Hidden Wealth

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International Macro History Online Seminar

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THE LONDON SCHOOL OF ECONOMICS AND POLITICAL SCIENCE

Contents

Summary

- I observe all wealth at death in England, 1892-1992
  - Using this, I estimate ‘hidden’ inherited wealth, in *any* form
  - >20% is hidden
- This ‘hidden’ inherited wealth predicts appearance in:
- Offshore Banking Leaks of 2013-6,
  - House values in 1999,
  - Oxbridge attendance, 1990-2016.
- and eliminates 1/3 of the decline of top 10% wealth-share over the 20th century

Wealth at Death

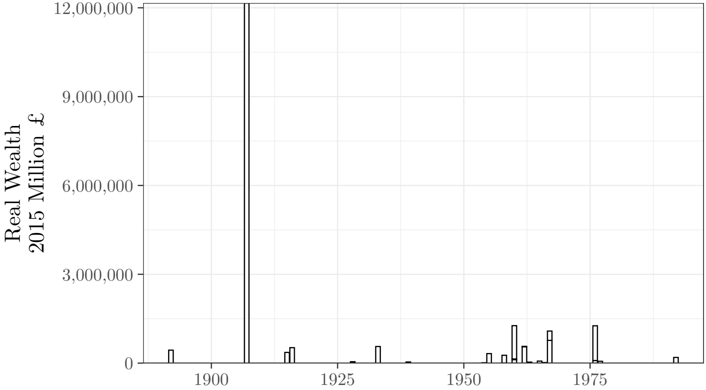

Figure 1: The Wealth at Death of Members of the Axxxxxxx Dynasty

Source: 100% PPR Calendar Sample.

The Concept

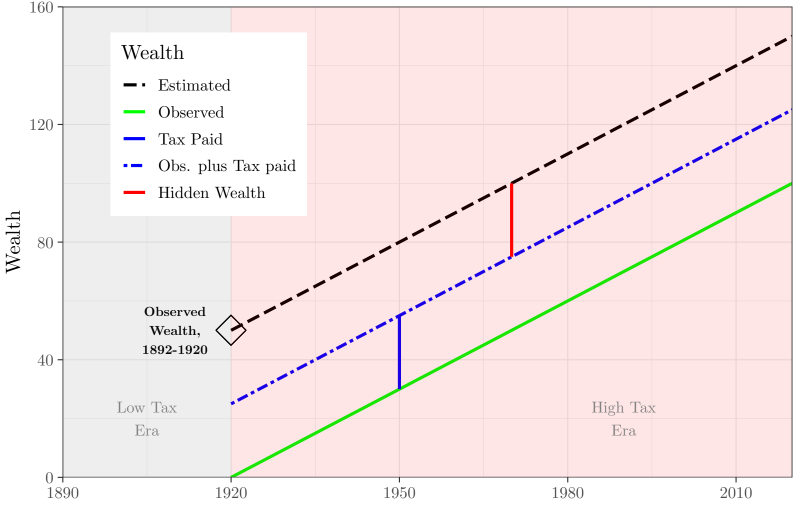

Figure 2: The Concept

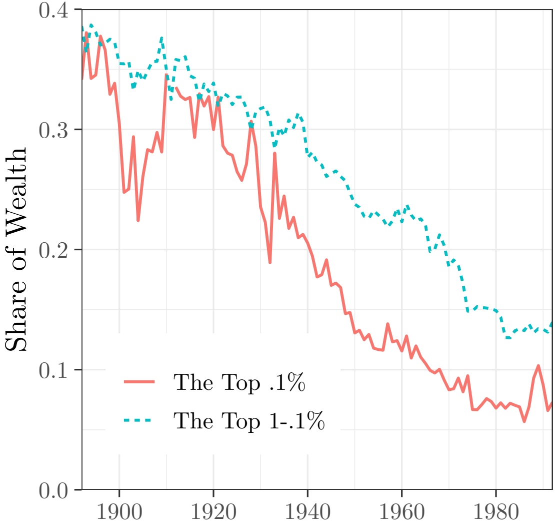

Figure 3: The Decline of the top .1% and .1-1%

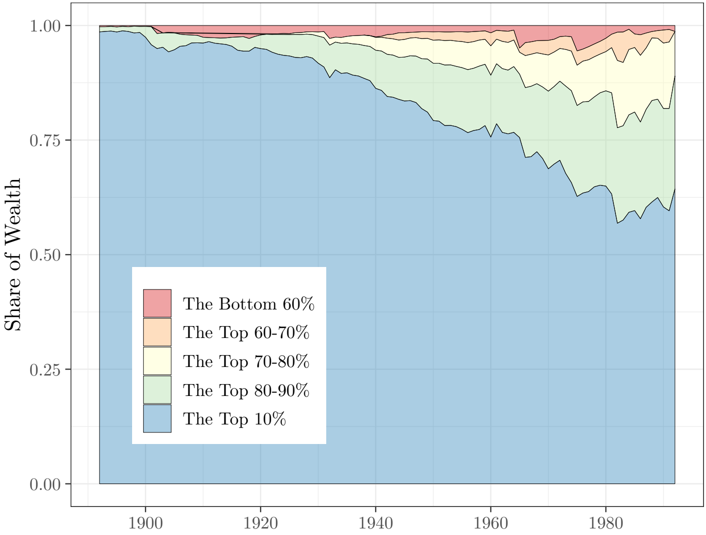

Figure 4: The Growth of 'Popular Wealth'

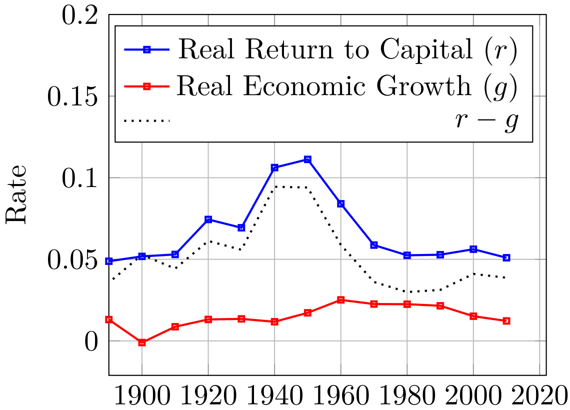

Figure 5: r and g

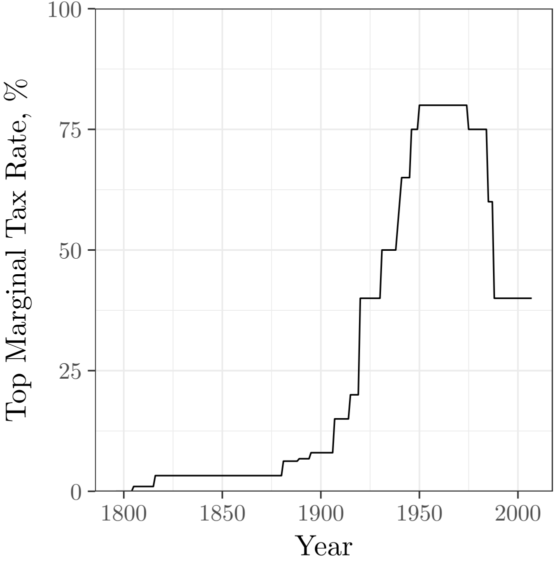

Figure 6: Inheritance Taxes in England

Related Literature

- Piketty (2014), Lindert (1986), Harbury (1962); Harbury and McMahon (1973); Harbury and Hitchens (1976, 1977); Atkinson and Harrison (1978); Harbury and Hitchens (1979); Lindert (1986); Atkinson et al. (1989); Atkinson (2013); Alvaredo et al. (2018).
- Zucman (2013), analyzing systematic anomalies in the foreign assets and liabilities of countries, estimates that 8% of household wealth is held unrecorded in offshore tax havens. Alstadsæter et al. (2019), also using off-shore banking leaks and micro-data, from Norway, Denmark and Sweden, claim that "the 0.01% richest households evade about 25% of their taxes" Alstadsæter et al. (2019).

Contents

Data

1. The Principal Probate Registry Calendar entries, 1892-1992
2. Taxes Due at Death
3. The Return on Capital and Capital Income Tax
4. The *Offshore Leaks Database*
5. 1881 Census of England and Wales,
6. the Complete Death Register, 1892-2007
7. Contemporary Outcomes: House Prices and Oxbridge Attendance

The Principal Source: The Principal Probate Registry Calendars

- The data for analysis is a complete digitization of the Principal Probate Registry (PPR) Calendar for England and Wales from 1892-1992.
- The probate index records all those who died with wealth above a minimum threshold

The Probate Threshold

Years	Nominal Probate Threshold	Source
1858-1900	£10	Turner 2010 p.628
1901-1931	£50	Turner 2010 p.628
1932-1964	£100	Atkinson and Harrison 1978, p.36*
1965-1974	£500	Atkinson and Harrison 1978, p.36
1975-1984	£1,500	Atkinson and Harrison 1978, p.36
1984→	£5,000	Turner 2010 p.628

Table 1: The Minimum Probate Threshold, 1858-2017

Who's in?

