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SEIGNIORAGE REVENUES IN THE UNITED KINGDOM

ABSTRACT

Alternative seigniorage estimates for the UK for the period 1950-2021 show that these revenues have been generally very small in relation to total tax receipts and with respect to similar recent estimates for the USA. The introduction of interest payments on banks' reserve balances in May 2006 and Quantitative Easing from 2009 sharply reduced opportunity cost seignorage revenues, but boosted, probably temporarily, revenues from monetary seignorage.

Keywords: Seigniorage; Bank of England; UK Treasury; Interest on Reserves
JEL CLASSIFICATION: E58; E62; H22

RIASSUNTO

Ricavi derivati dal signoraggio nel Regno Unito

Stime del signoraggio per il Regno Unito, relative al periodo 1950-2021, mostrano che i ricavi sono stati generalmente molto contenuti in relazione al gettito totale e se confrontati con stime analoghe relative agli USA. L'introduzione del pagamento di interessi sulle riserve bancarie del maggio 2006 e il quantitative easing del 2009 hanno notevolmente ridotto il ricavo da signoraggio ma hanno incrementato, forse solo temporaneamente, i ricavi derivati dal signoraggio stesso.

1. INTRODUCTION

Fischer (1982) argues that seigniorage revenue is one of the most important factors determining the desirability of a country choosing to stick with domestic money rather than replacing it with foreign money[1]. In practice, assessing the importance of seignorage revenue in government

[1] Fischer (1982) distinguishes between "active" and "passive" seigniorage whereby seigniorage use is active in high-inflation countries and passive in rapidly growing ones, where it can be obtained by providing high-powered money to

finance depends in part on the measure of seignorage that is chosen. In this paper, I compute alternative seignorage estimates for the UK in the period 1950-2021 and show how they have evolved in the context of the country's relatively high rates of inflation in the period 1950-1980s to more moderate rates in the 1990s and to generally low inflation in more recent years. I also show how some measures of seignorage have been impacted by changes in the Bank of England's monetary policy regime in 2006, which introduced interest payments on banks' reserve balances at the central bank, and by the policy of Quantitative Easing introduced in 2009. Finally, I compare the seigniorage revenue estimates for the UK to similar estimates for the USA provided in work by Barro (1982), Jefferson (1998) and Cutsinger and Luther (2022).

2. MEASURING SEIGNIORAGE

Barro (1982) and Jefferson (1998) suggest three measures of revenue seigniorage: central bank net revenue; opportunity cost seigniorage; and monetary seigniorage. In the first case, a central bank typically makes payments to the Treasury out of its revenues that accrue from the return on its portfolio of loans, investments, foreign currency reserves, and service fees net of operating expenses (e.g., wages and salaries) and capital replenishment. Opportunity cost seignorage asks the question, What additional income would an individual have earned if they had held interest-earning assets instead of non-interest earning money? It can be represented by $R^*\overline{H}$, where R is the representative rate of return on interest-earning assets and $\overline{H}$, is the average annual value of the monetary base. Finally, monetary seignorage measures the transactions value of nonmonetary assets that money holders can exchange at the central bank to obtain the desired increased in their base money balances, ΔH; thus, it represents the command over resources that the government obtained in that year by creating base money. Because the data necessary to calculate monetary seigniorage are most easily available, this measure of seignorage has been used most widely by monetary economists[2].

meet rapidly growing demand, without necessarily having high inflation. As a relatively low inflation country for most of the period since 1950, I would classify seignorage use in the UK as "passive".

[2] Earlier studies employing this concept include Friedman (1971), Fischer (1982), Dornbusch (1988), Grilli (1989) and Neumann (1992).

