Appendix to Financing the State: Government Tax Revenue from 1800 to 2012

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The first part of this appendix provides a short overview of the data coverage over time and coding decisions. Then follows a comparison Govrev and Mitchell with respect to coverage (section 2), an example of how coding decisions in 1965 affect estimates (section 3), and a detailed comparison of estimates from BDR, Govrev, and Mitchell around WWI (section 4). In the following section – section 5 – we present the replications of Table 1 and 2 in BDR and the results for yearly data. After that, in section 6, we provide an analysis of influential observations. A thorough description of coding, measurement, and sources is available in the codebook (attached to the final section).

A Coverage

Table A.1 provides the total number of years of available data by country for *Nominal GDP*, *Total Tax Revenue*, the *Size of Government* (share of total tax revenue in nominal GDP), and the availability of at least one disaggregated *Budget Item*. We have also noted the year of independence – or unification in the case of e.g., Germany or Italy – 1800 meaning independent/unified in 1800 or earlier. Unsurprisingly, far back in history, especially in the early 19th century, some data is simply unavailable. Figure A.1 provides an overview of data availability over time. While total government revenues (top-right panel) are available for

large swaths of time, the unavailability of nominal GDP estimates for many countries in the 19th century (top left panel) limits the calculations of government size (bottom left panel). In addition, disaggregated budgets are only available for a minority of independent/unified countries before about 1870. We are conservative in our coding in that if we find no evidence of revenue we code it as missing rather than zero.

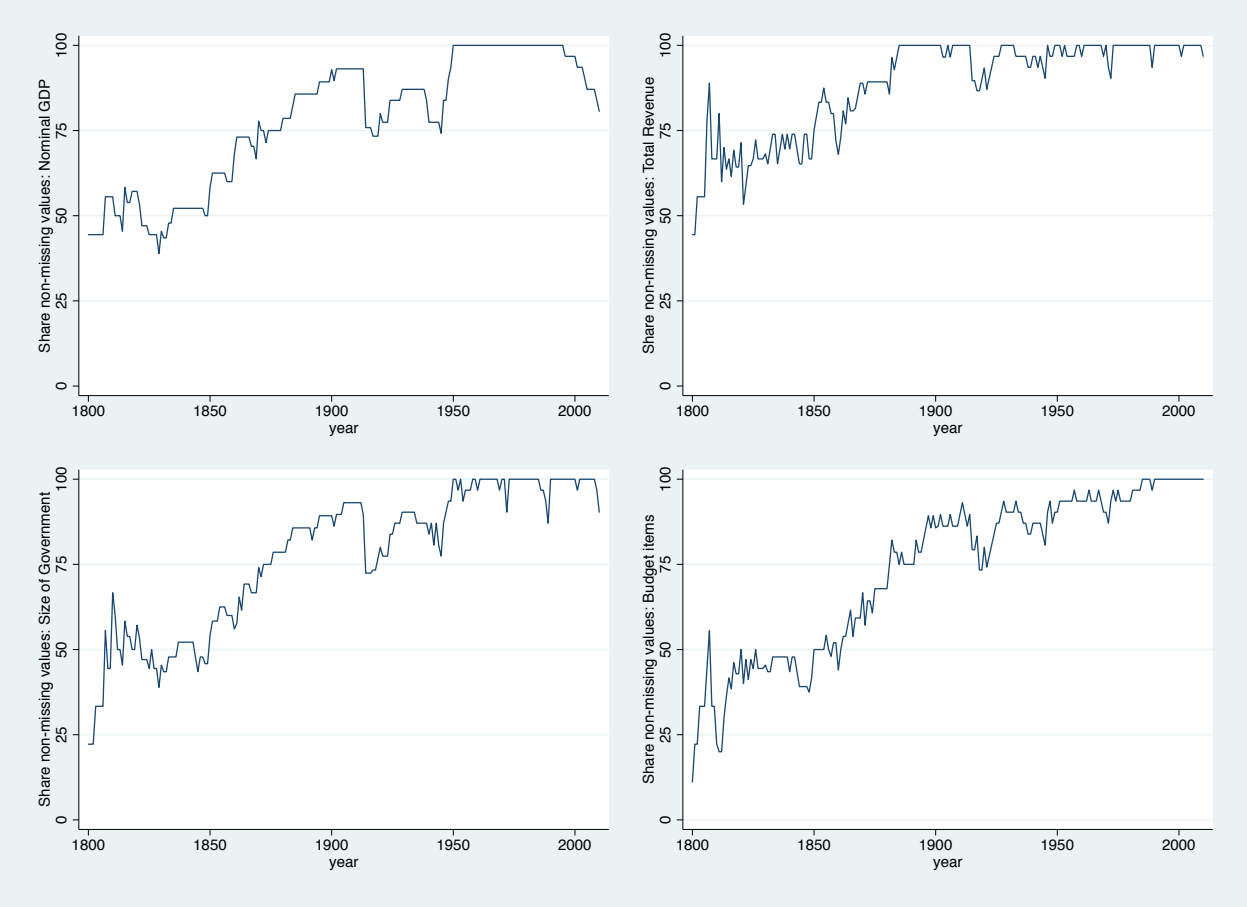
A common problem when constructing the dataset was that different sources provided partial coverage either in time or across variables, and across countries. In practice, this means that when data exists, there are often differences in how taxes and revenue are conceptualized and/or measured. Our solution to this was to use country-specific sources when available in long series. When high-quality data were only available for certain years, we used them as a way of adjudicating between existing cross-country sources.

A second challenge was that sources differed in how they classified revenues and their categories. This meant we often needed to learn about the underlying sources used and – when available – go directly to disaggregated information to be able to construct the classification we needed. This time-consuming process was crucial in order to make sure that variables are comparable over time and across countries.

Table A.1: Availability of Data in Number of Years by Country

Country	Year of Independence	Nominal GDP	Total Tax Revenue	Government Size	Budget Items
Argentina	1816	129	194	192	148
Australia	1901	111	110	111	110
Austria	1800	112	190	124	175
Belgium	1830	165	174	164	175
Bolivia	1825	61	127	59	43
Brazil	1822	152	189	147	131
Canada	1867	143	145	142	145
Chile	1818	186	194	201	195
Colombia	1831	213	174	176	161
Denmark	1800	194	192	192	176
Ecuador	1830	62	165	72	60
Finland	1917	152	129	130	129
France	1800	181	205	193	197
Germany	1871	139	134	117	133
Ireland	1921	64	89	86	90
Italy	1861	151	150	150	150
Japan	1800	127	132	132	132
Mexico	1822	118	186	113	99
Netherlands	1815	200	198	194	197
New Zealand	1857	145	172	151	156
Norway	1814	168	160	154	153
Paraguay	1811	71	112	69	31
Peru	1821	113	149	112	113
Portugal	1800	178	170	172	172
Spain	1800	162	194	157	194
Sweden	1800	212	212	212	152
Switzerland	1848	147	162	147	141
United Kingdom	1800	209	209	208	209
United States	1800	213	212	212	212
Uruguay	1830	142	126	126	114
Venezuela	1830	183	181	178	106

Figure A.1: Data availability over time



B Coverage compared to Mitchell

Table B.1: Availability of Data in Number of Years by Country: Govrev vs Mitchell

