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J C Odling-Smee
Under Secretary

30th May 1985

A Turnbull Esq
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Dear Andrew,

EMPLOYMENT EFFECTS OF INCREASES IN INFRASTRUCTURE EXPENDITURE

As promised, I attach copies of the two Treasury notes prepared for the Building and Civil Engineering EDCs, and the latest letter from the Federation of Civil Engineering Contractors (Mr Noar).

Yours,
JCS

J ODLING-SMEE

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EDC/B(85)21
EDC/CE(85)31

ECONOMIC DEVELOPMENT COMMITTEES FOR BUILDING AND CIVIL ENGINEERING

THE EMPLOYMENT EFFECTS OF PUBLIC EXPENDITURE ON CONSTRUCTION:
TREASURY NOTE

Note by the Office

Mr Peter Shaw, H M Treasury, has provided the attached note which describes how the Treasury model is used to produce estimates of the "cost per job" of additional public expenditure on investment.

This note is for discussion at the next meetings of the EDCs.

- > employment - nice benefit
- > main issue overall benefits

Note

Spoke to John Odling-Smee (Treasury) re clarity status of figures in para 7 and Table A. £47,000 and £51,000 are for first year, direct effects of the two categories of investment. Taking account of indirect effects the figures become £37,000 and £47,000, still for first year. In subsequent years the crowding out effect gains strength and the long run effect a job is nil.

AT
7/6

2 May 1985
1025/10.2

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TREASURY MODEL SIMULATIONS OF CHANGES IN PUBLIC EXPENDITURE ON INVESTMENT

This note describes how the Treasury model is used to produce estimates of the "cost per job" of additional public expenditure on investment.

Disaggregation

2. The model identifies three categories of government investment expenditure - central government investment, local authorities housing investment, and local authorities non-housing investment. No further disaggregation within these broad categories is made.

Direct and Indirect Effects

3. It is convenient to distinguish direct from indirect effects. Direct effects of additional public expenditure are those arising as a result of the particular expenditure under consideration, reflecting the response of the relevant suppliers. Indirect effects are those arising from changes in macroeconomic variables - such as interest rates, inflation, the exchange rate, and profitability - which the original expenditure and its direct effects bring about. Direct effects do not necessarily occur before indirect effects, and the former may take some time to build up. The slow build up of direct employment effects is a good example: some of the extra output generated by extra public expenditure may be met initially from greater productivity of the original workforce rather than by higher employment. In practice, the change in employment in the first year will reflect both direct and indirect effects.

Direct Effects

4. The Treasury model calculates these in four stages:

(a) investment is divided into imports and expenditure on domestic output;

(b) the domestic expenditure is allocated between manufacturing and private sector non-manufacturing output;

7. Using the parameters described above, it is possible to calculate the direct cost per person off the unemployment count in the first year. This yields figures of about £47,000 for local authority house building and £51,000 for other Government investment. The calculations are set out in detail in Tables A and B.

TABLE A

Direct Cost per Job for £1 billion additional L.A. Housing Investment

	<u>Equipment</u>	<u>Buildings</u>	<u>Total</u>
Asset Breakdown	0	£1,000m (100%)	£1,000m (100%)

Imports and Domestic Output

Import Content	-	£200m (20%)	£200m
leaving: Domestic Output	-	£800m (80%)	£800m
of which: Manufacturing	-	£200m (25%)	£200m
Non-manufacturing	-	£600m (75%)	£600m

Employment and Unemployment

	<u>Manufacturing</u>	<u>Non-Manufacturing</u>	<u>Total</u>
Additional Output	£200m	£600m	£800m
Output per Head	£13,000	£12,200	
Employment (Full Effect)	+15,400	+49,200	+64,600
Employment after First Year (= Full effect : 2)			+32,300
Unemployment after First Year (= 2/3rds of Employment Effect)			-21,500
Cost per person off unemployment register (£1,000m : change in unemployment)			£47,000

Source: based on co-efficients in the Treasury model

difference

marginal costs

Indirect Effects

9. In order to derive estimates of the total cost per job, it is necessary to allow also for indirect effects. These can be divided into effects tending to reduce the cost per job and those tending to increase it. Among the former are:

- (a) multiplier and accelerator effects resulting from the direct increases in output and incomes;
- (b) increased tax receipts by the Government;
- (c) reduced social security benefits due to the reduction in unemployment.

