

The Colonial Origins of Economic Development in Europe

Evidence from the Interior Colonization of modern-day Switzerland

Noah Sutter and Andrés Irarrázaval

London School of Economics and Political Science



Outline

1. Motivation and Background
2. Historical Background
3. Data
4. Empirical Framework
5. Results
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7. Conclusion



§ 1

Motivation and Background



Motivation - Braudel (1949)

*"We were comparing the converted plains of the Mediterranean with the cleared forests of northern Europe. [...] In the new towns in the **forest clearings of the North** there grew up a **more free civilization on the American pattern**. One of the problems of the Mediterranean [...] was that [...] newly-acquired land remained under the control of the wealthy. A **pick and an axe might be enough** in the North, as it was later to be in America, to make the soil productive. In the Mediterranean rich and powerful landowners had an essential role to play, increasingly so as small-scale improvements were abandoned in favour of extensive, long-term schemes. The goal could only be achieved by holding ranks under a discipline possible only through a rigid social order. [...]" Braudel (1986, p. 75)*

Motivation - Braudel's Argument

- ▶ **Labour-intensive colonisation:** a few people with rudimentary tools are enough to clear forest.
 - ▶ No power asymmetries between colonists $\Rightarrow$ egalitarian and inclusive institutions.
- ▶ **Capital-intensive colonisation:** draining swamps or irrigating land.
 - ▶ Capital requirements need to be covered by feudal lords or monasteries $\Rightarrow$ a "*rigid social order*" arises.
- ▶ Europe's **internal colonisation** (the expansion of Latin Europe along the intensive and extensive margin, 950–1350) potentially had an influence on the diverging growth trajectories of Europe's North and South (Little Divergence).
- ▶ Same logic as factor-endowment literature on colonisation of the Americas: Sokoloff and Engerman (2000), Engerman and Sokoloff (2002), Acemoglu et al. (2002, 2012).

Research Question

Question

Did the mode of high medieval colonisation, labour-intensive forest clearing or capital-intensive drainage/irrigation, determine the type of local institutions, and through these long-run economic and political outcomes?

- ▶ Extends framework by Engerman and Sokoloff (2002) and Acemoglu et al. (2012) from the Americas to study *internal* colonisation of Europe.
- ▶ Speaks to the *Little Divergence* (De Pleijt & Van Zanden, 2016; Fochesato, 2018; Goldstone, 2015; Henriques & Palma, 2023) and to the *Frontier Mindset* literature (Bazzi et al., 2020; Turner, 1893).
- ▶ Requires setting with variation in mode of colonisation *and* persistent institutional variation.

Case Study: Modern-day Switzerland

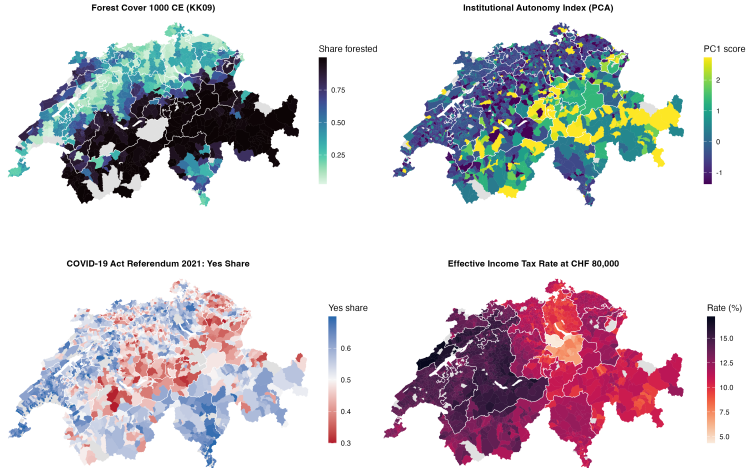
Modern-day Switzerland is a perfect case study:

- ▶ Variety in **date and mode** of colonisation.
- ▶ Variety of **institutional outcomes** that persist until 1798, and are partly restored by the Congress of Vienna until 1848.
- ▶ Situated at the **border between Northern and Southern Europe**.
- ▶ Alpine areas were never properly feudalised: low agricultural yields made them unattractive to the nobility (Maissen, 2015, p. 27).
- ▶ Rich historical documentation at the settlement level: the *Historisches Lexikon der Schweiz*.

Preview of the Results

1. **Mode of colonisation did determine medieval institutions.**
 - ▶ Labour-intensive forest clearing led to more egalitarian institutional outcomes in the high middle ages and early modern period.
 - ▶ Forest cover in 1000 CE strongly predicts institutional autonomy (measured as PCA index).
2. **Pre-industrial period (1500–1850):** no population-density penalty for autonomous forest-clearing settlements despite worse fundamentals; lower density by 1800 (-0.58^{**}). This is consistent with communal closure in a Malthusian world.
3. **Proto-industry:** within German-speaking Switzerland, instrumented autonomy raises participation in merchant-financed putting-out industry (*Heimarbeit*) by 16 pp.
4. **Reversal of fortunes after 1850:** instrumented autonomy reduces log population growth by 0.43–0.54, not explained by terrain.
5. **Political culture today:** more opposition to the 2021 Covid-19 act (rugged individualism towards the centre), but higher effective taxes on median incomes (communitarian towards the inside).

Summary of the Argument



Literature Review

1. **Institutions and endowments:** Acemoglu et al. (2002, 2012), Engerman and Sokoloff (2002), Kautsky (1907), and Sokoloff and Engerman (2000). Confirmation of the pattern up to the mid-19th century reversal.
2. **Little Divergence:** De Pleijt and Van Zanden (2016), Fochesato (2018), Goldstone (2015), and Henriques and Palma (2023). Forest clearing dominated north of the Alps, while drainage/irrigation was dominant in the south.
3. **Frontier mindset / rugged individualism:** Bazzi et al. (2019, 2020, 2021), Couttenier et al. (2017), García-Jimeno and Robinson (2009), Malik et al. (2023), and Turner (1893).
4. **Closest papers:**
 - ▶ **Rustagi (2024):** The extinction of the Zähringer family as quasi-experiment: self-governing municipalities show stronger cooperation norms today.
 - ▶ **Bosshart and Dittmar (2025):** Differences in high medieval colonisation cause divergence between East and West of Elbe.
 - ▶ **Lecce et al. (2022):** Persistent cultural effects of Piedmontese colonisation in Southern Italy.

§ 2

Historical Background



Europe's High Medieval Expansion (950–1350)

- ▶ "Latin Europe" (Frankish, Latin-rite, formerly Carolingian West) massively expanded its settled area (Bartlett, 1993).
- ▶ **Extensive margin:** *Reconquista*, Norman invasions of Britain and Ireland, German settlement east of the Elbe and in the Baltics, Crusader States, Scandinavian bishoprics.
- ▶ **Intensive margin:** Europe's *internal colonisation*, previously unsettled land *within* Latin Europe is settled.
- ▶ This paper focuses on the *intensive margin*.

