ENGLISH SUMMARY

Chapter I: The International Outlook

Economic growth is expected to increase in most countries in Western Europe and Japan and to be high and stable in the USA, Great Britain and Norway. The annual rate of growth in the OECD area is expected to be 2¼ per cent in 1997-99. Inflation was very low in 1996 and is expected to continue to be low but to increase slightly, primarily because of a higher level of activity in Western Europe and a high activity level in the USA. In Europe fiscal policy is tight in order to meet the Maastricht budget deficit criteria of 3 per cent of GDP. Moderation of the growth rate caused by tight fiscal policy has only partly been counteracted by an easy monetary policy. It is not expected that monetary policy will be tightened before the recovery is stable. Monetary policy in the USA is expected to be tightened further this year in order to curb inflationary pressures. Fiscal policy is reasonable tight and is expected to continue to be so in the future. In Japan fiscal and monetary policies are easy; in spite of this, growth in the private sector has not increased.

Chapter II: The Domestic Economy

Danish GDP is expected to grow by 3 per cent in 1997 and 2¼ per cent in 1998-99. Inflation is expected to remain relatively low, though a slight pick-up to 2½ per cent is expected in 1997 and 1998. The balance of payments is expected to remain at around 1¼ per cent of GDP and there will be a slight improvement of the general government financial balance; for 1999 there is projected a surplus of 1 per cent of GDP.

Danish growth is primarily being driven by private consumption, which will grow by approximately 3 per cent. A major factor behind the strong consumption performance is higher house prices, which increased by 10 per cent in 1996. Falling interest rates have been a driving force, but no further drop in the interest rate is predicted. Therefore, house price increases are expected to be lower in the future. However, further large increases in house prices cannot be ruled out, and in that case private consumption might grow substantially more than predicted. If that happens, a deteriorating balance of payments and increasing inflation may be the result.

Exports are another growth-generating factor in the Danish economy. The pick-up of growth in the European economies, plus improved competitiveness due to a depreciation of the Danish krone, will result in increasing exports. In 1997 exports of agricultural products and energy will contribute significantly to total exports. Exports of oil and gas from the North sea will continue to increase in the coming years, contributing to a steady surplus on the balance of payments.

Employment will increase by 30,000 persons between 1996 and 1999. The increase in employment will reduce unemployment further, though the speed of the decrease will slow significantly. The number of persons unemployed will be approximately 210,000 in 1999, corresponding to 7½ per cent of the labour force.

Table 1: Short-term prospects for the Danish economy

	1996 Current prices DKK bn.[d]	1996 Per cent of GDP	Percentage change in volume terms			
			1996	1997	1998	1999
Private consumption	544.1	53.7	2.6	2.8	3.1	2.7
Public consumption	254.2	25.1	1.9	1.7	-0.3	0.1
Gross fixed capital formation	167.6	16.5	7.8	4.2	2.2	2.4
of which:						
Residential investments	34.3	3.4	8.9	10.6	8.9	4.0
Fixed business investments	113.2	11.2	9.1	3.0	0.8	2.2
Public investments	20.2	2.0	-1.4	1.3	-0.9	0.0
Stock building[a]	1.3	0.1	-1.0	-0.6	0.1	-0.1
Total domestic demand	967.2	95.4	2.2	2.2	2.2	1.9
Exports of goods and services	344.6	34.0	2.3	5.0	3.2	4.0
Imports of goods and services	298.4	29.4	1.8	3.6	3.5	2.9
GDP	1013.5	100.0	2.4	2.9	2.2	2,5
Key indicators						
Consumer prices, percentage change[b]			2.1	2.6	2.6	1.9
Unemployment, per cent[c]			8.8	7.9	7.7	7.5
Current account, DKK bn.[d]			12.3	16.1	11.8	13.9
Current account, per cent of GDP			1.2	1.5	1.1	1.2
General government financial balance, DKK bn.[d]			-16.2	5.3	6.8	12.8
Gen. government financial balance, per cent of GDP			-1.6	0.5	0.6	1.1
Hourly wage costs, percentage change			4.1	4.2	4.4	4.4
Terms of trade, percentage change			-0.2	-1.2	-1.6	-1.2

a) The percentage changes are calculated as the real changes in stock building relative to real GDP in the previous year.
b) Implicit private consumption deflator.
c) In per cent of total labour force.
d) The DKK/USD exchange rate is taken as 5.80 in 1996 and 6.42, 6.46 and 6.46 in 1997-99.

