Eastern Enlargement of the EU: Economic Costs and Benefits for the EU Present member States?

THE CASE OF DENMARK
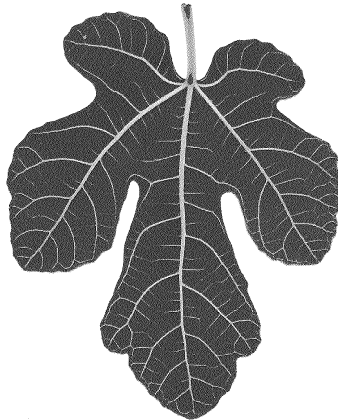
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1. Introduction

The enlargement of EU with a number of countries from Central and Eastern Europe (CEE countries or CEEC's) and the Mediterranean area has become a highly prioritised policy issue in the EU. The issue of an enlargement of the EU is not simply an economic cost-benefit consideration. It is first of all a project with a world political dimension. The two major strategic aims are projecting political stability and strengthening Europe as an economic power. Stable democracies have started to appear in the CEE countries, so some of the benefits of the enlargement are emerging already. Also on the economic field there are potential benefits. If accession takes place under the right conditions, it can provide "a significant further boost to economic growth and prosperity in the candidate countries as well as a positive, but necessarily smaller, impact on the present member states" (DG ECFIN, 2001).

There are fears, however, in the present member states as well as in the applicant countries about the consequences of the enlargement. In the candidate countries the concerns are related to the social and economic conditions, because of the foreseeable radical changes in the life of each individual, that naturally leads to uncertainty about the future. In the present member states the fears are related to the negative impacts of enlargement - uncontrollable immigration, unfair competition, financial burdens and so on. So the economic effects play a key role in the debate. In order to pursue the main goals of the enlargement process, it is important to provide economic information, so the enlargement will not be slowed or stopped by less substantiated economic figures or an one sided focus on the budgetary consequences. Therefore it is very important to provide the public and the politicians with measures of the economics of the enlargement, which is the motivation for this study.

The process of integrating more - primarily eastern European - countries in the European Union started in 1989. In 1993 the European Council meeting in Copenhagen laid down three basic criteria that the applicants must comply with before they can join the Union

- stability of institutions guaranteeing democracy, the rule of law, human rights and respect for and protection of minorities
- the existence of a functioning market economy as well as the capacity to cope with competitive pressure and market forces within the Union
- the ability to take on the obligations of membership including adherence to the aims of political, economic and monetary union

Furthermore, it is required that an applicant has created

- the conditions for its integration through the adjustment of its administrative structures, so that the European Community legislation transposed into national legislation can be implemented effectively through appropriate administrative and judicial structures.

The implementation of these requirements takes place in the applicant countries gradually over time along with the removal of barriers to trade. This has economic consequences also in the present member states. A huge body of literature concerning the possible effects of the enlargement process has emerged in the last 5-10 years. Some of the studies analyse specific aspects like immigration and the effects of removing trade barriers and some studies try to capture

all the effects in an analysis of specific countries. Thus, in many studies it has been analysed if the enlargement is a net cost or benefit to specific countries. Two of the more prominent of these studies are the predecessors of the present study, namely Kohler and Keuschnigg (1999a, 1999b). Based on CGE modelling they analyse the economic consequences for Austria and Germany[1]. Studies by Breuss (1999, 2001) analyse the Austrian case based on a macro-econometric modelling framework. Also Baldwin et al.(1997) and DG ECFIN (2001) are important contributions. From the various studies generated, it seems that the enlargement of the EU have three main groups of effects on the economy of a present member country like Denmark

- Trade effects
- Effects from movements of production factors
- Budgetary effects

The first two groups of effects are related to the applicant countries joining the single market and the customs union. The third is related to the financing of the increase in the EU budget. The economic effects of the enlargement are closely connected to the so-called Four Freedoms of the Single Market; free movements of goods, persons, services and capital.

The trade effects are generated by a gradual removal of economic as well as non-economic barriers to trade between the applicant countries and the EU15 countries. Economic theory as well as practical experience suggests that such measures will lower prices and increase trade, which normally will have positive welfare effects. In terms of the welfare effects, one needs, however, to distinguish between *trade creation* effects and *trade diversion* effects. The presence of trade diversion effects may lower the welfare effects, as we shall return to in section 2.3. Basic trade theory also suggests that lower trading costs will make the EU15 countries specialise even more in capital intensive production and the newcomers in labour-intensive production. This inter-industry trade might, however, be dominated by intra-industry trade that thanks to lower adjustment costs might enable some firms in specific industries to exploit economies of scale. Also the larger market may have some pro-competitive effects exposing industries dominated by monopolies or oligopolies to more competition.

The second effect is that the integration process is likely to facilitate an increase in factor movements when the newcomers join the single market. Due to the freedom of movement for people and capital, labour is likely to migrate from the CEE countries to EU15 countries and capital will move from the EU15 countries to the applicant countries. The movement of labour will affect, among other things, labour supply and wages, but also possibly the government budget through increases in taxes paid to the government and social security paid by the government. Capital in the shape of Foreign Direct Investments (FDI) will probably be moving towards the CEE countries with minor, but uncertain effects on the EU15 economies.

The third general effect is that the enlargement will be quite costly in terms of transfers from pre-accession programmes before the accession, and after accession from increased transfers on account of their participation in EU policies such as the Common Agricultural Policy (CAP) and

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[1] A number of even newer studies from Keuschnigg and Kohler build upon these two reports, and develop the analysis further, both as general treatments of the topic and as empirical studies of countries involved. See e.g. Kohler (2000), Kohler and Keuschnigg (2001) and Heijdra, Keuschnigg and Kohler (2001).

the structural programmes. The enlarged EU budget must be financed partly by the present member states by increasing their net-contributions to the EU.

Thus, we face positive and negative effects from the enlargement that tend to neutralize each other more or less. So we cannot tell in advance if the total effect is positive or negative. Uncertainty relates primarily to the size of the positive effects, because he cost of enlargement can be assessed with reasonable certainty and divided between the present member countries. The open question is how the country in question chooses to finance it. It can be done through increasing taxes or cutting other expenses, with different welfare decreasing effects. The benefits are much more difficult to get hold of. They depend on the initial size of the trade and other economic transactions between the new EU countries and the present member country in question. The initial size of trade is determined by tradition, culture and not least by the distance between the trading countries. Also the size and composition of the migration from the CEE countries to EU15 countries are quite uncertain, and the economic effects correspondingly difficult to assess. So the direct benefits of the enlargement is uncertain, but to some extent dependent on geographics. Thus, in terms of an increase in trade, Germany is more likely to benefit from the enlargement than is Spain and Ireland, but there are also secondary or indirect effects in terms of spill-over from the most affected economies to the rest of the European economies.

Another reason for the complexity in the estimation of the economic consequences is that we cannot just use experiences from previous enlargements to predict what will happen this time, because this fifth enlargement is quite different from e.g. the fourth enlargement. The countries in the fourth enlargement (Sweden, Finland and Austria) were at least as prosperous as the average of the EU12 countries and quite similar to them in many respects. The applicants this time have an average level of income pr. capita, which is substantially lower than the average level of income in the EU15 countries, and they have a quite different background. They are more based on agriculture and they only have a few years of real market-economy experiences.

Therefore a lot of research has been carried out the last 10 years trying to capture the economic effects of the enlargement. It is build mainly on theoretical considerations and on experiences from a decade of transition. This report will be concerned with measuring the effects on the Danish economy of enlarging the EU and inviting the newcomers to participate in the EU Single Market and customs union. This evaluation is made with the Danish model ADAM (Aggregated Danish Annual Model), which is a large-scale, dynamic, macro-econometric model build and maintained by Statistics Denmark, and used by the economic ministries as well as by a lot of other major institutions in Denmark. Figure 1 gives an overview of the model[2].

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[2] The model is described in details in section 5.2

Figure 1. ADAM, an overview

- a structural, dynamic, large-scale macro econometric model with short-term Keynesian and log-term classical properties
- static input-output system, consisting of 19 industries
- sectoral balances; including a household sector
- consumption function based on life-cycle hypothesis
- cost minimizing factor demand system
- foreign trade in SITC groups based on the Armington model
- wages determined in a "Right to manage"-version of the Philips curve
- detailed description of public sector finances
- interest rates determined on the bond market

The enlargement of EU is modelled in ADAM by multiplier analysis of various scenarios where a set of anticipated changes in the EU and the applicant countries as a consequence of the enlargement is applied.

An evaluation of the economic impact of the enlargement requires an assumption about the dates at which the different countries will access the Union. Formally the countries will be allowed to join as soon as they fulfill the Copenhagen criteria. That makes the timing of the enlargement a little uncertain still, because the applicant countries are moving towards a fulfilment of the criteria at a very different pace. In a recent study by DG ECFIN (2001) it is assumed that 8 CEE countries will join the union in 2005. In this study, however, it is assumed that only 5 countries, namely Poland, the Czech Republic, Hungary, Estonia and Slovenia will join the Union in 2005. These countries are 5 out of 6 in the "Luxembourg Group", which is by far the most important group of applicant countries. The last of the 6 countries, Cyprus, is not considered here, since its relation with the Danish economy is very marginal The second group consisting of Romania, Bulgaria, Latvia, Lithuania and Slovakia is supposed to join in 2007. Malta is not considered for the same reasons as for Cyprus. Turkey is not considered either, because it is still uncertain when they will join.

This report is organized in the following way: Firstly in section 2 we take a careful look at the possible effects of the enlargement. In order to understand the enlargement process and to be able to point out specific changes as scenario inputs, it is necessary to take a closer look at the institutional changes first. Then we go trough the three main channels that the effects operate through, namely trade effects, effects from factor movements and finally budgetary effects.

In section 3 we take a look at some of the existing data describing the trade flows between Denmark and the applicant countries. We take a historical view on the trade as it has occurred during the last 10 years or so in order to get an impression of the magnitudes and potentials for the trade. Since the trading conditions between the applicant countries and Denmark (and other EU countries) have improved a lot already after the gradual mutual removal of tariffs, we should be able to see some increases in trade already. The basic question is wether the level of bilateral trade between the applicant countries and Denmark is below the "potential" level or not. The

"potential" level of trade is strongly increased once the applicants are in the same Union as we are and their GDP per capita is closing in on the Danish, which is quite far ahead of them today. It is a fact - as it has been recognised in most other studies on this subject - that the potential for increases in the trade between the present member states and the newcomers are best measured by gravity models. This study is no exception. We put up a gravity model that measures the potential future trade between Denmark and the applicant countries.

In section 4 we introduce the variables representing the world market demand for goods and services produced in Denmark. This is a very important set of variable in a study like this, so the chapter is devoted to document the construction of such measures. In ADAM - as in many other macro models - this measure is constructed on the basis of the Armington model. In a model like ADAM it is not possible to model trade in different goods with different countries separately. It must be done in quite an aggregated way. So what the Armington model does, is to weigh together demand for certain groups of Danish export by different countries into single demand and prices variables for each group of exports. On top of that we need the gravity models from section 3 to indicate how much more weight should be put on the applicant countries in these measures in future years. At the end of the section we present some of the trade data sources used as input in this particular study.

In section 5, we present the methodology of the analysis undertaken. The idea behind the analysis is to compare a forecasted picture of the Danish economy affected by the enlargement of EU with a forecasted picture of the Danish economy with no enlargement imposed. A number of policy-scenarios that reflects the expected changes due to the enlargement are composed. In practice it is done by adjusting relevant variables like EU transfers, import and export quantities and prices, and immigration flows in the Danish macro-econometric model ADAM, to reflect the most important changes and effects of the enlargement discussed in section 1 and 2. Then the differences between these scenarios and a baseline scenario with no enlargement included are calculated by simulations with the model. It is assumed that effects similar to the effects on the Danish economy occur in the other present member states as well. That creates further indirect effects on the Danish economy, which are also included in the simulations.

We carry out two different types of scenarios. The first one is a short run scenario covering the effects in the years 2005-2010 as we assume the first 5 countries will become members of the Union in 2005. The relevant variables in the model are adjusted on a year to year basis reflecting the expected changes in trade, immigration etc. Additionally we simulate a long run scenario which is quite different from the short run scenario. The methodology here is to use the ADAM model more or less as a CGE model by introducing all effects in the first year of the simulation, and then run it until all variables are stabilized on a steady path. A span of as much as 55-65 years is necessary for such a simulation exercise. A model like ADAM is quite volatile in the short run so the true long run effects of a "shock" like the enlargement will not be revealed until after quite a long period of years when all the dynamic effects have had their day. On the other hand the short run effects might be highly relevant to politicians and other economic planners dealing with day to day economic issues.

We start by a discussion about the choice of type of model for an analysis like the present. There are two dominant types of models, namely CGE models and macro-econometric models. They both have advantages and drawbacks. As mentioned, the macro-econometric model ADAM is

chosen for this analysis. One of the advantages is the possibility to study disequilibria on the labour market, that is how the enlargement affects employment and unemployment. In section 5.2 the model apparatus is presented in some detail. The large-scale macroeconomic model ADAM is boiled down from thousands of equation to only 40 equations in order to facilitate a better understanding of how it works. The procedures for simulation with the ADAM model is discussed. In section 5.3 we have a quite detailed presentation of the scenarios carried out. It is described how the Armington and gravity models are utilized to create inputs for the scenarios. Finally, section 5.4 holds a discussion of a very simple framework for measuring the welfare effects on the Danish economy through measures of Equivalent Variation.

In section 6 the results are reported. The use of a large-scale macro-econometric model facilitates a surveillance of thousands of variables. However, we only report on a few of the most important ones. In the short run scenario we present the results in terms of various aggregated macro variables like GDP, employment, prices etc. This is very valuable information for the politician or planner. These are the variables that they are used to in the domestic economic policy planning and evaluation. Aggregate welfare should also be an important variable in judging whether a project like the enlargement is a net benefit or a net cost to a country. However, unlike CGE models, most macro-econometric models like the ADAM model does have this aggregate welfare variable in the portfolio of variables, but specifically for this project, a simple calculation of the Equivalent Variation is facilitated.

In section 7 conclusions are presented and discussed. The main findings are reported and they are measured against the results in studies comparable to the present. We point at where the most uncertain points are, and finally we point to if, where and how further investigations could improve the study.

2. Possible effects of the enlargement

The forthcoming enlargement of the European Union is a huge project that may have a considerable effect on the present member-countries and especially on the new member-countries. Implications will be political, institutional, economic, budgetary, social etc. The effects on EU15 members are relatively modest, involving three types of changes as listed by Kohler and Keuschnigg (2001). The first one is an *institutional reform*, that the EU itself need to work on in order to adapt the Union to the new situation with up to 28 country memberships. The reform was called for already in the Amsterdam Treaty. At the Luxembourg European Council meeting in 1997 it was stressed that as a prerequisite for enlargement of the Union, the operation of the institutions must be strengthened and improved in keeping with the institutional provisions in the Amsterdam Treaty". At the Nice Council Meeting in December 2000 the Intergovernmental Conference (ICG) concluded its work on the institutional issues that had to be resolved before the enlargement. In February 2001 the agreement was signed, and the ratification process of the treaty of Nice could begin. The changes related to distribution of seats in the European Parliament, voting rules in the EP and in the Council and the distribution of power between the different institutions and the decision making process will be changed. This may have some economic consequences for Denmark that should be included in this analysis. They are not included, however, firstly, because they are expected to be rather small, and secondly, because we will not be able in this report to implement their effects in the Danish model, because they do not easily "translate" into effects on specific economic variables. The last two points from Kohler and Keuschniggs list are *regional integration* (customs union and single market) and the *budgetary costs* of enlargement. The point *regional integration* is connected with the entrance into the customs union and the Single Market of the new countries. The effects can be divided into effects on trade and effects on the production factors. Those points are significant for the Danish economy and they will be dealt with below. In order to assess the economics consequences of enlargement of the EU we need a more detailed listing of what the enlargement process entails. Therefore in the following chapter we will take a closer look at some of the major institutional changes, and when we have some ideas about that we will take a look at some of their possible economic consequences.

2.1 Institutional effects

The process of transition towards open market economies started in 1989 when the Berlin wall was torn down. At the European Council meeting in Copenhagen in 1993 it was decided to let those eastern European countries that wanted membership of the EU, become members as soon as they were able to assume the obligations of membership by satisfying the economic and political conditions required. Those requirements were not only related to the economy, but were also political in terms of democracy, human rights etc. (see section 1 above). According to the "review procedure" the EU commission follows the development in the applicant countries closely and reports to the council about the progress. The countries having entered the negotiations must submit status reports on 31 chapters of the EU legislation. To qualify as new members, countries must adopt this entire "acquis communauitaire", and the idea is, that when applicant countries have done that, their entrance in the EU will not change it, only enlarge it.

In 1997 the European Commission presented the first analysis of the progress of the candidate countries, and now the commission submits regular reports to the Council on further progress achieved by each country. The first set of regular reports was submitted in November 1998 covering the 10 European CEE countries as well as Cyprus, Malta and Turkey. Very good progress had been made. Progress in adoption of the acquis varies a lot between countries. In the conclusions of the European Council in Göteborg June 2001 it is stated that candidates have made impressive progress and that more than two thirds of the negotiating chapters have been closed with some of the applicants.

The institutional changes already started by the European Agreements (EA) that was made during the nineties. By 1997 such agreements had been signed with 10 countries[3]. The agreements involve a mutual removal of formal trade barriers on manufactured goods between EU and the CEEC's before 2002. At the moment the exports of nearly all CEE manufactured goods to the EU have been liberalised. Only a limited number of goods are still subject to anti-dumping regulations. They are some wood products, coal, bulk chemicals and various iron and steel products (de Mooij, 2000) See also Brenton (1999). Around 20% of manufactured goods were in 1999 still subject to import tariffs in the CEE countries, but they will be removed by 2002 according to the EA. Other areas covered by the EA's are liberalisation of capital movements, approximation of laws relevant for the EU's internal market and competition policy, and financial co-operation, notably under the Phare Programme. Two economically important aspects of the integration, not covered by the EA's are free trade in the agricultural sector and the CEEC's access to EU15 labour markets. Migration from the CEEC10 is still subject to quite strict regulation.

Most of these initiatives are costly for the CEE countries, and therefore the reform is supported by the EU15 countries in the shape of direct transfers and an asymmetrical removal of trade barriers, meaning that the EU15 have been quite fast to remove trade barriers compared to the CEEC's, which is a way to give the newcomers a little aid in the first period.

Another institutional change is the CEEC's transition from a free-trade area connection with the EU15 countries to a customs union. This means that the tariffs placed on the CEEC's imports from ROW must be equalised with the tariffs that EU place on such trade today. This is a substantial change, since on average the applicant countries now impose a 7% tariff on manufactured goods and they must adjust it downward to the current 3% imposed on goods imported from ROW to EU. As a consequence of the protection of the European agriculture the EU tariffs on agricultural products are typically higher than those in the CEE countries. The table 2.1 below some pre- and post Uruguay tariffs in the CEEC10 countries and the EU15 as an aggregate.

It is clear from the table that there is a substantial difference in the tariffs between countries. For some countries the equalisation will have almost no effect since they are already close to the EU level, but for some countries it will change the market terms quite a lot.

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[3] CEEC1 countries: Poland, Hungary, Czech Republic, Estonia and Slovenia. CEEC2 countries: Latvia, Romania, Bulgaria, Lithuania and the Slovak Republic.

Table 2.1. Level of protection in the EU and in the CEEC's

	Trade weighted MFN tariffs, averages	
	Pre-Uruguay	**Post Uruguay**
Bulgaria	-	-
Czech Republic	4.9	3.8
Estonia	0.0	0.0
Hungary	9.6	6.9
Latvia	-	10.6
Lithuania	-	8.0
Poland	16.0	9.9
Romania	11.7	33.9
Slovakia	4.9	3.8
Slovenia	-	10.7
CEEC10	**8.6**	**6.0**
EU15	**5.7**	**3.6**

Source: Breuss(1999)

Also a large institutional change is the admission of the CEEC's into the single market. The EA's are a step of the way into the single market of the EU, but there is a long way to go still before totally free movements of goods, services, capital and people is achieved. The newcomers will have to comply with all the standards and regulations in the single market - known as the "internal-market acquis". That will reduce costs induced by waiting time at borders and customs formalities. Even more important is the removal of so-called technical barriers to trade which are implemented through regulations and product standards As a part of the entrance in the single market all restrictions on capital and labour markets must be removed to let labour and capital move freely across the borders. Capital movements are still only partially liberalised, and labour mobility is still severely restricted. However, free movement of labour may be the subject of some restrictions in the first years, in order to reduce the shock of possible immigration from the east to the west due to the huge wage gap between the two blocks. In the section 2.4 those factor movement aspects of the enlargement is discussed in more detail

2.2 Economic effects

The enlargement process will, as it was pointed out in the previous paragraph, influence the present member states economies through a number of channels. It is obvious that the magnitude of the effects will vary a lot between the EU15 countries. In general, one can expect countries like Germany and Austria to be affected most due to their geographic proximity and historical ties to the CEECs. The magnitude of the effects also depends a lot on the size of the pre-enlargement trade between the CEECs and the country in question as well as the initial size of the trade barriers to be removed. We will return to the actual size of trade between Denmark and the CEEC's in a later section, but firstly we will take a look at some aspects of what the economic literature has

to say in general about some of the expected effects of an integration of countries into a trading block.

The standard models in economic theory predict that gains from trade (and movements in production factors) will be particularly high in such a situation where factor endowments are as different as it is the case between the CEECs and the EU15 countries. The picture is that the production in the CEE countries is relatively labour intensive compared to the production in the present member states, whose production is relatively intensive in capital. Specifically, the models say there will be a fall in the price of the labour-intensive goods relative to the price of capital-intensive goods in the present member states, and so they will increase import of labour-abundant goods and increase exports of capital abundant goods to the CEEC's. The effect will be a decline in the production of the labour-intensive goods in the present member states and an increase in the production of capital-intensive goods in preparation for the increased export of these goods. Also the integration of comparatively labour- abundant countries will lead to a decline in wages relative to the price for capital in relatively capital-abundant present member states and, eventually, factor prices will tend to equalize between the EU15 and the CEEC's. The standard model also predicts a movement of labour from the labour-intensive countries towards the EU15, and a rise in labour intensity in all EU15 countries, since the price of labour will fall.

These results however, are based on a set of quite restrictive assumptions

- perfect competition on all markets
- all countries have access to the same technologies
- returns to scale are constant
- factor markets are clearing

In Boeri and Brücker (2000) it is stated that if we relax these assumptions, some provisions of the standard model are mitigated or even reversed. However, neither is the mobility of labour and capital perfect, nor do wages adjust instantaneously to changing prices on the goods markets. If factor mobility is not perfect it can be expected that a change in internationale prices will increase inter-industry differentials in wages and other factor incomes. Furthermore, if relative wages do not adjust instantaneously, a decline in the price of the labour-intensive goods can translate into unemployment and lower aggregate incomes. Another point is that if the technology gap between CEEC's and EU15 is neutral with respect to the productivity of sectors and factors, it is expected that relative rather than absolute factor incomes will converge through trade. This will lead to a continuation of the differences in wages and per capita incomes and thereby a continuation of the immigration. Furthermore, if EU15 is human-capital-intensive the price of human capital will tend to increase and the price of unskilled work will increase in the CEEC's. This is a further incentive for skilled workers to migrate from the CEEC's to the EU15 countries. Thus, the "old-fashioned" theories about the possible effects of integration do not really apply any more. In the subsections below on trade effects and factor movements appropriate newer theories are outlined.

2.2.1 Trade effects

In the seventies the above mentioned economic theories about comparative advantages as the source for international trade was more or less relieved or at least supplemented by authors like Dixit and Stieglitz (1977), who changed thinking about trade from being a result of comparative

advantages to a question of economies of scale based on Chamberlains theories about monopolistic competition. This has contributed to a more "modern" line of economic theory about regional integration which is better adapted to the present world. It can be found in Baldwin and Venables (1995), Krugmann (1995), Baldwin et al. (1997), Breuss (1999) and Kohler and Keuschnigg (2001), just to mention a few of the main works. Here there are two major categories of effects of integrating the CEEC's into the Single Market; *allocation effects* and *accumulation effects*. They could also be called *static or integration related effects* on the one hand *and growth related or dynamic effects* on the other hand. The allocation effects lead to reallocation of production and trade between different sectors and/or countries and the accumulation effects are the channels through which trade can alter the level of resources in a country, especially the capital stock. Effects which stimulate investments and thus change the capital stock are called dynamic effects.

The allocation effects under perfect competition are equal to the "old" view mentioned above : when prices for imported goods decrease due to removal of import tariffs we are facing trade volume changes: imports will be increased and some production is shifted between countries. The cost of consumption will go down and a positive welfare effect is created. This is called *the trade creation effects*. Another effect comes from trade price changes. When discriminatory tariff removal leads private agents to import from a supplier that is not the lowest cost source, thereby reducing home welfare by raising the nation's cost of consuming such goods, it is called *trade diversion*. Clearly trade diversion can arise from discriminatory tariff removal, not the removal of MFN tariffs.

The allocation effects found in models with imperfect competition and scale economies are firstly a welfare increase coming from the *pure profit effect* meaning that if the domestic price is above average costs an increase in output (due to an increased demand from the enlarged market) will raise profits and thus welfare. On the other hand there might be so-called *pro-competitive effects.* The entrance into the single market makes it impossible for multinational firms to follow a segmented price strategy. They cannot act as an oligopolist or monopolist any more as they used to do on the home market. Thus, the switch to a larger market will increase the consumers' welfare. As noticed by Kohler and Keuschnigg (2001) the fixed costs saved, when the competition drives firms out of the market, are also welfare enhancing.

The *scale effect* is that there are increasing returns to scale in many industries. Average costs fall with the scale of production and cheaper and easier *intra-industry trade,* helps to realize the scale effects more easily. Thus an increased intra-industry trade in intermediates have become the "new" dominant source of gains from trade, relieving the traditional inter-industry trade based on comparative advantages. Ethier (1979) argued that the major part of trade is not in final demand goods but in differentiated inputs, and that the possibility of such trade in effect gives rise to international (as opposed to national) economies of scale.

