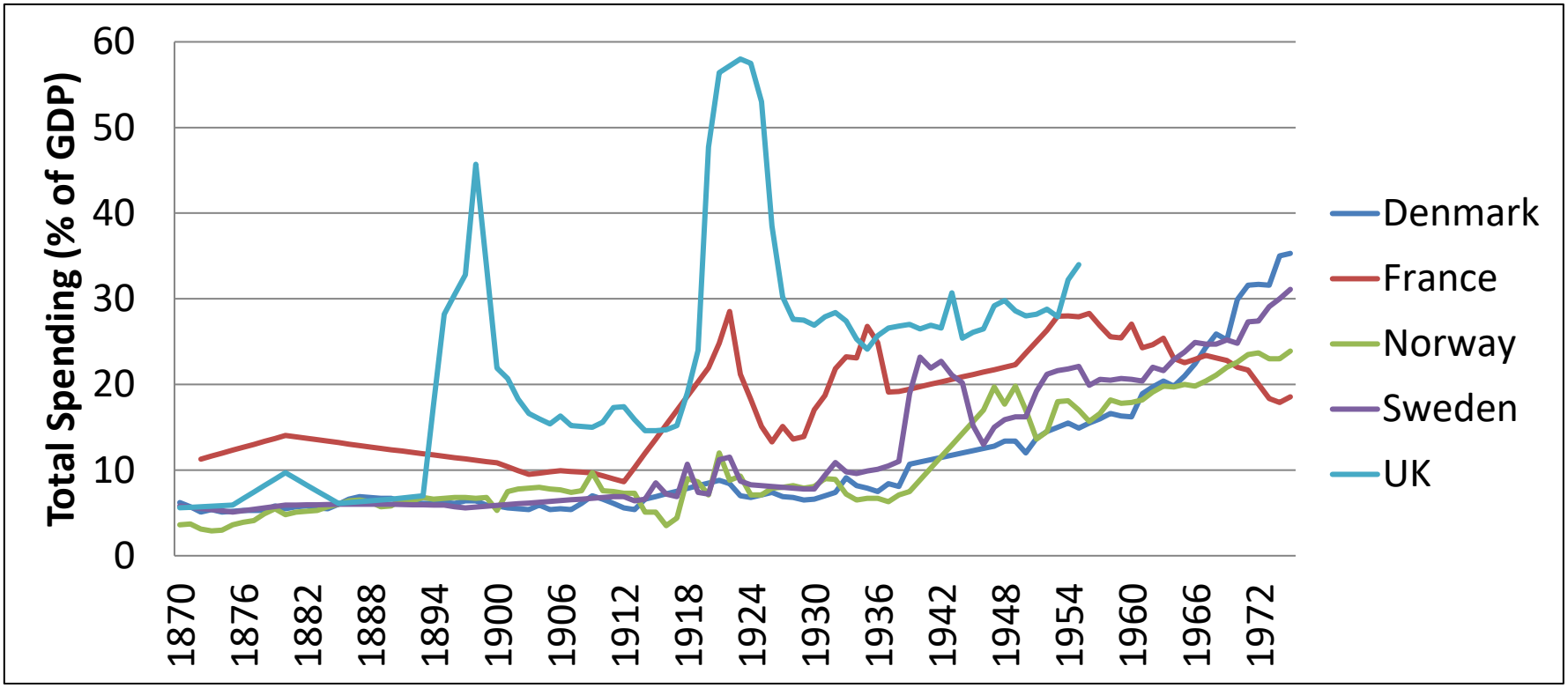
Historical Development

- The public sector has grown significantly over the past century
- For a typical country the public sector was small at the start of the twentieth century
  - In the order of 5-10% of GDP
- Expenditure then rose steadily for the next sixty years

Historical Development: Total spending



- The pattern of growth is similar across the countries

Expenditure in subcategories

- During the 19th century and until the mid of the 20th century three main categories of public spending:

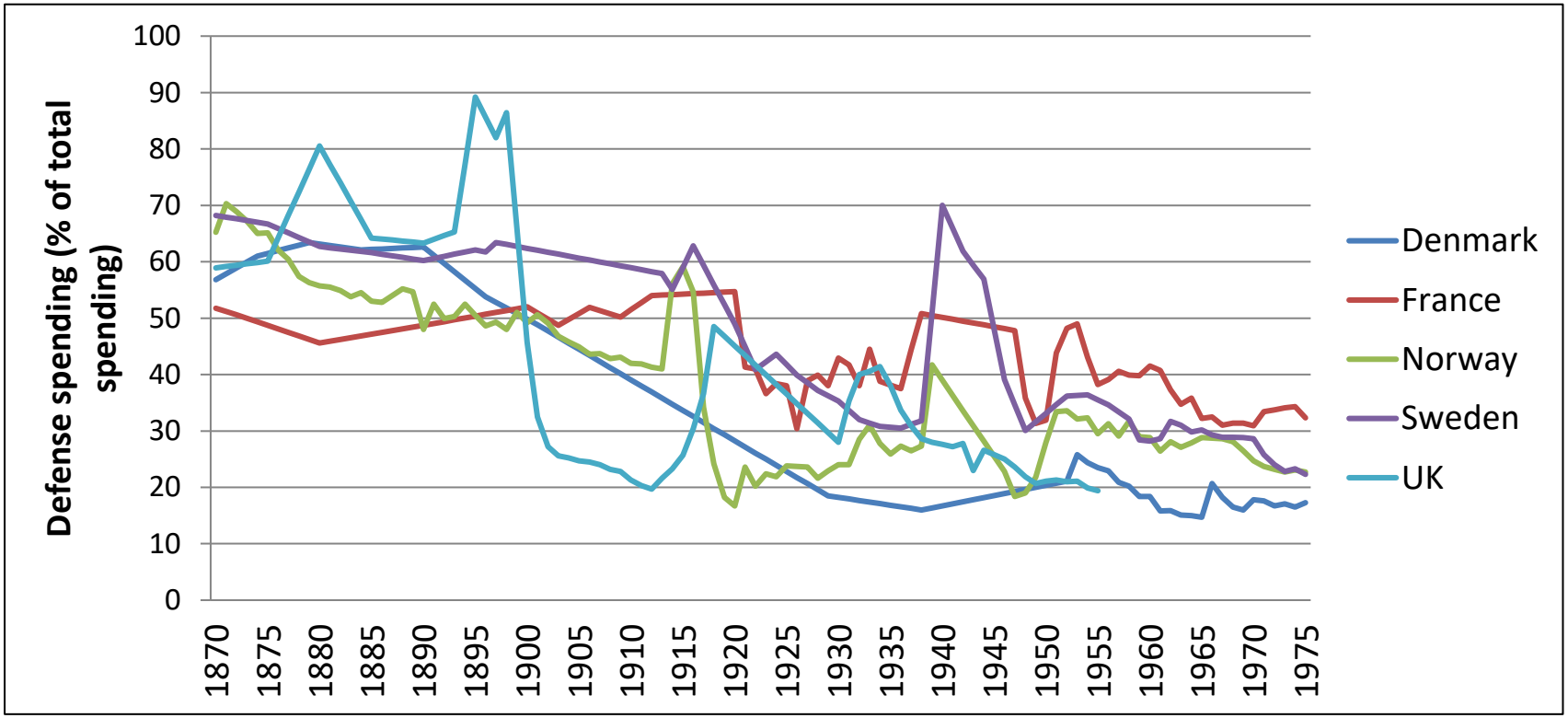
- **Security:** central government spending on defence, general administration, the judiciary and the police (“security”).