Depiction of Colonisation in the *Sachsenspiegel* (1330)



Colonists clearing a forest under the supervision of a lord (in green), handing a charter to a "locator" (?)

(Source: Historisches Lexikon der Schweiz, Sachsenspiegel, 1330)

Switzerland in the High Middle Ages

- ▶ Population likely **doubled** between the 12th and 13th century (horseshoe, agricultural innovation); three quarters of all Swiss cities founded in the 13th century (Maissen, 2015, p. 16–34).
- ▶ High variety in date and mode of colonisation and in institutional outcomes, largely conserved until the 18th century.
- ▶ Alpine area economically unattractive to the nobility ⇒ **never properly feudalised**.
- ▶ Early **Imperial Immediacy** (*Reichsunmittelbarkeit*): seven cities by 1241; rural Uri (1231), Schwyz (1241) (Braun, 2012).
- ▶ Early **disappearance of the high nobility**.
- ▶ Result: a **patchwork of local institutional heterogeneity**.

Institutional Variation in the *Alte Eidgenossenschaft* (Maissen, 2015)

- ▶ **13 polities** - 6 sovereign rural territories and 7 cities with suzerain territories.
- ▶ In the **rural territories** (*Länderorte*), *Landsgemeinde* (popular assembly) is central political institution.
- ▶ **Republics** dominated by a patriciate (or trade guilds in the cities). Cities are governed by elected mayors/guild headmen and the rural territories by elected governors (*Landammänner*).
- ▶ 9 polities are **associated** (*Zugewandte Orte*) with their own suzerain territories, several dozen **common bailiwicks** (*Gemeine Herrschaften*) are administered jointly by the 13 *Orte* by appointed baliffs (*Vögte*).
- ▶ The **only joint institution** of the Confederacy is the *Tagsatzung*: Irregular assembly of deputies from all 13 *Orte* (+ *Zugewandte*). **Very limited** legislative and no executive powers.

The *Alte Eidgenossenschaft* ("Old Confederacy") around 1700



(Source: Wikimedia)

§ 3

Data



§ 3.1

Historisches Lexikon der Schweiz

Data



Main Source: *Historisches Lexikon der Schweiz* (HLS)

- ▶ We scraped the universe of *Spaces and Locations* entries in the HLS for modern-day Switzerland and neighbouring border regions.
- ▶ **5299 locations**; modern Switzerland has 2175 municipalities, of which 2168 (99.7%) are matched to at least one entry.
- ▶ Entries give detailed settlement histories: population at different dates, mode of establishment, and early institutional characteristics.
- ▶ Entries are parsed with Anthropic's Claude API (Opus 4.5) into a structured dataset of historical, institutional, and economic variables.

Variables on Colonisation

From the HLS entries

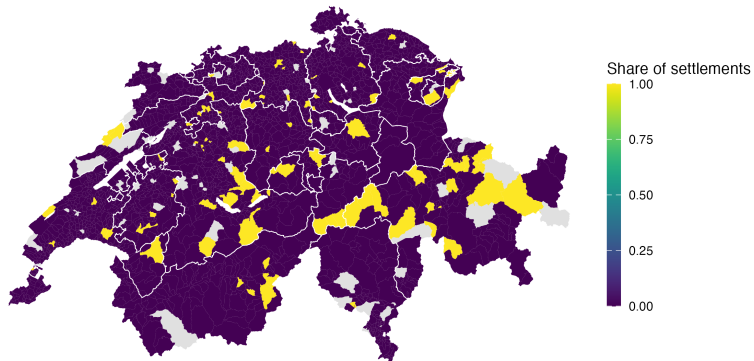
- ▶ Year of first documented mention
- ▶ Mode of colonisation (forest clearing; drainage/marsh reclamation etc.)
- ▶ Colonising group/institution
- ▶ Charter/*Handfeste* (and year)

From toponyms (Perler, 2022)

- ▶ **Felling trees:** *rüti, grüt, reuth, rüthi, ried, rieth, rhod*
- ▶ **Bark removal (*Schwendbau*):** *schwand, schwend, schwende, schwendi, schwandt*
- ▶ **Slash-and-burn:** *brand, sangi, sangere, stocke, stockere, stock*
- ▶ **Romance equivalents:** *essert, ronco, runc, runcs*
- ▶ **Late clearing (18th/19th c.):** *hard, loo, holz, wald, birch, buch, buech, tann*

Municipalities Colonised through Forest Clearing

Forest-Clearing Colonization (toponym + HLS)



HLS or toponym

Variables on High Medieval Institutions

Settlement level (HLS)

- ▶ Legal tradition
- ▶ Property rights
- ▶ Judicial autonomy (locally elected vs. appointed judges)
- ▶ Communal assembly (*Landsgemeinde*)
- ▶ Taxation autonomy; tithe obligations
- ▶ Labour service/*Corvée*; military obligations
- ▶ Commons rights

Polity level (*Ort*)

- ▶ *Länderort* (not dominated by a city)
- ▶ *Landsgemeinde* tradition; year of first assembly
- ▶ *Allgewaltige* assembly; universal vs. patrician right to file motions
- ▶ Assembly keeps legal, electoral and fiscal competence into the 19th c.
- ▶ Suzerain status (enters *negatively*)
- ▶ Coded for 13 *Orte*, 2 allied territories, 13 suzerain territories; local assemblies for 93 municipalities

Example Entry: Davos (Bundi, 1999)

Mode of settlement:

"[...] The valley is a young settlement area; it was cultivated and settled in the High Middle Ages by Romance-speaking farmers from the Albula Valley and the Engadin. [...] Around 1280, the settlement of Walsers took place under Walter V of Vaz, who combined the two Romance farms with twelve new Walser farms into a cooperative association [...]."

Medieval institutions:

"[...] The feudal and rent charter of 1289 records substantial payments in cheese, sheep, and cloth, military service obligations, but also personal freedoms and lower jurisdiction under their own Ammann. The high jurisdiction was held by the barons of Vaz [...]."

Outcomes and Controls from the HLS

Economic outcomes

- ▶ Population by (half-)century, 700–1900 (where available)
- ▶ Textile industry before 1870
- ▶ *Heimarbeit* (putting-out) textile industry before 1870
- ▶ Other early industry before 1870

Controls

- ▶ Presence of a Roman site
- ▶ Location on a trade route
- ▶ Adoption of the Reformation
- ▶ Type of location (town, village, hamlet, mountain pass, ...)

§ 3.2

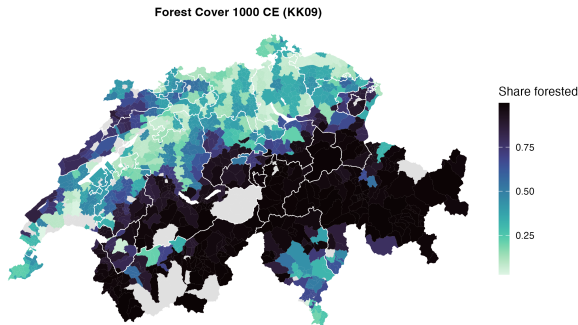
Other Data and Aggregation

Data



Forest Cover in 1000 CE

- ▶ **Kaplan et al. (2009):**
Anthropogenic land-cover change in Europe over the Holocene.
- ▶ Forest cover = complement of land use (sensible below the tree line).
- ▶ 5 arc-minute resolution (≈ 9 km); years 1000 and 1300 CE.

