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# WHAT WILL EU MEMBERSHIP AND THE VALUE-ADDED TAX REFORM DO TO FINNISH FOOD ECONOMY?
–A Computable General Equilibrium Analysis

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**ABSTRACT:** The purpose of this study has been to quantify the economic effects of Finnish EU membership for domestic food economy. The value-added tax reform has been handled as a requirement of Finnish EU membership. The scenarios calculated by means of the GEMFIN 4.5 model include the domestic support package to Finnish farmers. Further, subsidies that will be paid from EU's budget has been included in line of Finnish membership agreement. In the value-added tax reform the lower tax rate of foodstuffs has been accounted for. Also the abolition of primary production deduction has been included.

According to the results agricultural production will in the long run be reduced by 20 per cent due to EU-membership. Grain harvesting and production of pork are hit worst. On the other hand there will be growing export and production possibilities for special plants. The price of arable land will be reduced by 50-60 per cent. This is partly offset by the rise in the price of forest land. The total effect of EU-membership will, however, be a small improvement in welfare and the average price of the food basket will be reduced by 8 per cent.

**KEY WORDS:** food economy, EU membership, value-added tax reform, numeric general equilibrium modeling, GEMFIN-model.

**TIIVISTELMÄ:** Tutkimuksen tarkoituksena on ollut arvioida Suomen EU-jäsenyyden vaikutuksia elintarviketalouteen. Arvonlisäverouudistusta on käsitelty Suomen EU-jäsenyyden ennakkoehtona. GEMFIN-mallilla lasketut skenaariot sisältävät maanviljelijöille maksettavan kotimaisen tukipaketin. Laskelmissa huomioidaan myös EU:n budjetista maksettava tuki Suomen jäsenyyssopimuksen mukaan. Arvonlisäverouudistuksessa on huomioitu elintarvikkeiden alempi veroaste. Lisäksi laskelmissa huomioidaan alkutuotevähennyksen poistuminen.

Maatalouden tuotanto supistuu laskelmien mukaan pitkällä aikavälillä 20 prosenttia, kun Suomi liittyy EU:n jäseneksi. Eniten supistuvat viljan tuotanto ja sianlihan tuotanto. Erikoiskasvien tuotanto voisi jopa kasvaa. Maatalouden sopeutuminen heijastuu maatalousmaan hinnan laskuna jopa puoleen aikaisemmasta. Metsämaan hinnan sen sijaan arvioidaan nousevan lähes 10 prosenttia. EU-jäsenyys lisää kokonaisuudessaan jonkin verran suomalaisten hyvinvointia ja ruokakorin hinta laskee keskimäärin noin 8 prosenttia.

**ASIASANAT:** elintarviketalous, EU-jäsenyys, arvonlisävero, numeerinen yleisen tasapainon mallintaminen, GEMFIN-malli.

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# 1 INTRODUCTION

There are two important structural reforms going on in Finland. Finland becomes a member in the European Union (EU) and the value-added tax reform. The latter can be seen as a requirement of the former. Both reforms are wide-spread changes of public policy and raise strong feelings. People wonder who will lose and who will win in the reforms.

Up till now all foreign trade agreements of Finland have excluded agriculture. This has been motivated by needs of self-sufficiency in food economy and by regional policy considerations. The agreement for European Economic Area did not change agricultural protectionism in Finland.

With this history Finnish application for EU membership in 1992 represented a major shift in the general attitude towards agricultural policy. One part of Finns seemed to think that protectionistic agricultural policy is the cause of too high food prices and overproduction of most agricultural products. The old system of target prices and foreign trade licenses was shaking because there were strong pressures for cheaper goods in Finland.

The reforms have been studied separately most often by means of partial equilibrium analysis. The studies by Kuhmonen (1991), Leppä (1992), Vaittinen (1992), Alho et. al. (1993, 1994) and Kettunen and Niemi (1994) provide valuable information of the consequences of Finnish EU membership. Their answers remain limited, however, because their analyzing framework is partial. Törmä and Rutherford (1993) presented the first general equilibrium analysis of Finnish EU membership. Their estimates for the welfare and allocation effects were based on a computable general equilibrium model for the Finnish economy (GEMFIN).

The analysis of Törmä and Rutherford (1993) was conducted under the time when negotiations with EU were still on process. Finland is now a member of EU. Also, the political agreement for domestic support to Finnish farmers has been reached. The authors feel that this moment is a good one for updated calculations.

The aim of this research is to quantify the economic effects of Finnish EU membership for domestic food economy. Our scenarios separate the total effect into two parts: reduction of boarder protection in agriculture to the EU level and the value-added tax reform. To our knowledge this is the first analysis in which the value-added tax reform has been handled as a requirement of Finnish EU membership.

# 2 DEFINITION OF THE SCENARIOS

There are two categories of scenarios in our research. In the first category we quantify the economic effects of Finnish membership in EU (EU-mem.). In the second category we add the assumption of the value-added tax reform (VAT) of Finland. In these scenarios we consider two different treatments for primary production deduction (PPD).[1] The alternatives studied are: 1) PPD is totally abolished and 2) PPD is maintained. The value-added tax code requires abolition of PPD. PPD has represented a considerable advantage for food processing industries. The subsidy is worth of FIM 4.2 billion. It is therefore interesting to consider the case where PPD remains although it is against EU's agricultural policy.

Key features of the GEMFIN 4.5[2] model that we have used in our simulations are presented in the appendix. Detailed model structure as well as elasticity assumptions has been reported in Törmä and Rutherford (1993).

## 2.1 Tailored model features for agriculture

Agricultural protection system of Finland is very complex. When implementing the system in model equivalent form we have to decide which elements are most crucial for our purposes of analysis. We have decided to emphasize the importance of the target price system.

The leading idea is that the government restricts imports of certain agricultural products in order to maintain a high domestic producer price as incentive for domestic production. The government thus sets politically desired target prices for agricultural products. In the model, the government employs three different policy instruments, all of which support the producer price of agricultural products: import quotas, export subsidies and production quotas.

We treat import quotas and production quotas as exogenous, and we let the export subsidy rate be endogenous. It will be set at a level that will fix the producer price at the target level. The model allows for only one adjustment variable. We could have chosen production or import quotas for this task. We feel, however, that using export

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[1]   In our earlier paper (Törmä and Rutherford, 1993) all agricultural subsidies were allocated to primary production. Here we allocate the total amount between primary production and food processing industries. Primary production deduction is only available to food processing industries.

