Case Studies in Tax Expenditure Evaluation

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Topics for Discussion

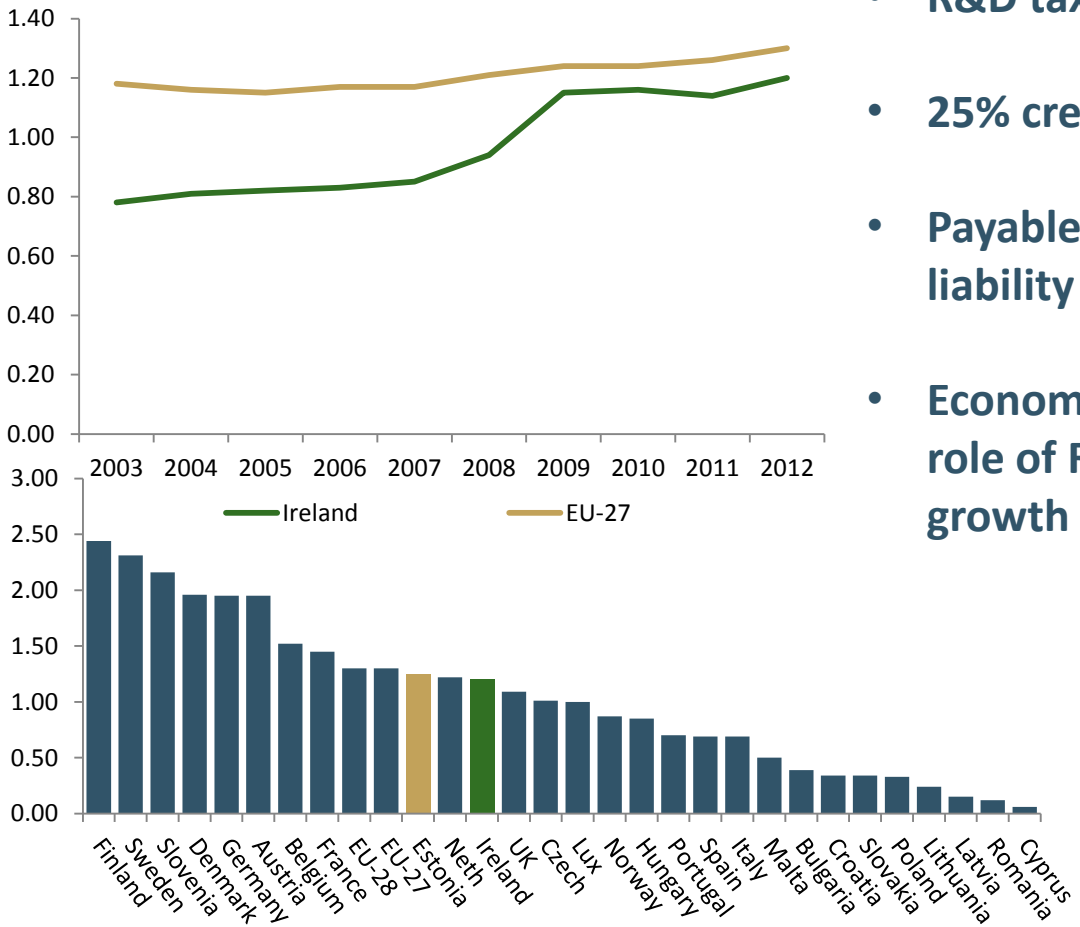
- Experience of tax expenditure evaluation
- Recent examples
- Case study 1: R&D tax credit
    - Evaluation and econometric analysis
- Key CBA concepts
- Case study 2: – economic impact assessment of Film Relief

Case Study 1: R&D Tax Credit

- Evaluation took place as part of a wider review of the R&D tax credit which was published on Budget day
- This wider review involved
  - Public consultation
  - Survey
  - Analysis of Revenue data
  - International Comparison
  - Econometric evaluation
- This presentation concerns the econometric evaluation of whether the R&D tax credit is effective in stimulating R&D expenditure by firms