Country	Inde-pendence	Govrev			Mitchell		
		Total Tax Revenue	Direct Share	Budget Items	Total Tax Revenue	Direct Share	Budget Items
Argentina	1816	194	112	148	140	92	97
Australia	1901	110	100	110	179	87	102
Austria	1800	190	194	175	179	179	133
Belgium	1830	174	175	175	156	156	156
Bolivia	1825	127	40	43	119	0	0
Brazil	1822	189	86	131	174	71	94
Canada	1867	145	94	145	195	77	132
Chile	1818	194	185	195	144	93	99
Colombia	1831	174	83	161	100	66	66
Denmark	1800	192	192	192	94	94	94
Ecuador	1830	165	155	60	133	0	0
Finland	1917	129	128	129	94	58	94
France	1800	205	196	197	179	144	152
Germany	1871	134	98	133	117	69	114
Ireland	1921	89	90	90	72	72	72
Italy	1861	150	150	150	132	132	132
Japan	1800	132	132	144	126	126	126
Mexico	1822	186	115	99	178	69	69
Netherlands	1815	198	195	197	149	149	148
New Zealand	1857	172	131	158	165	113	148
Norway	1814	160	161	153	143	99	117
Paraguay	1811	112	22	31	102	0	0
Peru	1821	149	113	113	144	95	95
Portugal	1800	170	171	172	98	87	92
Spain	1800	194	159	194	134	134	134
Sweden	1800	212	152	152	113	113	113
Switzerland	1848	162	137	141	144	77	144
United Kingdom	1800	209	209	209	194	192	193
United States	1800	212	89	212	206	78	201
Uruguay	1830	126	107	114	125	58	96
Venezuela	1830	181	74	106	168	57	88

C The 1965 Discrepancy

The table below illustrates how the discrepancy in 1965 is due to the decision to switch from Mitchell – measuring taxation at the central level – to the OECD data series on the general level using the example of Belgium. For years when all sources are available, it is clear that Mitchell, OECD Central and Govrev are in agreement (more or less), while BDR – using the OECD General series – is not. The example also illustrate that when large jumps appear – such as 1964-1965 in Govrev – it is worthwhile investigating its causes. In the Belgian example, as explained in the main document, this is due to tax reforms.

Table C.1: Direct Tax Revenues in Belgium (1963–1972)

Year	BDR	Govrev	Mitchell	OECD General	OECD Central
1963	38	39	38	–	–
1964	38	39	38	–	–
1965	63	45	39	63	–
1966	62	46	39	62	–
1967	61	46	39	61	–
1968	63	46	39	63	–
1969	63	48	41	63	–
1970	64	47	44	75	47
1971	65	49	46	65	49
1972	68	52	48	68	52

Note: OECD data on total and central government revenues begin in 1965 and 1970, respectively. Missing data is indicated by "–".

D WWI Comparison of Sources

Note: countries with missing data in all three datasets (Mitchell, Govrev, BDR) are dropped to facilitate presentation. The excluded countries are: Belgium, Colombia, Ireland, Mexico, Paraguay, and Venezuela.

Table D.1: Direct Tax Revenue Data Availability (1915–1919)

Country	Year	Mitch.	BDR	Govrev
Argentina	1915	–	0.0	–
Argentina	1916	–	0.0	–
Argentina	1917	–	0.0	–
Argentina	1918	–	0.0	–
Argentina	1919	3.5	3.6	3.4
Australia	1915	12.6	12.6	12.6
Australia	1916	16.5	16.5	16.5
Australia	1917	20.0	20.0	20.0
Australia	1918	22.2	22.2	22.2
Australia	1919	24.5	24.5	24.5
Austria	1915	4.2	–	–
Austria	1916	–	–	–
Austria	1917	–	–	–
Austria	1918	–	–	–
Austria	1919	–	–	–
Bolivia	1915	–	–	–
Bolivia	1916	–	–	–
Bolivia	1917	–	–	6.5
Bolivia	1918	–	–	–
Bolivia	1919	–	–	–
Brazil	1915	–	0.0	–
Brazil	1916	–	0.0	–
Brazil	1917	–	0.0	–
Brazil	1918	–	0.0	–
Brazil	1919	–	0.0	–
Canada	1915	–	0.0	–
Canada	1916	–	0.0	–
Canada	1917	–	0.0	–
Canada	1918	3.0	3.0	3.8
Canada	1919	5.7	5.7	6.8
Chile	1915	11.0	10.6	9.4
Chile	1916	5.3	3.8	3.2
Chile	1917	5.9	4.9	4.3
Chile	1918	5.4	5.5	5.0
Chile	1919	8.3	9.1	7.7
Denmark	1915	21.8	–	34.5
Denmark	1916	14.5	14.5	52.9
Denmark	1917	19.7	19.7	69.2
Denmark	1918	15.4	15.4	61.7
Denmark	1919	20.2	17.2	60.4
Ecuador	1915	–	–	4.5
Ecuador	1916	–	–	3.7
Ecuador	1917	–	–	3.7
Ecuador	1918	–	–	6.4
Ecuador	1919	–	–	4.7
Finland	1915	–	–	35.3
Finland	1916	–	–	47.9
Finland	1917	–	–	70.1
Finland	1918	–	0.0	88.1
Finland	1919	–	0.0	47.5
France	1915	24.5	–	20.6
France	1916	21.5	–	18
France	1917	22.4	–	19.6
France	1918	31.4	–	20.3
France	1919	27.2	–	18.5
Germany	1915	–	–	26.3
Germany	1916	–	–	10.4
Germany	1917	–	–	71.7
Germany	1918	–	–	–
Germany	1919	–	–	–
Italy	1915	23.1	23.1	32.7
Italy	1916	17.7	17.7	34.3

(a) Countries A-I

Country	Year	Mitch.	BDR	Govrev
Italy	1917	13.0	13.0	38
Italy	1918	10.0	10.0	41
Italy	1919	7.9	7.8	37
Japan	1915	9.2	9.2	–
Japan	1916	10.9	9.7	–
Japan	1917	10.2	10.2	–
Japan	1918	8.4	8.4	–
Japan	1919	9.4	9.4	–
Netherlands	1915	63.1	–	48.3
Netherlands	1916	70.6	–	56.3
Netherlands	1917	52.1	–	72.7
Netherlands	1918	56.7	–	72.3
Netherlands	1919	60.6	–	67.3
New Zealand	1915	9.6	9.6	41
New Zealand	1916	23.2	23.2	52
New Zealand	1917	27.8	27.8	64
New Zealand	1918	27.8	27.8	62
New Zealand	1919	24.4	24.4	55
Norway	1915	31.3	31.3	26.3
Norway	1916	43.1	36.1	49.8
Norway	1917	–	0.0	75.9
Norway	1918	86.7	0.0	76.1
Norway	1919	74.8	0.0	69.0
Portugal	1915	–	–	36.2
Portugal	1916	–	–	34.0
Portugal	1917	11.7	11.7	36.7
Portugal	1918	6.9	6.9	39.1
Portugal	1919	6.5	6.5	33.0
Peru	1915	10.7	–	12.2
Peru	1916	8.2	–	22.6
Peru	1917	7.6	–	23.5
Peru	1918	8.0	–	32.6
Peru	1919	6.6	–	35.5
Spain	1915	39.0	39.0	26.2
Spain	1916	38.6	38.6	30.0
Spain	1917	39.2	39.2	24.4
Spain	1918	40.8	40.8	31.6
Spain	1919	37.4	37.4	21.9
Sweden	1915	12.1	–	46.9
Sweden	1916	16.2	–	46.9
Sweden	1917	18.1	–	70
Sweden	1918	33.8	33.8	76.4
Sweden	1919	31.1	31.1	66
Switzerland	1915	–	–	7.8
Switzerland	1916	–	–	50.8
Switzerland	1917	37.9	–	66.4
Switzerland	1918	53.5	–	73.9
Switzerland	1919	67.1	–	67.7
United Kingdom	1915	38.9	38.9	43.9
United Kingdom	1916	60.7	60.7	54.7
United Kingdom	1917	65.4	65.4	77.9
United Kingdom	1918	65.1	65.1	74.2
United Kingdom	1919	48.7	48.7	67.3
United States	1915	–	0.0	–
United States	1916	16.4	16.4	16.4
United States	1917	35.2	35.2	35.2
United States	1918	–	0.0	–
United States	1919	–	0.0	–
Uruguay	1915	–	27.1	27.1
Uruguay	1916	–	30.0	30.0
Uruguay	1917	–	27.2	27.2
Uruguay	1918	–	24.2	24.2
Uruguay	1919	–	25.8	25.8

