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What has the public sector ever done for us?

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Why is the public sector interesting?

- **It's big**
 - It represents a sizable portion of the economy
- **Its outputs are special**
 - Health, education, policing etc. affect the whole of society, in particular the more vulnerable
 - The private sector often cannot be relied on to produce them efficiently and/or equitably
- **It's getting bigger**
 - Share of general govt spending in GDP forecast to rise from 37.5% in 2000 to 45.2% in 2006

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But surely markets are best?

- **Market failure**
 - Externalities
 - Moral hazard
 - Asymmetric information
 - Economies of scale
- **Public sector may be more equitable/efficient**
- **Public sector has problems too**
 - Incentive problems
- **Leads to bureaucracy and governance by target**

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Measuring public sector performance

- **Many problems in assessing public sector performance**
 - Difficulty in identifying the outputs
 - Lack of market prices
 - Attribution
- **Outputs previously measured by inputs**
 - Makes productivity measurement impossible, by definition

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The price of everything, but the value of nothing

- **Why would we want prices?**
 - Quality change
 - Adding apples and oranges
- **Products and services have a number of characteristics that are valued by consumers**
 - For example, when we compare computers, we compare CPU speed, memory, hard-discs etc.
 - Hedonic regressions of prices on characteristics

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The private sector method in public services

- **Lack of information on prices**
- **Need measure of marginal benefit to the consumer**
 - Cost shares have often been used as weights but may be divergence between marginal costs and benefits
 - Could use value judgement weights but this is controversial
 - Could attempt to impute values

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Problems with cost weighting

- **Are costs and benefits equated?**
 - Agency problems
 - Asymmetric information – moral hazard & SID
- **How do we account for quality change?**
 - Innovations may be both cost reducing and output increasing
 - e.g. The substitution of out-patient for in-hospital treatment may lower the cost of treatment as well as being a more effective method of treatment.
 - Cost weighting would lower the contribution of this treatment to aggregate growth

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Alternatives to cost weighting

- **Assume all outputs are equal**
 - E.g. add up numbers of pupils taught
 - Are all outputs equal?
 - Difficult to account for quality change
- **Get prices from somewhere else**
 - E.g. private healthcare
- **Attempt to measure impact of service on outcomes**
 - Attempt to replicate the workings of the market
 - Health: QALY
 - Education: Effect on earnings

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Health sector productivity

- **Health accounts for 30% of government spending in UK**
- **Very small private sector**
- **Many market imperfections**
- **Obvious candidate for outcome measure**
 - Health effect (QALY)
- **What about other characteristics of health sector (waiting times?)**

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Health sector productivity II

- **Need to obtain *marginal* impact**
 - Health outcomes are a function of medical interventions, diet, lifestyle, environment, genetic factors, etc.)
- **Need to control for these influences**
- **Methods exist for dealing with this**
 - Base calculations on a population that controls for outside influences e.g. OECD age-related disease project
 - Regression methods - regress outcomes on controls

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Measuring NHS outputs and productivity

- **Important to distinguish between**
 - Activities (e.g. operative procedures, diagnostic tests, outpatient visits)
 - Outputs (e.g. courses of treatment - may require a bundle of activities)
 - Outcomes (e.g. the characteristics of output of value to individuals)
- **In public sector focus is on activities**
- **In private sector focus is on outputs**
 - Prices value characteristics
 - Activities embedded in outputs
- **No markets and hence prices for NHS outputs**

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Implementation

- **Cost-weighted activity index (CWAI)**
 - Implies costs reflect valuations at the margin
 - Does this hold for the NHS?
 - May be no practical alternative in the short run
- **Valuation of outcomes**
 - Health outcomes
 - Readmission
 - Waiting times
 - Choice and certainty of date of treatment
 - Patient satisfaction
 - Environment
- **Attribution**

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Health in the National Accounts II

- **Output volume calculated using a CWAI**
 - Cannot account for changes in quality
 - Difficulties in accounting for new procedures
- **Figures for UK are extrapolated from those for England**
- **Input measurement should be relatively simple, but...**
 - No one is quite sure how many people the NHS employs
 - Problems of intermediate goods – e.g. Drugs

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A simple example

Category	Year 1 Unit cost £	Year 1 expenditure £m	Year 1 expenditure shares	Year 1 activities	Year 2 activities	Index 99/00	Index 00/01	% growth 2000/1
Knee replacement	4,785	165.9	0.833	34,662	39,902	100	115.1	15.1
Varicose vein	835	33.3	0.167	39,923	42,150	100	105.6	5.6
Total		199.2	1.000	74,585	82,052	100	113.5	13.5
Total (Old)						100	110	10

- Growth in unweighted index = 10%
- Growth in expenditure weighted index = 13.5
- This is because the it is the more expensive procedure that has grown the fastest

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Education sector productivity

- **Education accounts for 17% of government spending in UK**
- **Very small private sector**
- **Many market imperfections**
- **Three measures of output**
 - Volume or activity measure
 - Test scores
 - Earnings