Case Study 1: R&D Tax Credit

BERD/GDP ratio converging on EU-27



- R&D tax credit introduced in 2004
- 25% credit on R&D over 2003 levels
- Payable credit if insufficient tax liability
- Economic literature points to the role of R&D in driving economic growth and firm productivity

Market Failures & Government interventions

- Arrow (1962) describes two main market failures
  - Positive externalities (Spillover Benefits)
    - Knowledge non-rival
    - Partially non-excludable (imperfect patents)
  - Asymmetric Information leads to under-financing

- Consequence is firms underinvest in R&D relative to the societal optimum level
- Role for government in correcting this (Mirrlees, IFS, 2011)
- But possibility for Government failure
  - Deadweight
  - Supply of researchers inelastic. See Goolsbee (1998)

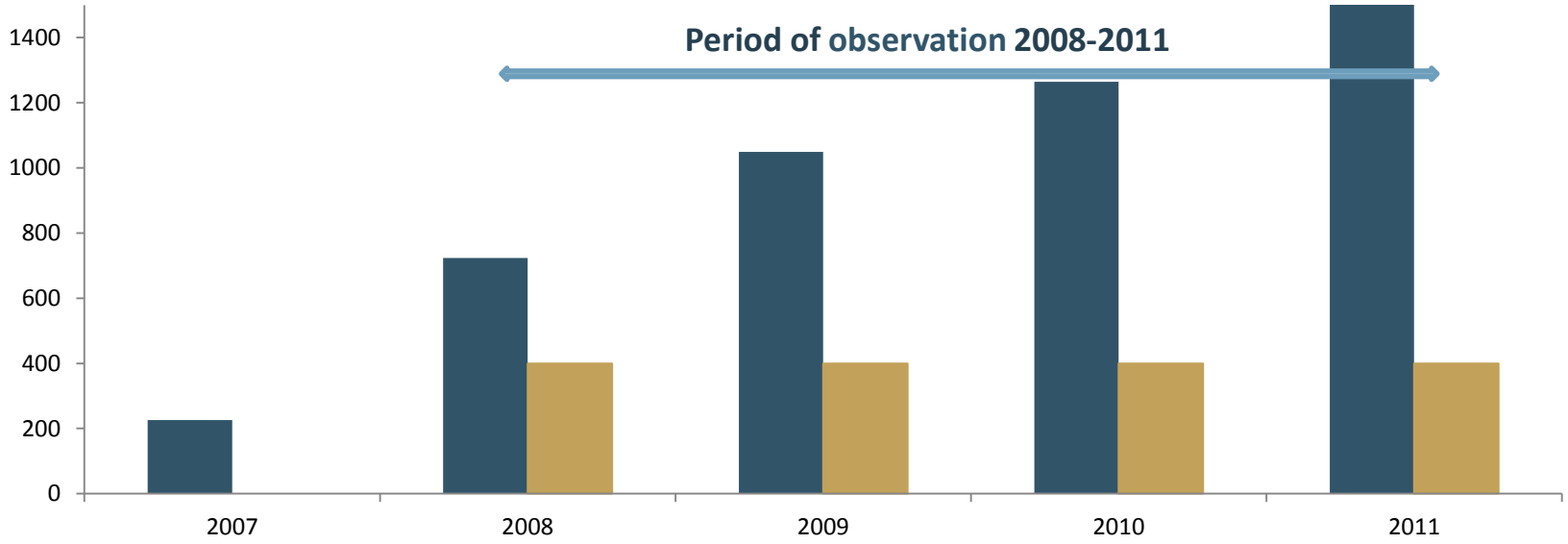
Methodological Approach and Data

- R&D demand equation – user cost of capital approach
  - Involves estimating the firms' demand for R&D over time in response the R&D credit and changing costs of capital
    - In other words – did the credit lead to more R&D?
  - Methodology used in UK (HMRC) and Australia

- Assembled a dataset using Revenue administrative records (on a confidential basis) matched with company accounts filed with the companies registration office (CRO).

- To make it into the dataset a firm had to be observed on all the above variables over the period 2008-2011.