(b) Countries I-U

Notes: "–" indicates missing data.

E Replication: Additional Analysis

E.1 Replication of Table 1 in BDR

Dependent variable: tax/GDP. All columns refer to common sample.

Table E.1: Table 1: Five-year average, all models

	(1) BDR	(2) Govrev	(3) BDR	(4) Govrev	(5) BDR	(6) Govrev	(7) BDR	(8) Govrev
Exec. rec.$_{t-1}$	0.05***	0.02*	0.005	0.003				
	0.02	0.01	0.003	0.004				
Pol. contest$_{t-1}$					0.3***	0.2***	0.03**	0.03
					0.08	0.06	0.02	0.02
War mob.$_{t-1}$			0.02	0.05**			0.02	0.05**
			0.02	0.02			0.02	0.02
ln(GDP/cap)$_{t-1}$			0.01	0.006			0.01	0.006
			0.009	0.007			0.009	0.007
Left HoG$_{t-1}$			0.007	0.002			0.006	0.002
			0.006	0.003			0.006	0.003
Tax/GDP$_{t-1}$			0.8***	0.8***			0.8***	0.8***
			0.04	0.05			0.04	0.05
Region trends	No	No	Yes	Yes	No	No	Yes	Yes
Observations	592	592	576	576	592	592	576	576
R-squared (within)	0.787	0.714	0.946	0.919	0.792	0.733	0.946	0.920
Number of countries	24	24	24	24	24	24	24	24
RMSE	0.0583	0.0354	0.0296	0.0191	0.0576	0.0342	0.0296	0.0190
R-square average	0.777	0.699	0.943	0.913	0.782	0.720	0.943	0.914

Five-year averaged data. Dependent variable: tax/GDP. All regressions include country and period fixed effects. Robust standard errors clustered at country level in parentheses. * p < 0.10; ** p < 0.05; *** p < 0.01.

E.2 Replication of Table 2 in BDR

We focus on the analysis in Table 2 in Beramendi, Dincecco and Rogers (2019), which is described by the equation below.

$$directtaxshare_{i,t} = \alpha + \beta E_{i,t-1} + \gamma X_{i,t-1} + \mu_i + \lambda_t + \epsilon_{i,t} \quad (1)$$

$\beta E_{i,t-1}$ is either executive recruitment or political contestation, the two measures of elite competition. $\gamma X_{i,t-1}$ is a vector with the following controls: a lag of direct tax share, tax revenues as a share of GDP, GDP/capita, left-wing head of government, and war mobilization.

The model also includes country (μ_i) and time (λ_t) fixed effects, along with region-specific time trends.

Table E.2 below reports full results based on five year averages (as in Table 2 of BDR). The only difference is the source of tax data (direct tax share and tax/GDP). Since the sample used by BDR and the sample covered by Govrev are not identical, I first replicate their results using only observations present in both samples. "BDR OS" refers to models using the BDR data on the BDR original sample. "BDR CS" refers to models using the BDR data on the common sample. Govrev denotes models using Govrev data on the common sample. Note that Govrev covers a longer time period and a different sample of countries than BDR. We restrict the analysis to the common sample to ensure that it is the quality and not the quantity of the data that is reflected in the results.

Table E.2: Five-year average, all models

	(1) BDR OS	(1) BDR CS	(1) Govrev	(2) BDR OS	(2) BDR CS	(2) Govrev	(3) BDR OS	(3) BDR CS	(3) Govrev	(4) BDR OS	(4) BDR CS	(4) Govrev
Exec. rec.$_{t-1}$	0.07***	0.08***	0.04	0.02***	0.01**	0.002						
	(0.02)	(0.02)	(0.03)	(0.005)	(0.005)	(0.006)						
Pol. contest.$_{t-1}$							0.4***	0.4***	0.3*	0.08*	0.05	0.03
							(0.1)	(0.1)	(0.2)	(0.04)	(0.04)	(0.04)
War mob.$_{t-1}$				-0.004	-0.02	-0.003				-0.004	-0.02	-0.002
				(0.04)	(0.04)	(0.02)				(0.04)	(0.04)	(0.02)
ln(GDP/cap)$_{t-1}$				0.07***	0.06**	0.04*				0.07***	0.06**	0.04*
				(0.02)	(0.02)	(0.02)				(0.02)	(0.02)	(0.02)
Left HoG$_{t-1}$				0.004	0.007	-0.005				0.002	0.006	-0.005
				(0.009)	(0.01)	(0.01)				(0.009)	(0.01)	(0.01)
Direct share$_{t-1}$				0.7***	0.7***	0.8***				0.7***	0.7***	0.8***
				(0.04)	(0.05)	(0.03)				(0.04)	(0.05)	(0.03)
Tax/GDP$_{t-1}$				-0.07	-0.06	-0.05				-0.07	-0.05	-0.07
				(0.04)	(0.04)	(0.09)				(0.04)	(0.04)	(0.08)
Observations	682	561	561	658	540	540	682	561	561	658	540	540
Number of countries	31	24	24	31	24	24	31	24	24	31	24	24
R^2 within	0.790	0.807	0.525	0.933	0.935	0.862	0.786	0.805	0.530	0.933	0.935	0.862
R^2 adj.	0.781	0.797	0.500	0.929	0.930	0.852	0.777	0.794	0.505	0.929	0.930	0.852
RMSE	0.112	0.103	0.0970	0.0633	0.0595	0.0501	0.113	0.104	0.0965	0.0634	0.0596	0.0500

Five-year averaged data. Dependent variable: direct tax share. All regressions include country and period fixed effects. Robust standard errors clustered at country level in parentheses. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Results Table 2: yearly data

Note: "BDR OS" refers to models using the BDR data on the BDR sample. "BDR CS" refers to models using the BDR data on the common sample. Govrev denotes models using Govrev data on the common sample.