[2]   There are three developments in this model version compared to the previous 4.0 version (Törmä and Rutherford, 1993). First, we have adopted the administrative pattern which is used in the input-output table when agricultural subsidies are allocated to production sectors. This is necessary because we want to separate the primary production deduction from the other subsidies of food processing industries. Second, we have desegregated the land input into arable and forest land. Third, we have modified the model to include simple dynamics. There is now a third time frame called the 'steady state'. GEMFIN 4.5 has been implemented by GAMS (Brooke A., Kendrick D. and Meeraus A., 1988) and MPSGE (Rutherford T., 1992).

subsidies is the best choice because it emphasizes the constant overproduction situation of Finnish agriculture.

Those who export agricultural products receive the target price for these goods and the government absorbs the loss through export subsidies when the goods are sold on the international market. Agricultural imports are sold at the domestic price and the difference between the lower international price and the sale prices is taken by the government as import quota rent.

In addition to foreign trade restriction, domestic output of agriculture is managed. The government sets politically desired production quotas for agriculture. This will reduce production volumes and we assume that as a consequence of this farmers will receive a premium in the target prices. Farmers thus earn a production quota rent.

Production quotas cannot be traded in Finland. If production quotas would be tradable then we could observe their market price. The premium in target prices would be the amount a farmer would be willing to pay for a unit of production quota. Because we don't have this information we have to estimate the premium using an indirect method.

We have estimated for each agricultural good the production volume that would have prevailed without the production quota system. Econometric time series trend models from the period 1960-81 were used to predict the production volume for 1990. The premium was then calculated by dividing the difference between actual and predicted production volume by the supply elasticity taken from Vaittinen (1992). This procedure corresponds to asking "By how much would the target price be reduced if the production quota system were abolished?"

There is an important element in the model. We have specified the land input to analyze the possible capitalization effect of Finnish EU membership. The land factor has been divided into two parts: arable land and forest land. If the price of land is altered in the new situation then EU membership would have effects even on property values. We feel that there is a strong possibility of underestimation if this capitalization effect were ignored.

## 2.2 Implementation of the target price system of agriculture

Domestic producer prices are set exogenously in the model. They are supported by endogenous export subsidy rent (XSR) which adjust to maintain a target output price. The model is calibrated using a parameter PQR, the producer quota rental rate which represents the premium received by agricultural producers with quota rights. Each agricultural good has its own PQR. The premium is 9.2% for milk and beef, 12.4% for pork, 19.3% for poultry and eggs, 4.9% for grains and for other plants and 10% for other agricultural products.

The ownership of production quota rights is determined by a vector QSHARE(h) which represents what share of all agricultural quota rights is held by consumer h.

QSHARE is based on consumer shares of farm ownership. Kettunen (1991) reports that 61.2% of all farms are owned by farmers and 19.1% by pensioners. The rest 19.7% was allocated to other entrepreneurs.

Import quota restrictions are exogenous for agriculture, with quota rents collected by the government. The 1990 benchmark is calibrated to a specified quota rent called MQR. If the international price of a commodity is $P_w$, the domestic price is: $P_d = P_w$ (1 + MQR + t) where t is the import tariff rate. MQR is 0.697 for milk and beef, 1.166 for pork, 1.076 for poultry and eggs, 1.173 for grains, 0.764 for other plants and 0.975 for other agricultural products. The relative producer price level is taken from the harvesting year 1993/94.[3] The price ratio corresponds to the external value of Finnish markka at the beginning of September 1994 (ECU = FIM 6.2). The devaluation (November 1991) and depreciation of markka (floating since September 1992) has thus been accounted for.

Total amount of export subsidies is reported in the input-output study. The benchmark has been calibrated by specifying adjusted export subsidies for agricultural products. This is based on actual differences between the European and domestic producer prices. The government is financing all export subsidies in the model.

The total effect of an agricultural policy change, such as the EU membership, will depend on several factors:

- **the degree of protection on imports** (MQR), the higher the value of MQR, the larger the resulting surge in agricultural imports

- **the substitution elasticity between domestic and imported agricultural products**, when this elasticity approaches plus infinity (perfect substitutability), we will have the largest trade respond

- **the extent to which domestic quota allocations restrict domestic output** (summarized by PQR), if PQR is large relative to MQR (or substitution elasticity between domestic goods and imports is small), elimination of the production quotas may, in fact, lead to reduction in agricultural imports

- **the supply response of domestic producers**, in particular the factor structure is quite important, the land input[4] has been included into the model in order to capture the possible long run supply response.

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[3]    The relative producer price ratio has changed considerably since 1990. MQR for grains was 1.420 in 1990. The price ratio has thus changed in favor of Finland in grains. This fact explains why the production of grains do not totally run out in this analysis as it did in our previous study. In Törmä and Rutherford (1993) the relative producer price ratios were taken from the harvesting year 1990/91. The other factor affecting the results is the level of the exchange rate. ECU costs now much less than in our previous study where calculations were conducted at the exchange rate ECU = FIM 7.0 .

[4]    The arable land input has been separated from the capital input using data from the input-output-study and capital cost shares of typical Finnish farms presented in Ala-Mantila (1992). The forest land input has been determined as in Törmä and Rutherford (1993).

GEMFIN 4.5 model has been calibrated to highlight the producer price difference existing between Finland and EU. We have wanted to emphasize the possibility of Finland being integrated into EU's Common Agricultural Policy. In this case high Finnish producer prices in agriculture would be harmonized to European levels. There are not too many technical difficulties in constructing other cases such as comparing Finnish producer prices to even lower world market prices.

## 2.3 Modeling of Finnish EU membership

EU membership of Finland is implemented as in Törmä and Rutherford (1993). This involves reduction of agricultural producer prices to European levels, elimination of the quota system of foreign trade in agricultural products, giving up subsidizing exports of food processing industries and abolition of the producer price premium of farmers.

In addition we have to decide how to model agricultural subsidies in case of membership. Table 2.1 gathers subsidies that Finnish agriculture will be receiving from both the domestic support package and from EU (Kettunen and Niemi, 1994, table 7, see also Principle Decision of the Cabinet, 5-26-1994). The gross and net EU membership fees are also presented (Kettunen and Niemi, 1994, table 12).

Table 2.1 Agricultural subsidies and EU membership fee of Finland, FIM bill

| Subsidy type | Year 1995 | | | Year 2000 | | |
|---|---|---|---|---|---|---|
| | Finland | EU | Total | Finland | EU | Total |
| CAP reform subsidy | 0 | 1.7 | 1.7 | 0 | 2.0 | 2.0 |
| LFA subsidy | 1.0 | 0.5 | 1.5 | 1.0 | 0.5 | 1.5 |
| Environmental subsidy | 0.7 | 0.7 | 1.4 | 0.7 | 0.7 | 1.4 |
| Domestic support | 3.8 | 0 | 3.8 | 3.8 | 0 | 3.8 |
| Transition period sub. | 1.9 | 1.1 | 3.0 | 0 | 0 | 0 |
| Total | 7.4 | 4.0 | 11.4 | 5.5 | 3.2 | 8.7 |
| Finlands EU mem. fee | | | | | | |
| gross | 6.8 | | | 8.7 | | |
| net | -0.4 | | | 2.7 | | |

Our starting point is the interpretation that EU membership will abolish the price subsidy system of Finnish agriculture. As a member, Finland will carry out EU's common agricultural policy. The income level of Finnish farmers will be supported by direct income subsidies. For this reason, we interpret all subsidies from EU as direct

income compensation to Finnish farmers. Domestic support based on hectares is also interpreted as direct income support.

