

Project 1.1: Historical Macroeconomic Data

Feinstein Fulfilled – GDP from the income side 1841-1920

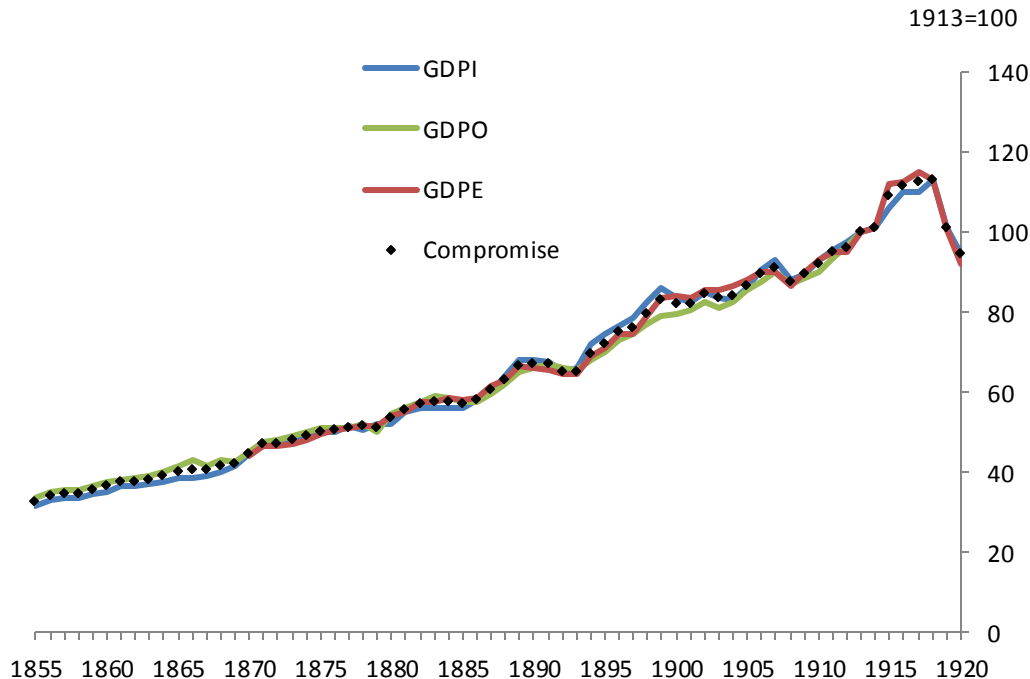
Solomos Solomou (University of Cambridge)

Ryland Thomas (Bank of England)

Background

- **Feinstein's (1972) Compromise index still commonly used as best estimate of late C19th UK GDP**

- Average of Income, Expenditure and Output measures
- Still used in Maddison dataset which feeds into Conference Board TED estimates

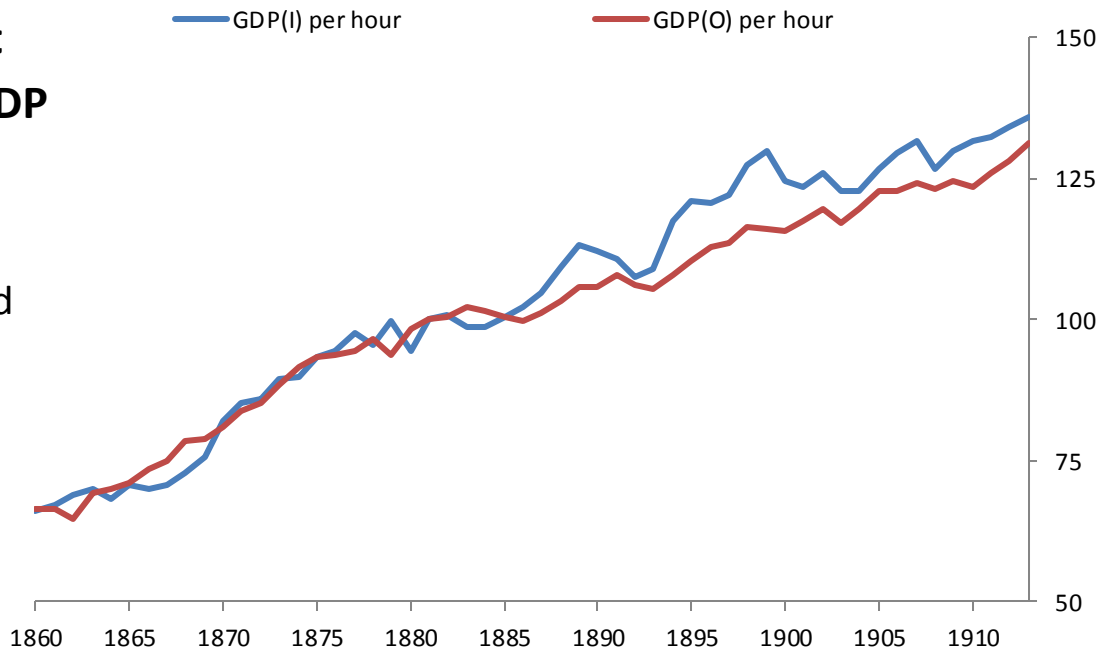


Feinstein Fulfilled

1881=100

- **But the 1972 estimates were not Feinstein's last word on C19th GDP**

- Divergences between different measures
- This matters for quantifying and interpreting the slowdown in productivity in the late C19th