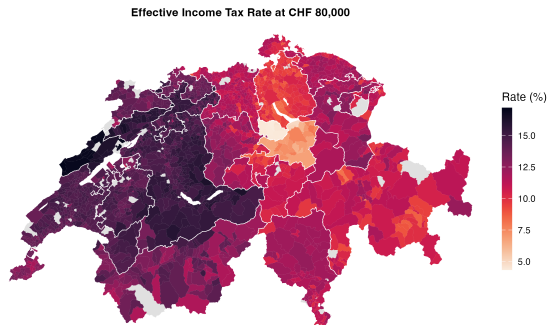


Aggregation to Grid Level

- ▶ Commune-level data are noisy with a lot of missing information but 26 cantons give too little statistical power.
- ▶ Main specification: $0.1^\circ \times 0.1^\circ$ **grid cells** as unit of observation.
- ▶ Historical and modern population at the commune level allow us to calculate precise population figures per cell. We work with **population-weighted** inputs and outcomes.
- ▶ Canton and language fixed effects
- ▶ Results reported at commune, grid and cantonal level.

Population and Tax Data

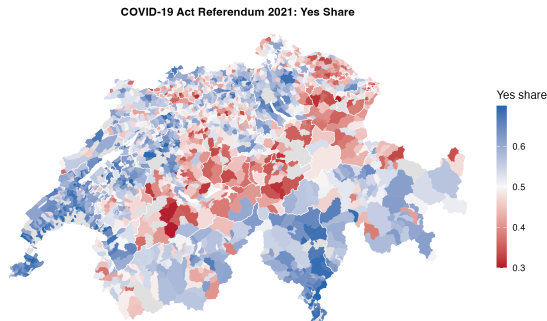
- **Population:** commune-level data since 1764 from Schueler (2023).
- **Taxes:** Swiss Federal Tax Administration online calculator; unmarried single, no church membership.
- Cantons set a base rate; municipalities set a local **multiplier**.
- The multiplier is determined locally.



Population-weighted mean income tax rate at CHF 80,000

Covid-19 Referendum

- ▶ Referendum on the Amendment of 19 March 2021 to the COVID-19 Act,(FSO).
- ▶ Federal Council acts under emergency law. In September 2020 parliament passes the Covid-19 Act. This is later amended and challenged twice by referendum.
- ▶ Following Bazzi et al. (2021), opposition to the act is treated as an expression of *rugged individualism*.



Summary Statistics: Commune Level

	N	Mean	SD	Min	Max
Institutional autonomy index (PC1)	3727	0.003	1.617	-10.88	13.97
Institutional autonomy (simple average)	3727	0.305	0.199	0.00	0.93
Forest cover 1000 CE	3613	0.480	0.324	0.03	1.00
Forest-clearing colonisation	3703	0.050	0.219	0.00	1.00
Deforestation 1000–1300	3613	0.010	0.011	-0.00	0.06
Elevation (m)	3727	652.639	316.161	201.00	2989.00
Terrain ruggedness (m)	3727	263.320	257.247	0.00	1510.78
Slope (%)	3727	7.920	7.985	0.00	45.10
Caloric suitability (pre-1500)	3727	1834.362	721.621	0.00	2655.85
Roman site	1487	0.830	0.376	0.00	1.00
Medieval trade route	801	0.836	0.370	0.00	1.00
Income tax rate, CHF 80k (%)	1985	12.872	2.163	4.34	17.19
Income tax rate, CHF 1m (%)	1985	32.683	4.182	17.64	38.94
Wealth tax rate, CHF 1m (%)	1985	0.384	0.144	0.09	0.73
COVID-19 Act: Yes share	2030	0.539	0.106	0.12	0.79
Early industry (pre-1870)	2046	0.776	0.441	0.00	7.00
Early textile industry	1724	0.537	0.499	0.00	1.00
Early Heimarbeit (putting-out)	1724	0.277	0.447	0.00	1.00
Log pop growth 1798–1850	718	0.404	0.311	-1.33	2.54
Log pop growth 1850–2019	1378	0.936	0.897	-3.22	4.03
Population 2019	2033	3735.565	12928.966	32.00	420217.00

§ 4

Empirical Framework



§ 4.1

Principal Component Analysis

Empirical Framework



Measuring Institutional Autonomy: Principle Component Analysis

- ▶ Overall historical institutional quality is a latent variable. PCA is standard for recovering it from correlated observables (Filmer & Pritchett, 2001; McKenzie, 2005; Vyas & Kumaranayake, 2006).
- ▶ The first principal component recovers the latent factor up to a scaling constant:

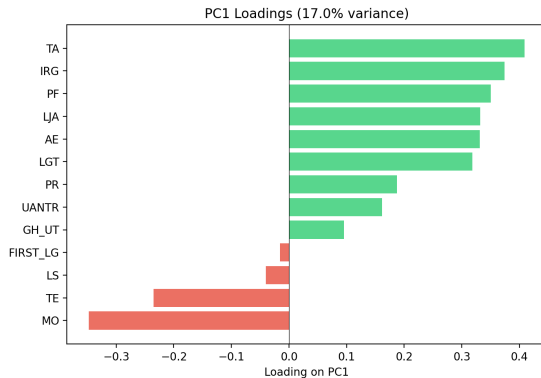
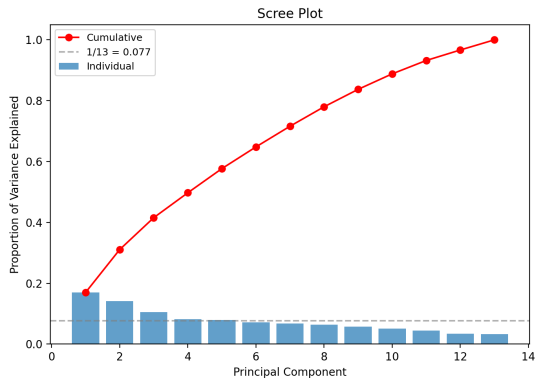
$$\widehat{\text{Institutional Quality}}_{i,t} = \text{PC1}(y_{i,1,t}, \dots, y_{i,J,t}), \quad \text{InstAutonomy}_i^{\text{PCA}} \equiv \text{PC1}_i.$$

- ▶ Inputs are recorded at the settlement level (HLS) and at the *Ort*/cantonal level; settlement-level information overrules cantonal in case of conflict.
- ▶ All components coded such that higher values indicate greater local autonomy.