- **Economic Services:** on economic services, transport and communication (“long-term public services”).

- **Collective goods and welfare:** spending on health, public housing, education and social security.

Historical Development: Security

- Defence spending was one of the largest items back in the 19th and the beginning of the 20th century



- Since then it has depended on circumstances

Historical Development: Economic services

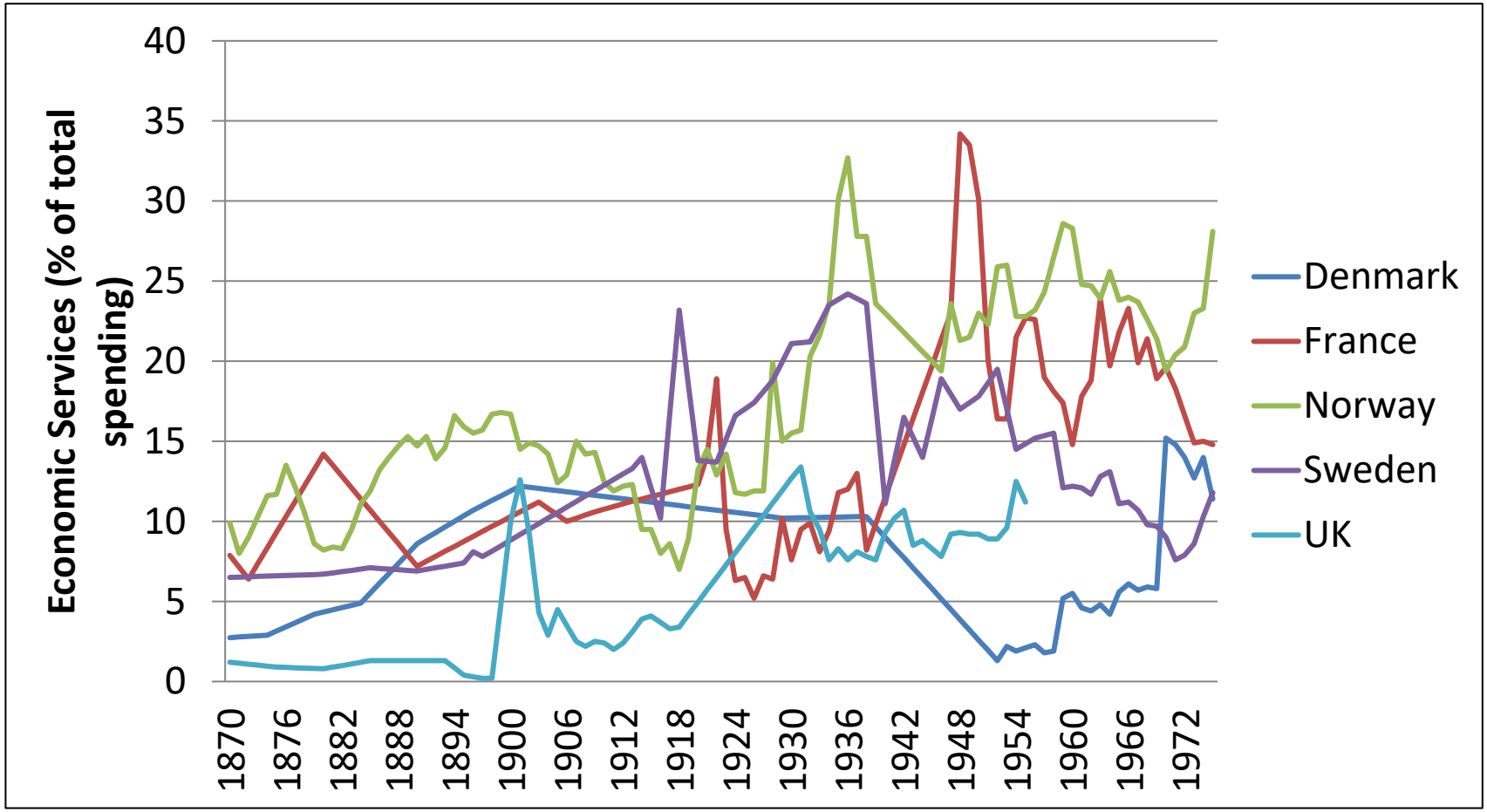
- The other two components of the public sector are related to the development process beginning from initial industrialisation.

- During the 19th century population moves from the countryside to urban areas; a requirement for infrastructural expenditure arises.

- Infrastructural expenditure is increasingly complementary with expenditure by private sector.

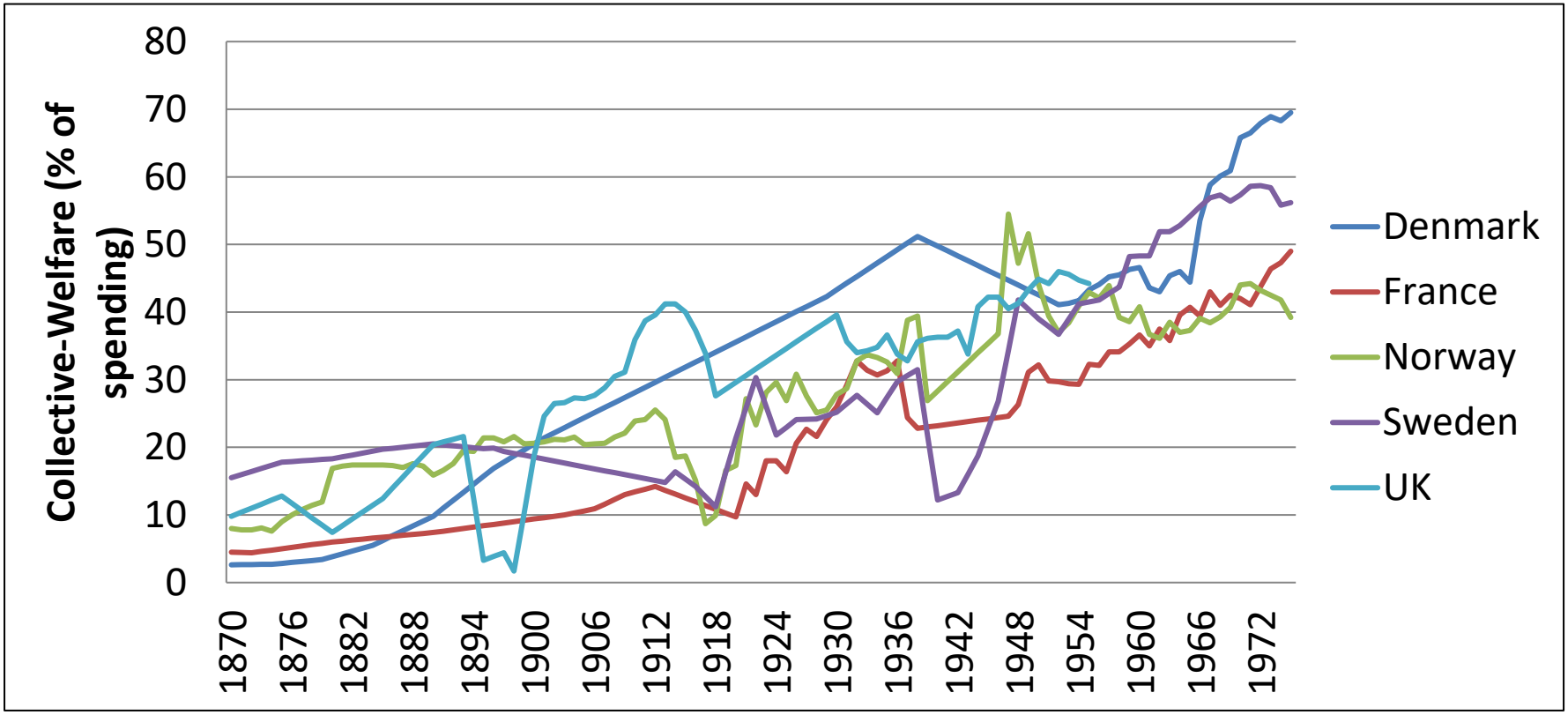
- Urbanisation produces a range of externalities such as pollution and crime.