Sources: Statistics Denmark, *National Accounts* and own estimates.

On the basis of the results of the collective bargaining round in the spring of 1997, it is predicted that labour costs will increase by 4 per cent in 1997. In light of falling unemployment, slightly higher wage increases are expected in 1998 and 1999, and Danish wage costs are expected to increase by ¼ per cent annually above the increase in wage costs among our competitors. Due to the impact of Danish labour market policies, it is predicted that labour costs will grow less than would have been expected given the historical relationship between wages and unemployment. However, there is a risk that wages will increase more than expected. Unemployment rates are very low, especially within the construction sector, and bottleneck problems might very well surface if the Danish economy grows faster than expected.

The general government financial balance has improved substantially, and a small surplus is expected in 1997. Relatively high growth rates in the Danish economy have increased tax revenues, and falling unemployment has decreased expenditure. The improvement has not been the result of a tight fiscal policy.

Policy Recommendations

During the last 20 years several measures have been introduced to reduce unemployment by reducing the labour force. In 1996 165,000 persons were on early retirement schemes, and 65,000 on paid leave. The popularity of these measures was not expected when they were introduced. When the paid leave schemes were introduced in 1993, the official estimate of the number of people that would be on paid leave was 20,000 persons per year. The various measures reduce labour supply, increase the welfare of the persons involved, and lead to higher public expenditure. The measures affect the labour market positively as well as negatively. The qualifications of the labour force may be enhanced as a result of them. This is a direct result of the paid leave scheme for educational purposes, but it may also be the case with other measures, if the temporarily vacant

jobs are filled by the long-term unemployed. On the other hand, the measures may lead to the marginalization of groups using the schemes; for example, young females might be perceived as less attractive labour due to the existence of the child-care leave scheme. Although the measures reduce unemployment in the short run, employment is reduced in the long run.

The measures were all introduced in periods of high unemployment. Conversely, they should be reduced in a period when unemployment is falling. Limitations can be introduced through spending controls for each scheme; these can easily be adjusted in the light of the general state of the economy or the labour market. Spending control can be enforced either by limiting the number of people on the scheme, or by regulating the compensation rate. Direct control of the number of people might be accomplished by setting criteria based on, for example, age or length of work experience. If tightening the admission criteria or reducing the compensation rate do not limit expenditure sufficiently, spending control will lead to rationing. Rationing is used elsewhere in the public sector to limit demand, for example in day-care, hospitals, homes for the elderly, etc.. It is thought-provoking that rationing is used in matters of literally life and death, while it apparently cannot be accepted when it comes to labour market schemes. By introducing spending controls for these schemes, the maximum possible influence on the labour market as well as on the budget will be known, and the risk of the schemes being perceived as a permanent right will be reduced.

The latest labour marked reform, which was a part of the budget for 1996, paid special attention to the uneducated young unemployed. After six months of unemployment they have to accept an offer of a course of education or training for 1½ years. This scheme has contributed significantly to the marked drop in youth unemployment. Unemployment has dropped by 2.7 percentage points for people aged 16-24, while for the group aged 25-59 it has decreased by only 0.8 percentage points. Studies show that the formerly unemployed young people have either started on a course of education or found employment in

the ordinary labour market. The reform means that benefits for the young unemployed are reduced and the scheme is therefore equivalent to a tightening of the rules of the benefit system for this group. The model can be said to have been a success.

Given the situation of the Danish economy, a tightening of fiscal policy will be appropriate in 1998. Growth in private consumption is expected to be high, in spite of the latest fiscal measures directed towards reducing growth in private consumption. Further tightening is also needed because implementation of the latest tax reform will cause an easing of fiscal policy in 1998. In this forecast it is assumed that fiscal tightening in 1998 will be of the same amount as the easing due to the tax reform, i.e. 4 bn. DKK. If this tightening of fiscal policy is not implemented, the risk of bottleneck problems and a deteriorating balance of payments will become pronounced.

