

Bartels, Kersting, Wolf. Testing Marx. Online Appendix

A Data Sources

Income tax statistics represent the main data source for capital accumulation, top 1% income share, and capital share. The Prussian statistical office regularly published tabulations with the number of taxpayers per income bracket and the aggregated tax or aggregated taxable income per income bracket. These tables are the source of information for the distribution of top incomes. Since the 1890s, these publications also included information on income composition and capital (wealth tax was first collected in 1895). Sources for income and wealth tax statistics by district are given in Table A.2. Income is generated in the year preceding the tax year, e.g., incomes taxed in 1914 are generated in 1913. For the tax years 1874 to 1891, tabulations by district are published in volumes of *Anlagen zu den Stenographischen Berichten über die Verhandlungen des Hauses der Abgeordneten*; for the tax years 1892 to 1914, tabulations by district are published in volumes of *Mitteilungen aus der Verwaltung der direkten Steuern im preußischen Staate*.

Capital accumulation. We measure capital accumulation using business assets (non-corporate firms) (*Vermögen aus Handel, Gewerbe und Bergbau*) recorded in wealth tax data 1895-1911. Sources for wealth tax statistics (*Ergänzungsteuer*) are listed in Table A.2.

Income inequality. We measure income inequality by the share of total income accruing to a particular fraction of the population such as the top 5%, the top 1% or the bottom 95%. The method is described in Section C.2. Income tax statistics are the main data source which are available from 1874 to 1913. Sources for income tax statistics (*Einkommensteuer*) are listed in Table A.2.

Capital share. Our main data source are income tax statistics recording capital income from interest and distributed profits, which we supplement with undistributed profits, self-employment capital income and government's capital income from additional data sources. Section C.5 provides details on our method to compute the capital share. The composition of income is included in income tax statistics from 1893-1913. Sources for income tax statistics (*Einkommensteuer*) are listed in Table A.2.

Income per capita. District-level income per capita is the total reference income (see Section C.4) divided by total reference population (see Section C.3). County-level income per capita is a population-weighted average between urban and rural counties in the district.

Capital concentration. Our measure of capital concentration is constructed using data on employment and the number of firms based on several firm censuses. We divide the number of employees by the number of firms in each district and county. We use district-level data reported by the Prussian statistical office for 1875 and 1882 and county-level data reported by the German statistical office for 1895 and 1907. The data allow also to calculate firm size by sector. We use volumes 40 and 83 of the *Preussische Statistik, Amtliches Quellenwerk* and volumes 116 and 218 of the *Statistik des Deutschen Reichs, Neue Folge*.

Votes for the SPD (share). We use election results provided by Caramani (2004). These data include the number of people allowed to vote, turnout and votes for all parties over multiple ballots for *Reichstag* elections. Available for elections in 1871, 1874, 1877, 1878, 1881, 1884, 1887, 1890, 1893, 1898, 1903, 1907, 1912.

Trade union membership (share). We digitize county-level data on membership in the free trade unions reported in Hirschfeld (1908). This source includes number of members in trade unions by sector from 1896 to 1906.

Strikes The *Statistik des Deutschen Reichs, Neue Folge* lists all strikes for the years between 1899 and 1905 by sector and place. We aggregate these data to the county-level. We use the following volumes of the *Statistik des Deutschen Reichs, Neue Folge*: 134, 141, 148, 157, 164, 171, and 178.

Sectoral employment. Occupation by sector on a county-level is reported in a census conducted by the German national statistics. We divide employment in industry or agriculture by total employment. This share is available for 1882, 1895, and 1907. We use volumes 2, 109, and 209 of the *Statistik des Deutschen Reichs, Neue Folge*.

Urban population. We measure the share of urban population in a county or district using the data provided by [Galloway \(2007\)](#), available for 1871, 1875, 1880, 1885, 1890, 1895, 1905, and 1910.

Population density. Based on data provided by [Galloway \(2007\)](#), available for 1871, 1875, 1880, 1885, 1890, 1895, 1905, and 1910.

Carboniferous strata. Based on the geological map provided by [Asch \(2005\)](#).

Table A.1: Prussian Inequality Panel, 1874-1913

Concept	Measure	Time Period	Region
Capital Accumulation	Business Assets	1895-1897, 1899, 1902, 1905, 1908, 1911	28 Districts, 544 Counties
Income Inequality	Top Income Shares	1874-1913	28 Districts
	Top Income Shares	1891-1910	544 Counties
Capital Share	Capital Share	1891-1913	28 Districts
Capital Concentration	Mean Firm Size	1875, 1882, 1895, 1907	544 Counties
Socialism	SPD Votes	1874-1912	229 Constituencies
	Union Membership	1896-1906	544 Counties
	(Successful) Strikes	1899-1905	17 Sectors × 544 Counties

Notes: Summary statistics are given in Appendix Table [D.1](#).