The *accumulation* effects or growth effects are a highly debated category of integration effects Breuss (1999).It is difficult to see exactly how the growth related effects work in practice. It is not very easy to point out the channels through which the enlargement may lead to an increase in GDP. But Baldwin & Scghezza (1996) identifies some channels through which that may lead to increased GDP. It requires transfer of new knowledge (R&D) and better dissemination of R&D. Also the increase in the size of the market and a better allocation of R&D resources on the market

may lead to an accumulation of capital and to actual growth. Kohler and Keuschnigg (2001) has a detailed discussion of how to model these dynamic growth effects in a CGE framework. Thus, the static or integration related effect is merely a reallocation of production and trade between sectors and/or countries that hopefully has some positive effect on welfare, but only a quite small effect on growth in the economy[4]. The accumulation effects on the other hand foresee increases in investment and thus accumulation of capital based on a more efficient R&D use and dissemination which may lead to some more substantial increases in growth. However, these effects are larger, the more developed the newcomers are. So the spillovers of R&D from the CEEC's might not be very substantial for the growth in the EU15 countries.

Some parts of economic theory state that economies will converge to the same level of per-capita incomes irrespective of initial endowments with physical or human capital. The driving force behind convergence is high returns from the accumulation of physical and human capital in economies with low initial endowments of those factors relative to economies with rich endowments. Then the movement of capital and labour, as well as technological spill-overs, necessarily enforces convergence. However other theories disagree with these prospects, but if they hold we should see a good deal of catching up by the CEEC's in the future years.

Now we have gone through the actual institutional changes in section 2.1 and the possible theoretical consequences. So now we will take a look at the actual economic effects. A number of the institutional changes are already implemented through the European Agreements. The trade between the CEEC10 and the EU now represents more than half the total trade of the CEEC10, which makes the EU by far the most important trading partner. In DG ECFIN (2001) it is shown that the CEEC10 imports from and exports to EU15 amounted to something like 60 to 70 percent in 1999. However, the relative importance for EU15 of the trade with the CEEC10 is only 10-12 percent of the total EU15 trade. Therefore an expansion of EU15 demand for imported goods at x% will increase CEEC10 exports by more than x%, and vice versa - an increase in CEEC10 demand for imported goods at y% will increase EU15 exports less than y%. The asymmetries are not restricted to the subject of trade. It is a general feature for nearly all subjects in this analysis.

Before to a description of the actual effects we take a look at figure 2.3 below. It is a schematic view of the trade flows between EU15, the CEE countries and the rest of the world.The flow named "A" is the intra EU trade flow between member countries, here exemplified by just two of the EU15 countries. The "A" flow together with the flow named "C" between EU and the rest of the world will only to a very limited degree be affected directly by any of the institutional changes that are going to be implemented.. Of course there will be some general equilibrium effects that will change the flows A and C, but presumably they will be rather small.

The trade flow "B" has increased quite a lot in volume during the transition period. The box with the CEE countries is framed with a dot-and-dash line indicating that these countries will become a part of EU in a number of years, but are not there yet. Finally we have the flow "D" between the CEEC's and the rest of the world (ROW). It will be affected too, as the CEEC's have to adapt their external tariffs to the EU level.

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[4]In this argument we disregard the growth effects that might come from the catching up process that is something which is not taken care of by the basic integration theory itself.

One of the sources to changing trade prices is the customs union that all new members must adapt to. At the outset we had substantial tariffs between the CEECs and EU15 as well as ROW (flows B and D respectively). When the CEECs enter the customs union the tariffs on trade with EU "B" must be eliminated completely. Then a common level of tariffs on trade with the ROW "C" and "D" respectively, must be equal to a level close to the tariff on "C".

Figure 2.3 Overview of trade-flows between EU, CEEC and ROW
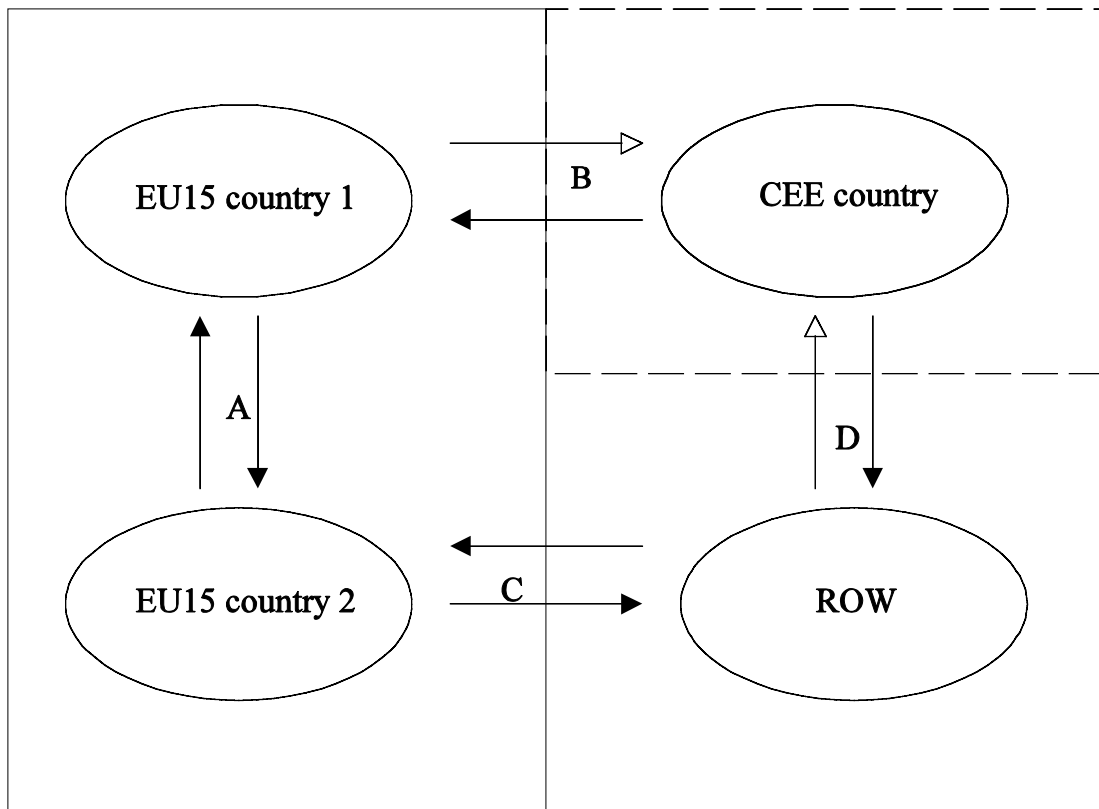
Another source for changing trade prices is a dramatic reduction or preferably removal of the so-called "technical barriers to trade". According to Brenton and Vancauteren (2001), they can arise when exporters have to comply with requirement for, amongst other issues, health, safety, environmental and consumer protection that differ from those in the domestic market. Significant additional costs can be imposed on the exporters that need to adapt product design, re-organise production systems, and defray expenses for multiple testing and certification. The technical barriers can be imposed both by government and by non-governmental organisations. In the first case they are characterised by their legal nature, and relate to technical specifications and testing and certification requirements in order for the product to actually comply with the specifications to which it is subjected. The non-regulatory barriers or standards in the latter case are voluntary and arise from the self-interest of producers or consumers. It could be to improve information in commercial transactions and to ensure compatibility between products. A very large share of the trade in the EU is in sectors affected by technical regulations (imposed by government). Actually, close to about three quarters of intra-EU import take place in sectors where differences in technical regulations are important. The removal of these technical barriers to trade due to

technical regulations amongst member states is a very crucial point for the further development of the Single Market in the EU.

The economic impact of technical barriers to trade is very difficult to estimate. Most of the estimates to date have been based on the same methodological approach as the assessment of the effects of ordinary tariffs and quantitative measures. The idea is that a wedge is driven in between the price of imported goods and the price of domestically produced goods making the latter more favourable to the consumers. The difficulties have often led to an ad hoc assumption about the size of technical barriers to trade in modelling work. In Keuschnigg and Kohler (1999) it is assumed to amount to 5 percent of total trade. In Baldwin et al. (1997) the ad hoc estimate is 10 percent. In a recent paper by Brenton and Vancauteren (2001) this subject is discussed in more detail. A gravity model is used and sectoral detail is accounted for. Their results suggest substantial border effects for all groups of sectors except for those subject to mutual recognition. The border effect is mitigated but remains considerable against trade with EU partners. High and persistent border effects are found for sectors where technical barriers are not important suggesting that factors other than policy-induced barriers are important determinants of the intensity of internal relative to external trade flows.

As it was concluded in the theoretical section, the effect of the increased trade will vary greatly between sectors, where some will benefit from the enlargement and some will suffer because of the increased competition from cheap Eastern European goods. Some of the sectors that will be exposed to more competition due to their labour-intensive production are textiles, clothing and footwear. Also basic and energy-intensive goods like chemicals, rubber and plastics may be strong competitors to the goods presently available in Denmark. Also in areas where scale matters like shipyards and iron and steel will be subject to strong competition.

Although the tariffs have almost been removed by now, the annual increase in trade is not supposed to stop increasing as well. It can be measured by gravity models that there is a huge potential for increasing trade still. This is due to the catching-up effect, which means that it can be assumed that once trade and factor movements are completely liberalised, the welfare levels in the countries inside a free trade union like the Single Market will tend to converge over time due to gradual equalization of technology and productivity in the Union. If we assume that effect will increase the trade in the CEEC's to the level of the EU15 it must increase a lot still. Such effects will be measured by a gravity model as can be seen in section 3.2

2.2.2 Labour migration effects

Both the barriers to and incentives for labour migration will be changed by the enlargement. There are substantial fears in some present member countries that they will be flooded by immigrants from the CEEC's once they gain full access the EU15 labour markets. However, many studies predict that the present member states stand to gain not only from increased trade but also from migration (Sinn et al., 2001). In contrast to public perception, a range of theoretical arguments suggests that the population in the immigration regions will gain overall from the immigration of labour, while the population that remains in the emigration regions will lose out. Theoretical approaches which assume full employment / market clearing show that immigration leads to increased output, Brücker and Wiese (2001). Recruitment of additional workers becomes profitable due to lower real wages brought about by the increase in labour supply. Because the

productivity of the new workers at lower wages exceeds their wage payments, additional profits are created and the capital income of the domestic population increases. This effect is in theory larger than the negative effect from the decrease in total wages. Thus, welfare improves overall for both the domestic population and the immigrants, who can now achieve higher income from employment.

A more realistic assumption, however, is that labour markets are not always cleared. If unemployment is present in the national economy, the welfare effect is not as obvious. It now depends on the structure of the immigration. Thus, immigration of workers who can substitute the kind of workers who are already unemployed will just increase unemployment, at least in the short run. See also Borjas (1995) and Wong (1995). The model of Kohler and Keuschnigg (2001) give the result that immigration expand and creates external gain from specialization in the same way as does capital accumulation.

Many studies have been carried out trying to estimate to immigration effects of the enlargement. The results are very different as pointed out in Straubharr (2001). Some of the studies have used the earlier enlargements with Greece, Portugal and Spain to estimate the possible effects of the present enlargement. Later in this report we argue that the applicant countries have a lot of "catching up" to do before their level of welfare have reached the level of welfare in the EU15 countries. So until that has happened there is a reason for people in the applicant countries to go west.

One of the studies carried out by Bauer and Zimmermann (1999) by asking 446 "academic experts" suggest that the old rule of thumb that about 3-4% of the CEEC population will migrate during the first couple of decades of the enlarged EU. About half is expected to go back or to other countries than the EU15 countries so the net immigration will be about 1-2% of the population in the CEECs which approximates to about 0.4 - 0.8% of the total EU15 population. Another one of the studies, is the often cited Boeri and Brücker (2000). Here an analysis is based on a time series model of immigration to Germany between 1967 and 1998. It allows for a convergence over time and the most important variables are the differences in per-capita income, the employment rate in the destination countries and the employment rate in the countries of origin. Also, differences in language and indicators for the standard of living are accounted for. A lot of caveats are attached to the results, and they should only be seen as "a clue to the magnitude of future migration". The model is able to predict that approximately 1 percent of the population in the CEECs will migrate, which is actually quite close to the estimate by Bauer and Zimmermann (1999). The 1% amounts to about 40,000 people immigrating in Denmark from the CEECs during a period of about 25 years. The effect is strong in the first years and then it gradually converges towards the 40,000 in total. These numbers are implemented in the model scenarios.

Most of the studies on this subject have differentiated between the immigration of skilled and low-skilled workers. It may affect the western economies quite differently according to which type of labour will immigrate. Some studies like Bauer and Zimmermann (1999) claim, that total unemployment may go down if primarily skilled workers immigrate into a western economy and the not quite as positive results will appear if primarily low-skilled workers come. Some investigations of the characteristics of the possible migrants suggest that it is primarily young and relatively well educated people who might migrate and not low-skilled workers as the theory suggests. It might turn out, however, that the knowledge of the migrants cannot easily be deployed

in the EU countries. Therefore, they might end up in low-paid jobs.

So based on these observations we find that obviously the right way to introduce the immigration aspect into the modelling framework would be to differentiate between low-skilled and high-skilled workers, since the effects for the workers themselves and for the economy they enter are quite depending on which group they belong to. However, such a differentiation is not possible in the model used for this analysis. We will, however, implement a gradual immigration of the 40,000 people from the CEEC's mention above. They will all be considered as the same type of worker as the ADAM model cannot handle different types of labour.

2.2.3 FDI flow effects

When the four freedoms are fully implemented capital is expected to flow in the opposite direction as labour. An increased flow from the EU15 countries to the CEEC's is expected, due to the lower risk premium to investments that investors will charge. This is very attractive for the CEEC's, because it contributes to the accumulation of capital and introduce new technology and knowledge. Productivity and growth will be affected in a positive direction. But the flow of FDI will probably be of minor importance to the EU15 economies. It has been argued that FDI will relocate economic activity from EU15 to the CEECs, due to comparative motives such as lower wages, low environmental demands and low energy prices. FDI would then result in lower investment and employment in the EU15 countries. However, empirical research show that the major part of FDI is aimed at expanding into new markets and not so much at reducing production costs, de Moij (2000) referring to Abraham et al. (1999). Only in certain sectors are FDI's motivated by the exploitation of low wage costs; textiles, electrical machinery, measuring instruments, and, to a lower extent, motor vehicles. In certain markets where transport costs are high and factor mobility is low, FDI may affect employment and wages. Kohler and Keuschnigg (2001) argue that investment in the CEEC's should be no different from investing in the home country, so they have no fear that an increase of FDI caused by the enlargement will be at the expense of a profitable domestic investment. A recent overview of the effects of FDI flows between EU15 and the CEEC's can be found in van Aarle and Skuratowicz (2000). Also Markusen (1997) and Di Mauro (2000) are valuable contributions here.

Accession to the EU will probably improve the investment climate in the CEECs. Indeed, the membership might have positive effects on macroeconomic and political stability. However, other factors also influence the amount of Foreign Direct Investments (FDI) into the CEECs. Matters like legal and administrative capabilities, the functions of the financial sector and developments with respect to corruption are some of the factors. FDI has already started to flow into Hungary, Poland and the Czech Republic and a lot more will follow. The user cost of capital and the price of labour might be significantly lower attracting investments from the EU. Boeri and Brücker (2000) state that FDIs by EU countries in the CEECs are mainly directed to non-tradable sectors or market-seeking activities in the tradable sectors. At the moment the effects from FDI initiated by the enlargement process on the CEEC economies have had some positive effects in that they amount to up to 25 percent of gross fixed investment. The effects of these investments on the EU15 countries are quite small, first of all because the investments themselves are quite small

Table 2.1 Danish FDI in Eastern Europe 1992-1997

	1992	1993	1994	1995	1996	1997
Net investment in Eastern Europe Mill. ECU's	10	34	40	139	186	167
Eastern investment in percent of total Danish net investment abroad	0.8%	7.0%	4.1%	7.5%	16.5%	7.6%
Eastern investment in percent of total Danish GDP	0.01%	0.03%	0.03%	0.11%	0.14%	0.12%

As it can be seen from table 2.1, the Danish investments in the Eastern European countries are rather limited so far. In 1997 they only amounted to 0.12% of Danish GDP, which is less than one percent of total Danish investment. Thus, the effect of these investments on the Danish economy is quite limited. Even if/when the eastern market becomes more profitable and attracts more Danish investments that may then be missing domestically, the magnitude is still limited and the effects on the Danish economy will be almost negligible. However other countries in the EU15 like, e.g. Germany and Sweden might be investing quite a lot more in Eastern Europe. It is significant contributions to the eastern economies, and they benefit from it. Thus, it will increase their growth and also the Demand for Danish exports. In other words, the effects on the Danish economy of FDI in Eastern Europe, may not come from the Danish FDI contribution itself, but from total effects on the European economy of the EU15 FDI in those countries. It can be argued, that on the European level the market for investments will be enlarged, which will make it a little harder to attract investors, which eventually will drive the interest rate up a little bit (a shortage of capital will increase its price - the interest rate). In the scenarios we already have the positive effects included in terms of increasing growth rates, that eventually will increase the demand for Danish export. So what we will put in the scenarios from the FDI discussion is a slight increase in the European interest rate level in line with Breuss (2001).

2.2.4 Budgetary effects

Until now, we have looked mainly at potential benefits of an enlargement. But there are also some costs to consider. The distribution of the costs and benefits among the member states is a bit of a problem in the context of the enlargement, because all CEE countries will become net recipient of EU funds. There are three major channels through which money are about to flow towards the east, namely the cohesion funds, the structural funds and Common Agricultural Policy (CAP). New member states will be entitled to support from the cohesion funds and the structural funds. All CEEC's will be entitled to "objective 1 support", which is intended for less develop regions. The total amount of support for one country cannot exceed 4 percent of GDP. The big question is what the total bill will be and how the current 15 EU members are going to finance it?

The first estimates made in the mid-nineties were quite high. The Agenda2000 estimates from the Berlin summit of the European Council in the spring 1999 are the ones that have been agreed upon. Entry plus pre-accession aid will amount to roughly 16 billion euro per year in the period 2000 to 2006. This corresponds to roughly 4% of GDP in the Luxembourg group and less than 0.2% of GDP in the current EU15 countries. To finance this bill, the Commission plans firstly to

let the new members make their contribution to the EU's budget with an own resources ceiling of 1.27% of GDP just as in the other EU15 countries. That amounts to 20 out of the necessary 80 billion ecu's. Then there can be drawn another 20 billion ecu's from the difference between the own resources ceiling and the actual payments. The remaining 40 billions are supposed to come from reductions in current payments. Thus, financing comes from revenues known as "own resources" which are drawn from customs duties, agricultural levies and some of the tax revenues collected by member states. In the case of Denmark it is most likely that the necessary resources will be drawn from the CAP support for Denmark. At the nice Council meeting countries like Sweden, Holland, Germany and Austria demanded a reduction, so they will not have to pay their full share of the cost of enlargement. The discussion about the financing is still ongoing.

In this report we will assume that the Danish contribution to the enlarged EU budget will come from increased transfers from Denmark to the EU, because it is still uncertain how the Danish government will deal with a situation, where CAP transfers to Danish farmers are being cut back. Naturally, the Danish farmers are not going to pay for the enlargement, so the Government must find some way to compensate them.

There are also some positive budgetary effects for the Danish economy. Government import might get cheaper, but the benefit might be offset by higher domestic prices. Another example is that the initial direct effects of removal of tariffs will be slightly negative on the budget, as the revenues will miss. But, if the tariff removal lead to an increase in trade, production and employment, the tax base is enlarged and tax revenues may also be increased. It might even be enough to outweigh the initial negative effects. In any case it will be necessary to let the large model used in this study keep track of all the different effects on the government budget.

The Common Agricultural Policy (CAP) also represents a major budgetary challenge. The CAP can be characterized as a system of price support. Intervention prices for agricultural products are given by the EU in order to keep prices at a certain level above the world market prices. The problem in relation to the enlargement is that the intervention prices are far above the normal price level in the CEECs, so a full integration of the CEECs in the CAP would cost an enormous amount of money. In the Agenda2000 it was decided to cut down gradually on the subsidies through the CAP according to the MacSharry reform from 1992. It is going to happen through lower guaranteed prices and more local responsibility over the CAP funds. The reform of the CAP is very important for the acceptability of the enlargement process and it is still ongoing. Since it is still quite uncertain what the outcome will be, it has been decided not to include any additional CAP expenditures in this study

The effects on the Danish national budget are not insignificant. They are not very large but large enough to require some considerations about how to finance them. In the model scenarios carried through later on in the report, two of the three scenarios are set up so that the government is allowed to finance the payments just through increasing its debt. In the last scenario it is assumed that income taxes are raised in order to fully finance the Danish share of the enlargement expenditures. The results are quite different when this constraint is imposed and it is obvious that the requirement of a balanced budget has somewhat negative effects on the general results.

3. Trade data

In section 2 it was stated that the trade between the CEECs and the single EU15 countries varies a lot so it is important to take a closer look at how Denmark is doing in this respect. Furthermore it was suggested that the trade have already changed a lot since the European Agreement was agreed upon in the early nineties, so we will have to take a closer look at that as well.

3.1 A historical view on the trade between the CEE countries and Denmark

Denmark is situated not as central as Germany and Austria to the CEE countries but still more closely than some other EU members. So it can be expected that there is some degree of trade between Denmark and at least the closest of the CEE countries. Two of the important factors determining the amount of trade between countries are on the one hand the proximity of the countries to each other determining the cost of transportation and on the other hand similar languages and mutual historical or cultural background. Aspects of these patterns can be found in the Danish trade with the CEE's. As it can be seen from table 3.1, Poland and the Baltic countries are the preferred trading partners.

We see that the Danish-Polish trade is particularly larger than the Danish trade with any other of the CEE countries. In 2000 1.8% of the Danish exports went to Poland, and 1.56% of total Danish imports came from Poland. Denmark has virtually no record of trading with countries like Bulgaria and Romania, in fact trading with countries like Lithuania and Latvia and somewhat higher, although they are particularly smaller economies.

In a dynamic perspective we see large movements in the trade with some of the countries. Especially the Danish trade with the Baltic countries has increased dramatically over the last 8 years as given in the table. After the opening of the eastern economies in the early nineties Denmark has increased its trade with the Baltic countries by approximately 400% while there is no noteworthy increase in the trade with countries like Bulgaria and Romania. The trade with Poland was significant from the beginning, but nevertheless both imports and export between Denmark and Poland has increased as well in this transition period. Figures 1 and 2 below show the development over the last 20 years in the share of Danish export and import for the 13 CEE countries in total, relative to the total Danish export and import.

Figure 3.1. **Exports, CEE13 shares**

Legend: Food and agricultural products; Raw materials; Manufactured goods
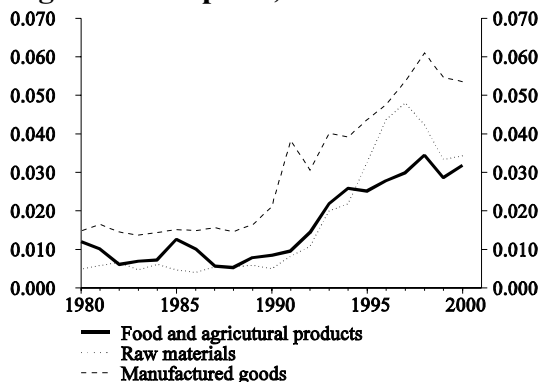
Figure 3.2. **Imports, CEE13 shares**

Legend: Food and agricultural products; Raw materials; Manufactured goods
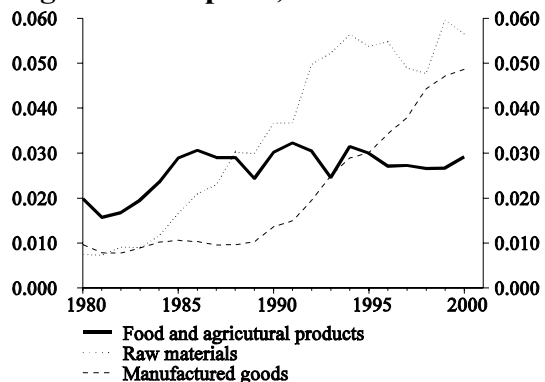
Table 3. 1. CEE countries share of overall Danish Export and Import in percent. Trade balances for 2000 in percent of Danish GDP.

	Exports			Imports			2000		
	1993	1996	2000	1993	1996	2000	Exports	Imports	Balance
Czech R	0.34	0.43	0.40	0.24	0.32	0.36	0.11	0.10	0.02
Estonia	0.09	0.19	0.26	0.06	0.14	0.24	0.07	0.06	0.01
Hungary	0.23	0.25	0.29	0.14	0.17	0.26	0.08	0.07	0.01
Poland	1.31	1.68	1.80	1.27	1.34	1.56	0.51	0.42	0.10
Slovenia	0.08	0.09	0.11	0.09	0.11	0.19	0.03	0.05	-0.02
Bulgaria	0.08	0.06	0.10	0.05	0.06	0.07	0.03	0.02	0.01
Latvia	0.08	0.18	0.24	0.05	0.16	0.27	0.07	0.07	0.00
Lithuania	0.09	0.36	0.44	0.08	0.26	0.47	0.13	0.12	0.00
Slovak R	0.09	0.11	0.11	0.03	0.04	0.06	0.03	0.02	0.01
Romania	0.08	0.11	0.12	0.04	0.08	0.10	0.03	0.14	0.01
Cyprus	0.11	0.07	0.09	0.01	0.01	0.01	0.03	0.00	0.02
Malta	0.13	0.05	0.05	0.01	0.00	0.00	0.01	0.00	0.01
Turkey	0.36	0.34	0.40	0.30	0.36	0.53	0.11	0.14	-0.03
CEEC5 [1]	2.05	2.64	2.86	1.80	2.08	2.61	0.80	0.70	0.10
CEEC10 [1]	2.48	3.46	3.87	2.06	2.69	3.59	1.09	0.96	0.13
CEEC13 [1]	3.07	3.93	4.41	2.37	3.06	4.13	1.24	1.10	0.14
Baltic	0.26	0.72	0.94	0.19	0.56	0.98	0.27	0.25	0.02
Poland	1.31	1.68	1.80	1.27	1.34	1.56	0.51	0.42	0.10
Others	1.50	1.52	1.67	0.91	1.16	1.58	0.46	0.43	0.03

Note 1: CEEC5: Czech Republic, Estonia, Hungary, Poland and Slovenia
      CEEC10: CEEC5, Bulgaria, Latvia, Lithuania, Slovak Republic, Romania
      CEEC13: CEEC10, Cyprus, Malta, Turkey

It is obvious that the opening of the eastern economies in the early nineties have had a distinct effect on the trade flows between Denmark and the CEEC. Table 3.2 and 3.3 focus on the developments in the nineties. The trade with CEEC has doubled, measured as shares of total exports and imports, in the period from 1992 to 2000. The sole exception is imports of food and agricultural products, where the market share of CEEC seems to be quite constant. The export of foodstuff as well as raw materials to the CEECs' have increased dramatically, however. These findings are somewhat contradictory to what we would have expected on the basis on the discussion in section 2. We would expect an increase in import of labour intensive products and a large increase in exports of capital intensive manufactured goods from Denmark to the CEECs' which is not really the case. However, the total size of this trade is not very significant.