Public sector finances will be improved markedly in 1997, and a surplus is expected. The improvement of the public balances is primarily a result of high growth in the overall economy since 1993. But the need for fiscal easing in future recessions and the ageing population will require a further improvement in public sector finances. Improvements are also required if the government's goal of a reduction of the public debt to 40 per cent of GDP by the year 2005 is to be met.

The composition of public expenditure and revenues is a political issue. Given Denmark's ambition to improve the educational system, provisions for the young and the elderly, and the health system, a debate on how to distribute public spending is needed. A reduction of public transfers would be a natural element in such a discussion. As the possibilities of taxing the mobile production factors diminish due to increased internationalisation, a debate on how to collect taxes is also needed. In an international perspective, the taxation of land and property, compared to the taxation of, for example, labour and capital, is low in Denmark. An increase in taxation of the immobile production factors is therefore an obvious possibility. However, changes in the taxation of property have distributional effects. As a result, increased taxation is more acceptable when

prices on houses are rising, because increased taxation in this case will result in reduced capital gains instead of losses. The extra revenue can be used to reduce public sector debt, which will make lower taxation of labour and capital possible in the longer run.

Chapter III: Denmark and EMU

The third and final phase of European Monetary Union (EMU) is set to begin on January 1, 1999. Denmark has elected to stay outside EMU, but under the terms of the Maastricht Treaty it will be possible for Denmark to join if it so desires, provided the necessary conditions are met.

Regardless of whether the country participates in EMU, the union will have consequences for Denmark. The advantages and disadvantages to Denmark of joining or not joining the monetary union are discussed in the report from an economic point of view only.

It is difficult to quantify the various advantages and disadvantages, and assessments must therefore depend to a great extent on a qualitative weighing-up of the factors involved. The economic discussion of EMU can be separated into discussion of the economic efficiency advantages on the one hand and macroeconomic stabilization policy and credibility on the other.

Participation in EMU would yield some efficiency gains. These gains would consist primarily of lower costs in connection with currency transactions and an elimination of the interest rate spread vis-à-vis the EMU. The possible reduction in Danish transaction costs is estimated at around ¼ per cent of GDP per year. The gains from elimination of the interest rate spread obviously depend on the size of the spread. It is hard to predict how large the interest rate spread will be outside of EMU, but provided that Denmark continues its current stabilization-focused economic policy, the spread will most likely be small. Furthermore, calculations indicate that national income would only increase marginally if the current interest rate spread vis-à-vis Germany was to be eliminated.

If Denmark joins EMU, national monetary and exchange rate policies must be relinquished, and fiscal policy will be subject to rules governing deficit and debt levels. This will reduce the credibility problems inherent in economic policy, provided that EMU turns out to be stable. A stable EMU means that the euro countries will be able to secure a low and stable inflation rate in accordance with the Maastricht Treaty. Gains in Danish credibility would, however, probably be small in comparison with those for many other EU countries.

It is difficult to say if the loss of national monetary and exchange rate policies would pose a stabilization problem. On the one hand, movements in Danish GDP have for a number of years been markedly different from changes in the GDP of the core EU countries. In principle, this could indicate that there is a need to keep the exchange rate as a potential stabilization instrument. On the other hand, it is possible that the economic correlation between Denmark and the core countries would become greater if Denmark were to join EMU, partly because economic policy coordination would be strengthened in EMU. In any case, the possibility cannot of course be excluded that Denmark will be hit by a large country-specific shock in the future, where control over a national exchange rate would be valuable. As far as the fiscal rules are concerned, analyses suggest that Denmark, given the current state of the public finances, would not have great difficulty in abiding by these.