2.1 Bank of England Remittances to the Treasury

I measure Bank of England (the Bank) net remittances to the UK Treasury as the sum of the corporate tax revenues paid on its profits and the annual dividend payment the Bank makes to the Treasury as required under the Bank of England Act[3]. The Bank's profits mainly reflect income from interest on its portfolio of securities, bills, and discounts and advances, much of which is dependent on the level of interest rates. In addition, the Bank receives income from management fees, charges for services, occasional capital receipts, and some one-off profits from the sale of bullion, securities, and exceptional items, for example, from divestments and the sale of buildings and property[4]. The largest element in the Bank's expenditure is salary and wages, which has varied over time with staff numbers. Since the Bank's nationalization in 1946, the distribution of net profits has evolved from an initial fixed annual dividend to the UK Treasury (1946-1971) to a negotiated dividend (1972-1983), and then to a fixed portion of post-tax profits (since 1984) that is adjusted depending upon the Bank's capital needs.

Table 1 provides data for Bank of England net remittances to the Treasury, total corporate profits tax accruals (which include the first item), and net remittances as a percent of the Treasury's revenues from taxes on corporate profits for the period 1947-2021. Net remittances have typically represented a very small share of total tax revenue from corporate profits, averaging 1.2% a year over the entire period and reaching a peak of about 5.3 % in 2013, which reflected a quite large (£2.3 billion) one-off payment associated with the winding up of the Bank's Special Liquidity Fund that had been introduced in April 2008 to help banks finance assets that had got stuck on their balance sheets following the closure of some asset-backed securities markets from 2007 onwards[5]. Table 2 shows that the UK experience in this regard contrasts sharply with that of the USA where Cutsinger and Luther (2022) report that the Federal Reserve Bank's net payments to the US Treasury have at times accounted for quite large

[3] The Bank of England Act 1946, as amended by the Bank of England Act 1998, requires the Bank to pay to the Treasury, in lieu of dividend on the Bank's capital, a sum equal to 25% of the Bank's post-tax profit for the previous financial year or such other sum as the Bank and HM Treasury may agree. The gross profits of the Bank are subject to corporate profits tax, the revenues from which are included in the UK National Accounts as profits emanating from public financial corporations. The tax paid on the profits is recognized as an expense in the period in which the profits arise and the Bank is entitled to tax relief on the amount due to the Treasury as a payment in lieu of a dividend.

[4] Anson and Capie (2022) provide an excellent history of the Bank of England's profits and the key factors behind movements in them.

[5] Under the Special Liquidity Scheme eligible banks could borrow overnight nine-month Treasury bills from the Bank of England in exchange for collateral and a fee; the Bank had borrowed the Treasury Bills from the UK Debt Management Office, which is an arm of the UK Treasury.

shares of corporate profits – for example, averaging more than 14% a year in the 1990s and early 2000s, and a remarkable 33.1% annual average over 2010-2021.

2.2 Opportunity Cost and Monetary Seigniorage

I calculate opportunity cost seigniorage in the UK from the construct $R^*\overline{H}$, where R is the yield on the Bank's investment portfolio and $\overline{H}$ is the average annual value of the UK money base. I proxy the yield on the asset portfolio by the rate on 3-month Treasury bills and the monetary base is defined as the sum of notes and coin in circulation plus banks' reserve balances on deposit at the Bank of England[6]. Monetary seigniorage is the annual change in the UK monetary base, ΔH[7]. In 2006, the Bank changed its monetary policy operating procedures in a manner that fundamentally affected revenues from the opportunity cost measure of seignorage. Most pertinently, from May 2006 it began targeting banks' reserve balances and paying interest on those reserves at its official Bank Rate. It gradually widened the range of reserve deposits that attracted interest, which encouraged a substantial increase in the willingness of banks to hold reserve balances at the Bank (an objective of the new operating regime) but resulted in a sharp increase in interest payments by the Bank. As such, the construct $R^*\overline{H}$ substantially overstates opportunity cost seignorage. To adjust for this, I follow Cutsinger and Luther (2022) in their calculation of the opportunity cost measure of seigniorage in the US (following a similar change in Federal Reserve monetary policy operating procedures) and define this measure of seigniorage for the period 2006-2021 by $(R^*\overline{H})$ - I, where I is the total interest paid by the Bank on banks' reserve balances over the course of the year.