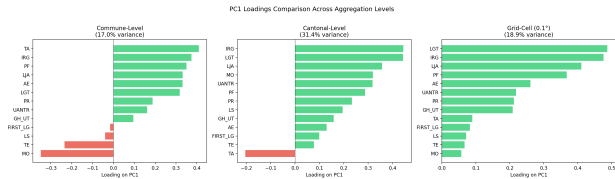
Components of the Institutional Autonomy Index

Code	Feature	Coding
<i>Panel A: Settlement level (Historisches Lexikon der Schweiz)</i>		
PR	Property rights	Best documented form, ordinal 1–5 (<i>freies Eigen</i> highest, <i>Zeitlehen</i> lowest)
LJA	Lower jurisdiction	Local control of <i>niedere Gerichtsbarkeit</i> , binary
AE	Elected <i>Ammann</i>	Local official elected rather than appointed, binary
PF	Purchased freedom	Community bought its liberty from its feudal lord, binary
TA	Taxation autonomy	Ordinal 0–3, normalised
TE	Tithe exemption	Binary, inverted from tithe obligation
LS	Labour service	<i>Corvée</i> days owed, inverted and normalised
MO	Military obligation	Inverted; 1 = no obligation
IRG	Institutional change	Rights gained minus rights lost
<i>Panel B: Cantonal level</i>		
LGT	<i>Landsgemeinde</i>	Communal assembly tradition, binary; municipality overrides if sub-cantonal <i>Landsgemeinde</i>
UANTR	<i>Antragsrecht</i>	Universal right to table motions, binary
GH_UT	Not subject territory	Inverted indicator for <i>Gemeine Herrschaft</i> / <i>Untertanengebiet</i> ; 1 = autonomous
FIRST_LG	First <i>Landsgemeinde</i>	Year of first recorded assembly, inverted and normalised

Scree Plot and PC1 Loadings



PC1 Loadings across Levels

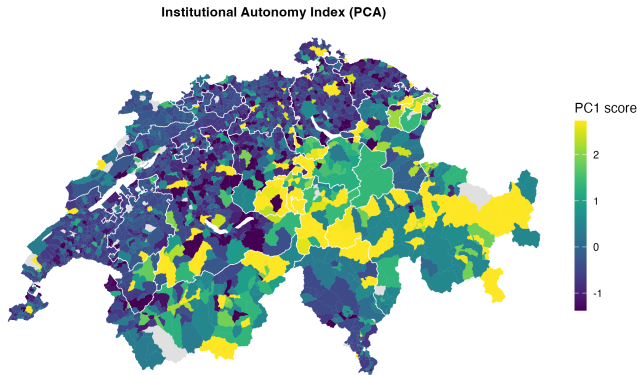


- ▶ Grid level: all autonomy indicators load in the same direction.
- ▶ Commune level: military obligation, labour service, tithe exemption and first *Landsgemeinde* load the other way.
- ▶ Military obligations common even among highly autonomous groups (e.g. *Walser*: autonomy in exchange for service).

PC1 of Medieval Institutional Autonomy by Municipality

Highest Autonomy:

- ▶ Along the Alpine arch: Upper Valais, Bernese Oberland, Central Switzerland, Grisons.
- ▶ Formerly forested Alpstein massif in the North East.
- ▶ Autonomous cities dotting the lowlands.
- ▶ Consistent with the less fertile high-altitude areas never being properly feudalised (Maissen, 2015, p. 27).



§ 4.2

Instrumental Variable Approach

Empirical Framework



First Stage

$$D_i = \alpha_1 + \pi Z_i + X_i' \gamma_1 + L_i' \delta_1 + \mu_{c(i)} + \nu_i$$

- ▶ i : settlements (commune), $0.1^\circ \times 0.1^\circ$ grid cells, or cantons; $c(i)$ the canton of i .
- ▶ D_i : endogenous institutional autonomy index (PC1).
- ▶ Z_i : **forest cover in 1000 CE** (baseline instrument).
- ▶ X_i : controls –

$$X_i = \underbrace{(\text{elev}_i, \text{lat}_i, \text{lon}_i)}_{\text{geography}} \oplus \underbrace{(\text{Roman}_i, R_i^{\text{miss}}, \text{TradeRoute}_i, T_i^{\text{miss}})}_{\text{historical (zero-imputed + miss dummies)}}$$

- ▶ $L_i = (\text{lang}_i^{\text{fr}}, \text{lang}_i^{\text{it}}, \text{lang}_i^{\text{rm}})$: language shares; $\mu_{c(i)}$: canton fixed effects.
- ▶ First-stage F tests $H_0: \pi = 0$; Stock–Yogo 10% critical value (one instrument): 16.38.

Reduced Form and 2SLS

Reduced form:

$$Y_i = \alpha_2 + \rho Z_i + X_i' \gamma_2 + L_i' \delta_2 + \mu_{c(i)} + u_i$$

2SLS:

$$Y_i = \alpha_3 + \beta D_i + X_i' \gamma_3 + L_i' \delta_3 + \mu_{c(i)} + \varepsilon_i,$$

$$D_i = \alpha_1 + \pi Z_i + X_i' \gamma_1 + L_i' \delta_1 + \mu_{c(i)} + \nu_i.$$

- ▶ $\beta = \rho/\pi$ is a **LATE for compliers**: settlements whose autonomy was raised by medieval colonisation through forest clearing.
- ▶ **Outcomes** Y_i : early industry, early textile industry, *Heimarbeit* (all before 1870), population growth; income tax rate at CHF 80,000 and CHF 1M, wealth tax at CHF 1M; Yes share in the 2021 Covid-19 referendum.

§ 5

Results



§ 5.1

First Stage

Results



First Stage: Forest Cover and Institutional Autonomy (Commune, $N = 5299$)

	(1) None	(2) Geo	(3) +Hist	(4) +Lang FE	(5) +Canton FE
Forest cover 1000 CE	1.459*** (0.0843)	0.861*** (0.110)	0.807*** (0.111)	0.587*** (0.108)	0.156 (0.120)
Canton FE	No	No	No	No	Yes
N	3613	3613	3613	3613	3613
R^2	0.085	0.121	0.160	0.179	0.240
First-stage F	299.1	113.3	77.6	61.7	7.3

- Forest cover in 1000 CE strongly predicts institutional autonomy. Results are robust to geographic and historical controls and language FE.

Balance Table (Commune Level)

	(1)	(2)
	Roman site	Trade route
Forest cover 1000 CE	-0.0142 (0.0304)	0.166*** (0.0269)
N	3613	3613
R^2	0.066	0.024

First Stage: Grid-cell Level

	(1) None	(2) Geo+Hist	(3) +Lang	(4) +Canton	(5) +Both
Forest cover 1000 CE	2.594*** (0.181)	1.823*** (0.283)	1.639*** (0.295)	0.601** (0.278)	0.596** (0.289)
Canton share controls	No	No	No	Yes	Yes
N	457	457	403	403	403
R^2	0.301	0.404	0.426	0.645	0.652
First-stage F	206.5	42.9	28.4	28.7	26.7

- ▶ Grid-cell results mirror the commune level. Cantonal first stage less robust to controls given $N = 26$.
- ▶ Results are not driven by differential documentation across municipalities.