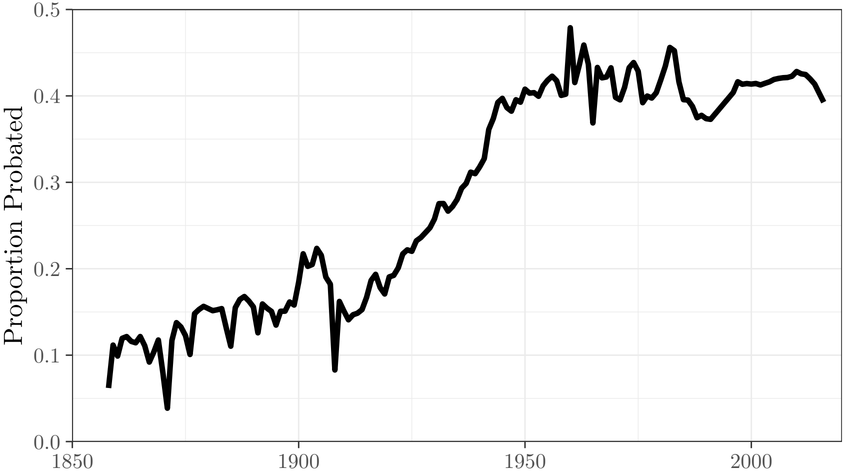

Figure 7: The Proportion Probated, 1858-2007

Builllding the Data

- The original printed volumes of the Principal Probate Registry, calendar from 1858 to 1996, have been digitized as scanned images and are made available at https://probatesearch.service.gov.uk
- I downloaded all of them, 1.5 million image files

509 **CUMING** William Herbert of "Nani Tal" College-place Southampton retired major-general in H.M. army died 20 December 1904 Probate **London** 11 April to Robert Octavius Cumming retired colonel in H.M. army and Robert Stevenson Dalton Cumming captain in the Royal Navy Effects £19416 17*s.* 8*d.* Resworn £19856 17*s.* 8*d.*

STEWART or **GORDON**
CUMMING Elizabeth Newton. *See* "**STEWART.**"

28 **CUMMING** Hugh Macpherson of Belmont Shanklin Isle-of-Wight died 26 November 1904 Probate **London** 18 January to John Charles Cumming esquire and John Durham solicitor Effects £849 3*s.* 4*d.*

CUMMING John of 113 Club Garden-road Sheffield died 23 June 1905 Probate **Wakefield** 11 August to Thomas Henry Cumming elementary-teacher Effects £235 4*s.* 2*d.*

CUMMING John Morley of Pathali Ram Assam India died 28 February 1905 Administration **London** 19 April to John Cumming journalist Effects £254.

1419 **CUMMING** Mary of 3 St. Stephen's-mansions Monmouth-road Bayswater Middlesex widow died 2 October 1905 Probate **London** 6 November to William Gordon Cumming colonel in H.M. army Effects £1242 0*s.* 9*d.*

CUMMING Robert of 14 Murrayfield-road Murrayfield Midlothian died 28 July 1905 at Edinburgh Confirmation of Janet Campbell Thomson Clark or Cumming widow William Oliphant Cumming solicitor and Mary Berwick Cumming and Jessie Grace Cumming spinsters and George Watt Sealed **London** 23 November.

CUMMING Robert Octavius of "Coulter" Cheltenham retired lieutenant-colonel in H.M. army died 7 October 1905 Probate **Gloucester** 17 November to Robert Stevenson Dalton Cumming captain in the Royal Navy Walter Charles Cumming cleric and Annie Elizabeth Cumming spinster Effects £109270 1*s.* 4*d.* Resworn £108,291-9-0.

CUMMINGS Ann of 3 Dewsbury-court York-street Swansea widow died 20 May 1905 at Terrace-road Swansea Administration **London** 27 November to Margaret Ann Ellery (wife of James John Ellery) Effects £30.

CUMMINGS Catherine Emily of 119 Hamilton-street Newcastle-upon-Tyne spinster died 2 August 1905 Probate **Newcastle-upon-Tyne** 9 September to Alexander Mark Turnbull solicitor and Thomas Gray solicitor's-clerk Effects £456 12*s.* 6*d.*
Resworn £716 " 7 " 0

CUMMINGS Emily Sophia of Lurganboy county Leitrim widow died 30 March 1905 Probate Ballina to Edwin Tyrrell Cummings M.D. Sealed **London** 14 November Effects £208 in England.

CUMMINGS George John of 32 Park-road Newcastle-upon-Tyne gentleman died 16 November 1904 Probate **Newcastle-upon-Tyne** 10 January to John Ditchburn grocer and Alexander Mark Turnbull solicitor Effects £2679 7*s.* 3*d.*

1541 **CUMMINGS** Richard of the "Half Moon" inn Billingham county Durham died 12 December 1905 Probate **London** 27 December to Janet Hannah Cummings widow Effects £252 11*s.* 6*d.*

CUMMINGS Sarah Jane of 9 Froddington-road Southsea Portsmouth (wife of Richard Cummings) died 17 January 1905 Probate **Winchester** 10 February to the said Richard Cummings pensioned-leading-stoker from the Royal Navy Effects £162 13*s.*

805 **CUMMINGS** Thomas of 19 Albert-embankment Lambeth Surrey died 29 March 1905 Probate **London** 29 June to Louisa Spicer (wife of Robert Spicer) Effects £87 16*s.* 7*d.*

CUMMINS Isabelia of 8 Tchidy-terrace Falmouth Cornwall (wife of Henry Royse Cummins) died 27 November 1905 Administration **Bodmin** 28 December to the said Henry Royse Cummings physician and surgeon Effects £400. Resworn £975-7-7

CUMMINS Robert of 40 Newgate-street Bishop Auckland county Durham died 9 November 1900 Probate **Durham** 13 April to Mary Ann Cummins widow Effects £56 12*s.* Resworn £1636.12.-

938 **CUMNER** Thomas of 15 Prince-street Deptford Kent died 3 March 1905 Probate **London** 27 July to John Stagg warehouseman Effects £15 4*s.*

CUNDELL Charles John of Haughton-le-Skerne Darlington died 19 January 1905 Administration **Durham** 28 February to Jane Cundell widow Effects £217.

CUNDELL Leonard of Hungerford Berkshire gentleman died 14 October 1905 Probate **Oxford** 23 December to Henry Stratton Cundell bank-manager and Matthew Henry Cundell agent Effects £1909 18*s.* 6*d.*

CUNDILL George of Scagglethorpe Yorkshire farmer died 4 November 1905 Probate **York** 16 December to Robert Cundill and George Arthur Cundill farmers Effects £610 16*s.*

CUNDY Francis of the "Gables" Watering St. Austell Cornwall retired farmer died 13 July 1904 Probate **Bodmin** 8 July to Annette Buckthorp singlewoman and Ernest Horatio Richards general-merchant Effects £1274 16*s.*

936 **CUNDY** the reverend Henry George of "St. Margaret's" Shortlands Kent clerk D.D. died 6 June 1905 Probate **London** 11 July to Robert Moxon esquire and Richard Howlett barrister-at-law Effects £5039 5*s.* 11*d.* Resworn £5230-9-4

CUNDY Robert of the Joint-counties-lunatic-asylum Carmarthen died 30 August 1905 Administration **London** 28 September to Emma Jane Jones (wife of Thomas Jones) Effects £344 14*s.* 10*d.*

1905.

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Buillding the Data

- Optical Character Recognition (OCR) was performed for each of the index pages using *ABBYY* fine-reader 12 software.
  - Over 1, 500, 000 images were collected into 504 PDF files of 2,000 pages each. This process was also automated.
- The OCR process resulted in 504 'dirty' (unformatted, full of duplicates) text files. These files were merged into 10 larger text files.
- Next the text patterns underlying the PPR Calendar entry structure were deduced by inspection

WOODHAMS Sarah. 16 January. **The Will of** Sarah Woodhams late **of** 61 Rose-Hill-terrace Brighton iu the County of Sussex Personal Estate **£**1,210. Spinster who **died** 25 December 1883 at 61 Rose-Hill terrace was proved at L6W6S by Edward Saxby Woodhams of 12 East-street Brighton Broker the Nephew and Emma Scrase of 10 ..Brunswick-place North Brighton Widow the Sister the Executors.
LOCKETT John **of** 1 Bath-street Burslem Staffordshire leather cutter **died** 13 November 1893 **Probate** Lichfield 21 December to Mary Lockett widow Effects **£**148 65. 7**d.**
ASTON Alfred Charles **of** 3 St. Annes Road WIllenhall Staffordshire **die**d 20 August 1906 **Probate** Birmingham 19 October to James Henry Edwards floor moulder and Joseph Price production controller. **£**1772.
LICCINS Edward **of** 150 Whitmore-park Holbrooks-lane Coventry **died** 19 April 1929 **Probate** Birmingham 8 June to Maria Liggins widow. **Effects £**48 8**s.**
KNEEBONE Julia **of** 89 Meneage-street Helston Cornwall widow **died** 12 May 1934 **Administration** Bodmin 18 June to Harold Dennis Kneebone hotel proprietor. Effects **£**86 Is. 7**d.**
ALLIX Elizabeth Barbara **of** 4 Hanover Court Hanover-street London W.1 spinster **died** 19 April 1945 **Prob**ate Llandudno 28 August' to Martins Bank Limited Effects **£**53380 **Is.** 3**d.**
LACEY John Ethelbert **of** 35 Wynfield-road Leicester **died** 30 November

Description	Example
A sequence of capital letters, delimits a new record/line	KAYE
	Willie
delimits address	" of "
	Church View Kirkburton
delimits death date	" died "
	12 December 1946
Type or Record (always "Probate" or "Administration")	Administration
	London
	3 May
delimits executor	" to "
	Benjamin Kaye boot and shoemaker
delimits taxable estate amount	Effects
	£1082 9s. Id.