Table 3 reports values from 1947-2021 for the Bank's net remittances to the Treasury, revenues for the product $R^*\overline{H}$ (adjusted to reflect interest paid on banks' reserve balances after 2006) and for the change in the monetary base, ΔH. For the period 1947-2005, the Bank's payments to the Treasury are always below the constructed measure, $R^*\overline{H}$. This was mainly because the monetary base was always substantially larger than the Bank's lending and investment portfolio (by about £14.9bn in 2005, the eve of the change in monetary policy regime) and because of particularly high interest rates for much of the 1970s and 1980s. However, revenues from

[6] Use of a longer-term interest rate (the yield on 10-year government bonds) to proxy R does not change the revenue estimates markedly.
[7] Data on UK Treasury bill yields are from Friedman and Schwartz (1982), the IMF's International Financial Statistics Database and Bloomberg. Data on the UK monetary base are from the databases of the Federal Reserve Bank of St. Louis and the Bank of England.

opportunity cost seignorage fell sharply after the change in monetary policy regime as the net impact of payments on banks' reserve deposits substantially reduced the Bank's net interest income. Net interest income declined further from 2009 as the growth of banks' reserves accelerated again following the introduction of Quantitative Easing. Thus, the Bank's payments to the Treasury were larger than seigniorage revenues for the product $R^*\overline{H}$ for ten of the next 15 years.

The change over the year in the monetary base, ΔH, would approximate to $R^*\overline{H}$ if the nominal interest rate equaled the growth rate of the monetary base. However, over 1947-2005 ΔH was typically less than $R^*\overline{H}$, although there were fluctuations from year to year. After 2006, however, the monetary measure of seigniorage is much larger as the Bank's balance sheet grew rapidly under the changed policy regime, and especially so following the introduction of Quantitative Easing, under which measures to absorb the growth of bank reserves were abandoned. For example, reserve balances increased from £440 million in 2005, the year before the change in regime, to £20,511 million in 2007, a year and a half into the regime, to £107,227 million in 2009, the first year of Quantitative Easing. Cutsinger and Luther (2022) suggest that the monetary measure of seigniorage might overestimate the extent to which governments have gained from the creation of money after 2008. This is because although central banks do not have an obligation to redeem issued currency, they have other obligations that might require them to exchange assets for that currency – for example, if they need to reduce the supply of base money to keep inflation to an acceptable rate – a problem that the Bank of England (and other central banks) began to grapple with in 2022. They argue that a better measure of monetary seigniorage would account for these obligations, for example, by booking the expansion and the expected discounted value of the future reduction in the year of the expansion, though this would appear to be fraught with practical difficulties.

Following Barro (1982), Jefferson (1998) and Cutsinger and Luther (2022) for the USA, in Table 4 I also present the three measures of seigniorage as a percent of UK total tax receipts. Net remittances have always been a small part of total tax revenues – less than 0.01% on average and never higher than 0.5%. Opportunity cost seignorage was generally the more important source of revenue for the government over 1947-2000, partly reflecting high rates of interest for much of the period. After 2000, and especially with change in the monetary policy regime after 2006 and the explosion of the Bank's balance sheet associated with Quantitative Easing, revenue from

monetary seignorage was dominant – these revenues rising from equivalent to 1% a year of total tax revenue in 1947-2000 to 3.3% in 2001-2010 and further to 11.1% in 2011-2021. Table 5 compare revenues from the three measures of seigniorage in the UK and the USA for 1947-2021. US Treasury seignorage revenues in relation to tax payments were typically three times as great as those to the UK Treasury on these measures.

3. CONCLUSIONS

This paper presented alternative seignorage estimates for the UK for the period 1947-2021. Seignorage revenues have been relatively low on all estimates and substantially lower than recent estimates of seignorage revenue in the US. The change in the Bank of England's monetary policy framework from 2006 to include interest payments on bank reserves and non-sterilized reserves expansion under Quantitative Easing sharply reduced revenues on the opportunity cost measure but boosted them, probably temporarily, on the monetary measure.