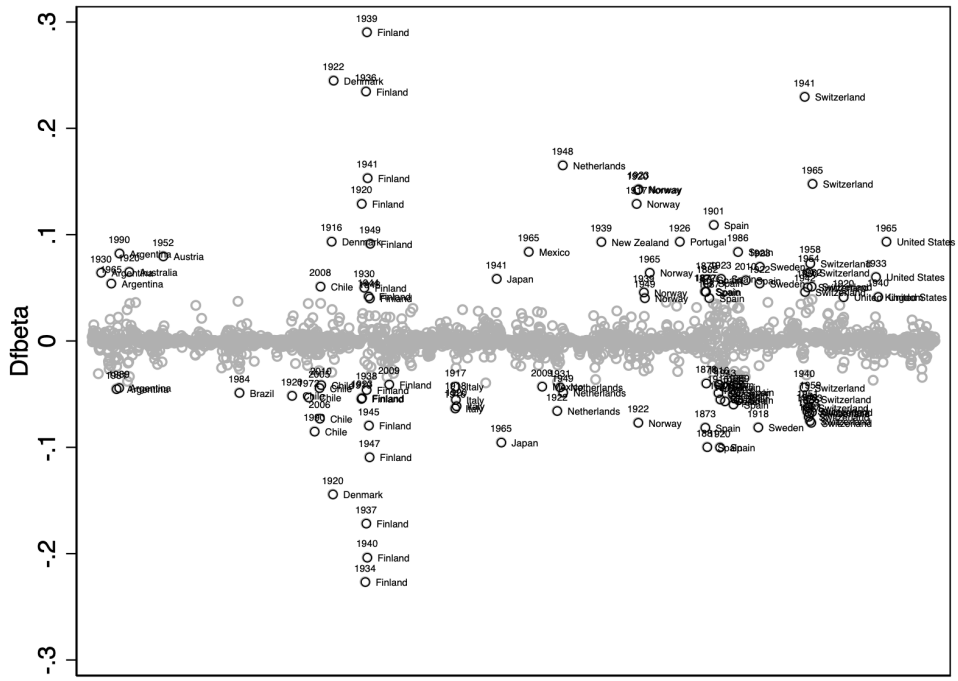
Table E.3: Yearly data

	(1) BDR OS	(1) BDR CS	(1) Govrev	(2) BDR OS	(2) BDR CS	(2) Govrev	(3) BDR OS	(3) BDR CS	(3) Govrev	(4) BDR OS	(4) BDR CS	(4) Govrev
Exec. rec.$_{t-1}$	0.07***	0.09***	0.04	0.005***	0.006**	0.002						
	0.02	0.02	0.03	0.001	0.002	0.002						
Pol contest.$_{t-1}$							0.4***	0.5***	0.3*	0.03**	0.03*	0.02
							0.1	0.1	0.2	0.01	0.02	0.01
War mob.$_{t-1}$				0.0008	-0.0006	0.001				0.0007	-0.001	0.002
				0.01	0.01	0.01				0.01	0.01	0.01
ln(GDP/cap)$_{t-1}$				0.02***	0.03***	0.01**				0.02***	0.03***	0.01**
				0.006	0.008	0.006				0.006	0.008	0.006
Left HoG$_{t-1}$				0.0007	0.0002	0.0003				0.0004	-0.0001	0.0002
				0.002	0.002	0.002				0.002	0.002	0.002
Direct share$_{t-1}$				0.9***	0.9***	0.9***				0.9***	0.9***	0.9***
				0.01	0.02	0.01				0.01	0.02	0.01
Tax/GDP$_{t-1}$				-0.01	-0.009	-0.005				-0.02	-0.009	-0.01
				0.02	0.02	0.03				0.02	0.02	0.03
Number of observations	3186	2623	2623	3135	2566	2566	3186	2623	2623	3135	2566	2566
Number of countries	31	24	24	31	24	24	31	24	24	31	24	24
R^2 within	0.783	0.798	0.502	0.970	0.968	0.936	0.779	0.797	0.512	0.970	0.968	0.936
R^2 adj.	0.773	0.787	0.474	0.969	0.967	0.932	0.769	0.785	0.484	0.969	0.967	0.932
RMSE	0.114	0.105	0.0999	0.0425	0.0415	0.0355	0.115	0.106	0.0989	0.0425	0.0415	0.0355

Yearly data. Dependent variable: direct tax share. All regressions include country and year fixed effects. Robust standard errors clustered at country level in parentheses. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

F Replication: Influential Observations

Figure F.1: Influential Observations



DFBETAs. Observations in black are influential, using $\frac{2}{\sqrt{n}}$ as cutoff.

Figure F.1 shows influential observations as indicated by DFBETAs. Positive values indicate observations strengthening BDR's proposed relationship. The most influential observations belong to Finland, in particular the years 1934, 1936, 1937, 1939, and 1940. What characterizes these observations is extreme volatility in the estimates from BDR (based on data from Mitchell), with the direct share often going from zero up to almost twenty and then back to zero again year to year. These extreme changes in tax revenues are unlikely to reflect real changes in the Finnish budget and are more likely to reflect measurement error, for instance by replacing missing values with zeroes. There is no such extreme volatility in the Govrev data. This volatility introduces downward bias in the 5 year average tax revenue estimates on which BDR rely, which may be particularly problematic if missingness is more common farther back in time. This may be the reason why BDR's estimates of direct taxa-

Figure F.2: Direct Tax Share

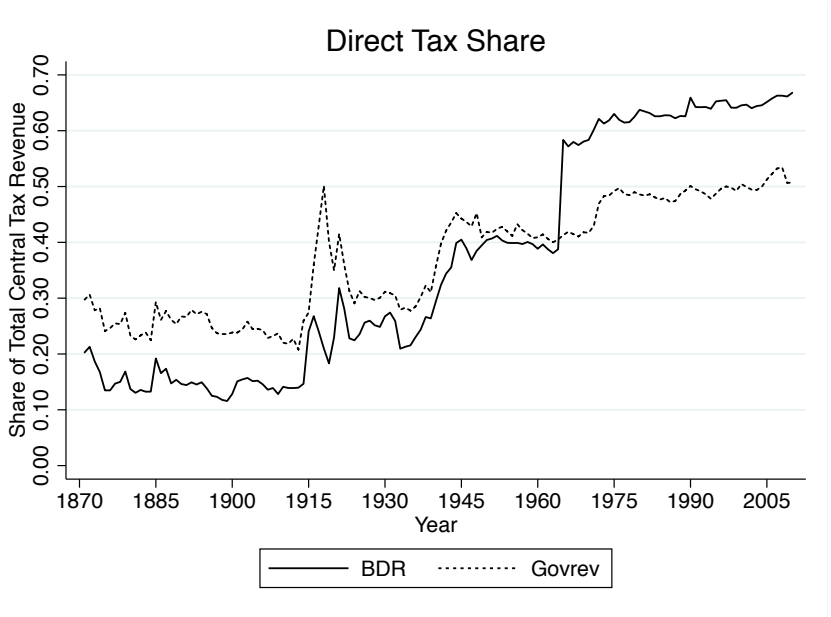


Figure F.2 plots the BDR and Govrev estimates of the average share of total central tax revenues from direct taxes over time. Note the dramatic increase in the BDR estimate in 1965.

tion is lower than Govrev before World War I – when missingness is more likely – than for later years (see Figure F.2).

