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by

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## SUMMARY

The international economic recovery became quite firmly established in 1983, with substantial growth recorded in North America, Japan, and to a lesser extent the UK. Against this background, the decline in the Irish economy was halted, and substantial gains were made in several aspects. The overall growth rate was miniscule at about  $\frac{1}{2}$  per cent, but there was a massive improvement in the balance of payments, a significant increase in industrial output, a marked reduction in the rate of inflation, some slowing down in the growth of unemployment, and a small reduction in the budget deficit as a proportion of Gross National Product.

It seems likely that 1984 will see a continuation of most of these trends. Gross National Product should increase by about 2 per cent in volume, the current account balance of payments deficit should fall to around £50 million, and the increase in consumer prices should be held to about  $8\frac{1}{2}$  per cent. However, the indications are that progress will continue to be very slow in relation to the two major problems of unemployment and the public finances. Employment could well stabilise at about its present level and even increase slightly later in the year, but this would still leave unemployment increasing at a rate of some 18,000 per year because of the growth in the labour force. On the assumption of a passive budget, in which both income tax bands and specific rates of excise duty are indexed in line with inflation, it seems probable that there would be very little change in the size of the nominal current budget deficit, although it would be reduced as a proportion of Gross National Product.

While neither of these outcomes can be regarded as at all satisfactory, there is little room for manoeuvre in budgetary strategy. Too determined an attempt to reduce the deficit could impair the expected recovery and increase the rise in unemployment, while trying to reduce unemployment by allowing the deficit to rise would be a short-term expedient which would intensify both problems in the longer term. Probably the most hopeful strategy would be to aim for a slightly lower deficit, while hoping that this and other current forecasts of the rate of economic recovery prove unduly cautious.

**FORECAST NATIONAL ACCOUNTS 1983**  
**A: Expenditure on Gross National Product**

	1982 £m	1983 £m	Change in 1983				
			£m		%		
			Total	Volume	Total	Price	Volume
Private Consumer Expenditure ...	7490	7995	505	-248	6¾	10½	-3¼
Public Net Current Expenditure ...	2682	2975	293	13	11	10½	½
Gross Domestic Fixed Capital Formation	3177	3077	-100	-280	-3¼	6	-8¾
Exports of Goods and Services (X) ...	6373	7653	1280	660	20	8¾	10¼
Physical Changes in Stocks ...	-6	146	152	142	-	-	-
Final Demand ...	19716	21846	2130	287	10¾	9	1½
less:							
Imports of Goods and Services (M) ...	7280	7907	627	181	8½	5¾	2½
GDP at market prices ...	12436	13939	1503	106	12	11	1
less:							
Net Factor Payments (F) ...	640	720	80	42	12½	5¾	6½
GNP at market prices ...	11796	13219	1423	64	12	11½	½

**B: Gross National Product by Origin**

	1982 £m	1983 £m	Change in 1983	
			£m	%
			Agriculture, Forestry, Fishing ...	1057
Non-Agricultural: Wages etc. ...	7270	7983	713	9¾
Other ...	1417	1594	177	12½
less:				
Net Factor Payments ...	640	720	80	12½
National Income ...	9104	10026	922	10¼
Depreciation ...	1140	1311	171	15
GNP at factor cost ...	10244	11337	1093	10¾
Taxes less Subsidies ...	1552	1882	330	21¼
GNP at market prices ...	11796	13219	1423	12

**C: Balance of Payments on Current Account**

	1982 £m	1983 £m	Change in 1983
			£m
			X—M ...
F ...	-640	-720	-80
Net Transfers ...	506	610	+104
Balance on Current Account ...	-1041	-364	+677

**FORECAST NATIONAL ACCOUNTS 1984**  
**A: Expenditure on Gross National Product**

	1983 £m	1984 £m	Change in 1984				
			£m		%		
			Total	Volume	Total	Price	Volume
Private Consumer Expenditure ...	7995	8863	868	168	10¾	8½	2
Public Net Current Expenditure ...	2975	3226	251	-30	8½	9½	-1
Gross Domestic Fixed Capital Formation	3077	3143	66	-122	2	6½	-4
Exports of Goods and Services (X) ...	7653	8953	1300	780	17	6¼	10¼
Physical Changes in Stocks ...	146	130	-16	-12			
Final Demand ...	21846	24315	2469	784	11¼	7½	3½
less: Imports of Goods and Services (M) ...	7907	8878	971	475	12¼	6	6
GDP at market prices ...	13939	15437	1498	309	10¾	8¼	2¼
less: Net Factor Payments (F) ...	720	799	79	36	11	6	5
GNP at market prices ...	13219	14638	1419	273	10¾	8½	2

**B: Gross National Product by Origin**

	1983 £m	1984 £m	Change in 1984	
			£m	%
Agriculture, Forestry, Fishing ...	1169	1216	47	4
Non-Agricultural: Wages etc. ...	7983	8743	760	9½
Other ...	1594	1784	190	12
less: Net Factor Payments ...	720	799	79	11
National Income ...	10026	10944	918	9¼
Depreciation ...	1311	1508	197	15
GNP at factor cost ...	11337	12452	1115	9¾
Taxes less subsidies ...	1882	2186	304	16¼
GNP at market prices ...	13219	14638	1419	10¾

**C: Balance of Payments on Current Account**

	1983 £m	1984 £m	Change in 1984
			£m
X - M ...	-254	75	+ 329
F ...	-720	-799	-79
Net Transfers ...	610	670	+ 60
Balance on Current Account ...	-364	-54	+ 310



## COMMENTARY

### *The International Economy — Introduction*

The pace of the world recovery exceeded expectations in 1983, and forecasts of growth in 1984 have also been revised very slightly upwards. The main development since the November *Commentary* is, perhaps, the increase in confidence that the recovery will not peter out quickly.

The shape of the recovery has not changed markedly. Growth remains low for this stage of the business cycle in many countries, and in 1984, as in 1983, it will be concentrated in North America and Japan. Unemployment is expected to rise in Europe, but to remain at its 1983 level for the OECD as a whole, because of employment gains in the faster growing countries.

### *Developments and Prospects*

Estimates of economic growth in 1983 were revised upwards for five of the seven major OECD countries. Forecast growth for 1984 has also been revised upwards by small amounts since the last *Commentary* for five of these countries. The recovery in Europe still seems likely to be modest, both by historical standards and by comparison with Japan and North America. Growth in the Western European economies is forecast to increase from 1 per cent in 1983 to 1½ per cent in 1984, with few countries exceeding a 2 per cent growth rate. By contrast growth rates in Japan and North America look set to increase from 3-3½ per cent to 4-5 per cent.

There were fears that an end to the sharp declines in savings rates, to historically low levels, in the US and the UK might weaken demand considerably. Consumption demand is expected to decelerate in the UK, but in the US increases in employment are expected to replace tax cuts and a falling savings ratio as stimuli to rapid consumption growth. Private non-residential investment picked up more quickly than expected there, and is also forecast to grow strongly in 1984, more than compensating for the slowdown in residential investment. A more modest pick up in investment demand is expected in the UK, where growth in exports following improvements in competitiveness and continuing market growth is predicted to contribute significantly to the increase in GDP. Export growth is also expected to be important for France, where domestic demand may fall, and Germany, where fast growth in residential investment, and somewhat slower growth in non-residential investment, are expected to make similar contributions to GNP growth.

Western European growth in 1984 is, in sum, highly dependent on the spillover effects of US expansion. Only in the US are rapid consumption growth based on increases in employment, and a strong rise in private non-residential investment, expected to provide the major stimulus to greater economic activity.

**TABLE 1: Short-term International Outlook**

Country	GNP/GDP % Change		Consumer Prices % Change		Hourly Earnings % Change		Unemployment Rate		Budget Deficit as % of GNP/GDP		Current Account Balance as % of GNP/GDP	
	1983	1984	1983	1984	1983	1984	1983	1984	1983	1984	1983	1984
United States	3½	5	4	5¼	4	5½	9½	8	3¼	3¼	-1¼	-2¼
Canada	3	5	6	5½	6¾	5¼	12	11	5¾	5	¾	¼
Japan	3	4	1½	1½	4½	4½	2¾	2¾	3½	2½	2	2½
West Germany	1¼	2	3	3¼	2¾	3¼	8½	9¼	3	2	¾	¾
France	½	0	9¼	7¼	11	8	8¼	9¼	3½	3¾	-1	¼
UK	2½	2¼	6	6	7½	6½	11½	11½	2¾	2¼	½	¼
Italy	-1½	2	14¾	12	14½	13½	10	10½	12	12½	½	¼
Belgium	0	1¼	7¾	6½	4	6½	14¾	15	12	11¼	-1¼	-¼
Denmark	1¾	¾	6¾	5¾	8½	5½	10¾	11¼	8¼	7½	-1¾	-¾
Netherlands	1	1¼	2¾	3¼	3¾	1	13¾	16	8	8¼	3½	5
Sweden	1¾	2¼	10½	5¾	10	7	3½	3¼	6¾	n.a.	-¾	-¼
Total (OECD)	2¼	3½	5½	5½	6	6	9	9	4¼	n.a.	-¼	-½

Sources: OECD *Economic Outlook* December 1983, NIESR *National Institute Economic Review* November 1983, London Business School Centre for Economic Forecasting *Economic Outlook* October 1983.

Differences in the stance of fiscal policy partly explain the divergence between North American and European growth prospects. In Western Europe, contractionary policies are the order of the day, with discretionary efforts to reduce budget deficits being partially or wholly offset by automatic increases, due, for example, to higher unemployment. Since growth rates will be higher in 1984 than in 1983 for most countries, those offsetting automatic increases in the deficit will tend to be reduced. More reductions in actual deficits can be expected, given that this is still the aim of many governments.

North American policies provide a strong contrast. The US, in particular, is running a strongly expansionary fiscal policy. Increases in the level of activity have, however, reduced the actual federal budget deficit to an estimated \$180 bn in 1983, despite earlier fears that it might be over \$250 bn. The deficit is expected to remain below \$200 bn in 1984, and to fall slightly as a percentage of GNP. A growing state and local budget surplus is also tending to reduce the actual general government deficit in the US, but fears remain that private investment will be crowded out, because the part of this deficit which will remain even if there is a return to high employment (the "structural deficit") is growing.