The other principle we have utilized is that we include in the direct income subsidy only permanent elements. This means that we exclude transition period subsidies. They are temporary in nature, centred in the first years of membership and most of them will be used as a once and for all compensation for changes in the value of state's grain stock. Transition period subsidies will have only short run effects while our interest is in calculating intermediate and long run effects.

Parametrized according to these principles the direct income compensation of Finnish farmers will be FIM 8.4 billion in the intermediate run and FIM 8.7 billion in the long run. Finland's gross and net EU membership fees has been parametrized as presented in table 2.1. We gather in table 2.2 the main elements of the EU membership scenario.

Table 2.2 Assumptions of Finnish EU membership scenario

- agricultural producer prices are reduced to European levels
- quota system of foreign trade in agricultural products is abolished
- export subsidies of food processing industries are abolished
- producer price premium of farmers is abolished
- support to Finnish farmers from EU and domestic sources is modeled as direct income subsidy (a lump-sum transfer)
- net EU membership payment to EU is included

## 2.4 Modeling of the value-added tax reform

When the sales tax is replaced by the value-added tax several changes will take place. First, the reform will remove the so called disguised sales tax paid by basic, industrial and services production. This tax code change has been implemented in our scenarios by setting the intermediate price content of former sales tax rate equal to zero for these sectors. The tax content is calculated from the input-output-table.

Second, there will be a value-added tax on those private services that have not been taxed in the turn-over tax system. This tax will also be imposed on public consumption. Third, some private services are exempt of the value-added tax. These two features have been implemented by imposing the tax on private consumption of foodstuffs, housing, household equipment, transportation, recreation and culture, other goods and services and on public consumption.

Finnish value-added tax reform allows lower tax rate for certain goods. While the general value-added tax rate is 22% of the net price, a lower 12% tax rate is charged for personal transportation and accommodation services, for cinema exhibitions, books, and medicine. There is a separate 5% rate for license fees of the Finnish Broadcasting Network. Expenditure shares of these goods can be obtained from Consumer Budget Survey of 1990. The effective value-added tax rate was then calculated as a weighted average.

The effective value-added tax rate was calculated to be 17.4% for private consumption of transportation services and 13.6% for recreation and culture. Health care services remain exempt from the value-added tax. The exception is medicine which faces a lower 12% tax rate. The effective value-added tax rate for private consumption of health care was calculated to be 11.6 %. In the Government Proposal to the Parliament (1993) a quite low tax rate, 11.6%, is motivated for private consumption of housing. We use this estimate in our simulations.

Finally, we take account of the fact that the value-added tax rate is 17% for foodstuffs until the year 1997 and will after that be reduced to 12%.

We gather in table 2.3 the main elements of the value-added tax reform scenario.

| Table 2.3  Assumptions of the value-added tax reform scenario |
| --- |
| - disguised sales tax is abolished |
| - value-added tax is imposed on those private services that were |
| - exempted in the old sales tax system |
| - exemption of some private services from value-added tax |
| - primary production deduction is abolished |
| - general value-added tax rate is 22% of net price, 12% for certain |
| - goods and services |
| - value-added tax rate for foodstuffs is 17% until 1997 and after that 12% |

## 2.5  The treatment of primary production deduction

PPD is granted for food processing industries. Our data base uses the input-output-table where PPD is included into production subsidies. Using the coefficients specified in the turn-over tax act we have calculated the magnitude of this deduction for different food industries. The total value of PPD was estimated to be 4.2 billion

FIM on the basis of 1988 input-output data. This is a similar figure that was estimated in the Proposal of the Cabinet (1993, 34). The separate tax refund on exported products adds to this figure more than 700 million. Sectoral subsidy rates are reported in table 2.4.

Table 2.4  Primary production deduction for the year 1990, percent of the gross price

| Industry | PPD, % |
|---|---|
| Slaughtering and meat processing | 11.1 |
| Milk processing | 19.1 |
| Production of mill and bakery goods | 3.7 |
| Production of sugar, chocolate and candies | 4.2 |
| Production of other foodstuffs | 4.8 |
| Production of feedingstuffs | 7.5 |
| Production of beverages | 2.1 |

In our scenarios we calculate both the case where PPD is removed and the case where it is maintained.

## 2.6  The time-frames

There are two[5] time-frames in our analysis. The situation where only labor mobility[6] across sectors is allowed, is labeled as intermediate run. Land and capital are sector specific factors of production in the intermediate run. In the long run capital is a mobile factor free for reallocation. The arable land factor will be free to reallocate between agricultural products in the intermediate and long run. There is, however, no substitution possibilities between arable and forest land.

The simulations have been implemented by holding the tax revenue[7] of the public sector constant. As the base of value-added taxation becomes broader we adjust the overall value-added tax rate to compensate for the changes in total tax revenue.

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[5]    Actually, there is a third time-frame in GEMFIN 4.5 model called the steady state. It corresponds to a time concept during which all factors are mobile but the price of capital is fixed. The quantity of the capital stock adjusts to equilibrate the economy. Results for the steady state are not presented in this report. Our focus is on the trade-off between intermediate and long run.

[6]    Our model assumes homogenous labor. It is thus not possible to separate those farmers that remain as farmer laborers from those that find new employment.

[7]    This is equivalent to holding the size of the public sector constant. When public tax revenue or public utility is constant then we can measure the social welfare change from the welfare changes of the consumers.

# 3  GENERAL EQUILIBRIUM ASSESSMENT OF THE REFORMS

**Effects on factor prices**

Factor price changes of the two reforms are presented in table 3.1. All price changes in this and in the other tables refer to the real price. The intermediate run view is that both the Finnish EU membership and value-added tax reform will raise the price of forest land and depress the price of capital. The wage rate will be only slightly affected. Finnish EU membership will mean that the price of arable land will collapse even in the intermediate run.

Capital intensive industries will benefit from the two reforms while labor intensive sectors and forestry will face rising factor costs. The lower price of arable land will partly compensate these factor price increases in harvesting of grains and other plants. Finnish EU membership will, however, have a capitalizing effect and farmers will experience a huge loss of their property values.