Another example is the United States. In 1933 BDR (based on Mitchell) reports a sizable drop in the direct tax share. Govrev, based on information from the Bureau of Economic Analysis (2013), reports no such drop. 1965 is also an influential observation, with BDR reporting a drop from 83 percent in 1964 to 77 in 1965. In contrast, Govrev, again based on BEA, shows no such drop. Interestingly, there are many influential observations in 1965 apart from the US, e.g., Switzerland, Mexico, Argentina, and Norway. Inspecting the data, 1965 is associated with large fluctuations in BDR, usually a dramatic increase. This across-the-board jump in the direct share in 1965 is not present in Govrev (see Figure F.2), and corresponds to a change in underlying source used by BDR (for more details about 1965, see the main paper and section 3 in this appendix).

United Kingdom in 1920 is another influential observation. Here, BDR reports a direct

share of 43 percent, down from 49 the year before, while Govrev reports a figure of 66 percent. Interestingly, Mitchell – the source used by BDR – reports an indirect share of 23 the same year, direct and indirect tax revenues thus summing up to 66. This means 44 percent of government tax revenue supposedly comes from neither direct nor indirect taxes. Govrev instead gives figures of 66 and 34 percent for direct and indirect shares, respectively.

In many cases, influential observations are instances when the BDR data – based on Mitchell – diverges significantly from the country-specific sources used in the Govrev dataset. For instance, BDR reports dramatic increases in Spain 1901 and New Zealand 1939, while Govrev – based on country-specific sources – show no such changes. In other cases, the levels of revenue reported by BDR are extreme compared to the information in Govrev. For instance, in Japan 1941 BDR reports a direct share of 6.8 percent, while the Govrev estimate based on information from the Japanese Ministry of Finance is 63 percent. In Mitchell's volume, total central tax revenues are (in millions of yen) 30,465, with direct tax revenues amounting to 2,063 (land: 25, income: 1,401, and corporation tax: 637). Indirect taxes amount to 578 (customs: 87, excises: 491). Thus, there is 27,824 million yen left that is not classified as either direct or indirect tax revenues. In fact, for decades Mitchell's indirect and direct categories do not even sum to twenty percent of total central tax revenues.

Sometimes volatility in BDR cannot be derived from Mitchell, for example Portugal in 1926 where BDR reports a direct share of 17 percent, up from 0 the year before. That the direct share was zero in 1925 is unlikely given that Portugal introduced a permanent income tax in 1922 and had an inheritance tax in place from 1838 (Genschel et al. 2019).[1] The Govrev estimate is 33 percent, down from 37 in 1925 (based on data from Statistics Portugal 2001).

One reason for the differences between Mitchell and Govrev can be that Mitchell uses older sources which perhaps do not use the same coding of budget categories while Govrev often relies on more modern sources, sources that are more likely to use standardized coding

[1]Mitchell – the source used according to BDR – reports 1925 as missing, while BDR reports it as zero.

practices. However, without having access to the original sources used by Mitchell, this remains a speculation.

G Codebook

Financing the State: Government Tax Revenue from 1800 to 2012

Codebook, Version 2.0

November 20, 2025

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1 Introduction

This dataset presents information on historical central government revenues for 31 countries in Europe and the Americas for the period from 1800 (or independence) to 2012.[1] Obtaining comprehensive information on the public finances of governments is challenging. Surprisingly, even for today's developed countries, for example the member countries of the OECD, there is no single cross-national database that provides a comprehensive picture of the sources of government funding starting with the establishment or independence of modern nation states in the early 19th century. What does exist are several databases with partial geographical or temporal coverage, often providing conflicting estimates of the size of the central governments, the sources of government funding, and nominal and real gross domestic products.

For this dataset, we have assembled information on the public finances of central governments as well as the level of economic activity of more than a dozen commonly used cross-national databases. We found that, unsurprisingly, several of these databases have themselves at least in part relied on the same cross-national and country-specific sources to construct their estimates. Nonetheless, estimates of our variables of interest, especially further back in time, are often wildly different.

To complement and adjudicate between existing databases, we combined information from these existing data collection efforts with additional country-specific sources to arrive at, to our knowledge, the most comprehensive historical dataset on public finances of central governments for the countries in our set. A description of the data aggregation process as well as all country specific sources are provided in this document.

In what follows we describe the coverage of the dataset across space and time (section 3) and present a detailed description of the variables (section 4). In ad-

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[1]If needed, users of the dataset can easily extend coverage beyond 2012 since the data series match with regularly updated information from the OECD and IMF.

dition, we provide a description of the coding process along with the references of the cross-national and country-specific sources that were used to construct our estimates (section 6).

2 Recommended Citations

Scholars who wish to use the data compiled here in their own work are kindly asked to include the following reference:

1. Anonymized

3 Coverage

The dataset provides an unbalanced panel of 31 countries: Argentina, Australia, Austria, Belgium, Bolivia, Brazil, Canada, Chile, Colombia, Denmark, Ecuador, Finland, France, Germany (West Germany between 1949 and 1990), Ireland, Italy, Japan, Mexico, New Zealand, Norway, Paraguay, Peru, Portugal, Spain, Sweden, Switzerland, the Netherlands, the United Kingdom, the United States, Uruguay, and Venezuela from 1800 (or independence) to 2012. In other words, the dataset includes all South American, North American, and Western European countries with a population of more than one million, plus Australia, New Zealand, Japan, and Mexico.

4 Variables

The dataset contains information on the public finances of central governments. To make such information comparable cross-nationally we have chosen to normalize nominal revenue figures in two ways: (i) as a share of the total budget, and (ii) as a share of total gross domestic product.[2]

The total tax revenue of the central state is disaggregated guided by the *Government Finance Statistics Manual 2001* of the International Monetary Fund (IMF) which provides a classification of types of revenue, and describes in detail the contents of each classification category. Given the paucity of detailed historical data and the needs of our project, we combined some subcategories. First, we are interested in total tax revenue `centaxtot`, as well as the shares of total revenue coming from direct (`centaxdirectsh`) and indirect (`centaxindirectsh`) taxes.

[2]Incomplete information on exchange rates of national currencies prevents us from providing additional data on government size and revenues in real terms in a common currency across countries, say U.S. Dollars or gold. However, since cross-national datasets of GDP in constant U.S. Dollars are available, for example see Maddison (2001a,b), analysts can normalize the fiscal variables using these data.

Further, we measure two sub-categories of direct taxation, namely taxes on property (`centaxpropertysh`) and income (`centaxincomesh`). For indirect taxes, we separate excises (`centaxexcisesh`), consumption (`centaxconssh`), and customs (`centaxcustomssh`).