Sources: See Appendix [A](#).

Table A.2: Sources of Income and Wealth Tax Statistics for Prussia

Income tax year	Source
1874	Stenogr. Berichte über die Verhandlungen des Hauses der Abgeordneten, 1875
1875	Stenogr. Berichte über die Verhandlungen des Hauses der Abgeordneten, 1876
1876	Stenogr. Berichte über die Verhandlungen des Hauses der Abgeordneten, 1877
1877	Stenogr. Berichte über die Verhandlungen des Hauses der Abgeordneten, 1877/78
1881	Stenogr. Berichte über die Verhandlungen des Hauses der Abgeordneten, 1882
1882	Stenogr. Berichte über die Verhandlungen des Hauses der Abgeordneten, 1882/83
1883	Stenogr. Berichte über die Verhandlungen des Hauses der Abgeordneten, 1883/84
1884	Stenogr. Berichte über die Verhandlungen des Hauses der Abgeordneten, 1885
1885	Stenogr. Berichte über die Verhandlungen des Hauses der Abgeordneten, 1886
1886	Stenogr. Berichte über die Verhandlungen des Hauses der Abgeordneten, 1887
1887	Stenogr. Berichte über die Verhandlungen des Hauses der Abgeordneten, 1888
1888	Stenogr. Berichte über die Verhandlungen des Hauses der Abgeordneten, 1889
1889	Stenogr. Berichte über die Verhandlungen des Hauses der Abgeordneten, 1890
1890	Stenogr. Berichte über die Verhandlungen des Hauses der Abgeordneten, 1890/91
1891	Stenogr. Berichte über die Verhandlungen des Hauses der Abgeordneten, 1892
1892/93	Statistik der preußischen Einkommensteuer-Veranlagung, 1892/93
1894/95	Statistik der preußischen Einkommen- und Ergänzungsteuer-Veranlagung, 1895/96
1896	Statistik der preußischen Einkommen- und Ergänzungsteuer-Veranlagung, 1896/97
1897/98	Statistik der preußischen Einkommen- und Ergänzungsteuer-Veranlagung, 1898
1899	Statistik der preußischen Einkommen- und Ergänzungsteuer-Veranlagung, 1899/1901
1900/01	Statistik der preußischen Einkommensteuer-Veranlagung, 1901
1902	Statistik der preußischen Einkommen- und Ergänzungsteuer-Veranlagung, 1902/04
1903/04	Statistik der preußischen Einkommensteuer-Veranlagung, 1904
1905	Statistik der preußischen Einkommen- und Ergänzungsteuer-Veranlagung, 1905/07
1906	Statistik der preußischen Einkommensteuer-Veranlagung, 1907
1907/08	Statistik der preußischen Einkommen- und Ergänzungsteuer-Veranlagung, 1908/10
1910	Statistik der preußischen Einkommensteuer-Veranlagung, 1910
1911	Statistik der preußischen Einkommen- und Ergänzungsteuer-Veranlagung, 1911/13
1911/12	Statistik der preußischen Einkommensteuer-Veranlagung, 1912
1913/14	Statistik der preußischen Einkommensteuer-Veranlagung, 1914

Note: Income is generated in the year preceding the tax year. For example, incomes taxed in 1914 are generated in 1913.

Figure A.1: Prussian Income Tax Statistics

Staat. Regierungsbezirke.		Veranlagung zum Einkommen von mehr als 3 000 M.,									
		über 6 500 bis 7 000 M.			über 7 000 bis 7 500 M.			über 7 500 bis 8 000 M.			
		zu dem jährlichen Steuerfusse von:									
		176 M.			192 M.			212 M.			
		Zahl der Genfiten		Steuer- betrag *)	Zahl der Genfiten		Steuer- betrag *)	Zahl der Genfiten		Steuer- betrag *)	
phy- fische Per- sonen	nicht phy- fische Per- sonen*)	phy- fische Per- sonen	nicht phy- fische Per- sonen*)		phy- fische Per- sonen	nicht phy- fische Per- sonen*)					
I	79	80	81	82	83	84	85	86	87		
Staat	A. Städte . . . 1901	11 583	.	2 038 608	9 674	.	1 857 408	8 321	.	1 764 052	
	1900	10 937	.	1 924 912	9 327	.	1 790 784	7 857	.	1 665 684	
	B. Land 1901	2 753	.	484 528	2 264	.	434 688	1 893	.	401 316	
	1900	2 581	.	454 256	2 128	.	408 576	1 738	.	368 456	
	C. Ueberhaupt . 1901	14 336	31	2 528 592	11 938	21	2 296 128	10 214	27	2 171 092	
	1900	13 518	22	2 383 040	11 455	20	2 203 200	9 595	22	2 038 804	
1. Königsberg	A. Städte . . . 1901	264	.	46 464	215	—	41 280	160	—	33 920	
	1900	277	—	48 752	201	—	38 592	177	.	37 524	
	B. Land 1901	48	.	8 448	45	—	8 640	36	—	7 632	
	1900	40	—	7 040	35	—	6 720	32	.	6 784	
	C. Ueberhaupt . 1901	312	1	55 088	260	—	49 920	196	—	41 552	
	1900	317	—	55 792	236	—	45 312	209	1	44 520	
2. Gumbinnen	A. Städte . . . 1901	124	—	21 824	77	—	14 784	57	—	12 084	
	1900	119	—	20 944	87	—	16 704	65	—	13 780	
	B. Land 1901	42	—	7 392	34	—	6 528	26	—	5 512	
	1900	35	—	6 160	32	—	6 144	22	—	4 664	
	C. Ueberhaupt . 1901	166	—	29 216	111	—	21 312	83	—	17 596	
	1900	154	—	27 104	119	—	22 848	87	—	18 444	