Monetary growth is now back on target in the US, after some rebasing and revision of target growth rates during the year to accommodate the recovery and certain financial innovations. Monetary aggregates in other major OECD countries are on or slightly above target. US interest rates look set to continue at high levels, under the influence of high prospective budget deficits and high growth. It should be noted, that in spite of nominal and real interest rates which are high at least by comparison with the 1970s, interest sensitive spending, on consumer durables and housing for example, has been quite buoyant in the US. The outlook for interest rates in other countries, despite some success, notably by Germany, in decoupling from US rates, depends heavily on exchange rate movements, to which we now turn.

The dollar has continued to rise in value as forecasters have advanced more and more reasons as to why it must eventually fall. Foremost among these is the sheer size of projected current account balance of payments deficits. It would require a massive increase in the foreign demand for dollar assets to offset these indefinitely. Nevertheless, the short-term rise in the dollar could continue for some time yet, and neither the timing nor the extent of its eventual decline can be predicted with any confidence. For this reason, the assumption of broadly constant exchange rates is used in this forecast as in most others, although such an assumption does allow for some short-term fluctuations around the prevailing level.

A modest and controlled fall in the value of the dollar during 1984 would not greatly change the international developments already outlined. Such a fall would probably be reflected in a rise in the value of the yen and deutschmark relative to other currencies, and might allow some lowering of interest rates to stimulate activity in those countries sufficiently to offset any loss of exports due to the currency movements. A massive decline in the dollar would have quite different implications, since its direct impact would be to remove much or all of the external stimulus to activity in Europe and Japan, while its indirect effect might be to shake the gradually reviving confidence of consumers and investors. The policy responses of European countries and Japan would then become crucial. However, while such a massive fall remains a possibility it cannot, at present, be regarded as a likelihood in 1984.

Inflation is expected to remain below 6 per cent in the OECD in 1984, with monthly earnings just slightly ahead of this figure. This negligible growth in real earnings reflects the depressed state of labour markets. An overall stabilisation of the unemployment rate is forecast, with increases in Europe offset by decreases in North America. World trade is expected to rise by something over four per cent, with continued rapid growth of US imports being a major factor. Trade in manufactures is expected to grow somewhat faster. The upturn in world activity is expected to lead to a modest rise in non-oil commodity prices, towards more normal levels.

As outlined in the last *Commentary*, the external environment for Ireland has improved in 1983 and is likely to be slightly more favourable during 1984. OECD and UK consumer price inflation are expected to remain constant, and given a constant effective exchange rate this could allow a reduction in Irish inflation. A fall in the value of the dollar, even if offset in trade-weighted terms by other currency movements such as a rise in the deutschmark, would tend to reduce oil and dollar-determined commodity prices, and thus enable a further lowering of inflation.

The likely increase in the growth of world trade may slightly overstate the improvement in Irish export prospects. This is because UK imports, especially of manufactured goods, are expected to grow more slowly in 1984. In addition, supply factors are of great importance to Irish agricultural and industrial exports. The prospects of an increase in new foreign investment are poor because of continuing world over-capacity in most industries, while there is little sign of a reduction in international interest rates which might indirectly stimulate domestic investment. Looking further ahead, the likelihood of the present world recovery being reversed must be faced. It is too early to predict when this might take place, or whether it will take the form of a gradual

petering out of growth or of a sharp downturn. However, it seems probable that the impetus provided by American expansion will either weaken or cease in 1985. Whether this signals the end of the international economic recovery will depend largely on the policy stance then being taken by the other major OECD countries. If this remains deflationary there is a real danger that the downturn could commence in 1985, with inevitable consequences for the long-term prospects of the Irish economy.

#### *The Domestic Economy — General*

Estimates of the out-turn for 1983 will inevitably be changed over the next few months as additional information becomes available. However, it seems unlikely that these changes will substantially alter the general picture of somewhat patchy economic progress. Thus, while the outline of 1983 presented in this *Commentary* might have to be amended in detail, it should, nevertheless, be sound enough in general to serve as a suitable foundation for projecting likely developments in 1984.

#### *Exports of Goods and Services*

On the basis of 11 months' trade statistics and preliminary Bord Fáilte estimates of tourism, it is clear that 1983 was an exceptionally good year for total export earnings. Virtually all categories of exports increased in value terms, reflecting in part the improved international trading climate. The really large increases in export volume were achieved in the electronic, chemical and non-manufacturing industrial sectors, where new capacity was the predominant factor.

Table 2 summarises the export performance in 1983 and presents a projection of exports for 1984. A considerable proportion of the increase in merchandise exports forecast for 1984 is accounted for by carryover, in the sense that if exports remained at their seasonally adjusted November 1983 level throughout 1984 the annual total would be 14 per cent higher in value than in 1983. Thus, the further increase projected during 1984 is relatively modest, especially in the likely context of favourable international conditions. Such caution seems advisable as it is possible that supply developments will be less dramatic than in 1983, but the possibility should be borne in mind that actual performance could prove considerably stronger than forecast here.

**TABLE 2: Exports of Goods and Services**

	1982		% Change		1983		% Change		1984
	£m	Volume	Value	Value	£m	Volume	Value	Value	£m
Agricultural	1327	5	11		1475	4	7		1578
Manufactured	3485	13	24		4325	12½	20		5187
Other Industrial	810	19	28		1037	16	24		1286
Other	68	-9	0		68	0	8		73
Total	5690	11¾	21½		6905	11	17¾		8124
Adjustments	-99	10	21		-120	9	17½		-141
Merchandise Exports	5591	11¾	21¼		6785	11	17¾		7983
Tourism	470	1	11¼		523	3	11¾		584
Other Current Receipts	312	0	10½		345	3	11¾		386
Exports of Goods and Services	6373	10¼	20		7653	10¼	17		8953

Similarly, in the case of tourism, where 1983 now seems likely to have shown a small volume rise, the prospects for 1984 look promising. Continued income growth in the USA, allied to a strong dollar, should boost transatlantic visits, while economic recovery in Europe and a lifting of French travel restrictions should increase tourism from Europe. In the light of these factors, the forecast rise of 3 per cent in the volume of tourism seems realistic, and is more likely to be an underestimate than an overestimate.

### *Investment*

Statistics relating to cement sales and housing suggest that the decline in building during 1983, while severe, was not quite as steep as seemed likely earlier in the year. With regard to investment in plant and equipment it is difficult to monitor trends due to uncertainties concerning the classification of imported capital goods. In view of known shortfalls in the public capital expenditure on certain types of equipment it seems probable that the fall in this type of investment was roughly in line with the fall in building activity.

For 1984, it is assumed on the evidence of the preliminary public capital programme and what is known of the mood of industrialists that there will be a further decline in the volume of capital formation as measured on an annual basis. Given the extent of the fall in the course of 1983, this in turn implies little change on the level of investment in the second half of 1983, with perhaps a slight upturn in some sectors, such as private house-building.

Table 3 summarises the forecast, which is based on the assumption that in 1984, unlike most recent years, projected public capital expenditure will match the level set out in the public capital programme.

**TABLE 3: Gross Fixed Capital Formation**

	1982			1983			1984
	£m	Volume	Value	£m	Volume	Value	£m
Building and Construction	1724	-8½	-3	1673	-3	3	1725
Machinery and Equipment	1453	-9	-3½	1404	-5	1	1418
Total	3177	-8¾	-3¼	3077	-4	2	3143

### *Stocks*

The second half of 1983 would appear to have seen some changes in the trends of stock-building. Exports of cattle and beef, together with the amount of beef put into intervention, suggests that the rise in the number of livestock on farms was considerably less than was previously assumed. Conversely intervention stocks, particularly of dairy produce grew much more rapidly, influenced partly by favourable weather conditions which maintained the supply of milk and partly by continuing difficulties in disposing of milk products from intervention. Thus, the increase in intervention stocks during the year amounted to almost £200 million.

Perhaps of even more significance, because it could be a signal of an economic turning point, is the evidence of the import statistics that the running down of non-agricultural stocks ceased in the second half of 1983 and was replaced by modest stock-building.

**TABLE 4: Stock Changes**

	1982 £m	Change in Rate £m	1983 £m	Change in Rate £m	1984 £m
Livestock on Farms	+ 13	- 5	+ 8	- 8	0
Irish Intervention Stocks	+ 116	+ 82	+ 198	- 98	+ 100
Other Non-ag. Stocks	- 135	+ 75	- 60	+ 90	+ 30
Total	- 6	+ 152	+ 146	- 16	+ 130

As Table 4 shows, the expectation is that non-agricultural stocks will continue to grow in 1984, as industrial output continues to expand and as some revival takes place in domestic consumption. Little change is expected in livestock numbers, although the possibility should be faced that there could be a reduction in the dairy herd in response to uncertainty and poor milk prices. Movements in intervention stocks are almost impossible to predict at this time of year. In Table 4, it is assumed that the financial imperative for the EEC to limit the cost of its intervention programme will lead to a slowing down in the rate of increase in Irish intervention stocks, but that it will not prove feasible to prevent such growth altogether.

#### *Current Public Spending*

Exchequer returns suggest that on a national accounts basis the value of current public expenditure on goods and services in 1983 was marginally below previous expectations. This seems to have been due to the price deflator being rather lower than expected, thus allowing a very small rise in the volume of expenditure. For 1984, it is assumed that there will be only marginal alterations to the official Estimates already published, expect that pay rises, and thus the deflator, will be higher than allowed for in the Estimates. Thus, a fall of 1 per cent in the volume of public spending on goods and services would be compatible with a rise of about 8½ per cent in value.

#### *Incomes*

Compared with the previous *Quarterly Economic Commentary*, forecasts of total incomes in both 1983 and 1984 have been revised very slightly upwards. In agriculture, An Foras Talúntais estimates farmers' incomes as having risen by about 11 per cent in 1983, which, when allowance is made for agricultural wages and for forestry and fishing, converts to an increase of about 10½ per cent for agricultural incomes as defined in the *Commentary*. No significant change has been made to the forecast for non-agricultural wages and salaries, as it is assumed that the bulk of the earnings from the higher than expected industrial exports has accrued to corporate profits.

For 1984 it is assumed that agricultural incomes will see only a very small increase, as whatever policy mix finally emerges from Brussels is bound to be inimical to Irish dairy farmers. With regard to non-agricultural wages and salaries it is still assumed that the depressed state of the labour market will ensure another year of moderate pay settlements whether or not there is any form of national agreement. The specific assumption made is that private sector settlements will average 5 per cent or less for the phase which falls within 1984. Depending on the timing of agreements and allied to the carryover from

1983 this could lead to an increase of about 9 per cent in average basic pay and just over 10 per cent in average earnings on an annual basis.

