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Abstract

This paper employs an extended accounting framework to estimate the role of real GDP growth and inflation in reducing the UK public debt to GDP ratio following the Napoleonic Wars and the two World Wars. Traditional debt accounting methods do not quantify the impact of growth on the budget balance and therefore underestimate the importance of growth. The extended accounting framework captures the impact of growth on the budget balance. Applying the extended approach to the UK shows that growth matters more than previously acknowledged in reducing the historical public debt ratio, especially following the Second World War. Inflation following the Second World War had a sizable but lesser impact on the debt ratio compared to real growth.

Policy points

- The real growth rate matters more than is generally recognised in reducing the public debt to GDP ratio.
- Given the importance of the real growth rate in reducing the public debt ratio, priority should be given to supply-side measures aimed at raising growth.
- Increasing the elasticity of tax revenues to GDP has the potential to improve the future trajectory of the debt ratio by amplifying the positive impact of growth on the budget balance.

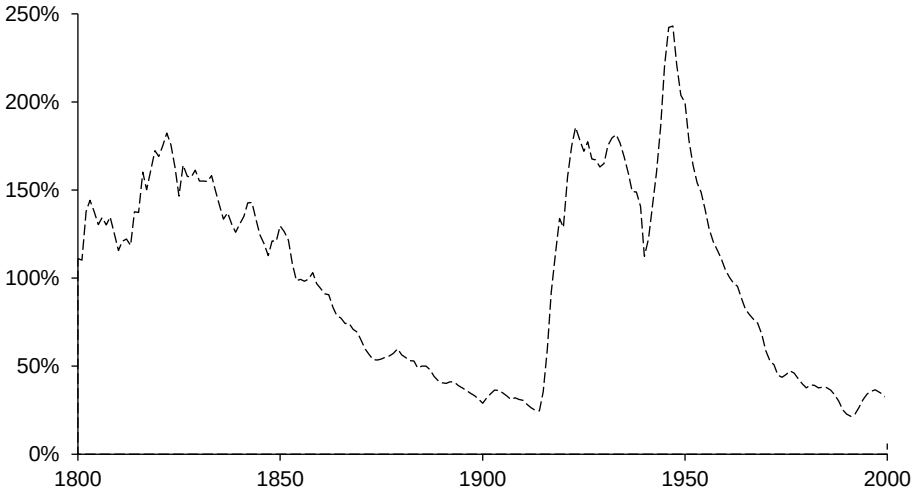
I. Introduction

From 1830 to 1913, the UK public debt to GDP ratio fell from an estimated 159 per cent to 25 per cent.[1] The post-Second World War period saw a similarly significant decline, with the debt to GDP ratio falling from an estimated 200 per cent in 1950 to 65 per cent in 1970. Despite official commitment to debt reduction during the interwar years, the debt ratio fell by just 3 per cent from 1921 to 1938.

[1] See data appendix. Sources match Crafts (2016).

FIGURE 1

UK public debt to GDP ratio, 1800–2000



Macroeconomists often use a well-established traditional accounting method to analyse past changes in the public debt ratio (see equation 1). This traditional accounting method decomposes changes in the public debt ratio into the contributions of the primary fiscal surplus, the interest-growth rate differential and a cumulative stock-flow adjustment term which captures valuation effects such as the impact of exchange rate changes for debt issued in foreign currency, 'below-the-line' fiscal operations such as privatisations, and errors in the data.[2] Crafts uses this method to determine on an ex-post accounting basis how the UK reduced its public debt to GDP ratio following the Napoleonic Wars and the two World Wars.[3] However, the traditional method understates the role of growth in reducing the debt ratio. In particular, it neglects the role of growth in increasing tax revenues and thereby increasing the fiscal surplus/reducing the fiscal deficit. This paper employs a modified version of the extended accounting framework developed by Mauro and Zilinsky to capture more fully the role of growth in reducing the UK's public debt to GDP ratio following the Napoleonic Wars and the two World Wars.[4] The framework is modified to produce an estimate of the impact of inflation on the debt ratio.

