“How many jobs will this create?”

Estimating the potential jobs from infrastructure plans

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Department of Public Expenditure and Reform

- Dept of Public Expenditure & Reform since 2014:
  - Economist in DPER's IGEES Unit
  - Currently, programme manager for Ireland's Behavioural Economics initiative
  - Formerly, programme manager for the Public Spending Code and lead analyst for the review of economic appraisals

- 2008-2014 – Policy Analyst – Forfás
- 2006-2008 – Transport Economist – Railway Procurement Agency
- 2004 – 2006 –European Commission; & Department of Transport

- 2004 – MSc. in Public Economic, University of York
- 2003 – BA in Economics, University of Dublin

Irish Government Economic & Evaluation Service

igees.gov.ie

- Support better policy formulation & implementation in the civil service through economic analysis and evaluation.
- Established in 2012 – approximately 80 economists and evaluators in all Departments
- Regular recruitment has taken place to build capacity – recruiting graduates and targeting experienced economists
  - Right now – recruiting graduates: gradpublicjobs.ie

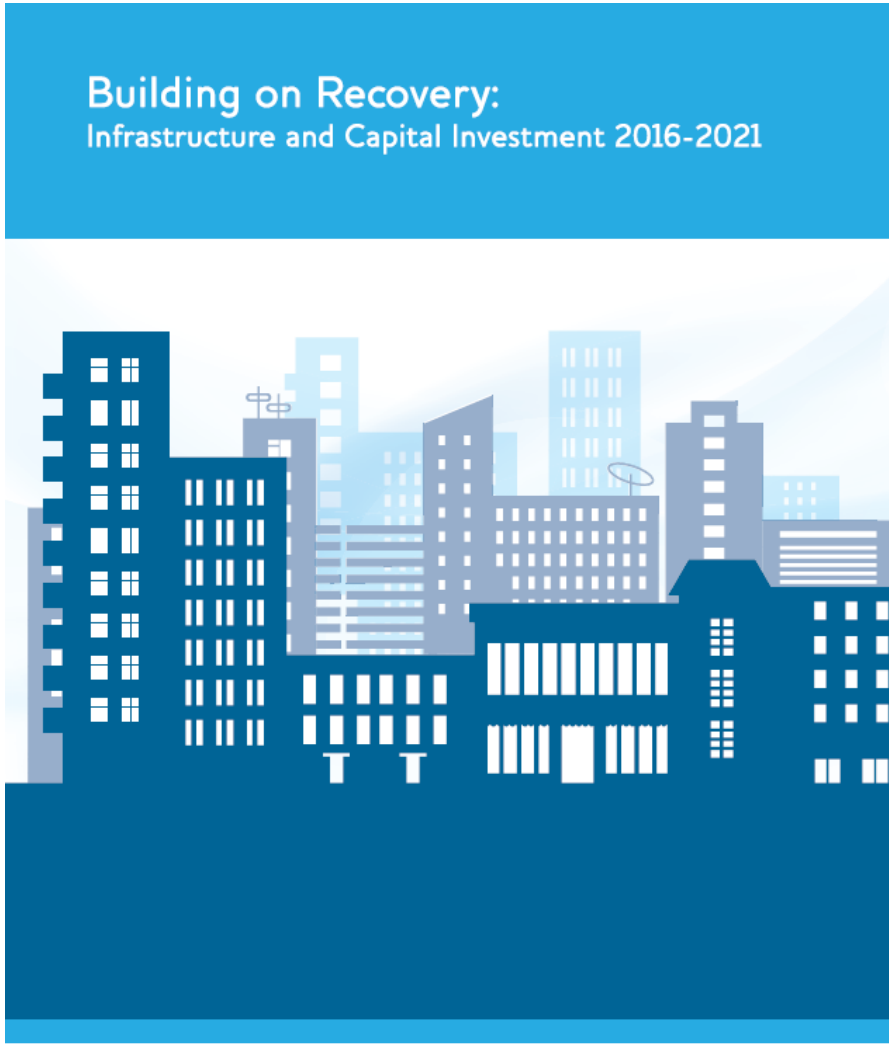
Capital Review:

- Identify priorities for capital spending
- Exchequer capital allocations for the next 6 years

A typical question for

a government economist:

“How many jobs will this create?”



