-10.8	-9.9	0.9
tourism	42.8	29.5	-13.3
other positions	34.5	27.9	-6.6
transfers	-8.3	-21.5	-13.2
balance on current account	*-20.7*	*-47.3*	*-26.6*
capital balance			
long term	9.3	79.3	70.0
credits	-71.9	-95.8	-23.9
debits	81.2	175.1	93.9
short term	24.4	-21.6	-46
credits	-36.8	-56.3	-19.5
debits	61.2	34.7	-26.5
balance on capital account	*33.7*	*57.7*	*24.0*
change of exch. reserves	*-4.8*	*5.8*	*10.6*
errors and omissions	*-2.7*	*3.8*	*6.5*
change in official assets	*5.5*	*20.0*	-
source: Oesterreichische Nationalbank, 1996; own calculations.			

Abstracts

The Austrian farm sector's adjustment to the CAP in 1995

(Karl Michael Ortner)

When Austria applied for membership in the EU in 1989, final output of agriculture was expected to decrease by 6.0 bill. ATS or 11 % as a consequence of lower producer prices and a different support regime in the EU. The last estimate before accession expected this decrease to be 15.8 bill. ATS or 23 %. Farmers were thus reluctant to embrace EU membership and pressed for an extended adjustment period and measures which would enable them to maintain current environmental standards and to deliver public goods and services at the same rate as before. Although this did not materialise, the accession treaty seemed to provide for sufficient benefits, such as compliance with GATT commitments, deregulation of the processing sectors, free trade within the union, increased productivity and lower consumer prices. Farmers were offered seemingly adequate compensations in the form of increased supplementary income payments for farmers in disadvantaged regions, CAP (Common Agricultural Policy) payments for crops and livestock, degressive compensation payments over the first four years of membership, and substantially increased payments for environmental services.

The present paper examines observed changes in Austrian agriculture, food processing and retail prices in 1995. Final output of agriculture decreased by 16 bill. ATS; cereals, milk, poultry, eggs and vegetables were the sectors most affected by accession. Net subsidies for agricultural services increased by almost 14 bill. ATS in 1995 which nearly compensated farmers aggregate income loss. In the dairy sector, processing and marketing margins increased but consumers saved at least 3.7 bill. ATS on the 1994 levels of consumption. The adjustment process for agriculture has just begun. Considerable pressure is expected due to a progressive decrease of temporary compensation payments and their discontinuation in 1999.

Environmental aspects of EU-integration of Austrian agriculture

(Marta G. Neunteufel)

The environmental consequences of the EU-Integration cannot be assessed yet. However, price changes of agricultural products and input factors, as well as changes in legal regulation for imports of agrochemicals, the increase of limits of animal stocks, and the introduction of a new incentive system for the promotion of environmental objectives influence the state of the environment significantly. The regional concentration of both grain (especially wheat and maize) and animal (pig and poultry) production was continuing in 1995. Accordingly, nitrate thresholds in the groundwater were often exceeded in the corresponding regions. This concentration process took also place among farms: the size of animal stocks per farm increased more than that of total stocks. Biological farming is rapidly extending in grassland areas while only a very small share of farms in cropland areas switched to biodynamic cultivation.

Market structure, marketing margins and EU membership: evidence from the Austrian meat sector *(Adusei Jumah)*

Retail prices are expected to follow the movements of producer prices, although there may be lags of adjustment and retailers may prefer to keep prices in the retail market constant or increase them. Claims that they are adjusting prices only in the preferred direction are frequently voiced by farmers and consumer groups alike. If they were right, retailers would act like oligopolists, being able to set prices and pocket monopoly rents. Cointegration analysis of the movements of monthly producer and retail prices of beef and pork for 1981-1994 in Austria confirmed that these claims are not justified: prices in the beef and pork marketing chain were found to be integrated, and the cointegration vector adheres to hypotheses which are valid only if the related markets are characterized by competitive behavior of the market participants. Specifically, the movement of any one of the four prices examined was accompanied by corresponding movements of the other three prices in the long run, and it led to partial adjustments to long-run equilibrium in the short run. Whereas marketing margins have remained stable in absolute terms, percentage margins have increased. Results from the expost forecasts revealed that in the absence of EU membership meat prices would have been higher than they were in 1995.

Macroeconomic development after Austria's EU accession - some selected observations *(Markus F. Hofreither)*

Since 1995 the EU has three new members: Austria, Finland and Sweden. Although all new members do face adjustment problems of varying intensity in the short term, the long term prospects of joining the EU are predicted to be positive. In general the integration of formerly separated economic areas is expected to entail gains in economic efficiency, growth, and welfare, mainly driven by increased competition. In more detail, the elements bringing about these desired results are primarily located in the elimination of transaction costs as well as increased specialization and hence economies of scale through larger markets. Additional arguments for integration at European countries are the increased bargaining power in international negotiations, the greater efficiency of common institutions in foreign policy and security matters, and last but not least, the increasing number of problems that cannot be solved in an isolated domestic setting.