§ 5.2

Economic Outcomes

Results



Measuring Economic Development

- ▶ No regional GDP numbers are available. Income or wealth data are not granular enough for the strategy employed.

Solution

- ▶ **Pre-industrial Malthusian economy:** population density and growth (Schueler, 2023) as proxy for development.
- ▶ **Industrial period:** local industry and proto-industry extracted from the HLS as a measure of the *type* of development.

The Pre-Industrial Equilibrium: Population Density Levels

	(1) 1700	(2) 1700+G	(3) 1798	(4) 1798+G	(5) 1800	(6) 1800+G
Institutional Autonomy (PCA)	-0.621 (0.403)	-0.0819 (0.295)	2.743 (45.20)	-7.716 (485.9)	-1.180*** (0.340)	-0.575** (0.247)
<i>N</i>	287	287	525	525	1889	1889

- ▶ There was no population-density penalty for forest-cleared high-autonomy communities (conditional on caloric suitability, altitude and ruggedness).
- ▶ By 1800, however, density is significantly lower.

Interpretation: Communal Closure in a Malthusian World

- ▶ In a Malthusian world, lower density is not a sign of poverty but of potentially **higher living standards**: There are more resources per member given limited output of the land.
- ▶ This is consistent with historically documented **communal closure**: inclusive features (commons rights) were tied to commune citizenship and remained closed to resident outsiders (so-called *Hintersassen*, Holenstein (2002)).
- ▶ In a Malthusian environment, insiders may have raised living standards by excluding outsiders.
- ▶ This cannot be tested directly as there is no income, wealth or yield data for the period.

Proto-Industry: *Heimarbeit* in German-speaking Switzerland

	(1) Heim(ctrl)	(2) Heim(+lang)	(3) Textile
Forest cover 1000 CE	0.105* (0.0636)	0.107* (0.0639)	0.124** (0.0603)
N	1238	1238	1238
R^2	0.043	0.043	0.135

- Putting-out industry: An urban *Verleger* supplied raw materials, rural families spun and weaved at home. In 1850, 75% of industrial workers worked at home; still half in 1880 (Tanner, 2004).
- Instrumented autonomy raises participation in merchant-financed putting-out by **16 percentage points** in the German-speaking subsample.

Capital Sorting

	(1) Putting-out	(2) Hand textile	(3) Capital-intensive
Institutional Autonomy (PCA)	0.155** (0.0778)	0.0290 (0.0643)	0.00178 (0.0429)
N	1238	1238	1238
Wild bootstrap p	0.179	0.816	0.971

- Precisely estimated zeros for textile industry for capital-intensive industries (textiles, leather, brewing) outside the putting-out relation.
- The *Verleger's* circulating capital substitutes for absent capital concentration.

The Reversal of Fortunes: Population Growth after 1850 (2SLS)

	(1) 1798–1850	(2) 1850–2019
Institutional Autonomy (PCA)	0.0202 (0.245)	-0.543*** (0.201)
<i>N</i>	697	1355

- ▶ Instrumented autonomy reduces log population growth by **0.43–0.54** (Acemoglu et al., 2002).
- ▶ Robust to canton-clustered wild bootstrap, Romano–Wolf correction, ruggedness, slope and caloric suitability controls.
- ▶ Not just geography: At equal terrain and caloric suitability, more autonomous places still fell behind.

§ 5.3

Political Culture

Results



Does the Internal Frontier Shape Political Culture?

- ▶ Did the settlement of high-altitude frontier of the medieval inward expansion have similar effects as the settlement of the American frontier (Bazzi et al., 2020, 2021; Turner, 1893)?
- ▶ **Three outcomes:**
 1. Income tax at CHF 80,000 (close to the national median) and at CHF 1M;
 2. Wealth tax on CHF 1M net worth;
 3. Yes share in the 2021 referendum on the Covid-19 act – the rugged-individualism measure of Bazzi et al. (2021).
- ▶ The existence of local tax multipliers make the tax rates representative of political views and dynamics at the municipal level.

Reduced Form: Covid Vote and Taxation

	(1)	(2)	(3)	(4)
	Inc 80k	Inc 1m	Wlth 1m	COVID yes
Forest cover 1000 CE	1.126*** (0.147)	-0.260 (0.290)	0.0174** (0.00772)	-0.0963*** (0.00834)
N	1915	1915	1915	1957
R^2	0.525	0.528	0.687	0.330

Covid Referendum: 2SLS

	(1) +Hist	(2) +Lang FE	(3) +Canton FE
Institutional Autonomy (PCA)	-0.146*** (0.0343)	-0.170*** (0.0492)	-0.313 (0.292)
Canton FE	No	No	Yes
<i>N</i>	1957	1957	1957

Instrumented historical autonomy significantly **reduces** the *Yes* share in the national Covid referendum.

Tax Rates: 2SLS

	(1) Geo	(2) +Hist	(3) +Lang	(4) +Canton	(5) Inclm	(6) Wlth1m
Institutional Autonomy (PCA)	0.971*** (0.288)	1.096*** (0.337)	1.935*** (0.605)	1.493 (1.140)	-0.447 (0.480)	0.0298* (0.0163)
Canton FE	No	No	No	Yes	No	No
<i>N</i>	1915	1915	1915	1915	1915	1915

Higher tolerance for taxes on median incomes and wealth; no premium at the top.

Results Summary: All Outcomes, 2SLS with Geographic Controls

	(1) First stage	(2) Inc 80k	(3) COVID	(4) Wlth 1m	(5) Δ pop 98–50	(6) Δ pop 50–19
Forest cover 1000 CE	0.465*** (0.114)					
Institutional Autonomy (PCA)		2.524*** (0.892)	-0.178*** (0.0634)	0.0511** (0.0239)	0.0168 (0.248)	-0.433** (0.200)
<i>N</i>	3613	1915	1957	1915	697	1355
First-stage <i>F</i>	50.4					

Cantonal-level Results ($N = 26$)

	(1) Inc80k	(2) Inc1m	(3) Wlth1m	(4) COVID	(5) Textile	(6) Heim
InstAutonomyIdx_PCA	1.689 (2.118)	-0.189 (2.813)	-0.0140 (0.0650)	-0.0860* (0.0457)	-0.195 (0.138)	-0.195 (0.146)
N	25	25	25	25	25	25

§ 5.4

Robustness

Results



Clustered Standard Errors and Wild Bootstrap

	(1) Inc 80k	(2) COVID	(3) Wlth 1m	(4) Δ pop 50–19
Institutional Autonomy (PCA)	1.935 (1.566)	-0.170 (0.106)	0.0298 (0.0494)	-0.543* (0.318)
N	1915	1957	1915	1355
Wild bootstrap p	0.184	0.128	0.535	0.018