Limitations in estimation and data availability



- Of the nearly 800 firms using the credit in 2008 only 400 were consistently claiming in the 4 years to 2011
- Of these 400 firms only 53 had necessary data in all 4 years across both the Revenue Commissioners and CRO
- Of the remaining 53 firms their ROAs were not a useful proxy for a firms hurdle rate of return due to the significant variance in ROA over time.

Learnings

- The nature of the R&D activity and the operation of the R&D credit make it very difficult to evaluate
- The size of the enterprise base in Ireland makes generating an adequate sample size difficult where missing data exists
- Evaluation of tax expenditures should be planned ex-ante to allow for necessary data to be collected
- Methodological paper published as IGEES working paper

Background to CBA

Tax expenditures may produce desired impacts, but…

- Are they worth the costs?
- Can the same outcome be achieved more efficiently?
- Do economic benefits exceed value of resources consumed?

Steps

- Identify costs (including administration and compliance costs)
- And benefits, but only include those arising as a consequence of tax expenditure proceeding
- Test key assumptions and projections in sensitivity analysis

Need to consider

- Type of benefit – (direct and indirect but not induced)
- Deadweight, displacement, opportunity costs and leakage

Concepts (1) – Shadow cost of public funds

Public funds are financed through taxation

- Taxation imposes economic costs that must be recognised in CBA – remember the OECD hierarchy!
- How many euros are lost in the economy to collect one extra euro of tax revenues.
- Value usually greater than one, e.g. SCPF = 1 + α
- Estimates for α range from 50%-100% (Honohon, 1996 and 1987), 30% (Forfas, 2003), 50% (DPER), 33% (European Commission, 2013)
- Overall value depends on distribution of taxation across types of taxes

Concepts (2) – Shadow price of labour

Concept of opportunity cost

- Not all of wage/employment benefits are 'additional'
- Relationship between employment and unemployment not one for one
- Opportunity cost - what would labour earn in absence of project?
- Reduce wage benefits by the opportunity cost
- Size of opportunity cost depends on occupation or economic sector
- Close to 100% for high skilled workers
- Generally not less than 80%

Concepts (3) – Deadweight and Multipliers

Deadweight costs

- How much of scheme benefits would have occurred anyway
- Use surveys/interviews, control/treatment groups, econometric analysis

Multiplier effects

- Benefits can be increased to account for 'indirect effects'
- But not for 'induced effects'
- Sectoral output multipliers given in CSO supply and use and input-output tables (see Table 12)
- Import multipliers available from same source (useful for 'leakage')

The Model (from Economic Impact Assessment of Film Relief)

SDW = Scheme deadweight

TDW = Tax deadweight (shadow price of public funds)

v = Shadow wage rate (shadow price of labour)

Lambda = adjustment to shadow wage rate from immigration

Benefits

B = [1 – SDW]*[(1 – v)*B1 + (1-v)*B2 + B3]

B1 = **Direct wage bill** + Direct Irish profits (both inclusive of taxes)

B2 **= Indirect wage bill** + Indirect Irish profits (both inclusive of taxes)

B3 = **Tax benefits** (after shadow price) + **Reduction in deadweight burden of taxation**

Reduction in deadweight burden of taxation = TDW [(1- v)*T1 + (1-v)*T2 + T3]

T1 = **taxes on direct wage bill** and on Irish component of direct profits

T2 = **taxes on indirect wage bill** and on Irish component of indirect profits

T3 = (1-v)*(Taxes on direct and indirect foreign profits)+ Lambda*v*(taxes on direct wage bill) + Lambda*v*(taxes on indirect wage bill)