Table 3.2 Exports by trading partners in percent

	1992			2000		
	CEEC13	EU15	ROW	CEEC13	EU15	ROW
Food and agricultural products (SITC 0+1)	1.4	68.9	29.7	3.2	64.1	32.7
Raw materials (SITC 2+4)	1.1	73.7	26.2	3.4	60.3	36.3
Manufactured goods (SITC 5-9)	3.1	65.6	31.3	5.4	61.9	32.8
Total exports of goods (SITC 0-9)	2.3	66.8	30.9	4.4	62.3	33.3

Table 3.3 Imports by trading partners in percent

	1992			2000		
	CEEC13	EU15	ROW	CEEC13	EU15	ROW
Food and agricultural products (SITC 0+1)	3.0	50.0	47.0	2.9	58.3	38.8
Raw materials (SITC 2+4)	5.0	71.0	24.0	5.7	66.7	27.6
Manufactured goods (SITC 5-9)	2.0	72.2	25.9	4.9	71.1	24.6
Total imports of goods (SITC 0-9)	2.2	69.1	28.7	4.7	69.4	25.9

On the import side there is a considerable increase in the manufactured goods where the CEEC countries increased their share by almost 150% in 8 years from 2.0% to 4.7%. Note that EU15 includes Austria, Finland and Sweden. Note also that trade shares for the rest of the world (ROW) in some respects increased in the period 1992-2000. The share of Danish exports for ROW increased by 2.1 percentage points. The ROW share in Danish imports decreased by 2.8 percentage points.

The pending question is whether the level of trade with the relative new market economies in Eastern Europe now has reached its potential level. Substantial adjustments has obvious taken place in early and mid nineties. But the developments in the late nineties seem to indicate that a new level has been reached. The gravity model offers a framework for analysing this question.

3.2 The gravity model

The gravity model of trade (Linnemann, 1966, and Linder, 1961) is commonly used to assess trade patterns between countries. The model relates trade flows between two countries to the importer's demand and exporter's supply and the cost of trade. Demand and supply is usually

approximated by the aggregate demand (GDP) or the population of the respective countries (or both). Cost of trade is often measured as the distance between the capitals of the countries. The model can be supplemented with dummies that reflects geographical, political or cultural relations.

The gravity model has proven successful in empirical analysis. Several studies have relied on this approach to measure the trade potential between the Eastern Europe and the EU15. The Hamilton-Winter (1992) study analyses the integration of associated countries into the EU. The Hamilton-Winter projections estimated the level of trade with Eastern Europe to increase dramatically after the opening of the Eastern Europe market in 1990. Exports of OECD countries to Eastern Europe actually increased 2-300 percent in the period 1991-1994 (Kaminski, Wang and Winters, 1996).

Helpman and Krugman (1985) and Krugman (1991) formulated the gravity model in the framework of differentiated products and increasing return to scale. But the model can also by derived in the framework of for example Heckscher-Ohlin models (Deardorff, 1995). Therefore the gravity model cannot be used to discriminate between theories of trade. We estimate a gravity model in the form:

$$T_{12} = \beta_o + \beta_1 \cdot P_1 + \beta_2 \cdot Y_1 + \beta_3 \cdot P_2 + \beta_4 \cdot Y_2 + \beta_5 \cdot D_{12} \tag{3.1}$$

where T_{12} is the trade flow from country 1 (exporter) to country 2 (importer)
P_1 and P_2 is the population of the respective countries
Y_1 and Y_2 is GDP per capita
D_{12} is the distance between capitals

All variables are in logs. Trade flows and GDPs are in current prices and denominated in DKK. We will refer to the predicted level of trade as potential trade[5].

3.3 Actual and potential trade between Eastern Europe and EU15

The data set for bilateral trade with CEEC13 has observations for the period from 1980-2000. But many country figures is only reported from 1993 and onwards. Therefore we restrict the estimation period to 1993-1999. Some of the figures for 1997-1999 are provisional, and will be revised. The figures are included in the estimation period, because vi expect the gains from the large number of observations are greater than the loss from the uncertainty of the provisional figures. Therefore we have a data set with 182 observations including aggregate imports and export to 13 CEE countries.

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[5] The data set is constructed from different sources. Bilateral trade figures are found in the Danish trade statistics. Figures for The Czech Republic, Hungary and Poland are found in OECD economic outlook. Figures other CEE countries are supplied by the European Commission. All CEE country figures are supplemented with recent indicator from the respective countries statistical offices. CEE Exchange Rates are found in the IMF International financial Yearbook. EU country figures are found in OECD economic outlook. Se section 5 for a more detailed description on the construction of the variables in the database.

Table 3.4 Gravity Model, Bilateral CEEC13 trade Pooled panel-data

		Estimated coefficient	Standard Error	t-statistics	p-value
Constant	β_0	0.94	0.60	6.59	0.00
Importer. population P_1	β_1	0.34	0.05	6.5	0.00
Importer. GDP per capita Y_1	β_2	0.35	0.08	4.1	0.00
Exporter. population P_2	β_3	0.74	0.05	13.95	0.00
Exporter. GDP per capital Y_2	β_4	0.63	0.08	7.38	0.00
Distance. D_{12}	β_5	-1.36	0.11	-12.12	0.00

Observations: 182, Period: 1993-1999

$R^2 = 0.72$, F-test (154,52) = 27,64 (H_0: $\beta_0^i, \beta_1^i, \beta_2^i, \beta_3^i, \beta_4^i, \beta_5^i = \beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5$)

This simple gravity model gives a fair explanation of the trade pattern with a value of 0.72 for the adjusted R^2. All estimated parameters have the expected sign, and none of them are insignificant. Meaning that increases in demand and supply both have positive effects on the level of trade. The distance or the cost of trade has a negative effect on the trade level. The log representation means that the parameters are elasticities.

The estimated relation will not trace the actual trade pattern to individual countries. The F-test rules out the possibility that identical sets of parameters will explain the trade pattern for every single country. But the gravity model can give some insight for the total potential trade with the region. The coefficients estimated for the population and GDP per capita for the importing and exporting countries differs somewhat. This is an interesting feature of the model. Usually population and GDP effects are on the same level for home and foreign markets. This result may imply that some kind of asymmetry is in place. We also estimate the model on a simular data set for the Danish bilateral trade with the EU15 countries. The results are given in table 3.5.

Table 3.5 Gravity Model, Bilateral EU15 trade. Pool panel data

		Estimated coefficient	Standard Error	t-statistics	p-value
Constant	β_0	7.54	0.86	8.75	0.00
Importer, population P_1	β_1	0.61	0.03	20.06	0.00
Importer, GDP per capita Y_1	β_2	0.52	0.06	8.09	0.00
Exporter, population P_2	β_3	0.58	0.03	19.2	0.00
Exporter, GDP per capital Y_2	β_4	0.63	0.06	9.91	0.00
Distance, D_{12}	β_5	-1.25	0.05	-24.51	0.00

Observations: 442, Period: 1980-1997

$R^2 = 0,84$, F-test (124,312) = 134,80 (H_0: $\beta_0^i, \beta_1^i, \beta_2^i, \beta_3^i, \beta_4^i, \beta_5^i = \beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5$)

Figure 3.3 Exports from DK to CEEC13
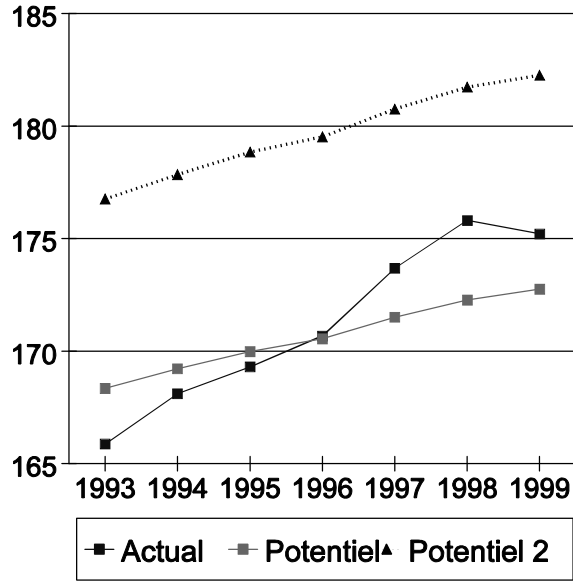
Figure 3.4 Imports from CEEC13 to DK
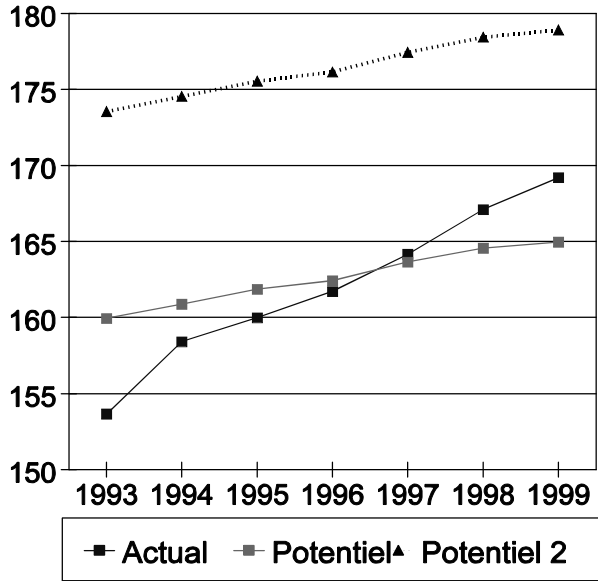
**Figure 3.5. Total trade DK-CEEC13
(sum of exports and import)**
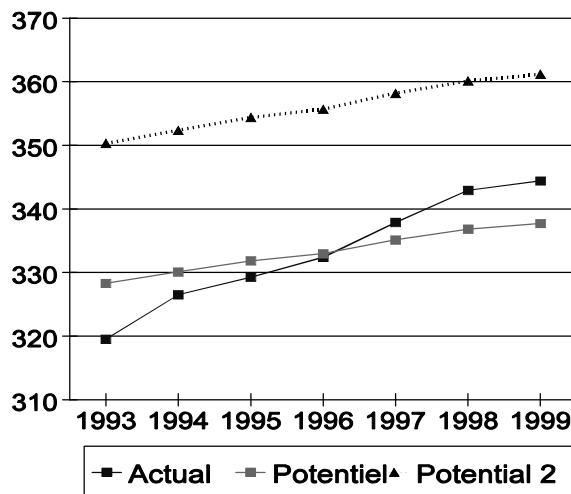
The gravity model for bilateral EU trade also provides a good explanation of the Danish trade pattern with the region. The estimated parameters are simular to those of the gravity model for the CEEC region. The effects from the foreign markets differ most. Possibly, there is a need for one or more dummy variables, like for the entrance in 1995 of Sweden, Finland and Austria. However, we do not whish to complicate this simple calculation more, so no dummies is included.

With these two gravity models, we can compare actual CEEC13 region trade with potential trade. We can also compare trade with potential trade as if the CEEC13 region where simular to the EU15 region. The latter (potential2) are computed by substituting β_0 - β_5 of the gravity model of the EU15 region into the gravity model of the CEEC13.

Actual trade, both exports and imports, grew significant more than potential trade. A glance at figure 3.5 tells the story. But the trade figures are reported in logs in the figures, so removal of the logs and a look at trade in current prices gives the full picture. In fact in the period from 1993 to 1999 exports from Denmark to CEEC13 grew 107% and imports from the CEEC13 even more impressive 175%. Potential trade grew approximately 50% in the same period. Less than half of the trade boom can explain trade potentials based on the GDP and population growth in the Denmark and CEEC13. It is evident that the DK-CEEC13 trade has been catching up in the period 1993-1999.

But has actual trade reached the potential level by 1999. The gravity model for the DK-CEEC13 trade does not clarify the question. On the contrary 'average' potential trade equals 'average' actual trade by assumption. The same is true for the DK-EU15 gravity model. When the DK-EU15 model is implemented on the DK-CEEC13 trade data, the assumption becomes that 'average' potential trade will be at the level of 'average' DK-EU15 trade. This situation is represented by 'potential 2' in figure 3-5 above. The difference between 'potential' and 'potential 2' trade level measures the possible catch up gab.

Of cause the gravity models' presented here are very simple. The high degree off uncertainty implies that conclusions may be misleading. But on the face of the estimated gravity models the potential bilateral trade level between CEEC13 and DK is at about 40 percent of what it can become if it reaches the DK-EU15 level. The recent development has narrowed that gab rapidly, but by the end of 1999 the gab is still at about 40 percent. That is the trade between CEEC13 and DK can be categorised to be at about 60 percent of an intra-EU level.[6]

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[6] Simular results on potential trade is reported by Boeri and Brücker (2001).

4. Principles for construction of data for world market demand for Danish export

As we argued in chapter 2, some of the effects of the enlargement come to Denmark through the foreign trade. So an assessment of the economic effects of the enlargement is largely dependent on how the model deals with the foreign trade. One very important aspect is how the variables representing the world market demand for goods and services produced in Denmark is formed. This chapter is devoted to the construction of such measures.

In ADAM as in many other macro models this measure is constructed on the basis of the Armington model.The *Armington-model* is widely used in empirical work on the demand for exports.[7] The starting point is a matrix of wold trade. The matrix shows where a given good k is produced and used. The matrix of world trade $X=(x_{ij})$ has in principle one row and one column for every country in the world. A specific element in the matrix x_{ij} indicates the amount of good k produced in country i and used in country j.

A complete matrix of wold trade is large. One way of reducing the size is to group neighbour countries into regions. The most simple matrix of world trade would then have only two rows and two columns, ie. one for Denmark (DNK) and one for the rest of the world (WLD), *cf. table 4.1*.

Table 4.1. A simple world trade matrix

Used in Production of goods	Denmark DNK	World WLD	Total production
Denmark (DNK)	$x_{DNK,DNK}$	$x_{DNK,WLD}$	$x_{DNK,\bullet}$
World (WLD)	$x_{WLD,DNK}$	$x_{WLD,WLD}$	$x_{WLD,\bullet}$
Total use	$x_{\bullet,DNK}$	$x_{\bullet,WLD}$	$x_{\bullet,\bullet}$

The sum of row one - named "Denmark" - is equal to total production of good k in Denmark, $x_{DNK,\bullet}$. The sum of column one - also named "Denmark" - is equal to the total use of good k in Denmark, $x_{\bullet,DNK}$. The diagonal of the matrix is the regions production for the domestic use, while the elements outside the diagonal is the flows of world trade - $x_{DNK,WLD}$ is exports of good k from Denmark and $x_{WLD,DNK}$ import of good k into Denmark. Consequently it must be true that total demand is equal to total production

$$x_{\bullet,DNK}+x_{\bullet,WLD} = x_{DNK,\bullet}+x_{WLD,\bullet} = x_{\bullet,\bullet} \tag{4.1}$$

In the Armington-model a CES-function of relative prices forms the market shares. In table 1 there are two CES-functions, one for the home market and one for the export market. The functions form the Danish market shares on the domestic market and the export market:

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[7]Paul S. Armington (1969).

$$\frac{x_{DNK,DNK}}{x_{WLD,DNK}} = \alpha_{DNK} \; (\frac{p_{DNK,DNK}}{p_{WLD,DNK}})^{\sigma_{DNK}}$$

$$(4.2)$$

Equation (4.2) says that the ratio between goods produced and used in Denmark and goods produced abroad but used in Denmark (imported goods) is a log-linear function of relative prices.

$$\frac{x_{DNK,WLD}}{x_{WLD,WLD}} = \alpha_{WLD} \; (\frac{p_{DNK,WLD}}{p_{WLD,WLD}})^{\sigma_{WLD}}$$

$$(4.3)$$

In equation (4.3) the ratio of goods produced in Denmark but used in the rest of the world (exported goods) and foreign produced goods used abroad is a function of the ratio between the export price and the world price. Equation (4.3) is often replaced by a log-linear relation for the market share $x_{DNK,WLD}/x_{\bullet,WLD}$ (the world market share for a small economy is insignificant, so $x_{\bullet,WLD} \approx x_{WLD,WLD}$). Therefore we can rewrite (4.3)

$$\frac{x_{DNK,WLD}}{x_{\bullet,WLD}} = \alpha_{WLD} \; (\frac{p_{DNK,WLD}}{p_{\bullet,WLD}})^{\sigma_{WLD}}$$

$$(4.4)$$

where the left hand side is the market share of Danish exports, and the explanatory variable is the relative price of Danish exports. The market share is usually measured in real terms, but if the market share is measured in current prices equation (4.4) still applies - ie. multiply the left hand side of equation (4.4) by the relative export price and replace σ_{WLD} with $(1 + \sigma_{WLD})$ on the right hand side.

The parameter α_{WLD} is usually interpreted as the equilibrium market share (that is the market share for a relative price at 1). The parameter σ_{WLD} is the elasticity of substitution (if the market share is measured in real terms).

It is common to rearrange equation (4.4):

$$x_{DNK,WLD} = \alpha_{WLD} \; (\frac{p_{DNK,WLD}}{p_{\bullet,WLD}})^{\sigma_{WLD}} \; x_{\bullet,WLD}$$

$$(4.5)$$

Now it becomes clear, that the Armington-model assumes a elasticity of demand of 1.

4.1 Towards a realistic measure of the export market for Danish manufactured goods

Equation (4.5) is widely used in small macroeconomic models. But for a more detailed analysis of foreign trade a detailed matrix of foreign trade is required. It has to be taken in to account that some markets are more important than others for Danish exports. It is obvious that the German

or the British market if far more important than for example the Australian or the Brazilian market. The problem in question does in principle not change much. What - above in table 4.1 - was contained in one row and one column and named the world now has to be divided into n rows and n columns – one for every region (where a region can be seen as a market).

After disaggregation equation (4.5) is replaced with n equations. Total export is the sum of these equations:

$$E = Total\ export = \sum_{j \neq DNK} x_{DNK,j} = \sum_{j \neq DNK} \alpha_j\ (\frac{p_{DNK,j}}{p_{\bullet,j}})^{\sigma_j} x_{\bullet,j} \qquad (4.6)$$

A possible strategy would then be to estimate these n export equations. That is however a very tedious and time consuming process. In the ADAM framework another strategy has been chosen. Equation (4.6) is simplified to a single equation, which uses weighted measures of foreign market demand and foreign market prices. Equation (4.6) can be rewritten in export growth rate terms

$$R(E) \approx \sum_{j \neq DNK} w_j^0 \left[R(market_j) + \sigma_j R(relative\ price_j) \right] \qquad (4.7)$$

Superscript ^{0}		value in base year
$R(\bullet)$		growth rate relative to base year, ex. $R(E)=E/E^0-1$
$Market_j$	$= x_{\bullet j}$	total demand market j
$Relative\ price_j$	$= p_{DNK,j}/p_{\bullet j}$	ratio between export price and market price on market j
w_j	$= x_{DNK,j}/E$	share of export market j

Equation (4.7) states that export performance is determined in a linear combination market growth and relative prices on n markets. Now assume that the price elasticity is independent of the market, ie

$$\sigma_j = \sigma \qquad \text{for every } j \qquad (4.8)$$

Then (4.14) reduces to

$$R(E) = \sum_{j \neq DK} w_j^0\ R(market_j) + \sigma \sum_{j \neq DK} w_j^0\ R(relative\ price_j) \qquad (4.9)$$

Following equation (4.9) export performance is given by the priceelasticity, word market demand and the relative price of Danish exports, where

- world market demand is a weighted average of demand in every region
- relative price of Danish exports is a weighted average of relative prices in every region

The approximation given in equation (4.9) introduces an small error. And the error will increase with the distance to the base year. To minimize this error world market demand and relative export price is generated using a chain index in the ADAM frame work, ie

$$R(world\ market)\ =\ \sum_{j \neq DK} w_{j,-1}\ R(market\ j) \tag{4.10}$$

$$R(Relative\ price)\ =\ \sum_{j \neq DK} w_{j,-1}\ R(relative\ price\ j) \tag{4.11}$$

$w_{j,-1}$ share of Danish export to region j year $t-1$

4.2 The sources of data for the Armington system

In this section we will take a look at the data available to be used in the Armington framework presented above. A central source of trade data is OECD's trade statistics. OECD countries are covered quite well, and non-OECD countries are to some extent in the statistics as well. Secondly, statistics on the Danish foreign trade give very detailed figures for exports and imports.

But two major data problems remains

- The use of domestically produced goods - the diagonal in the Armington trade matrices is not part of trade statistics
- Export price figures to specific regions or countries are not available

This problem with the domestically produced goods is quite serious, but it could (to some extent) be solved with additional information from other sources like figures for industrial production etc. In other statistics, however, one faces the problem that statistics on industrial production or other statistics cannot be compared with trade statistics. These statistics follow industries rather than goods. Consequently this strategy can only be applied for fairly aggregate figures.

But the findings of Armington (1969) also states conditions for leaving out the use of domestic produced goods. Suppose total demand is determined in two steps. In Step 1 each region or country chose among imports and domestically produced goods. In step 2 total demand for imports is divided between exporting countries according to relative prices. In this case total import of goods replaces total demand for goods k in equation (4.6), (4.7) and (4.8) above. In other words $x_{\bullet j}$ can be replaced with $x_{\bullet j} - x_{j,j}$. Then the use of domestic produced goods is no longer a problem, but the cost is that no substitution between domestically produced goods and import is possible. In the case of Denmark this problem may be minor. It is hard to imagine that Danish export prices having significant impact on total imports in neighbour countries.

The second data problem is with export prices. Only one figure for the price of exports of good k is available. The only option is to assume the single export price figure applies to all markets

$$p_{DNK,j} = pe \qquad \text{for all } j \tag{4.12}$$

The implication is that equation (4.11) can be simplified even more

$$R(relative\ export\ price) = R(pe) - \sum_{i \neq DNK}{}' w_{j,-1}\ R(world\ price_j)$$

(4.13)

To conclude this section, the world market demand variables are measured by indexes relating growth rates in world market demand to growth rates in imports of individual regions and the growth rate in world price the growth rates in import prices in individual regions.

$$R(world\ market) = \sum_{j \neq DK} w_{j,-1}\ R(market\ j)$$

(4.14)

$$R(world\ price) = \sum_{j \neq DK} w_{j,-1}\ R(world\ price\ j)$$

(4.15)

5. Methodological considerations

Analysis like the one dealt within this report, involve so many significant economic changes that it is impossible to carry through without help from a detailed macro economic model. Especially all the indirect or feedback effects from the domestic as well as the international economy are difficult to capture in a more simple partial model. There are however different types of models to choose from, and the first section 5.1 in this chapter is devoted to a discussion of the differences and similarities between the major types of models. In section 5.2 the ADAM model is introduced. The analysis will be conducted within the framework of the macroeconomic model ADAM. The core of the large-scale econometric model of the Danish economy is based mainly on annual national account figures. In section 5.3 we describe the construction of scenarios for the analysis of the enlargement. The effects on the Danish economy are evaluated in a standard multiplier analysis, meaning that the variables in the policy scenarios will be compared to a baseline scenario. Only the difference between the two is considered. To facilitate such analysis, a model of bilateral trade has been implemented in the core model. In the process of evaluating the enlargement process, the bilateral trade model has been expanded significantly. Now all CEEC10 countries enter the model individually as well as Malta, Cyprus and Turkey. In section 5.3.2 the simulation process is discussed. The simulations are set up in non-standard way. The central idea is to capture spillover effects from the increased trade between the CEE countries and the rest of the EU15 countries. In section 5.4 a measure of welfare effects is introduced.

5.1 Which type of model?

Before carrying out a policy analysis like the present, it is only natural to ask "which model type is best?" Generally three types of models can be distinguished (Monaco (1997)). One is the applied or computable general equilibrium model (CGE) and the other two major types are the macro-econometric model types (ME) and (IME). A macro-econometric model (ME) is a collection of equations - with parameters estimated using regression - that relate economic aggregates to one another. Most macro models themselves have little, if any, meaningful sectoral detail. An Interindustry macro-econometric model (IME) uses econometric equations to predict the behaviour of each sector of each real final demand category at a detailed level. Then the detailed predictions are used along with the IO A matrix to generate output[8].

There are of course advantages and disadvantages connected to all three model types, and they all have supporters and opponents. Quite strong opinions are often held by proponents of one type about the drawbacks of the other types. The truth probably is that when all the pros and cons are weighed together, they are quite close to being equally good, each of them having some advantages and some drawbacks. We will make a brief comparison of the three types of models in order to shed a little light on the differences between this study and other studies about the EU enlargement, which are generally based on the CGE model type, including the predecessor of this study (Keuschnigg and Kohler, 1999).

The CGE models generally aim to have a strong theoretical foundation. They are often based on

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[8] cf. Almon et al. (1974), Klein(1986) or McCarthy (1991).

an exact specification of the underlying consumer's utility function and producers production functions. Then the assumption of equilibrium is used to generate parameters consistent with observed data. They assume that all agents optimize and that equilibrium on all markets is reached quickly and that full employment is automatically generated..CGE models is based on the assumption that the world is a general equilibrium system and the models are very tidy. Observed data are by the modellers believed to be a little messy, because the statistical agencies cannot measure what the general equilibrium theory really needs to become truly operational. The CGE models are basically based on a single year of data and it is generally not possible to say how the model catches what ent on in the past. So it is not possible to answer the question "how good is the model at forecasting". Modellers rely on the fact that the theoretical basis of the model is valid. The CGE models can provide true welfare results, in terms of indexes of utility. However, even the dynamic form of the CGE models have little to say about how the economy responds over time to policy changes, at least on a year to year basis.