Source: Statistik der preußischen Einkommensteuer-Veranlagung 1902.

B Definitions of Geographical Units: Counties, Constituencies and Districts

Counties. We rely on the county boundaries as of 1895.

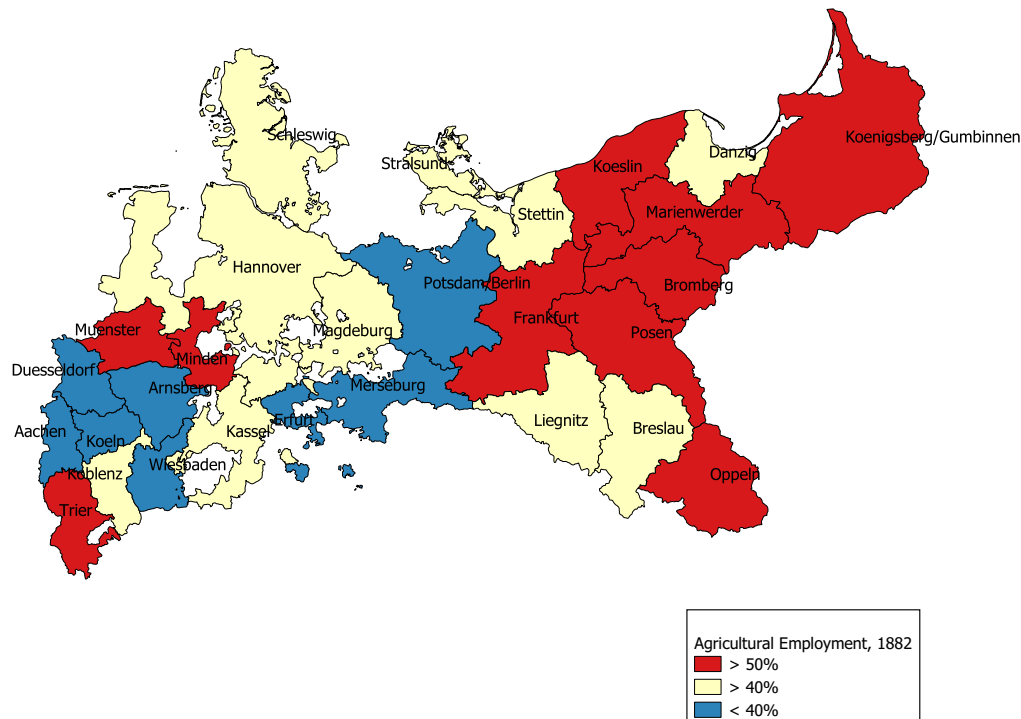
Constituencies. We rely on the boundaries for the nation-wide elections.

Districts. Several reforms changed the borders of Prussian districts. We harmonize the districts over time which leaves us with 28 harmonized districts for our analysis. We make the following four adjustments:

1. We combine Aurich, Hildesheim, Stade, Lüneburg, Osnabrück to Hannover.
2. We combine Gumbinnen, Königsberg, and Allenstein to Königsberg/Gumbinnen.
3. We combine Berlin and Potsdam to Brandenburg.
4. We drop Sigmaringen.

Figure B.1 illustrates the regional variation of industrialization across Prussian districts in 1882. Districts with more than 50% employment in agriculture in 1882 are classified as rural (red), districts with between 40% and 50% employment in agriculture in 1882 are classified as mixed (yellow), and districts with less than 40% employment in agriculture in 1882 are classified as industrial (blue).