Notes: Many variations of the above were employed.

Table 2: General Entry Patterns

Buillding the Data

- 'semi-clean' text files were imported to R and marked patterns in the text were found using *SQL* language (via the R package *sqldf*). The code converted the text to a database of rows and columns. Unique entries were identified and duplicates discarded.

- After this, individual fields were constructed from the relative position patterns.
  - Years and wealth were attributed.
- Much code was then devoted to cleaning the wealth measure as many entries had £ and shilling values conflated and post 1970 many records had the effects value conflated with a 10-digit record number
  - resulting in many decedents with astronomical levels of wealth!

- All nominal millionaires (over 4,000) were checked one by one

- Result every wealthholder in England, 1892-1992: A database of $N = 15,152,822$

SICH Francis of Corney House Chiswick **Middlesex** died 13 February 1912 Probate **London** 20 March to Alexander Sich Alfred Sich and George Sich brewers.
Effects £118107 1s. 3d.

viscount
PORTMAN the right honourable Gerald Berkeley seventh of The Manor Healing **Lincolnshire** died 3 September 1948 Probate (limited to settled land) **London** 23 April to the honourable Ian Leslie Melville banker and the most noble Edward William Spencer K.G. duke of Devonshire. Effects £4249000.
Former Grant P.R. 21 February 1949.

VANDERVELL Guy Anthony of Brockhurst Park Stoke Poges **Buckinghamshire** and of 24 Sloane Avenue **London S.W.3** died 10 March 1967 at 16 Bryanston Square London W.1 Probate **London** 14 April to Gerard Wilfred White and Rudolph Edgar Francis de Trafford bankers and Joseph Leonard Reed solicitor. £10950146.
Memorandum of Order dated 21 June 1968 under Section 26 of the Matrimonial Causes Act 1965 Annexed to Will.

BERRY, Benjamin of 3 Old Bank Ripponden nr Halifax West Yorks died 24 March 1953 Probate Leeds 22 April £ 821305196C

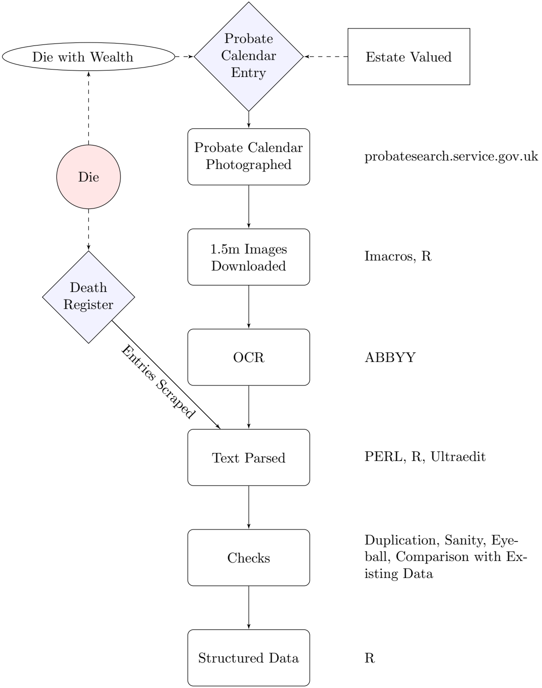
Figure 11: Examples of Problematic and unusually rich Entries

ELLERMAN C.H. sir John Reeves baronet of 1 South Audley-street **Middlesex** died 16 July 1933 at Hotel Royal Dieppe France Probate **London** 12 August to Frederick George Burt secretary and sir John Reeves Ellerman baronet.
Effects £17224425 3s. 8d. Resworn £25817786 11s. 8d.

VERNON Thomas Thorneycroft of Shotwick Park near **Chester** died 24 January 1919 Probate **London** 5 April to John Herbert Vernon flour miller Thomas Cooper bank manager and Elizabeth Cooper Vernon spinster.
Effects £324388 12s. 11d.

CAYZER sir Charles William of St. Lawrence Hall **Isle of Wight** of Gartmore **North Britain** and of 109 Hope-street **Glasgow** baronet died 28 September 1916 at Gartmore Probate **London** 24 January to August Bernard Tellefsen Cayzer and Herbert Robin Cayzer shipowners Admiral sir John Rushworth Jellicoe G.C.B. O.M. G.C.V.O. first sea lord of the Admiralty and Robert Alexander Hill solicitor.
Effects £2204148 9s. 3d.
Further Grant 3 October 1917.

CAYZER sir Charles William of St. Lawrence Hall **Isle of Wight** of Gartmore **North Britain** and of 109 Hope-street **Glasgow** baronet died 28 September 1916 at Gartmore Probate **London** 3 October to Harold Stanley Cayzer shipowner.
Effects £1946676 11s. 7d.
Former Grant January 1917.


Die with Wealth
Probate Calendar Entry
Estate Valued
Probate Calendar Photographed
probatesearch.service.gov.uk
Die
1.5m Images Downloaded
Imacros, R
Death Register
OCR
ABBYY
Entries Scraped
Text Parsed
PERL, R, Ultraedit
Checks
Duplication, Sanity, Eyeball, Comparison with Existing Data
Structured Data
R

Rank	Name	Death Year	Place	Wealth Nominal	Real
1	Sir John Reeves Ellerman, Baronet	1933	London	25,817,786	1,257,371,575
2	Henry Overton Wills	1911	Somerset	5,214,356	433,864,083
3	James Buchanan, 1st Baron Woolavington	1935	Cornwall	7,150,000	345,796,993
4	Charles Cross	1974	Hampshire	41,474,147	288,513,883
5	Wentworth Beaumont, Baron	1907	London	3,234,806	279,678,377
6	John Gretton	1899	London	2,883,640	265,401,845
7	Sir Andrew Barclay Walker	1893	Liverpool	2,876,781	260,701,343
8	Panaghi Athanarius Vagliano	1902	London	2,888,095	256,213,849
9	William Orme Foster	1899	Shropshire	2,587,681	238,162,639
10	William Louis Winans	1897	Brighton	2,522,005	233,821,183

Notes: 2015 prices.

Table 3: The 10 Richest English, 1892-1992

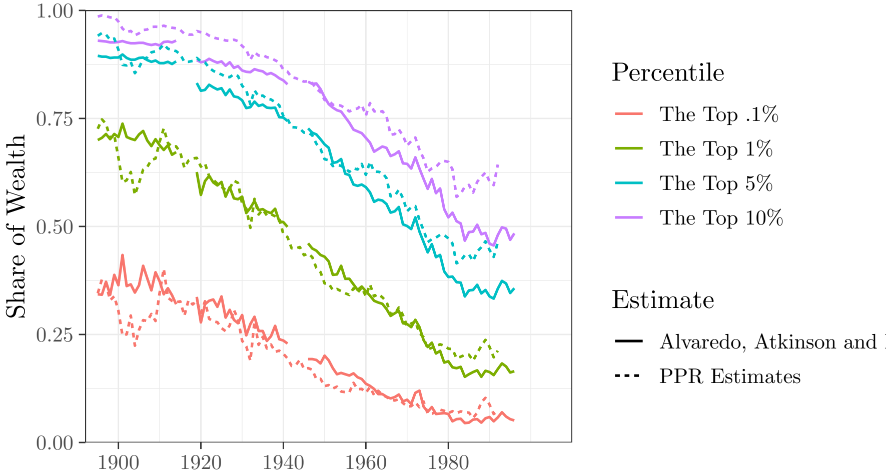


Figure 13: Comparing Different Estimates of Top Wealth Shares, England 1892-1992

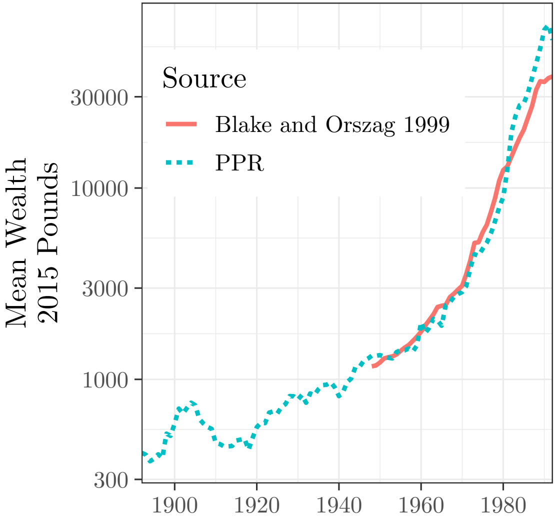


Figure 14: Comparing Average Wealth with Blake and Orszag (1999)