II. Traditional accounting

The traditional framework uses the following accounting identity to decompose changes in the debt ratio between any two years:

$$(1) \qquad d_T - d_0 = \sum_{t=1}^{T} \left(\frac{r_t - g_t}{1 + g_t}\right) d_{t-1} + \sum_{t=1}^{T} -b_t + \sum_{t=1}^{T} sfa_t$$

where *d* is the debt to GDP ratio, *r* is the real interest rate, *g* is the real growth rate, *b* is the primary surplus (the fiscal surplus excluding interest payments on the government's

[2] Abbas *et al.*, 2011.
[3] Crafts, 2016.
[4] Mauro and Zilinsky, 2016.

debt), and *sfa* is the stock-flow adjustment term (the statistical discrepancy between the actual change in the debt ratio and the factors on the right-hand side).

Under this equation, real GDP growth erodes the debt ratio because GDP is the denominator of the debt to GDP ratio. Since the equation takes real rather than nominal variables, the impact of inflation on the debt ratio is subsumed into the real interest term; inflation affects the debt ratio by lowering the real interest rate paid by the government.

III. Extended accounting

Mauro and Zilinsky extend the traditional framework to recognise that the primary fiscal surplus (as a percentage of GDP) depends partly on economic growth. They argue that, absent new policy measures, revenues tend to rise in line with nominal GDP, while primary expenditures tend to rise in line with the GDP deflator. For example, a 'neutral policy' approach would see the government raise civil servants' salaries and pensions in line with inflation.[5] The impact of growth on the primary surplus operates both through the business cycle and through changes in the long-run growth rate of the economy.

Under these assumptions, the primary expenditure to GDP ratio ought to erode steadily over time and the primary surplus ought to rise over time by the same amount as long as growth is positive and there are no new policy measures. To the extent that the primary surplus rises compared with the previous year's surplus by more than is implied by the erosion of the expenditure ratio, policy measures (whether tax hikes or real expenditure cuts) account for the difference. Though higher revenues resulting from economic growth enable the government to spend more, raising expenditures (as opposed to reducing the debt) is considered a policy choice enabled by economic growth.

Based on these assumptions, Mauro and Zilinsky derive the following accounting identity to decompose changes in the debt ratio between any two years:

$$(2) \qquad d_T - d_0 = \sum_{t=1}^{T}\left(\frac{r_t}{1+g_t}\right)d_{t-1} - Nb_0 - \sum_{t=1}^{T}\sum_{i=1}^{t} m_i - \sum_{t=1}^{T}\left(\frac{g_t}{1+g_t}\right)d_{t-1} - e_0\sum_{t=1}^{T}\left[1 - \prod_{i=1}^{t}\left(\frac{1}{1+g_i}\right)\right] + \sum_{t=1}^{T} sfa_t$$

Where *m* is policy measures, and *e* is the expenditure to GDP ratio.

According to this accounting identity, the change in the debt ratio is given by cumulative real interest costs, minus the initial primary surplus (N times), minus fiscal policy adjustment measures, minus the traditional real growth term (erosion of the debt ratio), minus the additional real growth term (erosion of the expenditure ratio), plus the cumulative stock-flow residual.

The relative significance of the additional growth term becomes greater when examining the cumulative change in the debt ratio over several years because large primary surpluses stemming from economic growth affect the debt ratio each following year. Policy measures also become more significant in a multi-year setting because they affect the debt ratio in the year they are undertaken and in every following year.

[5] ibid.

However, as with the traditional accounting framework, Mauro and Zilinsky's extended framework uses real variables and therefore does not produce an estimate of the impact of inflation on the debt ratio. To capture the impact of inflation on the debt ratio, equation 3 separates out the real interest term into the impact of the nominal interest rate on the debt ratio and the erosion of the debt ratio by inflation (see Escolano 2010 for a derivation): [6]

$$(3) \qquad d_T - d_0 = \sum_{t=1}^{T}\left(\frac{i_t}{1+\gamma_t}\right)d_{t-1} - \sum_{t=1}^{T}\left(\frac{\pi_t}{1+\gamma_t}\right)d_{t-1} - Nb_0 - \sum_{t=1}^{T}\sum_{i=1}^{t} m_i$$
$$- \sum_{t=1}^{T}\left(\frac{g_t}{1+g_t}\right)d_{t-1} - e_0\sum_{t=1}^{T}\left[1 - \prod_{i=1}^{t}\left(\frac{1}{1+g_i}\right)\right] + \sum_{t=1}^{T} sfa_t$$

where i is the nominal interest rate on the debt, γ is the nominal growth rate, and π is the inflation rate.