In the public sector, the carryover from the previous agreement is higher than in most private sector employment, but it is assumed that any 1984 settlement will be lower than in the private sector and perhaps somewhat delayed. Allowing for salary scale drift and special cases, average earnings in the public sector could rise by almost 10 per cent in 1984.

With regard to employment, it seems likely on the evidence of the Estimates that public sector employment could be about one per cent lower in 1984 than in 1983. Private sector employment is more problematical, in that the high growth export sectors are not heavy employers and that the employment intensive sectors such as building and traditional industries are likely to be slow to recover. However, it seems reasonable to expect total private sector employment to stabilise early in 1984, and perhaps to show marginal growth later in the year. This could leave average private sector employment about ½ per cent below 1983. On these assumptions, total wages and salaries would be about 9½ per cent higher in 1984 than in 1983.

Because of the steep rise in the average level of unemployment, and also because of the carryover from 1982 of large increases in benefit rates, transfer incomes rose very sharply in 1983. With a lower annual increase in unemployment projected, and on the assumption that benefit rates will be increased only barely in line with inflation, a more modest growth in transfer incomes is forecast for 1984.

#### *Disposable Income and Consumption*

Table 5 sets out the forecasts for personal incomes discussed above, showing that the rise in nominal terms will be lower in 1984 than in 1983. When inflation is allowed for the position is reversed, in that virtual stagnation in real personal income in 1983 is replaced by an increase of about 1 per cent in 1984.

**TABLE 5: Personal Income and Expenditure**

	1982		Change		1983		Change		1984
	£m	%	£m	%	£m	%	£m	%	£m
Agriculture etc.	1,057	10½	112		1,169	4	47		1,216
Non-Agricultural Wages and Salaries	7,270	9¾	713		7,983	9½	760		8,743
Other Non-Agricultural Income	1,367	8¾	112		1,479	10	148		1,627
Total Income Received	9,694	9¾	937		10,631	9	955		11,586
Current Transfers	2,211	14½	319		2,530	11¾	295		2,825
Gross Personal Income	11,905	10½	1,256		13,161	9½	1,250		14,411
Direct Personal Taxes	2,280	17	390		2,670	12¾	342		3,012
Personal Disposable Income	9,625	9	866		10,491	8¾	908		11,399
Consumption	7,490	6¾	505		7,995	10¾	868		8,863
Personal Savings	2,135	17	361		2,496	1½	40		2,536
Savings Ratio	22.2%				23.8%				22.2%

In attempting to predict consumption levels, total personal incomes are a poor guide, as they make no allowance for the proportion of income removed in direct taxation. In 1983, for example, the large increase in effective rates of direct taxation had the effect of reducing real disposable income by about 1½

per cent. The amount of direct taxation in 1984 will obviously depend on the budget, but account also has to be taken of likely changes in revenue received from existing tax levels. Table 5 is based on the assumption that there will be a considerable lagged effect in 1984 from the increases in effective tax rates in 1983. It also assumes almost complete indexation of income tax thresholds and bands. In total, the increase in direct taxation should be reduced from about 17 per cent in 1983 to under 13 per cent in 1984.

On these assumptions, personal disposable income in 1984 would rise by fractionally more than consumer prices. A rise of about  $\frac{1}{4}$  per cent in real disposable income would not, on its own, lead to any worthwhile recovery in consumer spending. However, the change in direction of disposable income, allied to changes in the composition of personal income, likely developments in the replacement cycle for consumer durables and improved economic confidence, are likely to increase the willingness to spend income rather than to save it. Such a fall in the savings ratio has been a major element in the economic recovery in both the USA and the UK, and its extension to Ireland in 1984 seems a reasonable expectation. In constructing Table 5 it is assumed that the savings ratio will fall by about  $1\frac{1}{2}$  per cent, which would return it to its 1982 level of 22.2 per cent, itself a relatively high figure by historical standards.

Such a development would allow personal consumption to grow by about 2 per cent in volume terms in 1984, compared with a fall of over 3 per cent in 1983. In calculating 1983 consumption a small allowance has been made for the increase in cross-border purchases, while it is assumed that these will continue at a similar level in 1984.

#### *Imports of Goods and Services*

The forecasts made for the different components of expenditure indicate that in 1983 Final Demand rose by about  $1\frac{1}{2}$  per cent in volume and nearly 11 per cent in value. Import statistics for the 11 months to November show that merchandise imports rose in response by about  $8\frac{1}{2}$  per cent in value, and probably by about  $2\frac{1}{2}$  per cent in volume. Among imported services, overseas tourism is thought to have declined considerably, but if shopping trips to Northern Ireland are classified as a form of tourist expenditure then the picture changes substantially. By its nature, the value of such traffic is difficult to assess, and it is not yet known how official statisticians intend to deal with the problem. For the purpose of this *Commentary* an arbitrary figure of £30 million has been assumed, over and above the normal annual level of spending in Northern Ireland, and has been added to both tourist imports and to personal consumption.

In 1984, Final Demand is forecast to rise by  $3\frac{1}{2}$  per cent in volume and over 11 per cent in value. Given the economy's high propensity to import during any phase of expansion, such a growth in Final Demand would induce an increase of about 6 per cent in the volume of imports of goods and services. Assuming that there is no major shift in the trade-weighted exchange rate, but that some commodity prices will continue to rise, this would leave the value of imports rising at over 12 per cent for 1984. Table 6 breaks down the import forecasts into their functional components, showing that the major increases in both



years are expected to be in goods for further production. There is some complication in the classification, as there is an obvious difficulty in assigning electronic goods between capital and intermediate categories, and it seems probable that for 1983 the official breakdown into use-categories overstates the former at the expense of the latter.

It is worth noting, that the further improvement forecast in the balance of payments deficit reflects not only a strong export performance but also continuing weakness in imports of capital goods, and, to a lesser extent, consumer goods. If there were to be a major recovery in the domestic economy, the balance of payments could quickly re-emerge as an important constraint on expansion.

**TABLE 6: Imports of Goods and Services**

	1982			1983			1984 £m
	£m	% Volume	% Change Value	£m	% Volume	% Change Value	
Capital Goods	943	-6	-1	933	-4	1½	947
Consumer Goods	1,786	-½	5	1,875	3	9	2,044
Intermediate Goods:							
Agriculture	328	8	16½	382	0	5½	403
Other	3,742	6½	12	4,187	10¾	17	4,898
Other	13	-31	-23	10	0	5½	11
Total Goods	6,812	2¾	8½	7,387	6¼	12½	8,303
Adjustments	-126	5½	11	-140	6	11	-155
Merchandise Imports	6,686	2¾	8½	7,247	6½	12½	8,148
Tourism	380	2	13	430	2	10½	476
Other Services	214	-2½	7½	230	2	10½	254
Imports of Goods and Services	7,280	2½	8½	7,907	6	12¼	8,878

### *Gross National Product*

With the continuation of export growth in the Autumn, it now seems likely that there was a small increase in real Gross National Product in 1983, perhaps of the order of ½ per cent. Sectorally, manufacturing industry accounted for most of this rise, with industrial production for the year likely to have increased by over 5 per cent.

In 1984 Gross National Product is forecast to increase by 2 per cent in volume terms. Again, the main contribution is expected to come from industry, although there could also be a modest rise in private sector services while the contraction of building and construction should be less serious than in 1983.

### *Employment and Unemployment*

Compatible with these forecasts of output would be a fall of about 1½ per cent or 18,000 in average employment in 1983, followed by just over ½ per cent or 6,000 in 1984. Such a fall in 1984 would be entirely a carryover from the reduction during 1983, so that employment is expected to stabilise from now on.

Unemployment rose sharply in the first quarter of 1983, but in the remainder of the year the rate of increase was about half that suffered in the previous 12 months. Constant employment would imply unemployment increasing at about the rate of growth of the labour force, or about 18,000 per

year. Thus, unemployment next Winter could be over 220,000, with the annual average level of the Live Register being between 210,000 and 215,000.

The growth in the labour force is, itself, not a fixed amount. As well as the highly predictable movement of cohorts into and out of working age categories, it is influenced also by changes in the participation rate and by changes in migration patterns. Thus, the relationship between movements in employment and unemployment is far from exact. In particular, if net emigration has been increasing, the employment picture for 1983 might be even less favourable than would appear purely from the trend in the Live Register. Conversely, if employment really does stabilise in 1984 an increase in emigration could limit the rise in the Live Register.

### *Prices*

The rise in the consumer price index in 1983 was just under 10½ per cent. In some ways, this was a disappointing outcome as the annual rate fell to under 10 per cent in May, but thereafter tended to rise, largely as a result of exchange rate movements. For 1984, there are likely to be conflicting influences on consumer prices. Exerting an upward influence will be the strength of the dollar, which has not yet fully worked through to consumer prices, and rising commodity prices as the world economic recovery continues. On the other hand, the likelihood of very low EEC farm price increases should limit the rise in domestic food prices, while a further reduction in the level of pay settlements should contain the effect on prices of domestic costs. Assuming that the Budget is largely neutral with regard to indirect tax rates and subsidies, it seems that the balance of these influences should result in a reduction of the inflation rate. An annual average increase of 8½ per cent in the consumer price index seems a reasonable expectation, with the annual rate to November 1984 falling to about 7½ per cent.

### *Public Finances*

Discussion of the public finances in 1983 and 1984 is complicated by the change in the status of the Post Office. On the old basis of including the Post Office in the direct government sector, the current budget deficit in 1983 was £960 million, which was very close to the official mid-year estimate of £950. However, on the new basis of excluding post and telecommunications, the 1983 deficit is calculated at £1,085 million. Similarly, the Exchequer borrowing requirement for 1983 changes from £1,756 under the old system to £1,853 under the new.

Whichever measure is adopted, analysis of the public finances in 1983 shows that, within the context of the anticipated budget deficit, both revenue and current expenditure were significantly below the official mid-summer estimates. The most important shortfalls on the revenue side concerned excise duties and income tax receipts. In order to take a view on revenue prospects for 1984 it is necessary to reach some conclusion on the reasons for these shortfalls, and also on the reasons for the higher than anticipated VAT receipts.

With regard to excise duties the explanation would appear to lie in a combination of the pattern of expenditure, with car sales in particular remaining very low, and the diversion of some trade, especially in spirits and

petrol, north of the border. It seems unlikely that delays in tax payments would be of any importance in this field.