Figure B.1: Districts by Agricultural Employment



Notes: Districts classified by agricultural employment.

Source: See Appendix A.

C Measuring Income Inequality and Capital Share

C.1 Income Tax Regimes

As income inequality and capital share measures are mostly based on income tax statistics, we start this section with a brief description of income tax regimes in Prussia. The Prussian income tax legislation can be divided into four phases: class taxation from 1821 to 1850 (1), class taxation and classified income taxation coexisting with a consumption tax (grind and butcher tax) in bigger cities from 1851 to 1873 (2), class tax and classified income tax from 1874 to 1890 (3), and modern income tax from 1891 to 1918 (4).

The class tax introduced in Prussia in 1820 is only of limited use for the estimation of income concentration because the assignment into a class hinges on the social class and not on income. Still, some contemporary authors argue that the class assignment was strongly related to the income position or earnings ability.¹ 12 subclasses were distinguished to which authorities of the municipality assigned all households² according to their social class. The second important drawback of the class tax is the fact that inhabitants of the biggest cities were not subject to the class tax, but instead had to pay grind and butcher tax (*Mahl- und Schlachtsteuer*) on flour and meat consumption.³ We might thus worry to underestimate the concentration at the top (1) if the class membership does not perfectly reflect the position in the income distribution, (2) if more top income earners lived in the biggest cities than on the country side, and (3) if top income earners transferred their residence to a bigger city subject to grind and butcher tax in order to evade the class tax.

In 1851, a new classified income tax (*klassifizierte Einkommensteuer*) replaced both the class tax as well as the grind and butcher tax for all tax units with incomes above 3.000 Mark. The new classified income tax roughly applied to the top 2% of the tax units (or 1% of the population) and was levied on income from real estate, business, wages, interest rates and other capital income. However, incomes were estimated by a local committee such that top incomes are most likely to be systematically underestimated.⁴ Since 1851, the class tax also incorporated explicit income bands, but the assignment to a class was under the responsibility of the Prussian administration and not revised annually, thereby potentially neglecting annual income fluctuations (Grant, 2002).

In tax year 1874, the grind and butcher tax was abolished and income taxation (classified and class tax) equally applied to cities and rural areas. Taxable income was defined as income from capital, renting and leasing, business, trade, and employment.

In 1891, a far-reaching income tax reform finally abolished the class tax. The definition of taxable income remained unchanged (§7 EStG). All households with incomes higher than 900 Mark were subject to a progressive income tax, which applied to 23% of the tax units or 31% of the population

¹Engel (1868), director of the Prussian statistical office, states that the four classes of the class tax encompassed the very rich, the rich, less wealthy townsmen and peasants and the lowest class servants and day laborer. His predecessor Dieterici (1849) refers to the four classes as *patricians, bourgeoisie, petty bourgeoisie, secondary citizens* in the city and *landlords, landowners with allodial title, peasants and landless farm workers* on the country-side. The tax was judged to be regressive by contemporary authors: The tax of highest class paid 48 times the tax of lowest class, even though top class citizens probably earned more than 100 times more than the lowest class (Dieterici, 1849).

²Tax units were mostly close family members including other relatives in the household without own income. Tax units in the lowest class were individuals, but not more than two tax units per household (Geisenberger and Müller, 1972).

³In 1820, the grind and butcher tax applied in 132 bigger cities which was reduced to 83 cities in 1851 (Ketterle, 1994).

⁴Taxpayers brought before court in the Prussian city Bochum in 1891 admitted to have earned incomes more than twice as high than estimated by the local authorities for the tax collection (Wagner, 1891, p.587).

in Prussia. The share of the taxed population steadily increased and reached 50% in 1913. Most importantly, the obligation to file a tax return is introduced for incomes above 3,000 M (about 3% of tax units) which the authorities cross-checked with their own information (§24 EStG).

The obligation for top income earners to file a tax return induces an upward shift of top incomes in many districts, particularly in rich districts like Wiesbaden and Köln. This provides further evidence that the tax authorities underestimated top incomes before 1891. Therefore, we adjust our top income share series 1874-1890 upwards, proportionately to the shift we observe between 1890 and 1891.

The Prussian wealth tax (*Ergänzungsteuer*) was introduced in 1893 and wealth was assessed in 1895, 1896, 1897, 1899 and then every three years. The wealth tax distinguished between business assets, financial assets and real estate. Business assets included all assets and rights of non-corporate firms operating in Prussia. Financial assets included, on the one hand, shares in corporations, but also cash, the net present value of annuities, appanage, and retirement contracts.