The most obvious alternative to participating in a stable EMU is to fix the exchange rate of the Danish krone against the euro. In this case, one would not reap the efficiency gains of joining the Union, consisting of lower transaction costs and an elimination of the interest rate spread. However, one would get the same low inflation rate as in the euro area. The scope for stabilization policy would probably not be greater outside EMU, as a fixed exchange rate would mean that Denmark could not deviate from the economic policy of the euro countries. In fact, it may be argued that the room for stabilization policy would be smaller outside EMU than inside it, because Denmark would have to observe the same fiscal rules as the euro countries but

without having any influence on the common monetary policy. A possible advantage to staying outside is that it would be possible to adjust the exchange rate if Denmark were hit by a major country-specific shock. Instead of a fixed exchange rate, one could choose an inflation target. This would, in principle, give a greater scope for stabilization policy, but an inflation target can be difficult to monitor and would, therefore, probably be less credible than a fixed exchange rate, and as a consequence lead to a greater interest rate spread. All in all, it is likely that a fixed exchange rate would be better for Denmark outside EMU than an inflation target, if EMU turns out to be stable. A schematic overview of the consequences of staying outside an EMU that has a low and stable inflation rate is given in Table 2.

Table 2: A schematic overview: The consequences of staying outside an EMU that has a low and stable rate of inflation.

	Fixed exchange rate	**Inflation target**
Lower transaction costs, etc.	÷	÷
Effect on real interest rate	÷	÷ ÷
Effect on inflation rate	0	0/÷
Room for stabilization policy	0/÷	?
Insurance against large shocks	+	+

Key:
"÷" means that it is a disadvantage to stay outside EMU.
"÷÷" means that it is a major disadvantage to stay outside EMU.
"+" means that it is an advantage to stay outside EMU.
"0" means that there is probably not much difference between joining and staying outside EMU.
"?" means that it is doubtful whether it is an advantage or a disadvantage to stay outside EMU.

It is, however, not certain that EMU will be stable, even though the Maastricht Treaty includes a number of monetary and fiscal rules that are meant to ensure stability. If EMU turns out to be unstable, economic considerations speak against participation, because Denmark would in that case get the same high and fluctuating inflation rate as the other euro countries. For the same reason, Denmark should not fix the exchange rate against the euro in such a case, as this would lead to an import of inflation from the euro area. Instead, one should base economic policy on an inflation target which would make it possible to avoid a high and fluctuating inflation rate. A schematic overview of the consequences of staying outside an EMU that has a high and fluctuating inflation rate is given in Table 3.

Table 3: A schematic overview: The consequences of staying outside an EMU that has a high and fluctuating rate of inflation.

	Fixed exchange rate	**Inflation target**
Lower transaction costs, etc.	÷	÷
Effect on real interest rate	?	?
Effect on inflation rate	0	+
Room for stabilization policy	0/÷	+
Insurance against large shocks	+	+

Key:
"÷" means that it is a disadvantage to stay outside.
"+" means that it is an advantage to stay outside.
"0" means that there is probably not much difference between joining and staying outside.
"?" means that it is doubtful whether it is an advantage or a disadvantage to stay outside.

The stability of EMU is decisive for whether it is advantageous to participate or not. If EMU turns out to be stable, the analyses show that there are a number of economic advantages to membership. The most important economic argument for not joining a stable EMU is the risk of being hit by large country-specific shocks in the future. Another argument for staying outside, at least in the beginning, is the risk that EMU will be unstable. Staying outside is a decision that can be reversed, while it is unrealistic to count on being able to leave again. This asymmetry, in combination with the risk of EMU being unstable, speaks for a "wait and see" attitude, as the running costs of this policy, in the form of bigger transaction costs and a positive interest rate spread, would not in all likelihood be overwhelming. However, if one believes that the probability of EMU being stable is high and the risk of future large shocks is small, then from an economic point of view Denmark should not hesitate to join EMU from the beginning.

The chapter only discusses the economic aspects of Denmark and EMU. The political considerations may be at least as important.

Chapter IV: European Integration: 40 Years with the Treaty of Rome

Economic cooperation between the Western European countries has gradually been extended during the last 40 years. As stated in the Treaty of Rome, the aims of economic integration have been to increase the economic welfare of all participating countries, and to reduce income inequalities between countries as well as between regions within each country. A central means of achieving these aims has been to ensure open borders for commodities, labour and capital. In this report, the consequences of economic integration on income, trade and factor mobility are analysed for the current 15 member countries of the EU.