For VAT receipts on the other hand, changes in lag structures were probably the main cause of the extra revenue. Given that the cross-border trade should have depressed VAT in the same way as excise duty, the only realistic explanation of the unexpectedly good figures is that a sizeable proportion of the revenue represented a lagged effect of the introduction of point of entry charging in 1982. It is worth recalling that VAT returns in 1982 were regarded as disappointing.

This has some relevance in considering the behaviour of income tax receipts in 1983. With the large increase in effective tax rates resulting from the decision not to index the tax bands in the 1983 Budget, a considerably higher rise than actually took place could have been expected in tax receipts. For the self-employed, this increase should take place in 1984 when taxes are paid on 1983 incomes. For PAYE taxpayers, the opportunity to delay payments should not exist, but it is hard to avoid the suspicion that there may have been some increase in the lag before increased taxes actually reach the Exchequer. Similar considerations arise even more strongly in relation to income levies and the residential property tax.

Thus, in looking to 1984, it seems reasonable to expect excise duties to benefit from some recovery in car sales and from a diminution in the rate of growth of cross-border purchases. VAT, on the other hand, will suffer from the loss of the 1982 backlog, although there is still a considerable carryover to be obtained from the increase in VAT rates during 1983. The large uncertainty concerns income tax, where it is possible to advance arguments either in favour of projecting forward the disappointing 1983 returns or for the opposite course of expecting some additional buoyancy from the unwinding of delayed payments. The balance of probability seems to favour the latter course, albeit cautiously.

On these assumptions and assuming indexation of both income tax bands and specific duties, total tax revenue in 1984 could amount to almost £5,300 million. With non-tax revenue, excluding P.O. receipts, likely to see little change, total revenue could be of the order of £5,875 million in 1984.

On the evidence of the Estimates, adjusted slightly downwards in the light of the actual expenditure out-turn for 1983 but allowing for a slightly higher Social Welfare expenditure as benefit rates are increased, total current expenditure could be about £6,950 million. Thus, the current budget deficit assumed in this forecast is £1,075 million, about the same in nominal terms as in 1983, but representing a reduction from 8.2 to 7.3 per cent of GNP on the new "ex-Post-Office" definition. This is a smaller reduction than was assumed in the previous *Quarterly Economic Commentary*, partly because it is based on the technical assumption of a "passive" budget, rather than on the "most likely" assumption adopted in the previous forecast, and partly because on the evidence of recent government statements the "most likely" policy aim has itself moved in the direction of seeking a smaller cut in the deficit.

#### *General Synthesis*

Although the magnitude of the world economic recovery remains broadly in line with that assumed in the previous *Commentary*, it now appears to be more

firmly based and greater confidence can be placed on its continuation in 1984. Against this mildly favourable background, Irish exports continued to expand rapidly in the second half of 1983, while the decline in both fixed capital investment and non-agricultural stock levels now appear to have been somewhat less acute than previously expected. Thus, the economic turnaround in 1983 was quite pronounced, with major improvements in the balance of payments and industrial production, a substantial fall in the rate of inflation, a marked slowing down in the rise in unemployment, and a reduction of the current budget deficit as a proportion of Gross National Product. However, while some progress appears to have been made with regard to every important economic variable, it remained inadequate in the case of unemployment, the public finances, and retail prices.

It seems probable that there should be a continuation of these favourable trends in 1984, but that progress on the employment, prices and public finance problems will still be very slow. One difficulty, which has perhaps not been sufficiently appreciated, is that the fast growing sectors of electronics and chemicals have low linkages with the rest of the economy. Thus, expansion in exports from these sectors, while very welcome in pushing back the balance of payments constraint, does not automatically induce much further growth. The employment content is small in relation to the value of output, while tax receipts are limited by the low rate of taxation on profits, and by the fact that there are relatively few employees to pay income tax. Thus, much of the value added by these industries must accrue as corporate profits, and the vital question is how far such funds will be re-invested in Ireland and how far they will be repatriated to the companies' country of origin. So far, there is little evidence on this point, but it can be hoped that the returns over the past twelve months have been sufficiently good to encourage a high rate of re-investment. If this is so, then the prospects for the second half of 1984 could be better than assumed in the forecast, and the outlook for 1985 could be significantly enhanced.

#### *Policy Implications*

The forecast for 1984 is mildly encouraging, in that it indicates the likelihood of some growth in the economy. However, it offers little hope of reversing the rise in unemployment and implies little amelioration in the condition of the public finances. Neither of these outcomes can be regarded as satisfactory, but policy initiatives designed to redress either problem are likely to make the other worse in the short term.

Taking a longer perspective, it is probably more important to check the rise in overseas indebtedness, as the service of this debt is a permanent drain on the economy. While no optimum figure can be placed on the desired reduction in current borrowing, it should certainly be reduced from its current level, provided that this can be done without disrupting the public confidence needed to sustain the recovery in 1984. If the fears that the international environment might deteriorate in 1985 are well grounded, then the need to make perceptible progress in reducing the deficit in 1984 is all the stronger.

The balance of advantage would thus seem to lie in reducing the anticipated budget deficit by perhaps some £50 million, while hoping that the underlying forecast is itself unduly cautious, so that revenue buoyancy will be greater than

assumed. Any attempt to take much more than this out of the economy in the form of a reduced deficit could run the risk of damaging economic confidence and choking off the recovery. Conversely, to aim deliberately for an increased deficit would be a short-term expedient which would be inappropriate to the stage of the economic cycle, and which could intensify the long-term problems of both the public finances and unemployment.

## THE NAAS MOTORWAY BYPASS — A COST BENEFIT ANALYSIS

Sean D. Barrett and David Mooney\*

### *Abstract*

The paper examines the Naas Motorway Bypass which cost £16m at 1983 prices. Twelve thousand vehicles a day using the bypass save over 10 minutes between 8 am and 8 pm and 6 minutes at other times. Five thousand vehicles a day using the present route through Naas also benefit by saving 4 minutes due to reduced congestion in the town. In addition to time savings, the bypass reduces accidents and fuel costs. Ninety-one per cent of the benefits accrue in time savings. The internal rate of return on the project is estimated at 20.51 per cent, assuming 2 per cent annual traffic and income growth. The sensitivity tests of the results show that even with zero growth in incomes and traffic for twenty years, a high proportion of leisure time savings with zero value and no increase in the value of fuel savings the project would have an internal rate of return which meets the test discount rate used by the Department of Finance.

The environmental aspects of the bypass are positive in terms of noise and smoke and lead pollution reduction. The impact on farm severance and natural amenities on the motorway route has been mitigated by several design features of the bypass.

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### *Introduction*

The Road Development Plan for the 1980s proposed the expenditure of £1,072m (at 1978 prices) on the Irish road system over this decade. In 1983, major improvements to roads cost £48m. The total cost of improvements in respect of works in progress in 1983 was £268m according to the Department of Finance report on Comprehensive Public Expenditure Programmes.

The low rate of return on investment in the Public Capital Programme has been adversely commented upon by economists. In this paper we apply cost benefit analysis to a major project in an important area of public investment.

### *The Project*

The Naas Motorway Bypass cost £16m at 1983 prices. This includes the construction of the motorway, four public road bridges and approach roads, two interchanges, an accommodation bridge for farmers, an underpass and a bridge over the town branch of the Grand Canal.

Naas is the junction point of the national primary routes N7 (Cork/Limerick) and N9 (Waterford). The Naas Motorway Bypass will remove from the town through traffic on the N7. The bypass route lies to the west of the town.

### *The Benefits from Highway Investments*

Studies of highway investments have quantified three main benefits: time savings, accident reduction, and vehicle cost savings. Shadow prices are imputed for these and projections are made of their values over the life of the project. The internal rate of return on the project is the rate which equates the present values of the streams of benefits and costs. This can then be compared with the test discount rate set by the Government for public sector projects.

In Britain, the computer programme COBA is used in the above way to evaluate trunk road investments. Following criticisms from environmental groups the Advisory Committee on Trunk Road Assessment was established in 1976 to comment on COBA "taking account both of economic and environmental factors". The committee's report, known as the Leitch Report, proposed the addition of environmental impact statements to give a wider view of a project in addition to the items quantified in COBA. Several environmental studies of the Naas bypass were prepared. These are reviewed later in this paper.

### *Valuing Time and Accident Cost Savings*

Time savings allow further activities to be engaged in. When working time is saved, more goods and services can be produced with the labour released. These savings are valued at the cost to the employer of hiring labour. Employers are assumed to hire labour until it is known the cost of doing so equals the marginal revenue product of the employee.

The wage cost as an indicator of the value of working time has been shown by Harrison and Quarmby (1969) to be subject to a number of qualifications. It ignores labour market imperfections, the possibility that road-using enterprises may not be able to convert time savings into resource savings, resources may not have alternative uses, and that in some cases travel time may be used productively.

The haulage market is, however, competitive since firms may substitute own vehicles for hired haulage. Fleischer (1962) and Hanning and McFarland (1963) found that firms were able, after adjustments to schedules, to attain the full benefits from highway improvements by economising on fleet and labour costs.

Monopolistic power in labour markets is limited for the groups which account for the bulk of working time travel. These groups include professional drivers, salesmen, commercial travellers, travelling sales engineers and mechanics. While some travel time on other modes may be used for productive purposes this is unlikely to apply to road travel.

The case for valuing leisure and work time at the same rate is that the traveller is indifferent between work and leisure. Where the disutility attached to work is greater than to travel, leisure time savings are valued at less than the wage rate. If, for example, the disutility attached to travel is half that attached to work, leisure time savings would be valued at half work time savings.

Empirical studies in Britain indicate that the value of non-working time is approximately 25 per cent of working time values. These studies are based on modal choices where the respondents choose between faster expensive modes thus trading off time against other costs. Barrett (1982) contains a summary of some of these studies.

In this paper we follow the British practice in regard to both work and leisure time savings. However, we test the impact of changing these shadow prices on the rate of return on the project in a number of sensitivity tests.

#### *Accident Costs*

The cost of injuries is estimated from hospital and other medical data and from the loss of output while the patient is undergoing treatment. In the case of fatalities we cannot establish the accident cost to the victim. This is the loss of utility from being alive. The four measures of loss which have been used are, therefore, imperfect.