Table 3.1  Factor price changes of Finnish EU membership and the value-added tax reform, percentage change compared to the 1990 benchmark

| Factor | Intermediate run | | | Long-run | | |
|---|---|---|---|---|---|---|
| | EU-mem. | VAT | Total | EU-mem. | VAT | Total |
| Labor | +0.5 | +0.1 | +0.6 | +0.7 | +0.8 | +1.5 |
| Capital | -0.8 | -4.1 | -4.9 | -1.2 | +1.5 | +0.3 |
| Arable land | -42.3 | +0.1 | -42.2 | -57.9 | +1.2 | -56.7 |
| Forest land | +0.2 | +4.7 | +4.9 | +1.5 | +6.6 | +8.1 |

In the longer run the view of factor price changes is a bit different. Finnish EU membership lowers the prices of capital and arable land but causes the price of forest land to increase. The value-added tax reform, on the other hand, raise all factor prices. As will be seen in table 3.6 the value-added tax reform generates economic growth. The indirect demand for factors will increase and raise factor prices.

It is interesting to note the magnitude of arable land price change. The capitalizing effect of Finnish EU membership will be very strong in the long run. Both reforms increase forest land prices also in the long run. As table 3.6 will reveal both reforms strengthen industrial production including wood and paper industries. The boom of these wood based industries will be capitalized in forest land prices.

The long run total factor price effect is moderate for capital. Wages will increase somewhat, however. The long run view given by our general equilibrium simulations is the following. First, adjustment of arable land prices will push down production

costs and thus soften the shock of lower producer prices for agriculture. Second, focusing on forestry will become an alternative. Owning forest land will be more profitable when Finland is a member in the European Union. Expanding of forestry will, however, become more difficult for farmers since forest land prices are increasing.

These factor price changes will cause income effects. According to our calculation farmers would lose 11% of their income in the long run if no income compensation is paid. In this case the purchasing power of other consumers would be increased as a consequence of the two reforms by about 0.4% on average.

## Effects on primary production

Table 3.2 gathers information about the effects of the two reforms on primary production. The value-added tax reform has no output effects in agriculture because we have held the target price system constant in the value-added tax case.

Table 3.2  Domestic output changes of primary production due to Finnish EU membership and the value-added tax reform, percentage change compared to the 1990 benchmark

| Commodity | Intermediate run | | | Long-run | | |
|---|---|---|---|---|---|---|
| | EU-mem. | VAT | Total | EU-mem. | VAT | Total |
| Prod. of milk and beef | +0.1 | - | +0.1 | -25.4 | - | -25.4 |
| Production of pork | -15.5 | - | -15.5 | 31.0 | - | -31.0 |
| Prod. of poultry and eggs | -12.0 | - | -12.0 | -18.7 | - | -18.7 |
| Production of grains | -22.0 | - | -22.0 | -41.1 | - | -41.1 |
| Production of other plants | -0.3 | - | -0.3 | +80.8 | - | +80.8 |
| Other agricultural prod | -5.2 | - | -5.2 | -31.5 | - | -31.5 |
| Agriculture on average | -5.1 | - | -5.1 | -20.8 | - | -20.8 |
| Forestry, fish. and hunting | 0 | +1.1 | +1.1 | +0.4 | +1.8 | +2.2 |

There will be only modest primary production losses from Finnish EU membership in the intermediate run. Capital is assumed fixed in the intermediate run and this explains why major losses do not materialize.

Production of milk and other plants will be maintained in the intermediate run. Greatest intermediate run losses are faced in production of pork and in harvesting of grains. The magnitude of these losses is 16-22%. Production of poultry and eggs will

suffer by 12%. The average intermediate run loss of agricultural production is about 5%.

The long run prospects of agriculture are much more gloomy. About 40% of grain production will be lost, about a third of pork production and a fifth of production of poultry and eggs will be lost when Finland is a member in the European Union.

Further, production of milk and beef will be reduced by about 25%. As will be apparent from table 3.5 milk processing will be facing increasing costs when the primary production deduction and export subsidies are abolished. Dairies suffer and the intermediate demand for raw milk will be reduced. The average decrease of agricultural production will be 20% in the long run.

Our simulations suggest that there are two escape rutes for farmers. The first is production of other plants. The increase of other plant production is about 80% in our calculation[8]. Our simulations even indicate that there would be possibilities to export other plants. The other alternative is forestry which will grow due to both reforms. The total increase of production is about one percent in the intermediate run and about two per cent in the long run.

From these results it is apparent that Finnish EU membership will be a severe test for agriculture. There will be major changes in the production structure when especially milk, pork and grain production becomes unprofitable. We have estimated using output losses that about 50 000 farm workers have to find a new job during the adjustment period. Capital intensive and exporting sectors, such as wood, paper and metal industries will absorb this labor in the longer run.

**Effects on the price level**

It is often postulated that Finnish EU membership means cheaper food. Our analysis verifies this assumption as can be seen from table 3.3 which collects changes of domestic prices.

Most of the total food price effect derives from EU membership. Lower producer prices of agriculture and cheaper exported food depress the average price of the food basket. The downfall of food price due to EU membership is 10%.

The value-added tax reform increases food price only slightly. Former hidden sales tax is removed when the value-added tax replaces the old system. Further, the lower long run 12% value-added tax rate for foodstuffs is beneficial. The opposite elements in the reform are the abolition of the primary production deduction and export subsidies which raise production costs in food processing industries. This explains why the prices of meat and milk based products increase due to the value-added tax reform. Slaughtering, meat and milk processing lost most when the primary

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[8] The main reason why other plant production grows is the fact that the price of arable land falls heavily when land is released from production of grains. Production of specialized plant products becomes possible when land costs decrease.

production deduction and export subsidies were abolished. As can be seen from table 3.3 the EU membership effect nearly balances the price effects of the value-added tax reform for milk based products.