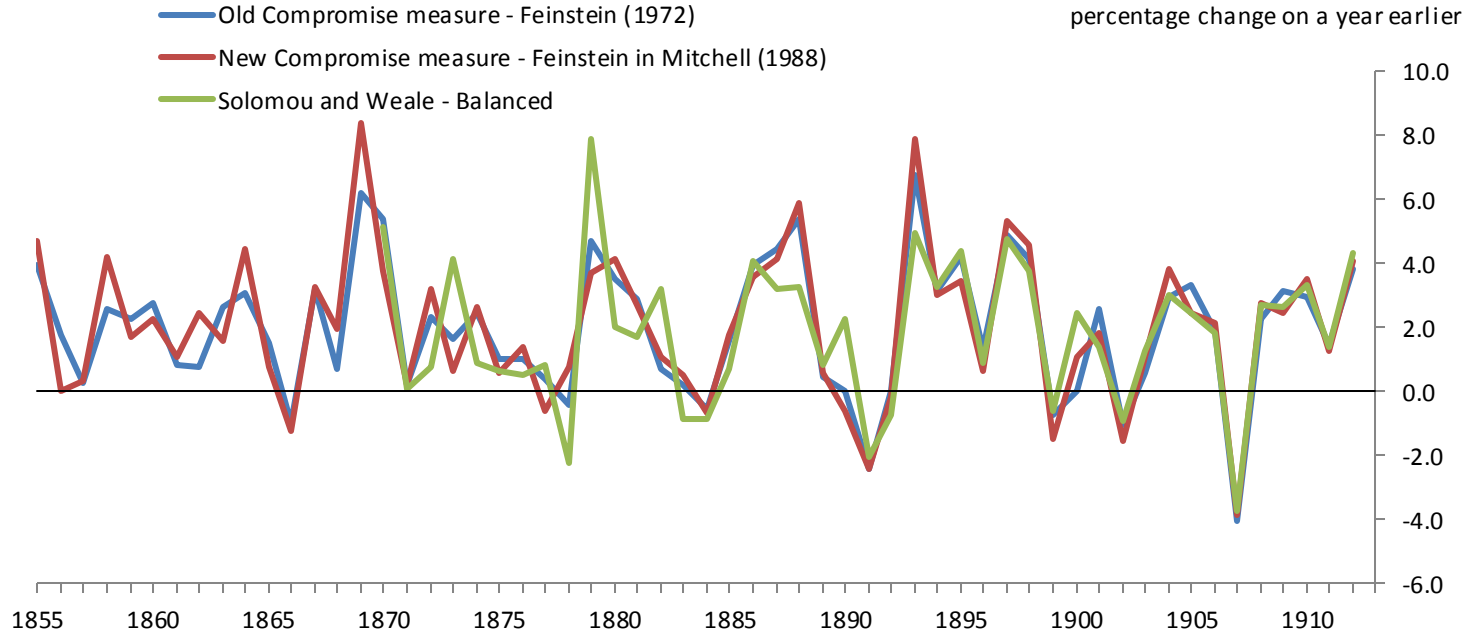


Feinstein Fulfilled

- **Feinstein was not happy and carried out further research**
 - Revisions to the **expenditure and income side** in Feinstein and Pollard (1988)
 - Investment and capital consumption revised 1760-1920
 - Net trade revised to include estimates of non-monetary gold net exports
 - Revisions appear in Mitchell's *British Historical Statistics*(1988) with recalculated compromise estimate
 - Investment revisions in Solomou and Weale's (1989) balanced estimates

Feinstein Fulfilled

- There are three summary measures of UK GDP for the 1870-1913 period a researcher might use !



Feinstein Fulfilled

- **Just to make things more complicated.....**
 - Feinstein made revisions to **output** measure
 - Work with Hildreth (1992) revised the Lewis' industrial production index used in Feinstein (1972)
 - Work with Mark Thomas on 1851 I-O table and industrial and services production (not yet published)
 - Important revisions to **income** measure (focus of this paper)
 - Average Earnings index, Feinstein (1990, 1998)
 - Number of wage earners, Feinstein (1989, 1998)
- **But these have never been brought together in a new compromise/balanced measure**

Feinstein Fulfilled

- **Other scholars have also made relevant improvements to the accounts**
 - Horrell, Humphries and Weale (1994) **Input-output table for 1841**
 - Boyer and Hatton (2002) revised **Unemployment measure for 1870-1913**
 - Broadberry et al. (2015) on the **GDP(O) for Great Britain 1700-1870**
 - Geary and Stark (various) and Andersson and Lennard (2018) on C19th **Irish wages and GDP**
- **So this ESCoE project aims to bring some of these revisions together and develop updated estimates of GDP for the C19th based on latest research**

Income measure of GDP

- **In this paper we focus on reconstructing the income measure based on**
 - Feinstein's revisions to average earnings and the number of wage earners
 - Boyer and Hatton's unemployment measure
- **We then take it back to 1841 to compare with Horrell et al. I-O Tables**
- **We also outline issues still outstanding for the output and expenditure measures**
- **So this paper is a first step**

Income measure of GDP

- **Income measure seen as more reliable estimate for business cycle movements**
 - Uses annual wage, unemployment and income tax data
- **GDP(O) and GDP(E) estimates**
 - Extensive linear/population-based interpolation
 - Lewis Industrial Production index used by Feinstein (1972) has imputed cyclical elements eg using marriages as a cyclical indicator
 - GDP(O) measure uses raw material inputs as a proxy for output in many industries so no account taken of changes stocks
 - Feinstein (1972) made ad hoc adjustments to expenditure estimates for stockbuilding
 - Before 1900 consumption largely a combination of output and trade data

Income measure of GDP

- **However.....**
 - Need an aggregate GDP deflator to convert income measure to real volumes
 - Wage and unemployment data have imperfect coverage
 - Income tax data on profits assessed on an average of previous years' profits
 - Little information on evasion