These factors augment the direct effects on output and employment, and reduce Exchequer costs.

10. Assuming that the money supply remains unchanged, the main factors tending to raise the cost per job are:

- (a) higher interest rates, which increase debt interest payments and reduce output and employment;
- (b) higher inflation, which reduces real wealth and private expenditure;
- (c) worse competitiveness, which causes a deterioration in the net trade balance.

These factors crowd out additional output and employment, and add to Exchequer costs.

11. In the Treasury model, the factors tending to reduce the cost per job outweigh those tending to raise it for the first year. As a result, the overall costs per person off the unemployment count are smaller in the first year than the direct effects. Lags in the response of employment to output mean that direct cost per job is reduced in the second year,

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ECONOMIC DEVELOPMENT COMMITTEES FOR BUILDING AND CIVIL
ENGINEERING

THE EMPLOYMENT EFFECTS OF INFRASTRUCTURE SPENDING

A note by the Treasury

At the meeting of the EDC for Civil Engineering on 9 January, there was some discussion of the different figures for the economic impact of infrastructure expenditure quoted in various contexts. This note discusses some of the different estimates that have been produced and comments on possible reasons for differences between them.

2. Inevitably there will be a range of estimates of the so-called "cost per job" of such spending depending on the assumptions used and the particular model employed. The summary of the report of the work done by the Henley Centre on Forecasting on behalf of the Building Materials Producers which was considered at the January meeting illustrated certain economic effects of investing an additional £1 billion per annum in construction over a five year period. The initial cost was estimated at around £10,000 per permanent job, falling to £5,000 in the second and third years, before rising again to around £10,000 by the end of the programme. The average cost was around £8,000 pa.

3. In a written answer given in the House of Commons on 9 January, the Prime Minister said:

'The cost per job created through infrastructure expenditure can vary substantially according to the nature of the spending. The purpose in quoting the range of figures given in my reply to the right hon Member for Birmingham Sparkbrook (Mr Hattersely) was to indicate that spending on Government investment schemes could be a very expensive way of reducing unemployment.*

The Treasury model simulations suggest that the cost to the PSBR per person taken off the unemployment register might, in the first year, be around £37,000 for local authority housing building; or around £47,000 for central Government investment. Furthermore, the estimated cost per job or per person taken off the unemployment register would rise over time as the increase in employment is eroded by higher interest rates and inflation.'

4. There are three main reasons for the different results produced by Henley and the Treasury using the Treasury model:

- a. different assumptions about the import and labour contents of infrastructure expenditure;
- b. different assumptions about monetary policy;
- c. use of employment rather than unemployment for calculating "cost per job"

5. The Treasury model makes a distinction between housing and non-housing investment, in terms of import and labour intensity, but otherwise is not designed to distinguish between the various categories of public investment expenditure. The Henley centre have increased the model's employment response to allow for the higher labour intensity which they believe

*at Hansard, col 1202 on 13 December the Prime Minister suggested a range of between £35,000 and £55,000.

applies to construction spending. However the model of the Warwick Institute of Employment Research suggests that the characteristics of low import content and high labour intensity occur only in some areas of public construction activity. Simulations on this model suggest that the first round costs per job through infrastructure spending range from £16,000 in housing through £32,000 for roads and up to £50,000 for health.

6. Both the Treasury and the Henley estimates quoted above are based on the standard assumption that the extra spending would be financed by higher borrowing. In the Treasury case, interest rates are assumed to be higher than otherwise to keep monetary growth on track. In the Henley case, interest rates are held unchanged. The resulting higher interest rates in the Treasury case offset some of the rise in employment, especially after a little time.

7. A further difference between the Henley and Treasury figures is that the former are based on the increase in employment, not on the reduction in unemployment. The reduction in unemployment is usually assumed to be less than the increase in employment because not all those obtaining jobs as a result of the increased expenditure will have been registered as unemployed.