
Measuring the Real Output of Services Activities: An Audit of Services Producer Price Indexes

Mary O'Mahony

King's Business School, King's College London

Lea Samek

NIESR



A COLLABORATION WITH



Measuring the volume of service sector activities

- Requires good measures of prices to construct volume measures
 - A priority area for ONS
- The first deliverable for project 2.1 was an audit of methods to measure price change: ONS relative to International practice
- There is an extensive literature on international comparisons of measurement methods and practice
 - E.g. *Eurostat-OECD Methodological Guide for Developing Producer Price Indices for Services*, documents produced by the Voorburg group, and published and internal ONS reports
- In this audit we decided to let the data speak

Services Producer Price Indexes (SPPIs)

- As a starting point we gathered information on SPPIs from data in the public domain
- Focus on Business to Business prices
- We downloaded data for 16 countries and 31 services activities from 2001-2016
- Overall we had a sample of nearly 3000 observations on price changes relative to the change in GDP deflators

Services Producer Price Indexes (SPPIs)

Coverage of SPPIs by Country

<i>Country</i>	<i>No. of SPPIs</i>	<i>Country</i>	<i>No. of SPPIs</i>
UK	31	France	28
US	26	Germany	19
Australia	25	Italy	12
Austria	16	Netherlands	18
Belgium	8	New Zealand	8
Canada	11	Norway	17
Denmark	8	Spain	12
Finland	22	Sweden	23
		Total	284

Services Producer Price Indexes (SPPIs)

Coverage of SPPIs by Activity

Service Activity	No. of SPPIs		No. of SPPIs
4921: COMMERCIAL RAIL FREIGHT	5	6200: COMPUTER SERVICES	15
4939: BUS AND COACH HIRE	3	6830: REAL ESTATE AGENCY	8
4941: FREIGHT TRANSPORT BY ROAD	15	6910: LEGAL SERVICES	10
5011: VEHICLE FERRIES - COMMERCIAL TRAFFIC	3	6920: ACCOUNTANCY	11
5020: SEA & COASTAL WATER FREIGHT TRANSPORTATION SERVICES	12	7022: BUSINESS AND MANAGEMENT CONSULTANCY	12
5210: STORAGE AND WAREHOUSING	14	7111: ARCHITECTURAL SERVICES	10
5224: CARGO HANDLING	11	7112: ENGINEERING SERVICES & RELATED SERVICES	10
5229: FREIGHT FORWARDING.	5	7120: TECHNICAL TESTING AND ANALYSIS	9
5310: NATIONAL POST/PARCELFORCE	8	7312: ADVERTISING SERVICES	10
5320: COURIER SERVICES	15	7320: MARKET RESEARCH	8
5510: LICENSED HOTELS AND MOTELS WITH RESTAURANTS. BUSINESS CUSTOMER	7	7732: RENTING SERVICES OF CIVIL ENGINEERING MACHINES AND EQUIPMENT	8
5620: CANTEENS AND CATERING	5	7800: RECRUITMENT AND PERSONNEL SERVICES	13
5810: BOOK PUBLISHING SERVICES	5	8011: SECURITY SERVICES	13
5920: SOUND RECORDING AND MUSIC PUBLISHING SERVICES	2	8122: INDUSTRIAL CLEANING	14
6110: BUSINESS TELECOMS	11	8210: SECRETARIAL ACTIVITIES	4
6820: PROPERTY RENTALS	8		
		TOTAL	284

Services Producer Price Indexes (SPPIs)