The gross output approach measures the discounted value of the expected future earnings of the victim. The net output approach deducts from this consumption. The shadow price approach derives an implicit value of life where deaths are increased or decreased by public policy. The insurance method seeks to measure the value a person sets on his life from the sum for which he is insured and the probability of his being killed in a particular activity.

The output measures are based on Gross National Product as the sole criterion for economic performance. It does not include factors such as grief, suffering, and loss of utility from being alive. The shadow price approach may yield vastly differing estimates of the value of life derived from different programmes. The insurance method measures the victim's concern for his family and dependants.

The fatal accident costs used in the paper are taken from COBA. They are based on the loss of output of the victim with consumption included as part of the loss of utility from loss of life for the victim. An allowance is also made to cover the costs of pain, grief, and suffering. Society devotes resources to the saving of life and the avoidance of injury, even though such expenditure cannot be justified on the basis of lost output from the victims.



In this paper we estimate that the bypass will reduce accidents but the accident savings will be relatively small in relation to the total benefits from the project.

Two earlier studies evaluated road investments in the area of the Naas bypass. O'Keefe (1962) estimated that the time savings, accident cost reductions, and vehicle cost reductions for the Naas dual carriageway yielded a benefit-cost ratio of 1.02 with an annual average daily traffic of 6,000 vehicles. Traffic now exceeds 26,000 vehicles. Feeney (1976) estimated that either a roundabout or a flyover at the junction of the Naas bypass and the north access road to the town would return benefits in excess of costs.

#### *The Present Pattern of Traffic through Naas*

Table 1 shows the 1982 traffic pattern on the national primary routes through Naas. Seventy-one per cent of traffic moves between 08.00 and 20.00 hours. The busiest hour is from 18.00 but traffic is heavy from 10.00 to 20.00 hours.

**TABLE 1: Estimated Traffic Pattern at Naas in 1982**

Hour from:	Share of Flow (%)
08.00	2.7
09.00	4.2
10.00	5.5
11.00	6.8
12.00	6.1
13.00	5.5
14.00	5.1
15.00	7.1
16.00	6.2
17.00	6.8
18.00	8.0
19.00	6.9
Total of above	71.0
20.00—08.00	29.0
	100.0

Source: McCarthy and Partners; Naas Traffic Study for 1000 hours to 1900 hours. Kildare County Council for other hours.

**TABLE 2: Estimated Traffic Times by Hour of Day without Bypass**

Hour	Journey Time (minutes)	Share of daily traffic
10.00 - 11.00	11.00	5.5
11.00 - 11.30	12.75	6.8
14.00 - 15.00	14.75	5.1
16.00 - 16.30	13.50	3.1
16.30 - 17.00	17.00	3.1
17.00 - 17.30	24.50	6.8
17.30 - 18.00	15.00	8.0
18.30 - 19.00	11.50	6.0
Weighted average	15.08	45.30

Source: McCarthy and Partners, Naas Traffic Study, 1971. (Based on 41 observations.)

In estimating the average speed of traffic during the period 08.00 to 20.00 hours we have 41 estimates of journey times from Monread, at the Dublin end of the bypass, to Ladytown which is one mile from the southern end of the

bypass. We assume that the latter section is travelled at 40 mph. The times shown in Table 2 for travel on the route to be bypassed are the sum of observed times for the town section and 1.5 minutes for the remaining mile to the motorway.

The weighted average of the journey times in Table 2 is 15.08 minutes. We assume that this time is representative of all travel between 08.00 and 20.00 and use this in calculating the time savings in Table 3. We refer to this as peak traffic and to the remainder as off-peak traffic.

On the N7 route it is estimated that off-peak journey times are 10.90 minutes. This comprises 40 mph on the southern mile, 30 mph on the 2 miles at the Dublin side of Naas and 20 mph on the 1.8 miles at the centre of Naas.

The average speed assumed on the motorway is 60 mph. This may be conservative as the maximum permitted speed on motorways is 70 mph and there have been pressures to raise this to as high as 85 mph. The bypass design provides stopping sight distance for 75 mph for its entire length.

### *Time Savings*

Nineteen thousand vehicles used the N7 and N9 routes through Naas daily and carried almost 31,000 people. Twelve thousand vehicles use the bypass on the N7 while 5,000 on the N9 benefit from reduced traffic congestion in the centre of Naas, between 08.00 and 20.00.

Traffic through Naas between 08.00 and 20.00 accounts for 71 per cent of the daily total. Table 3 shows that this category has savings of 10.28 minutes on the N7 while the 29 per cent travelling between 20.00 and 08.00 enjoy time savings of 6.1 minutes. In the case of N9 traffic the savings are 4.18 minutes between 8 am and 8 pm. At the off-peak periods, no time savings are assumed for this group.

**TABLE 3: Journey Times through Naas with and without Naas Bypass (minutes)**

	With Bypass	Without Bypass	Saving	Vehicles
N7 08.00 to 20.00	4.80	15.08	10.28	8,520
N7 20.00 to 08.00	4.80	10.90	6.10	3,480
N9 08.00 to 20.00	10.90	15.08	4.18	4,970
N9 20.00 to 08.00	10.90	10.90	0.00	2,930
				19,000

**TABLE 4: Estimated Time Savings from the Naas Bypass, 1983**

Category	Number per day	Time Saved (hours) per day	Value of Time £ per day	Annual Savings from Bypass (£000)
Car driver at work	5,548	630.6	3.362	774.0
Car passenger at work	1,102	125.3	2.196	133.4
Car driver non-work	8,512	967.5	0.725	256.0
Car passenger non-work	7,410	842.3	0.725	223.0
Goods vehicle occupants	6,251	710.5	2.464	639.0
Bus passengers	1,995	226.8	0.725	60.0
Bus driver	133	15.1	2.699	14.9
	30,951	3,518.1		2,100.3

In Table 4, we estimate the number of people travelling in the 19,000 vehicles by category of occupant using the occupancy factors from COBA and the time savings for each group. Just under 31,000 people will save 3,518 hours per day due to the bypass.

We estimate also that the annual value of these time savings in 1983 would have been £2.0m. This is estimated by taking the British values of time savings and reducing them to 56 per cent of the British figure to take account of the income differential in sterling between the two countries. They are then stated in Irish currency at mid-1983 exchange rates.

There are a number of sources of possible understatement of the value of time savings in these estimates. The individual time savings are based on a 1971 traffic survey. The valuation of these time savings is based on the difference between Irish and British incomes per head for the population as a whole rather than income differences per vehicle occupant. Our estimates do not include any benefits for N9 traffic in the off-peak period and local traffic in Naas. Both can be expected to gain from the removal of through traffic by the bypass.

#### *Accident Cost Savings*

Accident data prepared by An Foras Forbartha show that in the thirteen years to 1980 there were seventeen deaths and 143 serious injuries in road accidents in Naas. The population of Naas in 1971 was 7,739 and the highest accident rate for towns of this size was Killarney (population 7,724) which had 20 fatalities and 201 serious injuries while the lowest was Mallow (population 6,609) with three fatalities and 99 serious injuries.

The contribution of the bypass to road safety is the reduction in traffic in the town centre and its transfer to the motorway. Accident rates are lower on motorways than on undivided highways because the central median and flyovers reduce head-on and junction accidents.

#### *Motorway Accidents*

The probability of an accident on British motorways is 0.15 per million vehicle kilometres. There are 0.052 deaths per accident and 0.394 serious injuries per accident. The COBA motorway accident rates are thus 0.0078 deaths and 0.0591 serious injuries per million vehicle kilometres. The bypass is 8 kilometres and with an annual average daily traffic initially of 12,000 vehicles will generate 35.04 million vehicle kilometres of traffic per year with 0.273 deaths and 2.071 serious injuries.

We deduct from this accident figure the accident rate for 12,000 vehicles a day on the existing route. Daily traffic through the Naas section of the N7 grew from 9,165 to 18,918 between 1968 and 1981. The sum of the annual average

**TABLE 5: Estimated Costs per Accident, Ireland, 1983 (£IR)**

Accident	Urban	Rural	Motorway
Fatal	127,977	142,942	150,017
Serious	6,594	12,290	12,897

*Source:* adapted from COBA.

daily traffic figures for the thirteen years was 165,523 vehicles. During this period there were seventeen fatal and 143 serious injury accidents. The same accident rates for an average annual daily traffic volume of 12,000 imply 1.23 fatal and 10.37 serious accidents per year.

In Naas at present rates, 12,000 vehicles a day would cause 1.23 fatal and 10.37 serious injury accidents a year. At the costs per urban accident in Table 5 above this is an annual cost of £225,791. On the motorway route there will be 0.273 fatal and 2.07 serious injury accidents. At the cost per motorway accident in the above table these accidents will cost £67,652. The annual saving from diverting the traffic from Naas to the motorway in lower accidents will therefore be £158,139. While Naas has a relatively good safety record compared to other towns of its size in Ireland, British motorway accident rates imply that the number of accidents will be further reduced on the bypass. The accident rate reduction will more than compensate for the higher average cost per accident on motorways than in urban areas. The higher cost per accident on motorways is due to the greater severity of impact.

#### *Savings in Fuel Consumption*

The third quantified benefit from highway investment in COBA is fuel saving. The bypass substitutes a section of motorway with an average speed of 60 mph at all times for a route comprising three sections which have lower peak and off-peak speeds.

The Appendix gives estimates of the average fuel consumption per vehicle for each section in peak and off-peak periods and shows the average fuel consumption for the pre-bypass route at 2,892 gallons of petrol and 1,596 gallons of diesel per day. The fuel consumption estimates are based on the speeds used in the section on time savings.

The 12,000 vehicles which use the motorway were assumed in the section on time savings to have an average speed of 60 mph. The consumption of these vehicles will be 1,904 gallons of petrol and 974 gallons of diesel per day.

The 7,000 vehicles remaining on the old route to reach the N9 will have average speeds throughout the day now attained only in the off-peak periods. The fuel consumption for the N9 traffic, based on estimates in the Appendix for off-peak consumption, is as follows, cars: 798 gallons, light goods: 118 gallons and diesel: 546 gallons.