Historical Development: Economic services



Historical Development: Collective goods and Welfare

- Industrialisation increased the demand, initially, for the provision of public goods (health) and, subsequently, for welfare programmes.



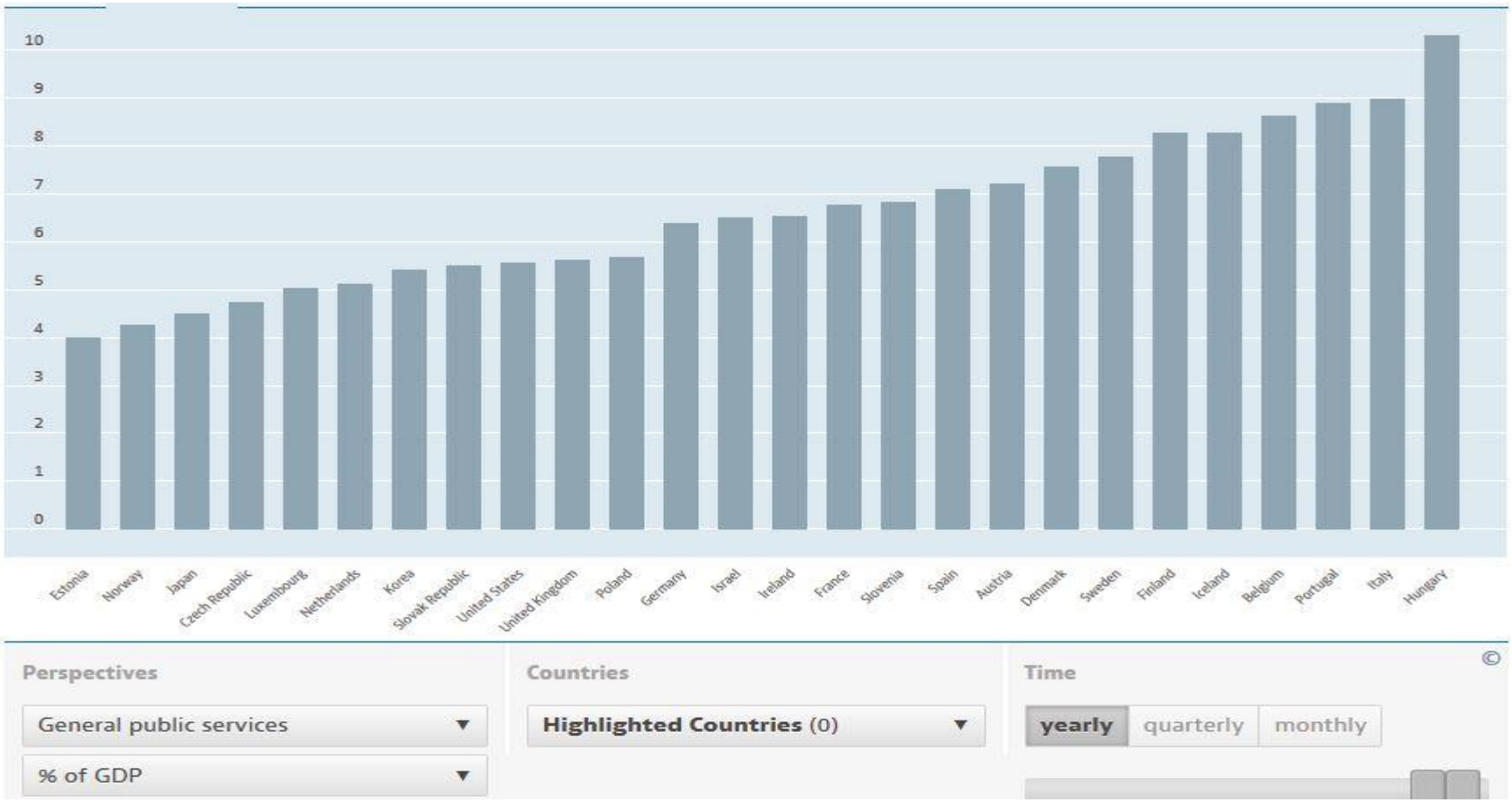
Current classification of Spending

- The Classification of the functions of government, (COFOG), defined by United Nations statistics division, categorizes public spending in 10 sub-categories.