Table 3.3 Domestic price changes of consumer commodities due to Finnish EU membership and the value-added tax reform, percentage change compared to the 1990 benchmark

| Consumer commodity | Intermediate run | | | Long-run | | |
|---|---|---|---|---|---|---|
| | EU-mem. | VAT | Total | EU-mem. | VAT | Total |
| Grain and grain products | -5.6 | -3.3 | -8.9 | -5.3 | -2.9 | -8.2 |
| Meat and meat products | -16.4 | +6.6 | -9.8 | -15.1 | +7.1 | -8.0 |
| Milk, cheese and eggs | -21.9 | +23.1 | +1.2 | -20.6 | +24.9 | +4.3 |
| Butter and other greases | -17.3 | +20.2 | +2.9 | -16.8 | +22.4 | +5.6 |
| Potatoes | -23.8 | +2.3 | -21.5 | -19.4 | -2.8 | -22.2 |
| Sugar | -6.4 | +1.4 | -5.0 | -6.1 | +2.8 | -3.3 |
| Other foodstuffs | -9.3 | -2.0 | -11.3 | -8.7 | -1.7 | -10.4 |
| Beverages | -0.3 | -14.5 | -14.8 | -1.2 | -14.5 | -15.7 |
| Clothing and footwear | +0.9 | -8.4 | -7.5 | +0.6 | -2.7 | -2.1 |
| Housing | +1.9 | +2.5 | +4.4 | -0.2 | +9.5 | +9.3 |
| Household equipment | +1.1 | -4.3 | -3.2 | +0.7 | 0 | +0.7 |
| Health care | +1.1 | +3.4 | +4.5 | +0.2 | +6.2 | +6.4 |
| Transportation | +1.3 | -4.2 | -2.9 | +0.8 | +1.1 | +1.9 |
| Recreation and culture | -0.2 | -2.2 | -2.4 | -0.7 | +1.3 | +0.6 |
| Other goods and services | +1.1 | +1.0 | +2.1 | +0.7 | +6.2 | +6.9 |
| On average | -1.1 | -0.8 | -1.9 | -1.7 | +3.5 | +1.8 |
| Foodstuffs on average | -10.3 | +1.0 | -9.3 | -9.9 | +1.5 | -8.4 |
| Private investment | +0.5 | -6.7 | -6.2 | +0.1 | -5.9 | -5.8 |

The net effect of the value-added tax reform is that the average price of foodstuffs increases by 1% in the intermediate run and by 1.5% in the long run. The total effect of the two reforms is a fall by 8-9% of average food price.

Finnish EU membership has negligible effect on the average price level of all consumer commodities. While food becomes cheaper other goods and services become dearer and these two effects nearly balance each other. The same holds true for the value-added tax reform for the intermediate run. According to our calculation the value-added tax reform increases consumer prices in the long run. The average price level of consumer commodities will increase by nearly 4% in the long run. The total long run price effect of the two reforms is nearly 2%.

The value-added tax reform places more taxes on present consumption and thus favors future consumption. This is seen in the price of private investment which declines 6-7% due to this reform. Finnish EU membership will have only small long run effect on the price of private investment.

**Effects on private demand**

The corresponding private demand changes are reported in table 3.4.

Table 3.4    Changes in private demand due to Finnish EU membership and the value-added tax reform, percentage change compared to the 1990 benchmark

| Demand category | Intermediate run | | | Long-run | | |
|---|---|---|---|---|---|---|
| | EU-mem. | VAT | Total | EU-mem. | VAT | Total |
| Private demand on average | +1.0 | +0.5 | +1.5 | +1.5 | -1.8 | -0.3 |
| Foodstuffs | +4.5 | -0.2 | +4.3 | +4.5 | -0.6 | +3.9 |
| Private investment | 0 | +5.0 | +5.0 | +0.2 | +6.2 | +6.4 |

As food becomes cheaper its demand increases. As members of the European Union Finns will purchase about 5% more food. EU membership will raise purchasing power on average and this together with lower consumer prices explains the 1-2% increase in private demand.

The value-added tax reform has negative long run effects on private demand which will decline by nearly 2% due to the reform. The co-effects of EU membership and VAT implementation on total private demand are thus negligible. Private investment will prosper, however. As future consumption becomes more attractive Finns will save more and spend the money on purchases of investment goods. The increase of private investment is 6%. Finnish EU membership will slightly sustain this development.

## The importance of primary production deduction

Table 3.5 Domestic price and output changes of food processing industries due to Finnish EU membership and the value-added tax reform, percentage change compared to 1990 benchmark. Long run

| | PPD is maintained | | PPD abolished | |
| Industry | Price | Output | Price | Output |
| --- | --- | --- | --- | --- |
| Slaughtering and meat processing | -18.5 | +3.9 | -2.0 | 0 |
| Milk processing | -10.4 | -4.9 | +24.5 | -16.2 |
| Production of mill and bakery goods | -6.5 | +2.5 | -0.7 | +1.0 |
| Production of sugar, choc. and cand. | +1.3 | -4.5 | +10.0 | -7.8 |
| Production of other foodstuffs | -5.8 | +3.6 | +2.1 | -1.8 |
| Production of feedingstuffs | -13.4 | -15.4 | -4.7 | -21.3 |
| Production of beverages | -1.8 | +3.1 | +1.1 | +3.0 |
| Food processing industries on average | -8.5 | -4.0 | +3.6 | -8.1 |

Table 3.5 reveals that food processing industries lose quite much when primary production deduction is abolished. The average production loss would have been only 4% if primary production deduction could have been maintained. The total effect of the two reforms is a fall of production by 8% in these industries. Output losses are centered in milk processing and production of feedingstuffs. The magnitude of these losses are 16-21%. Our conclusion is, however, that agriculture is the greatest loser in Finnish EU membership.

## Effects on economic growth

The effects on economic growth of the two reforms are presented in table 3.6. From this table it is apparent that Finnish EU membership will punish primary production and benefit the open sector. The value-added tax reform, on the other hand, will punish food processing but foster industrial growth. This growth will increase investments and the volume of construction will grow, too. Services face more taxes under the value-added tax system. The value-added tax thus lowers the demand for services. EU membership will benefit services somewhat, so the net effect of the two reforms is that the level of services production maintains its present level.

Table 3.6 GNP changes due to Finnish EU membership and the value-added tax reform, percentage change compared to the 1990 benchmark

| Industry | Intermediate run | | | Long run | | |
|---|---|---|---|---|---|---|
| | EU-mem. | VAT | Total | EU-mem. | VAT | Total |
| Primary production | -2.7 | +0.5 | -2.2 | -10.5 | +0.9 | -9.6 |
| Food processing ind. | +5.2 | -10.4 | -5.2 | +3.3 | -11.4 | -8.1 |
| Industrial production | -0.6 | +2.3 | +1.7 | +0.7 | +3.5 | +4.2 |
| Building and construction | -0.1 | +4.0 | +3.9 | +0.2 | +4.7 | +4.9 |
| Rented and ow-oc. dwell. | +0.1 | -0.4 | -0.3 | +3.4 | -2.1 | -1.3 |
| Services production | +0.2 | +0.8 | +1.0 | +0.6 | -0.5 | +0.1 |
| GNP | -0.1 | +1.0 | +0.9 | -0.3 | +0.7 | +0.4 |

The decline of primary production and growth of industry balance each other in the case of Finnish EU membership. In fact, GNP declines by 0.3% in the long run due to the reform. It is interesting to note that our calculation predicts that most growth comes from the value-added tax reform which boosts growth by 0.7%. The total effect of the two reforms is the following. Industry will grow 4% and GNP by 0.4% whereas primary production will decline by 10% and food processing industries by 8%.