In this way, equation 3 provides an estimate of the impact of inflation on the denominator of the debt ratio. It treats the nominal interest rate as being independent of inflation. While prolonged inflation should eventually raise the nominal interest rate on new debt issues, financial repression and the large stock of existing long-term fixed-rate gilts held down the average nominal rate on British government securities after the Second World War. Consequently, in the case of the UK, the treatment of nominal interest rates and inflation as independent is a reasonable approximation. Equation 3 also treats interest rates and trend growth as independent, which is an empirically plausible assumption.[7]

IV. Applying the extended approach to the UK

To what extent is equation 3 suitable for analysing the historical trajectory of the UK public debt ratio? Eichengreen *et al.* note that the framework rests upon strong assumptions about the response of fiscal variables to growth.[8] In particular, elasticity with respect to GDP is assumed to be 1 for revenues and 0 for expenditures. These assumptions turn out to be reasonably accurate when considering large panels of historical data. For the OECD countries from 1960 to 2010, for example, Fatas and Mihov find the elasticity of tax revenue and government expenditure with respect to GDP to be 0.948 and 0.102 respectively.[9] These results are in line with the assumptions of the extended accounting framework. For the UK in particular, Choudry calculates the elasticity of tax revenue with respect to GDP to be 1.24 for the period 1955–74, meaning that, if anything, the extended approach understates the impact of growth on the debt ratio following the Second World War.[10] The elasticities control for exogenous

[6] Escolano, 2010.
[7] Laubach and Williams (2003) use the Ramsey framework to link equilibrium real interest rates with trend growth. More recent studies suggest this link is weak and that real interest rates are largely determined by private sector investment and savings propensities. These have recently been driven by demographic forces, inequality levels within countries, and a preference for higher saving, particularly in Asia (Rachel and Smith, 2015, Rachel and Summers, 2019).
[8] Eichengreen *et al*., 2019.
[9] Fatas and Mihov, 2012.
[10] Choudhry, 1979.

influences such as discretionary changes in tax policy and therefore strip out the impact of policy measures.

Quantitative data on the elasticities of tax revenue and expenditure are lacking for the periods following the Napoleonic and First World Wars. Nevertheless, historical evidence on the structure of taxation suggests that tax revenues were reasonably responsive to economic growth. The reintroduction of the income tax in the UK in 1842 marked the start of a sustained rise in the share of direct taxes and a fall in the share of indirect taxes (in particular customs and excise duties) in the composition of government revenue. Direct taxes on wealth and income rose from 29.5 per cent of central government revenue in 1852 to 57.4 per cent in 1911, while indirect taxes on consumption fell from 70.5 per cent to 42.5 per cent.[11] Since indirect taxes were levied mainly on a narrow range of consumption items with a low income elasticity of demand (sugar, tea, alcohol, and tobacco), they did not attach effective 'handles' to economic growth. By contrast, large incomes were subjected to a higher effective rate of income tax than more modest incomes, making income tax revenues highly responsive to economic growth. This trend towards direct taxation over the nineteenth century thus improved the responsiveness of revenues to growth.

The trend towards direct taxation continued into the early twentieth century, with the share of direct taxes rising from 57.5 per cent in 1913/14 to 66.2 per cent in 1931/32.[12] (For reference, direct taxes accounted for an average of 65.8 per cent of revenue between 1950 and 1970).[13] In this way, although quantitative evidence on the elasticity of tax revenue for the periods following the Napoleonic and First World Wars is unavailable, the structure of the tax system suggests that revenues were responsive to growth in the late nineteenth and early twentieth centuries.