**TABLE 6: Total Fuel Consumption per day in Naas with and without Bypass (gallons) and Value of Annual Savings**

	Petrol	Diesel
Without bypass	2,892	1,596
With bypass	2,820	1,520
Savings due to bypass	72	76
Resource cost per gallon (p)	118	131
Annual Saving (£)	31,010	36,339

We must now combine the fuel consumption data on the bypass and for traffic remaining on the N9 and compare this with the current fuel consumption by the through traffic at Naas. This is summarised in Table 6. Fuel

**TABLE 7: Time Stream of Benefits and Costs of Naas Bypass with 20.51 per cent Discount Rate (2% traffic growth and income growth assumed)**

	Time (£'000)	Accident (£'000)	Fuel (£'000)	Total Benefit (£'000)	Costs (£'000)
1983	2100.3	158.1	67.3	2325.7	16012.0
1984	1813.3	136.5	57.0	2006.7	10.0
1985	1565.5	117.8	48.2	1731.6	8.3
1986	1351.6	101.7	40.8	1494.1	6.9
1987	1166.9	87.8	34.5	1289.2	5.7
1988	1007.4	75.8	29.2	1112.5	4.7
1989	869.7	65.5	24.7	960.0	3.9
1990	750.9	56.5	20.9	828.4	3.3
1991	648.3	48.8	17.7	714.8	2.7
1992	559.7	42.1	15.0	616.8	2.2
1993	483.2	36.4	12.7	532.3	1.9
1994	417.2	31.4	10.8	459.3	1.5
1995	360.2	27.1	9.1	396.1	2.6
1996	310.9	23.4	7.7	342.1	2.1
1997	268.5	20.2	6.5	295.2	1.8
1998	231.8	17.4	5.5	254.7	1.5
1999	200.1	15.1	4.7	219.8	1.2
2000	172.8	13.0	4.0	189.7	1.0
2001	149.1	11.2	3.3	163.7	0.8
2002	128.8	9.7	2.8	141.3	0.7
Totals	14556.0	1095.7	422.6	16074.3	16074.7

Note: Year begins: October 1st. Values are at 1983 prices. Fuel prices are assumed fixed in real terms.

**TABLE 8: Sensitivity Test Results on Rate of return on Naas Bypass**

Test	Title	Sensitivity Test Assumptions	Rate of Return (%)
1	Basic	2% traffic growth, 2% income growth, fixed fuel price	20.51
2	Basic + fuel price rise	2% traffic growth, 2% income growth, 2% fuel price growth	20.56
3	Zero value leisure	2% traffic growth, 2% income growth, fixed fuel price, zero value for leisure time	15.06
4	Zero growth 25% leisure	Zero traffic and income growth, 25% rate applied to 83% of cars in valuing time savings	12.75
5	Zero growth Zero leisure	Zero growth in traffic and incomes, Zero value for leisure time savings applied to 83% of cars	6.84
6	High Time	Basic assumptions with time savings increased 25%	25.16
7	Low Time	Basic assumptions with time savings decreased 25%	15.87
8	High Accident Value	Basic assumptions with accident costs increased 25%	20.86
9	Low Accident Value	Basic assumptions with accident costs decreased 25%	20.16

savings are small compared to the total benefits from the bypass. The savings estimated in Table 6 are conservative since they do not take into account the extra consumption of fuel by vehicles accelerating and decelerating in the congested pre-bypass traffic conditions.

### Summary of Costs and Benefits

Table 7 shows that the internal rate of return on the Naas bypass is 20.51 per cent assuming a 2 per cent annual growth in traffic and national income over a 20 year project life. Time savings account for 90.6 per cent of the benefits. Accidents cost savings and fuel savings account for 6.8 per cent and 2.6 per cent of the benefits respectively.

In Table 8 we show the sensitivity of the basic rate of return to changes in the benefits from the bypass. Since time accounts for an estimated 90.6 per cent of the benefits, the internal rate of return is most sensitive to changes in the time values used. The time sensitivity tests are tests 3 to 7 inclusive.

Test 3 attributes zero value to the non-work time savings due to the bypass. Table 4 shows that 58 per cent of those who benefit from the bypass save leisure rather than work time. The basic rate includes these savings at 25 per cent of the work rate. A zero value lowers the return to 15.06 per cent.

Tests 4 and 5 assume zero traffic and income growth. They increase the non-work share of car journeys on the bypass to 83 per cent, an increase of 25 percentage points over Tests 1 to 3 and 6 to 9 inclusive. Test 4 applies the 25 per cent value for leisure time savings while Test 5 uses the zero rate. Tests 6 and 7 increase and decrease the values of time in the basic test by 25 per cent. The rate of return is highly sensitive to these changes.

Tests 8 and 9 change the accident costs by 25 per cent but this makes minimal impact on the rate of return since these savings account for 6.8 per cent of the benefits from the bypass. Fuel savings account for only 2.6 per cent of the benefits. Test 2 shows that an annual rise of 2 per cent in real fuel prices makes minimal difference to the basic rate of return on the bypass.

Taken as a whole the tests show that the project is most sensitive to changes in the value of time. Even the most pessimistic scenario of zero traffic and income growth and zero value of leisure time applied to 83 per cent of cars leaves the project with a 6.84 per cent rate of return. The test discount rate used by the Department of Finance for public investment projects is 5 per cent.

**TABLE 9: Naas Bypass Rates of Return (%) for Various Traffic and Income Growth Rates**

Traffic Growth (%)	Income Growth (%)					
	2	3	4	5	6	7
	Case (a) Leisure Time Valued at 25% of Work Time					
2	20.51	21.70	22.88	24.06	25.25	26.44
3	21.66	22.87	24.06	25.25	26.46	27.66
4	22.83	24.04	25.24	26.45	27.66	28.87
5	23.98	25.21	26.43	27.65	28.87	30.08
6	25.16	26.39	27.62	28.85	30.08	31.31
7	26.32	27.56	28.80	30.04	31.29	32.52
	Case (b) Zero value for Leisure					
2	15.06	16.19	17.32	18.46	19.59	20.72
3	16.16	17.30	18.45	19.59	20.73	21.87
4	17.27	18.42	19.57	20.72	21.87	23.03
5	18.37	19.53	20.70	21.87	23.03	24.19
6	19.47	20.64	21.83	23.00	24.18	26.35
7	20.59	21.77	22.95	24.14	25.32	26.51

In Table 9 we examine the effects of changing the assumptions for income and traffic growth on the rates of return for the basic model and the basic model with zero value of leisure time. These are Tests 1 and 3 of Table 8.

#### *Implications for Road Investment Policy*

The positive rate of return on the Naas bypass suggests that similar projects might be examined for other congested towns on the national primary route network such as Newbridge, Athlone, Ballinasloe, Roscrea, Nenagh, and Arklow, including studies of less expensive inner relief roads such as that at Portlaoise.

The results indicate that in order to cover the annualised cost of the motorway a toll of an average of 50p would have to be charged. Collection cost would absorb about 25 per cent of revenue according to the Road Research Laboratory estimates of the cost of converting the M1 to a tollway.

Table 3 shows that almost 5,000 vehicles using the N9 will benefit from the bypass through reduced traffic congestion in Naas. It will not be possible to recoup in toll revenue any of these benefits from the bypass or from traffic on the N7 which continued to go through Naas, or local Naas town traffic.

The average time saving for N7 traffic is low at 10.28 minutes from 8 am to 8 pm and 6.10 minutes for the rest of the day. Delays at the collection points would negate part of the savings. At off-peak times a toll might divert traffic to the centre of Naas when it is relatively uncongested. The toll might be more expensive to collect due to overtime working. Since over 70 per cent of traffic moves between 8 am and 8 pm there may be a case for having the bypass toll free after 8 pm in Winter and somewhat later at other times.

The value of leisure time used in the study is 72.5p per hour. A 10.28 minute saving is worth only 12p per person or 22p including car passengers. With a toll of 22p, business travellers will enjoy a substantial consumer surplus from the bypass. Setting the toll high enough to recoup some of this consumer surplus would divert the leisure traffic back to Naas centre.

Road transport, on average, covers its road infrastructure costs. Feeney (1983) estimates that all classes of vehicles now cover their infrastructure costs. A case could be made, therefore, for setting any proposed toll on the bypass to cover only the marginal costs of the motorway over a normal dual-carriageway route. This is about 40 per cent of motorway costs and might divert traffic back to Naas centre. Some time savings would be lost in collection.

#### *The Environmental Impact of the Naas Bypass*

The COBA evaluation of highway investments in terms of time savings, accident cost reduction, and fuel savings was found by the Leitch Committee to be "basically sound . . . provided it is kept within the overall framework suggested" (p.87). The Leitch Committee examined "the weights given to economic and environmental factors" and recommended that the COBA assessment be accompanied by a project impact matrix dealing with the amenity and environmental aspects of road investment. Table 10 shows the summary of this project impact matrix from Button (1982). In a "first best" evaluation of the bypass these items would be shadow priced and included in the quantified internal rate of return. We are presently unable to give this

breadth to the cost benefit analysis of road investment. These unquantifiable items are none the less important.

**TABLE 10: The Project Impact Matrix Suggested by the Leitch Committee**

Incidence Group	Nature of Effect	Number of Measure	
		Financial	Other
Road Users	Accident savings	1	3
	Comfort and convenience		1
	Time savings	6	
	Vehicle cost savings	5	
	Amenity		2
Non-road users	Demolition of property/disamenity		22
	Demolition/disamenity to users of schools, churches, public open space		25
	Land-take, severance, and disamenity to farmers		7
Those concerned with intrinsic value of area	Landscape, scientific and historic value	3*	
Those indirectly affected	Sterilisation of natural resources, land use planning effects, effects on other transport operators		6*
Financial authority	Cost and financial benefits	7	
		<u>22</u>	<u>66</u>

\*plus verbal description

Source: K. Button, adapted from the Leitch Report.

In the summaries of the environmental studies which follow, we see that Naas suffered from serious noise, lead, and smoke pollution. However, the level of sulphur dioxide was only a third of the central Dublin level. The bypass will reduce the noise, lead and smoke pollution by removing 12,000 vehicles a day from Naas and increasing the speeds of those remaining. The other environmental impacts listed in the Leitch Report are small in the case of the Naas bypass. The impacts concerned are demolition of buildings, visual intrusion of the highway in the area of buildings, farm severance, and the effect on natural assets.

### Noise

Road traffic noise in Britain was found to be the most serious cause of noise nuisance by the Noise Advisory Council (1974). Noise nuisance is measured in weighted decibels or dB(A). The Wilson Committee (1963) recommended maximum daytime levels of 40 dB(A) in country districts, 45 dB(A) in suburban areas, and 50 dB(A) in urban areas and that these should not be exceeded for more than 10 per cent of the time.