Income measure of GDP

- 1. The compensation of wage earners**
- 2. The income of salaried workers**
- 3. The income of employers and the self-employed including farmers' income**
- 4. The gross trading profits of companies, non-profit institutions and general government**
- 5. Income derived from rental on dwellings and the operating surplus of the household sector**

Income measure of GDP

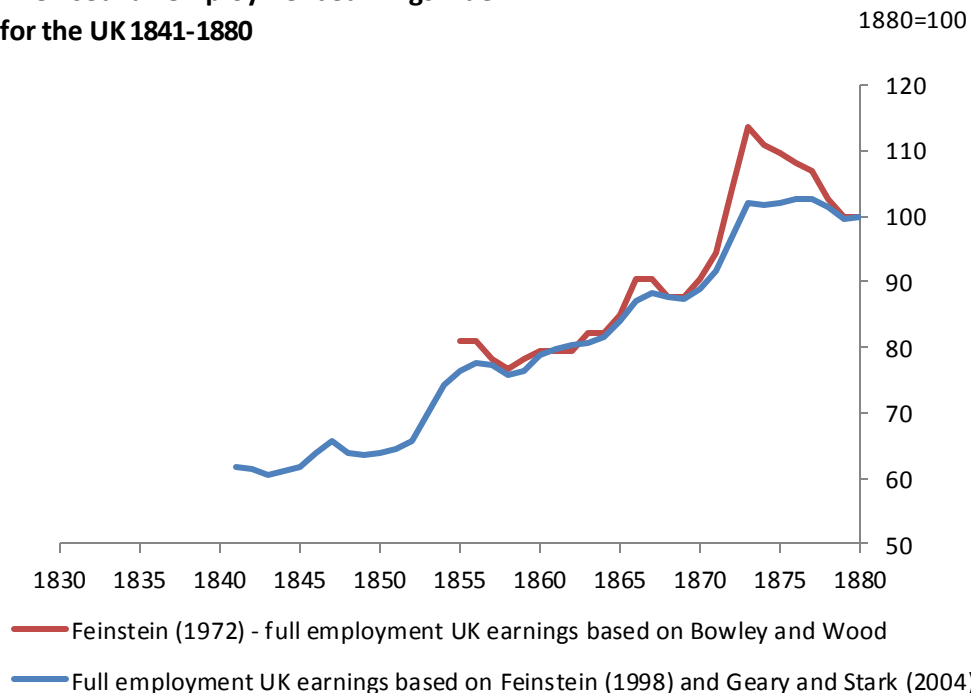
1. The compensation of wage earners

= full employment earnings * number of wage earners * (1 – unemployment rate)

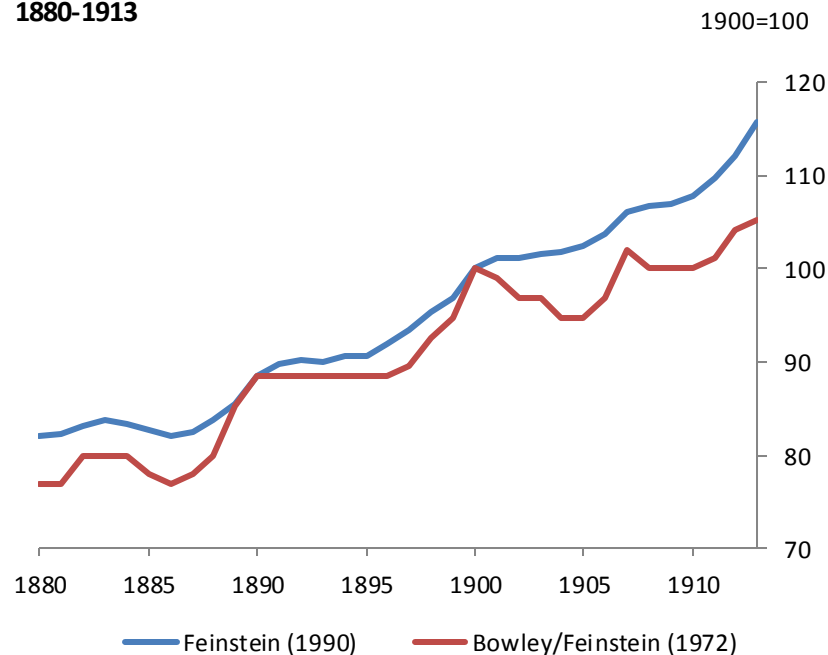
- Feinstein revised the first two in a series of papers (1989,1990, 1998)
- Boyer and Hatton (2002) revisited the later