Our categorization is thus:

1. Total Tax Revenue
    (a) Direct Taxes
        i. Property
        ii. Income
    (b) Indirect Taxes
        i. Excise
        ii. Consumption
        iii. Customs

The variables in the dataset and their names are listed together with a short description below.

cname The name of the country, using names from the *Quality of Government* dataset (Teorell et al., 2018).

ccode ISO three-digit numeric country code.

year The year.

gdpnom Nominal Gross Domestic Product (in millions of local currency). When unavailable, we use the Nominal Gross National Product or the Net National Product.

gdp Real Gross Domestic Product (in millions of local currency).

centaxgdp Total central government tax revenue as a share of GDP.

centaxtot Total central government tax revenue (in millions of local currency). Taxes are defined as compulsory and unrequited levies by the government, following the *Government Finance Statistics Manual 2001* of the (IMF). Since social security contributions involves an exchange – payments that provide a benefit in return – they are not unrequited payments.[3] For this reason we exclude social security contributions and non-tax revenues (which is the same approach as the IMF).[4]

[3] A key element in many standard definitions of taxation – including the OECD and the World Bank – is that taxes are unrequited, or as Martin et al., eds (2009) puts it "*Taxation* consists of the obligation to contribute money or goods to the state in exchange for nothing in particular" (p. 3)

[4] See Kiss et al. (2009) for a discussion of the issues with classifying parts of the budget as taxes vs. non-tax revenues.

centaxdirectsh Share of total central government tax revenue from direct taxes. A direct tax is imposed *directly* upon an individual person (legal or natural) or property, in contrast to a tax imposed upon a transaction. Direct taxes include taxes on income, property, and other direct taxes.

centaxpropertysh Share of total central government tax revenue from property taxes, most importantly levies on land and real estate. These include (i) recurrent taxes on immovable property, (ii) recurrent taxes on net wealth, (iii) estate, inheritance, and gift taxes, (iv) taxes in financial and capital transactions, (v) other taxes on property.

centaxincomesh Share of total central government tax revenue from income taxes. These include taxes on (i) income, profits, and capital gains by individuals, (ii) income, profits, and capital gains by corporations and other enterprises, and (iii) taxes on payroll and workforce. Ideally, we would prefer to separate these three subcategories, however, especially historical data sources often do not allow a more fine grained presentation. The separation of individual and corporate income taxes is inconsistent across time and space. In many countries, individuals (including lawyers, doctors, and accountants) can choose whether to incorporate their personal business or remain 'in persona' businesses. Such choices, in turn, are often influenced by taxation rules. To circumvent such difficulties and reduce coding inconsistencies, we combined personal and corporate income taxes. The inclusion of payroll taxes is particularly problematic, if one studies the political economy of tax choices. However, payroll taxation as a concept started being introduced in the mid-twentieth-century without clear historical analogue. As a result, we also combine payroll taxes with other income taxes to arrive at an overall estimate of the level and extent of income taxation.

centaxindirectsh Share of total tax revenue from indirect taxes. An indirect tax is a tax on type of transaction, for example sales or importing goods. Indirect taxes include excises, customs, consumption taxes, and other indirect taxes.

centaxexcisesh Share of total tax revenue from excises. Excise taxes are domestic taxes on the production or sale of specific goods, or licenses granted for the sale of production of such goods. In this category we include monopoly profits of state-owned companies because we see the difference only in form rather than substance. For example, if a state owns all salt production in a country and charges a higher price as a result of this setup, the welfare results are no different compared to a situation in which salt was produced competitively and the price was increased by a special levy on salt sales. Thus, a monopoly is an alternative way to tax a product, the monopoly price including an implicit tax.

centaxconssh Share of total tax revenue from consumption taxes. This category includes levies on value-added taxes, sales taxes, and turnover and other general taxes on goods and services. Before consumption taxes in their current form be-

came popular (starting in the 1920s), there were various forms of other broad-based consumption taxes which are all included in this category.

centaxcustomssh Share of total tax revenue from customs and taxes on international trade. Customs are the international pendant to excises in that they tax the flow of goods across a country's borders. Our measure of customs includes (i) customs and other import duties, (ii) taxes on exports, (iii) taxes on profits of export or import monopolies, (iv) exchange profits, (v) exchange taxes, and (vi) other taxes on international trade and transactions.

5 Data summary

The goal of the dataset is to provide the most comprehensive dataset on government revenues for the selected countries from 1800 (or independence/unification) until today. Table 1 provides an overview of the data coverage by country. The *year of independence* is the year in which a country was independently able to collect revenues at the central government level. These years may differ from formal declarations of independence or the completion of independence wars. If fiscal independence was achieved before 1800, we enter 1800 as the starting year for our data collection effort.

Table 1 provides the total number of years of available data by country for *Nominal GDP*, *Total Tax Revenue*, the *Size of Government* (share of total tax revenue in nominal GDP), and the availability of at least one disaggregated *Budget Item*.

Unsurprisingly, far back in history, especially in the early 19th century, some data is simply unavailable. Figure 1 provides an overview of data availability over time. While total government revenues (top-right panel) are available for large swaths of time, the unavailability of nominal GDP estimates for many countries in the 19th century (top left panel) limits the calculations of government size (bottom left panel). In addition, disaggregated budgets are only available for a minority of independent countries before about 1870.

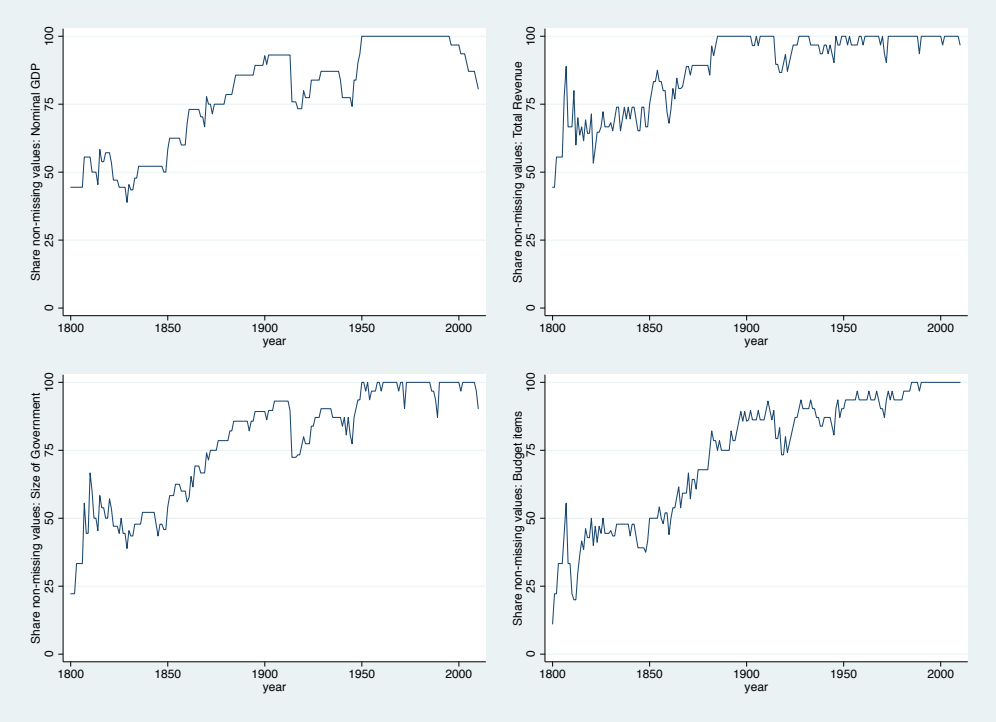
6 The Coding Process

Collecting data for a larger number of countries over long time spans presents difficult issues regarding measurement and consistency. The overall goal of the data collection has been to create long time series that are internally consistent within a country over time and that connect to contemporary datasets which in turn allow easy continual updates in the future. When different sources of data are combined, there need to be decisions about how to decide which sources to use and how

Table 1: Availability of Data in Number of Years by Country

Country	Year of Independence	Nominal GDP	Total Tax Revenue	Government Size	Budget Items
Argentina	1816	129	194	192	148
Australia	1901	111	110	111	110
Austria	1800	112	190	124	175
Belgium	1830	165	174	164	175
Bolivia	1825	61	127	59	43
Brazil	1822	152	189	147	131
Canada	1867	143	145	142	145
Chile	1818	186	194	201	195
Colombia	1831	213	174	176	161
Denmark	1800	194	192	192	176
Ecuador	1830	62	165	72	60
Finland	1917	152	129	130	129
France	1800	181	205	193	197
Germany	1871	139	134	117	133
Ireland	1921	64	89	86	90
Italy	1861	151	150	150	150
Japan	1800	127	132	132	132
Mexico	1822	118	186	113	99
Netherlands	1815	200	198	194	197
New Zealand	1857	145	172	151	156
Norway	1814	168	160	154	153
Paraguay	1811	71	112	69	31
Peru	1821	113	149	112	113
Portugal	1800	178	170	172	172
Spain	1800	162	194	157	194
Sweden	1800	212	212	212	152
Switzerland	1848	147	162	147	141
United Kingdom	1800	209	209	208	209
United States	1800	213	212	212	212
Uruguay	1830	142	126	126	114
Venezuela	1830	183	181	178	106

Figure 1: Data availability over time



to judge their quality. In addition, using and combining different sources has the potential to introduce measurement error and potentially bias the constructed estimates. Beyond the decisions about how we integrated disparate sources, we also address a few issues that are relevant for analysis based on these data below.

