



**National Institute
of Economic and
Social Research**

**Measuring International Comparative
Performance in the Provision of Public
Services: A Review.**

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Summary

1. Why International Comparisons
2. What to measure - outputs or outcomes.
3. International Comparisons using the National Accounts.
4. Outcome based Studies.
5. Conclusions.

Why International Comparisons

As a Benchmark to compare UK Performance

To get a more accurate measure of Britain's relative productivity performance at the aggregate economy level.

Ideally we would like measures of

levels at a point in time

growth rates

Output measurement in the National Accounts: Trends

Output: units produced adjusted for quality change

Most common measure: value of output deflated by a price index - quality adjustment in the prices.

No prices in publicly provided services so use quantity indicators, (e.g. the cost weighted activity index in for the UK health care sector).

Then need to incorporate quality adjustments in the quantity indicators.

Output measurement in the National Accounts

In some private sector services quantity indicators are also used.

General conclusion among productivity analysts

It is valid to compare quantity indicators when the service is publicly provided with a deflated value series in a system where a service is privately provided

The main issue is how to take account of quality change, which is a problem with both types of measurement

Output measurement in the National Accounts: Levels

Comparison of two countries: requires the nominal value of output produced and a measure of the relative price of the service.

Non-market services: nominal GDP is measured by inputs used (generally wage costs plus an allowance for capital consumption)

Could use direct quantities, e.g. number of hospital operations, number of pupils educated etc.

Quality and aggregation problems

Outputs or Outcomes

Should we restrict attention to quality adjusted outputs or should analysis be based on outcomes

in National Accounts

in analysis of International performance

applied to specific services

Are Outcomes a better measure of public sector performance

Arguments put forward by some productivity analysts

Should use outcome measures such as QALY (quality adjusted life years) or lifetime earnings.

Consumer cannot evaluate the merits of different types of services.

Therefore need to look at the effectiveness of these services

Human Repair versus Car Repair (Jack Triplett, Brookings Institution)

Car Repair: measuring real output - expenditures on a sample of car repair jobs, estimate a price index for each job, adjust prices for quality and then deflate expenditures

Alternatively, could estimate marginal benefit to consumer directly

But we do not need to do this as the market ensures the marginal benefit equals the marginal cost of producing equals price.

Passes the consumer's willingness to pay test

Human Repair versus Car Repair

Human Repair

Could also sample expenditures on various types of treatment and construct a price index (derive weighted quantities where health is publicly provided)

or estimate marginal benefit directly using an outcome measure

Human Repair versus Car Repair

Human Repair: Why might we use outcomes

1. Quality issues
2. Third party provider (government or insurance company)
3. Agency problems - the consumer cannot evaluate the effectiveness of treatment

These problems also occur with car repair but main difference is the consumer can scrap the car

Therefore outcomes may give a more accurate measure of performance (both private and public)

Outcome Approach: Examples

Health Care: Outcomes based on valuing additional years of life

Education: Outcomes are investment in human capital, proxied by lifetime earnings

Police: Outcomes may be reduction in crime rates.

Health Studies

Health = H(medical, diet, lifestyle, environment, genetic etc.)

effectiveness of the health sector
= δ (health) / δ (medical intervention)
other influences constant.

Disease based approach

consider population diagnosed with the disease

estimate the extent to which medical interventions raise years of life.

Health Studies

Many studies for the US (heart attacks, breast cancer, depression etc.)

Show considerably higher productivity growth than implied in US National Accounts

Problems

- control for exogenous factors
- chronic diseases underrepresented
- few studies consider quality of life

Education Studies

Jorgenson and Fraumeni, argue 'output' of education sector is investment in human capital - increases productivity of both work and leisure

estimates hours spent and discounted lifetime earnings in market and non-market activities, then calculates differences in earnings from enrolling in education.

Based on individual population data.

Results in very high numbers - increases US nominal GDP in 1987 by 80%. - mainly driven by non-market component.

Education Studies

Problems

valuing non-market time, higher for high earners

does not take account of impact of inherent ability

omits on the job training

Inconsistent with existing national accounts

J & F add new education output figures to other sectors to calculate new totals for US National Accounts

Should National Accounts take on board outcome approach?

National Accounts measures values of transactions in a given period

Outcomes typically stretch longer than this

It is necessary to control for exogenous factors such as lifestyles - difficult to do

There may be external benefits - learning by doing - divergence between private and social benefits

All these go beyond the boundary of the National Accounts - one step too far.

Quality adjustments

Is it possible to do these independent of outcomes

Computer example

Output is number of computers produced

Quality adjustment through hedonic price index

Outcome - increase in output due to use of computers

private benefit equals marginal cost of production

But may be social returns - spillovers

Quality adjustments

Hedonic price index - measures potential output rise
suggests quality adjustment could be based on measures
which have the potential to achieve outcomes

education to a particular standard (GCSEs, A-levels)

effectiveness of medical treatments from trials

problems, estimating grade inflation, data on medical
treatment trials

Alternatively, just live with output measures

frequently quality adjustments are inadequate in the
private sector

International comparisons using National Accounts Data.