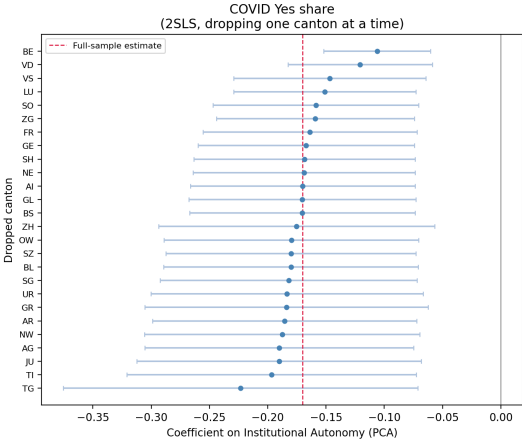
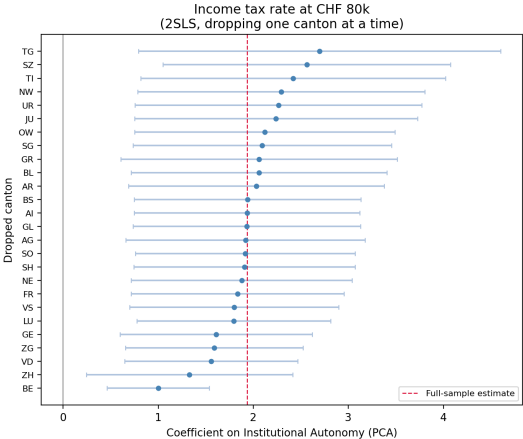
Conley Spatial HAC Standard Errors: Reduced Form

	(1) Inc 10	(2) Inc 25	(3) Inc 50	(4) COV 10	(5) COV 25	(6) COV 50	(7) Pop 10	(8) Pop 25	(9) Pop 50
Forest cover 1000 CE	1.126*** (0.408)	1.126** (0.553)	1.126** (0.445)	-0.0963*** (0.0174)	-0.0963*** (0.0176)	-0.0963*** (0.0115)	-0.428** (0.203)	-0.428* (0.233)	-0.428* (0.235)
Distance cut-off	10 km	25 km	50 km	10 km	25 km	50 km	10 km	25 km	50 km
<i>N</i>	1915	1915	1915	1957	1957	1957	1355	1355	1355

Conley Spatial HAC Standard Errors: 2SLS

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Inc 10	Inc 25	Inc 50	COV 10	COV 25	COV 50	Pop 10	Pop 25	Pop 50
Institutional Autonomy (PCA)	1.935 (1.223)	1.935 (1.631)	1.935 (1.550)	-0.170** (0.0727)	-0.170* (0.0949)	-0.170 (0.121)	-0.543 (0.349)	-0.543 (0.376)	-0.543* (0.291)
Distance cut-off	10 km	25 km	50 km	10 km	25 km	50 km	10 km	25 km	50 km
<i>N</i>	1915	1915	1915	1957	1957	1957	1355	1355	1355

Leave-one-canton-out Coefficients



Further Checks

- ▶ **Documentation bias:** could results reflect differences in how thoroughly municipalities are documented in the HLS? Analysis shows that this is not the case.
- ▶ **Terrain:** ruggedness, slope and caloric suitability controls leave the reversal-of-fortunes result intact.
- ▶ **Multiple testing:** Romano–Wolf correction.
- ▶ **Levels of aggregation:** commune, grid cell and canton give consistent pictures (cantonal results noisier, $N = 26$).

§ 5.5

Validation: The *Walser* Migrations

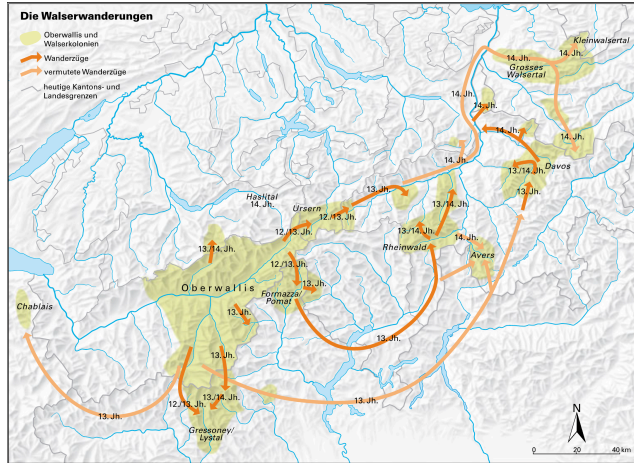
Results



Who Were the *Walser*?

- ▶ German-speaking settlers from the Upper Valais (*Wallis*) who left the area in the High Middle Ages to settle the mostly Romansh Alpine region.
- ▶ Specialised in colonising **high-altitude settlements** and high Alpine agriculture; settlements in modern France, Italy, Switzerland, Austria, Liechtenstein (Waibel, 2013; Zinsli, 1968).
- ▶ Made productive use of non-fertile land and were therefore granted **extensive autonomy**:
 - ▶ Free local election of the *Ammann*, autonomous local jurisdiction, free movement, free land tenure.
 - ▶ Usually obliged to military duty for local lords (Waibel, 2013).
- ▶ Settlements limited and along clear migration routes (quasi-experiment): We compare *Walser* colonies to comparable settlements that could have been, but were not, *Walser*-settled.

Migration Routes of the *Walser* (12th–14th century)



Out-migration of the *Walser* from Upper Valais (**Source:** Historisches Lexikon der Schweiz, Waibel, 2013)

Treatment, Control, and Frameworks

Treatment: We identify *Walser* colonies from the place register of Zinsli (1968) and the HLS. Unclear cases are checked against a third source. *Walser* immigration into existing Romansh settlements are excluded from both control and treatment groups.

- ▶ **Framework A:** All non-Walser settlements above 1000 m a.s.l. (excluding the Upper Valais homeland) are control group.
- ▶ **Framework B:** Canton of Grisons (*Graubünden*) (most *Walser* settlements, greatest autonomy) is control group.
- ▶ **Framework C:** Settlements above 800 m in seven *Walser* cantons (Grisons, Uri, St. Gallen, Ticino, Glarus, Valais, Bern; homeland excluded) are control group.

Resutik et al. (2025): Find no genetic difference between inhabitants of *Walser* and non-*Walser* communes. Channels other than cultural transmission can be ruled out.

Specification

$$Y_i = \alpha + \delta \text{Walser}_i + G_i' \gamma + L_i' \theta + \varepsilon_i, \quad i \in \mathcal{F},$$

$$Y_i = \alpha + \delta_C \text{Colony}_i + \delta_H \text{Homeland}_i + G_i' \gamma + L_i' \theta + \varepsilon_i,$$

- ▶ $\mathcal{F}$: sample defined by Framework A, B or C.
- ▶ G_i : geographic controls; L_i : language shares.
- ▶ Second specification separates the *Walser* colonies from the Upper Valais homeland.