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TABLE 1 - *Bank of England Payments to the UK Treasury in Relation to Corporate Tax Receipts (£ millions)*

Year	(1) Payments from the Bank of England to UK Treasury [a]	(2) Revenue from corporate profits tax	(3) (1) as a % of (2)	Year	(1) Payments from the Bank of England to UK Treasury [a]	(2) Revenue from corporate profits tax	(3) (1) as a % of (2)
1947	3.6	358	1.02	1985	30.2	16,854	0.18
1948	2.5	289	0.88	1986	62.4	15,345	0.41
1949	2.6	279	0.95	1987	48.3	16,264	0.30
1950	2.4	297	0.82	1988	40.3	18,808	0.21
1951	2.9	268	1.10	1989	69.7	23,433	0.30
1952	2.9	315	0.93	1990	89.8	20,070	0.45
1953	3.7	379	0.99	1991	99.6	16,736	0.60
1954	3.8	254	1.51	1992	98.5	12,976	0.76
1955	3.5	249	1.42	1993	50.2	12,578	0.40
1956	4.3	211	2.06	1994	70.8	15,398	0.46
1957	5.1	200	2.57	1995	134.9	20,174	0.67
1958	5.1	255	2.02	1996	126.1	24,726	0.51
1959	5.8	275	2.13	1997	72.5	32,001	0.23
1960	4.7	262	1.81	1998	109.0	34,020	0.32
1961	6.3	263	2.41	1999	102.0	32,743	0.31
1962	7.1	335	2.13	2000	73.0	38,061	0.19
1963	5.0	383	1.32	2001	88.0	34,255	0.26
1964	4.8	390	1.24	2002	61.0	31,274	0.20
1965	5.5	484	1.15	2003	55.0	31,647	0.17
1966	7.0	141	5.00	2004	42.0	38,076	0.11
1967	5.9	1,171	0.51	2005	64.0	47,014	0.14
1968	6.1	1,287	0.48	2006	52.0	50,269	0.10
1969	8.7	1,358	0.64	2007	72.0	50,159	0.14
1970	6.0	1,658	0.36	2008	119.0	45,856	0.26
1971	3.6	1,527	0.24	2009	243.0	38,823	0.63
1972	10.5	1,429	0.73	2010	454.0	45,752	0.99
1973	11.9	1,939	0.61	2011	102.0	45,216	0.23
1974	9.9	2,847	0.35	2012	79.0	43,222	0.18
1975	9.6	2,310	0.42	2013	2313.0	43,199	5.35
1976	12.7	2,168	0.59	2014	75.0	45,026	0.17
1977	6.7	3,037	0.22	2015	99.0	43,824	0.23
1978	10.9	3,839	0.28	2016	117.0	54,611	0.21
1979	13.0	4,884	0.27	2017	125.0	54,561	0.23
1980	14.4	6,783	0.21	2018	110.0	54,691	0.20
1981	45.2	8,471	0.53	2019	74.0	51,253	0.14
1982	34.0	10,492	0.32	2020	65.0	50,077	0.13
1983	45.6	12,089	0.38	2021	60.0	61,360	0.10
1984	53.6	13,997	0.38	2022			

Notes: [a] Payments from the Bank of England to the Treasury comprise profits transfers in lieu of dividend under the 1946 Bank of England Act and corporate tax payments on profits.
Sources: Bank of England Annual Reports; A Century of UK Economic Trends, Office for National Statistics and Bank of England; and OECD Tax Revenue Statistics.

TABLE 2 - *Seigniorage Revenues from Central Bank Profit Remittances to the Treasury in Percent of Corporate Tax Receipts*

Annual average:	Bank of England to UK Treasury	US Federal Reserve to US Treasury
1947-1959	1.42	1.91
1960-1969	1.67	5.20
1970-1979	0.41	10.76
1980-1989	0.32	20.93
1990-1999	0.47	14.14
2000-2009	0.22	14.43
2010-2021	0.68	33.06
2020-2021	1.42	1.91

Sources: Table 1 for the UK and Cutsinger and Luther (2022) for the USA.