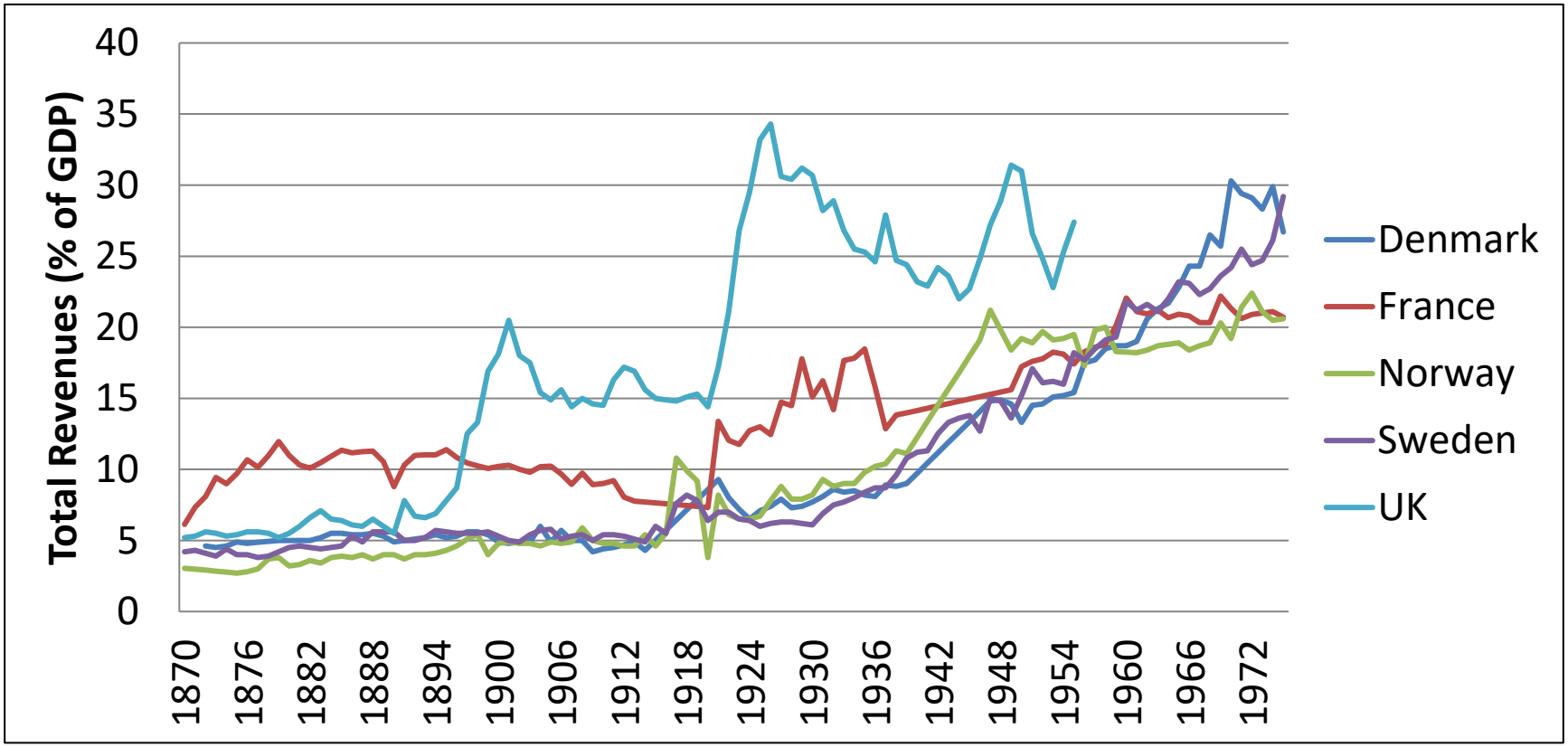
Government broad objective (division)	Sub-items
General public services	Executive and legislative organs, financial and fiscal affairs, external affairs foreign economic aid, basic research, R&D related to general public services, public debt services, transfers of a general character between different levels of government
Defence	Military and civil defence, foreign military aid, R&D related to defence
Public order and safety	Police, fire-protection services, law courts, prisons, R&D related to public order and safety
Economic affairs	General economic, labour and commercial affairs, agriculture, forestry, fishing and hunting, fuel and energy, mining, manufacturing and construction, transport, communication, other industries, related R&D
Environmental protection	Waste and water waste management, pollution abatement, protection of biodiversity and landscape, related R&D
Housing and community amenities	Housing development, community development, water supply, street lighting, R&D related
Health	Medical products, appliances and equipment, outpatient, hospital and public health service, R&D related to health
Recreation, culture and religion	Recreational and sporting, cultural services, broadcasting and publishing services, religious and other community services, R&D
Education	Pre-primary, primary, secondary and tertiary education, post-secondary non-tertiary education, education nondefinable by level, subsidiary services to education, R&D
Social protection	Sickness and disability, old age, survivors, family and children, unemployment, housing, R&D, social exclusion, nec.

Current trends

https://data.oecd.org/gga/general-government-spending.htm#indicator-chart



Historical Development: Total tax revenues



- Upward trend as in the case of Total spending

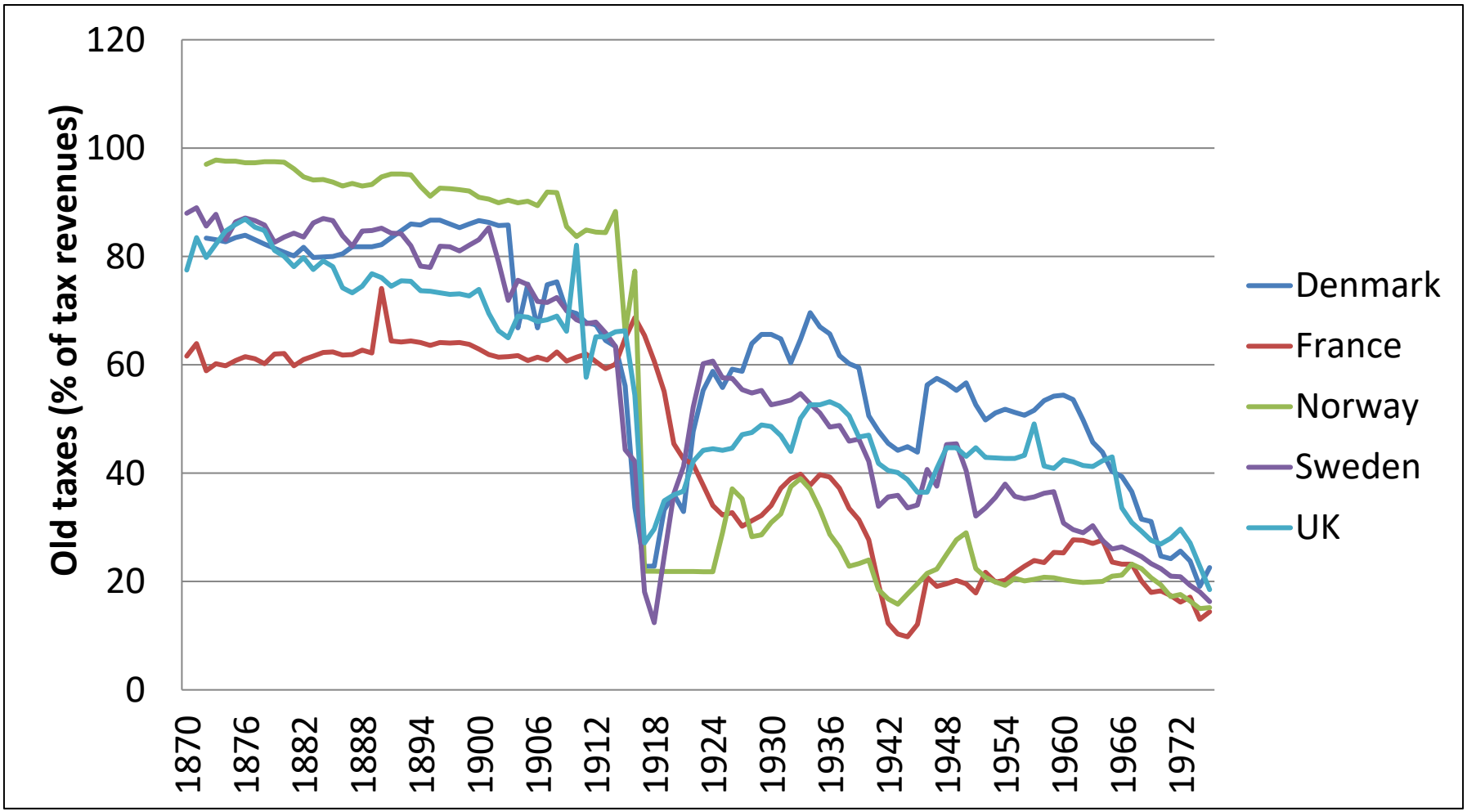
	Classification of direct taxes	Classification of Urban taxes	Total taxes	Classification of Indirect taxes	
Direct taxes	Rural taxes		1. Land tax		
			2. Assessed tax		
	Urban taxes	Trade and corp. taxes	3. Corporate tax		
			4. Trade tax		
		Payroll tax	5. Payroll tax		
		Non-payroll tax	5. Non-payroll tax		
		Capital taxes	6. Property tax		
			7. Inheritance tax		
			8. Extraordinary tax		
			9. Other direct tax		
			10. Customs tax	Customs taxes	Indirect taxes
			11. Excise tax	Market taxes	
			12. Turnover tax		
			13. Other indirect tax		