The ME and IME models are rooted in the data, which usually is national accounts statistics. The data are used in regression equations in an attempt to capture the movement in the data. Economic theory is used as a guide to select variables to be used in the regression equations, not as a means to determine the functional form So these types of models are only partially based on economic theory. The IME and ME models aims at having a strong correspondence to available data. In general they are able to reproduce the past economic history very closely. The idea is that by incorporating as much information from the past as possible the model will be better at predicting the future or the effects of a policy change than if less information had been incorporated. The Lucas critique[9] is often used by CGE modellers as an argument against this view. It is often possible to measure how good a ME or IME model is at forecasting by comparing previous attempts with what actually happened. These models may not be as easy to understand as the CGE models, because the latter rely so heavily on known economic theory. The ME and IME models are more often like a "black box". However daily users of these models may not agree that it is difficult to explain the effects. The output from ME and IME models are generally more friendly to the users, because they show the year by year (quarter by quarter) response to a policy change. Policymakers are often more interested in what happens on the path to equilibrium as they are in the final equilibrium state.

Thus, there are major differences between the two types of models. In practical work, however, there is evidence that results from the two types of models are quite similar. Statistics Denmark builds and maintains two large scale macroeconomic models, DREAM and ADAM. The first one is a very large dynamic CGE model, and the latter is a macroeconometric model of the IME type as described above. In a recent paper by Pedersen and Rasmussen (2001) the long run properties of those two models are compared. It turns out that the long run properties are similar with respect to both the aggregate demand and aggregate supply. One reason is that the adaptive expectations in the ADAM model and the rational expectations in the DREAM model are more or less the same in the long run. The resemblance in the short run is due to the fact that the wealth effects from owner-occupied dwelling matches the effects in DREAM generated by the intertemporal

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[9] Lucas (1976) made a fundamental criticism of macro models. He showed that because the estimated equations were reduced forms based on observed outcomes, the parameters were functions of the average embedded policy regime. His point was that this means that the regression equation parameters should change with the policy proposals made.

optimizing agents. So although the models may look different, the results they produce on the aggregated level are quite similar. In the following section the Danish ADAM model is presented.

5.2 The Danish macroeconomic model ADAM

The macroeconomic model ADAM (Aggregated Danish Annual Model) is the core of the macroeconomic model apparatus employed by Danish government agencies. ADAM is in custody of Statistics Denmark, the Danish central statistical office, which has been a centre for economic modelling since 1970. ADAM is an annual model constructed in the modelling tradition of Tinbergen and Klein. The model displays features which are influenced by the Keynesian tradition.

The short term dynamics of ADAM can in short be described as that of the multiplier-accelerator model. Gross output is determined by the level of demand, most groups of which are, in turn, predominantly determined by total income. Employment - and therefore unemployment - is determined by domestic output and the costs of labour relative to capital. For wages the model has a phillips-curve and output prices are formed as a markup on costs. The rate of unemployment is a key variable. Demand shocks affects unemployment and hence wages through the phillips-curve. Outprices prices and domestic prices responds on changes in the wage rate. In the medium term this becomes a predominant crowding out effect as foreign trade respond to relative prices.

For the interest rate is formed so demand must meet supply at the market for bonds. Except for the very short run the German interest rate acts as an anchor. The domestic interest rates can and will deviate from the German interest rate if the domestic rate of inflation deviate from the rate of inflation abroad. In the medium to long term effects on the interest rates becomes increasingly important through the effects on capital formation, output prices and consumption

With reference to standard textbooks ADAM can be characterised as a model of a small open market economy with crowding-out predominantly via foreign trade. ADAM is a large-scale model. The level of disaggregation is relatively large by international standards for econometric models. The model contains 19 industries, consumption is determined in 8 groups and foreign trade at the 1-digit SITC level etc. All together about 4000 variables in about 2500 equations. Given the dynamic structure of the model, the level disaggregation and variances in the specification of the relationships the model can reflect lots of interesting effects. It is obvious impossible to account for all of those in the paper. But the model is surveyed in some detail in the next two sections.

5.2.1 Outline of the model structure

This section presents a simple system of equations representing the general features of the model. The dynamic structure of the model, the degree of disaggregation and specific features, which may be important under some circumstances, have been suppressed.

The variable mnemonics used in the presentation are fairly straightforward and should be clear from the comments below. The marking of a variable with a bar indicates that the variable is exogenous. It should be noted, though, that exogenous variables in this presentation are not

necessarily exogenous in the real ADAM model. If a variable there is determined predominantly by exogenous variables, it can as a matter of simplification be denoted as exogenous here. General function forms are denoted by F($\cdot$). Special functions are R($\cdot$) indicating growth rates and Diff($\cdot$) indicating differences in absolute terms.

Demand for goods and services and demand for production factors

Private consumption	$fCp = F(\dfrac{Yd}{pcp}, \dfrac{Wcp}{pcp})$	(5.1)
Optimal capital stock, buildings	$fKb^{w} = F(fY, \dfrac{uib/\overline{dtkb}}{py})$	(5.2)
Optimal capital stock, machinery	$fKm^{w} = F(fY, \dfrac{lna/\overline{dtq}}{uim/\overline{dtk}})$	(5.3)
Private investments, d = b, m	$fIp<d> = F(fK<d>^{w}, fK<d>)$	(5.4)
Capital stock, d = b,m	$fK<d> = fK<d>_{-1} + fIp<d>$	(5.5)
Employment	$Q = F(fY, fKm) + \overline{Qo}$	(5.6)
Demand for dwellings	$fKbh^{w} = F(\overline{U}, \dfrac{Yd}{\overline{U}\cdot pcp}, \dfrac{uibh}{pcp})$	(5.7)
House prices	$phk = F(\dfrac{fKbh^{w}}{fkbh})$	(5.8)
Capital stock, dwellings	$fKbh = F(\dfrac{phk}{pibh}, \dfrac{fKbh^{w}}{fKbh})$	(5.9)
Private investments, dwellings	$fIbh = Diff(fKbh)$	(5.10)
Exports	$fE = F(\overline{fEe}, \dfrac{pe}{pee})$	(5.11)
Final demand	$fD = fCp + \overline{fCo} + fIp + fIbh + fE$	(5.12)

Supply of goods and services

Imports	$fM = F(fD, \dfrac{\overline{pm}}{py})$	(5.13)

Gross domestic product	$fY = fD - fM$	(5.14)

Labour market

Labour supply	$Ua = F(Q, \overline{U})$	(5.15)

Unemployment	$Ul = Ua - Q$	(5.16)

Prices

Domestic prices d = y,cp,co,im,ib,ibh,e	$p\!<\!d\!> = F(\dfrac{lna}{dtq}, \dfrac{uim}{dtk}, uib, \overline{pm}, \overline{tsi})$	(5.17)

Wage	$lna = F(pcp, \dfrac{fY}{Q \cdot \overline{Hgn}}, Ul)$	(5.18)

Usercosts d = b, m	$ui\!<\!d\!> = pip\!<\!d\!>\cdot(iwbz - R(pip\!<\!d\!>), \overline{tsd})$	(5.19)

Incomes and taxes

Indirect taxes	$Si = (fY \cdot py)\cdot \overline{tsi}$	(5.20)

Factor income	$Yf = fY \cdot py - Si$	(5.21)

Direct taxes	$Sd = (Yf + Ty + Tipn)\cdot \overline{tsd}$	(5.22)

Transfers	$Ty = F(Ul, lna)$	(5.23)

Disposable income	$Yd = Yf + Ty + Tipn - Sd$	(5.24)

Sector balances

Net flow of interest, private sector	$Tipn = \mathrm{F}(iwbz, \overline{iwbu}) \cdot Wpqp$	(5.25)
Net flow of interest, public sector	$Tion = -iwbz \cdot Wzbg$	(5.26)
Net flow of interest abroad	$Tien = \mathrm{F}(iwbz, \overline{iwbu}) \cdot Ken$	(5.27)
Private sector net lending	$Tfpn = Yd - fCp \cdot pcp - fIp \cdot pip - fIbh \cdot pibh$	(5.28)
Private sector net lending	$Tfon = Tion + Sd + Si - \overline{fCo} \cdot pco - Ty$	(5.29)
Balance of payments	$Tfen = Tien + fE \cdot pe - fM \cdot \overline{pm}$	(5.30)
Private financial wealth	$Wpqp = Wpqp_{-1} + Tfpn$	(5.31)
Public sector debt	$Wzbg = Wzbg_{-1} - Tfon$	(5.32)
Foreign debt	$Ken = Ken_{-1} + Tfen$	(5.33)
Private wealth	$Wcp = Wpqp + fKbh \cdot phk + fK \cdot pip$	(5.34)

Interest rate

Domestic demand for bonds	$Wpbz = \mathrm{F}(iwbz - \overline{iwmm}, Wpqp)$	(5.35)
Foreign demand for bonds	$Wfbz = \mathrm{F}(iwbz - \overline{iwbu}, \mathrm{R}(\dfrac{lna}{lnat}), \dfrac{Tfen}{fY \cdot py})$	(5.36)
Rate of interest	$iwbz = \mathrm{F}(Wzbg, Wpbz + Wfbz + \overline{Wnbz})$	(5.37)

Commodity demand – (5.1)-(5.12)

Total private consumption expenditure at constant prices, *fCp*, is a function of disposable income, *Yd*, and private wealth, *Wcp*, both in current prices, but deflated by the price of private

consumption, *pcp*. Public sector consumption expenditure, *fCo*, is closely related to public sector employment, which in turn is exogenous.

Capital formation at constant prices, *fIp<d>*, is follows the principle of capital adjustment. Actual capital gradually approaches optimal capital, *fKb<d>*^{w}. For buildings optimal capital is given by output at constant prices, *fY*, and user-costs, *uib*. The rate of interest, *iwbz*, is usually the predominant factor in user-costs. Optimal capital for equipment and machinery is related to production and relative factor costs. Factor costs is the wage rate, *lna*, and user-costs, *uim*, Both prices is adjusted for growth in efficiency, *dtq* and *dtk*. Private employment, Q, rather quickly adjust, and production will fulfill demand given the actual stock of capital. Total employment, *Q*, is given by the sum of private sector employment and public sector employment, *Qo*.

House prices, *phk*, adjust so demand equals supply at the housing market. In the short run supply, *fKbh$_{-1}$*, is inelastic, but demand is driven by disposable income, *Yd*, house prices, *phk* and the mortgage cost, essentially *iwbz*. Investments at constant prices, *fIbh*, react to the ratio of house prices and the investment deflator.

Exports at constant prices, *fE*, is given by foreign demand, *fEe*, and the relative export price, *pe/pee*. The market for Danish exports, *fEe*, and the and the export market price, *pee*, is measured as a weighted average over the relevant goods and markets. Se section 4 above.

Total final demand, *fD*, is straight forward the sum of the individual components of demand.

Commodity supply – (5.13)-(5.14)

Import fM is determined through demand fD. The part of total demand, which is satisfied by import, depends on foreign prices (import price pm) compared with the price on domestically produced goods, py. This is due to the fact, that the two types of commodity(.......) is non-perfect substitutes. The part of demand, which is not imported, is produced by Danish manufactures. Hereby both import and domestic production (gross domestic product, fY) depends on the competitive power.

Labour market – (5.15)-(5.16)

Labour supply *Ua* depends on employment *Q*, because high employment, and thereby high probabilities of getting jobs, encourage people to enter the labour market. Labour supply is also closely related to the exogenous population size *U*. Unemployment *Ul* is defined as labour supply *Ua* minus employment *Q*.

Prices – (5.17)-(5.19)

The domestic prices, pd, is determined partly by importprices, pm, and partly by the wage rate and usercosts of machines and buildings, where the first two is corrected for the productivity index of the factors, respectively *dtq* and *dtk*. The correction is done because manufactures makes a mark-up

on the total unitcosts, where the various dutys is included, represented by the exogenous duty rates *tsi.* The price pd is a vector of the prices *py, pcp, pco, pipm, pipb, pih* and *pe;* i.e. the GDP-deflator and the price of the 6 demand components.

The wage rate *lna*, is determined in an extended Phillips-curve, including the traditional right hand side variables unemployment *, Ul,* and consumer prices, *pcp.* In addition to this an increased average labour productivity *, fY/(Q·Hgn),* implies a higher wage. Here *Hgn* is the annual working hours.

The usercosts of machines and buildings, respectively *uim* and *uib,* is a measure for the reel financing costs of capital equipment. Beside the price of capital equipment, we also include the nominal interest rate without expected capital gains, *iwbz-R(pipd).* The fiscal rules of depreciation, *tsd,* and the physical depreciation is taken into account.

Incomes and taxes – (5.20)-(5.24)

In this simplified representation the indirect taxes follows the gross domestic product at current prices *, fY·py,* due to the fact that the duty rates *,tsi,* is exogenous. GDP at factor cost *, Yf,* is defined as the gross domestic product at current prices minus indirect taxes *, Si.*

The direct taxes, *Sd,* depends on the incomes of the private sector and the exogenous tax rates *, tsd.* The incomes of the private sector equals the sum of factor income, *Yf,* income transfers to households, *Ty,* and private sector net interest receipts, *Tipn.* The income transfers to households, *Ty,* is, due to unemployment benefits, attached with unemployment, *Ul,* and the wage rate, *lna,* because the rate of daily cash benefits is connected with the wage rate.

The disposable income, *Yd,* is determined as the total income of the private sector minus the direct taxes, *Sd.* The total income exists of the sum of factor income, *Yf,* income transfers *, Ty,* and private sector net interest receipts, *Tipn.*

Sector balances – (5.25)-(5.34)

The net interest receipts for the three sectors (private, government and foreign) is determined in parallel relations as financial wealth/debt times the interest rate which is relevant.

- The net interest receipts for the private sector, *Tipn,* is determined as the wealth of the private sector, *Wpqp,* times a weighted average of the redemption yields of bonds, *iwbz,* and the exogenous foreign interest rate, *iwbu.*
- The net interest receipts for the government sector, *Tion,* is determined by multiplying the financial wealth of the government sector, *-Wzbg,* with the redemption yields of bonds, *iwbz.*
- The net interest receipts from abroad, *Tien,* equals the Danish (negative at the moment) net foreign assets, *Ken,* times a weighted average of the redemption yields of bonds, *iwbz* and the exogenous foreign interest rate, *iwbu.*

The net lending is defined as the sectors income minus expenses.

- The private sector net lending, *Tfpn*, is determined as the sectors disposable income, *Yd*, minus consumption at current prices, *fCp · pcp,* and minus private machine and residencial investment, respectively *fIp · pip* and *fIh · pih*.
- Government sector net lending, *Tfon,* equals income, which includes the net interest receipts, *Tion*, together with direct and indirect taxes, *Sd* and *Si*, minus expenses, which is government consumption expenditure at current prices, *fCo · pco,* and income transfers to households, *Ty*.
- Net lending abroad, *Tfen*, equals net export of goods and services, *fE · pe* minus *fM · pm*, plus net interest receipts from abroad, *Tien*.

The financial wealth of the three sectors is defined in parallel relations as last periods wealth and the periods net lending (financial savings).

- The private non-financial sector`s financial wealth, *Wpqp*, equals last periods wealth, *Wpqp*$_{-1}$, plus the periods net lending, *Tfpn*.
- The central Government`s bond debt, *Wzbg*, equals the debt at the beginning of the period, *Wzbg*$_{-1}$, minus the periods net lending, *Tfon*. In this system of equations it is assumed, that the government finance its debt by writing bonds.
- The net foreign assets at the end of the period, *Ken*, is determined by the outstanding debt at the beginning of the period, *Ken*$_{-1}$, plus net lending abroad, *Tfen*.

The interest rate – **(5.35)-(5.37)**

The private non-financial sectors holding of bonds (net), *Wpbz*, is specified according to port-folio theory, where the sectors financial wealth, *Wpqp*, is distributed on the different kind of claims, depending on the difference between the interest rate on the wealth and the interest rate of alternative claims, here the redemption yields of bonds, *iwbz*, and the inter-bank rate, *iwmm*.

In the same way the foreign demand for Danish bonds, *Wfbz*, depends on the difference between the interest rate on Danish bonds, *iwbz*, and the interest rate of alternative claims, here the German redemption yields of bonds, *iwbu*. In addition the difference between the increases in Danish and German wages, R(*lna/lnat*), and the balance of payments in relation to GDP, *Tfen/(fY · py)*, enters the relation as explaining variables. The argument for this is, that e.g. large increases in Danish wages and a large deficit on the balance of payments will give rise to devaluation problems. The redemption yields of bonds, which is determined as the equilibrium interest rate, is a function of supply and demand on the bond market. The supply of bonds exists of central Governments bond debt, *Wzbg*. The demand of bonds exists of private sectors net demand, *Wpbz*, foreign demand for Danish bonds, *Wfbz*, and the exogenous demand from the Danish national bank, *Wnbz*. The most es-sential thing for determination of the redemption yields of bonds is the foreign demand for Danish bonds.

5.2.2 Multiplier properties

In this section two examples will illustrate the general properties the model, it has nothing to do directly with the actual analysis. It is supposed to give an idea about how the model behaves< when various shocks are implemented. The multiplier is the difference between two scenarios. The first

scenario, usually called the base run, is in this section a model solution of steady state growth. The second scenario, usually called the alternative scenario, is obtained by shocking one (or more) exogenous variable in the model. As ADAM is a genuine econometric model in real time lots of interesting year to year dynamics usually is the result. These effects will be reflected in figures in the section, where as they generally will be suppressed in the text comments.

A permanent increase in government spending

Firstly, the model is shocked by permanent increased government expenditures. Some of the results are illustrated in figure 5.1 below.

Figure 5.1 Effects of a 0.5 percent of GDP increase in government spending.
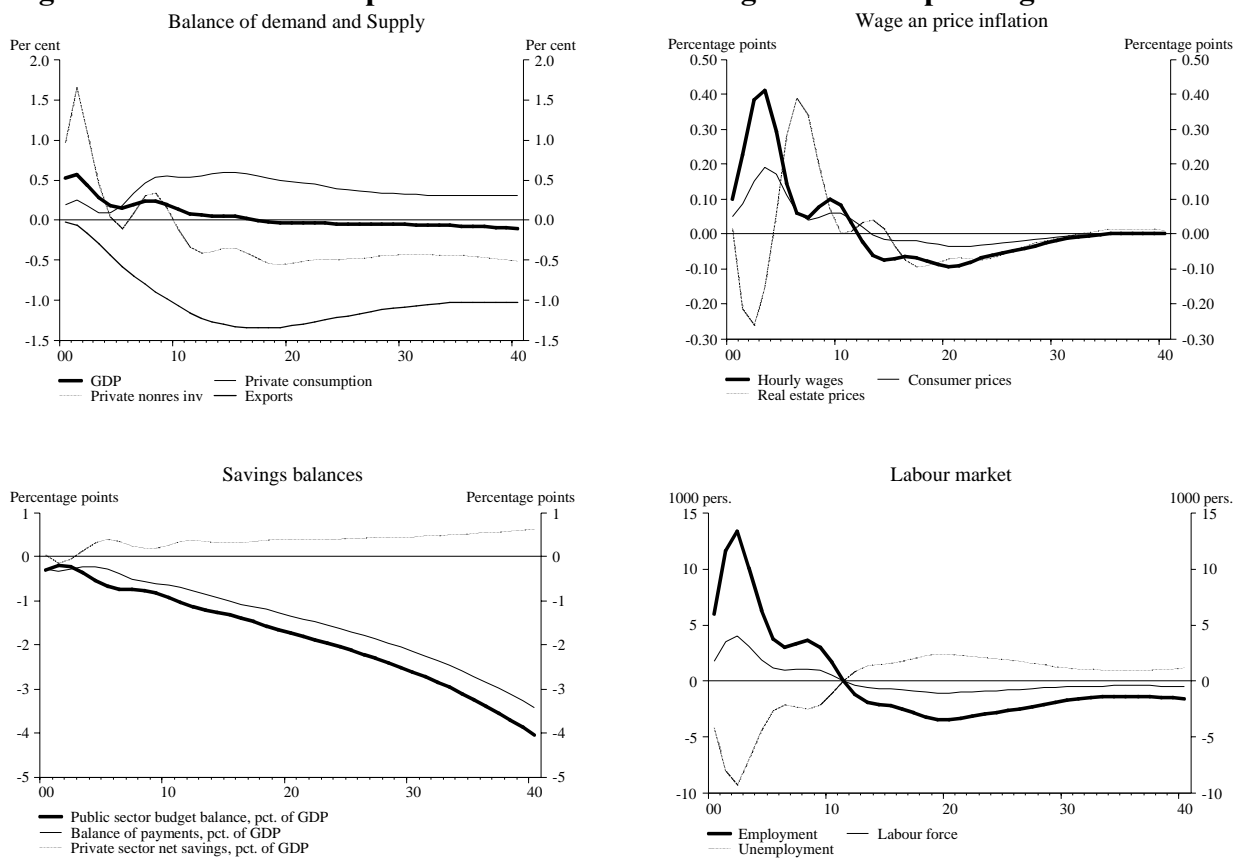
As illustrated in figure 5.1, in the short run, the effects of an increase in government spending works through the traditional income multiplier. The effect on GDP peaks after 2 years, at approx. an 1 to 1 response to the initial increase in government spending. Hereafter, exports are crowded out through the competitiveness effects of the endogenous wage setting and the effects on domestic demand from rising interest rates. After 15 years the positive effect on GDP is eliminated. Note that the period from the expansion is initiated to the point of full crowding out is fairly long. Beyond year 15 following the expansion, the effect on GDP and employment is negative due to the permanent lift in the price and wage level. Moreover, the composition of demand is shifted towards domestic demand. The current account of the balance of payments is permanently deteriorating, exclusively due to a deterioration of the public sector budget balance. As the expansion of government spending is permanent, the long-term effects of compound interest rate

deteriorate the savings balances more than the increase in spending. However, in an actual policy planning situation, counterbalancing measures would be taken. A balanced budget multiplier results in an initial expansion of GDP of approximately half the increase in government spending.

Permanent higher interests rates abroad

Secondly the model is shocked with higher interest rates abroad. The shock is quite drastic 1 percentage point downwards. As the base run interest rate is constant at about 5.5 percent, this is a reduction of nominal interest rates above 20 percent. Results which can be compared with figure 1 are given in figure 5.2.

Figure 5.2. Effects of a 1 percentage increase in the German interest rate.
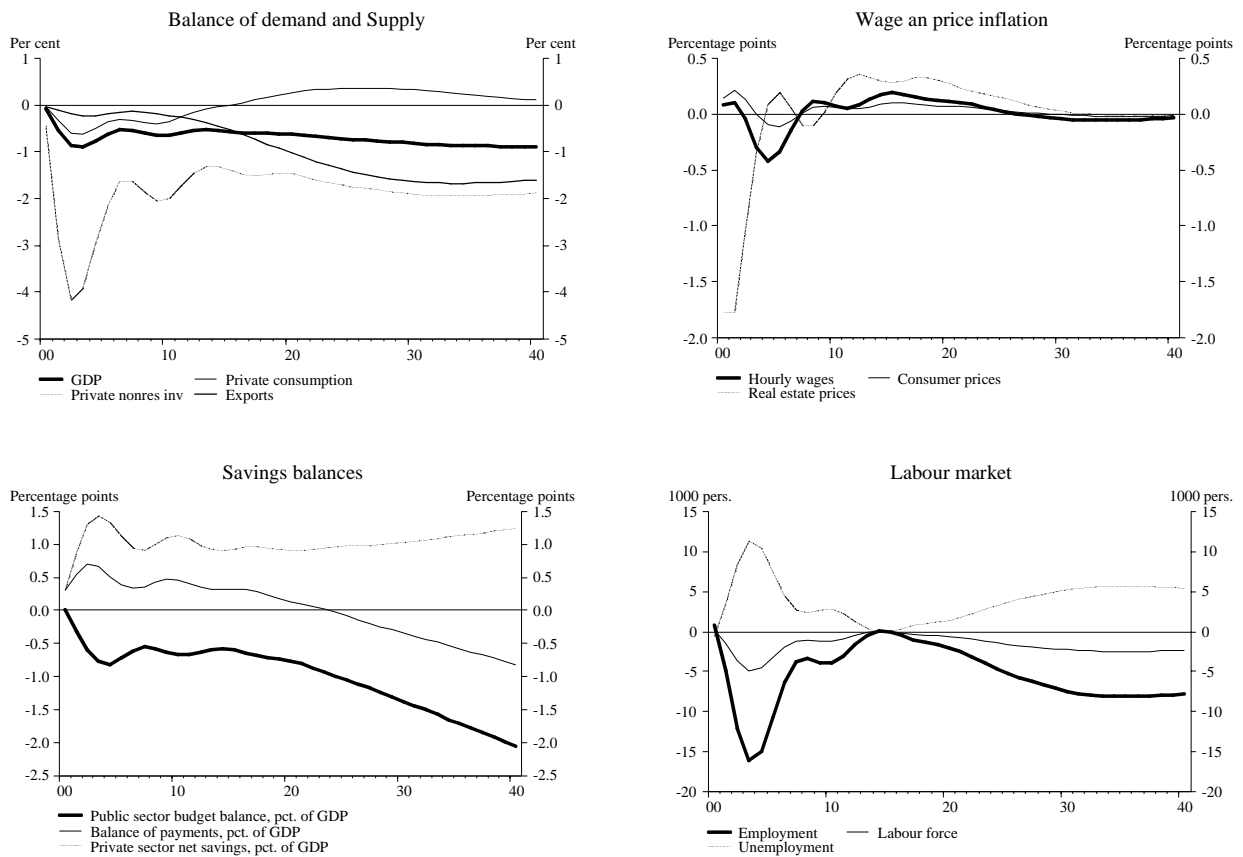
A higher interest abroad translates into an increase in Danish interest rates relatively fast. Note the significant effect on housing prices. An important propagation mechanism of demand works through effects on household wealth via the housing market. This is due to the institutional set-up of housing financing through mortgage institutions which is the most significant factor behind the relatively high interest rate sensitivity of the Danish economy.