C.2 Pareto Interpolation

Top income shares – our measure for income inequality – are obtained by applying the Pareto interpolation method commonly used in the top income share literature since the contributions of [Piketty \(2001, 2003\)](#). Note that both the shape and the scale parameters are estimated for each income bracket separately allowing the parameters to vary across the distribution. This procedure is similar to the most recent methodological innovation of Generalized Pareto interpolation by [Blanchet et al. \(2022\)](#). Our estimation procedure involves several steps:

The first step is to construct measures of total potential taxpayers, N_{dt} , and total income $\sum_{i=1}^{N_{dt}} y_{idt}$ in district d and year t . Total income is the sum of taxed and tax-exempt income. We estimate tax-exempt income following [Hoffmann and Müller \(1959\)](#), who produced historical national accounts for Germany 1851-1957. Appendix Figure C.3 displays the evolution of total reference income per capita in Prussian administrative districts. The total reference population is the sum of tax units and tax-exempt; both are given in the Prussian income tax statistics. We provide further details on reference total income in Appendix C.4 and total population in Appendix C.3.

The second step is to estimate the average income of the top $x\%$, $\bar{y}_{dt,topx}$, using the Pareto interpolation method. The shape parameter $b = a/(a - 1)$ is computed using the lower bound of the income bracket $y_{low,topx}$, where the percentile cut-off of the top $x\%$ is located, and from the average income above this lower bound, $\bar{y}_{low,topx}$:

$$b_{topx} = \bar{y}_{low,topx} / y_{low,topx} \quad (\text{C.1})$$

The scale parameter k is computed as

$$k_{topx} = y_{low,topx} \cdot p_{low,topx}^{1/a_{topx}}, \quad (\text{C.2})$$

where $p_{low,topx}$ is the population share at the lower threshold of the top $x\%$'s income bracket. Third, the top $x\%$ income threshold is computed as

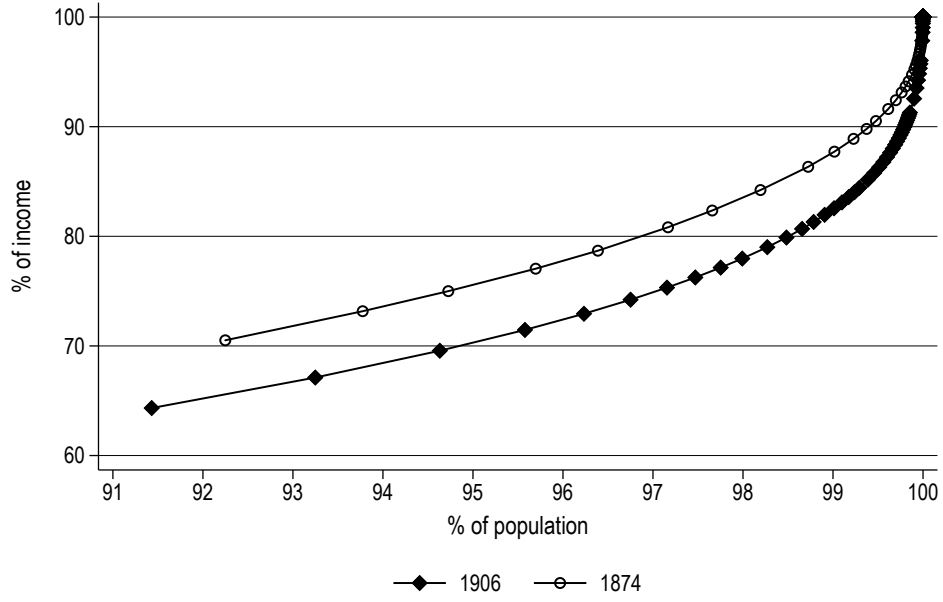
$$thr_{topx} = k_{topx} / (p^{1/a_{topx}}) \quad (\text{C.3})$$

where p is equal to 0.01 for the top 1%, for example. Fourth, average income of the top $x\%$, $\bar{y}_{topx}$, is then estimated from

$$\bar{y}_{topx} = b_{topx} \cdot thr_{topx} \quad (\text{C.4})$$

Appendix Figure C.1 illustrates the extremely fine-grained nature of Prussian income tax data, particularly at the top of the income distribution: One income bracket often includes less than 0.1% of total potential taxpayers so that we can estimate top thresholds like the top 1%-threshold very precisely.

Figure C.1: Top Tail of the Lorenz Curve Based on Prussian Income Tax data, 1874 and 1906



Notes: Each marker represents the cumulative population share and cumulative income share of an income tax bracket and above as recorded in official income tax statistics for Prussia as a whole in 1874 and 1906.
Source: Stenogr. Berichte über die Verhandlungen des Hauses der Abgeordneten, 1875; Statistik der preußischen Einkommensteuer-Veranlagung 1907.