**Final test: effects on welfare**

The final test of any economic policy reform is a Pareto improvement calculation. The relevant question is: "If the losers were compensated will the reform improve the welfare of at least one member of the society?". Table 3.7 gathers data on the changes of consumer welfare.

Table 3.7 Consumer welfare changes due to Finnish EU membership and the value-added tax reform, percentage change compared to the 1990 benchmark

| Consumer | Intermediate run | | | Long run | | |
|---|---|---|---|---|---|---|
| | EU-mem. | VAT | Total | EU-mem. | VAT | Total |
| Wage earners | +0.4 | +0.4 | +0.8 | +0.8 | -0.4 | +0.4 |
| Farmers | +2.5 | +3.3 | +5.8 | +2.4 | +2.8 | +5.2 |
| Other entrepreneurs | 0 | +0.7 | +0.7 | +0.3 | +0.8 | +1.1 |
| Pensioners | 0 | +0.2 | +0.2 | +0.1 | +0.9 | +1.0 |
| Other consumers | +0.3 | -0.3 | 0 | +0.4 | -0.6 | -0.2 |
| On average using utility weights[1] | +0.6 | +0.6 | +1.2 | +0.8 | +0.1 | +0.9 |

[1]    We use utility weights in calculating the social welfare change. These weights have been calculated from benchmark 1990 utility levels of the consumers. The weights used thus correlate heavily with net disposable income of the consumers in year 1990. Other weighting schemes could have been used and the results for an average are sensitive to the scheme used.

Our calculation show that both reforms are small Pareto improvements on average. Wage earners, farmers and other consumers will win in the intermediate run from Finnish EU membership. Farmers will get a 2.5% welfare bonus if FIM 8.7 billion will be paid as direct income compensation for them. The bonus will be about the same in the long run. All consumers will win somewhat in the long run. All in all, EU membership seems to be quite neutral in welfare terms. Our conclusion is that the average welfare of Finns do not change much when Finland becomes a member in the European Union. The magnitude of average welfare gain is only 0.6-0.8%. This figure is, however, over 50% of net incomes of agriculture. In this respect the welfare gain is not so small.

The value-added tax reform improves welfare of nearly all consumers in the intermediate run. The tax reform is neutral in welfare terms in the long run. Wage earners and other consumers will be losers in the long run. Others will win. Farmers will benefit from price increase of forest land and net savers or pensioners will benefit from the rising price of capital. The net effect is negative for wage earners. They will receive increases in their wages but price increases that the value-added tax reform generates in the long run will eat the purchasing power of their earnings.

The total effect of the two reforms is that after farmers have been compensated there remains enough money so that nearly all consumers win. Only other consumers are net losers in the long run. The average improvement of welfare is 0.9%. The extra welfare bonus of farmers is 5%. Wage earners would win 0.4% and other entrepreneurs and pensioners would win about 1% in welfare terms.

**Who gets what? - a sensitivity analysis**

The welfare results are of course highly dependent on the direct income compensation paid to farmers. To find out the break-even points of welfare we have conducted a series of simulations where direct income compensation varies. These results are presented in figure 3.1.

Figure 3.1



Sensitivity of welfare change to direct income compensation of farmers
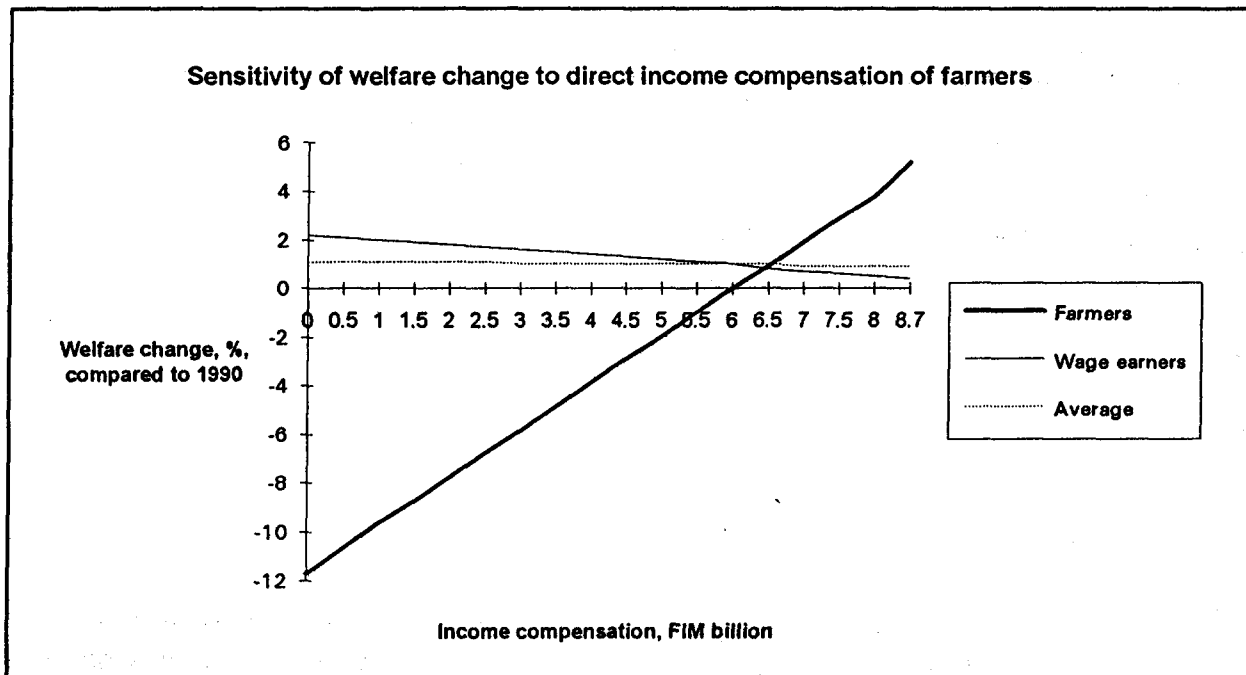
The figure reveals that the average welfare change, about +1%, is independent from the level of direct income compensation. EU membership will be mainly an income distribution problem. The long run direct income compensation that would compensate for farmers their losses of income is FIM 6 billion. If farmers get more than this they will receive some extra bonus for partly losing an occupation. If no income compensation were paid for the farmers then wage earners would double their welfare gain. In this case wage earners would win 2% and farmers would lose 12% in welfare terms. If FIM 6.5 billion were payed to farmers then both parties would be equally well off and win about 1%.