TABLE 3 - *Measures of UK Treasury Revenue from Inflationary Finance (£ millions)*

Year	Payments from the Bank of England [a]	$R^*\bar{H}^{bc}$	$\Delta\bar{H}$	Year	$R^*\bar{H}^{bc}$	$R^*\bar{H}^{bc}$	$\Delta\bar{H}$
1947	3.6	10	73	1985	30.2	1,626	620
1948	2.5	10	-115	1986	62.4	1,508	573
1949	2.6	11	11	1987	48.3	1,410	689
1950	2.4	12	7	1988	40.3	1,598	1032
1951	2.9	16	52	1989	69.7	2,287	907
1952	2.9	50	70	1990	89.8	2,562	961
1953	3.7	53	83	1991	99.6	2,013	420
1954	3.8	37	101	1992	98.5	1,702	439
1955	3.5	80	107	1993	50.2	1,040	918
1956	4.3	112	90	1994	70.8	1,093	1,259
1957	5.1	115	77	1995	134.9	1,427	1,331
1958	5.1	113	80	1996	126.1	1,390	1,512
1959	5.8	86	78	1997	72.5	1,656	1,495
1960	4.7	130	119	1998	109.0	1,850	1,553
1961	6.3	143	106	1999	102.0	1,465	1,984
1962	7.1	120	38	2000	73.0	1,821	2,306
1963	5.0	107	64	2001	88.0	1,602	2,205
1964	4.8	142	154	2002	61.0	1,401	2,666
1965	5.5	197	195	2003	55.0	1,384	2,670
1966	7.0	211	147	2004	42.0	1,828	2,328
1967	5.9	205	95	2005	64.0	1,974	2,104
1968	6.1	264	183	2006	52.0	-14	15,490
1969	8.7	314	137	2007	72.0	-38	8,571
1970	6.0	319	160	2008	119.0	-232	14,724
1971	3.6	267	313	2009	243.0	-38	79,230
1972	10.5	270	254	2010	454.0	18	44,498
1973	11.9	517	533	2011	102.0	-79	-7,039
1974	9.9	725	589	2012	79.0	-451	95,189
1975	9.6	673	789	2013	2313.0	-449	60,525
1976	12.7	788	730	2014	75.0	-169	15,336
1977	6.7	600	772	2015	99.0	-49	13,934
1978	10.9	768	1,186	2016	117.0	-575	16,629
1979	13.0	1,327	1,180	2017	125.0	452	116,073
1980	14.4	1,673	860	2018	110.0	951	49,520
1981	45.2	1,519	631	2019	74.0	76	1,217
1982	34.0	1,364	293	2020	65.0	-1,927	163,145
1983	45.6	1,217	704	2021	60.0	797	215,198
1984	53.6	1,246	706	2022			

Notes: [a] Payments from the Bank of England to the Treasury comprise profits transfers in lieu of dividend under the 1946 Bank of England Act and corporate tax payments on profits.
[b] R is the yield on 3-month UK Treasury bills. $\bar{H}$ is the annual average of the monetary base.
[c] From 2006 $R^*\bar{H}$ is replaced by 2006 $(R^*\bar{H}) - I$, where I is the representative interest rate paid on banks' reserves balances at the Bank of England following a change to the monetary policy regime.
[d] $\bar{H}$ comprises bank's reserve balances at the Bank of England plus notes and coin in the hands of the public.
Sources: Bank of England Annual Reports; A Century of UK Economic Trends, Office for National Statistics and Bank of England; Friedman and Schwartz (1982), IMF's International Financial Statistics database; and Bloomberg.

TABLE 4 - *Measures of UK Treasury Revenue from Inflationary Finance in Relation to Total Tax Revenues*