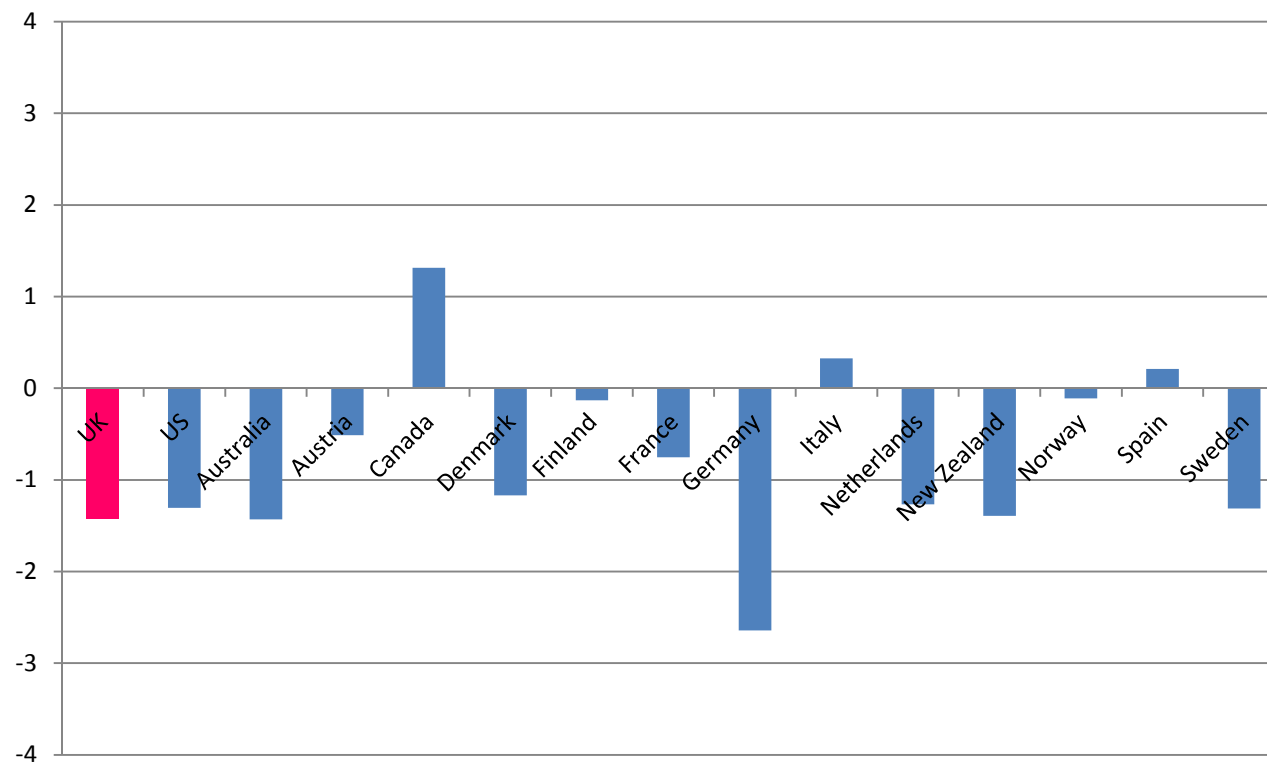
Measurement Methods

- **Direct use of prices of repeated services (RP)** - this uses either real transaction prices, or sometimes list prices, of the same service product in successive survey periods.
- **Contract pricing (CP)** – prices in long term contracts for the repeated delivery of similar services.
- **Percentage fee (PF)** – this method calculates the price of the service as the product of the percentage fee and value of the product to which the fee relates.
- **Unit value (UV)** – this constructs prices as the ratio of revenue to quantities.
- **Model pricing (MP)** – this is based on the hypothetical price of a (representative) standardised service.
- **Time based (TB)** – this is where the price of a service is specified in terms of the time spent in its provision.
- To this we added a further category, **mixed methods (MX)**, where the method was identifiable but involved a mix of the above methods and there was no clear reason to allocate to one of these.

Services Producer Price Indexes (SPPIs)

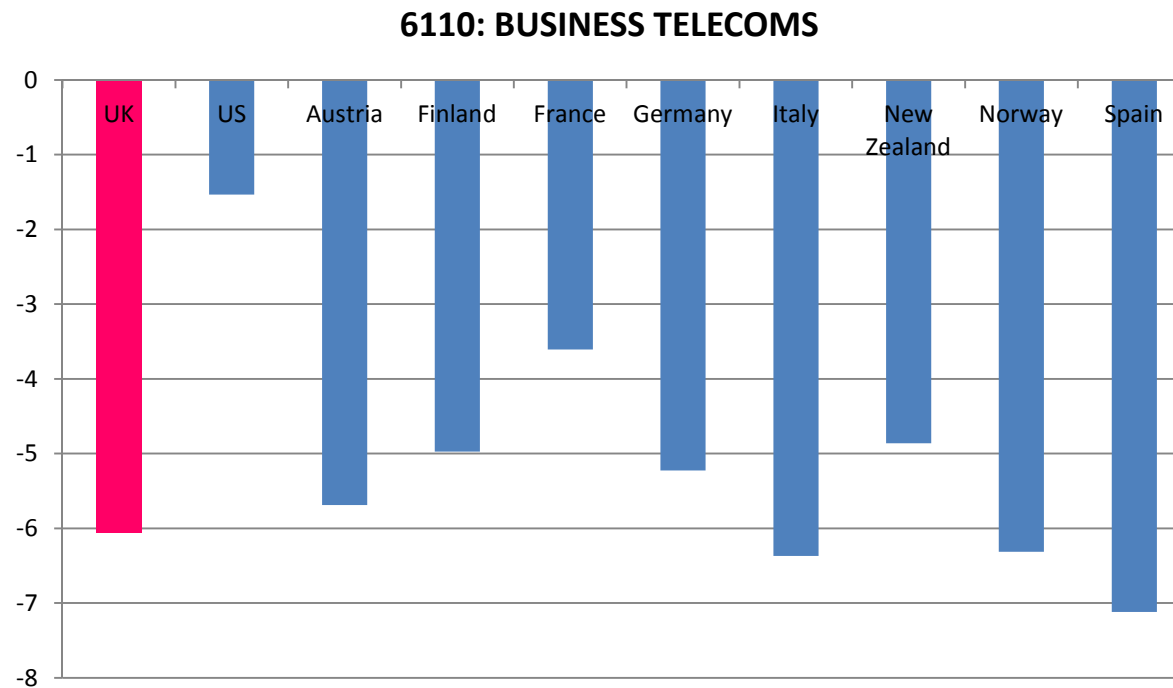
Annual average growth in SPPI, relative to GDP deflator