Walser Colonisation: Institutional Autonomy and the Covid Vote

	(1) Inst A	(2) Inst B	(3) Inst C	(4) COV A	(5) COV B	(6) COV C
Walser colony	0.486 (0.297)	0.509 (0.327)	0.447 (0.283)	0.00124 (0.0303)	-0.0369 (0.0323)	-0.00431 (0.0303)
N	412	278	514	158	86	192
R^2	0.165	0.049	0.177	0.243	0.289	0.345

- ▶ *Walser* colonies have significantly higher institutional autonomy than comparable very-high-altitude settlements (Framework A). This confirms the first stage results.
- ▶ No such effect within Grisons or the *Walser* cantons; no effect on Covid voting.

Walser Colonisation: Taxation and Population Growth after 1850

	(1) Tax A	(2) Tax B	(3) Tax C	(4) Pop A	(5) Pop B	(6) Pop C
<i>Walser</i> colony	-0.0142 (0.435)	0.655* (0.360)	-0.312 (0.357)	-0.387 (0.378)	-0.312 (0.450)	-0.382 (0.352)
<i>N</i>	156	85	190	98	70	143
<i>R</i> ²	0.621	0.175	0.743	0.368	0.310	0.413

- ▶ Within Grisons (Framework B), *Walser*-settled municipalities tolerate higher taxes on median incomes and show a significant population decrease after 1850 relative to comparable communities.
- ▶ This confirms the economic and political-culture results.

§ 6

Discussion



The Pre-Industrial Equilibrium

- ▶ Lower density by 1800 in a Malthusian world could potentially indicate higher living standards and subsistence levels per capita.
- ▶ Mechanism could be **communal closure**: Commons rights are tied to commune citizenship, and are closed to *Hintersassen* (Holenstein, 2002).
- ▶ At the same time we see **broad participation in the commercial economy**: textile putting-out, the dominant form of industry.
- ▶ The *Verleger*'s circulating capital substituted for absent capital concentration.
- ▶ This is consistent with Engerman and Sokoloff (2002): More inclusive institutions lead to broader commercial participation.

The Reversal of Fortunes: Industrialisation

Two mechanisms:

1. **Technological shift:** Textile production relocated to where capital concentration was higher and an energy source (a river) was available. Agglomeration effects and the railway network in the lowlands increased the disadvantage of forest-clearing areas.
2. **Exclusion:** The closure mechanisms that may have raised living standards in the Malthusian period now served as a barrier to necessary in-migration.

We find empirical support for the first hypothesis.

Legacy: Political Culture

- ▶ **Political culture** survived into the 21st century, not industry.
- ▶ **Rugged individualism towards the outside:** rugged individualism directed at the national administration. Historically autonomous communities are more likely to vote against the 2021 Covid-19 act.
- ▶ **Communitarian towards the inside:** Higher effective income taxes at median incomes, no premium at the top.
- ▶ Consistent with institutions that are **egalitarian but exclusionary**. Self-governance finances club goods while the community is sceptical of outside involvement.
- ▶ In line with Rustagi (2024) on cooperation norms; different from Bazzi et al. (2020), there is no opposition to taxation. This is plausible because taxes are levied at the communal level.

§ 7

Conclusion



Conclusion I - Main Findings

- ▶ We test Braudel (1949)'s claim that the mode of high medieval internal colonisation shaped institutions and thereby economic fortunes.
- ▶ **Forest cover in 1000 CE predicts higher medieval institutional autonomy:** Labour-intensive forest clearing produced less hierarchical, more inclusive institutions (Acemoglu et al., 2012).
- ▶ **Pre-industrial:** No density penalty despite worse fundamentals; more proto-industrial (putting-out) textile activity in German-speaking Switzerland (broad participation in commercial activity (Sokoloff & Engerman, 2000)).
- ▶ **Industrialisation:** Advantage disappears; forest-clearing locations grow less and are less likely industrialise once production becomes capital- and energy-intensive.
- ▶ **Long-run political culture:** communitarian towards insiders, ruggedly individualist towards the national centre.

Conclusion II: Contributions and Caveats

- ▶ Extends Acemoglu et al. (2012), Engerman and Sokoloff (2002) and Bazzi et al. (2020, 2021) to the medieval European context: Institutional formation conditional on factor endowments worked similarly in Europe's high medieval settlement expansion.
- ▶ New light on the **Little Divergence**: arable land in the South was gained through capital-intensive irrigation/drainage (hierarchical, feudal relations); north of the Alps and east of the Elbe through labour-intensive forest clearing.
 - ▶ *Caveat*: We cannot account for the Low Countries, East Elbia or Southern Europe.
- ▶ A **frontier mindset at an internal, non-moving frontier**: Unlike the American version, communitarian towards insiders and libertarian only towards the political centre.
- ▶ After 1848 most institutional variation disappeared. Only a few cantons kept the *Landsgemeinde* as sole legislature (Glarus and Appenzell Innerrhoden to this day).

§ 8

Appendix



Summary Statistics: Grid-cell Level (0.1°)

	N	Mean	SD	Min	Max
Institutional autonomy index (PC1)	505	0.235	0.929	-1.58	3.82
Forest cover 1000 CE	494	0.641	0.332	0.03	1.00
Elevation (m)	505	934.777	598.587	191.00	4526.00
Income tax rate, CHF 80k (%)	418	12.326	2.497	0.00	17.06
Wealth tax rate, CHF 1m (%)	418	0.374	0.142	0.00	0.72
COVID-19 Act: Yes share	418	0.534	0.101	0.12	0.74
Early textile industry (share)	418	0.273	0.361	0.00	1.00
Early Heimarbeit (share)	418	0.151	0.288	0.00	1.00
German-speaking share	418	0.642	0.472	0.00	1.00
Log pop growth 1850–2019	329	0.895	0.909	-2.03	4.42
Communes per cell	505	10.618	18.669	1.00	386.00

Summary Statistics: Cantonal Level

	N	Mean	SD	Min	Max
Institutional autonomy index (PC1)	26	0.391	0.914	-0.58	1.97
Forest cover 1000 CE	26	0.538	0.269	0.21	0.99
Elevation (m)	26	687.814	259.682	285.52	1230.23
Income tax rate, CHF 80k (%)	26	11.435	2.810	4.40	15.79
COVID-19 Act: Yes share	26	0.555	0.089	0.36	0.69
Early Heimarbeit (share)	26	0.295	0.262	0.00	1.00
Log pop growth 1850–2019	21	1.114	0.533	0.21	1.99
Communes per canton	26	191.077	173.803	20.00	651.00

First Stage: Cantonal Level

	(1) None	(2) Geo+Hist	(3) +Lang
forest__cover__1000CE	2.523*** (0.422)	2.326 (1.393)	2.277* (1.274)
N	26	25	25
R^2	0.552	0.687	0.758
First-stage F	35.8	11.6	.