Year	Payments from the Bank of England as a % of total tax receipts	$(R^*\overline{H})$ as a % of total tax receipts	$\Delta\overline{H}$ as a % of total tax receipts	Year	Payments from the Bank of England as a % of total tax receipts	$(R^*\overline{H})$ as a % of total tax receipts	$\Delta\overline{H}$ as a % of total tax receipts
1947	0.11	0.28	2.12	1985	0.02	1.22	0.46
1948	0.07	0.26	-3.16	1986	0.04	1.03	0.39
1949	0.06	0.25	0.26	1987	0.03	0.91	0.44
1950	0.05	0.26	0.16	1988	0.02	0.92	0.60
1951	0.06	0.34	1.10	1989	0.04	1.22	0.49
1952	0.06	0.99	1.39	1990	0.04	1.27	0.47
1953	0.07	1.00	1.55	1991	0.05	0.98	0.20
1954	0.07	0.70	1.89	1992	0.05	0.82	0.21
1955	0.06	1.45	1.93	1993	0.02	0.49	0.43
1956	0.07	1.90	1.51	1994	0.03	0.48	0.55
1957	0.08	1.83	1.23	1995	0.05	0.57	0.53
1958	0.08	1.72	1.22	1996	0.05	0.52	0.57
1959	0.08	1.23	1.12	1997	0.03	0.58	0.53
1960	0.07	1.82	1.66	1998	0.03	0.59	0.50
1961	0.08	1.90	1.41	1999	0.03	0.44	0.60
1962	0.09	1.44	0.46	2000	0.02	0.51	0.64
1963	0.06	1.23	0.74	2001	0.02	0.43	0.60
1964	0.05	1.56	1.69	2002	0.02	0.37	0.71
1965	0.05	1.80	1.78	2003	0.01	0.35	0.68
1966	0.06	1.77	1.23	2004	0.01	0.43	0.55
1967	0.04	1.54	0.71	2005	0.01	0.43	0.46
1968	0.04	1.76	1.22	2006	0.01	0.57	3.20
1969	0.05	1.85	0.81	2007	0.01	0.73	1.68
1970	0.03	1.67	0.84	2008	0.02	0.69	2.87
1971	0.02	1.33	1.55	2009	0.05	0.18	16.46
1972	0.05	1.26	1.18	2010	0.09	0.20	8.64
1973	0.05	2.22	2.28	2011	0.02	0.18	-1.29
1974	0.03	2.51	2.04	2012	0.01	0.17	17.29
1975	0.03	1.80	2.11	2013	0.41	0.19	10.61
1976	0.03	1.79	1.66	2014	0.01	0.24	2.60
1977	0.01	1.19	1.53	2015	0.02	0.28	2.28
1978	0.02	1.39	2.14	2016	0.02	0.13	2.56
1979	0.02	2.09	1.85	2017	0.02	0.26	17.03
1980	0.02	2.06	1.06	2018	0.02	0.58	7.03
1981	0.05	1.64	0.68	2019	0.01	0.56	0.17
1982	0.03	1.26	0.27	2020	0.01	-0.08	23.63
1983	0.04	1.07	0.62	2021	0.01	0.17	27.74
1984	0.04	1.02	0.58	2022			

Notes: [a] Payments from the Bank of England to the Treasury comprise profits transfers in lieu of dividend under the 1946 Bank of England Act and corporate tax payments on profits.

[b] R is the yield on 3-month UK Treasury bills. $\overline{H}$ is the annual average of the monetary base.

[c] From 2006 $R^*\overline{H}$ is replaced by 2006 $(R^*\overline{H}) - I$, where I is the representative interest rate paid on banks' reserves balances at the Bank of England following a change to the monetary policy regime.

[d] $\overline{H}$ comprises bank's reserve balances at the Bank of England plus notes and coin in the hands of the public.

Sources: Bank of England Annual Reports; A Century of UK Economic Trends, Office for National Statistics and Bank of England; Friedman and Schwartz (1982), IMF's International Financial Statistics database; Bloomberg; and UK National Accounts Bluebook.

TABLE 5 - *Measures of Seigniorage Revenue in the UK and USA, 1947-2021 in percent of Total Tax Revenues*

	Central Bank Remittance to the Treasury		Opportunity Cost Seigniorage		Monetary Seigniorage	
	UK	USA	UK	USA	UK	USA
1947-1959	0.07	0.65	0.94	2.03	0.95	0.56
1960-1969	0.06	1.41	1.67	2.71	1.17	2.40
1970-1979	0.03	2.75	1.72	3.78	1.72	3.63
1980-1989	0.03	3.67	1.24	4.48	0.56	3.34
1990-1999	0.04	2.69	0.67	3.04	0.46	4.08
2000-2009	0.02	2.45	0.47	2.02	2.79	10.67
2010-2021	0.05	4.59	0.24	1.22	9.86	18.73

Sources: Table 4 for the UK and Cutsinger and Luther (2022) for the USA.