Central vs. Total Government Revenues

The dataset covers central government tax revenues only. Although we would prefer to include all levels of government, this was not possible given our ambition regarding time and cross-sectional coverage. Considering the difficulties collecting the data for the central level of government, adding local or regional levels of government would require time and resources beyond the scope of this project and may simply be unavailable for some countries in the distant historical past.

Analysts should take this focus on central government tax revenues into account when drawing conclusions from the data. First, given the exclusion of sub-national taxation, the level of government taxation is likely biased downwards in federal countries like Germany or the United States. The omission of sub-national taxation

could be particularly problematic if the extent of fiscal centralization has changed over time. Second, the relative shares of direct and indirect taxes may be affected depending on which level of government such taxes are collected. For example, if one type of tax – say income tax – is collected at the local level and another – the value-added tax for instance – on the central level, then the relative importance of these taxes is different when looking through the lens of central tax revenues only.

Combining sources

When different sources are used for constructing a single data series, measurement error can arise from differences in definitions and methods of calculation. Researchers commonly average values when multiple sources are available. We chose not do so for several reasons. First, many of the cross-national sources we rely on use an overlapping set of sources to construct their estimates. Averaging across available values would leave us with an unknown amalgamate of potentially duplicated sources. Second, the longitudinal coverage of the available sources varies substantially. Simple averages would overweight some sources. In addition, such weights would differ across countries and time periods, and result in jumps in the longitudinal record when the availability of sources changes. Third, the quality of available sources differs markedly. Generally, we prefer country-specific secondary or primary sources (for example, by country experts, central banks, treasury departments, or national statistical agencies) over available cross-national datasets for historical periods. Equally averaging sources of differing quality may increase rather than reduce measurement error.

Rather than averaging across available sources, we followed a decision tree to decide which sources to use as the basis for our estimates. Keeping in mind our goal of connecting historical time series to contemporary high-quality data sets (such as from the OECD, the IMF, and CEPAL), we were guided by the following rules in our data collection effort:

- *Minimize the number of sources.* We keep the number of sources to construct any data series as low as possible without reducing coverage over time. This decreases the risk of changes reflecting coding differences in sources. In addition, if several sources provide information on several concepts (e.g. the individual parts of the budget), we prefer to use a single source across concepts within the same time period.

- *Prefer high-quality sources.* We give primacy to primary and country-specific secondary sources, especially if detailed sources and explanations are provided. We find that country specific sources are often more fine-grained and more specific about the estimates they present. On the flip side, country-specific sources often entail idiosyncratic sources of government revenue (e.g.

a stamp tax, or a tax on bubbly wine) that need to be categorized into the standard budget framework we employ. However, we often felt that doing such categorization ourselves (and providing the necessary information about such coding decisions) results in a more consistent coding than relying on other researchers' decisions by using data from existing cross-national datasets. That being said, several of the existing cross-national databases we rely on have done an excellent job for their selected time period/countries, so that we confidently relied on them for parts of our dataset as well.

In practice, we often had more than one source available for a specific country. The correspondence between the estimates given by that source and country-specific information helped us decide which source provide the higher quality information. For instance, we preferred to rely on cross-country statistical compilations which did not depart dramatically from country-specific sources – such as statistical yearbooks or detailed studies of government budgets. In many cases we could use statistical yearbooks or country case studies to find out whether reported estimates from cross-national compilations such as Mitchell were credible.

We also used country-specific information to investigate volatility. For instance, if a source provides estimates that fluctuate widely between years this may reflect a particularly turbulent historical period (for instance a major war), but if there is no clear reason for the fluctuations, there might be other underlying issues with the data (such as missing data for one of the subcategories making up a variable) which explain the pattern.

Another way of detecting potential problems with historical cross-country sources was the correspondence between their estimates and ones given by contemporary sources such the OECD. For most countries, there were country years in which both OECD and other sources overlapped. A large discrepancy may indicate that the two sources used different underlying classifications (e.g., definition of income tax), different aggregation (e.g., central vs general government), or different underlying data.

Another red flag was when the tax revenue categories summed to more than 100 percent of total revenue. This may again have been caused by the categorization of revenue sources, but also by issues with the denominator. Without access to the underlying data on which the estimates are based it is not possible to know the causes of these discrepancies. Thus, by comparing different sources it was in most cases possible to make an informed decision about which one provided the most plausible estimates.

- *Check the consistency of sources.* When it is necessary to rely on two or more sources to construct a long-run data series, we make certain that these data are comparable when covering the same overlapping time period within

a country, so that we can have confidence that the data are relying on similar methods or are drawing on the same primary source. When there are significant jumps at the intersection between two series, the last value of the ending series has been coded as missing.

- *Time series consistency trumps cross-sectional consistency.* We are particularly interested in understanding long-run trends within countries. In the occasional case of deciding between using the same source to reach cross-country consistency, and employing different sources to obtain consistent within-country estimates, we prefer to emphasize time series consistency. This preference is also reflected in our preference for high-quality country-specific sources.

The focus of the dataset is on providing ratios (to the total budget and the size of the economy). For budget shares we have a strong preference for both the numerator and the denominator of the ratio to come from the same source. For example, if we have a series of nominal income taxes, we prefer to obtain the size of the total central government budget to come from the same source as well. Many sources already provide such ratios to begin with which suits our purpose.

Nominal GDP data for the distant past is often particularly difficult to obtain. In fact, the concept of gross domestic product was only first introduced by Simon Kuznets in 1937 to measure the productivity of the U.S. economy, and only afterwards was gradually adopted by other countries. As a result, there are no contemporary estimates of GDP before World War I. Economic historians have by now created estimates of varying quality for the size of the total economy of most countries in our dataset for a substantial part of the historical period we are interested in. If GDP estimates are unavailable, we rely on Gross National Product (GNP) or Net National Product (NNP) estimates. If the latter are also not available, we cannot provide government revenue estimates normalized by economic output, but may still present budget shares if available. Real GDP estimates provided for each country are always from one source only, as base years and the deflator series used may differ. Importantly, these estimates are not comparable in absolute terms across countries, but rather are included to judge relative economic growth within a country. For cross-nationally comparable estimates of real GDP and real GDP per capita, we recommend to use the data from (Bolt and van Zanden, 2013).