The level of permanent income compensation after the transition period has been planned to be about FIM 9 billion. This represents a clear overcompensation with respect to the level that we calculated as the break-even point.

Based on these findings, our conclusion is that Finns have a difficult choice to make. Which level of direct income compensation to farmers is considered to be fair and reasonable?

# 4 COMPARISON TO EARLIER ESTIMATES

Some other studies where quantitative estimates are presented concerning Finnish EU membership are available. We compare our estimates of some macro variables to the results of these other studies in table 4.1.

Table 4.1  Comparison of study results on Finnish EU membership* for the long run

| Tool of analysis | Partial eq. | Macromod. | General eq. |
|---|---|---|---|
| Macro variable | Vaittinen (1992) | Leppä (1992) | This Study |
| GNP, % | +1.5 | +0.6 | +0.4 |
| Output of agriculture, % | -85 | -30 | -21 |
| Employment in agriculture, num. | - | -23000 | -50000** |
| Price of food, % | -13 | - | -8.0 |

* All results refer only to agricultural adjustment in EC membership
** Reallocation need during the adjustment period

There seems to be most difference between the partial and general equilibrium analyses. The signs of effects are the same in all three studies but Vaittinen's estimate for the growth effect is much larger compared to the result obtained in this study. This discrepancy is partly explained by the fact that Vaittinen (1992) did not include any adjustment possibilities for agriculture in his study. Price driven adjustment is a key feature of our long run model.

The results of Leppä (1992) and this study match quite well. In KESSU IV macromodel analysis the output loss of agriculture was set exogenously to be minus 30%. Our results confirm that at least under current exchange rate this educated guess was not too biased. The employment effect is much smaller compared to our estimate. This deviation is partly explained by the fact that our analysis takes into account not only derived demand effects on labor but also the substitution possibilities between capital and labor. As can be seen from table 3.1 the factor price ratio changes are in favor of capital in the long run. As labor becomes relatively more expensive it will be substituted by relatively cheaper capital.

The estimate of GNP effect of Finnish EU membership is about the same magnitude in Leppä (1992) and in this study. If we think this result in a reversed manner we get an estimate of the efficiency loss of present protectionistic agricultural policy in Finland. The estimate for the loss is FIM 400-700 a year for an average Finn. This

means that a typical Finn has to pay FIM 1-2.0 per day extra in his food expenses. Finnish EU membership was accepted in the popular election of October 16th 1994. We can then conclude that Finns consider this sum not worth of paying considering the security it gives in means of domestic supply of food.

# 5 CONCLUSIONS

The purpose of this study has been to quantify the economic effects of Finnish EU membership for domestic food economy. The value-added tax reform has been handled as a requirement of Finnish EU membership. The scenarios include the domestic support package to Finnish farmers. Further, subsidies from EU's budget has been included in line of Finnish membership agreement. In the value-added tax reform the lower long run tax rate of foodstuffs has been accounted for. Also the abolition of primary production deduction has been included.

Our first conclusion is that Finnish EU membership will mean a downward spiral of the price of arable land even in the intermediate run. Finnish EU membership will thus have a capitalizing effect and farmers owing the fields would experience a huge loss of their property values. This effect is partly offset by the rising forest land price as wood based industries and forestry expand.

The second conclusion deals with prospects of agriculture. There will be only modest primary production losses from Finnish EU membership in the intermediate run. Capital is assumed fixed in the intermediate run and this explains why major losses do not materialize. Production of milk and beef and production of other plants will be maintained in the intermediate run. Greatest intermediate run losses are faced in production of pork and in harvesting of grains. The magnitude of these losses is 16-22%. The average intermediate run loss of agricultural production is about 5%.

The long run prospects for agriculture are much more gloomy. About 40% of grain production will be lost, about a third of pork production and a fifth of production of poultry and eggs will be lost when Finland becomes a member in the European Union. Further, production of milk and beef will go down by 25%. The average decrease of agricultural production will be 20% in the long run. The only agricultural product that will have possibilities for growth is other plants. Our simulations even indicate that there are possibilities to export other plant products.

Third, our analysis gives support to earlier estimates that food will be cheaper when Finland joins the European Union. Lower producer prices of agriculture and cheaper exported food depress the average price of the food basket. The fall of food price due to EU membership is 9% in the intermediate run and 8% in the long run.

Food processing industries lose quite much when primary production deduction is abolished. The average output loss would have been only 4% if primary production deduction could have been maintained. The total effect when primary production deduction is abolished is an average production loss of 8% for these industries. Milk processing and production of feedingstuffs decline 16-21% in the long run. Our fourth conclusion is that not only agriculture but also food processing industries suffer from Finnish EU membership. Agriculture takes the hardest blow, however.

Fifth, the decline of primary production and growth of industry nearly balance each other in the case of Finnish EU membership. GNP grows only 0.4% in the long run due to the value-added tax reform and due to EU membership.

Our last conclusion postulate that both reforms are small Pareto improvements on average. Wage earners, farmers and other consumers will win in the intermediate run from Finnish EU membership. Farmers will get a 5% welfare improvement if FIM 8.7 billion will be paid as direct income compensation for them. The improvement will be about the same in the long run. All consumer will win somewhat in the long run. All in all, EU membership seems to be quite neutral in welfare terms. Our conclusion is that the average welfare of Finns do not change much when Finland becomes a member in the European Union. The magnitude of average welfare gain is only 0.6-0.8%. This figure is, however, over 50% of net incomes of agriculture. In this respect the welfare gain is not so small.

The value-added tax reform improves welfare of nearly all consumers in the intermediate run. The tax reform is quite neutral in welfare terms in the long run. Wage earners and other consumers will be losers in the long run. Others will win. Farmers will benefit from price increase of forest land and net savers or pensioners will benefit from the rising price of capital. The net effect is negative for wage earners. They will receive increases in their wages but price increases that the value-added tax reform generates in the long run would eat the purchasing power of their earnings.

The total effect of the two reforms is that after farmers have been compensated there remains enough money so that nearly all consumers win. Only other consumers are net losers in the long run. The average improvement of welfare is 0.9%. The extra welfare bonus of farmers is 5%. Wage earners would win 0.4% and other entrepreneurs and pensioners would win about 1% in welfare terms.

The size of long run direct income compensation that would compensate for farmers their losses of income is FIM 6 billion. If farmers get more than this they would receive some extra bonus for partly losing an occupation. If no income compensation were paid for the farmers then wage earners would double their welfare gain. In this case wage earners will win 2% and farmers will lose 12% in welfare terms. If FIM 6.5 billion were payed to farmers then both parties would be equally well of and win about 1%.