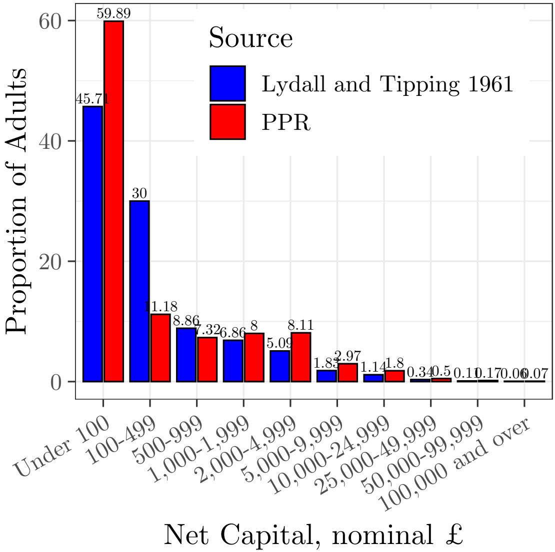


Figure 15: Comparison of Net Capital with Lydall and Tipping (1961), by Wealth Band, 1950s

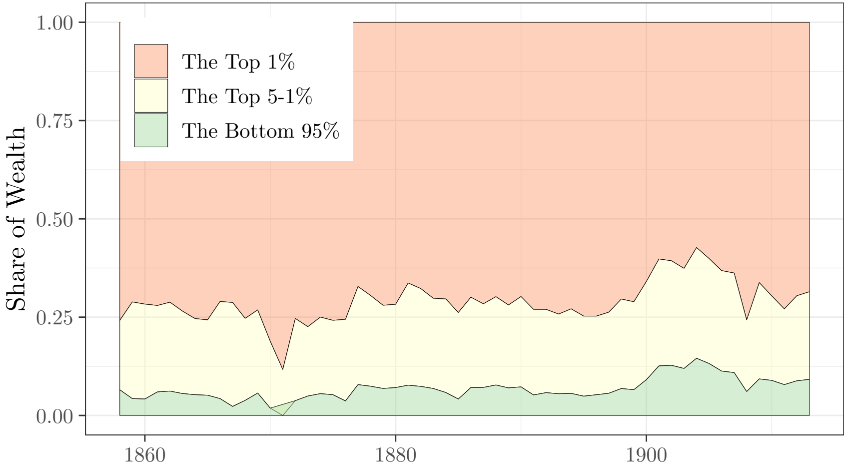


Figure 16: Top Wealth-Shares, pre-World War I

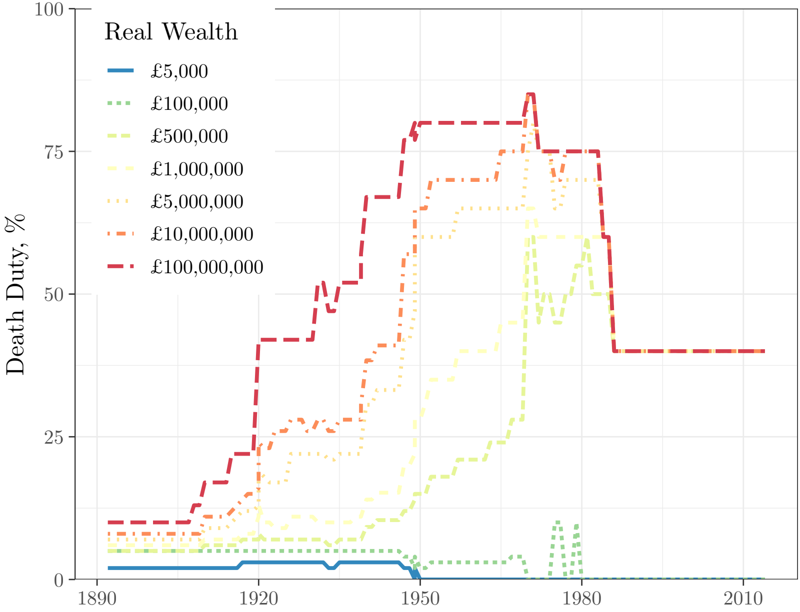


Figure 17: Death Duties, 1892-2015

	Year	Name	Real Wealth	Death Duties, %	Tax Paid
1	1933	Sir John Reeves Baronet Ellerman	1,257,371,575	52	653,833,219
2	1974	Charles Cross	288,513,883	75	216,385,412
3	1935	TRH James Woolavington	345,796,993	52	179,814,437
4	1957	James Armand De Rothschild	183,395,206	80	146,716,165
5	1958	William Stone	147,904,760	80	118,323,808
6	1940	TRH Marmaduke Furness	139,121,970	67	93,211,720
7	1940	Jack Bamato Joel	138,382,028	67	92,715,959
8	1929	Bernhard Baron	213,606,754	42	89,714,837
9	1974	James Henry Bryan	119,247,477	75	89,435,608
10	1935	Arthur Stanley-Wills	169,260,470	52	88,015,445
11	1946	William Johnston Yapp	128,326,006	67	85,978,424
12	1953	Hugh Richard Grosvenor*	105,630,735	80	84,504,588
13	1921	TRH Sir Ernest Joseph Cassel	199,628,495	42	83,843,968
14	1949	TRH Eleanor Countess Peel	102,871,973	80	82,297,579
15	1948	TRH Gerald Berkeley	105,111,626	77	80,935,952

Notes: 2015 prices. "TRH" = "The Right Honourable". * 2nd Duke of Westminster. On #8:link

Table 4: The 10 Largest Taxpayers, 1892-1992

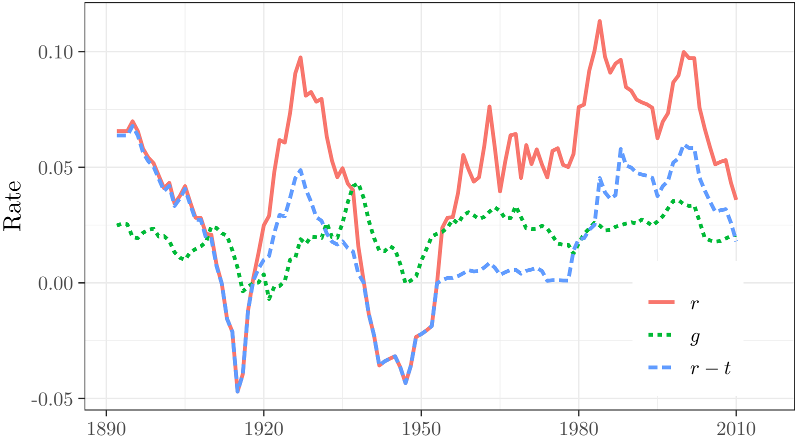


Figure 18: The Net-of-Taxes Rate of Return to Capital

Source: The real return on wealth, r, and the real GDP growth, g, Jordà et al. (2019), website. (For 1892-5, I use the average r 1896-1899.) The highest rate of tax on capital income, t, Piketty (2014) http://piketty.pse.ens.fr/files/capital21c/en/xls/, spreadsheet Chapter14TablesFigures.xlsx. sheet "DetailsTS14.1UK", *Detailed series on UK top income tax rates (data provided by A.B. Atkinson, September 2011*). Where $r < 0$, t is set at 0, as taxes are not due on negative capital income. The figure plots decadal moving averages for visual clarity, annual figures are used in the analysis.

Offshore Leaks

The *Offshore Leaks Database* by the International Consortium of Investigative Journalists (ICIJ) contains detailed account level information on 785,000 offshore companies, foundations and trusts from four recent data leaks;

1. The Paradise Papers (2017 and 2018, principally from the law firm Appleby),
2. The Panama Papers (2016, the law firm Mossack Fonseca),
3. The Bahamas Leaks (2016, official corporate registry)
4. The Offshore Leaks (2013, Portcullis Trustnet and Commonwealth Trust Limited).
    - There are more than 720,000 names of people and companies behind these Offshore accounts and I utilize these names in my analysis.

Contemporary Outcomes: House Prices and Oxbridge Attendance

- All voters in the UK are listed in the *electoral roll*. I extracted the records of the 1999 UK *electoral roll* from a CD-ROM entitled UK-Info Disk (2000).
  - I then link the individual addresses from the electoral roll of 1999 to house price data by postcode in 2017 (from the land registry).
- Attendance at Oxford and Cambridge Universities is sourced from official publications and email directories (see Clark and Cummins (2014); Clark et al. (2014); Clark and Cummins (2015, 2018)).