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Expenditure and Reform


45,000Jobs

The brief

Refresh 2009 Dept of Finance paper - survey of departments:

8-12 direct jobs per € million

Scope:

- Easy to replicate and explain
- Quick to update – budgetary allocations
- Include other areas of capital spend – not just construction
  - Machinery/equipment/ICT
  - Supports for enterprise and R&D*

*Results not comparable

Approaches / Review of Irish literature

Bottom-up (surveys)	• Dept. of Finance: 8-12 direct jobs per € million • Construction Industry Council: 11 direct & indirect • NDFA – school building programme 9 direct & indirect • Transport projects – 8-14 direct & indirect (NTA)
Input-Output	• National Transport Authority – 10.6 direct and indirect jobs (2005 Input-Output Tables)

Also, structural models - HERMES

Review of literature hampered by direct/direct & indirect, short-/long-run, VAT/ex-VAT.

International literature useful for relative impacts; but exchange rate, differing levels of leakage etc.

Data sources

Multipliers	CSO Input-Output Tables Table 12 2011 Leontief inverse of domestic product flows with multipliers for other inputs
Labour Costs	CSO Earnings Hours and Employment Costs Survey Average Annual Earnings and Other Labour Costs by sector
Hours worked	Eurostat via QNHS Full-time and part-time employment by sector

Multipliers for ‘other inputs’

Table 12 2011 Leontief inverse of domestic product flows with multipliers for other inputs	41-43
Products * Products	Construction and construction works
Output multipliers	**1.585**
Direct and indirect multipliers for other inputs	
Imports of goods and services	0.478
Product taxes less subsidies	0.026
Compensation of employees	0.575
Net operating surplus	-0.172
Consumption of fixed capital	0.089
Other taxes less subsidies on production	0.005

Direct and indirect multipliers for other inputs

Advantages:

- no double counting
- Compensation of employees – easier link jobs

Multipliers: What impacts?

Direct

+

Indirect

Induced

1											
2			*Products*								
3		*NACE Rev. 2*	41-43	19,31,32	25	26	27	28	29	30	
4			**Construction and construction works**	**Petroleum; furniture; other manufacturing**	**Fabricated metal products**	**Computer, electronic & optical products**	**Electrical equipment**	**Machinery and equipment n.e.c.**	**Motor vehicles, trailers and semi-trailers**	**Other transport equipment**	**Repair/installatic machinery & equipment**
5											
6	**If an additional €1 million is spent on finished products in a particular sector..**										
7		Additional Total Purchases, €m	1.0								
8											
9											
10	**The domestically produced final goods will lead to an increase of compensati**										
11		Compensation of employees multiplier (direct and indirect)	0.575								
12		Estimated increase in Compensation of employees due to additional €1m in purchases	0.575								
13											
14											
15	**Average labour cost in 2014**										
16		Average labour cost (2014)	42,790	53,710	53,710	53,710	53,710	53,710	53,710	53,710	53
17		Share of Full-time (2014)	0.83								
18		Share of Part-time (2014)	0.17								
19		Average FTE Labour costs (2014)	46,735								
20											
21		**Number of direct and indirect jobs (FTE) per €1 million additional expenditure [FOR DOMESTICALLY PRODUCED GOODS ONLY]**	**12.3**								
22											
23											
24		Lookup code for InputOutput and Multiplier Tables	24	8	14	15	16	17	18	19	
25		NACE Group	F	C	C	C	C	C	C	C	

For additional €1 million spent in a sector how much does this increase the total wage bill?

$$\frac{\text{Increase in total wage bill}}{\text{Annual labour costs (FTE)}} = \text{Number of jobs per € million invested}$$

Jobs estimates | IO analysis domestic only | IO analysis EXPECTED SOURCING | Construction subsectors | Enterpr ...

One number – lots of caveats

Input-Output Analysis	Time lag (2011); changing multipliers/structural changes in economy Multipliers best for small increases Changing costs; investment drive-up costs? Excludes self-employed in construction Input-Output tables – production assumptions
Construction period only	Excludes: Operations and maintenance jobs Jobs due to new infrastructure – e.g. increased connectivity
Increased “compensation of employees” = increased jobs	Spare capacity? overtime? Construction labour is domestic?

Estimated additional direct & indirect jobs (FTE) per €1 million additional expenditure

Construction	12
Machinery repair and installation	8
Computer consultancy	2
Manufacturing	0.05 - 3
Transport equipment	<0.3
Computers and electronics	0.02

Adjusted for imports

But what *is* the construction spend in the Capital Plan?

