DIRECT AND INDIRECT EFFECTS OF EU ACCESSION FOR THE AUSTRIAN FARM SECTOR

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Abstract:

Austria's EU accession has caused the most dramatic incision in the post-war history of Austrian agriculture. The short-term effects primarily occurred as substantial price drops for important commodities like grains, livestock, and milk. These changes have been forecast quite accurately, but nevertheless do rock the sector in its political fundaments, although quite generous compensation payments are provided during the first four years.

This paper deals with the medium term aspects of EU accession concerning the Austrian farm sector. In applying an econometric simulation model the likely consequences of the reactions of farmers in a 6 year adjustment period are analyzed. In paying special attention to the various macro linkages of the farm sector the full effects of EU accession can be subdivided into direct effects emerging from changing agricultural policy as well as market conditions, and indirect effects, induced by the changing macroeconomic environment.

Souhrn:

Vstup Rakouska do Evropské Unie způsobil nejdramatičtější řez v poválečné historii rakouského zemědělství. Nejdříve se to krátkodobě projevilo podstatným poklesem cen u těchto komodit: obilí, živý inventář a mléko. I když tyto změny byly předpovezeny poměrně přesně, přesto otřásly tímto odvětvím v jeho politických základech , třebaže bylo poskytnuto štědré odškodné po dobu prvních čtyř let.

Tato práce se zabývá střednědobými aspekty vstupu do Evropské Unie s ohledem na rakouský zemědělský sektor. Jsou zde analyzovány pravděpodobné důsledky reakcí zemědělců v 6-ti letém přechodném období při aplikaci ekonometrického simulačního modelu. Když zaměříme zvláštní pozornost na různé makrovazby zemědělského sektoru, pak můžeme veškeré účinky vstupu do Evropské Unie dále dělit na přímé účinky, které vyplývají z měnící se zemědělské politiky a také tržních podmínek, a nepřímých účinků, které jsou způsobeny měnícím se makroekonomickým prostředím.

Key words:
EU Accession, agricultural sector, macro linkages, Austria.

Klíčová slova:
Vstup do Evropské Unie, zemědělský sektor, makrovazby, Rakousko.

1   Introduction and Problem

Since January 1, 1995 Austria is, together with Finland and Sweden, a full member of the European Union (EU). For Austrian agriculture, as well as most parts of the upstream and

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downstream sectors, this EU accession brought about the most dramatic incision in the post-war history.

In order to analyze the medium term aspects of this integration process concerning the Austrian food sector this paper is organized as follows: After briefly describing the actual situation of the Austrian farm sector after EU accession (Section 2) the adjustment processes within the farm sector are looked at in a more systematic way (Section 3). In applying an econometric simulation model the likely consequences of the reactions of farmers in a 6 year adjustment period are analyzed empirically (Section 4). Here the direct effects caused by the fundamentally changed incentive structure for farmers by changing relative prices and increased direct payments as well as changing market conditions, are only one focus of interest. Additionally, an attempt is made to separate this direct effects from indirect effects, induced by a changing macroeconomic environment in the course of the integration process. Finally, some generalized conclusions are drawn, with particularly taking into account structural similarities and differences between the situation in Austria and the Czech Republic (Section 5).

2 Austrian Agriculture and EU Accession

2.1 Austrian Farm Sector before EU Accession

Table 1 presents selected information concerning agricultural output levels as well as production values in a comparison between the EU and Austria.

TABLE 1: Basic Characteristics of Agriculture - Austria and EU (1993)

Subsector	EU	Austria	Share
Agricultural Area (1000 ha)	128 075	3 519	2.7 %
Farm Labor (1000 persons)	8 190	249	3.2 %
Crop production (1000 t)			
Wheat	83 524	1 381	1.7 %
Barley	48 024	1 456	3.0 %
Grain-Maize	25 804	1 561	6.0 %
Livestock production (1000 t)			
Beef/Veal	7 736	224	2.9 %
Pork	13 338	406	3.0 %
Cow Milk	110 652	3 350	3.0 %
Butter	1 797	41	2.3 %
Cheese	5 195	88	1.7 %
Eggs	4 848	92	1.9 %
Value of Crop Production (mill. Ecu)	106 092	1 413	1.3 %
Value of Livestock Prod. (mill. Ecu)	98 470	2 857	2.9 %
Total Production Value (mill. Ecu)	205 576	4 129	2.0 %

SOURCE: Eurostat (1993); Kommission der EU (1993)

According to TABLE 1 livestock production has a bigger share than crop production, a fact simply mirroring the natural production conditions in Austria. The milk subsector, being the only feasible branch of farming in many otherwise disadvantaged regions, is of primary importance.