Contents

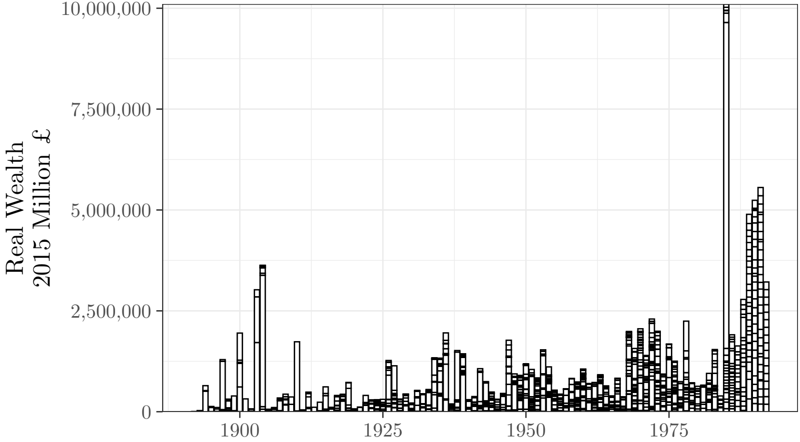


Figure 19: Cummins's

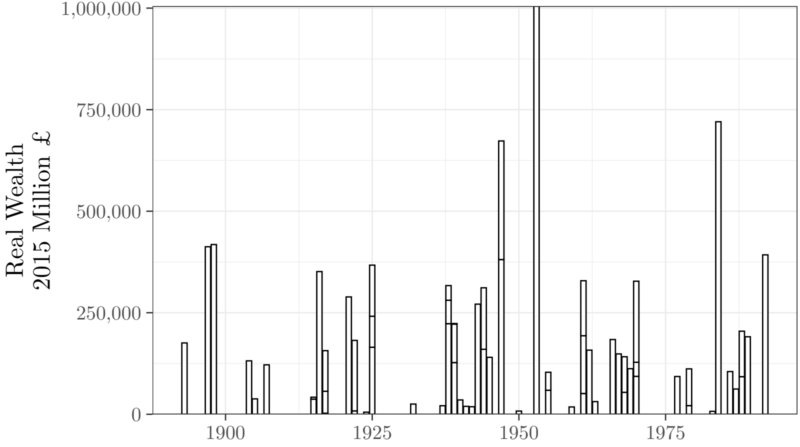


Figure 20: Comyns's

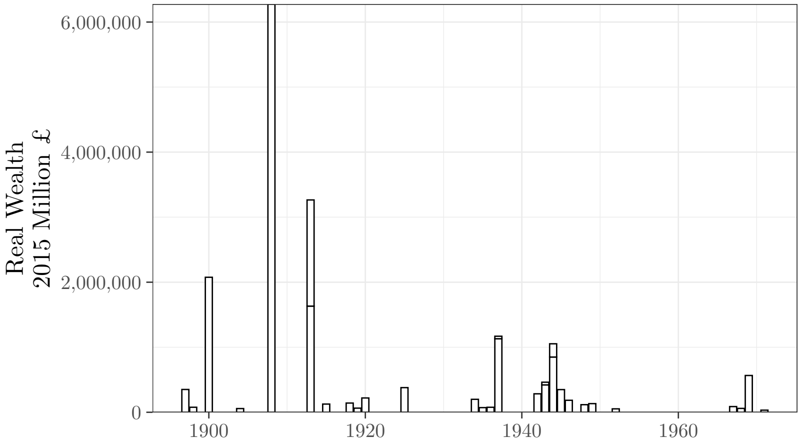


Figure 21: XXXXX's

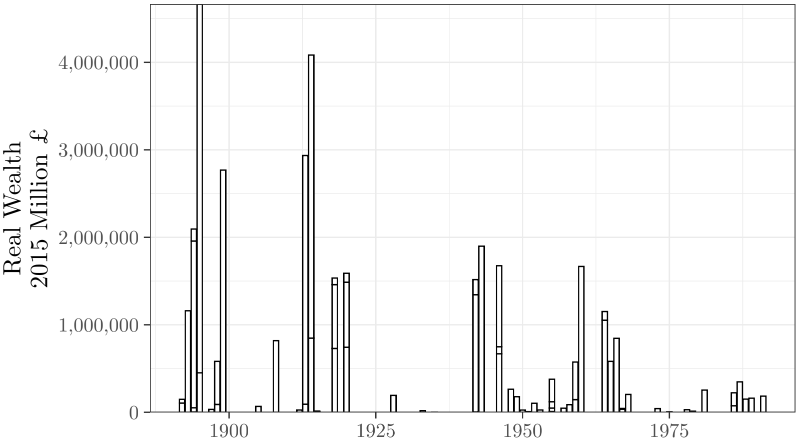


Figure 22: XXXXX's

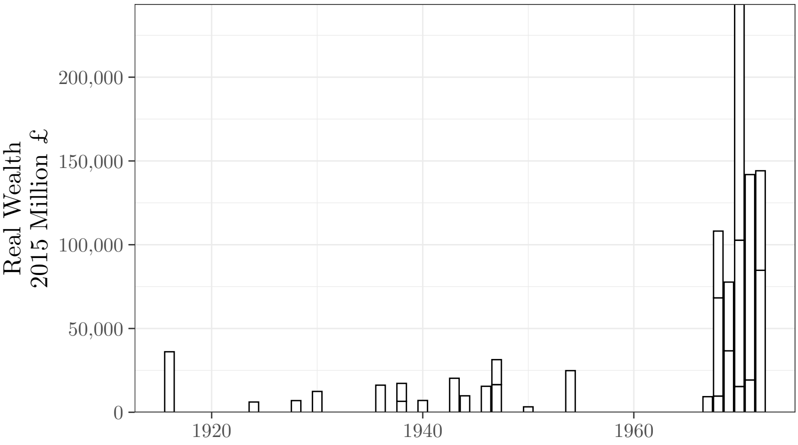


Figure 23: Dumpleton's

Rare Surnames -> 'Dynasties'

- Surnames shared by 2-100 people in 1881
  - 36,719 surnames
  - $N = 1,049,250$
  - $N = 2,133,793$ in 2002
- Track their wealth 1892-1992
  - Top 1,500 = 'Victorian Elite'
- The rare surname level mirrors the individual level ->

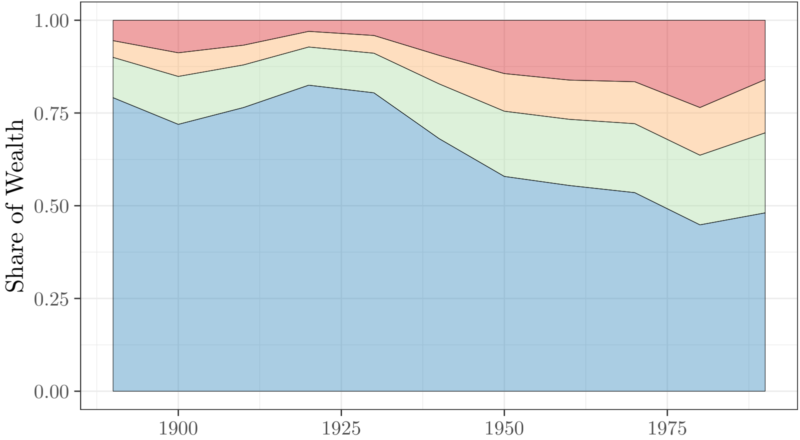


Figure 24: Observed Wealth Shares, Rare Surname Level, 1892-1992

Table 5: English Surname Extinction, 1881-2001

N Range, 1881	N, Surnames	N, 1881	N, 2001	Prop. Extinc
1	1,791	1,791	38,330	0.15
2-5	3,442	10,151	80,365	0.14
5-10	5,212	36,103	142,200	0.10
10-20	7,402	104,419	269,520	0.07
20-50	11,306	363,995	675,159	0.05
50-100	7,566	532,791	928,219	0.02
500-2,000	3,734	3,557,709	6,278,178	0.00
>2,000	1,680	13,607,051	24,335,967	0.00

Note: Calculated from the 1881 census (Schurer and Woollard (2000) and Natio
Statistics (2002)

Table 6: English Surname Extinction, 1881-2001, Victorian Elite Dynasties

N Range, 1881	N, Surnames	N, 1881	N, 2001	Prop. Extinct	Ra
2-5	26	93	539	0.08	5.
5-10	68	458	2,054	0.12	4.
10-20	173	2,525	5,866	0.07	2.
20-50	542	18,547	32,733	0.03	1.
50-100	691	50,295	84,922	0.00	1.

Note: Calculated from the 1881 census (Schurer and Woollard (2000) and National Statistics (2002)

Wartime Destruction

Wartime destruction, $_{wd}$ of wealth, W, for surname j is calculated as

$$W_{wd} = \frac{\sum_{t=WarStart-5}^{WarStart} w_{jt} - \sum_{t=WarEnd}^{WarEnd+5} w_{jt}}{\sum_{t=WarStart-5}^{WarStart} w_{jt}} \tag{1}$$

where $WarStart$ is the start year of the war (either 1918 or 1939) and $WarEnd$ is the end of the war (1918 or 1945).