Mauro and Zilinsky acknowledge that, at some point, it becomes economically and politically untenable for governments not to increase real primary expenditures against the background of prolonged economic growth. In a booming economy with rapidly-growing real wages in the private sector, for example, it would eventually become difficult for the public sector to retain its civil servants if their salaries lost competitiveness with the private sector.[14] Other work starting with Adolf Wagner in the nineteenth century suggests that rising national income leads to increased public spending in the long run.[15] However, conclusive evidence for either effect is limited, and therefore treating real government expenditure as being independent of growth (elasticity with respect to GDP of 0) is a plausible assumption. [16]

[11] Daunton, 2001, p. 35, 54, 175–7.
[12] Daunton, 2002, p.175.
[13] Office for National Statistics.
[14] Mauro and Zilinsky, 2016.
[15] Gemmell, 1993.
[16] Baumol's cost disease suggests that government services become relatively more expensive over time due to lagging productivity growth in the public sector, causing public spending to grow (Baumol 1967). However, this hypothesis of government expansion is hard to verify due to the difficulty of measuring government sector output, which until 1998 was taken to be equal to the value of inputs to government activities (Atkinson 2005). This output=input convention implies zero productivity growth, making it impossible to test Baumol's hypothesis.

Wagner's law posits a positive link between national income and public spending. Empirical tests of the law have produced mixed results. Just 44 per cent of studies surveyed by Paparas and Richter (2019) find unqualified support for the law, and many earlier studies suffer from methodological problems with spurious regression (Henrekson 1993).

V. Results

Table 1 provides the decomposition of the debt ratio reductions following the Napoleonic Wars and two World Wars using the extended accounting framework. The analysis divides the 82-year period of debt reduction following the Napoleonic Wars into three shorter sub-periods that correspond to the sub-periods analysed by Crafts. The results reveal that growth had a greater impact in eroding the public debt to GDP ratio than suggested by the traditional accounting method, especially during the 1950–70 sub-period when real annual GDP growth averaged 3.25 per cent. During this sub-period, the impact of growth via the primary balance was more than twice as large as implied by the traditional method. Figure 2 compares the traditional and additional contributions of real growth to reducing the debt ratio.

The results also highlight the significance of the inflation rate in determining the trajectory of the debt ratio. Average inflation was negligible from 1831 to 1913 and therefore had little impact on the debt ratio. However, the deflation of the interwar period caused the debt ratio to rise by an estimated 53 per cent of GDP. By contrast, higher inflation following the Second World War caused the debt ratio to decline by as much as 85 per cent of GDP from 1950 to 1970. During this period, financial repression held down nominal interest rates relative to inflation, preventing higher nominal rates from offsetting the impact of inflation.[17] In this way, while not as significant as real growth, inflation and deflation nonetheless had sizable impacts on the debt ratio during the twentieth century.

[17] Dow, 1970; Blackaby, 1979; Allen, 2014.

FIGURE 2

Traditional and additional contributions of real growth to changes in UK public debt ratio, per cent of GDP