The top $x\%$ income share in district d in year t results from dividing the total income of the top $x\%$ by total income of the population:

$$\text{Top } x\% \text{ Share}_{dt} = \frac{\bar{y}_{dt,topx} \cdot N_{dt} \cdot x\%}{\bar{y}_{dt} \cdot N_{dt}} \quad (\text{C.5})$$

We estimate the top $x\%$ income share in a Prussian county or constituency c using the urban and rural income distribution of the county's or constituency's district d , which is recorded in Prussian income tax data, and the county's urbanization rate, u_{ct} . Our approach is related to the measure of international weighted inequality from [Milanovic \(2005\)](#) reconstructing subgroup distributions from the overall distribution. We first compute the average income in the district's rural areas and urban areas – $\bar{y}_{dt,rural}$ and $\bar{y}_{dt,urban}$ – as well as the top $x\%$ average income in rural and urban areas $\bar{y}_{dt,rural,topx}$ and $\bar{y}_{dt,urban,topx}$. Urban top income shares systematically exceed rural top income shares, because urban incomes are higher than rural incomes and the urban-rural income gap is even larger for top incomes than for average incomes.

$$\text{Top } x\% \text{ Share}_{ct} = \frac{((u_{ct} \cdot \bar{y}_{dt,urban,topx}) + ((1 - u_{ct}) \cdot \bar{y}_{dt,rural,topx})) \cdot N_{ct} \cdot x\%}{((u_{ct} \cdot \bar{y}_{dt,urban}) + ((1 - u_{ct}) \cdot \bar{y}_{dt,rural})) \cdot N_{ct}} \quad (\text{C.6})$$

C.3 Reference Total Population

The reference total population is needed to compute the number of tax units that represent a particular fractile of the population, such as the top percentile or the top decile. In general, there are two approaches to derive the reference total population. The bottom-up approach adds the (estimated) number of tax exempt to the number of taxpayers documented in the income tax statistics. The top-down approach draws on population statistics and obtains total tax units as the sum of married couples and bachelors reduced by the number of children. For the period 1874-1913, the number of tax exempt is documented in income tax statistics in Prussia. Hence, we can apply the bottom-up approach and obtain our reference total population as

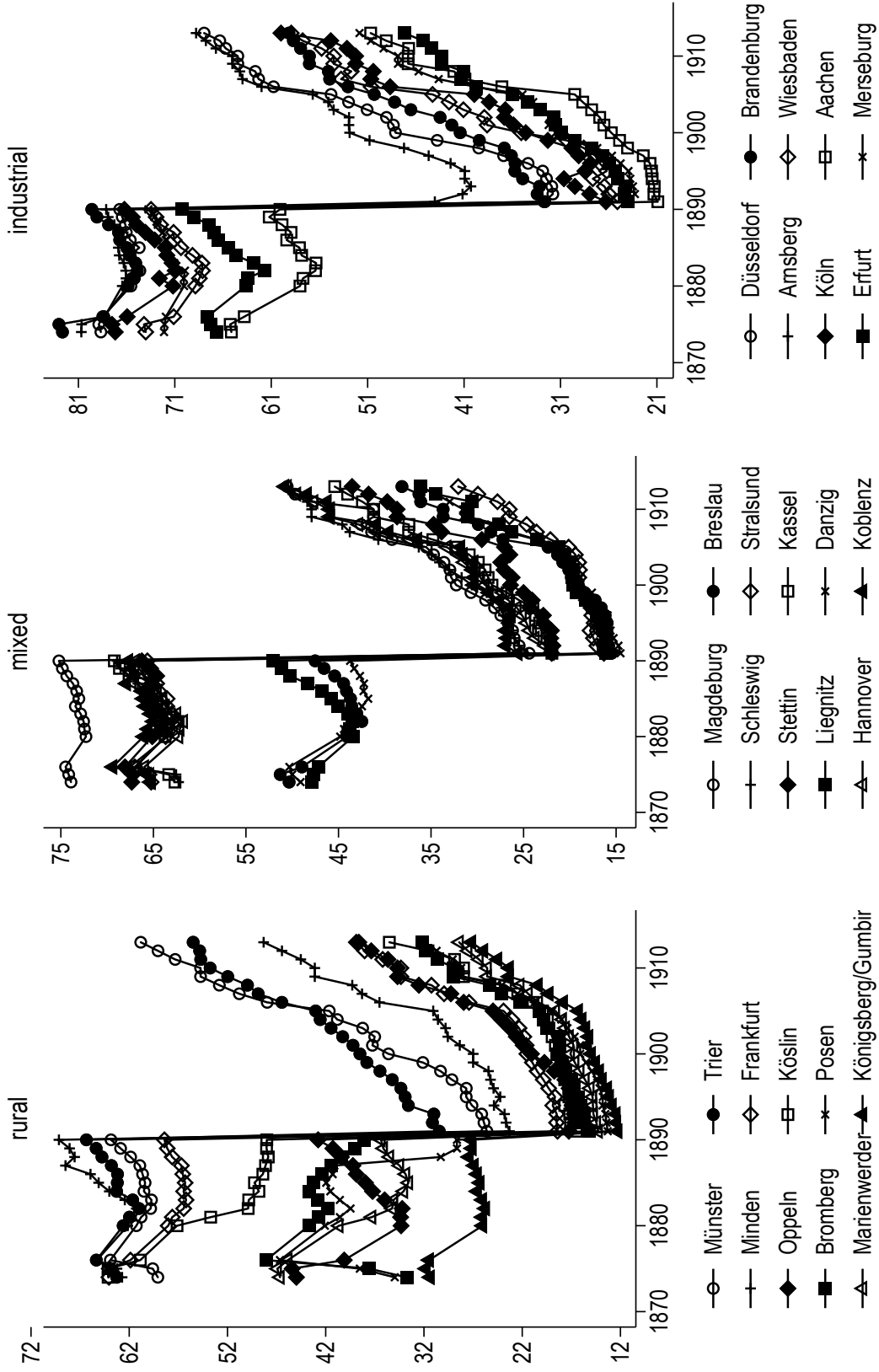
number of tax units recorded in tax statistics