Since 1960 the average per capita income in the EU has increased by 140 per cent in real terms, and the dispersion of GDP per capita of the individual countries has been reduced markedly, cf. Table 4. However, these developments have not proceeded steadily during the period. From 1960 to 1973, both economic growth and the speed of income convergence were much faster than in the subsequent 25 years. This was particularly true for the poorer Southern European countries, Greece, Portugal and Spain, whose incomes got considerably closer to the EU average. It is notable that these countries did not have any formal trade arrangements with the European Economic Community in the 1960s.

Taken over the whole period 1960-94, the relative GDP per capita has improved for Greece, Portugal, Spain and Ireland in particular, while Sweden and the United Kingdom have experienced large reductions in their GDP per capita relative to the EU average.

Yet large income differences remain among the European countries. The Danish GDP per capita is for example 75 per cent higher than the Greek GDP per capita. Differences in productivity explain much of these income inequalities, but different levels of employment, measured either in numbers of people or numbers of hours, also contribute significantly. Spain has for example almost the same GDP per hour of employment as Denmark, yet its income per capita is still one third smaller than that of Denmark due to the proportion of employed persons in the population being very low.

Table 4: Indicators of income and export structure in the EU countries

	GDP per capita[a]		Difference in export structure[b]		Export concentration[c]	
	1960	**1994**	**1961**	**1994**	**1961**	**1994**
	----- EU = 100 -----				-Pct. of total exports -	
Austria	97	111	49	31	25	11
Belgium	99	111	44	33	21	18
Denmark	115	112	61	43	37	15
Finland	89	89	79[f]	51	68[f]	34
France	107	105	28	20	9	9
Germany[d]	121	119	36	23	12	9
Greece	43	64	87	63	76	27
Ireland	61	84	73	58	52	34
Italy	87	102	37	34	17	11
Netherlands	114	102	42	36	18	13
Portugal	38	68	66	54	42	24
Spain	58	75	70	32	43	20
Sweden	123	96	52	37	41	20
United Kingdom	124	97	31	26	10	11
EU average	100	100	51[f]	39	32[f]	18
Standard deviation[e]	25	15	19[f]	13	21[f]	9

a) The figures for GDP per capita as a percentage of the EU average are based on GDP figures adjusted for differences in purchasing power parities.

b) The difference in the export structure is based on an index which measures how much the commodity composition of the exports of each country deviates from the average commodity composition of the exports of all other EU countries. The index has a value of zero if the two commodity compositions are identical and a value of 100 if no commodity appears in both commodity compositions.

c) The measure of export concentration expresses the amount by which the proportion of the total exports of a country constituted by five commodities exceeds the proportion which those same five commodities constitute of the total exports of all the EU countries. For each country, the selected five commodities are those for which the proportion they constituted of total exports exceeds their average proportion of EU exports by the greatest amount.

d) For both years, GDP per capita is calculated using data only for the former West Germany, while the export data are for the former West Germany in 1961 and for the unified Germany in 1994.

e) The standard deviation of GDP per capita is weighted using the population of each country as weights. The standard deviations of both export structures and export concentrations are unweighted.

f) 1964.

Sources: OECD, *Economic Outlook* and *Foreign Trade Statistics*, and own calculations.

This suggests that the substantial variation in economic structures is the main reason for the sustained income inequality among the EU countries, and that more similar national economic policies are required to equalize the current income differentials. However, the analyses in this report, together with several international studies, provide evidence that the progress made towards free trade and factor mobility has contributed to growth in economic welfare as well as the equalization of GDP per capita in the EU area. This indicates that trade agreements between the EU and the Central and Eastern European countries could increase growth and income in the latter countries.

The international movement in the direction of free trade has increased foreign trade as a proportion of GDP in most countries. Yet the free trade area in Western Europe has gone further in liberalizing trade and factor mobility than international trade agreements in general. As a consequence, trade among the EU countries has expanded faster than trade with countries outside the EU. Thus, the main effect of the regional trade arrangement has been to create new trade, although trade diversion has also occurred, particularly when the UK, Spain and Portugal joined the EU. For Spain and Portugal, this caused their GDP per capita to converge towards the EU average in the period immediately after their EU membership.