In the negotiations concerning EU accession the question of production entitlements in the form of production quotas and reference quantities has been a matter of vital interest. For the milk subsector an A-quota of 2,385 000 t has been conceded, and additionally a D-quota of 367 000 t as well as a SLOM-reserve of 180 000 t has been granted. Concerning grain production a basic acreage of 1,200 000 ha has been negotiated, oil seeds can be grown on 150 000 ha. Concerning sugar an A-quota of 316 529 t and a B-quota of 73 881 t have been agreed. By and large, these quotas put Austria in a position to maintain agricultural production.

There was quite a clear notion that and by how much agricultural prices would drop in case of EU accession, as there was an increasing gap between Austria and the EU during the last decade, reaching about 23 % in 1994 (Schneider, 1994a). To provide a smooth transition from the former system to the CAP setting temporary measures in the form of degressive compensation payments over the next four years and reimbursements for the plunge in inventory values have been agreed upon. Furthermore, there has been some enlargement, but not necessarily improvement, in the support of mountainous areas concerning both volume and the number of persons eligible. Additionally, accompanying environmental measures (so called "ÖPUL-Programm") as well as regional support measures are implemented in a way similar to other EU-member countries. In sum the agricultural budget volume has increased from 19 bio. ATS to 31 bio. ATS with an extra amount of about 5.8 bio. ATS for meeting unforeseen demands in this first year.

Despite the existing trade barriers Austrian agriculture had substantial foreign trade relations with the EU before accession. Nearly 60 % of agricultural commodity trade has been done with EU-countries. However, the agricultural trade deficit vis a vis the EU has more than doubled since '72.

2.2   **First real-world Experience as EU-member**

The most perceptible influence of the CAP on Austrian farmers is the change in prices. As predicted, Austrian prices for bread grains dropped by 53 %. Taking into account the compensation payments revenues per ton may decline by 30 % in this crop year. Concerning pigs (-20 %) and cattle (-10 %) the projections of previous market analyses have been confirmed. Only for milk market prices plunged by almost 35 %, which was clearly beyond expectations[1]. Taking into account compensation payments dairy farmers are experiencing a drop of revenues of about 20 %.

Compared with Bavarian price levels the development of bread grains, milk and, particularly, pig prices temporarily showed some "overshooting". This phenomenon, however, should vanish in course of time when agents' expectations consolidate and some structural deficiencies are eliminated. Taking compensation payments into account does not restore pre-accession price levels for most commodities (BMLF, 1995). Input prices, by a long shot, do not show a pattern similar to output prices. This is only marginally compensated by eliminating the levy on mineral fertilizers or subsidizing farmers contributions to hail insurance.

The removal of trade barriers did not lead to the expected increase in agricultural and food exports. On the contrary, there was some loss of export volumes in those areas which had been supported heavily in the past, prominent examples being beef and dairy. Quite

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[1] Schneider (1995, 333) traces the lower milk price in Austria back to, on the one hand, higher production costs and, on the other hand, to a lack of efficiency and weak market performance of domestic dairies.

surprisingly, up to now no significant inroads in import markets have occurred. This may be explained by the fact that domestic producers and retailers ex ante reduced their prices to levels comparable to EU conditions.

The present problems of the food sector in this integration process can be traced back to cost inefficiencies in the production structure of farms, lack of competitiveness of downstream sectors showing monopolistic characteristics, and insufficient, or even nonexistent, marketing performance on foreign food markets.

3 Theoretical Aspects of EU accession

3.1 Macroeconomic Impacts of Integration

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, caused by elimination of transaction costs as well as increased specialization and hence economies of scale through larger markets. 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 is 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[2].

3.2 Effects of EU accession for the Farm Sector

3.2.1 Agricultural Policy and Farm Sector Performance

The development of agricultural sectors is determined by a complex mix of different forces. At first blush this process seems to be determined solely by the relevant rules and regulations of agricultural policy designed to solve the so called "farm problem"[3]. By including previously neglected international aspects (Schuh, 1974, 1981, Gardner, 1981) as well as the increasing awareness of the ineffectiveness of the applied rules (Gardner, 1983, 1987), in the course of time this perception began to change. Today, we are much more cautious in judging our knowledge of the genuine forces driving agricultural development (Gardner, 1992). We are aware of the fact that there are substantial impacts from non agricultural sectors, be they domestic or abroad, and that self-interest of the relevant actors plays a prominent role in determining agricultural policy (Hofreither/Salhofer/Sinabell, 1995). In general, it seems safe to argue that the forces behind the scenes driving this development can be found in the domain of market conditions in a broad sense, the macroeconomic environment of the farm sector, and the general perception and appreciation of the farm sector by the non-farm population. None of this is a direct consequence of farm policy.