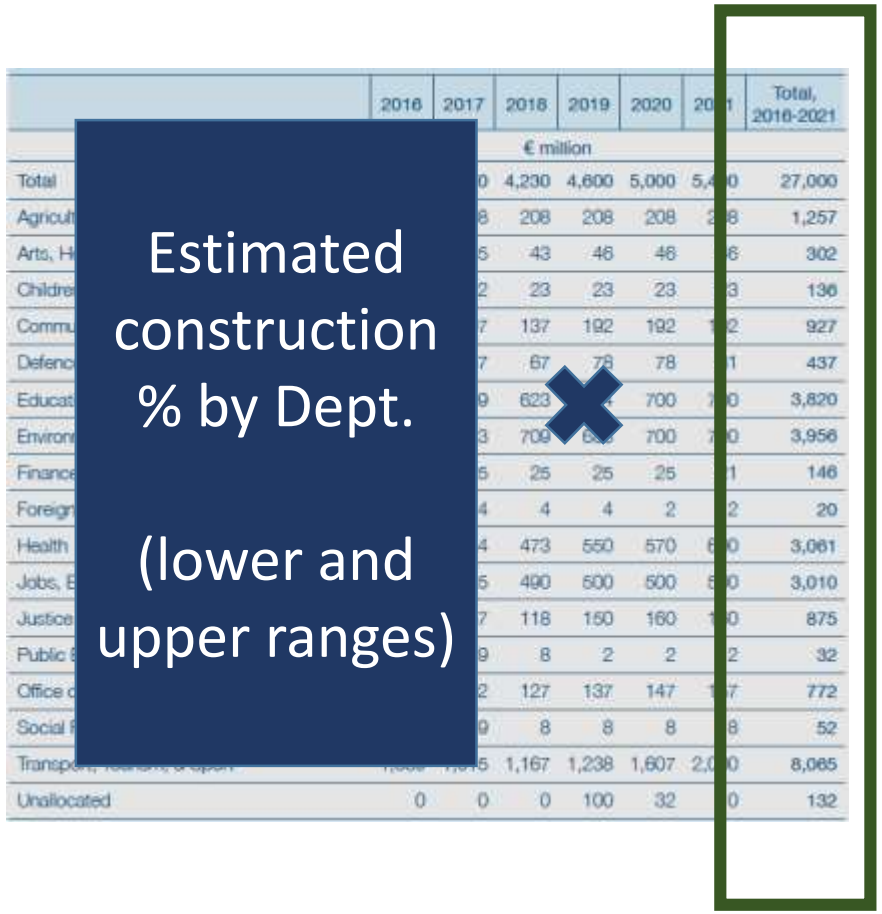
✓Total allocation by Dept.

? Share construction spend

- Memo for Government
- Departmental submissions
- Breakdown by sub-head in previous Revised Estimates

	2016	2017	2018	2019	2020	2021	Total, 2016-2021
	€ million						
Total	3,800	3,970	4,230	4,600	5,000	5,400	27,000
Agriculture, Food & the Marine	217	208	208	208	208	208	1,257
Arts, Heritage & the Gaeltacht	76	45	43	46	46	46	302
Children & Youth Affairs	22	22	23	23	23	23	136
Communications, Energy & Natural Resources	107	107	137	192	192	192	927
Defence	66	67	67	78	78	81	437
Education & Skills	545	599	623	654	700	700	3,820
Environment, Community & Local Government	539	623	709	685	700	700	3,956
Finance	25	25	25	25	25	21	146
Foreign Affairs & Trade	4	4	4	4	2	2	20
Health	414	454	473	550	570	600	3,061
Jobs, Enterprise, & Innovation	495	525	490	500	500	500	3,010
Justice	130	157	118	150	160	160	875
Public Expenditure & Reform [Less OPW]	9	9	8	2	2	2	32
Office of Public Works	102	102	127	137	147	157	772
Social Protection	11	9	8	8	8	8	52
Transport, Tourism, & Sport	1,039	1,015	1,167	1,238	1,607	2,000	8,065
Unallocated	0	0	0	100	32	0	132

Getting to the construction jobs estimates



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Estimated construction % by Dept.

(lower and upper ranges)

× 12.3 = Total job year estimates

÷ 6 years of the Capital Plan = **42,958-45,867 jobs**

Communicating numbers:
The challenge of language

Short-term construction “jobs”	•**Sustained / supported** •**Job-years**
Direct & indirect	•**Construction-related**
Estimate	•**Rounding** False precision: 42,958-45,867

42,958-45,867 direct & indirect FTE jobs sustained


45,000Jobs