Much remains to be done in analysis of Finnish EU membership. In GEMFIN 4.5 model the focus was in the modeling of the target price system of agriculture. At this moment it was not possible for us to include important elements such as unemployment or features of imperfect competition. Our purpose is to develop the model further so that the reliability of its results could still be improved.

Finally, a word of warning. The reader should not think that numbers presented in this report represent the ultimate truth of economic effects of Finnish EU membership. We are aware of the approximate nature of our numeric results. GEMFIN 4.5 like any economic model can only characterize the reality. Our purpose has been to get the

signs right and to calculate rough figures of the macro effects. The exact number magnitudes are another story maybe unattainable for an economist.

In spite of its deficiencies this beats mental arithmetic, does it not?

## APPENDIX: Features of the GEMFIN 4.5 model

### Nature of the model
- numeric, computable general equilibrium simulation model
- static (short and long run) and dynamic (steady state) analysis possible
- Walrasian, price adjustment equilibrates the economy
- non-Walrasian features such as unemployment or deficits of foreign trade and
  the public sector can be modeled as special cases

### Benchmark data
- Input-Output Study 1988
- Consumer Budget Survey 1985 and 1990
- special studies on taxation and on agricultural subsidies of the Central
  Statistical Office of Finland and the Government Institute for Economic Research
- National Accounts
- Benchmark is calibrated and replicated for the year 1990

### Consumption
- 5 consumer classes: wage earners, farmers, other entrepreneurs, pensioners
  and other consumers
- three level utility function of the Constant Elasticity of Substitution (CES) type
  (present consumption, leisure and future consumption)
- public sector represented as a separate agent

### Production
- 29 production sectors of which 6 agricultural sectors and 7 food processing industries
- capital, labor, arable and forest land factors included
- multi-level CES technology

### Foreign trade
- small open economy framework
- domestic production and exports modeled as joint products according
  to Constant Elasticity of Transformation (CET) technology
- Armington assumption for imports

### Taxation
- factor and output taxes included
- each consumer has individual marginal income tax rate
- producer price mechanism and agricultural subsidies modeled according
  to Finnish institutions
- primary production deduction of food processing industries represented
  as separate subsidy rate
- value-added tax reform modeled
- lower value-added tax of foodstuffs included

### Reported applications
- Reform of Social Security Payment System of Employers
  (Honkapohja and Törmä, 1988)
- Finland's Grand Tax Reform (Törmä and Rutherford, 1992)
- Agriculture and EC Membership of Finland (Törmä and Rutherford, 1993)
- Value-Added Tax Reform of Finland (Törmä, Rutherford and Vaittinen, 1994)

### Technical implementation
- GAMS/MPSGE (Word Bank and Thomas Rutherford)
- PC with 486/50 Mhz suggested

**APPENDIX: Production sectors and consumption commodities in GEMFIN 4.5 model**
**(... continues)**

## PRIMARY PRODUCTION:

Production of milk and beef.
Production of pork.
Production of poultry and eggs.
Production of grains.
Production of other plants.
Other agricultural production.
Forestry, fishing and hunting.

## FOOD PROCESSING INDUSTRIES:

Slaughtering and meat processing.
Milk processing.
Production of mill and bakery goods.
Production of sugar, chocolate and candies.
Production of other foodstuffs.
Production of feedingstuffs.
Production of beverages.

## OTHER MANUFACTURING AND SERVICE INDUSTRIES

Mining and quarrying.
Textile, wearing apparel and leather industries.
Production of wood and wood products.
Production of paper and paper products.
Production of fertilizers and pesticides.
Other chemicals and chemical products.
Metal industries.
Other manufacturing industries.

Electricity, gas, heating and water services.
Building and construction.
Trade, restaurants and hotels.
Transport, storage and communication.
Financing, insurance and business services.
Rented and owner-occupied dwellings.
Other private services.

## PRIVATE CONSUMPTION COMMODITIES

Grain and grain products.
Meat and meat products.
Milk, cheese and eggs.
Butter and other greases.
Potatoes.
Sugar.
Other foodstuffs.
Beverages.
Clothing and footwear.
Housing.
Household equipment.
Health care.
Transportation.
Recreation and culture.
Other goods and services.

# REFERENCES

**Ala-Mantila O. (1992)**, Principles of Production Cost Evaluation, Agricultural Economics Research Institute, Research Publications 180 (in Finnish).

**Alho K., Kotilainen M. and Widgrèn M. (1993)**, Finland in European Union, estimates of economic effects, The Research Institute of the Finnish Economy, B81 (in Finnish).

**Alho K. and Widgrèn M. (1994)**, Finland's EU Choice, The Research Institute of the Finnish Economy, B94 (in Finnish).

**Brooke A., Kendrick D. and Meeraus A. (1988)**, GAMS, A User's Guide, The Scientific Press.

**Government Proposal to the Parliament (88/1993)**, of the Value-Added Tax Law.

**Honkapohja S. and Törmä H. (1988)**, Welfare Effects of the Reform for Employer Social Security Payment System, The Finnish Economic Journal, 3/1988 (in Finnish).

**Kettunen L. (1991)**, Finnish Agriculture in 1990, Agricultural Economics Research Institute, Research Publications 63 (in Finnish).

**Kettunen L. and Niemi J. (1994)**, The EU Settlement of Finnish Agriculture and National Support, Agricultural Economics Research Institute, Research Publications 75 (in Finnish).

**Kuhmonen T. (1991)**, The Effects of EC-membership on the Agriculture of EFTA-countries, Pellervo Economic Research Institute, Reports and Discussion Papers N:o 95 (in Finnish).

**Leppä A. (1992)**, The Effects of EC-membership for Finnish Economy, in Finland a Member of the European Community, Government Institute for Economic Research, Publications 5, 71-88 (in Finnish).

**Principle Decision of the Cabinet**, 5-26-1994 of the Domestic Support Package for Agriculture.

**Proposal of the Cabinet**, 34/1993.

**Rutherford T. (1992)**, General Equilibrium Modeling with MPS/GE, Department of Economics, University of Colorado, USA.

**Törmä H. and Rutherford T. (1992)**, A General Equilibrium Assessment of Finland's Grand Tax Reform, University of Jyväskylä, Reports from the Department of Economics and Management 15.

**Törmä H. and Rutherford T. (1993)**, Integrating Finnish Agriculture into EC's Common Agricultural Policy, Reports from the Government Institute of Economic Research 13.

**Törmä H., Rutherford T. and Vaittinen R. (1994)**, Welfare Effects of the Finnish Value-Added Tax Reform: A General Equilibrium Evaluation, Consumer Research Institute, Publications (in print).

**Vaittinen R. (1992)**, Export Barriers of Agriculture and Its Social Costs in Finland, Labour Institute for Economic Research, Studies 39 (in Finnish).