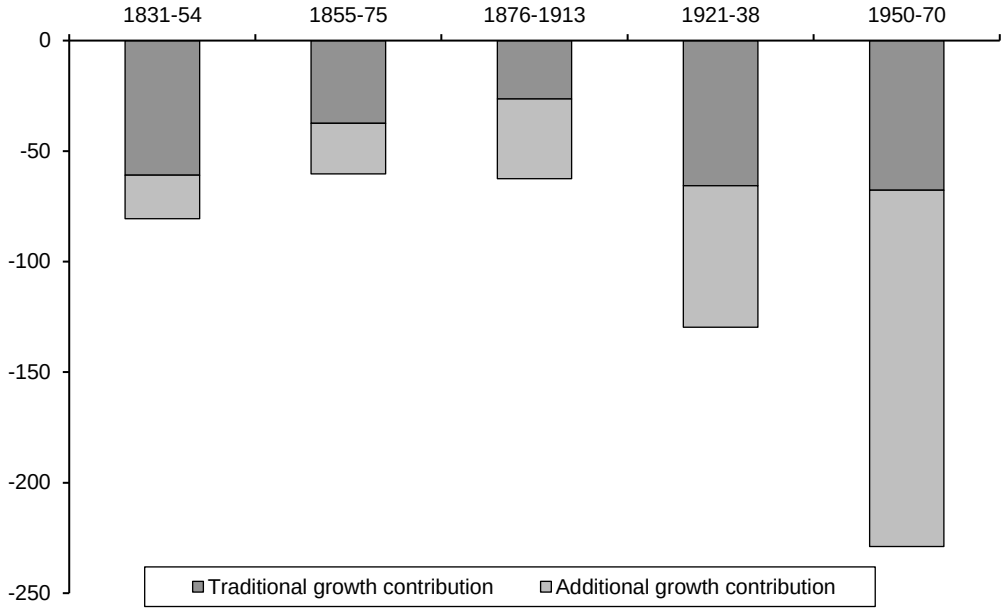


FIGURE 3

Contribution of inflation to changes in UK public debt ratio, per cent of GDP

TABLE 1

Decomposition of changes in UK public debt to GDP ratio

Per cent of GDP

	Initial debt ratio	*Final debt ratio*	*Change*	*Nominal interest component*	*Inflation component*	*Initial primary surplus*	*Measures*	*Traditional growth component (derived from Crafts 2016)*	*Additional growth component*	*Stock-flow adjustment*
1831–54	157.9	103.9	-53.9	115.5	7.8	-146.9	52.7	-60.9	-19.7	-2.4
1855–75	101.8	54.7	-47.1	54.2	-5.4	-55.6	28.0	-37.5	-22.8	-8.1
1876–1913	56.5	24.7	-31.8	57.2	1.4	-80.7	63.5	-26.4	-36.1	-10.7
1921–38	147.2	143.8	-3.4	120.1	53.9	-86.8	43.7	-65.7	-64.0	-4.7
1950–70	200.3	64.7	-135.6	88.3	-95.4	-132.8	251.7	-67.7	-161.2	-18.4

Note: The sum of columns 4–10 equals the change in the debt ratio (column 3).
Sources: See data appendix.

VI. Lessons

This analysis demonstrates that economic growth played a more important role than previously thought in the past reduction of the UK public debt ratio. Crafts emphasises the role of primary budget surpluses in reducing the debt ratio. The extended accounting framework demonstrates that these primary surpluses to a large extent derived from the impact of economic growth on the government's tax revenues, especially after the Second World War. Supply-side policies aimed at raising GDP growth are therefore a more valuable complement to fiscal consolidation in reducing the debt ratio than previously acknowledged.

Secondly, the framework highlights the possibility of improving the responsiveness of the primary budget balance to economic growth as part of a debt reduction strategy. Increasing the elasticity of tax revenues with respect to GDP should generate additional tax revenues for a given increase in GDP and thereby automatically increase the primary surplus/reduce the primary deficit. Mathematically, doubling the elasticity of tax revenues doubles the impact of economic growth on the primary surplus for any given year. Considering the substantial historical contribution of growth to reducing the debt ratio via the budget balance, such reforms could have a sizable impact on the future trajectory of the debt ratio.

Finally, given the favourable impact of inflation on the debt ratio following the Second World War, it may be tempting to conclude that a higher inflation rate would help to reduce the debt ratio. Notwithstanding the current official commitment to the 2 per cent inflation target, there are at least two reasons why inflation may not be as effective as it was in the past as a tool for reducing the debt ratio. Firstly, in the absence of financial repression, nominal interest rates will respond more quickly to changes in inflation as investors demand higher interest rates to compensate for higher expected inflation. Secondly, as of the end of 2020, index-linked gilts made up 24 per cent of the government's debt portfolio.[18] Consequently, there now exists an automatic link between inflation and the nominal interest rate on a large proportion of the debt. For these reasons, inflation will likely have a greater impact on nominal interest rates than in the past, offsetting the favourable impact of inflation on the debt ratio.