Initially, the effect on employment of the increase in the foreign interest rate is quite significant due to the contraction in demand. Hence GDP is 0.9 per cent lower four years after the foreign interest rate hike. However, the long-term effects on employment are limited due to substitution

between input factors.

5.3 Scenarios and simulation setup

In this section we will present the central scenarios, we have set up for the ADAM model. Secondly we will then discuss the setup for the model solution.

5.3.1 Scenarios

The enlargement process must be translated into assumptions for the exogenous variables in the model. As the effects of the enlargement process on the CEEC and EU15 except Denmark is outside the scope of the model, we will rely on the results of recent research in the area.

The political integration process started more than 10 years ago and is likely to go on at least five year ahead. The time schedule for the enlargement process is of cause extremely important for the year to year results. As mentioned above the process seems to be firmly on track, but on a open time schedule. Therefore uncertainty prevail on the timing of the integration process. We will adopt a commonly held view; namely that the CEEC5 will be ready for entrance in the European Union in 2004. Therefore the CEEC5 becomes members of the union in 2005. All other countries in question enters the Union in 2007. This may be an optimistic view. Especially because Turkey is among those remaining countries. Nevertheless this will be our scenario. One might argue that although timing is important in short- and medium term forecasts, it is not crucial for our evaluation.

The scenarios include the following elements:

* *Pre-enlargement adjustments*, most of which will occur in the CEEC. These adjustments will have significant impact on the economic development in the CEEC.
* A *financial burden on EU15* and flow of *transfers to CEEC* . Our assumption will be along the lines of the Berlin summit scenarios.
* The entrance of the CEEC in the Custom union will *reduce tariffs and trade barriers* in 2005 and 2007. The EU15 therefore face lower import prices from the CEEC and a lower revenue on tariffs. But even more significant the CEEC will face less tariffs and more competition from EU15 exports.
* The entrance of *the single marked* will introduce (temporary) productivity increases and price adjustment in product market in EU15.
* The *liberalisation of the capital marked* will introduce flows of FDI into the CEEC. The effects on the Danish economy is unclear. In practice effects are introduced through a small increase in the interest rates in the euro area.
* The *liberalisation of the labour market* will introduce immigration from CEEC to EU15.

These institutional changes will have an impact on the EU15 as well as on the CEEC. The effects on Denmark other EU15 countries will part of the model solution. The effects on the CEEC will basically be exogenously for the model solution. The effects on the CEEC can however be treated in two parts:

- Economic integration of the CEEC and EU15.
- A process of catching up welfare in the CEEC.

The future is likely to bring about further economic integration between the CEEC and the EU15, no matter whether the CEEC becomes members of the European Union or not. CEEC welfare can (and will) eventually catch up. It is however our assumption that the enlargement process will facilitate these developments. The enlargement process will speed up the process of economic integration. We also assume that additional effects originating from being part of the European Union will prevail in the long run.

In section 3 we estimated that the integration effects could amount to an increase of up to 40 percent in bilateral trade between the CEEC and Denmark. Other authors have found simular potentials. Boeri and Brücker (2000) estimate for example the level of actual trade between Denmark and the CEEC to be at about 40 percent of potential trade. We will assume that the enlargement process bring about only an additional 20 percent increase in bilateral trade. Estimating the welfare catch up effects in the CEECs. Breuss (2001) finds the enlargement effect on the CEEC GDP to be 2 percent in 2005/2006 and 3 percent in 2008/2010. Accounting for marginal effects on imports, we will assume that the welfare aspect adds additional 5 percent points to bilateral trade between the CEEC's and Denmark. The economic integration of the enlargement process and consequent economic developments in the CEEC is in total assumed to increase CEEC demand for EU15 exports with 25 percent in the medium and long run.

For the other effects in concern more concrete assumption will be applied. For the enlargement cost we adopt the scenarios from the Berlin summit.[10] For reduction in tariff will follow the lines of Kohler and Keuschnigg (1999) and Breuss (2001). The temporary effects on prices and productivity is based on the scenario of Breuss (2001). The idea introducing temporary effects of FDIs into the CEEC is also inspired from the work of Breuss. Finally the scenario for immigration is adopted from Boeri and Brücker (2000). The assumptions for the short to medium run scenario is summarised in table 5.1.

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[10] Se Kohler (1999) table 13 line P19

Table 5.1 Assumptions for the short to medium term
      (Deviation from baseline)

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Integration and welfare catch up	a	1.0	2.0	2.0	4.1	5.1	6.2	7.2	8.2	9.4	10.5	11.6
	b	-.4	-.8	-1.2	-1.6	-2.0	-2.4	-2.8	-2.8	-2.8	-2.8	-2.8
Enlargement costs	c	.039	.038	.087	.115	.137	.161	.188	.250	.300	.300	.300
Reduction of tariffs	d	.	.	.	.	.	10	10	10	10	10	10
	e	.	.	.	.	.	-.15	-.30	-.35	-.50	-.50	-.50
Price and productivity adjustments	f	.	.	.	.	.	-1.5	-.7	-1.5	-.7	.	.
	g						.75	.70	.60	.50	.40	.30
Foreign direct investment	h	.	.	.	.05	.07	.09	0.11	0.13	0.15	0.15	0.13
Immigration	i	.	.	3.5	6.7	9.6	12.2	14.5	16.6	18.5	2.02	2.17

Note: a)   CEEC demand for Danish exports (in percent)
      b)   CEEC export prices (in percent)
      c)   Rate for Denmarks contribution to EU by GNI in percentage points
      d)   Tariffs on agriculture products in percent
      e)   Import price adjustments in percent points
      f)   Domestic price adjustments in percent points
      g)   Productivity in percent
      h)   Interest rate in percentage points
      i)   Number of immigrants in thousand persons

Note that integration effect and welfare effects are introduce gradually, and in 2010 only half of the full effect has materialised.

For long run scenarios the timing of events are not very important. The model input is

- Economic integration and welfare catch up of the CEEC
- Enlargement costs
- Tariffs cuts on imports
- Immigration

Table 5.2 Assumptions for the long term

	2000-2065
CEEC economic integration and welfare catch up	25% increase in world market demand for Danish exports
Enlargement costs	0.1 percent point increase in rate for contribution to EU by GNI
Reduction of tariffs (single market effect)	10% reduction in agricultural tariffs 0.5% reduction in import prices
Immigration (labour market liberalisation)	40.500 CEEC immigrants

5.3.2 The solution process

Given the assumptions in section 5.3.1 it is in principle simple task to compile a base run scenario and the alternative scenarios except for two important issues.

Firstly there will be spillover effects throughout the EU15 region. Therefor we adopt the following iterative simulation procedure.

1) Initial effects are compiled in a multiplier analysis for Denmark
2) The effects on Danish imports, export prices, wage rates and interest rates are imposed on the EU15. That is, we assume the effect on Denmark equals EU average.
3) Initial effects are redefined
4) Step 1-3 is repeated until convergence is achieved

Both the initial effects and the final effects will be reported. The latter will give some evidence on the spillover effects.

Secondly by default no budget constraint is imposed in the model solutions although the enlargement process involves transfers to CEEC. The costs are partly offset by higher external trade and expansion in domestic production. Therefore one lesson to be learned is about the requirements for fiscal policy. For the short run we alternatively assume that the effects on public sector borrowing requirement (PSBR) year by year must be neutralized by tax increases.

Turning to results in the long run the timing of events are not very important. Although the analysis is perceived in a highly dynamic model environment. We simplify our analysis to a comparative static one. We will ignore temporary and minor effects. We will assume that the enlargement process takes place in year one; ie the enlargement process is anticipated as a permanent chock to the Danish economy from year one.

When simulating the actual effects on the Danish economy, we have to leave the comparative static view. There are two reasons - one technical and one more principal. The nature of the model excludes all other possibilities than a dynamic world. But more importantly the fiscal reaction to effects on budget has to be dealt with both en the real world and in the model.

This is of cause a very complicated issue. Even though the Maarstricht Criteria do not fully apply for Denmark, the government has committed themselves to fulfill the criteria. Moreover the government cannot run massive deficits or surpluses in the long run. There some kind of fiscal action rule will have to be part of the scenario. But both the nature and the timing of the budget constraint will have some impact on the results. Specific actions - whether it is on the spending and income side of the budget - will have specific impact on the economy. Restricting ourselves to broadly based measures, we expect variations in the outcome to narrow. But still the question of timing remains..

We have chosen to apply a simple income tax rule. Taxes will have to be changed from year one in order to neutralize effects on PSBR in the long run. Or to phrase it in another way a one step tax rate change to keep government net debt unchanged in the long run.

5.4 A simple framework for evaluating welfare consequences

When a macroeconometric model is used to calculate the economic effects of various policy scenarios, a large number of macroeconomic variables will be available for making comparisons between the scenarios and the baseline. Most often some of the variables will show an improvement, while other variables get worse. On such a basis it can be difficult to decide which of the scenarios is most favourable or if any of the scenarios are favourable at all. One could say that the ultimate question is whether society's utility measured either, as the sum of the individual utilities or according to some other aggregation scheme, is lower or higher in the new situation than in the baseline forecast. This is a question that can be handled by a social welfare function like the ones that are implemented in many CGE models. In contrast to macroeconometric models CGE models are almost exclusively used for policy analysis so here it is more natural to include a social welfare function as a means to measure total effects on society from policy changes. There is no well-established tradition of implementing such welfare measures in macroeconometric models like the ADAM model. We will however, calculate welfare effects with the ADAM model anyway.

By assuming that there is no utility from leisure and at the same time there is no disutility from work, we can restrict the measurement of the welfare effects to private consumption. So the question is how much the utility derived from private consumption changes in a policy scenario. A standard way to measure the value of such changes is to look at the changes in the individual consumers surpluses derived from the consumption of the various private consumption goods in the model. The individual surpluses can be added to give the total consumers' surplus[11].

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[11] However, this is only exactly true when the utility function is quasilinear. This is a special kind of function that implies that changes in income do not affect demand. Most often this is not true in reality, but it is often a good approximation if changes in income only affect demand marginally.

Consumers' surplus is good measure of utility changes in many cases, especially when changes are small. But for some analysis it is not really sufficient. So we need to find a way to measure utility changes in the light of observable consumer choices and we need to reflect these changes in a monetary measure.

One way to get to a monetary measure is to ask how much people would be willing to pay not to loose the benefits that they expect to gain from the enlargement. Or if they expect negative effects, one could then ask about their willingness to accept monetary compensation for the losses they expect to suffer. Or to put it another way: How much money would we have to give to or take away from the consumers *before* the enlargement in order to make them just as well of as they will be after the enlargement? This is called the **equivalent variation** in income, since it measures the income change that is necessary to match the change in prices if utility is to be kept the same after the enlargement as it was before. In figure 5.3 below, the geometric background for the equivalent variation is illustrated in the simple case of only two consumption goods.

Figure 5.3 The equivalent variation
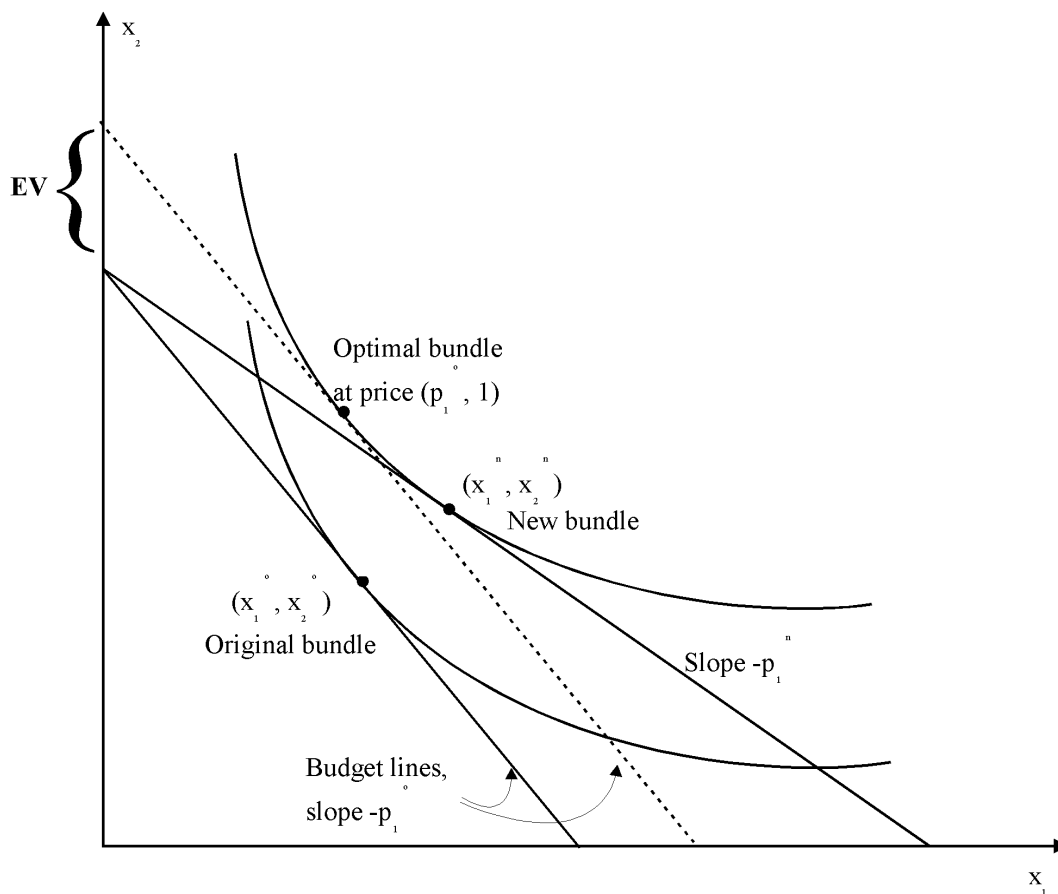
We see that the consumer has to choose between two goods (x_1, x_2) and that he originally faces the prices $(p_1^o, 1)$, which means that good x_2 has been chosen as the numeraire good and the price therefore set to one. The superscript o refers to the "old" prices in the initial situation, and n refers to the "new" prices after the enlargement. At these prices the chosen bundle of goods is (x_1^o, x_2^o). At this point the slope of the budget line is equal to the slope of the utility curve, which is -(p_1^o

/ 1) = - p_1^o. Now we imagine that the enlargement of EU lower the price of good 1 from p_1^o to p_1^n. That will move the budget line to the right, with the new slope $-p_1^n$, as illustrated. The consumption of good one will increase because it is cheaper now, but also the consumption of good two will increase, because the consumer is "richer", as he does not have to spend so much of his income to get a sufficient amount of good one. That leads to the new consumption bundle (x_1^n, x_2^n). To measure in monetary terms the benefit to the consumer of this new bundle, we could ask how much money we would have to give to him before the enlargement if we wanted to make him just as well of as he will be after the enlargement. On the diagram we could ask how far do we have to lift the old budget line before it is tangent to the same utility curve as the new bundle (x_1^n, x_2^n) is on? We see that the dotted line is tangent to the utility curve is the point that would be optimal, if the prices were the same after the enlargement as they were before. Now the vertical distance between the budget line in the initial situation and the dotted budget line is the equivalent variation measure.

There is another measure called the compensating variation in income (CV), which is quite similar to the equivalent variation. It measures the change in income that will just compensate the consumers for the price change due to the enlargement. The question is, how much money must we take away from or give to the consumer in the new situation in order to make him as well off as he was before the enlargement? Thus the two measures vary according to the price they use to estimate the optimal consumption bundle after the change.

The empirical requirements of estimating the equivalent variation are quite large. Many CGE models actually do have social utility functions that can be used for such a purpose, but the ADAM model does not. So for the empirical implementation of this measure we will use approximations to the equivalent variation in the form of Laspeyres and Paasche quantity indices.

$$Q_L = \frac{\sum_{i=0}^{11} p_i^o x_i^n}{\sum_{i=1}^{11} p_i^o x_i^o} \qquad Q_P = \frac{\sum_{i=0}^{11} p_i^n x_i^n}{\sum_{i=1}^{11} p_i^n x_i^o}$$

Here Q_L and Q_P are the Laspeyres and Paasche quantity indices respectively, and p and x are prices and quantities respectively. The superscript o refers to the "old" prices in the initial economy, and n refers to the "new" prices after the enlargement has taken place. We will sum over the 11 different groups of consumer goods in the ADAM model. We see that both of the two indices display a ratio of the new quantities over the old quantities. The difference is that the Laspeyres index uses the old prices as weights and the Paasche index uses the new prices as weights. When those indices are estimated we can conclude the following

If $Q_L > 1$ and $Q_P > 1$ then consumers are better off after the enlargement
If $Q_L < 1$ and $Q_P < 1$ then consumers are worse off after the enlargement
If $Q_L > 1$ and $Q_P < 1$ then the conclusion depends on the shape of the indifference curves
If $Q_L < 1$ and $Q_P > 1$ then we have an inconsistency

As in Bardazzi (2001) we will express these indices in levels. As such they are actually first order approximations to the equivalent and compensating variations (Boadway & Bruce, 1984)

$$EV \approx \sum_{i=1}^{11} p_i^o x_i^n - \sum_{i=1}^{11} p_i^o x_i^o = \sum_{i=1}^{11} p_i^o \Delta x_i$$

$$CV \approx \sum_{i=1}^{11} p_i^n x_i^n - \sum_{i=1}^{11} p_i^n x_i^o = \sum_{i=1}^{11} p_i^n \Delta x_i$$

The two measures will always have the same sign, but normally they will be different due to the different prices used as weights. If they are positive, it indicates that in general the new situation is better than the old one. By relating these EV and CV measures to the Danish GDP or other aggregated measures, we facilitate in principle a comparison with similar calculations in other countries. It requires of course, that the similarities in the calculations are substantial.

The equivalent variation measure uses the original price, whereas the compensating variation measure make uses of the new estimated price. It is difficult to say which measure is better, but it is obvious that when we want to compare different policy scenarios it is better to use the same "old" prices for all estimates of the welfare effects than all the different "new" prices. So we choose to rely mostly on the equivalent variation for our calculations.

All of the above-mentioned theory about welfare measures and indices come from the microeconomics literature and considers only a single consumer. We are, however, going to estimate an aggregated expression right away, because all consumers are grouped together in the ADAM model. By doing that we assume implicitly that all consumers have the same demand function and that the properties of the aggregate demand function is equal to the properties of these individual demands. This is of course not very realistic, but the question is how far it is from the "true" aggregated welfare. We do not know so we have to live with this measure as it is, but we then need to be a little more careful humble in our interpretation of it. Whether or not positive values of EV and CV measured this way can be interpreted as indicators of a Pareto improvement can be discussed. The argument could be, that since we have a positive value, at least some individual consumers must be better off than before. It is a fact that some prices and also some relative prices on private consumption will change as a consequence of the enlargement process. This will change the composition of the individual consumption bundles and make some people better off and some worse off. We cannot tell if any individuals are worse off. And we cannot tell if the ones better off are able to compensate the ones worse off and still be better off. Actually, all we can say is that it is quite likely that if we have positive values of the EV and CV measures we are probably better off than before.

The practical implementation of these measures into the ADAM model is quite straightforward. In the model firstly the total private income is divided between consumption and saving as it is described in section 5.2.1. Then the total consumption is divided between the 11 groups of consumer goods by the linear expenditure system.

The model operates with both the quantities (fixed 1995 prices) and the prices of those goods. As we are looking for the consumption by Danes, we must add and subtract some items from the consumption that can be measured on the market. Some of the money that Danes spend and gain their utility from is spend in other countries. So one of the 11 groups of consumption are tourist

expenditures by Danes abroad. At the same time foreign tourist spend money in Denmark that gives no direct utility to Danes. So a share of tourist expenditures in Denmark is deducted from 6 groups in order to get what is spend by Danes.

Thus, we save the quantities and the prices from the 11 groups in the baseline forecast. When we have the result of the policy scenario, we deduct the old quantities from these new quantities and multiply it by the "old" price from the baseline forecast. So after the foreign tourist expenditures are deducted from the "new" groups we get the following equation, where variables with a *p* in front are prices, and the superscripts o and n indicates "old" and "new" which is equal to baseline and policy scenario respectively

$$EV = pCf^o(fCf^n - fCf^o) + pCn^o(fCn^n - fCn^o) + pCi^o(fCi^n - fCi^o) + pCe^o(fCe^n - fCe^o) + pCv^o(fCv^n - fCv^o) + pCs^o(fCs^n - fCs^o) + pCt^o(fCt^n - fCt^o) + pCh^o(fCh^n - fCh^o) + pCb^o(fCb^n - fCb^o) + pCg^o(fCg^n - fCg^o) + pCk^o(fCk^n - fCk^o)$$

Obviously, the result of the EV calculation is not very enlightening itself, because is just an amount of money. We have chosen to divide EV by the GDP in order to facilitate a comparison with other similar calculations in other analysis in Denmark as well as in other countries. Thus the equation for EVY which is the EV share of GDP becomes

$$EVY_t = EV_t / py_t^o \cdot Y_t^o$$

where py^o is the GDP price index and Y^o is GDP itself. Thus, the current price GDP used is the one from the base-line scenario.

6. Simulations and results

The scenarios and especially the setup for simulation of the short run and long run effects of the enlargement process on the Danish economy differs in a number of ways. Therefore, is the results presented in two sections.

6.1 Short run scenarios for the effect on the Danish economy

A number of short run simulations has been carried out to examine the scenarios set out in section 5. The results are found in table 6.1. Table 6.1 is designed to expose the direct effects on the Danish economy (A), the spillover effects (B) and the effects of a budget constraint(C). I.e. the figures under heading B add spillover effects from EU15 countries to the direct effect from the enlargement scenarios under heading A. The figures under heading C furthermore applied a very simple budget constraint role on top of results of B.

The budget constraint in place is a year to year balancing of the general government finances. These scenarios are highly hypothetical. A year to year balanced budget would be malpractice as a remedy for general economic policy in a business cycle, as it is in the case of the enlargement scenarios. The analytical rationale for applying a budget constraint is nevertheless obvious. Without a budget constraint there would be little or none effect on economic activity from the enlargement cost in model apparatus used here. The budget constraint is a tool for transforming the budget effects in B (and A) into effects on economic activity, and therefore a mean to evaluate the significance of a budget deficit or surplus.

The costs of the enlargement process on the present member's countries runs in advance of the benefits. Economic integration and welfare catch up gradually emerges partly as a result of the programmes financed by the enlargement cost. The focus in the first years of the enlargement process naturally is the enlargement costs although some positive feedback in the form of more demand for EU15 exports etc.

The overall effects on the Danish economy are small. The burden of the enlargement cost puts pressure on government finances and the balance of payments. The requirement for the public sector borrowing (PSBR) gradually increases. In 2010 the PSBR has become 0.5 percent of GDP. The imbalances furthermore cause domestic interests rates to raise, and further negative effects on economic is the result. If the government, still somewhat hypothetical, fully neutralise the budget deficit, domestic demand is restrained. A 0.5 percent negative effect on GDP is the magnitude. These effects are moderate. But still the negative effect of the enlargement cost dominate the positive effects in the first 5-10 year period of the enlargement process.

The enlarged custom union results in a very small negative effect as the remaining tariffs already are small. CEEC exports will be more competitive, and the will be a loss of tariff revenue. But the effects are almost negligible.

Table 6.1 Short run effects of EU-Enlargement on the Danish economy
               Deviations from baseline in percent

	2005			2006			2007			2010		
	A	B	C	A	B	C	A	B	C	A	B	C
CEEC economic integration and welfare catch up												
GDP	.07	.09	.21	.07	.09	.21	.08	.09	.19	.11	.15	.12
Exports	.17	.23	.32	.20	.24	.32	.21	.26	.28	.25	.33	.18
Imports	.18	.24	.45	.19	.26	.48	.24	.29	.46	.32	.42	.42
PSBR	.04	.06	.00	.05	.06	.00	.05	.06	.00	.07	.09	.00
EVY	.03	.04	.15	.04	.04	.17	.04	.05	.17	.07	.09	.16
Reduction of tariffs												
GDP	-.02	-.05	-.07	-.04	-.13	-.20	-.04	-.17	-.33	-.05	-.21	-.53
Exports	-.04	-.12	-.14	-.08	-.30	-.36	-.11	-.40	-.53	-.17	-.59	-.77
Imports	-.01	-.08	-.12	-.03	-.23	-.36	-.02	-.30	-.58	-.02	-.41	-.96
PSBR	-.01	-.02	.00	-.02	-.06	.00	-.03	-.10	.00	-.03	-.15	.00
EVY	.01	.00	-.01	.02	-.01	-.07	.02	-.01	-.15	.03	-.02	-.35
Price and productivity adjustments												
GDP	.13	.13	.09	.16	.17	.01	.31	.36	.11	.46	.56	1.04
Exports	.18	.19	.16	.35	.36	.22	.55	.69	.49	.89	1.13	1.64
Imports	.04	.05	-.02	.02	.04	-.25	.18	.30	-.13	.33	.57	1.37
PSBR	-.05	-.05	.00	-.14	-.14	.00	-.13	-.11	.00	.16	.24	.00
EVY	.07	.07	.03	.05	.05	-.08	.08	.09	-.11	.02	.05	.34
Foreign direct investment												
GDP	-.07	-.10	-.14	-.09	-.13	-.22	-.11	-.14	-.30	-.13	-.14	-.27
Exports	-.01	-.07	-.12	-.01	-.11	-.18	-.02	-.10	-.23	-.01	-.06	-.08
Imports	-.09	-.16	-.23	-.12	-.20	-.37	-.13	-.21	-.48	-.13	-.19	-.42
PSBR	-.02	-.04	.00	-.04	-.06	.00	-.06	-.08	.00	-.07	-.08	.00
EVY	-.03	-.04	-.07	-.04	-.05	-.13	-.05	-.06	-.19	-.06	-.08	-.25
Migration												
GDP	.16	.21	.15	.23	.30	.30	.29	.35	.48	.36	.39	.75
Exports	.10	.22	.18	.17	.32	.35	.25	.40	.54	.52	.59	.87
Imports	.15	.26	.16	.20	.35	.37	.23	.37	.60	.19	.28	.87
PSBR	-.03	.00	.00	.00	.04	.00	.04	.08	.00	.09	.11	.00
EVY	.10	.11	.06	.12	.14	.13	.13	.15	.43	.10	.12	.43
Enlargement cost												
GDP	-.07	-.09	-.53	-.08	-.10	-.56	-.09	-.11	-.55	-.14	-.11	-.43
Exports	.00	-.06	-.36	.00	-.05	-.31	.01	-.05	-.21	.02	-.07	.24
Imports	-.09	-.15	-.90	-.10	-.15	-.96	-.12	-.17	-.97	-.17	-.27	-.88
PSBR	-.21	-.23	.00	-.25	-.27	.00	-.33	-.34	.00	-.44	-.46	.00
EVY	-.04	-.05	-.46	-.05	-.06	-.54	-.06	-.07	-.61	-.09	-.11	-.69
Total effects												
GDP	.20	.19	-.27	.26	.20	-.45	.43	.38	-.39	.62	.56	-.67
Exports	.40	.37	.04	.61	.46	.03	.88	.79	.35	1.49	1.33	2.07
Imports	.18	.16	-.65	.20	.06	-1.08	.38	.28	-1.08	.53	.39	.40
PSBR	-.28	-.28	.00	-.41	-.43	.00	-.45	-.49	.01	-.22	-.26	.00
EVY	.13	.13	-.30	.13	.12	-.51	.16	.05	-.64	.07	.06	-.36

(A) Direct effects on the Danish economy, (B) Incl. Spillover effects from EU15, (C) Budget effect neutralised

The major positive effects concern immigration and higher CEEC demand for Danish exports. As most of the immigrant is expected to be in the workings age, about two thirds joins the labour force. The results is downward pressure on domestic wage rates. Danish exports become more competitive outside the EU-CEEC region. And domestic production replace imports. The emigration lead also to higher public expenditure through unemployment benefit, pension schemes etc. But CEEC immigration on the whole is beneficial for the Danish economy. The integration process and the welfare catch up process in the CEEC results in higher overall demand for Danish exports. But the most foreign trade benefits originates from trade with countries outside the EU-CEEC area (ROW). The reason for this is that Denmark (and EU15) gain competitive power on the world market.