+ tax exempt

= reference total population

Figure C.2 shows that more than half of the population were taxpayers across Prussian districts from 1874 to 1890. This share was reduced by the introduction of a tax allowance in 1891 and then steadily increased.

Figure C.2: Share of Taxpayers in Total Population in Prussian Districts, 1874-1913



Notes: Share of Taxpayers in % of total population. The introduction of a tax threshold of 900RM with the tax reform of 1891 drastically reduced the share of taxpayers.

Sources: See Appendix A.

C.4 Reference Total Income

There are two approaches to derive the reference total income. The bottom-up approach adds the (estimated) income of tax exempt to the taxpayers' income documented in the income tax statistics. The top-down approach draws on national accounts and obtains reference total income as a fixed share of private household income documented in national accounts. National accounts provide a useful benchmark both regarding consistency over time and comparability across countries via the United Nations' System of National Accounts (SNA) first charted in 1947 and the European System of Accounts (ESA) which is a modification of SNA. We apply the bottom-up approach as national accounts were first produced in Germany in the interwar period.

During our period of observation, incomes recorded in income tax statistics represent the most reliable source for national income (Helfferrich, 1917, p.91). The most consistent series of national income (*Volkseinkommen*) in Germany and German states is the series of Hoffmann and Müller (1959). Their numbers are based on tax incomes augmented by estimated non-filer income. Despite recurring criticism of this series, no attempt of replacing it has been undertaken.⁵ In order to compute household income, Hoffmann and Müller (1959) estimate non-filers' income in German states. Applying the bottom-up approach, the reference total income 1874-1913 is obtained as

Tax income recorded in tax statistics (1)