Estimating 'Expected' Wealth, 1920-2018

W^* at year t of of surname j

$$W^*_{j,t} = \frac{\sum_{1892}^{1920} W_j}{28}(1 + r^{net}_{1920})(1 + r^{net}_{1921})\dots(1 + r^{net}_{t-1}) \qquad (2)$$

where W is observed real wealth in any year, 1892-1920, growing at the net-of-taxes rate of return on capital, r^{net}, where taxes are the maximum tax rate on capital income (T^K), estimated as

$$r^{net} = r - T^K \qquad (3)$$

Cumulative tax paid (T^p) is calcualted as

$$T^p = \sum_{1920}^{t} T_t^D * W_{j,t}^{obs}$$

where as before death taxes are T^D and $(1-\alpha)W_{j,t}$ is observed wealth from the PPR calendars.
An upper limit on hidden wealth (HW) from tax evasion and avoidance can then be calculated as the difference between the estimated 'true' lineage wealth minus cumulative death-taxes paid and *reported* lineage wealth at death

$$HW_{j,t} = W_{j,t}^* - \left[W_{j,t}^{obs} + \frac{T^p}{30}\right] : W_{j,t}^* > W_{j,t}^{obs} + \frac{T^p}{30} \qquad (4)$$

with α calculated as

$$\alpha_{j,t} = \frac{HW_{j,t}}{W_{j,t}}$$

Note that HW must be greater than zero to be considered 'hidden'. Observed wealth that is in excess of that predicted by the level of inherited wealth, a HW of less than zero, is taken as a measure of new wealth (NW), which is driven by the growth rate of the economy.

$$W_{j,t} = (\frac{1}{1-\alpha})W_{j,t}^{obs} \tag{5}$$

Name	Variable	Source	Eq.
Directly Observed			
'True' Lineage Wealth	W	Probate Valuations 1892-1920	
Death Taxes	T^D	IR Tables, Figure 17	
Reported Wealth	$W^{obs} = (1-\alpha)W$	Probate Valuations 1920-92	
Taken from Other Studies			
Return on K	r	Jordà et al. (2019)	
Tax on K income	T^K	Piketty (2014)	
Calculated			
Taxes Paid	T^p	$T^D(1-\alpha)W$	6
Net return on K	r^{net}	$r - T^K$	3
Expected Wealth	W^*	$(1-\alpha)W(1+r^{net})$	2
Hidden Wealth	HW	$[W^* - (W^{obs} + T^p)] > 0$	7
New Wealth	$-HW$	$(W^{obs} + T^p) - W^* < 0$	8
'True' Wealth, Inheritors	W	$W^* - T^p$	9
'True' Wealth, Non-Inheritors	W	$\frac{1}{1-\alpha}W^{obs}$	10
Proportion Hidden	α	HW/W	11

Notes: Estimated for rare surname j and time t. Summary terms for illustration, see text for detailed equations.

Table 7: Summary Table of Sources, Identities and equations for Estimating Lineage Wealth

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Table 8: Wartime Destruction of Wealth, World War I

Victorian Wealth	Pre-War Wealth	Post-War Wealth	Prop. Destroyed	N
All	63,987	39,532	0.382	342,614
Elites	2,148	891	0.585	2,395
Middling	35	56	-0.590	894
Bottom	13	109	-7.285	1,643

Note: Wealth is in Millions, £2015. *Source*: 100% PPR Calendar Sample.

Table 9: Wartime Destruction of Wealth, World War II

Victorian Wealth	Pre-War Wealth	Post-War Wealth	Prop. Destroyed	N
All	90,516	76,019	0.160	623,136
Elites	1,501	1,111	0.259	4,521
Middling	213	187	0.123	2,639
Bottom	314	316	-0.007	5,285

Note: Wealth is in Millions, £2015. *Source*: 100% PPR Calendar Sample.

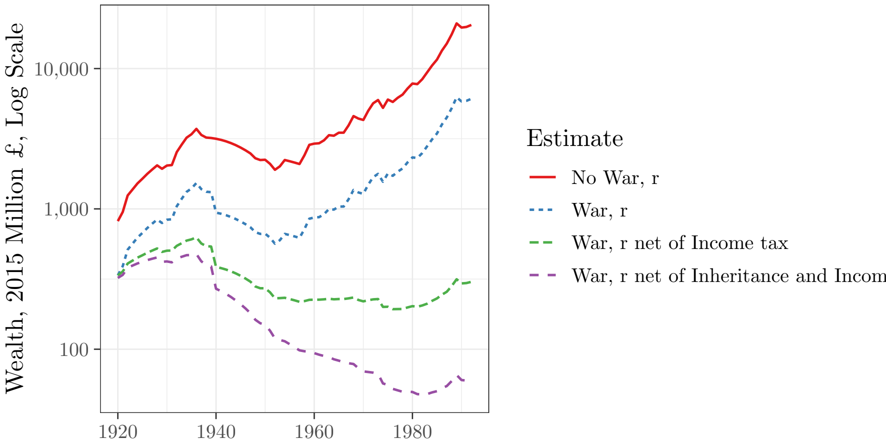

Figure 25: The effect of Wartime Destruction, r, and r net of income and inheritance taxes on Capital Accumulation

Table 10: The effect of War and Taxes on a fortune of £1 Billion in 1920 accumulating to 1992

Growth Path	Wealth, £bn. 1992	Lost Wealth	Prop. Loss
No War, r	20.46	0.00	0.000
War, r	6.09	14.37	0.702
War, r net of income tax	0.30	5.79	0.283
War, r net of inheritance an income tax	0.06	0.24	0.012

Note: Wealth is in Millions, £1920. *Source*: Simulation.

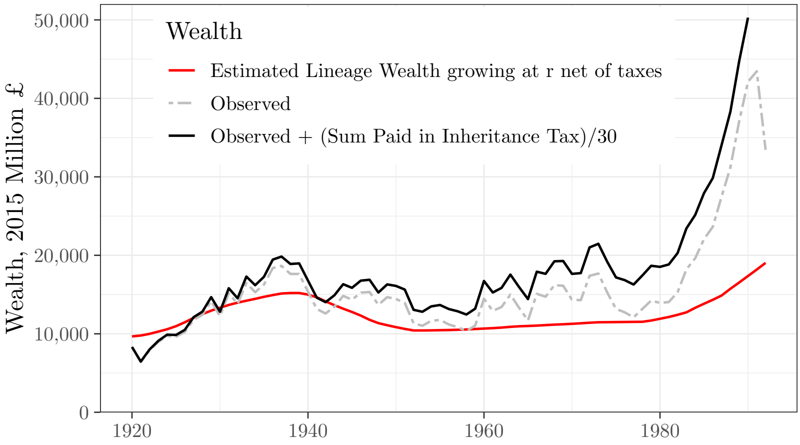

Figure 26: All

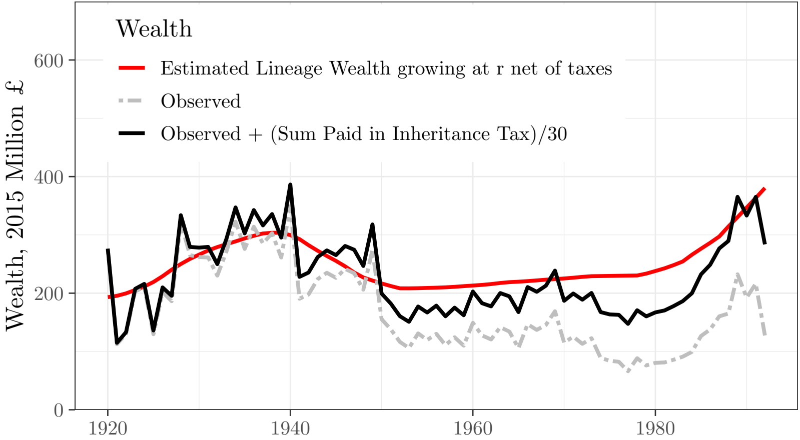

Figure 27: Victorian Elite Lineages

Table 11: Hidden Wealth and the Propensity to Hide, the Victorian Rare Elite, England 1920-1990

Decade	'True' Wealth	Observed Wealth	Observed + Paid in Inheritance Tax	Hidden Wealth	Prop. Hidden
1920	2,203	2,035	2,102	100	0.046
1930	2,894	2,787	3,040	-147	-0.051
1940	2,597	2,379	2,771	-174	-0.067
1950	2,106	1,242	1,714	392	0.186
1960	2,189	1,377	1,990	199	0.091
1970	2,292	962	1,748	544	0.237
1980-92	3,845	1,796	3,296	549	0.143

Note: Wealth is in Millions, £2015. *Source*: 100% PPR Calendar Sample.