Levels: current estimates meaningless

Calculations are implicit in total economy levels comparisons.

If comparing two systems which are publicly provided and nominal output is measured by the wage bill then relative labour productivity is identically one.

Similarly for total factor productivity

Implicit calculations differ from this due to use of PPPs rather than wages as deflators and assumptions on capital consumption.

International comparisons using National Accounts Data.

Growth Rates can be compared as long as quantity indicators or deflated values are employed.

International comparability will be affected by the extent to which the calculations adjust for quality.

And some countries continue to measure trends in outputs by trends in inputs

Example: Comparing US and UK TFP growth in Health and Social Services

International comparisons using National Accounts Data.

National Accounts: Generally data are not available for real materials purchases (no deflators)

Hence estimates are based on two inputs, labour and capital.

More general measure also allows for changes in the quality of inputs, e.g. capital divided into ICT and non-ICT assets, labour divided by skill types.

International comparisons using National Accounts Data.

Conventional measure: Total Factor Productivity (TFP)

Value Added Tornqvist Equation, at time t.

$$d\ln(A) = d\ln(Q) - \alpha^L d\ln(L) - \alpha^K d\ln(K)$$

TFP **Output** **Labour** **Capital**

α^J = input J's share in the value of output, (averaged over periods t and t-1).

TFP is the difference between real output growth and share weighted input growth.

TFP growth, 1979-99.

	UK 1979-99	UK 1989-99	US 1979-99	US 1989-99
Total Economy	1.35	1.14	1.01	1.17
Market Services	1.26	1.01	1.28	1.60
Non-Market	1.09	2.06	1.26	0.74
<i>Health & Social Services</i>	<i>0.87</i>	<i>1.80</i>	<i>1.25</i>	<i>2.48</i>

Impact of ICT and Labour Quality, 1989-99

Non-Market Services % output growth due to:

	UK	US
Labour skills	27	20
ICT capital	2	10

Applying these to health services suggests:

About one percentage point of the 1.80 p.p. rise in UK TFP is due to these changes in factor mix.

In the US changes in factor mix account for 1.8 p.p. of the 2.7 p.p. growth in TFP.

Outcome Based Comparisons: Global Studies

World Health Organisation WHO

Health Systems Attainment Index

measures level of health (health status) and health inequality, responsiveness, fairness of contributions

Ranges from 93 for Japan down to 36 for Sierra Leone

No significant difference among developed industrial nations

Outcome Based Comparisons: Global Studies

OECD Programme for International Student Assessment (PISA)

survey of 15 year-olds in some 30 mainly OECD countries conducted in 2000 (further studies planned)

covered three domains:

reading literacy

mathematical literacy

scientific literacy

Outcome Based Comparisons: Global Studies

Selected results from PISA (2000)

<i>Country</i>	Combined reading literacy		Mathematical literacy		Scientific literacy	
	<i>Mean</i>	<i>Rank (OECD)</i>	<i>Mean</i>	<i>Rank (OECD)</i>	<i>Mean</i>	<i>Rank (OECD)</i>
Australia	528	4	533	5	528	7
Canada	534	2	533	6	529	5
Finland	546	1	536	4	538	3
France	505	14	517	10	500	12
Germany	484	21	490	19	487	20
Italy	487	20	457	23	478	23
Japan	522	8	557	1	550	2
United Kingdom	523	7	529	8	532	4
United States	504	15	493	18	499	14
OECD total	499		498		502	

Outcome Based Comparisons: Global Studies

Problems with PISA

UK results not consistent with previous poor performance in international comparisons (in particular mathematics, below average)

Prais (2002) - doubts relating to

- The nature of the questions asked

- The intended age-group

- Sampling (schools and pupils)

Low British response rate

Outcome Based Comparisons: Other Studies

OECD Age Related Disease Project

Disease based approach

Small number of OECD countries

Considers heart disease, strokes and breast cancer

No clear association between treatment patterns/
technologies and health outcomes.

But UK performance generally poor

Outcome Based Comparisons: Other Studies

NIESR studies on the impact of skills on productivity

Compared the impact of skills on productivity in matched plants for a number of industries (machine tools, furniture, clothing, ceramic tableware, hotels, retailing, financial services)

Aggregate studies - comparing stocks of human capital across countries.

Results show Britain ahead of US but lagging Germany and France

Conclusions

What is the best measure to use in evaluating public sector performance

Depends on question being asked

If comparing across sectors or attempting to derive an accurate measure of the aggregate productivity gap then need national accounts (not outcomes)

If comparing performance of individual sectors then should probably go to an outcome approach

Conclusions

Outcome approach has many difficulties.

But all research faces difficulties

The most robust results can only be carried out at a detailed level

Global studies tend to generate more heat than light
- politically sensitive

Probably best to compare British performance with a small number of countries