Revenues in subcategories

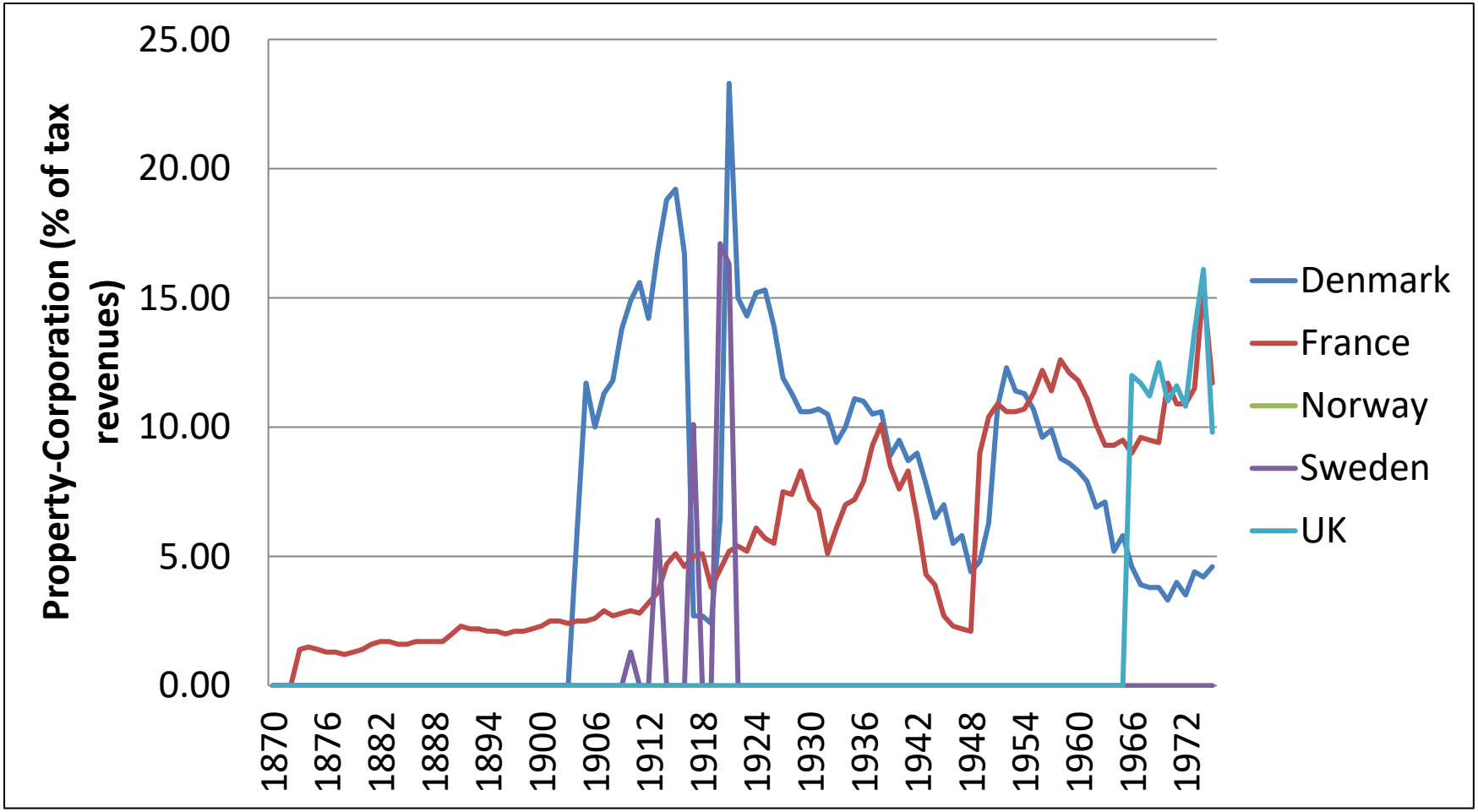
- During the nineteenth century, the dominant taxes were customs, excise duties, land taxes and inheritance taxes.

- These old taxes were gradually complemented and, in some cases, replaced by (personal) income tax and taxes on corporations and property (**Aidt and Jensen (2009a)**).