The short term oriented market ordering policies have proved to be highly inefficient in preventing the farm sector from experiencing an unfavorable income development and continuous outmigration (Gardner, 1992). This may be caused by factor market conditions, as well as influences from the macroeconomy on agriculture. Agricultural output prices, but also

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[2] Concerning the latest EU enlargement a substantial deal of the former differences between EU and EFTA has been already eliminated by the implementation of the European Economic Area (EEA).

[3] Put simply, this 'farm problem' has long been considered as a consequence of low demand and supply elasticities in the short run, causing volatile farm prices and low income of the farm population.

the prices for input factors can be severely influenced by such factors. Moreover, also in case of administered prices there is an indirect impact from macroeconomic conditions via the budget, e.g. when export subsidies are necessary to maintain price levels. Nowadays, in the course of changing the fundamental elements of farm policy by increased "decoupling", the state of the budget gets increasingly important and so the status of the budget may become the very limit for supporting farmers in the long run.

So emphasizing the various linkages of the farm sector in trying to figure out the full consequences of changing market as well as political conditions seems to be legitimized quite well (Hofreither/Pruckner/Weiß, 1991; Hofreither, 1994). These interrelationships are particularly relevant in a situation, where both agricultural and macroeconomic conditions change simultaneously, undoubtedly happening during the process of integration of two economic areas.

3.2.2 Direct Effects of Integration

Direct effects of integration are defined as influences coming from changes within the agricultural sector, mainly being caused by changing policy rules and conditions on farm commodity markets, respectively. Here, producer prices and quantitative constraints (production quotas, reference quantities) are of crucial importance. Furthermore, the way of inducing and supporting the provision of public goods through agriculture may change. These direct influences do provide the basis of a large body of empirical literature on agricultural sector modeling. Conventionally, we implicitly expect these direct consequences of integration on the agricultural sector to be the only relevant impacts on farm sector performance. However, in the light of the above mentioned arguments concerning the various determinants of farm sector development, in the case of EU accession a more thorough examination of the validity of this assumed dominance of direct effects is necessary.

3.2.3 Indirect effects of Integration

Considering agriculture as a sector being embedded in the macroeconomy calls for the consideration of intersectoral influences. Two types can be distinguished (Hirschman, 1958; Freebairn/Rausser/de Gorter, 1982; Andrews/Rausser, 1986). 'Forward linkages' do account for influences stemming from changes in the macroeconomy. 'Backward linkages' capture influences of agriculture-specific changes on the macro economy, which may be transmitted back to the agricultural sector. However, due to the decreasing quantitative importance of the farm sector these influences are expected to be of minor relevance.

With respect to forward linkages the following examples are formulated with explicit reference to the case of the EU accession of Austria:

? Improved trading opportunities may stimulate export activities and therefore the income of the accessing country. Declining overall inflation temporarily will raise real income and hence stimulates aggregate demand. Due to Engel's law, demand for food will increase less.

? Widening the income gap between agriculture and non-agricultural sectors results in additional migration, perhaps being intensified by improved labor market conditions.

? A decrease in the foreign trade price index may affect the farm sector in two ways: Reduced import prices do induce a lower general price level and hence decreases the costs of nonfarm inputs in agriculture. The induced substitution process from labor to capital and intermediate inputs puts pressure on the agricultural labor force.

? A downward pressure on the interest rate will lower the user cost of capital. The induced investment re-enforces the above mentioned substitution effect and stimulates macroeconomic demand. The effect of intensified competition on the user cost of capital is ambiguous, as both an increase as well a decrease in the the depreciation rate is possible.

4   Quantifying Direct and Indirect Effects - Some Simulation Experiments

4.1.1   The method applied

The empirical results of this paper rest upon an econometric simulation model designed to analyze the interdependence between the Austrian nonfarm economy and the agricultural sector. This simulation model is a 'link' between an agricultural and a macro model. Founding on previous work of Hofreither/Pruckner/Weiß (1991) two updated and restructured models have been applied. The annual data base covers the years 1954 to 1992, although most equations are estimated using the years 60-92 only.