Historical cross-national databases

We collect data on public finance and economic output from the the following cross-national sources:

- Mitchell (2007c,a,b). Provides historical statistics for a large number of countries. Often among the sources going farthest back in history but unfortunately

also inconsistent in the way budget items are coded or even which parts of government budgets are presented. Other cross-national sources often rely on it.

- Abbas et al. (2010). Provides estimates of gross government debt-to-GDP ratios for a global sample from 1880 to today. We partially rely on it for its GDP estimates and its reference section.

- Mauro et al. (2013) covers an unbalanced panel of 55 countries from 1800-2011 with a focus on debt. We rely on its coverage of total central government revenues, nominal GDP, and the size of government.

- Global Financial Data Inc. (2013) is a commercial provider of historical financial data. Since we were unable to find a listing of its sources, we mainly use this dataset for cross-checking of total government revenue, as well as a source of real GDP estimates.

- The International Monetary Fund (IMF) publishes two sets of government financial statistics: IMF International Financial Statistics (IFS) and IMF Government Finance Statistics (GFS). We rely on these for the parts of the second half of the twentieth century.

For European countries (including their former colonial off-shoots in North America and the antipodes), we found the following cross-national databases particularly helpful:

- Flora et al. (1983) provides estimates of government revenue and its components from 1800 to 1975 for thirteen European countries. For many of the European countries this is the main source for total tax revenues and its subcomponents. By using secondary, country-specific sources, we find that Flora often provides data of higher quality than other sources such as Mitchell.

- Flandreau and Zumer (2004) covers 18 countries between 1880 and 1913. The dataset focus mainly on debt and revenue but it also covers total tax revenues and GDP. We use the dataset primarily for cross-checking.

- The Organisation for Economic Co-operation and Development (OECD) covers total tax revenue and its components in member states from 1973 to 2011. For most OECD members in the dataset this source is used from 1973 for all variables except GDP and and the size of government.

For Latin America, the following databases proved an important starting point:

- The Montevideo-Oxford Latin American Economic History Database (MOxLAD) (2010) is the most comprehensive database on historical financial statistics in Latin America for the 20th century. Unfortunately, a substantial part is taken from Mitchell without adjustment.

- The United Nations Economic Commission for Latin America and the Caribbean (ECLAC or in Spanish CEPAL, 2012) provides disaggregated data on government revenues starting in 1990. In addition, for some countries we used CEPAL's estimates of GDP ranging back to 1950 (CEPAL, 2012).

Contemporary cross-national databases

The goal of the data collection is to join historical data series to high quality current databases to allow easy updating of the database in the future. In all cases, we thus try to take the most current data on all the indicators of interest from these selected databases. For the European countries, we found that the data provided by the *Organisation for Economic Co-operation and Development* best suits our purposes. For Latin America, the United Nations Economic Commission for Latin America and the Caribbean CEPAL (2012) provides high-quality data of government finances from 1990 onwards. For these countries in particular, we often judged CEPAL data of higher quality than the corresponding IMF data sets.

Overall, a substantial part of the final dataset comes from country-specific sources. In Table 2 we list the shares of the final dataset that were drawn from the most common existing cross-country databases. Among the historical sources, we retain significant portions of the data provided by Flora et al. (1983) in the final dataset. For total tax revenues, there is substantial overlap between Mitchell, GFD, and OxLAD, overstating the reliance on these sources in the table.

Table 2: Share of data sourced from existing cross-country databases

	Govt Size	Total Tax	Income	Customs	Excise	Consumption
GFD	4.9	12.6	.	.	.	.
CEPAL	2.9	2.4	2.0	2.0	2.6	4.5
Flora	7.3	2.2	29.4	27.0	32.4	17.3
Mauro	5.7	.	.	.	.	.
OxLAD	.	6.6	4.2	4.2	.	2.7
Mitchell	.	12.4	4.0	4.9	1.5	1.4
IMF GFS	.	1.4	2.2	2.6	1.9	4.7
OECD	6.0	0.7	15.5	9.3	8.9	14.6

Country-Specific Sources

For most countries, we used additional sources to complement and cross-check the general sources that we have mentioned so far. These sources also helped us judge the quality of existing sources and with the choice between them. These country-specific sources are listed below.

Argentina: Alvaredo (2007), Ferreres (2005), Paolera and Taylor (2003).
Australia: Barnard (1987), Hutchinson (2012), Statistical yearbooks from The Government of the Commonwealth of Australia (n.d.) (several years), Reinhardt and Steel (2006).
Austria: Schulze (2000) and (2005), Bairoch (1976), Pammer (2010).
Belgium: Smits et al. (2009), Peeters et al. (2005).
Bolivia: Peres-Cajías (2014).
Brazil: Araújo et al. (2008), Goldsmith et al. (1986), Instituto Brasileiro de Geografia e Estatística (IBGE), Instituto de Pesquisa Econômica Aplicada (IPEA), Ludwig (1985).
Canada: Bird (1983), Statistical Yearbooks (various years).
Chile: Braun et al. (2000), Díaz et al. (2016), Mamalakis (1989).
Colombia: Departamento Nacional de Planeación (1998), Gómez (2007), Grupo de Estudios del Crecimiento Económico Colombiano GRECO (1999), Junguito and Rincón (2004), Kalmanovitz and Rivera (2009), Melo (1989), Robinson and Urrutia (2007), Roca and Ramírez (2010).
Denmark: Hansen (1984), Johansen (1985).
Ecuador: Guzmán and Arroba (1988), Rodríguez (1992).
Finland: Hjerppe (1989), Smits et al. (2009).
France: Toutain (1987).
Germany: Ritschl (2005), Feldman (1993).
Ireland: Broadberry and Klein (2012), Kennedy (1971).
Italy: Baffigi (2011).
Japan: Nakabayashi (2012), Ohsato (1966), Statistics Bureau Statistics Japan (2014), Okawa, ed (1971).
Mexico: Cabrera (2011), Instituto Nacional de Estadística y Geografía (INEGI), Sausi Garavito (2005).
Netherlands: Smits et al. (2000), Smits et al. (2009), van der Bie and Smits (2001).
New Zealand: Goldsmith (2008), Statistical Yearbooks (various years) New Statistics New Zealand (n.d.) Long Term Data Series (LTDS).
Norway: Grytten (2004), Statistics Norway (2000).
Peru: Seminario and Beltran (1996), Portocarrero S et al. (1992).
Portugal: Batista et al. (1997), Lains (2003a,b), Marinheiro (2006), Mata (1993), Nunes et al. (1989), Nunes (2003), Pinheiro (1997a,b), Valério (2001).
Spain: Comín (1995), Comín and Díaz (2005), Prados de la Escosura (2003).
Sweden: Krantz and Schön (2007), Gårestad (1987), Stenkula (2015), Central Bureau of Statistics (1960).
Switzerland: Halbeisen and Lechner (1990), University of Zurich (2012).
United Kingdom: Broadberry et al. (2011), Hills et al. (2010).
United States: Bureau of Economic Analysis (BEA,B), United States Bureau of the Census (USCB), U.S. Government Printing Office (GPO), Johnston and Williamson (2011), Wallis (2006).

Uruguay: Azar et al. (2009), Bonino et al. (2012), Dondo (2007), Instituto de Economía del Uruguay (IECON).
Venezuela: Baptista (1997), Batalla (2001), Batalla (2002), Batalla (2003), Corso (2011).

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