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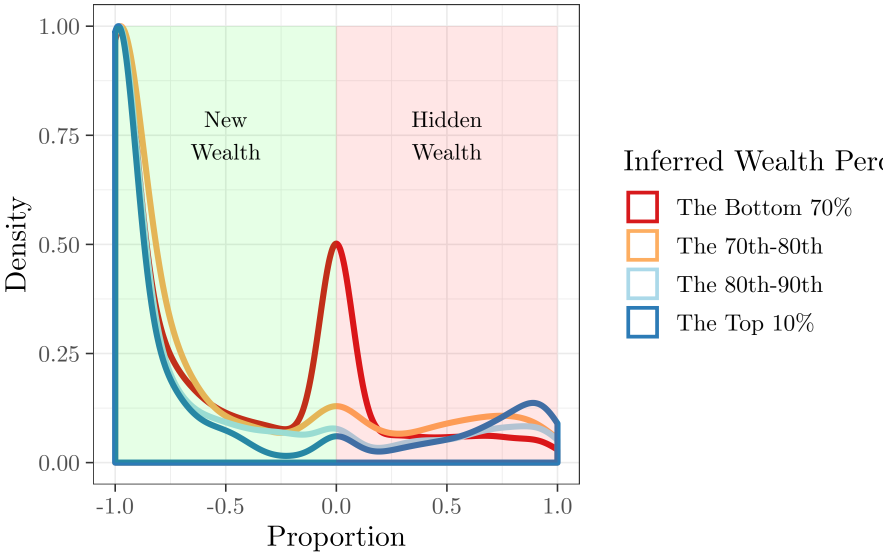

Figure 28: 1980-92

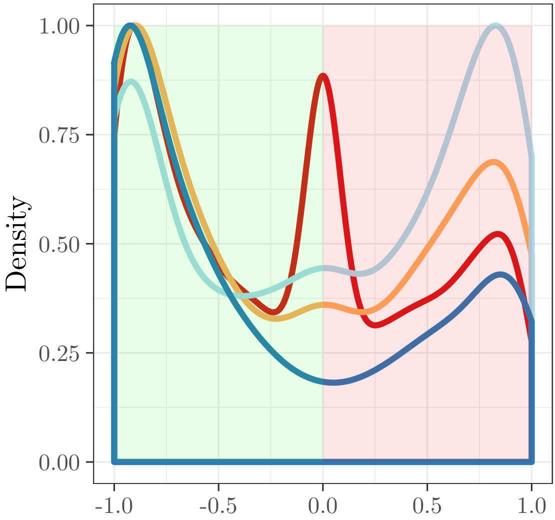

Figure 29: 1920-50

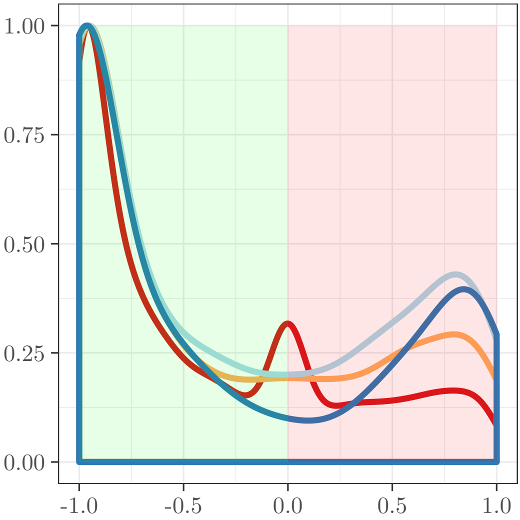

Figure 30: 1950-80

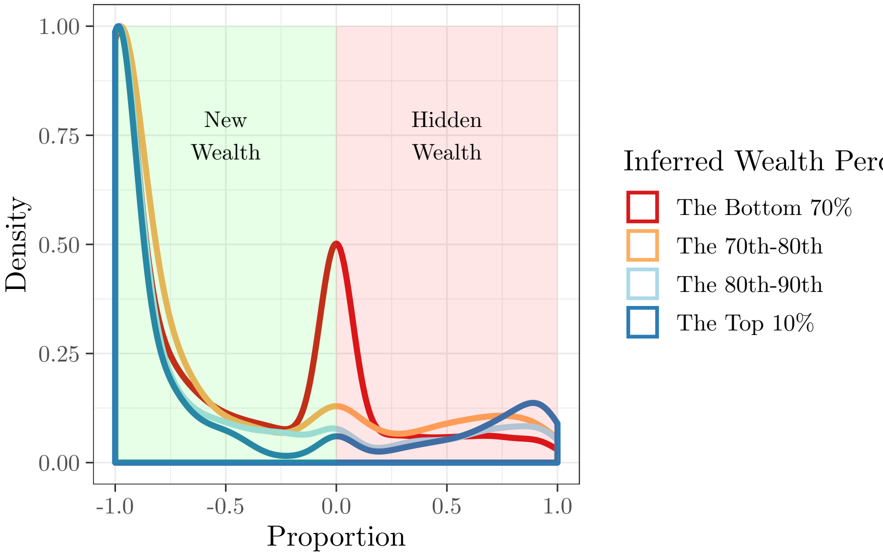

Figure 31: 1980-92

Table 12: Mean Proportion of Wealth Hidden, Surname Level

Inferred Wealth Percentile	Generation 1920-50	1950-80	1980-92	N
The Top 10%	.22	.23	.14	5,550
The 80th-90th	.34	.23	.10	5,616
The 70th-80th	.27	.18	.10	5,630
The Bottom 70%	.20	.12	.06	39,497

Note: Negative hidden wealth is set at zero. *Source*: 100% PPR Calendar Sample.

The general forms of the empirical models I apply to the surname level data are:

$$Y^j = c + \beta_1 \sum D^j_{OW} + \beta_2 X^j + \beta_3 ln(N^j_{2002}) \tag{6}$$

$$Y^j = c + \beta_1 \sum D^j_{OW} + \sum \beta_{2i} D_{X^j} + \beta_3 ln(N^j_{2002}) \tag{7}$$

$$X^j = \left\{ D^j_{Hider}, HW^j, \alpha^j \right\} \tag{8}$$

$$Y^j = \left\{ D^j_{Paradise}, H^j_{pcv} j, OXB^j \right\} \tag{9}$$

Table 13: Summary Statistics, Rare Surname Level

Statistic	N	Mean	St. Dev.	Min	Median	Max
Generation	56,763	2	.82	1	2	3
N, Probated	56,763	7.70	8.20	0	5	149
N, 2002	56,763	78.92	72.84	0	58	597
Inferred Wealth	56,763	.61	1.95	0	.13	110.70
Observed Wealth	56,763	.87	5.94	0	.35	1,269.79
Tax Paid	56,763	.19	3.17	0	.01	508.84
Hidden Wealth	56,763	−.38	6.02	−1,269.79	−.13	79.17
Hidden Wealth (>0)	56,763	.23	1.31	0	0	79
Proportion Hidden	56,763	−.35	.65	−1	−.6	1
Proportion Hidden (>0)	56,763	.15	.29	0	0	1
Hide Any Wealth	56,763	.26	.44	0	0	1
Victorian Elite	56,763	.08	.27	0	0	1
In Paradise Leaks	18,921	.12	.32	0	0	1
N, Paradise	18,921	.68	2.67	0	0	35
House Value, 1999	18,126	334.45	305.41	7.26	289.25	14,750.00
Oxbridge Rate	18,921	.01	.02	0	0	0

Note: Wealth is in Millions, £2015. House prices are thousands, £.
Source: 100% PPR Calendar Sample.

Wealth, Hidden Wealth and the Proportion of Hidden Wealth as Predictors of Presence in the Paradise Papers

	Paradise Dummy				
	(1)	(2)	(3)	(4)	(5)
Wealth Percentile: 70-80	1.121	1.089	1.114	1.120	1.122
	[1.455]	[1.091]	[1.378]	[1.446]	[1.459]
80-90	1.142	1.105	1.137	1.139	1.143
	[1.698]	[1.284]	[1.639]	[1.660]	[1.705]
The Top 10%	1.434	1.378	1.425	1.426	1.434
	[4.691]***	[4.231]***	[4.605]***	[4.620]***	[4.693]***
D_{Hider}	1.262				
	[3.414]***				
Hidden Wealth		1.052			
		[2.385]*			
HW: 0-.2m			1.125		
			[1.114]		
HW: .2m-1m			1.295		
			[2.661]**		
HW:>1m			1.470		
			[2.864]**		
Prop. Hidden, α				1.384	
				[3.042]**	
α: 0-.5					1.281
					[2.601]**
α .5-.75					1.130
					[.964]
α. 75-.9					1.318
					[1.860]
α>.90					1.399
					[2.064]*
$N_{\mathbf{2002}}$	1.004	1.004	1.004	1.004	1.004
	[12.928]***	[12.786]***	[12.942]***	[12.898]***	[12.929]***
Observations	15,975	15,975	15,975	15,975	15,975
Log Likelihood	-5,704.953	-5,707.971	-5,703.599	-5,706.159	-5,704.265
Akaike Inf. Crit.	11,421.910	11,427.940	11,423.200	11,424.320	11,426.530

Note: *p<.05; **p<.01; ***p<.001

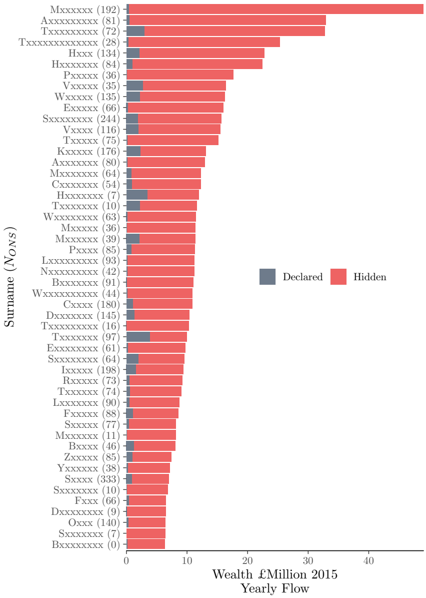

Figure 32: The Top 50 Hiding Dynasties, Hidden and Declared Wealth

Source: 100% PPR Calendar Sample.