The macro model is basically Keynesian, stressing the demand side of the economy. It consists of 23 behavioral equations, whereof 10 are describing long term, 13 short term reactions. There are 25 definitions equations. All equations utilize cointegrated error correction (EC) mechanisms, estimated using the Granger two-step procedure with the estimation of a long run (cointegrated) relationship between the levels of dependent and independent variables as the first step, and the estimation of the short run reactions between the differenced variables including the lagged residuals from the first step as EC-terms. OLS is used on both stages.

The agricultural sector was modeled on the basis of earlier work of C. Weiß (1992).

21 behavioral and 17 definitions equations describe a supply, a demand, and a price section. Estimation method is 3SLS (Kniepert, 1995). The main difference to the original model of Weiß lies in a higher degree of aggregation; due to conceptual difficulties, plant and animal production are no longer distinguished. In contrast to other agricultural sector models a production function is utilized to aggregate factors of production.

The models are linked via 11 equations aggregating agricultural and non-agricultural price and national accountancy variables.[4] The structure of this link allows the assessment of direct and indirect effects as well as of forward and backward linkages by comparing the solutions of the two models run separately and jointly, rsp. Within the model link intersectoral effects are fully endogenous, guaranteeing logical coherence between alternative scenarios.

4.1.2   Simulating medium-term effects of EU accession

Founding on the Checchini-Report as well as the studies of Breuss et al. (1994), Schneider (1994b) and Neunteufel/Ortner (1989) we put up following assumptions for our simulation:

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[4] A detailed description of the model structure in German is available from the authors upon request.

TABLE 2: Assumptions for the EU-Simulation

Variable	Change
MACRO ECONOMY:	
Import prices	- 5 %
Terms of trade	+ 5 %
Gross Income of Trading Partners	+ 3 % (a)
Depreciation	+ 1 %-point
Labor Productivity	+ 1.6 % (a)
Public Investment	+ 3.2 Bill 1995-ATS/year (b)
Gross Austrian EU-payments	29 Bill 1995-ATS/year (c)
AGRICULTURE:	
Producer Price	- 23 %
Input prices	- 10 %
Agricultural Subsidies	17 345 bill.

REMARKS: (a) percentage difference of the relevant variable between the base run and the EU-run after a 6 year period, which means a gradual adjustment in 6 steps. All other changes occur instantaneously in the first period. (b) Represents the flow of EU-funds to measures aiming at structural improvement (c) Value in the first year of membership; in following years: + 1 Bill 1995-ATS/year

TABLE 3: **Simulation Results - Alternative Policy Scenarios**
(All figures are average annual growth rates in per cent during the period 1995 to 1999)

Variable	SCENARIO				
	Base Run	EU Accession			
	Growth rate (p.a., in %)	Growth rate (p.a., in %)	Growth rate (p.a., in %)	Growth rate (p.a., in %)	
		Full Effect	Direct Effect (a)	indirect Effect (b)	Indirect Effect in % of Full Effect (b)
	(1)	(2)	(3)	(4) = (2) – (3)	(5) = (4)*100/2
MACRO ECONOMY:					
Real GDP	2.5	2.7	2.7	0	1
Real Gross Investment	4.3	5.3	5.4	-0	-1
Real Imports	4.7	5.7	5.5	0.2	4
Real Exports	4.3	4.8	4.8	0	-0
Real Private Consumption	2.3	2.7	2.6	0.1	5
Employment	0.3	0.6	0.6	0.1	11
Domestic Price Index	1.5	1.1	1.5	-0.3	-30
Household Income (real)	2.8	3.1	3.3	0.1	3
AGRICULTURE:					
Production (real)	1.5	0.3	0.2	0.1	28
Tilled Acreage	-0.4	-0.5	-0.5	-0.1	9
Agric. Exports	3.0	4.6	4.1	0.5	11
Agric. Imports	1.7	6.7	6.5	0.2	3
Self Employed	-2.2	-5.5	-5.6	0.1	-1
Employed Workers	-0.9	-1.1	-1.0	-0.1	9
Disposable Income	2.8	-0.3	-0.3	0	2
Gross Agric. Investment	0.5	-7.6	-9.1	1.4	-18
Food Prices	1.5	-0.4	-0.2	-0.2	42

SOURCE: Own calculations

REMARKS: (a) Full Effects (Col.(2)) are calculated using the model-link; Direct Effects (Col.(3)) are solutions of the isolated submodels. (b) Differences due to rounding

In implementing these assumptions in a simulation experiment with the linked econometric models the following results have been obtained (Table 3). The base run (Col.(1)) roughly depicts the situation of Austria in the EEA.