The overall (total) effect on the Danish economy is negative in the first 5-10 year. The negative effect build up over the first 6-8 years. In the last 2 years of the simulation period the positive effects are starting to catch up.

In table 6.2 we distinguish between six different effects. This of cause an analytical approach. In reality none of the effects goes without the others.

The positive effects originates from integration effects on the CEEC15, the temporary price and productivity adjustments in the EU15 and the migration effects. The migration is single most significant positive effect. The tariff reduction and the enlargement cost introduce negative effects in the Danish economy. CEEC exports is increased at the cost of intra EU15 trade. The effect on the government budget is small. The enlargement cost increase the public sector borrowing requirements. The effects on GDP is small and negative unless budget constraints are introduced. Therefore the overall effect is small but positive, unless budget constraints are introduced.

We also try to single out the spillover effects from the EU15 countries. Under the heading A effects in CEEC and Danmark is allowed. Where as under the heading B effects on EU15 are assumed to be along the lines of the effects on Denmark. Comparing A and B illuminates the spillover effects from the existing member countries on the Danish economy. These effects appear to be small. In the case stronger CEEC demand for Danish exports the indirect effect trough EU15 demand for Danish exports is about 1/10 of the direct effect. Other elements imply stronger spillover effect. The migration scenario introduce significant positive spillover effects. On the other hand the tariff scenario and the enlargement cost scenario introduce strong negative spillover effects. The overall spillover effects are negative, but small.

The characteristics of the effects changes if budget effects are neutralised year by year. The burden of the enlargement cost then depress the economic activities in Denmark and EU15. As the enlargement cost runs in advance of the positive trade effects the overall effects are negative in terms of GDP or welfare. The welfare loss peaks in 2007. After 2007 the positive effects from CEEC welfare catch up and the gains better trade performance start to pick up. In the 2010 the welfare loss is reduced.

It may be misleading to read the figures of table 6.1 literally. The input for the scenarios and the simulations has carefully been prepared. But a lot of uncertainty remains on magnitude and timing in scenarios. Mistakes in magnitude and timing will affect the results. But the general conclusion appear to be quite firm. Alternative assumptions on the input for the scenarios have an impact on the magnitude of the results.

In table 6.2 we alternatively assume integration and welfare effects to be a lot stronger and to appear more rapidly. In the central scenarios EU enlargement shift the growth rates of CEEC by 1 percent. In the optimistic scenario the CEEC growth rates shifts 1½ percent. Then the positive effect from CEEC demand for Danish exports materialise stronger and faster. But the overall effect on the Danish economy is still negative if a budget constraint is imposed.

Table 6.2 An alternative short run integration and welfare catch up scenario.
Deviations from baseline in percent

	2005			2006			2007			2010		
	A	B	C	A	B	C	A	B	C	A	B	C
	CEEC economic integration and welfare catch up											
GDP	.09	.13	.31	.10	.13	.32	.11	.15	.29	.16	.23	.18
Exports	.24	.34	.47	.27	.37	.47	.29	.40	.43	.35	.50	.28
Imports	.25	.34	.66	.29	.38	.70	.32	.42	.68	.44	.63	.63
PSBR	.06	.09	.00	.07	.09	.00	.07	.09	.00	.10	.13	.00
EVY	.04	.05	.22	.05	.06	.25	.06	.07	.25	.09	.13	.24
	Total effects											
GDP	.23	.23	-.17	.29	.25	-.34	.47	.43	-.29	.67	.64	.73
Exports	.47	.48	.20	.69	.59	.20	.97	.93	.50	1.59	1.50	2.17
Imports	.24	.26	-.45	.27	.18	-.85	.46	.42	-.86	.65	.60	-.60
PSBR	-.26	-.25	.00	-.39	-.40	.01	-.43	-.46	.00	-.20	-.21	.00
EVY	.14	.14	-.23	.14	.14	-.43	.17	.17	-.56	.10	.10	-.29

(A) Direct effects on the Danish economy, (B) Incl. Spillover effects from EU15, (C) Budget effect neutralised

In table 6.3 we assume the enlargement cost to be larger the expected. Pre-enlargement cost is not changed, but in the period 2005-2010 enlargement cost is assumed to grow faster. In 2010 enlargement costs are at about the doble of the central scenario. The result is a more negative effect on the Danish economy.

But neither in the case of table 6.2 or 6.3 differs vastly from the initial results in table 6.1

Table 6.3 An alternative short run enlargement cost scenario.
Deviations from baseline in percent

	2005			2006			2007			2010		
	A	B	C	A	B	C	A	B	C	A	B	C
Enlargement cost												
GDP	.07	.09	.21	.07	.09	.21	.08	.09	.19	.11	.15	.12
Exports	.17	.23	.32	.20	.24	.32	.21	.26	.28	.25	.33	.18
Imports	.18	.24	.45	.19	.26	.48	.24	.29	.46	.32	.42	.42
PSBR	.04	.06	.00	.05	.06	.00	.05	.06	.00	.07	.09	.00
EVY	.03	.04	.15	.04	.04	.17	.04	.05	.17	.07	.09	.16
Total effects												
GDP	.23	.23	-.17	.29	.25	-.34	.46	.43	-.32	.56	.49	.00
Exports	.47	.48	.20	.69	.59	.20	.97	.92	.48	1.59	1.38	1.57
Imports	.24	.26	-.45	.27	.18	-.85	.46	.41	-.91	.50	.34	-.65
PSBR	-.26	-.25	.00	-.39	-.40	.00	-.45	-.48	.00	-.50	-.54	.00
EVY	.14	.14	-.23	.14	.16	-.43	.17	.16	-.58	.03	.02	-.84

(A) Direct effects on the Danish economy, (B) Incl. Spillover effects from EU15, (C) Budget effect neutralised

6.2 Long run scenarios for the effect on the Danish economy

As mentioned above it would be misleading to draw conclusions on the effects of the enlargement process based only on short or medium terms simulations. The negative effects will by construction appear immediately where as the effects from CEEC integration and welfare catch up will emerge gradually. And as CEEC welfare catch up, the enlargements cost eventually will decrease somewhat. This is the assumptions for long run simulation presented below.

For the long run scenario the overall conclusion is that the positive effects from CEEC demand for Danish exports and the CEEC immigration more than counterbalance the cost of the enlargement costs.

But note first that the budget constraint applied in the long run simulations is of another nature than in the short run scenarios. In the long scenarios there are no year to year balancing. Instead the budget in long run is neutralised. Therefore budget constraint in place could be called a sustainable tax policy. The direct and indirect effect generally yields surplus on the public finances in the long run. Therefore the budget constraint becomes a tax cut scenario. In contrast to the short run scenarios, where the budget constraint was a depressive element, the budget constraint here is expansive.

**Table 6.4 Long run effects of EU enlargement on the Danish economy
Deviations from baseline in percent.**

	Trade effects			Migration			Cost of enlargement			Total effects		
	A	B	C	A	B	C	A	B	C	A	B	C
GDP	.13	.13	.17	1.00	1.06	1.31	.00	.00	-.08	1.13	1.20	1.44
Private consumption	.40	.42	.60	-.24	-.06	1.25	.00	.00	-.41	.15	.38	1.58
Investment	.15	.16	.20	.78	.87	1.09	.00	.00	-.07	.94	1.05	1.27
Exports	.21	.23	.13	2.68	2.70	1.92	.00	.00	.22	2.82	2.93	2.28
Imports	.52	.55	.62	.52	.75	1.16	.00	.00	-.15	1.04	1.33	1.75
Production	.08	.08	.09	1.30	1.34	1.40	.00	.00	-.02	1.38	1.44	1.50
PSBR	.15	.16	.00	1.21	1.27	.01	-.37	-.37	.00	.99	1.07	.00
Balance of payment	-.17	-.18	.03	1.14	1.21	.03	-.37	-.37	-.03	.94	1.03	.02
Consumer price	.36	.39	.47	-1.63	-1.38	-.87	.00	.00	-.18	-1.28	-.96	-.45
Export price	.22	.24	.31	-1.41	-1.24	-.81	.00	.00	-.15	-1.19	-.97	-.55
Import price	-.17	-.17	-.16	-.08	-.08	-.04	.00	.00	-.01	-.25	-.25	-.22
Wage rate	.85	.92	1.08	-3.25	-2.78	-1.79	.00	.00	-.35	-2.42	-1.81	-.81
Employment	.04	.05	.06	1.14	1.17	1.22	.00	.00	-.02	1.18	1.22	1.28
Equivalent variation	.18	.19	.28	-.05	.03	.66	.00	.00	-.20	.13	.23	.80

(A) Direct effects on the Danish economy, (B) Incl. Spillover effects from EU15, (C) Budget effect neutralised

The results on the long run scenarios as presented in table 6.4.[12] Three different effects are distinguished: enlargement cost, immigration effects and other effects under the heading of trade effects (CEEC integration and welfare catch up and reduction of tariffs). Compared to the short and medium term the negative effect from the enlargement cost is now less dominant effect. By assumption the enlargement cost is lower in the long run. But equally important know the full effects of CEEC integration and welfare catch up as well as the full effect of the CEEC immigration has emerged.

The direct effect of the enlargement cost is a government deficit of 0.4%t of GDP. If taxes are used to offset the budget effect, the effect on GDP is -0.1%. This is a result of mixed effects. The tax cuts are in general contractive for domestic demand. But the effect is also disinflationary. Therefore competitive gains in foreign trade emerge and a reduction of imports and a increase of exports is the result. The overall welfare loss (EVY) of the enlargement cost is .20 percentage points. The welfare loss is measured as a share of GDP.

The trade effects are, as in the short and medium run scenarios, small. But the full effect has now emerged. The stronger demand for Danish exports in CEEC and EU boost domestic production

[12] Long run effects are measured as the average effects in the period 2055-2065. After approximately 50 year a steady state growth scenario is reached.

and outgrow the effects from more competitive CEEC goods. The overall effect of integration effects are positive. The welfare gain adds up to 0.2- 0.3% percentage points.

On top of the trade effects immigration adds extra positive effects. The welfare gain is about 0.7 percentage point. Taking all effects together the overall welfare gain is 0.8 percentage points. Only 0.1 percentage points is a direct effect of the trade integration. The spillover effects through the EU15 trade adds another 0.1 percentage point to the welfare gain. But the single most important factor for the welfare gain is the general tax cut.

As in the short and medium run the effects are uncertain. And the calculated inputs for scenarios are to some extent arbitrary. But the overall conclusion do not change even if the scenarios are changed quite dramatic. Table 6.5 presents the effect of a alternative enlargement cost scenario. Here we assume that enlargement costs more than double - that is the effect on contribution to EU by GNI is raised 0.25 percentage point (compared to 0.1 percentage point in the central scenario) . The enlargement costs now introduce welfare losses at 0.5 percentage points. But the total effect of the enlargement process is still a welfare gain for the Danish economy.

Table 6.5 An alternative enlargement cost scenario.
Deviations from baseline in percent

	Cost of enlargement		Total effects	
	B	C	B	C
Real GDP	.00	-.20	1.20	1.31
Private consumption	.00	-1.04	.38	0.96
Investment	.00	-.18	1.05	1.15
Exports	.00	.56	2.93	2.61
Imports	.00	-.37	1.33	1.53
Production	.00	-.05	1.44	1.46
PSBR	-.92	.00	.52	.00
Balance of payment	-.92	-.05	.47	-.02
Consumer price	0.00	-.46	-.96	-.71
Export price	.00	-.37	-.97	-.77
Import price	.00	-.03	-.25	-.24
Wage rate	.00	-.89	-1.81	-1.33
Employment	.00	-.05	1.22	1.25
Equivalent variation	.00	-.50	.23	.50

(B) Effects on the Danish economy, incl. spillover effects from EU15
(C) Budget effect neutralised

The small overall long run macroeconomic effects may cover more dramatic effects at a disaggregated level. The PSBR or government balance can be inspected in some details in table 6.6. In table 6.6 the benefits from the integration process are neutralised by a relaxation of direct

taxes according to the scenario in table 5.2 and table 6.4(C). Even though net revenue is unchanged, the composition of government expenditures and revenues do change. Contribution to EU by GNI is part of higher miscellaneous operating expenditures. Government expenditures on consumption and investments is mainly wages costs. Therefore the supply side effects (from immigration) on wages and prices materialise in reduced government employment costs. The general effects on economic activity is reflected in more revenue on indirect taxes.

Table 6.6 Long run effects of eastern enlargement on the Danish government balance Deviation from baseline in percent

Expenditures		Revenues	
Government consumption	-0.76	Operating surplus	-0.49
Interests and dividends	0.70	Interest and dividends	0.57
Subsidies	0.14	Indirect taxes	0.93
Income transfers to households	-0.35		
		Direct taxes	-0.99
		Misc. taxes	0.57
Misc. operation expenditure	3.50	Misc. operation revenues	-0.79
Investments	-0.48		
Misc. capital expenditure	0.00	Misc. capital evenues	0.00
Total expenditures	-0.23	Total revenues	-0.23
		Net revenues (share of GDP)	0.00

Scenario: table 5.2 and table 6.4 (C)

Table 6.7 Long run effects of eastern enlargement on contributions to EU Deviation from base line in percent

Contributions to EU budget		EU return flows	
Contribution by GNI	20.24	Subsidies products	0.65
Contribution by VAT	0.78	Subsidies productions	0.00
Tariffs	-0.14	Misc. transfers	0.00
Duties	0.00		
Misc. transfers	0.00		
Total transfers	8.08	Total transfers	0.56
Net contributions	17.24		

Scenario: table 5.2 and table 6.4 (C)

In table 6.7 transfers to EU is decomposed. Except for the contribution by GNI only minor changes occurs. The enlargement process involve increased foreign trade. The Danish bilateral trade vis á vis CEEC13 is increased and bilateral trade with EU15 .But supply side effects imply increased exports to the rest of the world as well. Industrial products benefits most.

**Table 6.8 Long run effects of eastern enlargement
on the Danish foreign trade
Deviation from baseline in percent**

	Exports		Imports	
	Volumes	Prices	Volumes	Prices
Food and agriculture	2.11	-0.29	1.59	-0.08
Raw materials and oil	1.17	-0.52	1.75	-0.29
Manufactured goods	3.40	-0.46	2.02	-0.24
Tourism and services	0.20	-0.28	0.98	0.00
Total	2.28	-0.55	1.76	-0.22

**Table 6.9 Long run effects on the Danish economy
Gross output and factor income
Deviation from baseline in percent**

Sector	share	fx_i	px_i	X_i	V_i	Si_i	Yf_i	Yw_i	Yr_i
Total	1.00	1.50	-0.66	0.83	1.07	0.76	0.61	0.44	0.88
Agriculture	0.03	1.91		1.91	1.61	0.43	2.27	1.16	2.51
Construction	0.07	1.08	-0.57	0.50	0.58	1.73	0.35	0.28	0.48
Extraction coal, oil, gas	0.01				-0.17		0.02	-0.80	0.06
Housing	0.05	0.94	-0.56	0.38	0.44	1.32	0.37	0.13	0.31
Manufacturing	0.26	2.45	-0.50	2.01	2.06	22.08	1.75	1.76	1.67
Service	0.42	1.45	-0.58	0.86	0.93	1.34	0.81	0.75	0.87
Government sector	0.15		-0.69	0.69	-0.53	-0.37	-0.77	-0.80	-0.49

$share_i$ Share of total gross output in year 2000
fX_i Gross output at constant prices
px_i Output price
X_i Gross output at current prices
V_i Use of commodities
Si_i Indirect taxes, net
Yf_i GDP at factor cost
Yw_i Wage bill
Yr_i Gross operating surplus

Tracing effects to a sectoral level is therefore not surprising that manufacturing output is increased most. As a consequence investment and employment is directed towards the manufacturing sector. An overview of sectoral effects is given in table 6.9 and table 6.10. More detailed figures can be reviewed in annex 2.

Table 6.10 Long run effects on the Danish economy
          Gross output and factor input
          Deviation from baseline in percent

	share	fX_i	hq_i	fKm_i	fKb_i	fVm_i	fVe_i
Total	1.00	1.50	1.28	1.28	0.97	1.54	1.29
Agriculture	0.03	1.91	1.98	1.74	1.90	1.91	2.11
Construction	0.07	1.08	1.09	1.02	1.06	1.08	1.01
Extraction coal, oil, gas	0.01						
Housing	0.05	0.94	0.94	0.89	0.91	0.94	0.94
Manufacturing	0.26	2.45	2.57	2.28	1.85	2.48	1.46
Service	0.42	1.45	1.59	1.11	1.47	1.37	1.10
Government sector	0.15						-0.05

$share_i$ Share of total gross output in year 2000
fX_i Gross output at constant prices
hq_i Volume of hours worked
fKm_i Capital stock, machinery etc
fKb_i Capital stock, buildings etc
fVm_i Use of commodities, excl energy, at constant prices
fVe_i Use of energy at constant prices

7. Conclusion

The main findings of this project are that the net effects on the Danish economy are quite small. There are some benefits and some costs. In the short run the costs seem to be larger resulting in increasing foreign trade but negative effects on production and welfare. In the long run the positive effect from the immigration to Denmark has turned the results slightly positive.

Some of the previous studies of the economic effects for the present member-states of the eastern enlargement of EU have shown quite different results. There may be some differences between studies of the same country due to different methodologies, but the biggest differences seem to be between countries. That finding is due to the very different relations that the countries have to the applicant countries in terms of geographical proximity, language, history of trade, and many more. Countries like Ireland and Portugal have a very remote relationship with the CEE countries, while it is a completely other case with Germany and Austria. A country like Denmark is somewhere in between, so the effects on the Danish economy cannot readily be predicted on the basis of those for Austria and Germany. Especially the benefits of the enlargement seem to be unevenly distributed between the present member-countries. The costs of financing the enlarged EU budget is supposed to be borne according to the EU15 countries share of the EU15 budget. Thus, it is important that calculations are carried out for every country to show the possible net effects. This study, building on the Kohler and Keuschnigg (1999) study shows some results that are different from the Austrian and German results.

This report is concerned with a calculation of the possible effects on the Danish economy employing the large scale macro-econometric model ADAM in Statistics Denmark. The analysis is formed as a comparison of a forecasted picture of the Danish economy affected by the enlargement of EU with a forecasted picture of the Danish economy with no enlargement imposed. The differences between these scenarios and a baseline scenario with no enlargement included are calculated by simulations with the model. It is assumed that effects similar to the effects on the Danish economy occur in the other present member states as well, and this gives a feedback effect on the Danish model.

Our review of the process of preparing the CEE countries as well as the EU15 countries for the enlargement shows that it has come very far. After the Helsinki Council meeting the qualification to become a member has been declared an open race. It seems that 5-8 countries will have fulfilled the three Copenhagen criteria and adapted the entire "acquis communauitaire" and thus be ready to join the European Union in 2005. In this study we have looked at the case where the 5 economically most important countries joins in 2005 and the rest in 2007. The CEEC countries will join a customs union with the EU15 countries and enter the Single Market, which will ease the conditions for trade between the countries. The single market access is supposed to introduce some immigration into Denmark. A series of exogenous variables in the ADAM model are adapted to reflect these changes. Also the Danish net contribution to the EU budget is increased.

Theoretical considerations about what will happen after the enlargement are not clear cut. Depending on models used an assumptions taken theory predicts in general positive effects from the freeing of the markets, but there are many special cases and exceptions.

The key question is whether the positive effects from integration process counterbalance the costs.. In the analysis the integration was spilt into a number of different effect, and grouped in

short run and long run effects. Some effects are on the whole temporary, and can by ignored in the long run.

Concerning the short to medium term effects our findings are that the positive effects do not quite offset costs. The cost in terms of contribution to transfers Central and Eastern Europe run in advance of the benefits. The enlargement costs are not unimportant. On the other hand they are not a threat to economic welfare in Denmark. The analysis points out that even minor positive effects from the integration process will offset the cost. The simulation results suggest this will be the case in the medium term.

In the long run positive effects from integration seems to outweigh costs. The expected immigration, perhaps most important, brings along supply side effects. Thus production costs will be reduced and productivity increased. This is perhaps the most important effect on the Danish economy in the long run.

These findings are not all simular to findings in other studies for other countries. In Breuss(2001) simulation results show the same magnitude in the short to medium term as we have found for d´Denmark. Kohler and Keuschnigg (Kohler, 1999) documents on the other hand significant positive effects for the Austrian economy in the long run. In the case of Denmark, in contrast to Austria in the heart of Europe, only a few of the Central and Eastern Europe countries are next door neighbours; namely the Baltic countries and Poland. The gravity aspect, including transportation costs aspect, may be a significant part of the difference.

One of the major drawbacks of using the ADAM model in this case has turned out to be that only one type of labour is present. Many of the theoretical effects are based on a differentiation between skilled and unskilled labour immigration. It might have given some of results if we had been able to work with such a differentiation. On the other hand, almost all of the available estimates of the possible migration effects from the enlargement are more or less "guesstimates", so the input for such analysis would still be quite uncertain.

A number of other uncertainties and risks are present in the analysis presented above. The enlargement is a complex process. A number of the most important economic aspects has been treated. At the risk of be proved wrong we have judged other effects as minor, and they are ignored in the analysis. A number of auxiliary assumptions has been employed in the analysis. In particular the assumptions on potential economic growth in Central and Eastern Europe and the potential level for bilateral trade vis á vis Denmark is crucial in the analysis.

A the moment time series data for the new market economy is sparse. The quality an quantity of the data involved in analysis is constantly being improved. Further investigation can reduce uncertainties and risks. On the other hand alternative assumptions has been employed in the analysis with different outcomes. But the difference between the results was minor. This leads to the conclusion, that the results are quite robust.

Thus, in pure economic terms the effects are small and almost negligible in the Danish case in the long run, so in consideration of for example the possible benefits in terms of economic and political stability and peace in Europa, should be the important issues in the debate on the enlargement process as far as Denmark is concerned.