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Data Appendix

Note: b is primary budget surplus to GDP ratio, *t* is government receipts to GDP ratio, *e* is primary government expenditure to GDP ratio, *i* is average nominal interest rate on government debt, π is rate of inflation, *g* is real GDP growth rate, *d* is public debt to GDP ratio.
Sources: Sources match Crafts (2016).

TABLE 2

Fiscal sustainability data, UK 1831–1913

	b	*t*	*e*	*i*	π	*g*	*d*
1831	6.39	11.04	4.56	3.71	-5.07	4.47	1.579
1832	5.76	10.94	4.87	3.61	-2.99	-1.43	1.647
1833	6.13	10.63	4.74	3.61	-2.71	1.45	1.666
1834	5.99	10.87	4.07	3.65	1.89	4.28	1.566
1835	5.69	10.06	3.87	3.68	0.53	5.08	1.470
1836	2.38	9.56	6.51	3.62	4.78	1.86	1.406
1837	5.19	8.90	4.56	3.72	-3.18	-0.73	1.465
1838	5.04	9.74	3.75	3.75	0.60	5.51	1.377
1839	4.80	8.80	3.69	3.73	1.05	4.36	1.305
1840	4.95	8.49	4.20	3.75	-3.45	-2.84	1.393
1841	5.18	9.15	4.40	3.73	-1.16	-3.61	1.466
1842	5.33	9.57	4.75	3.74	-3.18	-0.71	1.533
1843	4.96	10.08	4.94	3.73	-3.44	3.05	1.538
1844	5.45	9.90	4.62	3.70	3.71	5.40	1.411
1845	5.70	10.07	4.06	3.87	0.57	5.29	1.325
1846	5.09	9.77	3.94	3.63	0.13	6.75	1.236
1847	4.70	9.03	4.09	3.60	6.42	-2.50	1.186
1848	3.99	8.79	4.82	3.58	-6.94	3.17	1.244
1849	4.24	8.81	4.68	3.61	0.26	1.46	1.226
1850	5.08	8.92	4.55	3.59	-6.76	-1.73	1.338
1851	4.93	9.63	4.24	3.58	0.66	4.40	1.268
1852	4.85	9.17	4.10	3.59	-1.00	1.97	1.249
1853	4.28	8.95	3.87	3.59	8.87	2.89	1.113
1854	4.13	8.15	3.72	3.63	4.23	1.74	1.039
1855	2.78	7.85	5.37	3.59	1.37	1.45	1.018
1856	0.60	8.15	8.14	3.50	-0.10	4.15	1.012
1857	3.09	8.75	5.88	3.55	-0.24	1.25	1.009
1858	3.56	8.97	5.14	3.55	-3.00	-1.48	1.052
1859	3.40	8.70	4.35	3.55	1.19	6.74	0.974
1860	3.53	7.75	4.94	3.56	0.34	-0.58	0.973
1861	2.61	8.47	5.27	3.26	2.77	4.12	0.910
1862	2.58	7.88	5.15	3.27	0.56	0.34	0.901
1863	2.60	7.73	4.65	3.26	1.77	4.50	0.847
1864	2.68	7.25	4.16	3.30	3.76	1.72	0.794
1865	2.69	6.83	3.91	3.34	-1.08	4.98	0.760
1866	2.38	6.61	3.71	3.35	3.42	0.91	0.721
1867	2.48	6.09	3.81	3.35	-0.75	0.10	0.722