Revisions to average earnings

A revised full employment earnings index for the UK 1841-1880

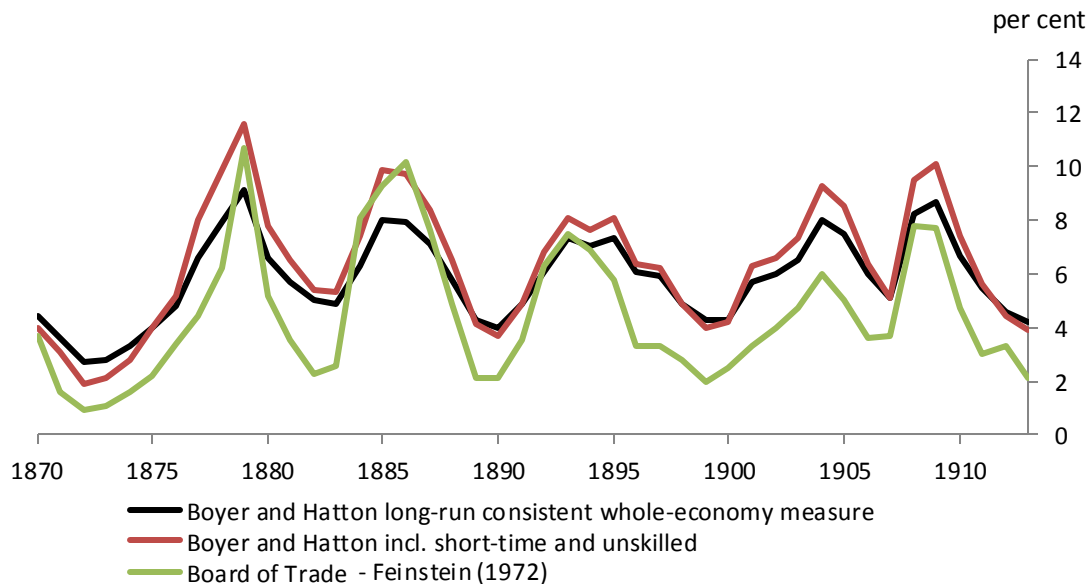


Feinstein's revised earnings index for the UK 1880-1913



Unemployment

- Expanding the coverage beyond unions/skilled labour leads to higher and less volatile measure



Profits and self-employment income

4. Profits and (non-farm) self employment income

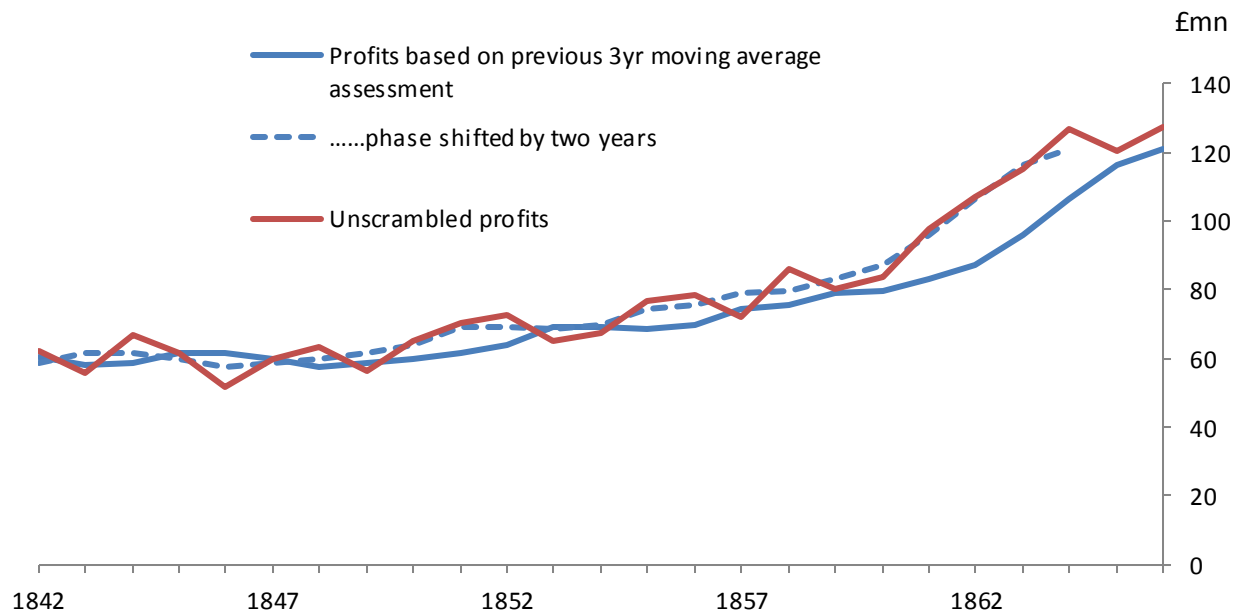
	+	+	-	-	-	+	+	+	-	+	=
	Schedule C Taxable income	Schedule D Taxable income	Taxable income adjustment	Interest paid in the UK	Salaries assessed under schedule D	Small incomes exempt from tax	Total Evasion	Co-ops and charities	Net property income from abroad	Depreci- ation	Gross trading profits + non- farm self- employment income
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	
1851	26	75	3	21	7	43	43	0	10	8	154.3
1861	29	114	4	20	10	61	61	0	20	16	226.9
1871	38	221	8	23	14	67	103	1	40	23	368.0
1881	39	279	10	26	20	70	61	3	60	29	364.9
1891	37	325	12	23	23	80	55	6	94	31	381.2
1901	42	434	16	25	21	101	51	11	107	45	515.1
1911	46	573	21	27	27	117	37	18	177	67	607.0