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Annex 1. Bilateral Trade CEEC13-Denmark

EXPORTS, BULGARIA
CURRENT PRICES

	SITC 0	SITC 1	SITC 2	SITC 3	SITC 4
1980	2064	1830	1	198	0
1981	1267	2556	3799	978	4
1982	1978	1805	118	891	0
1983	3083	1843	10458	752	2
1984	4952	1369	16544	862	0
1985	1229	1040	6126	799	0
1986	778	1043	4890	617	0
1987	8667	1517	2343	422	1
1988	6874	2061	1209	431	0
1989	26536	1823	74	700	0
1990	5711	2299	483	424	0
1991	4793	568	1010	296	0
1992	9812	2041	245	0	0
1993	23729	1797	2974	872	0
1994	33458	2337	4291	0	354
1995	47667	1162	8294	0	0
1996	11027	1159	8511	10	2459
1997	26832	1149	9656	0	6313
1998	32503	3217	16789	0	9389
1999	32075	2891	12651	72	170
2000	56858	4573	16558	0	116

	SITC 5	SITC 6	SITC 7	SITC 8	SITC 9
1980	14776	2933	25585	13380	24
1981	7806	499	26540	9223	15
1982	12741	929	31415	11658	75
1983	26578	1504	73085	18229	24
1984	22437	2036	66200	10998	29
1985	16069	1248	66313	10041	44
1986	21581	1634	53462	26895	75
1987	27599	1507	40784	17404	298
1988	24183	1310	53249	17751	242
1989	27157	769	106318	14723	0
1990	36379	9621	71916	6905	74
1991	27288	14794	52521	7874	94
1992	32235	29059	45496	20667	1097
1993	57720	30795	47483	21372	3283
1994	49144	41921	32198	24184	2040
1995	76910	40793	48543	18839	1760
1996	69636	37235	27731	16004	494
1997	68216	49289	37900	16504	947
1998	92111	67114	94621	31329	1028
1999	84043	72766	53842	26067	1023
2000	72111	84568	79516	56694	1089

IMPORTS, BULGARIA
CURRENT PRICES

	SITC 0	SITC 1	SITC 2	SITC 3	SITC 4
1980	5679	3840	586	0	0
1981	3872	235	826	0	0
1982	8037	520	1886	40394	108
1983	7559	3649	5899	0	114
1984	9497	3925	6031	0	0
1985	12729	4151	6330	9	0
1986	5693	5565	3140	1	0
1987	8930	2614	3817	0	0
1988	3624	4095	3890	0	0
1989	6340	1829	5888	0	0
1990	5892	2747	5711	0	0
1991	9765	8716	13445	0	0
1992	6470	6091	15199	0	0
1993	3503	6750	3655	0	0
1994	6659	11594	9535	0	0
1995	11782	19633	9062	0	0
1996	7224	29095	8404	0	0
1997	10049	25412	4485	0	0
1998	11102	23175	6288	0	0
1999	3114	14866	33996	0	0
2000	684	11106	5664	0	0

	SITC 5	SITC 6	SITC 7	SITC 8	SITC 9
1980	3902	519	7913	9754	0
1981	6215	326	5895	7081	0
1982	6040	8558	3745	8770	0
1983	5625	2182	3401	9768	0
1984	1522	2085	3870	13198	0
1985	1769	2407	5899	15489	0
1986	487	3231	15824	10078	0
1987	1699	1529	7371	5321	0
1988	5482	1064	5104	5675	937
1989	7131	1457	986	3856	943
1990	9246	751	3978	6546	335
1991	11473	967	4083	22944	220
1992	2487	23616	9641	70248	1146
1993	2286	10953	3314	72580	1270
1994	5565	17458	6619	91899	1351
1995	1261	26625	7997	70095	1325
1996	78	18096	10429	68462	1252
1997	402	16728	13802	97115	3750
1998	551	23296	20111	114286	2580
1999	589	23053	16078	130410	2033
2000	2360	20990	18850	178847	7060

EXPORTS, ESTONIA
CURRENT PRICES

	SITC 0	SITC 1	SITC 2	SITC 3	SITC 4
1980	0	0	0	0	0
1981	0	0	0	0	0
1982	0	0	0	0	0
1983	0	0	0	0	0
1984	0	0	0	0	0
1985	0	0	0	0	0
1986	0	0	0	0	0
1987	0	0	0	0	0
1988	0	0	0	0	0
1989	0	0	0	0	0
1990	0	0	0	0	0
1991	0	0	0	0	0
1992	41569	2272	55	3729	106
1993	116280	4775	1437	11207	5
1994	95150	7045	2297	1092	383
1995	118279	6952	4165	3041	557
1996	107569	4210	14216	41810	2714
1997	173722	11357	23132	1456	2926
1998	165040	13579	29684	26075	2044
1999	144559	10121	29619	11866	1955
2000	235625	7906	41322	10125	1328

	SITC 5	SITC 6	SITC 7	SITC 8	SITC 9
1980	0	0	0	0	0
1981	0	0	0	0	0
1982	0	0	0	0	0
1983	0	0	0	0	0
1984	0	0	0	0	0
1985	0	0	0	0	0
1986	0	0	0	0	0
1987	0	0	0	0	0
1988	0	0	0	0	0
1989	0	0	0	0	0
1990	0	0	0	0	0
1991	0	0	0	0	0
1992	8055	8175	27613	10315	976
1993	18580	10550	32905	27909	718
1994	30443	25798	68958	50037	2529
1995	44401	57162	90984	47639	1595
1996	59943	69432	203449	66723	2996
1997	67919	105865	199806	101169	940
1998	74885	107772	285046	108807	3123
1999	61407	112966	225813	109348	2382
2000	83796	148213	317921	132481	4382

IMPORTS, ESTONIA
CURRENT PRICES

	SITC 0	SITC 1	SITC 2	SITC 3	SITC 4
1980	0	0	0	0	0
1981	0	0	0	0	0
1982	0	0	0	0	0
1983	0	0	0	0	0
1984	0	0	0	0	0
1985	0	0	0	0	0
1986	0	0	0	0	0
1987	0	0	0	0	0
1988	0	0	0	0	0
1989	0	0	0	0	0
1990	0	0	0	0	0
1991	0	0	0	0	0
1992	45425	0	20982	27429	0
1993	41241	50	14113	77273	0
1994	72922	16	31462	38248	0
1995	41013	0	57879	104353	0
1996	30818	0	113932	87996	0
1997	36674	35	135798	55343	49
1998	36531	174	98176	79527	133
1999	78475	82	72783	75134	0
2000	63579	0	60594	403013	0

	SITC 5	SITC 6	SITC 7	SITC 8	SITC 9
1980	0	0	0	0	0
1981	0	0	0	0	0
1982	0	0	0	0	0
1983	0	0	0	0	0
1984	0	0	0	0	0
1985	0	0	0	0	0
1986	0	0	0	0	0
1987	0	0	0	0	0
1988	0	0	0	0	0
1989	0	0	0	0	0
1990	0	0	0	0	0
1991	0	0	0	0	0
1992	8535	11381	22190	4014	486
1993	21447	15829	2733	20264	1888
1994	11329	42682	736	54586	896
1995	66659	47647	6479	32083	5247
1996	31881	110812	11969	34794	10216
1997	21132	187033	13226	48173	4705
1998	14471	338619	30685	156040	9075
1999	1796	349544	43226	229055	30517
2000	4064	367296	59575	285178	6659

EXPORTS, LITHUANIA
CURRENT PRICES

	SITC 0	SITC 1	SITC 2	SITC 3	SITC 4
1980	0	0	0	0	0
1981	0	0	0	0	0
1982	0	0	0	0	0
1983	0	0	0	0	0
1984	0	0	0	0	0
1985	0	0	0	0	0
1986	0	0	0	0	0
1987	0	0	0	0	0
1988	0	0	0	0	0
1989	0	0	0	0	0
1990	0	0	0	0	0
1991	0	0	0	0	0
1992	193656	6142	1314	9421	65
1993	27409	8650	13769	4644	55
1994	85962	37093	18015	2882	2015
1995	83229	28024	54143	3558	773
1996	143911	61143	47252	6580	6127
1997	371684	81110	67864	13118	11056
1998	392782	57498	44012	99	13439
1999	382836	27202	43924	72199	36222
2000	209939	21121	66841	7977	33076

	SITC 5	SITC 6	SITC 7	SITC 8	SITC 9
1980	0	0	0	0	0
1981	0	0	0	0	0
1982	0	0	0	0	0
1983	0	0	0	0	0
1984	0	0	0	0	0
1985	0	0	0	0	0
1986	0	0	0	0	0
1987	0	0	0	0	0
1988	0	0	0	0	0
1989	0	0	0	0	0
1990	0	0	0	0	0
1991	0	0	0	0	0
1992	10484	7556	31339	11718	901
1993	11168	31482	49788	66884	597
1994	37121	84271	99350	114279	2235
1995	43620	136163	232035	181653	2935
1996	51312	199543	270619	224617	5222
1997	65348	299342	444529	282391	6222
1998	81998	392737	454965	290081	4399
1999	84333	401216	384927	321913	5474
2000	116120	537339	327112	340924	11334

IMPORTS, LITHUANIA
CURRENT PRICES

	SITC 0	SITC 1	SITC 2	SITC 3	SITC 4
1980	0	0	0	0	0
1981	0	0	0	0	0
1982	0	0	0	0	0
1983	0	0	0	0	0
1984	0	0	0	0	0
1985	0	0	0	0	0
1986	0	0	0	0	0
1987	0	0	0	0	0
1988	0	0	0	0	0
1989	0	0	0	0	0
1990	0	0	0	0	0
1991	0	0	0	0	0
1992	75209	647	8635	220494	0
1993	38531	1047	14142	147263	0
1994	52889	162	43730	172727	0
1995	58259	190	69434	37145	0
1996	53863	9	55708	1679	0
1997	44174	0	56154	1702	0
1998	47878	0	68159	5539	0
1999	75232	0	65691	27126	0
2000	145649	95	81305	119402	0

	SITC 5	SITC 6	SITC 7	SITC 8	SITC 9
1980	0	0	0	0	0
1981	0	0	0	0	0
1982	0	0	0	0	0
1983	0	0	0	0	0
1984	0	0	0	0	0
1985	0	0	0	0	0
1986	0	0	0	0	0
1987	0	0	0	0	0
1988	0	0	0	0	0
1989	0	0	0	0	0
1990	0	0	0	0	0
1991	0	0	0	0	0
1992	24920	17467	350	8883	333
1993	13526	29664	597	50645	1264
1994	18325	58293	912	129424	4914
1995	66373	42422	10710	246535	7272
1996	70625	47222	46717	340293	37127
1997	107274	56817	52623	469248	10918
1998	65723	145376	117854	588875	18578
1999	97544	226709	163676	709235	32052
2000	81523	266952	131031	880698	42969

EXPORTS, ROMANIA
CURRENT PRICES

	SITC 0	SITC 1	SITC 2	SITC 3	SITC 4
1980	15004	3093	1414	660	2434
1981	6260	1510	2792	2395	0
1982	384	59	634	1096	0
1983	392	435	79	1244	824
1984	384	239	89	1302	2628
1985	472	251	160	413	0
1986	23526	225	281	852	0
1987	1263	354	15	367	0
1988	0	0	2792	1030	831
1989	1414	0	3597	457	0
1990	113476	616	1717	185	167
1991	11714	52	4500	800	158
1992	8895	1580	2312	0	0
1993	55641	496	2536	470	386
1994	16005	371	3299	0	447
1995	45273	162	2985	0	125
1996	46237	258	5801	0	945
1997	34554	238	3685	0	1194
1998	61142	33	5943	0	2962
1999	43467	116	6663	4	27
2000	48682	178	7412	43	24

	SITC 5	SITC 6	SITC 7	SITC 8	SITC 9
1980	23858	4061	65275	11090	257
1981	28843	1990	25505	4098	82
1982	20385	2650	13315	3014	0
1983	36037	1413	8167	5387	47
1984	42120	1882	7065	4054	52
1985	46387	1632	16133	3024	114
1986	38743	3678	8664	4341	118
1987	15888	733	7367	4031	145
1988	16095	604	6239	3017	693
1989	31427	1600	12871	3418	289
1990	63387	3462	10047	9824	47
1991	39640	8487	15887	7826	78
1992	28604	29824	72540	8409	3684
1993	26400	4418	99951	9926	13132
1994	43514	12672	122783	13334	7886
1995	67519	11408	178850	21018	12038
1996	98515	7937	114330	24836	8634
1997	79316	13886	151539	23701	1249
1998	97719	15808	200739	31902	1277
1999	82629	20674	206275	32573	1219
2000	128402	43412	125828	41374	1152

IMORTS, LITHUANIA
CURRENT PRICES

	SITC 0	SITC 1	SITC 2	SITC 3	SITC 4
1980	2376	0	2009	21004	0
1981	4551	1	1608	30605	0
1982	2381	0	2106	70177	0
1983	537	46	916	1	0
1984	651	44	1070	0	213
1985	206	22	245	0	0
1986	181	97	584	0	0
1987	1043	380	513	0	0
1988	50	661	2703	1019	0
1989	551	1022	1120	0	0
1990	759	1259	114	0	0
1991	958	1617	132	0	0
1992	2246	2102	1801	0	0
1993	817	1478	162	0	0
1994	2288	1938	315	2003	0
1995	1851	1964	185	0	0
1996	24002	7618	187	4485	82
1997	22607	9414	312	5830	45
1998	3026	7385	2036	2926	0
1999	3772	6253	3351	0	0
2000	3184	5388	10311	0	0

	SITC 5	SITC 6	SITC 7	SITC 8	SITC 9
1980	2865	18634	6366	34316	43
1981	2158	14823	7928	34765	0
1982	5663	15381	7719	43827	0
1983	28650	17538	22161	48276	0
1984	90958	37588	29880	58357	0
1985	116875	30048	22417	69083	0
1986	122282	38256	37660	59289	1
1987	30044	16595	11379	37761	0
1988	14393	19530	11594	35768	106
1989	234	36776	5228	41670	366
1990	407	17325	6490	32221	468
1991	2436	8737	1429	19396	186
1992	4196	18768	3765	26323	1479
1993	1018	10358	2388	41205	312
1994	96	21813	2478	35575	832
1995	1452	51586	7432	27020	1711
1996	2752	36994	9926	19386	1976
1997	3289	59793	18433	18664	1931
1998	2779	77756	24769	32075	5099
1999	354	50594	28324	34338	7326
2000	886	70283	56944	56545	3029

EXPORTS, CYPRESS
CURRENT PRICES

	SITC 0	SITC 1	SITC 2	SITC 3	SITC 4
1980	41016	483	633	2	1157
1981	58550	973	202	4	2101
1982	43990	1533	312	14	1302
1983	41215	1530	355	12	1057
1984	32825	2295	1076	34	6410
1985	45989	2372	987	100	1362
1986	48297	2257	537	39	1663
1987	45448	3220	723	25	1338
1988	47990	3304	1310	67	2399
1989	51858	2907	840	0	2857
1990	44511	2245	1518	0	3119
1991	76840	2080	1703	3175	2364
1992	76876	2082	2205	0	1860
1993	51126	1268	2185	43	2414
1994	47939	2000	1858	13	743
1995	58207	2693	2560	0	2313
1996	57012	1924	2561	0	3180
1997	48912	476	1552	47	3025
1998	66943	777	1734	0	1789
1999	60362	2546	1890	94465	2028
2000	70897	805	1758	175280	2272

	SITC 5	SITC 6	SITC 7	SITC 8	SITC 9
1980	7857	13870	16464	2453	4
1981	7992	12686	24989	4361	44
1982	10353	10263	56007	3328	10
1983	11755	8004	42770	5797	93
1984	13163	9760	34281	6423	59
1985	21062	10908	104202	6196	221
1986	15905	8638	27086	6889	360
1987	14129	8106	23008	9419	938
1988	18290	5474	24652	10409	45
1989	18013	6980	35662	12735	143
1990	17141	7828	45007	16859	510
1991	18688	7907	43680	15706	0
1992	17602	10790	89527	22491	683
1993	16224	19213	148573	17487	947
1994	17042	15375	117460	18819	888
1995	18606	12428	52032	21335	818
1996	20343	10696	90353	20574	1286
1997	23119	10174	202314	26077	730
1998	20429	9874	487851	31406	473
1999	24524	14746	287104	32705	4241
2000	25391	14355	112748	108690	5793

IMPORTS, CYPRESS
CURRENT PRICES

	SITC 0	SITC 1	SITC 2	SITC 3	SITC 4
1980	7117	111	2854	0	0
1981	4725	17	3647	0	6
1982	4575	85	5609	0	14
1983	4367	279	1225	0	10
1984	8125	511	1138	0	0
1985	9287	297	6447	0	0
1986	8569	889	3329	0	0
1987	9568	769	1500	0	0
1988	10650	820	2116	0	0
1989	14298	1386	2589	0	0
1990	15842	1386	1055	0	0
1991	10932	1287	1697	0	0
1992	12975	1164	1793	0	0
1993	6272	784	1094	0	0
1994	3904	1191	1433	0	0
1995	6315	1635	789	0	0
1996	4558	2046	1194	0	0
1997	5287	1933	524	0	0
1998	10579	1921	755	0	0
1999	3807	1377	147	0	0
2000	5575	2900	209	0	0

	SITC 5	SITC 6	SITC 7	SITC 8	SITC 9
1980	0	3	0	17640	0
1981	0	166	0	11219	0
1982	0	639	0	11027	0
1983	0	0	7	11103	0
1984	0	2	6	7681	0
1985	26	18	133	13917	0
1986	292	6	2	14739	0
1987	200	31	1	25144	3
1988	138	296	37	11973	135
1989	1719	56	247	7177	735
1990	694	18	111	11297	661
1991	99	9	613	6126	770
1992	508	13	624	1978	935
1993	1330	0	516	1309	839
1994	2611	60	12593	1636	192
1995	4547	0	190	332	970
1996	2085	0	10730	375	370
1997	1759	0	2181	9102	361
1998	3921	1603	4925	16294	1007
1999	4284	190	27737	13718	1010
2000	3200	6	818	14401	567

EXPORTS, HUNGARY
CURRENT PRICES

	SITC 0	SITC 1	SITC 2	SITC 3	SITC 4
1980	58233	407	9682	73	1556
1981	44345	348	15159	66	1476
1982	16809	143	18511	116	4244
1983	24393	98	10784	265	4518
1984	9140	144	11713	467	2060
1985	6153	329	20343	373	3948
1986	4138	355	22149	12	918
1987	14000	414	17993	87	2096
1988	24472	666	19054	84	6229
1989	11007	349	21563	23	9010
1990	8631	319	15524	438	2952
1991	14110	1255	17268	653	144
1992	33145	1251	25448	217	2875
1993	114697	3390	27833	531	5080
1994	114298	1944	36395	1261	9411
1995	68881	6789	35048	1139	23302
1996	60220	881	29218	1058	27826
1997	92917	1846	26456	625	21790
1998	119780	2224	28152	590	11194
1999	71592	4084	31519	0	262
2000	148586	2425	38765	18	677

	SITC 5	SITC 6	SITC 7	SITC 8	SITC 9
1980	27904	28364	102485	49396	3
1981	34349	27236	110563	52308	51
1982	52987	42985	108566	61546	18
1983	53532	43395	92857	62465	20
1984	61112	60033	106456	77076	56
1985	68400	68085	115904	59960	763
1986	70847	51331	113738	63430	328
1987	61085	69051	108989	64918	214
1988	70028	67267	105897	69093	1426
1989	78027	38918	189033	106894	370
1990	104611	41795	178278	77233	661
1991	119712	50560	141466	73516	1718
1992	93779	56364	147663	90214	4410
1993	109173	60177	131874	85175	1784
1994	156865	81096	261962	102952	105
1995	163353	86001	209603	98732	231
1996	183782	78322	220262	97504	1053
1997	196621	95048	238352	97368	648
1998	258737	100300	363195	116697	1422
1999	231914	109502	393059	138400	4525
2000	234481	137400	387725	147262	1979

IMPORTS, HUNGARY
CURRENT PRICES

	SITC 0	SITC 1	SITC 2	SITC 3	SITC 4
1980	20534	885	6886	6918	21
1981	28640	18	10969	4541	328
1982	20764	23	10191	4920	0
1983	30564	2839	12394	4996	102
1984	30582	2985	11527	3971	41
1985	42846	3099	21462	5940	0
1986	40118	2797	18707	2589	0
1987	43621	2159	9982	3365	106
1988	48641	2793	14404	3977	1575
1989	44049	652	10237	4248	4467
1990	46205	1283	7617	6030	2380
1991	68670	1553	13407	6019	367
1992	82776	2252	10950	7929	2609
1993	44622	1049	10136	6162	529
1994	43998	813	12481	5053	645
1995	39864	2537	12824	7305	302
1996	37203	1936	10985	7550	2015
1997	34811	1786	13667	9943	1435
1998	26444	1541	14621	11470	2047
1999	22088	2275	16812	12854	1896
2000	24879	2952	23707	10093	990

	SITC 5	SITC 6	SITC 7	SITC 8	SITC 9
1980	50113	91551	34842	54800	0
1981	42289	81062	30551	45635	3
1982	31827	114154	31025	51052	0
1983	85562	124203	34681	42979	28
1984	76567	178486	41199	42383	0
1985	98307	131233	39040	41676	4
1986	40395	166932	43201	50139	1
1987	32661	113598	38167	61181	0
1988	32301	93475	35116	68968	3629
1989	27740	91781	35157	51679	3872
1990	33121	129996	29565	70439	6212
1991	30901	78247	45150	63227	5617
1992	52675	80308	45693	62546	6952
1993	43496	66373	41534	59281	5270
1994	45774	95383	60839	57071	6257
1995	43829	113648	72155	56038	8898
1996	39799	106837	108326	53493	58300
1997	43763	134345	153336	83951	83648
1998	37656	136276	298297	113323	131554
1999	44599	136327	310858	108156	95328
2000	59819	219226	465000	94802	10994

EXPORTS, MALTA
CURRENT PRICES

	SITC 0	SITC 1	SITC 2	SITC 3	SITC 4
1980	109861	225	313	124	644
1981	46536	253	50	69	524
1982	25883	121	134	101	1437
1983	41709	133	261	19	1497
1984	32408	194	30	18	1596
1985	54324	421	92	17	54
1986	41305	291	47	18	600
1987	36237	437	362	15	642
1988	39078	129	478	61	724
1989	40286	206	186	0	1918
1990	46160	251	740	0	1578
1991	48105	382	430	0	1714
1992	50647	208	895	0	1808
1993	57933	284	703	45	1161
1994	46275	109	893	45	1072
1995	61483	356	832	0	669
1996	57695	179	890	30973	172
1997	66385	335	700	1534	184
1998	69463	404	463	61	155
1999	60213	205	1162	0	129
2000	75676	698	322	44	11

	SITC 5	SITC 6	SITC 7	SITC 8	SITC 9
1980	9184	9731	10930	2170	15
1981	10257	9967	17848	3019	156
1982	13644	11532	14853	3310	117
1983	14324	9690	13804	3007	345
1984	10779	10638	14571	3923	241
1985	10980	14695	19349	4266	35
1986	10347	14628	22261	8505	134
1987	11168	21698	41403	3956	177
1988	9396	22386	32669	4697	131
1989	9365	17483	26472	7251	232
1990	10023	16687	25040	6307	88
1991	9938	2862	19409	8453	26
1992	11761	6440	23233	10259	311
1993	11323	8872	203640	12477	873
1994	18229	7703	278641	8797	1920
1995	15051	5708	20255	10964	3150
1996	12855	4813	43177	12364	2804
1997	15814	11280	184253	13669	499
1998	19073	16571	26448	15323	346
1999	20130	6819	85788	15383	662
2000	23819	8650	57861	14165	451

IMPORTS, MALTA
CURRENT PRICES

	SITC 0	SITC 1	SITC 2	SITC 3	SITC 4
1980	0	0	640	0	0
1981	0	0	579	11	0
1982	0	0	1340	0	0
1983	4	166	1237	0	0
1984	194	0	1320	0	0
1985	23	0	264	0	0
1986	0	0	650	0	0
1987	0	1	607	0	0
1988	22	0	126	0	0
1989	1224	0	410	0	0
1990	0	652	56	0	0
1991	0	0	1540	0	0
1992	2623	0	292	0	0
1993	0	0	81	0	0
1994	0	0	32	0	0
1995	95	0	253	0	0
1996	0	0	184	0	0
1997	36	0	61	0	0
1998	0	0	541	0	0
1999	0	0	263	41946	0
2000	0	0	0	0	0

	SITC 5	SITC 6	SITC 7	SITC 8	SITC 9
1980	0	2212	11552	10423	0
1981	154	2403	9391	13884	0
1982	0	2932	7819	17847	0
1983	35	2320	8366	15467	0
1984	361	4105	11880	19770	0
1985	138	3972	17681	36647	0
1986	222	2572	8871	33730	0
1987	0	2365	11363	38952	6
1988	83	2197	12733	23646	154
1989	419	2489	14065	24453	94
1990	105	2380	6509	22369	236
1991	378	2018	13337	14846	50
1992	191	2723	27835	10076	467
1993	55	1763	12044	4296	208
1994	39	2236	9703	6060	309
1995	23	2010	9138	4703	426
1996	125	1362	5917	2426	676
1997	0	971	12168	3302	143
1998	36	779	8570	6046	365
1999	56	676	8158	5222	11389
2000	0	776	9113	5393	1507

EXPORTS, SLOVAK R
CURRENT PRICES

	SITC 0	SITC 1	SITC 2	SITC 3	SITC 4
1980	0	0	0	0	0
1981	0	0	0	0	0
1982	0	0	0	0	0
1983	0	0	0	0	0
1984	0	0	0	0	0
1985	0	0	0	0	0
1986	0	0	0	0	0
1987	0	0	0	0	0
1988	0	0	0	0	0
1989	0	0	0	0	0
1990	0	0	0	0	0
1991	0	0	0	0	0
1992	0	0	0	0	0
1993	14715	442	8049	416	2563
1994	34371	507	17305	393	5010
1995	28627	652	18430	488	8864
1996	28780	98	7567	794	10526
1997	31558	107	28025	684	6105
1998	42004	213	20895	794	7841
1999	31029	154	12582	655	164
2000	106927	204	8535	509	179

	SITC 5	SITC 6	SITC 7	SITC 8	SITC 9
1980	0	0	0	0	0
1981	0	0	0	0	0
1982	0	0	0	0	0
1983	0	0	0	0	0
1984	0	0	0	0	0
1985	0	0	0	0	0
1986	0	0	0	0	0
1987	0	0	0	0	0
1988	0	0	0	0	0
1989	0	0	0	0	0
1990	0	0	0	0	0
1991	0	0	0	0	0
1992	0	0	0	0	0
1993	38967	12785	86243	25001	137
1994	56862	18686	71071	39380	204
1995	59194	26307	69420	49724	121
1996	70767	37477	112179	46255	7710
1997	81888	37647	82193	49403	223
1998	93070	38004	137428	41797	108
1999	116154	44391	94572	43062	44
2000	120450	59349	87706	56153	443

IMPORTS, SLOVAK R
CURRENT PRICES

	SITC 0	SITC 1	SITC 2	SITC 3	SITC 4
1980	0	0	0	0	0
1981	0	0	0	0	0
1982	0	0	0	0	0
1983	0	0	0	0	0
1984	0	0	0	0	0
1985	0	0	0	0	0
1986	0	0	0	0	0
1987	0	0	0	0	0
1988	0	0	0	0	0
1989	0	0	0	0	0
1990	0	0	0	0	0
1991	0	0	0	0	0
1992	0	0	0	0	0
1993	1371	127	93	3856	0
1994	607	18	843	4548	0
1995	696	33	4239	3770	0
1996	9390	0	4226	7076	0
1997	22675	48	7081	641	0
1998	10576	20	13058	765	0
1999	6396	85	17213	860	0
2000	20489	94	23729	2573	0