Wealth, Hidden Wealth and the Proportion of Hidden Wealth as Predictors of House Price in 1999

	House Price				
	(1)	(2)	(3)	(4)	(5)
Wealth Percentile: 70-80	17.5*	14.2	15.8*	18.1*	17.8*
	(7.6)	(7.6)	(7.6)	(7.7)	(7.7)
80-90	46.0***	42.1***	44.8***	46.3***	46.2***
	(7.8)	(7.8)	(7.8)	(7.9)	(7.9)
The Top 10%	94.8***	89.5***	93.0***	94.6***	94.9***
	(8.2)	(8.2)	(8.2)	(8.2)	(8.2)
D_{Hider}	39.3***				
	(6.6)				
Hidden Wealth		15.1***			
		(2.7)			
HW: 0-.2m			4.5		
			(10.0)		
HW: .2m-1m			47.3***		
			(9.6)		
HW:>1m			95.4***		
			(14.4)		
Prop. Hidden, α				61.4***	
				(10.4)	
α: 0-.5					28.5**
					(9.6)
α .5-.75					51.4***
					(12.0)
α. 75-.9					60.9***
					(14.9)
α>.90					22.7
					(16.6)
$N_{\mathbf{2002}}$	−.6***	−.6***	−.6***	−.6***	−.6***
	(.03)	(.03)	(.03)	(.03)	(.03)
Observations	18,126	18,126	18,126	18,126	18,126
R^2	.02	.02	.02	.02	.02
Note:	*p<0.05; **p<0.01; ***p<0.001				
	Wealth is in 2015 Pounds, Per Annum flow				

Wealth, Hidden Wealth and the Proportion of Hidden Wealth as Predictors of Oxbridge Attendance Rate 1990-2016

	Oxbridge Attendance Rate (Z)				
	(1)	(2)	(3)	(4)	(5)
Wealth Percentile: 70-80	.101***	.096***	.098***	.103***	.103***
	(.022)	(.022)	(.022)	(.022)	(.022)
80-90	.114***	.108***	.112***	.116***	.116***
	(.023)	(.023)	(.023)	(.023)	(.023)
The Top 10%	.262***	.253***	.259***	.263***	.263***
	(.024)	(.024)	(.024)	(.024)	(.024)
D_{Hider}	.067***				
	(.019)				
Hidden Wealth		.041***			
		(.008)			
HW: 0-.2m			$-$.007		
			(.029)		
HW: .2m-1m			.093***		
			(.028)		
HW:$>$1m			.167***		
			(.042)		
Prop. Hidden, α				.119***	
				(.030)	
α: 0-.5					.029
					(.028)
α .5-.75					.092**
					(.034)
α. 75-.9					.107*
					(.043)
α>.90					.091
					(.047)
$N_{\mathbf{2002}}$	.002***	.002***	.002***	.002***	.002***
	(.0001)	(.0001)	(.0001)	(.0001)	(.0001)
Observations	18,921	18,921	18,921	18,921	18,921
R^2	.041	.042	.042	.041	.041
Note:	*p$<$0.05; **p$<$0.01; ***p$<$0.001				
	Wealth is in 2015 Pounds, Per Annum flow.				
	No hidden wealth, $\alpha = 0$ are the				

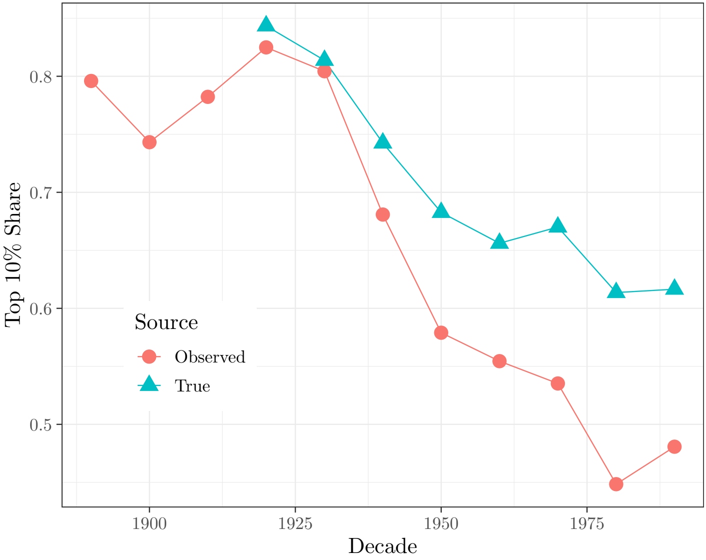

Figure 33: Top 10% Shares, Observed and 'True'

Notes: Calculated at the Rare Surname Level. *Source*: 100% PPR Calendar Sample.

Contents

Conclusion

- In England, 1920-92, I find 8,839 dynasties that are hiding at least £7.4 Billion.
- Method could be applied to other countries
- Decline in wealth in equality may be entirely driven by Hidden Wealth

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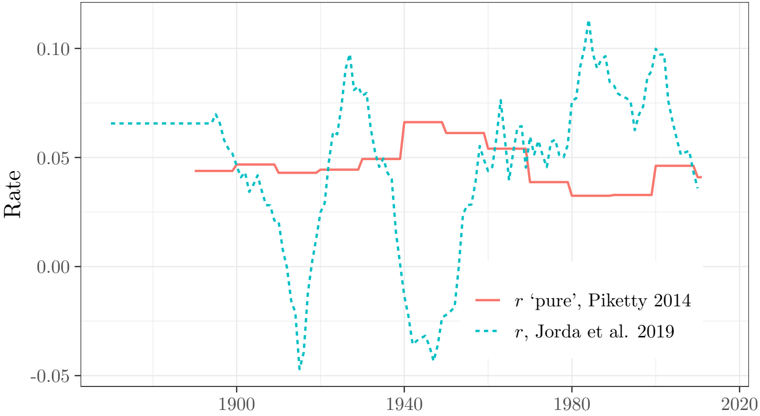

Figure 34: Estimates of Rate of Return to Wealth or Capital, Jorda et al. 2019 and Piketty 2014

Source: Jordà et al. (2019), website. (For 1892 to 1895, I use the 1896 value.) Piketty (2014): http://piketty.pse.ens.fr/files/capital21c/en/xls/, spreadsheet Chapter6TablesFigures.xlsx. sheet "TS6.1".

Table 14: Hidden Wealth and the Propensity to Hide, the Victorian Rare Elite, England 1920-1990, Using Piketty (2014) rate of return on capital

Decade	'True' Wealth	Observed Wealth	Observed + Paid in Inheritance Tax	Hidden Wealth	Prop. Hidden
1920	2,222	2,045	2,110	112	0.050
1930	2,675	2,801	3,043	-368	-0.138
1940	2,055	2,380	2,831	-776	-0.378
1950	2,102	1,242	1,867	235	0.112
1960	2,214	1,377	2,158	56	0.025
1970	2,301	962	1,917	384	0.167
1980-92	3,292	1,795	3,322	-30	-0.009

Note: Wealth is in Millions, £2015. *Source*: 100% PPR Calendar Sample.

Table 15: Wealth, Hidden Wealth and the Proportion of Hidden Wealth as Predictors of Presence in the Paradise Papers and Contemporary Outcomes, comparison using alternative r

	logistic Paradise Dummy		*OLS* House Price		*OLS* Oxbridge Rate	
	Odds Ratio		000s of Pounds		Z-Score	
	(1)	(2)	(3)	(4)	(5)	(6)
	J	P	J	P	J	P
Wealth Percentile: 70-80	1.121***	1.089***	17.473*	16.864*	.101***	.091**
	(.079)	(.079)	(7.647)	(7.655)	(.022)	(.022
80-90	1.142***	1.131***	45.971***	48.117***	.114***	.114**
	(.078)	(.079)	(7.846)	(7.863)	(.023)	(.023
The Top 10%	1.434***	1.398***	94.781***	94.155***	.262***	.262**
	(.077)	(.077)	(8.237)	(8.243)	(.024)	(.024
D_{Hider}	1.262***	1.265***	39.263***	39.411***	.067***	.058*
	(.068)	(.070)	(6.583)	(6.766)	(.019)	(.019
$N_{\mathbf{2002}}$	1.004***	1.004***	−.566***	−.567***	.002***	.002**
	(.0003)	(.0003)	(.035)	(.035)	(.0001)	(.0001
Observations	15,975	15,975	18,126	18,126	18,921	18,92
R^2			.018	.018	.041	.041

Note: $^{*}p<0.05$; $^{**}p<0.01$; $^{***}p<0.001$
J uses Jorda et al. (2019) r series
P uses Piketty et al. (2014) r series
No hidden wealth is the omitted category
Oxbridge Rate is Z-Score
House Prices are in Thousands of 2018 Pounds

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