In the case of Austria a substantial deal of the differences to the EU has already been eliminated by joining the European Economic Area (EEA). Hence, it is not a big surprise that the short term effects of EU accession at the macroeconomic level have been quite modest. In fact, only a significant price cut in the food sector, the negative impact of financial net contributions to the EU budget within the currant account as well as their negative effect on the federal budget, intensified by vastly enlarged payments to farmers and the agro-industry, are the outstanding developments. The ongoing attempts to increase competitiveness to be able to utilize the chances provided by this European market do show first advancements. However, the full range of dynamic integration effects, being the outstanding effect of joining the EU, will take more time to materialize. Hence, supporting this process is one of the primary tasks of public and private decision makers in the upcoming years.

Zusammenfassungen

Die Anpassung der österreichischen Landwirtschaft 1995 an die GAP *(Karl Michael Ortner)*

Als sich Österreich 1989 um die EU-Mitgliedschaft bewarb, wurde erwartet, daß als Folge niedrigerer Produktionskosten und eines anderen Förderungssystems in der EU die landwirtschaftliche Endproduktion um 6 Milliarden Schilling oder 11 % abnehmen würde. Die letzte Schätzung vor dem Beitritt sagte voraus, daß die Abnahme 15,8 Mrd. ATS oder 23 % betragen werde. Die Landwirte zögerten daher, die EU-Mitgliedschaft zu befürworten und drängten auf eine verlängerte Anpassungsphase und auf Maßnahmen, die es ihnen ermöglichen würden, gegenwärtige Umweltstandards aufrechtzuerhalten und öffentliche Güter und Dienstleistungen im bisherigen Ausmaß erbringen zu können. Obwohl ihnen das nicht zugestanden wurde, schien es, daß der Beitrittsvertrag genügend Vorteile mit sich bringen würde, wie zum Beispiel die Erfüllung der GATT-Verpflichtungen, die Deregulierung der Verarbeitungssektoren, Freihandel innerhalb der Union, erhöhte Produktivität und niedrigere Verbraucherpreise. Den Landwirten wurden angemessen erscheinende Ausgleichszahlungen angeboten in Form von erhöhten zusätzlichen Einkommenszahlungen in benachteiligten Regionen, in Form von GAP-Zahlungen für pflanzliche und tierische Produkte, von degressiven Ausgleichszahlungen in den ersten vier Jahren der Mitgliedschaft und wesentlich erhöhten Zahlungen für Umweltleistungen.

Die vorliegende Arbeit untersucht, welche Veränderungen in Österreichs Landwirtschaft, Verarbeitungsindustrie und Einzelhandelspreisen 1995 eingetreten sind. Die landwirtschaftliche Endproduktion nahm um 16 Mrd. ATS ab: Getreide, Milch, Geflügel, Eier und Gemüse waren jene Sektoren, die vom Beitritt am meisten betroffen waren. Die Nettosubventionen für landwirtschaftliche Leistungen stiegen 1995 um beinahe 14 Mrd. ATS, eine Summe, die die Einnahmensverluste der Landwirte fast ausgleicht. Im Milchsektor stiegen Verarbeitungs- und Marktspannen an; dennoch hätten sich die Konsumenten mindestens 3,7 Mrd. ATS erspart, wenn sie das Konsumniveau von 1994 beibehalten hätten. Der Anpassungsprozeß der Landwirtschaft hat gerade erst begonnen. Sie wird als Folge der progressiven Abnahme der zeitlich begrenzten Ausgleichszahlungen und deren Einstellung im Jahr 1999 weiterhin unter beträchtlichem Druck stehen.

Umweltaspekte der EU-Integration der österreichischen Landwirtschaft *(Marta G. Neunteufel)*

Die Auswirkungen des EU-Beitritts auf die Umwelt können noch nicht abgeschätzt werden. Preisveränderungen landwirtschaftlicher Produkte und Input-Faktoren, wie auch Veränderungen gesetzlicher Regelungen für die Einfuhr von Agrochemikalien, die Anhebung von Tierbestandsobergrenzen und die Einführung eines neuen Förderungssystems zur Unterstützung umweltpolitischer Ziele beeinflussen den Zustand der Umwelt entscheidend. Die regionale Konzentration von Getreide- (besonders von Mais und Weizen) und tierischen Produkten (Schweine und Geflügel) setzte sich 1995 fort. Als Folge wurden Nitratschwellenwerte im Grundwasser in den entsprechenden Regionen oft überschritten. Dieser Konzentrationsprozeß fand auch in Betrieben statt: die Größe der Tierbestände pro landwirtschaftlichen Betrieb stieg stärker an als die Größe des gesamten Bestandes. Die biologische Landwirtschaft weitete sich in Grünlandgebieten schnell aus, während in den Ackerbaugebieten nur ein geringer Anteil von Betrieben auf biologischen Anbau umstieg.