Costs

C = (1 + TDW)*Scheme Cost

Scheme cost includes tax foregone, administration costs and compliance costs

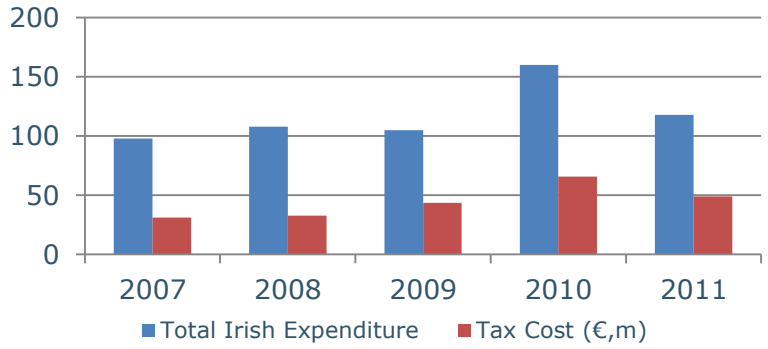
Case Study 2: The Film Relief

Section 481

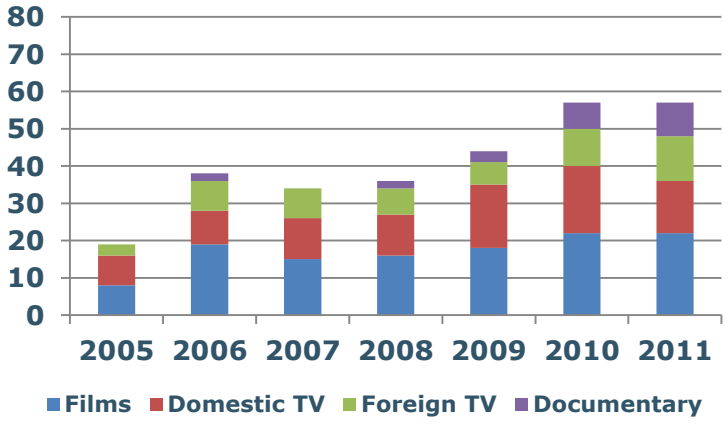
How it operated

- In existence since 1987
- Max of €50m per production
- Income tax incentive (€50K per investor @ marginal rate), Upfront benefit
- TV, Film, Documentary, Animation
- Reformed to tax credit to company (lower cost)

Expenditure of €118m in 2011, costing the exchequer approximately €55m



55 productions in 2011 (€118m in expenditure)



Inefficient subsidy

- Cost €41 (per €100) to provide €28 subsidy to companies
- High return, low risk
- Replaced with direct tax credit to production companies

Data Sources

Main variables	Data source
Labour Expenditure	Revenue Commissioners/Irish Film Board
Materials and services expenditure	Revenue Commissioners/Irish Film Board
Multiplier	CSO
Tax Receipts (PAYE, USC, PRSI, VAT)	Revenue Commissioners
Tax Receipts (Schedule D)	Dept. of Finance estimates using IBEC data
Social Welfare Savings	Indecon (on behalf of IBEC)
Tax Costs	Revenue Commissioners

- **Assembling the dataset involved getting access to Revenue Commissioner administrative records on a confidential basis.**
- **Data also supplied by Irish Film Board.**
- **Some estimates made by Dept. Finance using own analysis and submissions received in consultation round**

Parameter Values

Parameter	Value
Shadow price of public funds	150%
Shadow wage rate	80%
Proportion of shadow wage rate attributable to immigration	55%
Scheme deadweight	35%
Effective Tax Rate	35%
Multiplier – Indirect effects	1.6
Multiplier – Induced effects	N/A

Finally, Sensitivity Tests

Shadow price of labour	100%	80%	60%	50%	40%	30%	20%
Deadweight							
10%	-€38.2m	-€21.1m	-€4.2m	€4.1m	€12.3m	€20.5m	€28.6m
20%	-€41.8m	-€26.5m	-€11.6m	-€4.2m	€3.2m	€10.4m	€17.6m
35%	-€47.1m	-€34.7m	-€22.5m	-€16.5m	-€10.6m	-€4.7m	€1.2m
40%	-€48.9m	-€37.4m	-€26.2m	-€20.7m	-€15.2m	-€9.7m	-€4.3m
50%	-€52.4m	-€42.9m	-€33.5m	-€28.9m	-€24.3m	-€19.8m	-€15.3m
60%	-€56.0m	-€48.4m	-€40.9m	-€37.2m	-€33.5m	-€29.9m	-€26.3m
70%	-€59.5m	-€53.8m	-€48.2m	-€45.4m	-€42.7m	-€39.9m	-€37.2m

End of presentation

- References can be accessed via hyperlinks in soft copy of presentation
- Any questions??