Profits and self-employment income

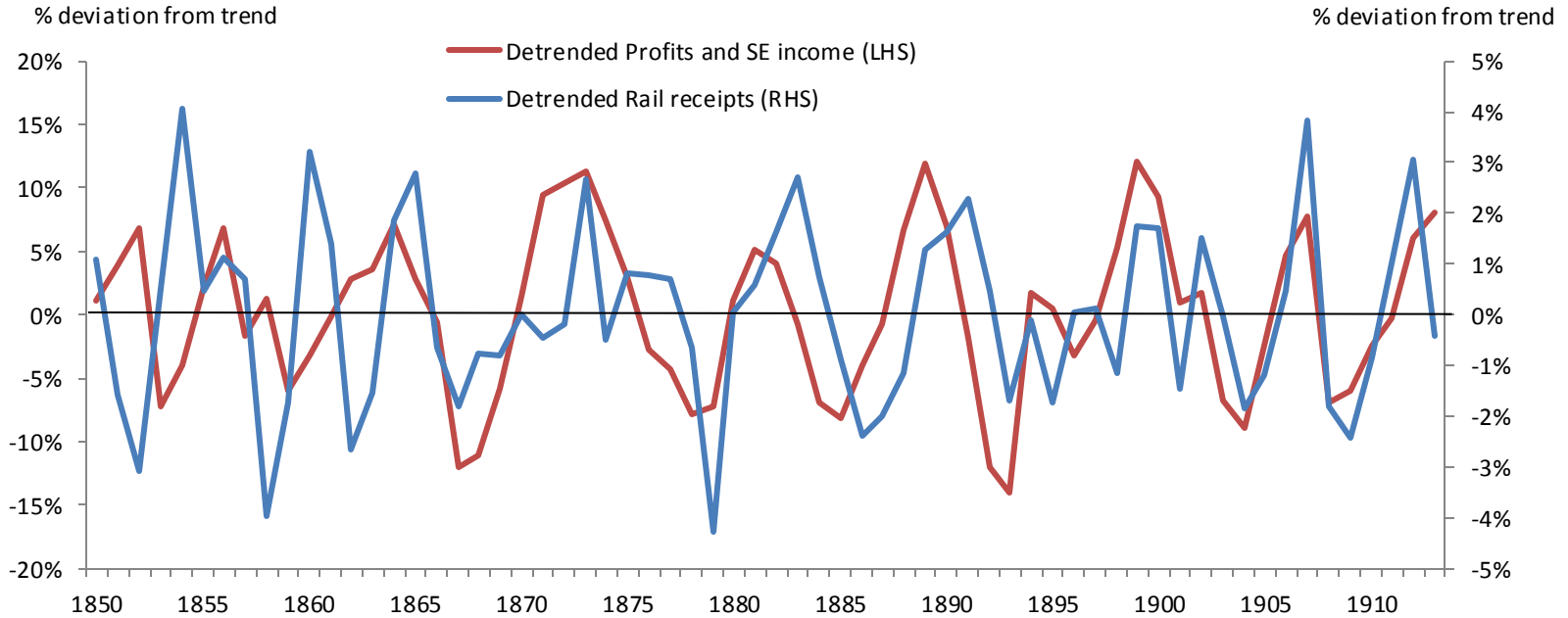
4. Profits and (non-farm) self employment income

	+	+	-	-	-	+	+	+	-	+	=
	Schedule C Taxable income	Schedule D Taxable income	Taxable income adjustment	Interest paid in the UK	Salaries assessed under schedule D	Small incomes exempt from tax	Total Evasion	Co-ops and charities	Net property income from abroad	Depreci- ation	Gross trading profits + non- farm self- employment income
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	
1851	26	75	3	21	7	43	43	0	10	8	154.3
1861	29	114	4	20	10	61	61	0	20	16	226.9
1871	38	221	8	23	14	67	103	1	40	23	368.0
1881	39	279	10	26	20	70	61	3	60	29	364.9
1891	37	325	12	23	23	80	55	6	94	31	381.2
1901	42	434	16	25	21	101	51	11	107	45	515.1
1911	46	573	21	27	27	117	37	18	177	67	607.0

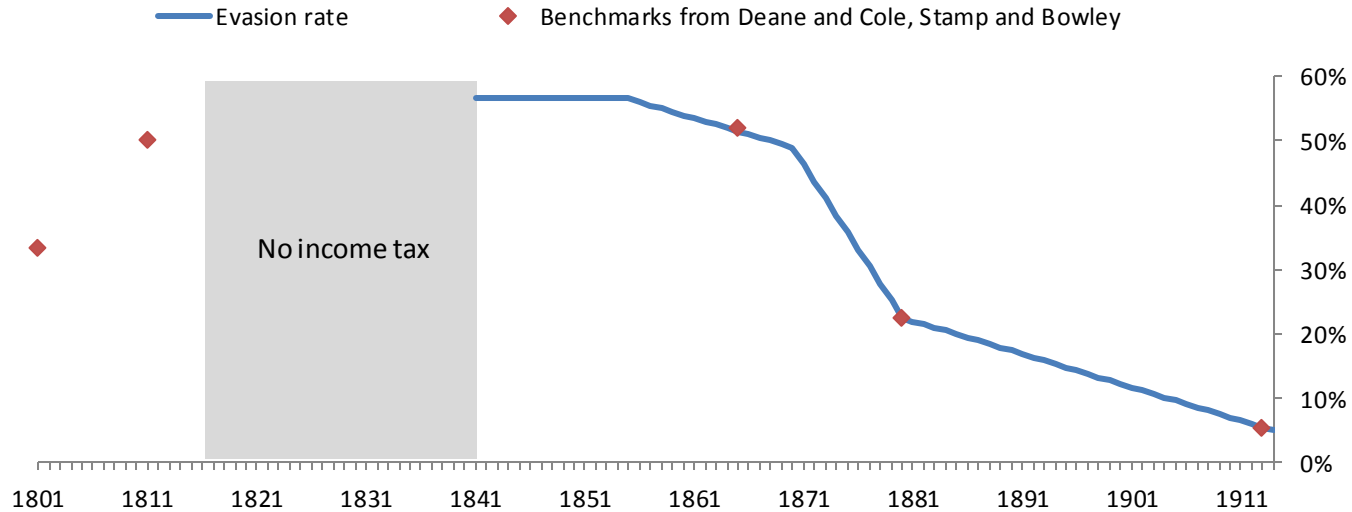
Issue 1 – Unscrambling profits from assessments



Issue 1 – gives you series that peaks “too soon”