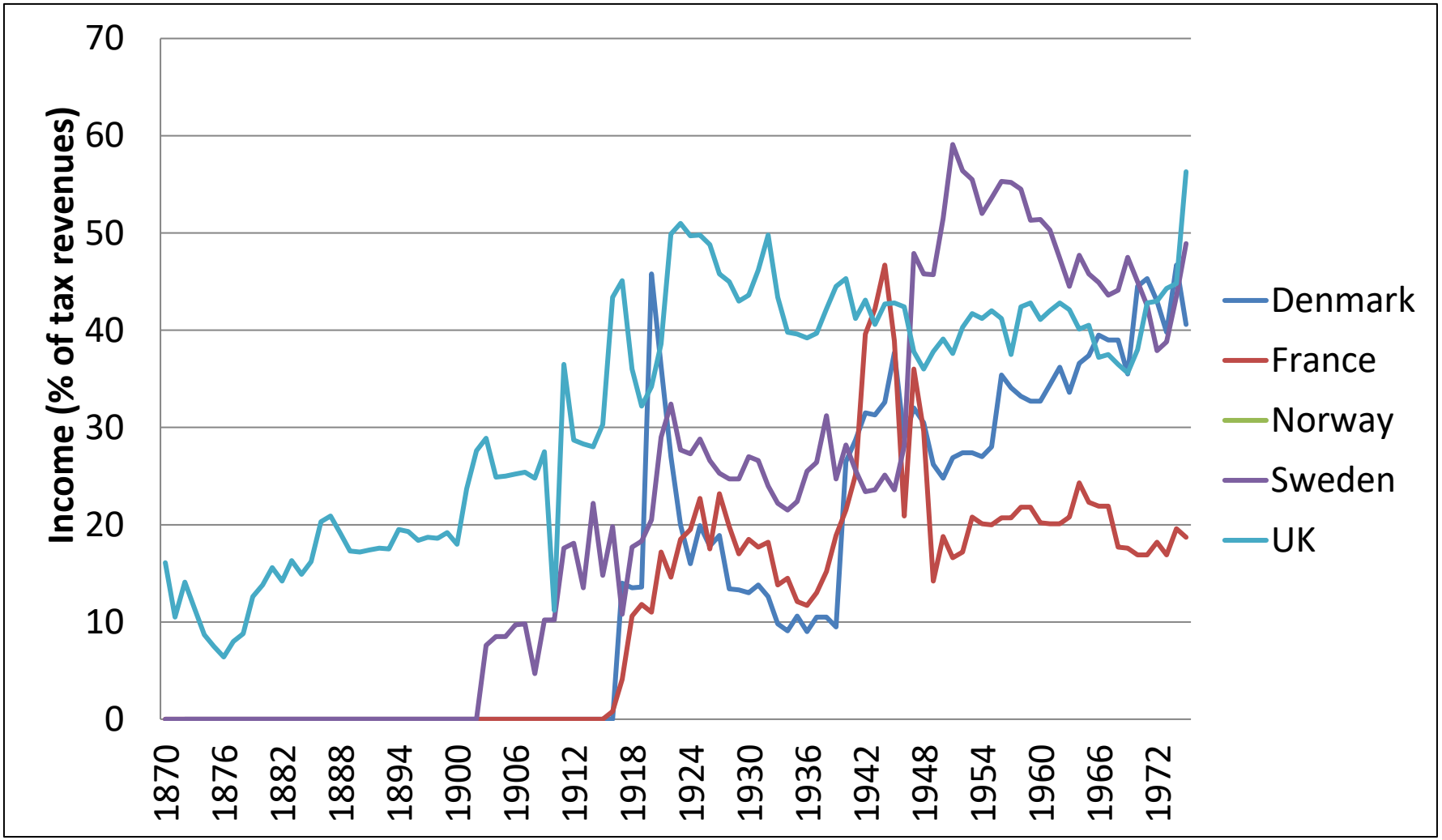
Historical Development: Old Taxes



Historical Development: Property and Corporation taxes



Historical Development: Income taxes



Income tax

- The size of government increased dramatically in proportion to the size of the economy over the last 200 years.
- One important idea is that efficient taxes are behind the development of the public sector.
- The income tax is the most important tax innovations of the past 200 years.
- **Aidt and Jensen (2009b)** study the main factors which induce a society to innovate and adopt efficient taxes.

Aidt and Jensen (2009b):Income taxation in historical perspective

Table 1
The timing of the income tax

Country	Permanent income tax from	Episodes of temporary income taxes	Local/state income taxes from	Revenue yield reaches 5% in
United Kingdom	1842	1798–1802, 1803–16	None	1844
Austrian Empire[f]	1849	1778, 1789–90	None[d]	1905
Italy	1864	None	<1861[a]	1877
Japan	1887	None	None	1925
New Zealand	1891	None	None	1915
Norway	1892	1809	1882	1892
Netherlands	1893	1797	None	1899
Sweden	1902	1809–12	1920	1903
Denmark	1903	1789, 1809, 1848–50, 1864, 1867–70	1861	1917[e]
France	1911	1793	None[d]	1918
United States	1913	1862–72, 1894–95	1706	1916[g]
Australia	1915	None	1884	1915
Canada	1917	None	1866	1919
Germany[c]	1920	1808	1851[b]	1924
Finland	1920	1865–81	1873	1920
Belgium	1922	1797	None[d]	1922
Switzerland	1939	1911–14, 1917–1928, 1933–37	1840	1942

Notes: a. Income taxes levied by some of the old states before unification in 1861. b. Prussia introduced the income tax in 1851, followed by Hessen in 1869. c. The German Empire (1871–1918) and the Weimar Republic (1919–33). d. We could find no indication in the literature that local and/or state income taxes were used before the introduction of the nation-wide income tax. e. The threshold for Denmark was most likely reached before 1917. f. Austro-Hungarian Empire after 1867. g. 1916 is the first year for which Mitchell (2003c) records separate revenues from income taxes.
Sources: See Appendix.

Sample and empirical specification

- **Aidt and Jensen (2009b)** attempt to understand what explains the timing of the introduction.
- Their sample consists of 17 countries over the period 1815-1939.
- Empirical specification:

$$P(y_{it} = 1 | x_{it}, y_{it-1} = 0) = \frac{1}{1 + e^{-(x_{it}\beta + H(t - t_i))}}$$

- $\boldsymbol{Y_{it}}$: takes the value of 1 if country I adopted the income tax, and 0 in the years before that.
- $\boldsymbol{X_{it}}$: determinants of the adoption of the income tax. The authors consider 4 main driving forces.

The main Hypotheses to be tested

- **Political Factors**
  - **Hypothesis 1:** If democratisation acts as a commitment device for redistribution of income, the extension of the voting franchise make more likely the adoption of the income tax.
  - **Hypothesis 2:** The secret ballot makes adoption of the income tax more likely.
  - **Hypothesis 3:** The income tax is more likely to be adopted where left-wing parties are important.
  - **Hypothesis 4.** For a given franchise, the income tax is less likely to be adopted in election years and more likely to be adopted the longer there is to the next election.

The main Hypotheses to be tested

Table 2

Overview of explanatory variables and mnemonics

Category	Variable definition and prediction
Political factors	1) *Suffrage* (U-shaped): The electorate (for parliamentary elections) in percentage of the enfranchised age and sex group, before women's suffrage, male population only. Coded 0 if no elections took place. 2) Secret ballot (+): Dummy variable equal to 1 in the years after the introduction of the secret ballot and 0 otherwise. 3) *Left-wing parties* (+): The share of seats held by left-wing parties in the lower chamber of parliament. 4) *Election year* (−): Dummy variable equal to 1 in election years and 0 otherwise. 5) *Years to next election* (+): The number of years until the next election. 6) *Political competition* (?): The polity IV index.

The main Hypotheses to be tested

- **Social learning and Geographical diffusion**
  - **Hypothesis 5:** The income tax is more likely to be adopted in a particular country if other (neighbouring) countries have already adopted it.

Social Learning & geographical diffusion

1) *Geographical closeness* (+) is defined as

$$GC_{ij} = \sum_i \frac{1}{\text{dist}_{ij}} A_j(t)$$

where $dist_{ij}$ is the distance between the capitals of country i and j. $A_j(t) = 1$ if country j adopted the income tax in year $\tau \leq t$, and is 0 otherwise.