Industry: Inference Variants

	(1) Tex(cl)	(2) Heim(cl)	(3) Ind(cl)	(4) Tex(Con)	(5) Heim(Con)	(6) Tex(clr-IV)	(7) Heim(clr-IV)
Inst. Aut.	0.118 (0.100)	0.101 (0.107)	-0.00859 (0.0604)	0.118 (0.117)	0.101 (0.144)	0.229 (0.204)	0.422* (0.255)
N	1238	1238	1433	1238	1238	1238	1238
Wild bootstrap p	0.237	0.382	0.894			0.186	0.027

References I

-  Acemoglu, D., Johnson, S., & Robinson, J. A. (2002). Reversal of fortune: Geography and institutions in the making of the modern world income distribution. *The Quarterly journal of economics*, 117(4), 1231–1294.
-  Acemoglu, D., Johnson, S., & Robinson, J. A. (2012). The colonial origins of comparative development: An empirical investigation: Reply. *American Economic Review*, 102(6), 3077–3110.
-  Bartlett, R. (1993). *The making of europe: Conquest, colonization, and cultural change, 950-1350*. Princeton University Press.
-  Bazzi, S., Fiszbein, M., & Gebresilasse, M. (2020). Frontier culture: The roots and persistence of “rugged individualism” in the united states. *Econometrica*, 88(6), 2329–2368.
-  Bazzi, S., Fiszbein, M., & Gebresilasse, M. (2021). “rugged individualism” and collective (in) action during the covid-19 pandemic. *Journal of Public Economics*, 195, 104357.

References II

-  Bazzi, S., Gaduh, A., Rothenberg, A. D., & Wong, M. (2019). Unity in diversity? how intergroup contact can foster nation building. *American Economic Review*, 109(11), 3978–4025.
-  Bosshart, L., & Dittmar, J. (2025). Political competition and economic divergence: Development before and after the black death.
-  Braudel, F. (1949). *La méditerranée et le monde méditerranéen à l'époque de philippe ii* (Vol. 1). Armand Colin.
-  Braudel, F. (1986). *The mediterranean and the mediterranean world in the age of philip ii* (Vol. 1). Fontana Press.
-  Braun, B. (2012, June). *Reichsunmittelbarkeit* [Version of 25.06.2012, accessed 04.03.2026]. <https://hls-dhs-dss.ch/de/articles/009832/2012-06-25/>
-  Bundi, M. (1999). *Davos* [Version of 1999, accessed 01.06.2026]. <https://hls-dhs-dss.ch/de/articles/001571/2016-12-02/>

References III

-  Couttenier, M., Grosjean, P., & Sangnier, M. (2017). The wild west is wild: The homicide resource curse. *Journal of the European Economic Association*, 15(3), 558–585.
-  De Pleijt, A. M., & Van Zanden, J. L. (2016). Accounting for the “little divergence”: What drove economic growth in pre-industrial europe, 1300–1800? *European Review of Economic History*, 20(4), 387–409.
-  Engerman, S. L., & Sokoloff, K. L. (2002). Factor endowments, inequality, and paths of development among new world economics.
-  Filmer, D., & Pritchett, L. H. (2001). Estimating wealth effects without expenditure data—or tears: An application to educational enrollments in states of india. *Demography*, 38(1), 115–132.
-  Fochesato, M. (2018). Origins of europe’s north-south divide: Population changes, real wages and the ‘little divergence’ in early modern europe. *Explorations in Economic History*, 70, 91–131.

References IV

-  García-Jimeno, C., & Robinson, J. A. (2009). The myth of the frontier. *NBER Working Paper, 14774*.
-  Goldstone, J. A. (2015). The great and little divergence: Where lies the true onset of modern economic growth? *Available at SSRN 2599287*.
-  Henriques, A., & Palma, N. (2023). Comparative european institutions and the little divergence, 1385–1800. *Journal of Economic Growth, 28*(2), 259–294.
-  Holenstein, A. (2002). *Hintersassen* [Version of 2002, accessed 11.08.2026]. <https://hls-dhs-dss.ch/de/articles/010252/2001-07-10/>
-  Kaplan, J. O., Krumhardt, K. M., & Zimmermann, N. (2009). The prehistoric and preindustrial deforestation of europe. *Quaternary science reviews, 28*(27-28), 3016–3034.
-  Kautsky, K. (1907). *Sozialismus und kolonialpolitik: Eine auseinandersetzung*. Berlin: Vorwärts.

References V

-  Lecce, G., Ogliari, L., & Orlando, T. (2022). State formation, social unrest and cultural distance: Brigandage in post-unification Italy. *Journal of Economic Growth*, 27(3), 453–483.
-  Maissen, T. (2015). *Geschichte der Schweiz*. Hier und Jetzt, Verlag für Kultur und Geschichte.
-  Malik, M. A., Ali Mirza, R., & Rehman, F. U. (2023). *Frontier governmentality*. WIDER Working Paper.
-  McKenzie, D. J. (2005). Measuring inequality with asset indicators. *Journal of Population Economics*, 18(2), 229–260.
-  Perler, A. (2022, July). "rüti" and "schwand" indicate historical clear-felling of forests [Published on 01 July 2022; modified on 07 October 2025]. <https://blog.nationalmuseum.ch/en/2022/07/rueti-and-schwand-indicate-historical-clear-felling-of-forests/>

References VI

-  Resutik, P., Schneider, J., Aeschbacher, S., Vigeland, M. D., Gysi, M., Moser, C., Barbieri, C., Widmer, P., Currat, M., Kratzer, A., et al. (2025). Uncovering genetic signatures of the walser migration in the alps: Patterns of diversity and differentiation. *Forensic Science International: Genetics*, 76, 103206.
-  Rustagi, D. (2024). Historical self-governance and norms of cooperation. *Econometrica*, 92(5), 1473–1502.
-  Schueler, M. (2023). Population figures from before 1850 available for the first time at the local level – population censuses in switzerland before 1850 [Published 15 June 2023]. Retrieved November 11, 2025, from <https://www.bfs.admin.ch/asset/en/25105950>
-  Sokoloff, K. L., & Engerman, S. L. (2000). History lessons: Institutions, factor endowments, and paths of development in the new world. *Journal of Economic perspectives*, 14(3), 217–232.
-  Tanner, A. (2004). *Heimarbeit* [Version of 2004, accessed 11.08.2026]. <https://hls-dhs-dss.ch/de/articles/016213/2015-03-09/>

References VII

-  Turner, F. J. (1893). The significance of the frontier. *American history*, 199–227.
-  Vyas, S., & Kumaranayake, L. (2006). Constructing socio-economic status indices: How to use principal components analysis. *Health policy and planning*, 21(6), 459–468.
-  Waibel, M. (2013, August). *Walser* [Version of 20.08.2013, accessed 24.10.2025]. <https://hls-dhs-dss.ch/de/articles/007950/2013-08-20/>
-  Zinsli, P. (1968). *Walser volkstum*. Verlag Bündner Monatsblatt.