Issue 2: Profits and evasion



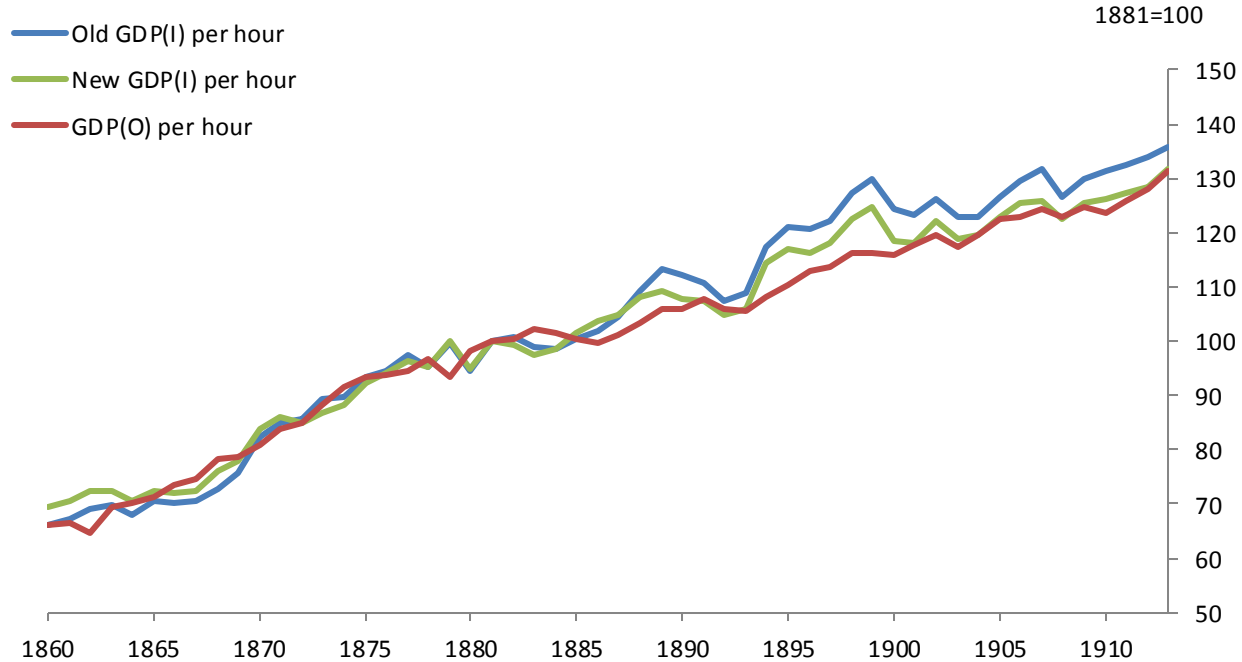
“New” Estimates – Nominal GDP

- New nominal GDP estimates close to 1841 I-O table (3% lower)
- Less discrepancy with Expenditure and Output-based nominal measures

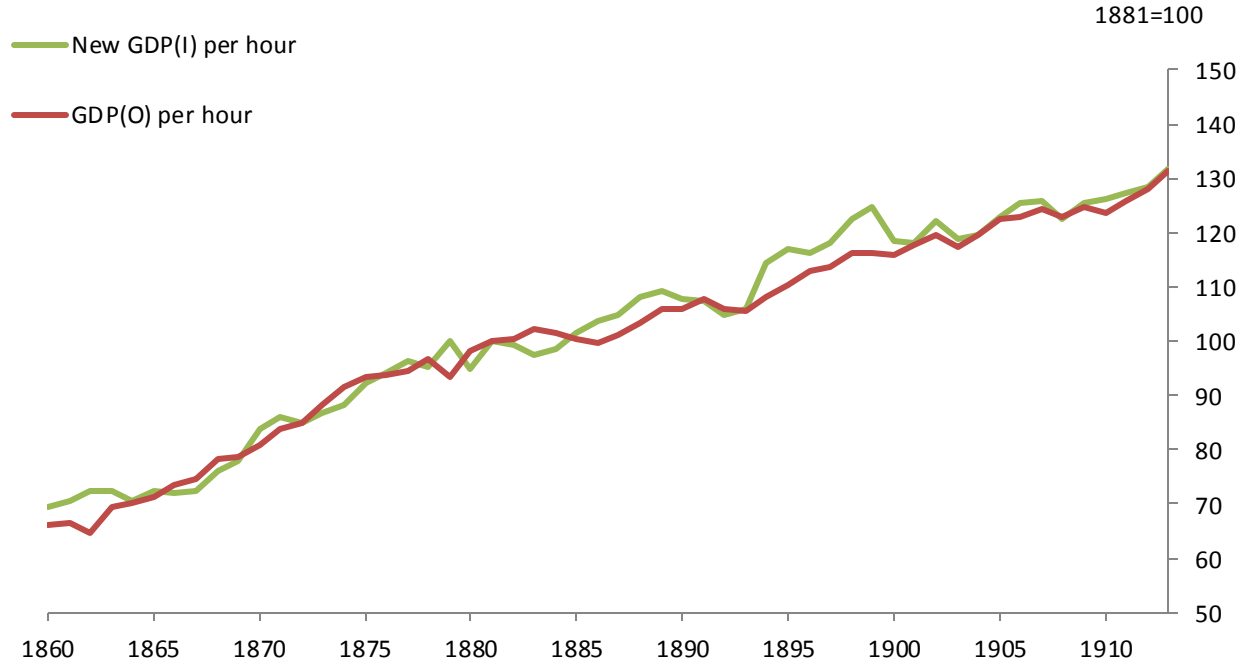
Table 2.2: Nominal GDP at factor cost estimates (£mn)