2) *Linguistic closeness* (+) is defined as

$$LC_{ij} = \sum_i \left(1 - \sqrt{\frac{15 - \text{common}_{ij}}{15}}\right) A_j(t)$$

where $\#\text{common}_{ij}$ is the number of common notes in the linguistic tree between the (dominant) language of country i and j in year t. $A_j(t)$ is defined as above.

3) *Learning from temporary adoptions* (−) is defined as *linguistic closeness*, except that $A_j(t) = 1$ if country *j* has a temporary income tax in year *t* and 0 otherwise.

The main Hypotheses to be tested

- **Tax collection costs**
  - **Hypothesis 6:** Improvements in the tax collection technology increase the probability that the income tax is adopted.

Tax collection costs	1) *Tax technology index* (+) is the sum of ● *Census* (dummy variable coded 1 in year t if the country had a population census at some $\tau \leq t$ and 0 otherwise). ● *Local income tax* (dummy variable coded 1 for the years after a country started to levy income tax at the local and state level and 0 otherwise). ● *Education attainment* (dummy variable coded 1 for the years after which enrollment in primary education as a percentage of all 5 to 14 years olds reached 60% and 0 otherwise). ● *Urbanization* (dummy variable coded 1 for the years in which more than 10% of the population lived in towns with more than 20,000 inhabitants).

The main Hypotheses to be tested

- **Spending pressures**
  - **Hypothesis 7:** The income tax is more likely to be adopted in times of fiscal spending pressures.

Spending pressures	1) *War* (+): A dummy variable equal to 1 if a country was at war in year *t* and equal to 0 otherwise. 2) *Deficit* (+): The difference between total (central) government spending and total (central) government tax revenues in percentage of total spending, lagged one year. 3) *GDP per capita* (+): GDP per capita at 1990 International Geary-Khamis dollars. 4) *Population* (+): The size of the total population in 1000s. 5) *Age structure* (+): The percentage of the population above 65 years of age. 6) *Urbanization rate* (+): The percentage of the population living in towns with more than 20,000 inhabitants. 7) *Agricultural share* (−): The number of individuals employed in agriculture, mining and fishing per 1000 employees.

Table 3
Logit estimates of the probability of adopting the income tax, 1815–1939

Model	1	2	3	4	5	6
Suffrage	−0.226***	−0.258***	−0.236***	−0.200**	−0.247***	−0.224***
	[−3.16]	[−3.29]	[−2.97]	[−2.67]	[−3.37]	[−3.12]
Suffrage^2	0.00178***	0.00203***	0.00199***	0.00153**	0.00196***	0.00176***
	[2.76]	[2.91]	[2.78]	[2.34]	[2.97]	[2.73]
Secret ballot	2.551**	2.054*	2.178*	2.354*	2.225**	2.540**
	[2.21]	[1.68]	[1.86]	[1.95]	[2.05]	[2.20]
Tax technology index	0.995*	1.115*	0.765		1.224**	0.970*
	[1.89]	[1.88]	[1.29]		[2.11]	[1.84]
Temporary income tax	−2.213**	−2.355***	−3.658***	−2.727***	−2.852***	−2.104**
	[−2.57]	[−2.60]	[−3.12]	[−2.83]	[−2.73]	[−2.43]
Linguistic closeness	3.014*	2.657	1.821	3.587*		3.578*
	[1.71]	[1.43]	[0.92]	[1.82]		[1.94]
Log(GDP per capita)	−1.258	−0.864	0.772	−1.069	0.316	−1.420
	[−0.90]	[−0.57]	[0.42]	[−0.75]	[0.30]	[−1.02]
War	0.994	1.113	1.188	0.845	1.263	0.861
	[1.21]	[1.33]	[1.31]	[0.98]	[1.63]	[1.03]
Log(Population)	0.152	0.0598	0.316	0.191	0.448	0.097
	[0.71]	[0.27]	[1.17]	[0.85]	[1.64]	[0.44]
Years to next election		−0.005				
		[−0.08]				
Election year		−0.153				
		[−0.24]				
Left-wing parties			0.017			
			[0.76]			
Political competition			−0.220*			
			[−1.94]			
Education attainment				0.128		
				[0.11]		
Urbanization				2.348*		
				[1.86]		
Local income tax				0.157		
				[0.19]		
Geographic closeness					79.790	
					[1.35]	
Learning from temporary adoptions						−1.468
						[−0.81]
Years without income tax	0.115	0.113	0.185	0.105	0.132	0.110
	[1.16]	[1.10]	[1.51]	[1.01]	[1.26]	[1.11]
Spline 1 (*1000)	0.150	0.150	0.203*	0.151	0.168	0.143
	[1.51]	[1.45]	[1.74]	[1.47]	[1.55]	[1.43]
Spline 2 (*1000)	−0.109*	−0.111*	−0.142*	−0.113*	−0.120*	−0.105*
	[−1.73]	[−1.70]	[−1.96]	[−1.74]	[−1.73]	[−1.65]
Constant	1.886	0.387	−14.71	0.966	−12.15	3.511
	[0.19]	[0.04]	[−1.05]	[0.09]	[−1.54]	[0.34]
Observations	920	861	850	920	920	920
Joint significance[a]	12.22***	13.05***	9.11**	9.13**	13.42***	11.90***
Turning point	63.5	63.6	59.3	65.4	63.0	63.6

Notes: z statistics in brackets; * significant at 10%; ** significant at 5%; *** significant at 1%. a. Wald test of joint significance of suffrage and suffrage^2. In model (2) and (3), we lose data from Finland before 1906 and 1917, respectively.