Pryke and Dodgson (1975) estimate that in 1970, 21 million people in Britain lived in dwellings with an external noise level above 65 dB(A) for over 10 per cent of the time. Since closing windows reduces noise inside a dwelling by 16 dB(A) an acceptable level of noise inside the house is not possible where the external noise level exceeds 65 dB(A).

Noise levels in Naas exceeded the British target level of 65 dB(A) in two of



the three locations examined by the Health Inspectorate of Dublin Corporation in 1978. The noise index values found were as follows—

Dublin Road	17 August 1978	79 dB(A)
Naas centre	30 August 1978	82.5 dB(A)
Newbridge Road	29 August 1978	64 dB(A)

The reduction in the number of vehicles using Naas from 19,000 to 9,000 per day will reduce the noise nuisance in the town centre. The new route has design features which minimise the impact of noise and confine it to a smaller number of people.

#### *Atmospheric Pollution*

Lead pollution in Naas is reduced in two ways by the new road. Twelve thousand vehicles a day will be taken out of the town while those remaining move faster thus reducing their lead pollution. Mean air-lead concentration in Naas in the summer of 1979 was high and comparable with that in central Dublin.

Smoke pollution in Naas was also close to central Dublin levels. It is mostly due to traffic. Sulphur dioxide, on the other hand, was only a third of the central Dublin levels.

The transfer of vehicle pollution away from Naas disperses it over a wider area with a smaller population. Table 11 shows the pollution in Naas before the bypass.

**TABLE 11: Pollution in Naas and Dublin, Summer 1979**

	May	June	July	Mean
(a) Air Lead Concentration in Micrograms per Cubic Metre				
Naas Centre	2.65	2.06	1.42	2.04
O'Connell Street	2.30	2.30	2.30	2.30
Dame Street	4.5	2.7	2.3	3.5
(b) Sulphur and Smoke in Micrograms per Cubic Metre				
		Sulphur	Smoke	
Naas Centre		19.8	36.3	
Dame Street		61.8	32.5	
Clontarf		20.5	9.3	

Source: Kildare County Council and Dublin Corporation.

#### *The Impact on the Physical Environment*

The Leitch Report proposed the inclusion of the following effects in the assessment of highway investments:- (a) the number of buildings to be demolished, (b) the number of buildings exposed to visual intrusion, (c) the land of each grade required by the scheme, (d) the impact on farm severance and (e) the impact on natural assets.

Only one cottage was demolished in the construction of the Naas bypass. The main areas of housing close to the bypass are at Monread and Osberstown. Here the motorway is in a cutting and trees will be planted to reduce noise and visual intrusion. The land used in the bypass was of high grade. However, the use of material from two gravel pits in the vicinity of the bypass has exhausted the pits and the area can now be restored to agricultural use.

Two new bridges reduce the impact of farm severance and a new accommodation road has been built. Four farms severed have access through existing public roads. One has an accommodation bridge and six are served by a new bridge and accommodation road. Three small parcels of land (1.4, 1.5 and 5 acres) which were isolated from their main farms have been acquired by Kildare Council.

The bypass leaves adequate headroom over the Naas branch of the Grand Canal. This preserves the option that the branch might be restored as an amenity in the future.

The environmental costs of a motorway in a previously rural area are a relatively new area of research. The design of the Naas bypass incorporates several attempts to reduce these costs. They should, however, be kept under review but are probably much less than the environmental costs caused by the same traffic in the centre of Naas.

### *Improving Road Investment Evaluation*

Time, accident costs savings, and fuel savings are the quantified benefits from road investment. Time savings dominate the benefits from the Naas bypass and should be carefully evaluated in the assessment of road investments.

Project surveys should ascertain the wage costs of those likely to benefit from the investment, the division of users between work and non-work trips, and the spread of traffic over 24 hours. Actual incomes of beneficiaries should be used rather than those imputed from COBA. A time savings study might also examine whether the 25 per cent value for leisure time savings is correct in Ireland.

Current British research seeks to establish accident costs from the compensation which people trade off against risks. It is likely that the COBA estimates of accident costs will be raised thus increasing the rate of return from road investment.

A standard form of assessment, or Irish COBA, even if imperfect, would ensure comparability of highway investment appraisal between different projects. This would include both the quantified benefits and the environmental impact assessments recommended in the Leitch Report.

The development of wider cost benefit analysis could permit comparison of transport and other investments including those in the private sector with market prices "corrected" for social spillovers and market imperfections. Finally, in the difficult circumstances of the Irish public finances it is important that the appraisal should not exclude low cost solutions such as inner relief roads.

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## APPENDIX

### Fuel Consumption on N7 through Naas (gallons)

	Section 1	2	3	Total per vehicle	Number of vehicles	Total fuel consumption
08.00 to 20.00						
Cars	0.056	0.103	0.031	0.19	9983	1897
Light goods	0.080	0.122	0.390	0.241	1139	274
Diesel	0.180	0.223	0.089	0.492	2369	1166
20.00 to 08.00						
Cars	0.056	0.067	0.031	0.154	4077	628
Light Goods	0.080	0.081	0.039	0.20	465	93
Diesel	0.180	0.175	0.089	0.444	968	430

These estimates are based on COBA.

STATISTICAL APPENDIX

	Output Indicators				Employment		Output per Head		
	1	2	3	4	5	6	7	8	
	Manufac- turing	Trans- portable Goods	Elec- tricity Output	Cement Sales	Manufac- turing	Trans- portable Goods	Manufac- turing	Trans- portable Goods	
	1973 = 100	1973 = 100	G.W.H.	000 Metric Tons	000's	000's	1973 = 100	1973 = 100	
1977	115.9	115.4	9127	1516.5	202.8	213.8	118.1	117.0	
1978	125.6	125.1	9815	1751.7	206.8	218.0	125.6	124.4	
1979	133.3	132.9	10853	2067.8	215.1	227.0	128.2	126.9	
1980	131.9	131.6	10733	1814.9	213.1	225.3	127.9	126.7	
1981	135.7	134.1	10767	1812.5	206.0	218.1	136.2	133.3	
1982	134.6	133.6	10792	1486.1	198.9	210.3	139.9	137.7	
Quarterly Averages or Totals									
1980	I	131.8	130.3	3022	424.8	215.9	227.5	126.2	124.2
	II	141.4	142.2	2502	495.0	214.3	227.4	136.5	135.5
	III	123.5	124.3	2538	476.9	212.1	224.1	120.4	120.1
	IV	128.6	127.4	2851	418.2	210.2	221.9	126.4	124.5
1981	I	128.1	126.5	2885	410.2	206.6	218.4	128.2	125.6
	II	143.3	141.4	2546	516.6	205.4	218.1	144.3	140.6
	III	130.4	131.1	2408	488.8	206.1	218.7	130.8	129.9
	IV	136.1	133.0	2928	396.9	205.7	217.0	136.8	132.9
1982	I	131.1	128.4	2954	335.2	202.4	213.9	133.9	130.2
	II	143.9	143.3	2514	436.2	199.9	212.5	148.8	146.2
	III	127.4	128.7	2425	405.9	198.4	209.7	132.8	133.1
	IV	136.1	133.9	2899	308.8	194.7	205.1	144.5	141.5
1983	I	139.1	136.7	2990	298.1	188.3	198.8	152.7	149.0
	II	148.7	146.2	2650	367.1	185.4	197.2	165.8	160.7
	III	134.2	135.3	2470	371.5				
	IV								
Quarterly Averages or Totals Seasonally Corrected									
1980	I	136.4	136.2	2718	494.1	216.8	229.0	130.1	128.9
	II	132.7	133.5	2655	445.4	214.7	226.7	127.8	127.6
	III	129.1	127.6	2670	434.5	211.9	224.2	126.0	123.4
	IV	127.5	127.3	2674	457.8	200.1	221.4	126.1	124.7
1981	I	132.0	131.6	2606	482.5	207.5	219.8	132.1	129.8
	II	134.2	132.4	2708	461.2	205.8	217.4	135.1	132.0
	III	136.2	134.5	2729	444.5	205.9	218.5	136.7	133.4
	IV	135.5	133.3	2737	408.8	204.6	216.5	137.0	133.4
1982	I	134.5	133.1	2676	398.2	203.3	215.3	136.8	134.0
	II	134.8	134.2	2674	394.9	200.3	211.9	139.1	137.3
	III	133.4	132.4	2737	368.2	198.2	209.5	139.2	137.1
	IV	135.3	134.0	2704	340.6	193.7	204.5	144.4	142.1
1983	I	142.8	141.9	2720	316.4	189.1	200.2	156.1	153.6
	II	139.1	136.8	2816	336.6	185.8	196.6	154.8	150.8
	III	141.0	139.5	2786	344.1				
	IV								

Unemployment	Prices						
	9	10	11	12	13	14	
Live Register Av. Monthly	Consumer Price Index	Agricultural Price Index	Import Unit Value	Export Unit Value	Terms of Trade	Price of Stocks + Shares	
000's	Nov. 1975 = 100	1975 = 100	1975 = 100	1975 = 100	1975 = 100	1975 = 100	
106.4	130.0	153.9	139.3	142.3	102.1	133.1	1977
99.2	139.9	174.0	146.2	151.6	103.7	201.5	1978
89.6	158.5	184.2	165.9	165.0	99.5	215.6	1979
101.5	187.3	179.3	195.6	179.5	91.8	212.0	1980
127.9	225.6	213.1	232.4	208.4	89.7	219.9	1981
148.2	264.2	232.3	249.4	231.5	92.8	179.9	1982
192.7	291.9					223.7	1983
Quarterly Averages or Totals							
92.0	173.5	180.4	183.6	174.9	95.3	206.4	1980 I
94.0	186.3	186.3	192.6	181.0	94.0	206.1	II
103.9	191.8	176.2	194.8	183.4	94.1	211.3	III
116.0	197.7	179.0	205.3	185.9	90.6	224.2	IV
125.8	209.9	202.9	221.4	192.0	86.7	218.9	1981 I
124.3	218.1	213.2	231.3	204.8	88.5	235.3	II
126.8	230.4	213.9	236.8	211.5	89.3	223.1	III
134.5	243.8	220.0	236.6	216.2	91.4	202.7	IV
146.8	249.5	237.0	243.5	222.2	91.3	192.3	1982 I
149.0	263.9	235.3	248.4	231.1	93.0	174.6	II
159.0	269.5	230.3	254.0	235.0	92.5	175.5	III
171.6	273.8	229.7	255.6	238.3	93.2	178.3	IV
188.3	280.6	242.0	247.0	237.3	96.1	172.0	1983 I
188.1	288.3	246.0	254.5	247.7	97.3	206.1	1983 II
193.0	296.5	250.1	268.8	257.0	96.7	249.7	III
201.3	302.0					267.2	IV
Quarterly Averages or Totals Seasonally Corrected							
87.5	174.0	177.4	No Seasonal Pattern	No Seasonal Pattern	No Seasonal Pattern	No Seasonal Pattern	1980 I
95.1	185.6	179.0					II
106.8	191.3	179.2					III
116.6	198.2	186.9					IV
121.7	210.8	198.7					1981 I
125.5	217.2	205.3					II
129.5	229.7	218.0					III
134.7	244.4	229.4					IV
142.2	250.6	231.7					1982 I
150.9	262.9	226.8					II
161.5	268.6	234.9					III
171.8	274.4	239.6					IV
183.7	282.0	236.5					1983 I
190.0	287.3	237.3					II
195.6	295.5	255.3					III
201.5	302.6						IV