	Old GDP(I)	Present GDP(I)	GDP(E)	GDP(O) Broadberry et al + A&L	Input-Output Horrell et al (1994)
1841		509	481	563	526
1851		567	565	564	
1861	716	782	821	812	
1870	918	983	1079	1129	
1880	1043	1104	1297		
1890	1299	1313	1373		
1900	1679	1686	1794		
1910	1873	1905	2052		

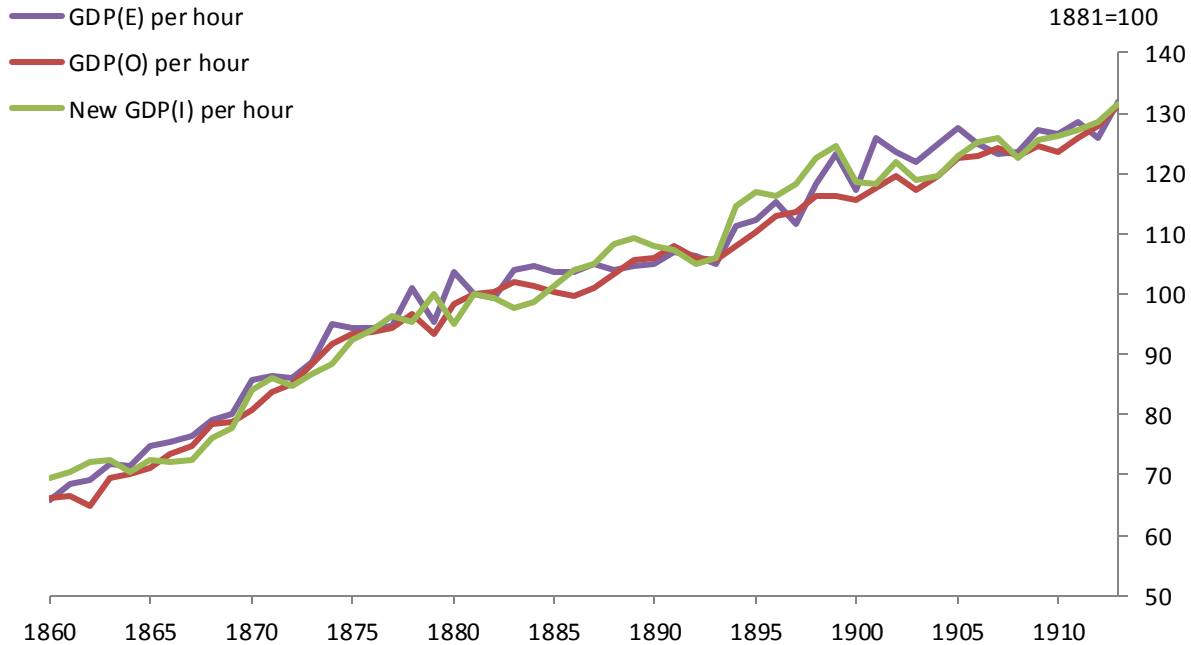
“New” Estimates – real GDP per hour



“New” Estimates – real GDP per hour

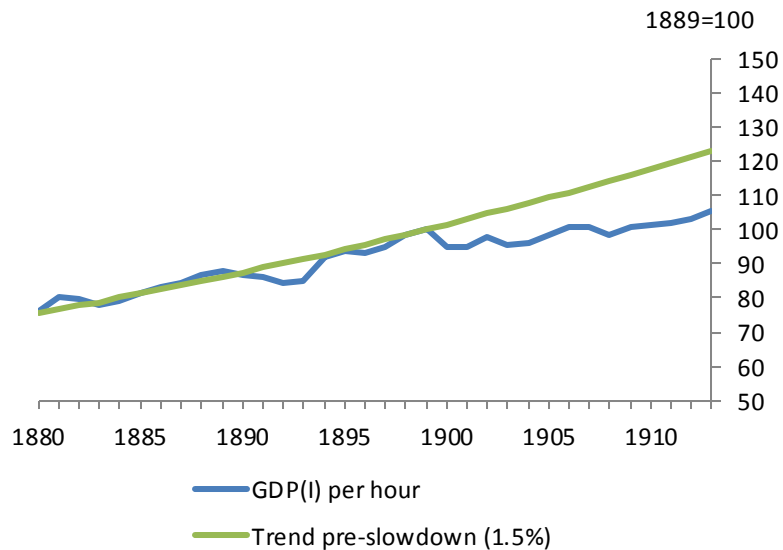


“New” Estimates – real GDP per hour

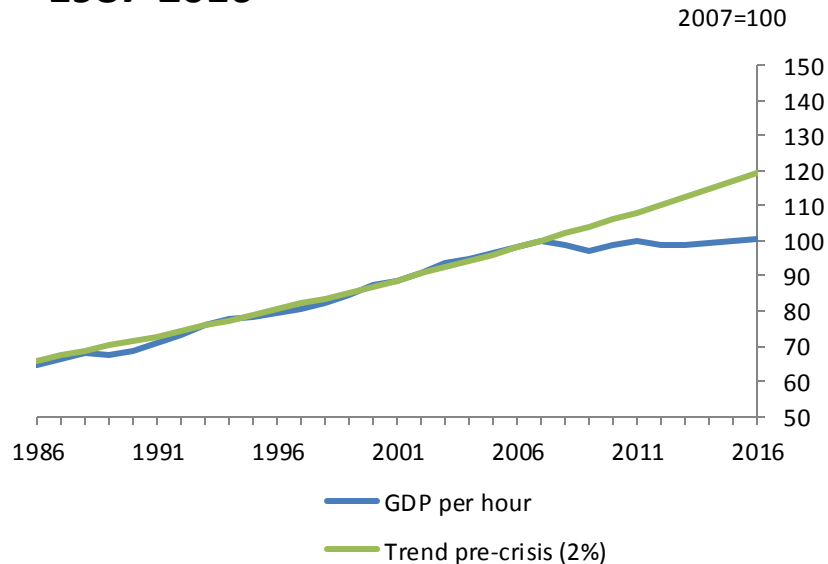