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Volume of output (activities)

Pupil/Student Numbers, UK, 1994-2001

	Nursery	Primary	Secondary		Further Ed	Higher Education		Special	Total
			age <15	age 16+		UG	PG		
1994	99.0	98.7	97.8	99.2	93.6	93.8	92.0	98.9	96.8
1995	100	100	100	100	100	100	100	100	100
1996	99.4	101.6	98.7	105.8	97.6	102.9	99.8	98.9	100.3
1997	98.9	102.4	99.7	112.7	93.3	106.4	99.3	99.0	100.5
1998	99.2	102.9	100.1	114.3	92.0	118.0	119.4	99.2	102.0
1999	98.2	102.7	102.1	114.2	91.3	115.8	111.8	98.5	101.9
2000	121.1	102.0	102.3	114.5	109.0	117.5	115.8	97.6	105.8
2001	142.8	101.3	103.9	115.5	114.5	123.4	129.1	96.6	107.9
SH95	0.48	38.76	23.76	3.88	21.33	9.03	1.88	0.88	100
G	5.22	0.37	0.85	2.17	2.88	3.92	4.84	-0.34	1.55

Share in total pupils in 1995

Annual growth rate, 1994-2001

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Quality of Output I: Test scores

	KS2: > Level 4	GCSE: % 5 + A*-C	A-levels: % 3+	HE: % 1 st and 2.1
Per cent of pupils/students				
1994	62.5	46.6	66.1	47.2
1995	62.5	47.8	68.9	47.5
1996	62.5	48.4	70.0	47.8
1997	62.5	49.3	69.0	48.2
1998	62.0	50.9	69.4	49.7
1999	70.0	53.1	70.0	50.2
2000	73.5	54.7	86.2	51.1
2001	73.0	55.7	74.2	52.9

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Pupil effectiveness index

$$PUPE_i = a_i PUP_i \lambda_i + (1 - a_i) PUP_i$$

Pupils achieving standard

Value of achieving standard

Pupils not achieving standard

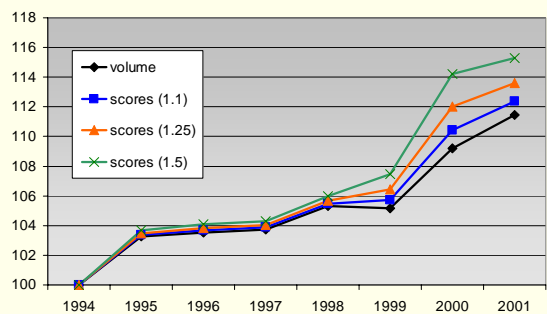
- This can be summed over all levels, i , of education to get the total quality adjusted output

$$\Delta QE_t = \sum_i \omega_i^e \Delta \ln(PUPE_{i,t})$$

- How do we determine λ_i ?

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Quality adjusted indices based on test scores for UK education



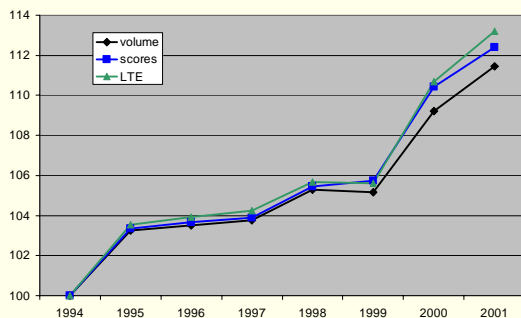
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Quality of outcome II: earnings outcomes

- **Education impacts upon two types of labour market outcomes – earnings and activity:**
 - Employed (earns a wage)
 - Unemployed (earns benefit)
 - Inactive (earns nothing)
- Earnings estimated as a function of education, experience and a set of control variables
- Total effect on lifetime earnings a product of the earnings in each state and the probability of being in each state

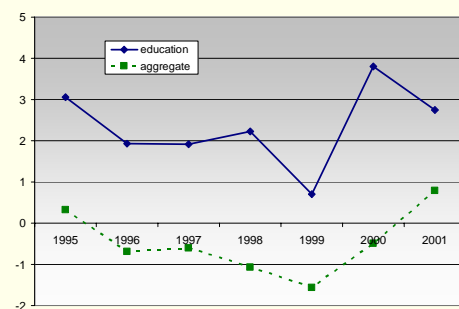
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Output and outcome measures for UK Education, 1994-2001



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Annual differences in labour productivity growth rates, (UK-US), 1995-2001



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A Rough and Ready Guide

- What is the organisation's *raison d'être*?
- Can the outputs/services provided be equated into a simple common metric?
- If not, what are options?
 - Private sector valuations
 - Private firms offering similar outputs/services
 - Private firms offering outputs/services with similar characteristics
 - Other market valuations
 - Surveys (discrete choice experiments?)
 - Cost weights

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