6200: COMPUTER SERVICES



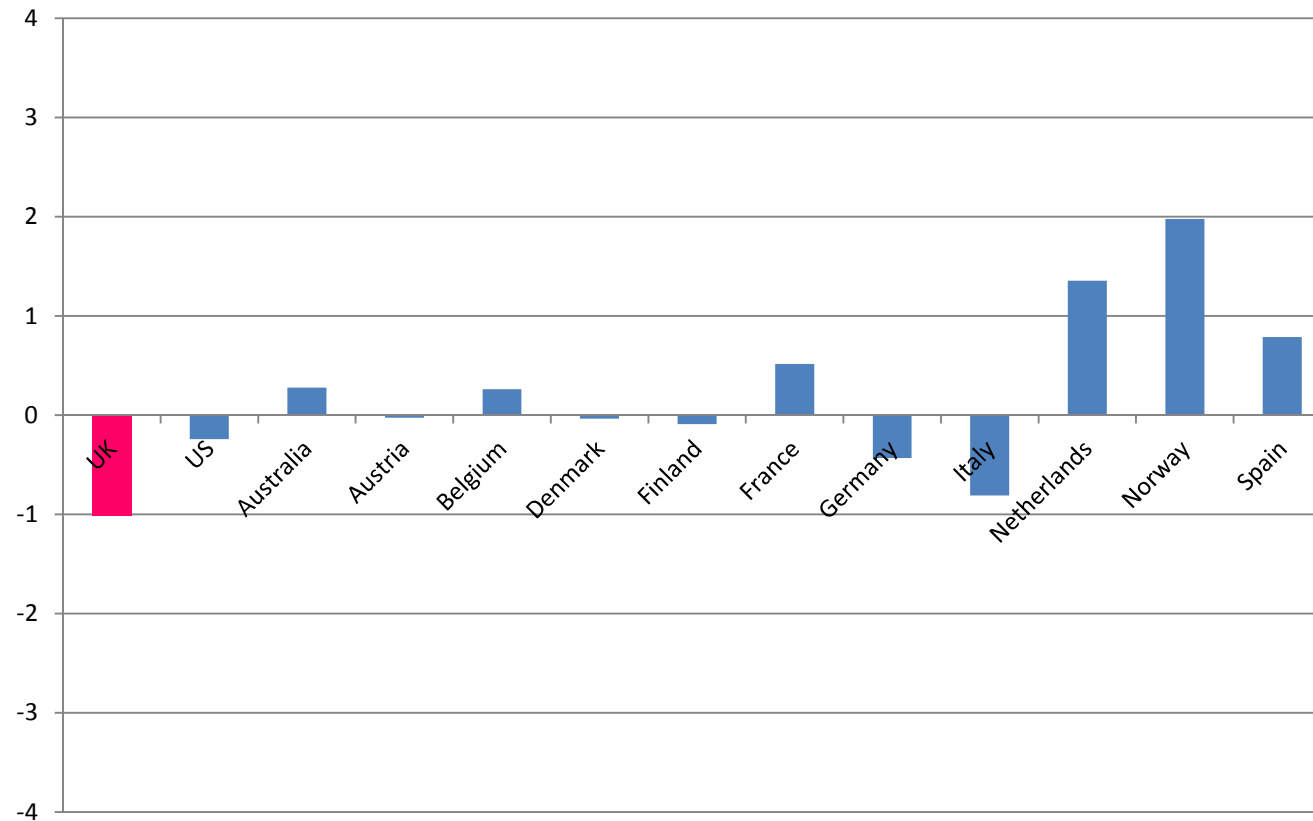
Services Producer Price Indexes (SPPIs)