Comparison with today's productivity puzzle

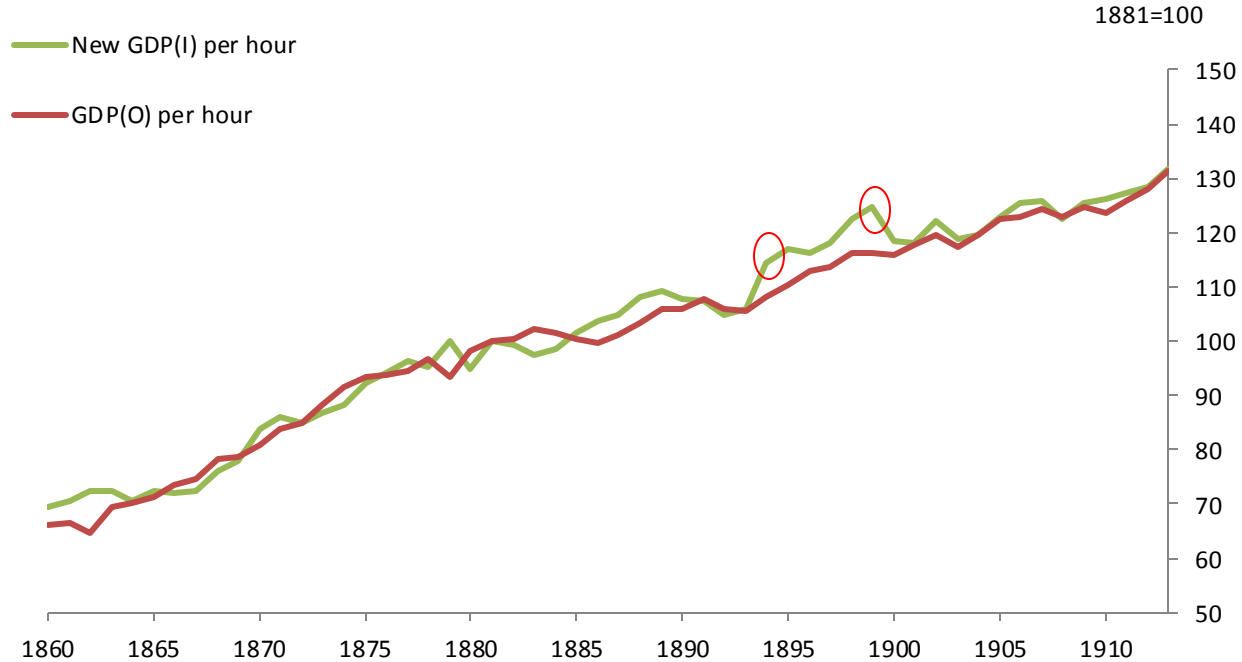
1880-1913



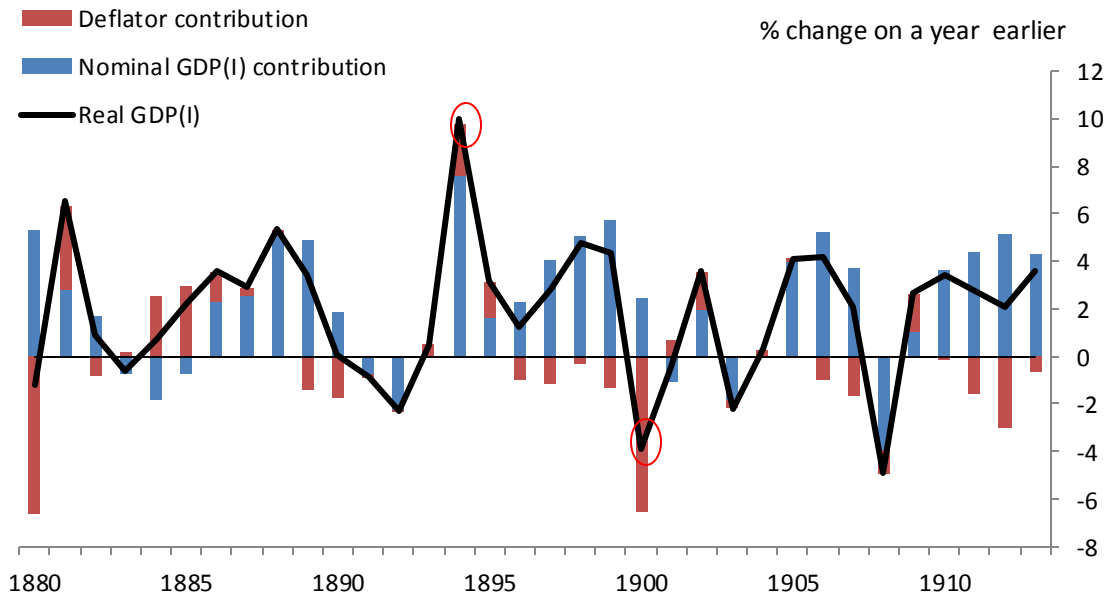
1987-2016



“New” Estimates – real GDP per hour



Possible issue with GDP deflator in 1900



Next steps

- Results so far ESCoE technical paper
- Review expenditure measure and GDP deflator
- Sensitivity to evasion and “unscrambling assumptions”
- Implications for interpreting the productivity slowdown in late C19th, early C20th