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Model	1	2	3	4	5	6
Suffrage	−0.226***	−0.258***	−0.236***	−0.200**	−0.247***	−0.224***
	[−3.16]	[−3.29]	[−2.97]	[−2.67]	[−3.37]	[−3.12]
Suffrage^2	0.00178***	0.00203***	0.00199***	0.00153**	0.00196***	0.00176***
	[2.76]	[2.91]	[2.78]	[2.34]	[2.97]	[2.73]
Secret ballot	2.551**	2.054*	2.178*	2.354*	2.225**	2.540**
	[2.21]	[1.68]	[1.86]	[1.95]	[2.05]	[2.20]
Tax technology index	0.995*	1.115*	0.765		1.224**	0.970*
	[1.89]	[1.88]	[1.29]		[2.11]	[1.84]
Temporary income tax	−2.213**	−2.355***	−3.658***	−2.727***	−2.852***	−2.104**
	[−2.57]	[−2.60]	[−3.12]	[−2.83]	[−2.73]	[−2.43]
Linguistic closeness	3.014*	2.657	1.821	3.587*		3.578*
	[1.71]	[1.43]	[0.92]	[1.82]		[1.94]
Log(GDP per capita)	−1.258	−0.864	0.772	−1.069	0.316	−1.420
	[−0.90]	[−0.57]	[0.42]	[−0.75]	[0.30]	[−1.02]
War	0.994	1.113	1.188	0.845	1.263	0.861
	[1.21]	[1.33]	[1.31]	[0.98]	[1.63]	[1.03]
Log(Population)	0.152	0.0598	0.316	0.191	0.448	0.097
	[0.71]	[0.27]	[1.17]	[0.85]	[1.64]	[0.44]
Years to next election		−0.005				
		[−0.08]				
Election year		−0.153				
		[−0.24]				
Left-wing parties			0.017			
			[0.76]			
Political competition			−0.220*			
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Education attainment				0.128		
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Local income tax				0.157		
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Geographic closeness					79.790	
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Learning from temporary adoptions						−1.468
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Years without income tax	0.115	0.113	0.185	0.105	0.132	0.110
	[1.16]	[1.10]	[1.51]	[1.01]	[1.26]	[1.11]
Spline 1 (*1000)	0.150	0.150	0.203*	0.151	0.168	0.143
	[1.51]	[1.45]	[1.74]	[1.47]	[1.55]	[1.43]
Spline 2 (*1000)	−0.109*	−0.111*	−0.142*	−0.113*	−0.120*	−0.105*
	[−1.73]	[−1.70]	[−1.96]	[−1.74]	[−1.73]	[−1.65]
Constant	1.886	0.387	−14.71	0.966	−12.15	3.511
	[0.19]	[0.04]	[−1.05]	[0.09]	[−1.54]	[0.34]
Observations	920	861	850	920	920	920
Joint significance[a]	12.22***	13.05***	9.11**	9.13**	13.42***	11.90***
Turning point	63.5	63.6	59.3	65.4	63.0	63.6

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Main Results

- **Political factors:**
  - A non-linear relationship exists between the variable ***suffrage*** and the income tax: The turning point is around 63%.
  - The ***secret ballot***, on the other hand, contributed significantly to the introduction of the income tax.

- **Social learning and Geographical diffusion**
  - **Linguistic closeness** has the expected positive effect in the probability of adoption.

- **Tax collection costs**
  - **Temporary income tax** has, as expected, a negative effect on the probability of a permanent adoption.

- **Spending pressures**
  - The dummy variable **war** is not statistically significant in any of the specifications. However, episodes of **temporary income taxation** often coincided with war.

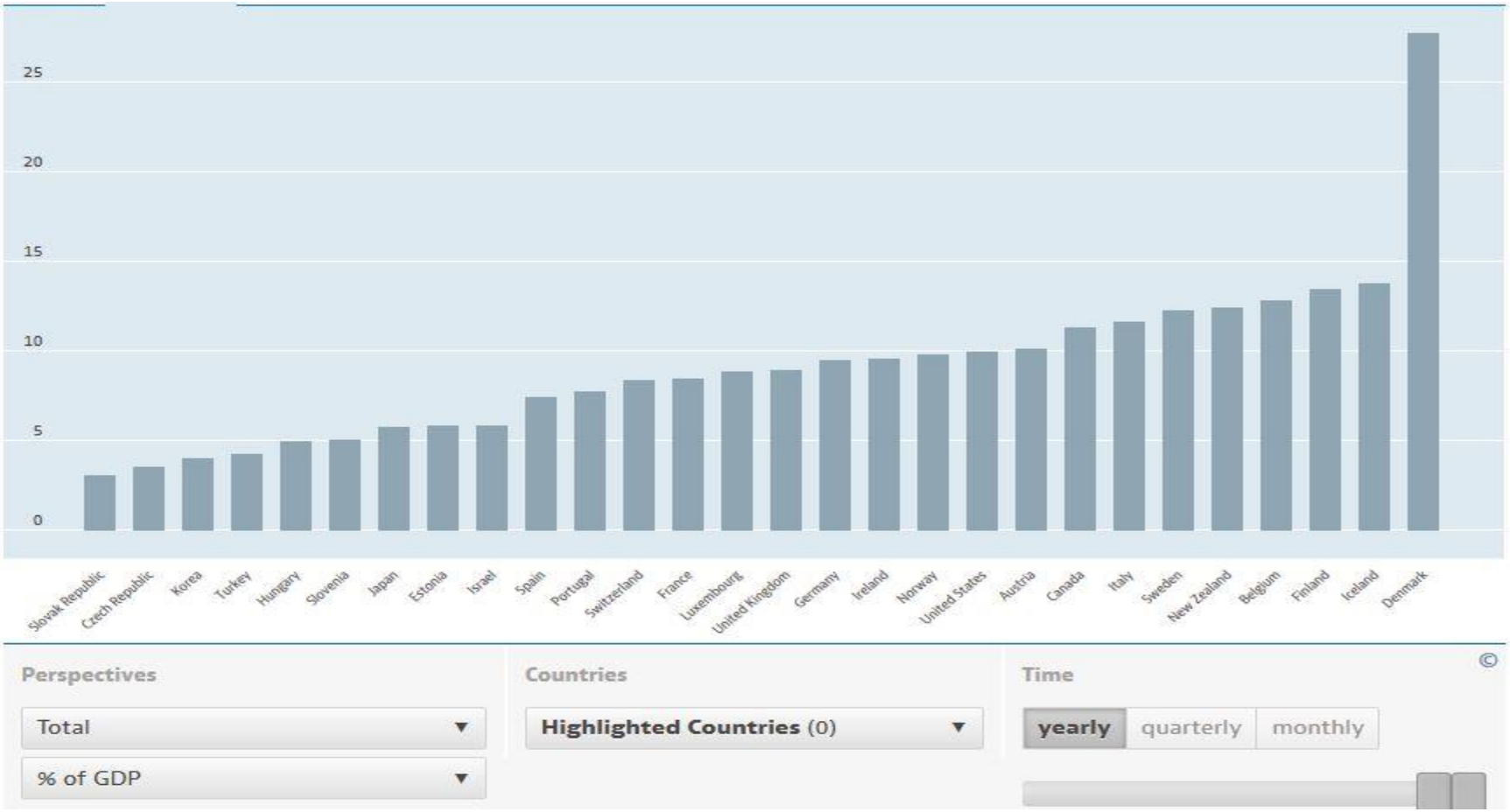
Current classification of Taxes

- According to the system of National Accounts (SNA) taxes are classified in the following categories:
  - Income and profits
  - Payroll and workforce
  - Property
  - Goods and services
  - Other

- The **United Nations System of National Accounts** (often abbreviated as **SNA**) is the internationally agreed standard set of recommendations on how to compile measures of economic activity.

Current trends

https://data.oecd.org/tax/tax-revenue.htm



Total taxes on personal income (% of GDP)

Readings

Hindriks, Jean, and Myles, Gareth D. Intermediate Public Economics. MIT Press Books 1, 2013. (relevant parts of chapter 4)

Aidt, Toke S. & Jensen, Peter S. (2009b). "**The taxman tools up: An event history study of the introduction of the personal income tax**," Journal of Public Economics, Elsevier, vol. 93(1-2), pages 160-175.