The impact of EU accession on the macroeconomy is positive: together with its components, real GDP as well as employment are slightly improved against the base run, the same holds for real household income. Inflation is dampened by about 0.4 % during this 6 year adjustment period.

In the agricultural sector, output roughly stagnates. Production factors develop accordingly: outmigration of the self employed is increased by more than 3 % pts, the demand for investment goods drops by 8 %. Acreage slightly decreases, growth in agricultural income vanishes.

4.1.3 Magnitude of indirect effects

After simulating the total effect of EU accession on the Austrian farm sector the question of the relative impact of indirect effects is addressed. Technically this is accomplished by simulating the consequences of the direct impacts of EU accession for the farm sector with

the isolated agricultural model. Hereby all forward and backward linkages are eliminated. Additionally, the non-agricultural macro model is examined in this respect as well. The relative differences between this simulation experiment and the outcome of the previous subsection are shown in Table 3, col.(4). As expected, the indirect effects on the non-agricultural sector are of minor importance; only Domestic Prices (with food prices being a quite important component) are affected more considerably (1.1 % instead of 1.5 % inflation). For the agricultural sector, the indirect effects are of greater importance; for most variables, the adverse effects are mediated (e.g., growth of real production: 0.3 instead of 0.2 %), an outcome which was to be expected due to the expansionary effect of the accession on the macro economy. For no variable the direction of change is reversed.

5 Summary and policy oriented conclusions

Accessing the EU has been the most dramatic incision in the post-war history of Austrian agriculture. The short-term direct effects primarily occurred in the form of substantial price drops for important commodities, being only partially offset by compensation payments. The inroads in domestic markets by import competition have, at least so far, not been of great importance. Ex ante projections of these price drops have been quite realistic, hence the static income effects may also be in line with the magnitude of these forecasts in the short run. In the medium term, however, in addition to these conventionally mentioned direct impacts via changes of agricultural market variables the existence of significant indirect influences via changing macroeconomic conditions has to be taken into account. Changing macroeconomic conditions are to influence output as well as factor market conditions for agriculture, primarily with consequences for migration and investment behavior. Neglecting these influences may lead to seriously biased results. Furthermore, biased scientific results may lead to seriously impaired policy measures. So the awareness of the fact that agriculture too is embedded in the macroeconomy is of important value for both the agricultural economist and the politician concerned with agricultural issues.

The interesting question for this conference may be whether these results are of any significance for the Czech Republic. This question has two facets: first, do macro linkages exist for the farm sector in the Czech Republic, and, second, are they of similar magnitude? Of course, particularly this last question can only be gauged in detail when a similar model structure is at hand to check for empirical results. For the time being only a comparison of structural characteristics may provide some clues to answer at least the first question.

Although the absolute levels of GDP between Austria (150 bio. ECU) and the Czech Republic (26.7 bio. Ecu) for the year 1993 differed widely, the relative importance of the farm sector is surprisingly similar[5]. In trying to answer the first question it seams reasonable to check how much is to be gained by the Czech Republic in case of an EU accession. If the hypothesis holds, that in case of two integrating areas with great differences concerning size the smaller one will gain much more, a substantial improvement of macroeconomic conditions in the Czech Republic is to be expected. This would act in favor of a high relevance of macro linkages in case of EU accession. On the other hand, the agricultural sector in the Czech

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[5] In the Czech Republic the farm sector produces 871 mio. Ecu (Austria 3.45 bio. Ecu), accounting for 3.3 % (2.3 %) of total GDP in 1993. Agricultural employment is 271 000 persons in the Czech Republic and 249 000 in Austria. Also the production factor land is utilized in roughly the same amount in both countries: total area under cultivation amounts to 6.91 mio ha in the Czech Republic, in Austria this figure shows 7.52 mio ha. Due to the higher share of forests in Austria the picture of total acreage under cultivation switches slightliy, as 3.48 mio ha are farmed in Austria, while the Czech Republic showed 4.28 mio ha in 1993.

Republic is relatively small in comparison to other CEEC countries, which gradually offsets the first mentioned effect. However, in directly comparing the Czech Republic with Austria, both the macroeconomic impacts of EU accession as well as the relative share of agriculture is higher than in Austria, which seems to support the hypothesis that the effects analyzed in this paper are, at least, of the same importance in both countries. Hence the analysis of the consequences of accessing the EU by the Czech Republic should take into account also the indirect effects mentioned in this paper.

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