	Money Earnings Weekly Averages		Real Earnings		20	Consumption Indicators		
	16	17	18	19		21	22	
	Manufac- turing	Trans- portable Goods	Manufac- turing	Trans- portable Goods	New Cars Regis- tered	Retail Sales Value	Retail Sales Volume	
	1973 = 100	1973 = 100	1977 = 100	1977 = 100	Total	1975 = 100	1975 = 100	
1977	206.3	206.1	100.0	100.0	82310	143.0	106.9	
1978	236.2	235.7	106.4	106.3	105582	170.4	116.4	
1979	271.3	271.1	107.9	107.9	95938	197.9	120.3	
1980	321.2	321.0	108.1	108.1	91032	226.5	119.3	
1981	373.8	372.6	104.4	104.2	104645	268.8	118.8	
1982	419.1	419.8	100.0	100.2	72603	293.4	112.1	
Quarterly Averages or Totals								
1980	I	302.3	301.5	109.8	109.5	34241	203.3	115.4
	II	318.3	318.6	107.7	107.7	23589	224.0	119.1
	III	318.8	318.2	104.7	104.5	20517	223.9	115.6
	IV	345.2	345.6	110.0	110.3	12592	254.7	127.3
1981	I	346.2	344.6	103.9	103.6	35696	238.8	113.3
	II	373.3	371.4	107.9	107.4	29306	264.1	119.8
	III	383.8	385.2	104.9	105.5	32351	278.8	120.7
	IV	391.7	389.2	101.2	100.7	7292	293.5	121.2
1982	I	393.3	390.6	99.3	98.7	28114	269.5	108.4
	II	417.6	423.0	99.7	101.1	21223	291.3	112.1
	III	424.0	423.6	99.1	99.1	14012	289.2	108.6
	IV	441.3	441.9	101.6	101.8	9981	323.6	119.2
1983	I	440.6	440.8	99.1	99.3	29262	295.6	105.5
	II					11951	301.4	104.9
	III					11924	305.3	104.4
	IV							
Quarterly Averages or Totals Seasonally Corrected								
1980	I	307.1	307.5	111.0	111.1	25027	218.0	122.2
	II	315.5	314.8	107.1	106.6	21166	221.9	118.6
	III	319.3	317.4	104.9	104.5	21570	225.2	116.0
	IV	342.3	343.8	109.3	109.9	25128	242.2	120.5
1981	I	351.7	351.6	104.8	105.0	24790	253.9	120.1
	II	370.1	367.0	107.4	106.4	26598	261.8	119.3
	III	384.4	384.2	105.1	105.4	34184	278.0	120.1
	IV	388.4	387.2	100.7	100.5	15255	279.1	114.7
1982	I	399.7	398.7	100.1	99.9	19242	286.4	114.8
	II	413.5	417.3	99.3	100.2	19314	288.1	111.4
	III	425.3	423.4	99.3	99.0	15074	291.9	109.5
	IV	437.1	438.9	101.1	101.6	18407	308.0	112.8
1983	I	447.9	450.0	99.8	100.5	19746	312.4	111.1
	II					11197	290.8	105.1
	III					12673	308.8	105.7
	IV							

Government			Monetary Developments				
23	24	25	26	27	28	29	
Current Revenue	Current Expenditure	Current Deficit	Money Supply M3	Licensed Banks Domestic Government	Credit Non-Gov.	External Reserves	
£m	£m	£m	£m End Period	£m End Period	£m End Period	£m End Period	
1757	1966	209	3257.3	836.0	2639.5	1200.7	1977
2023	2421	398	4117.2	902.6	3475.2	1251.9	1978
2384	2905	521	4986.3	1005.9	4350.5	974.7	1979
3155	3708	553	5828.6	1132.6	5050.7	1346.0	1980
3973	4796	823	6972.7	1277.4	6053.6	1473.1	1981
4908	5896	988	7876.0	1564.7	6677.4	1594.0	1982
5711	6671	960					1983
Quarterly Totals			Monthly Totals				
751	777	26	5003.1	875.8	<del>4607.6</del>	960.7	1980 I
783	1013	230	5103.7	952.5	4585.8	979.7	II
726	870	144	5447.8	1123.1	4773.0	1164.4	III
895	1047	152	5828.6	1132.6	5050.7	1346.0	IV
871	1076	205	6147.6	1124.1	5381.7	1322.7	1981 I
936	1188	252	6369.8	1201.5	5511.6	1191.7	II
970	1245	275	6679.8	1217.8	5785.0	1071.8	III
1196	1287	91	6972.7	1277.4	6053.6	1473.1	IV
1044	1437	393	7098.2	1334.1	6366.8	1406.0	1982 I
1176	1474	298	7141.8	1369.9	6347.9	1464.6	II
1184	1457	267	7498.7	1510.7	6458.1	1521.0	III
1505	1534	29	7876.0	1564.7	6677.4	1594.0	IV
1220	1646	426	8006.4	1510.3	7058.5	1235.1	1983 I
1405	1654	249	8106.3	1638.4	7055.1	1343.2	II
1440	1560	120				1914.4	III
1646	1811	165					IV
Quarterly Totals (S.C.)			Monthly Totals (S.C.)				
709	742	39	5034.6	No	4494.9	834.8	1980 I
816	1020	204	5198.1	Seasonal	4548.0	1050.3	II
782	916	144	5504.6	Pattern	4730.6	1169.4	III
881	1054	173	5799.9		5031.4	1235.2	IV
791	996	204	6084.1		5248.9	1291.8	1981 I
984	1214	230	6406.5		5478.8	1268.9	II
1032	1313	281	6691.2		5144.3	1076.7	III
1186	1296	110	6820.9		6022.8	1352.6	IV
965	1340	383	7032.3		6207.1	1375.1	1982 I
1215	1492	277	7183.4		6318.7	1554.7	II
1281	1509	229	7518.9		6420.7	1528.6	III
1402	1530	128	7702.5		6637.3	1463.7	IV
1198	1599	401	7935.8		6880.7	1208.5	1983 I
1424	1631	207	8155.1		7024.2	1424.4	II
1571	1611	40				1920.2	III
1487	1796	309					IV



	Visible Trade Indicators					Exchange Rates		
	30	31	32	33	34	35	36	
	Imports (Value)	Exports (Value)	Import Excess (Value)	Imports (Volume)	Exports (Volume)	Effective Index	Sterling	
	£m	£m	£m	1975 = 100	1975 = 100	Dec. 1971 = 100	Per IR£	
1977	3090.9	2518.2	572.7	129.9	122.2	77.01	1.0000	
1978	3713.1	2963.2	749.9	148.8	134.8	77.57	1.0000	
1979	4817.5	3501.1	1316.4	170.3	146.5	77.08	0.9646	
1980	5419.6	4130.9	1288.7	162.6	158.9	74.01	0.8862	
1981	6578.4	4777.6	1800.8	166.0	158.3	67.75	0.8002	
1982	6812.3	5687.9	1124.4	160.3	169.8	67.35	0.8125	
1983						65.16	0.8226	
Monthly Averages								
1980	I	476.6	319.6	157.0	182.8	150.5	75.85	0.9276
	II	440.0	334.4	105.6	160.9	153.2	74.71	0.9026
	III	433.2	356.6	76.6	156.6	161.3	74.65	0.8905
	IV	458.1	363.1	95.0	157.2	162.0	70.75	0.8231
1981	I	511.7	339.6	172.1	162.7	144.1	67.24	0.7686
	II	557.2	405.5	151.7	169.6	162.0	66.57	0.7730
	III	572.6	419.4	153.2	170.4	161.8	67.85	0.8177
	IV	549.4	450.7	98.7	163.4	170.3	69.32	0.8407
1982	I	597.7	411.2	126.4	172.8	153.3	67.71	0.8126
	II	589.5	503.7	85.8	167.1	180.7	67.72	0.8171
	III	532.5	475.0	57.5	147.6	173.2	66.88	0.8022
	IV	550.8	506.5	44.3	151.7	176.3	67.10	0.8185
1983	I	585.8	471.5	114.3	167.1	164.8	69.46	0.8943
	II	592.1	575.8	16.4	163.8	192.6	65.14	0.8171
	III	602.4	606.8	-4.4	157.8	195.6	63.28	0.7894
	IV						62.74	0.7896
Monthly Averages. Seasonally Corrected.								
1980	I	466.5	346.0	120.5	178.7	165.2	No Seasonal Pattern	No Seasonal Pattern
	II	423.8	334.8	89.0	154.8	155.6		
	III	453.3	349.0	104.3	165.2	158.0		
	IV	464.4	349.2	115.2	158.8	152.2		
1981	I	504.1	361.0	143.1	158.7	154.8		
	II	537.6	406.9	130.7	164.0	160.4		
	III	597.7	414.2	183.5	179.1	160.5		
	IV	555.4	434.0	121.4	164.0	162.6		
1982	I	586.8	436.4	143.9	169.7	163.4		
	II	573.3	500.5	72.8	163.7	181.3		
	III	547.4	468.8	78.6	152.0	165.4		
	IV	567.1	488.2	79.9	154.5	167.9		
1983	I	570.6	507.7	62.9	163.6	176.2		
	II	577.3	565.9	11.4	160.9	191.1		
	III	620.6	601.3	19.3	162.5	194.3		
	IV							

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