Capital movements were not liberalised until the beginning of the 1980s, but since then foreign direct investments among the EU countries have grown substantially. These capital flows appear to have contributed to the relatively good performance of Spain and Portugal. Ireland has also benefitted from direct foreign investments, but these came somewhat earlier and in particular from countries outside the EU, for example the USA and Japan. In sum, the analyses indicate that both increased trade and capital mobility can explain some of the income convergence among the EU countries. In contrast, the mobility of labour within the EU is still modest by any standard, and is therefore unlikely to have had any significant impact on the income levels of the different countries.

Since 1960, the commodity composition of foreign trade has also undergone large changes. These changes have been most dramatic for countries on the European periphery, such as Ireland, Spain, Portugal and Greece. This means that all the countries in the EU today have a very similar commodity composition of their imports. The commodity composition of exports has also become more similar, but most of this development towards more equal export structures occurred before 1980. Consequently, there are still substantial differences in the export structures of the EU countries, cf. Table 4.

Export concentration, which is a measure of how reliant a country is on a few commodities, has decreased significantly in most EU countries since the beginning of the 1960s. Yet, apart from smaller countries generally having a more concentrated export structure than larger countries, the smaller countries on the periphery are still quite dependent on relatively few commodities.

Combining the different indicators of foreign trade, the small countries on the European periphery, i.e. Finland, Greece, Portugal and Ireland, appear to be more likely to experience an adverse trade shock. Membership of EMU would therefore be associated with higher risks for these countries than for countries in the European core, and would require that they develop an ability to adapt relatively fast to changes in demand and supply conditions.

The analyses show that Denmark belongs neither to the core of the EU nor to the group of small countries on the periphery. The Danish export structure deviates somewhat from that of the core countries and is moderately concentrated, due mainly to a large proportion of foodstuffs in total exports. Yet this does not in itself give rise to serious concerns in relation to a possible membership of EMU.

Chapter V: R&D and economic growth

In this chapter, Danish research and development (R&D) activity is described and discussed in an international context. The social benefits of R&D are assessed, and an analysis of the consequences of technological development for the demand for worker skills is presented.

R&D is believed to be an important element in enhancing innovation, competitiveness and economic growth in the longer run. Therefore, the Danish government is concerned about the fact that R&D expenditure in Denmark is lower than in most comparable countries. In 1993, Danish R&D expenditure amounted to DKK 15.7 billion, or 1.8 per cent of GDP. The political goal is for R&D expenditure to reach a level of at least 2 per cent of GDP. In 1993, the average R&D expenditure in the EU amounted to almost 2 per cent of GDP, compared to 2.6 per cent in the United States and 2.7 per cent in Japan. However, Danish R&D effort has increased considerably during the last ten years, thus diminishing the gap between Denmark and other countries.

In spite of the increased amount of resources devoted to R&D there has been no increase in the number of patent applications in Denmark, possibly indicating failures in the ability to transfer and make use of R&D results. Furthermore, in international trade in highly R&D intensive industries data indicate that Denmark is lagging behind many other OECD countries when it comes to exporting knowledge-intensive products.

Changes in total factor productivity (TFP) in the Danish manufacturing, construction and services sectors are analysed in a growth-accounting framework. The analysis shows that for the period 1948-95, average yearly TFP growth has been over 1 per cent in the manufacturing and construction sectors, and more than 1½ per cent in the services sector. In all sectors, the largest TFP growth rates were seen in the period 1958-73, whereas TFP growth rates were generally lower in all sectors in the years following 1974. In particular, the analysis points to very discouraging productivity growth rates in manufacturing

since the beginning of the 1980s. However, poor total factor productivity performance since the beginning of the 1970s is characteristic of the whole OECD area.

The educational level of the Danish population measured by length of education has grown by approximately 20 percent over the last 50 years. Moreover, since the 1960s the number of persons with a medium or long education has tripled. It is noteworthy that a majority of these persons are employed in the public sector, whereas only 9 percent have found employment in the manufacturing sector, which is responsible for most private R&D expenditure.