Annual average growth in SPPI, relative to GDP deflator



Services Producer Price Indexes (SPPIs)

Chart 9a. 7800: RECRUITMENT AND PERSONNEL SERVICES



Main Results (1)

Regressions results: Dependent variables is growth in relative SPPIs

	2001-2016			2006-2016
	(1)	(2)	(3)	(4)
US	0.76*** (3.24)	0.75*** (3.21)	0.64*** (2.85)	0.71*** (2.75)
Australia	0.38* (1.70)	0.40* (1.79)	0.12 (0.54)	0.49* (1.89)
Austria	0.47 (1.56)	0.49 (1.58)	0.50* (1.68)	0.66** (2.12)
Belgium	0.55 (1.42)	0.53 (1.35)	0.18 (0.47)	0.33 (0.84)
Canada	0.58 (1.60)	0.57 (1.57)	0.53 (1.52)	0.84** (2.12)
Denmark	0.61 (1.62)	0.59 (1.54)	0.21 (0.55)	0.33 (0.86)
Finland	0.28 (0.94)	0.26 (0.85)	0.25 (0.88)	0.44 (1.45)
France	0.18 (0.71)	0.12 (0.48)	0.08 (0.34)	0.23 (0.89)
Germany	0.29 (1.05)	0.26 (0.93)	0.21 (0.78)	0.40 (1.38)
Italy	-1.00*** (2.69)	-1.08*** (2.87)	-0.77** (2.14)	-0.64* (1.70)
Netherlands	0.37 (1.34)	0.35 (1.23)	0.35 (1.23)	0.24 (0.82)
New Zealand	0.03 (0.08)	0.05 (0.14)	0.05 (0.11)	0.64* (1.66)
Norway	0.59 ** (2.05)	0.57 ** (1.97)	0.43 (1.52)	0.81*** (2.70)
Spain	0.01 (0.02)	0.02 (0.05)	0.23 (0.70)	0.37 (1.08)
Sweden	0.83*** (3.20)	0.80*** (3.08)	0.62** (2.49)	0.62** (2.25)
Year Dummies	NO	YES	YES	YES
Code Dummies	NO	NO	YES	YES
Adjusted R ²	0.008	0.012	0.13	0.14
No. Observations	2952	2952	2952	2533

Main Results (1)

- Both examination of prices for particular services and panel regressions suggest lower or equal price growth in the UK than most other countries, the main exception being Italy
- Looking at the period 2006-2016, the US, Australia, Austria, Canada, New Zealand, Norway and Sweden all show significantly higher growth, after including time and service activity dummies; there was no significant difference with other countries
- This suggests that the UK poor productivity growth performance relative to other countries in the past decade is unlikely to be due to biases in its measurement of services activities prices

Main Results (2)

Regressions results: Dependent variables is growth in relative SPPIs

	(1)	(2)	(3)	(4)
RP	-0.27 (1.13)	-0.25 (1.00)	0.05 (0.02)	-0.56 (1.62)
CP	-0.26 (0.85)	-0.24 (0.78)	-0.25 (0.82)	-0.84* (1.89)
PF	0.59 (1.16)	0.60 (1.19)	0.99* (1.87)	1.14 (1.59)
UV	-2.42*** (6.79)	-2.38*** (6.69)	-2.45*** (6.64)	-0.74 (1.51)
MP	-0.37 (1.15)	-0.38 (1.18)	-0.75** (2.06)	-0.93** (2.40)
MX	-0.11 (0.44)	-0.09 (0.36)	-0.10 (0.36)	-0.27 (0.89)
Year Dummies	NO	YES	YES	YES
Country Dummies	NO	NO	YES	YES
Code Dummies	NO	NO	NO	YES
Adjusted R ²	0.03	0.04	0.05	0.15
No. Observations	1698	1698	1698	1698

Main Results (2)

- The measurement method appears to matter.
- The preliminary results suggest that growth in prices measured using model pricing (MP) is about 1% lower per annum than that using time based methods (TB).
- A back of the envelope calculation suggests that using MP rather than TB might raise labour productivity in industry M, Professional, Scientific and Technical in the UK, from 0.8% per annum to 1.7%, for the period 2006-2016.
- This is likely to have a small impact on aggregate real GDP but is likely to have knock on impacts in other industries which use these services as inputs

Further work

- More precise estimate of measurement method effect.
- Increase sample size
- Control for other variables that impact on prices, e.g. market structure, regulation and adoption of IT technology
- Impacts on sectoral productivity – using results from ESCoE project 2.3, Sectoral productivity estimates
- Audit of deflators