1868	2.09	6.29	4.19	3.55	-3.20	3.30	0.695
1869	2.01	6.28	4.49	3.54	-1.29	2.13	0.690
1870	2.92	6.51	3.47	3.62	-2.26	8.24	0.649
1871	2.25	6.39	3.39	3.63	2.58	2.19	0.611
1872	2.36	5.65	3.39	3.64	5.90	-0.60	0.579
1873	2.44	5.75	3.13	3.66	4.13	1.38	0.546
1874	1.98	5.57	3.44	3.67	-2.31	6.03	0.523
1875	2.10	5.42	3.49	3.76	-4.83	-0.56	0.547
1876	2.18	5.59	3.70	3.75	-2.51	0.00	0.565
1877	2.30	5.88	3.89	3.77	-2.30	-1.05	0.585
1878	1.96	6.19	3.97	3.77	-0.22	5.86	0.558
1879	2.28	5.93	4.72	3.81	-5.75	-5.77	0.634
1880	1.44	7.00	3.87	3.81	6.88	12.00	0.535
1881	2.33	5.32	3.93	3.99	-3.03	-2.19	0.559
1882	2.26	6.27	4.05	4.04	0.94	0.89	0.547
1883	2.13	6.31	4.11	4.06	-0.28	5.61	0.518
1884	2.17	6.23	4.09	4.44	-2.35	0.42	0.476
1885	2.17	6.27	4.52	4.43	-2.76	-1.60	0.497
1886	1.59	6.69	5.22	3.58	-1.20	1.20	0.499
1887	2.13	6.81	4.59	4.27	-0.42	3.08	0.485
1888	2.10	6.73	4.49	4.07	-0.13	1.02	0.460
1889	2.00	6.59	4.31	4.03	1.39	3.09	0.438
1890	1.94	6.32	4.50	3.96	1.66	1.50	0.421
1891	1.81	6.44	4.65	3.88	0.04	1.80	0.412
1892	1.77	6.45	4.86	3.86	0.04	-0.44	0.412
1893	1.75	6.62	4.97	3.85	-0.38	-1.90	0.419
1894	1.52	6.71	4.89	3.84	-2.12	7.68	0.396
1895	1.57	6.41	5.02	3.86	-1.27	1.92	0.390
1896	1.66	6.58	5.05	3.81	1.03	4.47	0.367
1897	1.62	6.71	5.32	3.96	1.07	-1.80	0.368
1898	1.58	6.94	5.12	3.97	0.27	6.65	0.343
1899	1.27	6.71	5.03	3.99	1.37	6.72	0.316
1900	0.49	6.30	6.27	4.08	6.25	-3.53	0.296
1901	-1.63	6.76	8.47	3.15	-0.39	7.00	0.307
1902	-1.54	6.84	9.18	3.17	-0.98	-1.42	0.342
1903	-0.29	7.64	8.40	3.80	0.39	-0.99	0.360
1904	1.06	8.11	6.40	3.59	-0.04	2.00	0.351
1905	1.36	7.46	5.97	3.51	-0.18	3.19	0.339
1906	1.49	7.34	5.80	3.52	0.91	0.14	0.332
1907	1.57	7.29	5.63	3.29	1.52	0.47	0.318
1908	1.61	7.20	5.75	3.15	-3.90	2.74	0.315
1909	1.31	7.36	5.70	3.24	3.35	-1.70	0.307
1910	-0.20	7.01	6.14	3.07	0.67	1.82	0.306
1911	2.42	5.94	6.33	3.13	1.43	3.72	0.279
1912	1.31	8.75	6.48	3.16	2.95	-0.89	0.267
1913	0.98	7.78	6.49	3.18	0.54	5.81	0.247

Variable	*Source*
Debt interest charges	Mitchell (1998), Total debt charges, p. 587
Total public debt	Mitchell (1988), Total funded and unfunded debt, p. 601
Nominal GDP	Mitchell (1988), Gross Domestic Product at current market prices, p. 831
Real GDP	Mitchell (1988), Gross Domestic roduct at constant market prices, p. 837
Inflation	[derived from nominal and real GDP]
Government expenditure	Mitchell (1988), Total gross expenditure, p. 587
Government receipts	Mitchell (1988), Total gross income, p. 581