Technological development is believed to skew the demand for worker skills. In many countries this has led to a fear of losing employment opportunities for unskilled labour as a result of skill-biased technological progress. The analysis in this chapter does indeed indicate that historically, employment opportunities for unskilled labour in Denmark have deteriorated as a consequence of technical progress. For the period 1957-92, an annual output growth of at least 5.8 per cent would thus have been required in order to stabilise employment of unskilled labour at unchanged relative factor costs. On the other hand, the observed average output growth rate of 2.6 per cent was just sufficient for the employment of skilled labour to remain unchanged at unchanged relative factor costs. The problem of skill-biased technical progress means that attention must be paid to the flexibility of the labour market and to education policy.

The chapter also attempts to analyse the relationship between R&D and productivity in both a Danish and an international perspective. Several analyses emphasize that development of new processes and products is not only influenced by firms' own R&D activities. The use and exploitation of knowledge already developed elsewhere is also of great importance. Knowledge spillovers embodied in services, materials and capital equipment can be estimated using the input-output tables in the national accounts. In Denmark there is a tendency for industries with low R&D activity to compensate by acquiring a relatively high proportion of new technology from other sources, i.e. from other industries or from imports, and vice versa. This observation is in line with international investigations.

R&D is generally believed to be associated with positive externalities, making R&D very important to society. In reality, given the problems of measuring the social benefit of R&D, it is very difficult to establish the optimal level of R&D from society's point of view. However, due to the positive externalities associated with R&D, public support for private R&D may be necessary in order to ensure that sufficient R&D is undertaken. Such public support could be given in the form of tax deductions or direct financial support. Consequently, it might be preferable to change the current system in the direction of promoting incentives to invest in R&D instead of other kinds of investments not associated with positive externalities to the same degree. A statistical analysis for the period 1957-93 estimates the sensitivity of R&D demand in the Danish manufacturing sector with respect to user costs for R&D capital at -0.7. Consequently, Danish R&D stock could be increased by 12 per cent if tax deduction possibilities were increased from the current 100 per cent to 125 per cent. Further, the analysis finds neither substitution nor complementarity between the volume of public and private R&D at the macro level.

The positive external effects from public R&D on production in the private business sector are analysed for the period 1957-92 in a factor demand system. The calculations are based on the hypothesis that public R&D reduces private production costs by affecting the productivity of the production factors. The analysis shows that public R&D capital and private capital embodied in machinery are complementary, while public R&D reduces the demand for labour, energy and materials. The estimation results are uncertain but indicate that private production costs are reduced by -0.03 per cent when public R&D capital rises by 1 per cent. Consequently, an enhancement of public R&D activity could result in a social surplus.

In Denmark, public R&D expenditure as a percentage of GDP is comparable to most other countries, whereas R&D carried out by the private business sector is lower. The Danish goal is to increase the private sector's share of total R&D expenditure, and the share of the private sector's R&D effort has actually increased from 53 per cent of the total in 1983 to 58 per cent of the total in 1993. However, as the Danish private sector consists mainly of small or medium size enterprises, it is not necessarily desirable to give too high a priority to private R&D. Rather, it is important to secure the production of public R&D and the transfer of the results thus obtained, focusing on possible barriers to such transfers of knowledge. Thus, in general it is not to be recommended that Danish researchers patent their results, as this can hinder knowledge transfer. The technological service institutes are important agents in facilitating knowledge transfer.

Danish research policy has been examined twice by OECD experts, the last time being in 1994. The OECD has recommended a higher degree of control and a more strategic approach, implying among other things identification of priority fields. However, several other analyses suggest caution when attempting to identify priority fields, especially for basic research, as such attempts have generally not been successful historically. On the contrary, it is important to emphasize autonomy in basic research, as it is generally very difficult to identify areas which will be important in 10-15 years. However, it is crucial that basic research is regularly evaluated by academic standards, and that such evaluations have consequences for allocation of resources. In Denmark there has been a long debate on goals and instruments for research policy, leading in 1997 to the formulation of a national research strategy.