	SITC 5	SITC 6	SITC 7	SITC 8	SITC 9
1980	0	0	0	0	0
1981	0	0	0	0	0
1982	0	0	0	0	0
1983	0	0	0	0	0
1984	0	0	0	0	0
1985	0	0	0	0	0
1986	0	0	0	0	0
1987	0	0	0	0	0
1988	0	0	0	0	0
1989	0	0	0	0	0
1990	0	0	0	0	0
1991	0	0	0	0	0
1992	0	0	0	0	0
1993	9955	39973	8658	14296	1015
1994	8898	96046	10951	19007	2014
1995	24832	111767	12565	16924	1266
1996	16411	57537	98175	18617	1881
1997	9414	77171	16438	12994	5659
1998	5451	75501	20320	19401	1579
1999	6532	95601	25360	78000	3390
2000	10616	96676	34229	172742	4184

EXPORTS, TURKEY
CURRENT PRICES

	SITC 0	SITC 1	SITC 2	SITC 3	SITC 4
1980	4718	56	761	28	2883
1981	4596	226	1010	23	2956
1982	11390	93	1118	38	398
1983	5934	307	2655	4951	580
1984	25413	119	2689	146	5127
1985	73163	547	2306	421	4901
1986	29200	329	2813	574	854
1987	34646	199	10959	385	965
1988	7229	451	4419	17	586
1989	4265	783	4443	0	1063
1990	39485	594	7222	0	1065
1991	40032	586	11000	262	7820
1992	65211	2042	8264	0	8725
1993	108138	1503	13129	54829	6374
1994	51366	1747	16036	42750	1902
1995	100930	4421	43837	138	19111
1996	65871	7121	104665	30285	24131
1997	82027	11338	128024	986	15341
1998	49608	4021	85501	1253	13961
1999	68481	555	37700	539	19052
2000	77718	7832	30929	821	20846

	SITC 5	SITC 6	SITC 7	SITC 8	SITC 9
1980	21247	2968	22652	4275	0
1981	17883	4207	190296	9264	2
1982	26963	3761	113366	14953	7
1983	46678	4668	113422	22449	1265
1984	41776	6995	141284	27700	93
1985	54583	10950	126736	37980	573
1986	69318	14703	141050	43755	246
1987	101887	29107	159582	50761	190
1988	79978	10188	168727	69299	3843
1989	92403	21315	185471	65630	2774
1990	94246	42001	340243	111861	2746
1991	103723	52151	340164	107056	1579
1992	143815	34691	344586	57511	2084
1993	193308	34850	394693	81436	8668
1994	148710	29513	253698	54488	13818
1995	194936	51646	520055	64429	10997
1996	228556	46193	365280	89584	32191
1997	271961	52609	468903	143260	8943
1998	379762	65305	599265	130638	10917
1999	366859	60270	656151	127437	22062
2000	465796	94028	650078	152539	11056

IMPORTS, TURKEY
CURRENT PRICES

	SITC 0	SITC 1	SITC 2	SITC 3	SITC 4
1980	51416	10001	9789	0	34
1981	51011	15883	10324	0	92
1982	60560	18696	17916	0	101
1983	78790	18496	19279	0	85
1984	88968	30471	23176	0	64
1985	107196	23321	27518	2	10
1986	106626	31376	39893	0	97
1987	88717	25307	46810	0	130
1988	92832	23677	87785	19489	122
1989	82004	17015	85950	0	173
1990	84576	31849	81754	0	158
1991	101902	28822	74292	209	151
1992	84826	25409	90467	0	132
1993	56128	24615	86015	7	75
1994	70169	38532	93900	0	172
1995	65295	27416	92791	51	119
1996	71979	19769	103552	97	189
1997	91951	37297	97455	85	165
1998	106519	32141	85698	240	127
1999	93931	35498	98134	0	119
2000	108401	46405	97014	6539	48

	SITC 5	SITC 6	SITC 7	SITC 8	SITC 9
1980	81	2167	979	9969	0
1981	99	4151	1025	15027	15
1982	1191	5229	958	23317	0
1983	745	7330	895	40881	0
1984	1030	12323	622	54722	0
1985	1214	27690	451	91494	0
1986	1309	35536	836	91519	0
1987	4046	40416	8620	101917	30
1988	1105	43564	9970	134028	3613
1989	881	71926	20392	184895	4840
1990	11897	76835	20173	207226	7793
1991	6834	98330	34019	182698	6510
1992	12799	122389	33773	184466	7507
1993	5724	90664	17862	229868	2160
1994	7868	109847	123497	282740	14704
1995	11494	138277	77922	402874	2996
1996	8041	146790	109199	441863	5476
1997	28941	206201	165401	589130	4907
1998	23230	248626	221309	720632	6260
1999	21880	251679	283882	808731	8926
2000	20227	330608	321458	943559	13201

EXPORTS, CZECH R
CURRENT PRICES

	SITC 0	SITC 1	SITC 2	SITC 3	SITC 4
1980	0	0	0	0	0
1981	0	0	0	0	0
1982	0	0	0	0	0
1983	0	0	0	0	0
1984	0	0	0	0	0
1985	0	0	0	0	0
1986	0	0	0	0	0
1987	0	0	0	0	0
1988	0	0	0	0	0
1989	0	0	0	0	0
1990	0	0	0	0	0
1991	0	0	0	0	0
1992	0	0	0	0	0
1993	71397	6320	10446	176	4758
1994	144402	7746	14970	14	8445
1995	177314	8244	20927	1236	8051
1996	123946	5399	30218	512	8335
1997	108148	7105	39888	100	5917
1998	151102	6812	44756	792	2296
1999	195040	7825	54140	1621	296
2000	241691	9207	58440	905	1422

	SITC 5	SITC 6	SITC 7	SITC 8	SITC 9
1980	0	0	0	0	0
1981	0	0	0	0	0
1982	0	0	0	0	0
1983	0	0	0	0	0
1984	0	0	0	0	0
1985	0	0	0	0	0
1986	0	0	0	0	0
1987	0	0	0	0	0
1988	0	0	0	0	0
1989	0	0	0	0	0
1990	0	0	0	0	0
1991	0	0	0	0	0
1992	0	0	0	0	0
1993	114600	86634	352135	143933	1763
1994	139885	109768	385725	159831	903
1995	192980	148774	401120	166475	1031
1996	199637	179362	498076	164554	1254
1997	202093	174727	448018	183695	1047
1998	344087	163252	418526	167538	2961
1999	256171	235145	377928	172179	3747
2000	308404	265428	392255	205708	1952

IMPORTS, CZECH R
CURRENT PRICES

	SITC 0	SITC 1	SITC 2	SITC 3	SITC 4
1980	0	0	0	0	0
1981	0	0	0	0	0
1982	0	0	0	0	0
1983	0	0	0	0	0
1984	0	0	0	0	0
1985	0	0	0	0	0
1986	0	0	0	0	0
1987	0	0	0	0	0
1988	0	0	0	0	0
1989	0	0	0	0	0
1990	0	0	0	0	0
1991	0	0	0	0	0
1992	0	0	0	0	0
1993	11791	348	10705	3000	0
1994	3855	301	13467	4131	0
1995	24415	465	21660	1644	0
1996	10321	547	16783	438	0
1997	19342	658	21923	264	0
1998	17535	709	27724	378	0
1999	4954	852	28291	626	38
2000	11850	1931	29053	773	41

	SITC 5	SITC 6	SITC 7	SITC 8	SITC 9
1980	0	0	0	0	0
1981	0	0	0	0	0
1982	0	0	0	0	0
1983	0	0	0	0	0
1984	0	0	0	0	0
1985	0	0	0	0	0
1986	0	0	0	0	0
1987	0	0	0	0	0
1988	0	0	0	0	0
1989	0	0	0	0	0
1990	0	0	0	0	0
1991	0	0	0	0	0
1992	0	0	0	0	0
1993	45926	155322	154642	60226	9717
1994	61440	245886	256298	83410	12199
1995	65032	242292	294264	80640	13207
1996	65498	205153	385662	88747	15341
1997	66092	232567	469401	102815	22191
1998	61992	302042	569098	104513	24743
1999	89413	318231	574078	134334	24420
2000	90161	395249	596356	104655	26436

EXPORTS, LATVIA
CURRENT PRICES

	SITC 0	SITC 1	SITC 2	SITC 3	SITC 4
1980	0	0	0	0	0
1981	0	0	0	0	0
1982	0	0	0	0	0
1983	0	0	0	0	0
1984	0	0	0	0	0
1985	0	0	0	0	0
1986	0	0	0	0	0
1987	0	0	0	0	0
1988	0	0	0	0	0
1989	0	0	0	0	0
1990	0	0	0	0	0
1991	0	0	0	0	0
1992	83533	2530	1851	7059	35
1993	31610	3742	5299	2937	0
1994	61709	14599	20307	12404	0
1995	91828	9560	22562	14827	131
1996	129561	20189	21783	51346	5415
1997	122371	11010	24258	57218	6702
1998	159963	11037	23505	94908	6248
1999	145874	11555	20472	61341	7879
2000	168061	18504	20031	447	2134

	SITC 5	SITC 6	SITC 7	SITC 8	SITC 9
1980	0	0	0	0	0
1981	0	0	0	0	0
1982	0	0	0	0	0
1983	0	0	0	0	0
1984	0	0	0	0	0
1985	0	0	0	0	0
1986	0	0	0	0	0
1987	0	0	0	0	0
1988	0	0	0	0	0
1989	0	0	0	0	0
1990	0	0	0	0	0
1991	0	0	0	0	0
1992	8484	7631	31810	28872	313
1993	14599	29674	54093	53234	793
1994	15024	26807	63593	70641	2587
1995	19550	60220	69665	72911	3934
1996	24763	105706	93989	82491	15195
1997	39095	150447	138942	97010	12010
1998	53801	198311	231297	120682	2839
1999	59641	194710	216776	130177	4183
2000	84281	233534	230722	132974	7285

IMPORTS, CZECH R
CURRENT PRICES

	SITC 0	SITC 1	SITC 2	SITC 3	SITC 4
1980	0	0	0	0	0
1981	0	0	0	0	0
1982	0	0	0	0	0
1983	0	0	0	0	0
1984	0	0	0	0	0
1985	0	0	0	0	0
1986	0	0	0	0	0
1987	0	0	0	0	0
1988	0	0	0	0	0
1989	0	0	0	0	0
1990	0	0	0	0	0
1991	0	0	0	0	0
1992	25485	69	17456	118607	0
1993	32223	392	26328	452671	0
1994	26520	1007	39436	114530	0
1995	35040	88	51809	77975	0
1996	46886	153	78410	28727	0
1997	29322	56	82197	82504	0
1998	42815	351	95790	43358	0
1999	49085	174	130526	83335	0
2000	48047	97	144809	101940	0

	SITC 5	SITC 6	SITC 7	SITC 8	SITC 9
1980	0	0	0	0	0
1981	0	0	0	0	0
1982	0	0	0	0	0
1983	0	0	0	0	0
1984	0	0	0	0	0
1985	0	0	0	0	0
1986	0	0	0	0	0
1987	0	0	0	0	0
1988	0	0	0	0	0
1989	0	0	0	0	0
1990	0	0	0	0	0
1991	0	0	0	0	0
1992	10520	1684	526	4103	341
1993	6653	6157	1882	28691	793
1994	7014	11848	3513	59135	2768
1995	8040	29810	2128	88896	1953
1996	42873	41728	3643	179814	3359
1997	66455	71811	6419	255903	4714
1998	23373	99024	11340	371869	8575
1999	41873	112222	24306	459508	10674
2000	47603	175782	47831	478273	9209

EXPORTS, POLAND
CURRENT PRICES

	SITC 0	SITC 1	SITC 2	SITC 3	SITC 4
1980	111106	5325	8060	7957	2431
1981	176036	6022	17170	7842	409
1982	126658	5929	36192	9389	1324
1983	157822	8193	14578	3996	37
1984	198507	11240	12059	6713	15
1985	350485	12664	13451	3757	2
1986	294594	19653	10329	3432	6
1987	74993	15712	19063	4885	20
1988	110628	17261	25604	4604	955
1989	265032	37798	24220	80128	2874
1990	167102	27230	16452	61941	1895
1991	321836	47240	36822	110978	420
1992	249386	17629	33947	92902	4057
1993	512963	15376	54633	124949	11599
1994	813731	17380	63755	61907	20810
1995	573501	19703	61193	32731	28115
1996	831949	20123	66188	266036	41500
1997	757545	31158	93902	349389	39166
1998	868611	34513	96841	92607	15310
1999	608950	45742	92372	116282	1000
2000	825010	52181	126703	61689	5173

	SITC 5	SITC 6	SITC 7	SITC 8	SITC 9
1980	40471	55687	157878	20301	103
1981	44421	39537	117025	22738	185
1982	62387	57659	103449	39492	11478
1983	44629	47827	130972	37865	7307
1984	65418	66707	215679	56082	3908
1985	55522	116051	285915	37853	1218
1986	74234	116059	188097	76936	1646
1987	74176	105595	222329	68992	2346
1988	92884	123990	248202	105003	1623
1989	90371	163198	399330	142055	1252
1990	139923	263775	546413	247205	1970
1991	267898	552077	2846294	400732	2908
1992	271894	696619	1302774	479088	4882
1993	343961	718135	912762	502855	10987
1994	487812	786266	907691	583284	18427
1995	491636	947402	1053172	688458	15272
1996	607500	1050974	1338409	783124	14712
1997	856581	1237348	1625615	938407	7531
1998	920956	1408352	1801849	1137783	15458
1999	976779	1463568	1752610	1114691	20666
2000	1083449	1614811	1781492	1212834	22936

IMPORTS, POL
CURRENT PRICES

	SITC 0	SITC 1	SITC 2	SITC 3	SITC 4
1980	57297	339	21032	1523496	0
1981	40358	344	18140	467556	0
1982	50037	236	17659	564021	0
1983	71309	105	22054	642433	0
1984	137294	189	43061	1287908	1222
1985	216731	1106	71836	1025040	736
1986	279251	842	79538	568442	0
1987	297583	912	79198	584532	0
1988	349288	62	84543	578149	89
1989	323423	281	103718	513999	403
1990	431770	20	156014	408111	0
1991	497915	347	142676	397959	0
1992	351366	541	191480	422394	1826
1993	291941	328	182573	579265	1016
1994	438965	121	243745	928996	940
1995	443535	158	195154	884897	0
1996	384715	22	114150	793480	0
1997	408306	741	130951	1245154	17
1998	417046	942	158919	891284	0
1999	427121	1462	177929	823679	1510
2000	498612	5912	197468	1095182	222

	SITC 5	SITC 6	SITC 7	SITC 8	SITC 9
1980	29674	98820	52088	78796	0
1981	31221	76052	41533	59981	6
1982	40667	104619	48897	37520	22
1983	40844	118938	59349	56945	0
1984	62847	152001	80056	91295	0
1985	70405	176466	101600	134082	0
1986	67365	177230	100079	184902	1
1987	86729	177498	67171	182680	5
1988	74601	223469	63354	219463	2656
1989	89713	236591	70204	262447	15621
1990	174646	398735	118134	421547	10113
1991	204642	461698	142747	690253	18980
1992	185318	502773	153164	948996	37501
1993	131355	467952	147168	1140909	50771
1994	190281	548757	207801	1259802	38901
1995	165125	653072	285866	1429743	39652
1996	172783	618387	451131	1550890	37212
1997	175394	690670	508634	1807018	55417
1998	196656	885760	613747	2058549	85427
1999	191442	1044162	723189	2081439	72009
2000	251021	1213091	937873	2262937	100413

EXPORTS, SLOVENIA
CURRENT PRICES

	SITC 0	SITC 1	SITC 2	SITC 3	SITC 4
1980	0	0	0	0	0
1981	0	0	0	0	0
1982	0	0	0	0	0
1983	0	0	0	0	0
1984	0	0	0	0	0
1985	0	0	0	0	0
1986	0	0	0	0	0
1987	0	0	0	0	0
1988	0	0	0	0	0
1989	0	0	0	0	0
1990	0	0	0	0	0
1991	0	0	0	0	0
1992	5134	610	16750	0	0
1993	21201	2231	34328	170	180
1994	27206	842	27804	22	595
1995	20913	1386	34303	321	1821
1996	19465	1694	29968	153	799
1997	34722	2326	31881	361	2158
1998	35769	1236	45243	169	2542
1999	34297	1974	24878	119	0
2000	42519	2752	20231	245	126

	SITC 5	SITC 6	SITC 7	SITC 8	SITC 9
1980	0	0	0	0	0
1981	0	0	0	0	0
1982	0	0	0	0	0
1983	0	0	0	0	0
1984	0	0	0	0	0
1985	0	0	0	0	0
1986	0	0	0	0	0
1987	0	0	0	0	0
1988	0	0	0	0	0
1989	0	0	0	0	0
1990	0	0	0	0	0
1991	0	0	0	0	0
1992	19449	5699	27449	18494	219
1993	49158	12240	36525	36816	697
1994	48377	14248	51859	40986	368
1995	72357	17910	50585	53995	899
1996	54292	24876	57690	70982	3986
1997	70317	37998	90098	67990	3758
1998	76326	42684	94211	61566	3605
1999	102420	55019	104667	71129	2783
2000	98855	51582	112965	93807	3934

IMPORTS, SLOVENIA
CURRENT PRICES

	SITC 0	SITC 1	SITC 2	SITC 3	SITC 4
1980	0	0	0	0	0
1981	0	0	0	0	0
1982	0	0	0	0	0
1983	0	0	0	0	0
1984	0	0	0	0	0
1985	0	0	0	0	0
1986	0	0	0	0	0
1987	0	0	0	0	0
1988	0	0	0	0	0
1989	0	0	0	0	0
1990	0	0	0	0	0
1991	0	0	0	0	0
1992	618	208	756	0	0
1993	514	78	426	0	0
1994	661	93	116	0	0
1995	263	126	330	0	0
1996	2137	119	908	211	0
1997	2236	125	1615	89	0
1998	1244	118	2218	0	0
1999	914	104	7758	0	0
2000	911	328	7621	0	0

	SITC 5	SITC 6	SITC 7	SITC 8	SITC 9
1980	0	0	0	0	0
1981	0	0	0	0	0
1982	0	0	0	0	0
1983	0	0	0	0	0
1984	0	0	0	0	0
1985	0	0	0	0	0
1986	0	0	0	0	0
1987	0	0	0	0	0
1988	0	0	0	0	0
1989	0	0	0	0	0
1990	0	0	0	0	0
1991	0	0	0	0	0
1992	2920	33210	51130	26976	0
1993	7035	40812	91012	35363	1469
1994	6562	63121	108545	40397	5592
1995	4458	69250	136086	43559	2622
1996	4527	67985	159787	40836	1455
1997	7253	82930	200851	70582	5221
1998	15479	92781	306775	83974	3398
1999	29580	102455	307586	100581	3434
2000	10131	106177	412821	121108	8354

Annex 2. Long run effects on the Danish economy - detailed results

Scenario is given by table 5.2 and table 6.4 (C).

Table B2.1. **Long run effects on the Danish economy**
       Exports
       Deviation from baseline in percent

		ε	fE_i	fEe_i	pe	pee
Total export			2.28		-0.55	
Food and live animals	SITC 0	2.26	2.11	1.59	-0.28	-0.06
Beverages and tobacco	SITC 1	2.26	2.11	1.59	-0.43	-0.06
Raw materials	SITC 2+4	1.42	2.51	2.43	-0.30	-0.26
Mineral fuels	SITC 3				-0.07	
Chemicals	SITC 5	3.75	3.73	2.60	-0.42	-0.15
Manufactured goods	SITC 6	3.33	4.12	2.97	-0.49	-0.17
Ships, aircraft etc	SITC 7y	1.00	2.80	2.53	-0.25	-0.17
Machinery	SITC 7q	1.00	2.80	2.19	-0.42	-0.17
Misc. manuf. goods	SITC 8+9	2.95	3.38		-0.54	-0.17
Tourism etc		1.60	0.75		-0.46	
Other services					-0.18	

ε_i	Price elasticity
fE_i	Export
fEe_i	Word market demand
pe_i	Export price
pee_i	World market price

Table B2.2. **Long run effects on the Danish economy**
Imports
Deviation from baseline in percent

		ε	fMu_i	fMz_i	fAm_i	pxm_i	pm_i	fM_i
Total imports							-0.22	1.75
Food and live animals	SITC 0	0.29	1.89	1.58	1.61	0.08	-0.08	1.65
Beverages and tobacco	SITC 1	0.94	1.67	1.05	1.48	0.45	-0.02	1.15
Raw materials	SITC 2+4	0.69	2.27	2.07	2.08	0.01	-0.32	2.10
Mineral fuels	SITC 3						-0.07	1.34
Chemicals	SITC 5	0.30	2.74	2.42	2.54	0.38	-0.08	2.48
Iron and metal goods	SITC 6m		3.89	2.33	2.33		-0.28	2.55
Other manufactured goods	SITC 6q	1.33	2.76	1.79	2.18	0.27	-0.28	1.95
Passenger cars, trucks	SITC 7b							1.80
Ships, aircraft etc	SITC 7y						-0.12	2.94
Machinery	SITC 7q	0.95	2.58	1.45	1.80	0.37	-0.12	1.69
Misc. manuf. goods	SITC 8+9	1.03	2.39	1.93	1.88	-0.05	-0.58	2.08
Tourism etc								1.71
Other services								0.69

ε_i Price elasticity
fM_i Import
fMz_i Part of import group with price elasticity
fMu_i Residual part of import group
pxm_i Relative price
fAm_i Demand for import
pm_i Import price

Table B2.3. **Long run effects on the Danish economy**
Gross output and factor income
Deviation from baseline in percent

Sector	share	fx_i	px_i	X_i	V_i	Si_i	Yf_i	Yw_i	Yr_i
Total	1.00	1.50	-0.66	0.83	1.07	0.76	0.61	0.44	0.88
Agriculture	0.03	1.91		1.91	1.61	0.43	2.27	1.16	2.51
Construction	0.07	1.08	-0.57	0.50	0.58	1.73	0.35	0.28	0.48
Extraction coal, oil, gas	0.01				-0.17		0.02	-0.80	0.06
Housing	0.05	0.94	-0.56	0.38	0.44	1.32	0.37	0.13	0.31
Manufacturing	0.26	2.45	-0.50	2.01	2.06	22.08	1.75	1.76	1.67
Construction materials	0.01	2.25	-0.52	1.72	1.82	3.88	1.59	1.48	1.81
Electricity, gas	0.02	1.32	-0.47	0.85	0.99	1.80	0.76	0.51	0.82
Food industry	0.05	1.92	-0.31	1.60	1.71	-0.11	1.29	1.18	1.51
Petroleum refineries	0.01	0.86		0.86	0.91	-0.47	0.79	0.07	0.80
Chemicals	0.04	3.08	-0.46	2.61	2.71	4.21	2.43	2.32	2.62
Metal products	0.08	2.76	-0.49	2.26	2.39	7.64	2.09	1.97	2.39
Beverage and tobacco	0.01	1.78	-0.47	1.29	1.37	2.46	1.19	1.03	1.29
Misc manufactured	0.04	2.59	-0.56	2.02	2.11	-2.42	1.89	1.79	2.06
Transport equipment	0.01	2.12	-0.45	1.67	1.79	7.02	1.44	1.36	1.54
Service	0.42	1.45	-0.58	0.86	0.93	1.34	0.81	0.75	0.87
Financial	0.05	1.21	-0.71	0.49	0.60	0.58	0.43	0.40	0.24
Trade	0.11	1.96	-0.64	1.31	1.43	2.74	1.23	1.16	1.34
Misc. services	0.16	1.42	-0.62	0.79	0.89	1.31	0.72	0.65	0.84
Transport sea	0.04	0.26		0.26	0.25	13.11	0.28	-0.42	0.36
Other transport	0.07	1.34	-0.51	0.82	0.96	1.45	0.64	0.59	0.70
Government sector	0.15		-0.69	0.69	-0.53	-0.37	-0.77	-0.80	-0.49

$share_i$ Share of total gross output in year 2000
fX_i Gross output at constant prices
px_i Output price
X_i Gross output at current prices
V_i Use of commodities
Si_i Indirect taxes, net
Yf_i GDP at factor cost
Yw_i Wage bill
Yr_i Gross operating surplus

Table B2.4. **Long run effects on the Danish economy**
Gross output and factor input
Deviation from baseline in percent

	share	fX_i	hq_i	fKm_i	fKb_i	fVm_i	fVe_i
Total	1.00	1.50	1.28	1.28	0.97	1.54	1.29
Agriculture	0.03	1.91	1.98	1.74	1.90	1.91	2.11
Construction	0.07	1.08	1.09	1.02	1.06	1.08	1.01
Extraction coal, oil, gas	0.01						
Housing	0.05	0.94	0.94	0.89	0.91	0.94	0.94
Manufacturing	0.26	2.45	2.57	2.28	1.85	2.48	1.46
Construction materials	0.01	2.25	2.30	2.10	2.18	2.25	2.24
Electricity, gas	0.02	1.32	1.32	1.32	1.28	1.32	1.32
Food industry	0.05	1.92	1.99	1.65	1.88	1.92	1.82
Petroleum refineries	0.01	0.86	0.87	0.83		0.86	0.86
Chemicals	0.04	3.08	3.15	2.87	2.99	3.08	3.01
Metal products	0.08	2.76	2.80	2.61	2.67	2.76	2.70
Beverage and tobacco	0.01	1.78	1.85	1.69	1.73	1.78	1.72
Misc manufactured	0.04	2.59	2.62	2.48	2.53	2.59	2.53
Transport equipment	0.01	2.12	2.18	1.96	2.09	2.12	2.04
Service	0.42	1.45	1.59	1.11	1.47	1.37	1.10
Financial	0.05	1.21	1.21	1.21	1.11	1.21	1.02
Trade	0.11	1.96	1.97	1.88	1.88	1.96	1.92
Misc. services	0.16	1.42	1.46	1.26	1.36	1.42	1.09
Transport sea	0.04	0.26	0.38	0.20	0.34	0.26	0.26
Other transport	0.07	1.34	1.40	1.29	1.31	1.34	1.24
Government sector	0.15						-0.05

$share_i$ Share of total gross output in year 2000
fX_i Gross output at constant prices
hq_i Volume of hours worked
fKm_i Capital stock, machinery etc
fKb_i Capital stock, buildings etc
fVm_i Use of commodities, excl energy, at constant prices
fVe_i Use of energy at constant prices