TABLE 3

Fiscal sustainability data, UK 1921–38

	b	*t*	*e*	*i*	*π*	*g*	*d*
1921	5.10	24.41	19.30	4.41	-10.52	-9.71	1.472
1922	7.47	25.64	18.17	4.45	-16.05	5.31	1.668
1923	8.92	24.86	15.94	4.52	-8.01	2.96	1.762
1924	7.60	23.26	15.66	4.58	-1.39	4.72	1.726
1925	6.46	22.57	16.11	4.59	0.27	3.52	1.633
1926	6.10	24.04	17.95	4.85	-1.41	-3.12	1.717
1927	6.89	23.95	17.06	4.57	-2.36	7.69	1.635
1928	7.53	24.21	16.68	4.75	-1.12	0.89	1.613
1929	7.00	23.84	16.84	4.85	-0.34	2.85	1.584
1930	6.15	24.14	17.99	4.75	-0.40	-0.80	1.592
1931	5.41	25.92	20.51	4.51	-2.40	-4.64	1.698
1932	7.25	27.41	20.16	4.49	-3.58	0.07	1.736
1933	7.42	26.93	19.51	3.89	-1.40	3.18	1.792
1934	6.76	25.59	18.83	3.61	-0.68	5.97	1.731
1935	5.68	25.02	19.34	3.63	0.87	3.70	1.650
1936	4.95	24.95	20.00	3.58	0.55	4.77	1.587
1937	3.89	24.54	20.65	3.66	3.73	3.50	1.472
1938	1.56	24.44	22.88	3.63	2.77	0.78	1.438

Variable	*Source*
Debt interest charges	Middleton (1996), Table A1.1, Debt interest, p. 648
Total public debt	Mitchell (1988), Total funded and unfunded debt, p. 601
Nominal GDP	Middleton (1996), Table A1.1, GDP(E), p. 648
Real GDP	Mitchell, Solomou, and Weale (2012), Table 1A, Monthly GDP at market prices, p. 12
Inflation	Feinstein (1972), Table 61, Price index for gross domestic product at factor cost
Government expenditure	Middleton (1996), Table A1.1, Total public expenditure, p. 648
Government receipts	Middleton (1996), Table A1.2, Public sector receipts, p. 648

TABLE 4

Fiscal sustainability data, UK 1950–1970

	b	*t*	*e*	*i*	*π*	*g*	*d*
1950	6.64	38.83	32.19	2.42	0.65	3.24	2.003
1951	4.98	37.77	32.79	2.63	7.40	3.62	1.798
1952	2.22	37.07	34.85	2.91	9.03	-0.16	1.656
1953	0.26	35.32	35.06	3.09	3.02	4.62	1.547
1954	1.96	34.91	32.95	3.08	2.06	3.80	1.497
1955	2.28	34.48	32.20	3.37	3.64	3.64	1.410
1956	1.51	33.45	31.94	3.43	6.28	1.60	1.309
1957	1.56	33.49	31.93	3.52	4.03	1.91	1.236
1958	2.54	34.41	31.86	3.84	4.53	0.29	1.197
1959	1.94	34.30	32.36	3.92	1.58	4.12	1.142
1960	1.48	33.95	32.47	4.25	1.72	4.93	1.089
1961	1.63	35.19	33.56	4.50	3.16	4.09	1.039
1962	2.87	36.99	34.12	4.49	3.44	2.13	1.006
1963	1.61	35.93	34.32	4.34	1.94	3.48	0.986
1964	1.09	35.83	34.74	4.53	1.98	6.32	0.920
1965	1.47	37.45	35.98	4.83	3.67	2.53	0.863
1966	0.94	37.15	36.20	4.96	5.73	1.92	0.825
1967	-0.39	39.01	39.39	5.35	2.78	2.78	0.797
1968	1.19	40.75	39.55	5.58	4.07	4.15	0.786
1969	4.74	42.81	38.08	6.03	5.72	1.30	0.729
1970	6.46	44.29	37.82	6.48	7.22	2.27	0.647

Variable	*Source*
Debt interest charges	Middleton (1996), Table A1.1, Debt interest, p. 648
Total public debt	Mitchell (1988), Total funded and unfunded debt, p. 601
Nominal GDP	Middleton (1996), GDP(E), Table A1.1, p. 648
Real GDP	Mitchell (1988), Gross domestic product at constant market prices, p. 837
Inflation 1950–65	Feinstein (1972), Table 61, Price index for gross domestic product at factor cost
Inflation 1965–70	[derived from nominal and real GDP]
Government expenditure	Middleton (1996), Total public expenditure, Table A1.1, p. 648
Government receipts	Middleton (1996), Public sector receipts, Table A1.2, p. 648