Marktstruktur, Marktspannen und EU-Mitgliedschaft: Ergebnisse aus dem österreichischen Fleischsektor *(Adusei Jumah)*

Man kann erwarten, daß die Einzelhandelspreise den Bewegungen der Erzeugerpreise folgen, obwohl es möglicherweise Verzögerungen der Anpassung geben wird, weil Einzelhändler es vorziehen könnten, Preise konstant zu halten oder zu erhöhen. Daß sie dies tun und die Preise nur in die erwünschte Richtung anpassen, wird von Landwirten und Verbrauchern gleichermaßen häufig behauptet und beklagt. Wenn sie recht hätten, würde das heißen, daß Einzelhändler wie Oligopolisten handeln, Preise setzen und monopolistische Renten einstecken können. Die Analyse der Bewegungen monatlicher Erzeuger- und Einzelhandelspreise von Rinder- und Schweinefleisch von 1981 bis 1994 in Österreich mittels Kointegration zeigt allerdings, daß diese Behauptungen nicht gerechtfertigt sind. Es wurde festgestellt, daß die Preise in der Rinder- und Schweinehandelskette kointegriert sind und daß der Kointegrationsvektor Hypothesen bestätigt, die nur gelten, wenn die betreffenden Märkte durch kompetitives Verhalten der Marktteilnehmer charakterisiert sind. Genauer gesagt wurde die Bewegung eines jeden der vier beobachteten Preise langfristig von entsprechenden Bewegungen der drei anderen Preise begleitet, wobei es kurzfristig zu partiellen Anpassungen an ein langfristig geltendes Gleichgewicht kam. Während die realen Marktspannen in Absolutbeträgen unverändert geblieben sind, nahmen sie prozentuell zu. Die Ergebnisse der ex post Prognosen zeigen, daß die Fleischpreise, wäre Österreich nicht EU-Mitglied geworden, höher gewesen wären als sie 1995 tatsächlich waren.

Einige Anmerkungen zur makroökonomischen Entwicklung nach Österreichs EU-Beitritt *(Markus F. Hofreither)*

Seit 1995 hat die EU drei neue Mitglieder: Österreich, Finnland und Schweden. Obwohl alle neuen Mitglieder vorübergehend mit Anpassungsproblemen zu kämpfen haben, werden die langfristigen Aussichten des EU-Beitritts positiv beurteilt. Es wird erwartet, daß die Integration ehemals getrennter wirtschaftlicher Gebiete hinsichtlich der wirtschaftlichen Effizienz, des Wachstums und der Wohlfahrt Vorteile nach sich ziehen wird, hauptsächlich angespornt durch erhöhten Wettbewerb. Konkret sind die Faktoren, die die erhofften Ergebnisse mit sich bringen, vor allem die Beseitigung von Transaktionskosten sowie eine erhöhte Spezialisierung und, als Folge, höhere Skalenerträge durch größere Märkte. Zusätzliche Argumente für die Integration von europäischen Ländern sind das größere Gewicht bei internationalen Verhandlungen, die größere Effizienz gemeinsamer Institutionen in der Außenpolitik sowie in Sicherheitsfragen und nicht zuletzt die wachsende Anzahl von Problemen, die im isolierten nationalen Rahmen nicht gelöst werden können.

Im Falle Österreichs wurde ein maßgeblicher Teil der Unterschiede zur EU schon durch den Beitritt zum Europäischen Wirtschaftsraum (EWR) beseitigt. Daher ist es nicht überraschend, daß die kurzfristigen Effekte des EU-Beitritts auf der makroökonomischen Ebene ziemlich gering waren. Tatsächlich sind die auffälligsten Entwicklungen eine geringe Preissenkung im Lebensmittelbereich, die negative Wirkung der finanziellen Nettozahlungen an das EU-Budget, sowohl auf die Zahlungsbilanz als auch für das Staatsbudget, verstärkt durch beträchtlich erweiterte Zahlungen an die Landwirte und den agroindustriellen Sektor. Die fortgesetzten Anstrengungen zur Steigerung der Wettbewerbsfähigkeit, die dazu beitragen, die auf den europäischen Märkten gebotenen Möglichkeiten nutzen zu können, zeigen erste Erfolge. Trotzdem bedarf es noch einiger Zeit, um die gesamten erwarteten Auswirkungen des Beitritts zur EU auch tatsächlich realisieren zu können. Daher wird es in den nächsten Jahren eine der Hauptaufgaben öffentlicher und privater Entscheidungsträger sein, diesen Prozeß zu unterstützen.