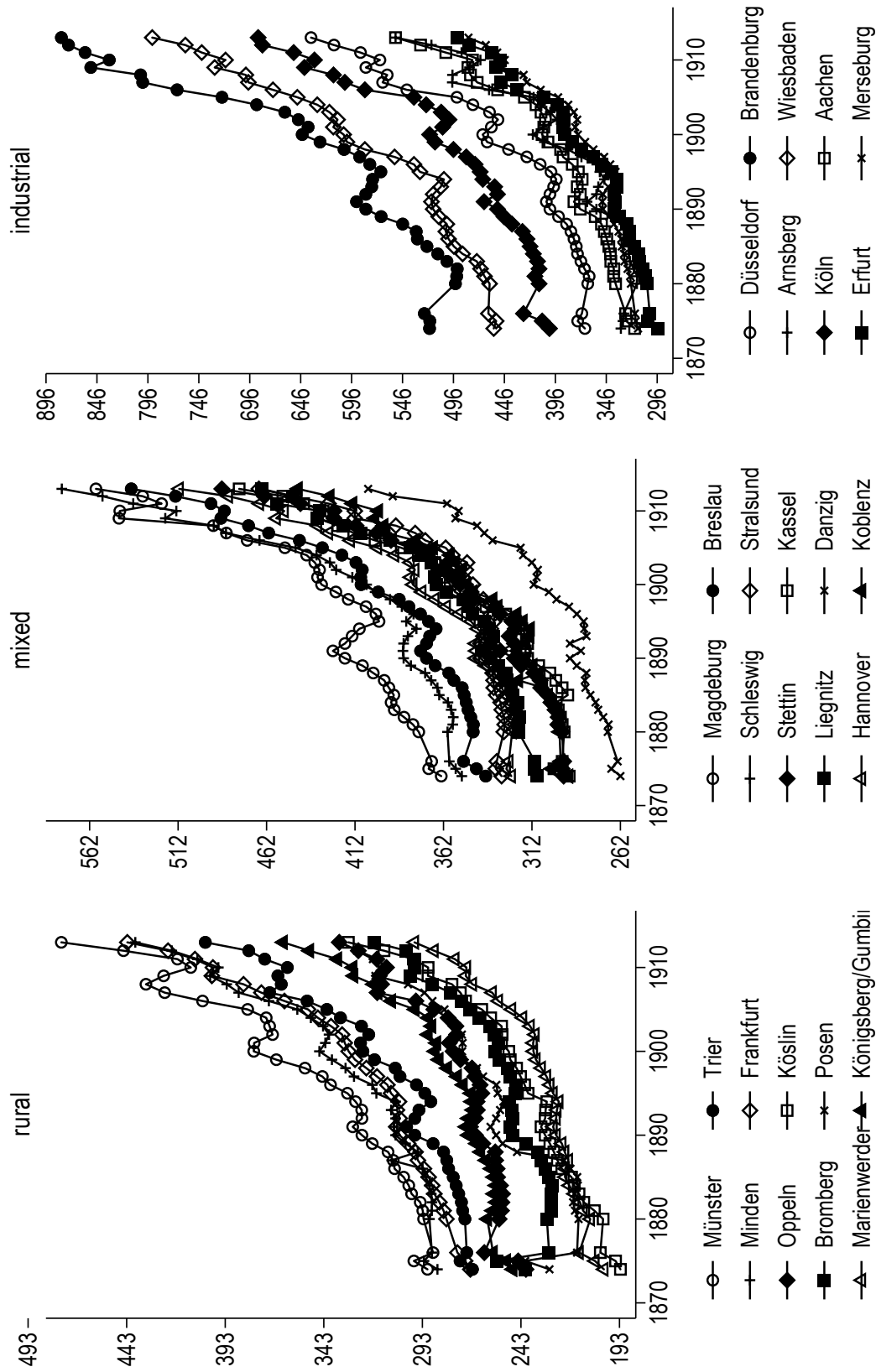
+ Income of non-filers with income beneath the tax allowance (from Hoffmann and Müller 1959) (2)

= Reference total income

Tax income (1) per income bracket is imputed under the assumption that incomes are Pareto distributed following Piketty and Saez (2003). The group of non-filers (2) consists of two subgroups. The first group is exempted because their income is below the exemption limit of the income tax. The Statistical Office (Statistisches Reichsamt, 1932) published an estimate of the average income of tax-exempted non-filers for the year 1913. We follow Hoffmann and Müller (1959) and deflate the 1913 figures with the wage index for average gross wages in the industrial and agricultural sector from 1870 to 1914 from Kuczynski (1947). The second group is exonerated from tax statistics because of personal circumstance that reduce the capability to generate income such as the number of children, sickness, and indebtedness (§18 and §19 Prussian EStG 1891). This group exists since the tax reform in 1891. Average income of exonerated tax units in Prussia from 1891 to 1913 and in each province in 1907 is provided by the Statistical Office (Statistisches Reichsamt, 1932). As we do not have further information, we assume that average income of this group is equal across districts within a province. We deflate 1907 province average incomes using an index for Prussia 1891-1913. Figure C.3 displays the evolution of total reference income per capita in Prussian administrative districts.

⁵See, e.g., Fremdling (1988).

Figure C.3: Reference Total Income per Capita in Prussian Districts, 1874-1913



Notes: Per capita income in current RM.

Sources: See Appendix A.

C.5 Capital Share

We calculate the capital share from the income-side. Capital income is the sum of interest, distributed profits (=dividends), undistributed profits (=retained earnings) and capital gains. Our main data source are income tax statistics recording capital income from interest and distributed profits, which we supplement with undistributed profits, self-employment capital income and government's capital income from additional data sources. Since 1891, Prussian income tax statistics documented the income composition of top income earners (roughly the top 1%) on the district level.

More precisely, tax statistics record the income composition of income earners with incomes exceeding 3,000 RM distinguishing between four income categories: capital income, income from renting and leasing, income from trade, business and mining, and, finally, employment income. Keeping in mind that these incomes accrue to roughly the top 1% of income earners, we count all income types as capital income (and not as labor income) except employment income. We might overestimate capital income in richer districts compared to poorer districts, because more taxpayers cross the 3,000 RM income threshold in richer districts so that more capital income is recorded in the income composition statistics.

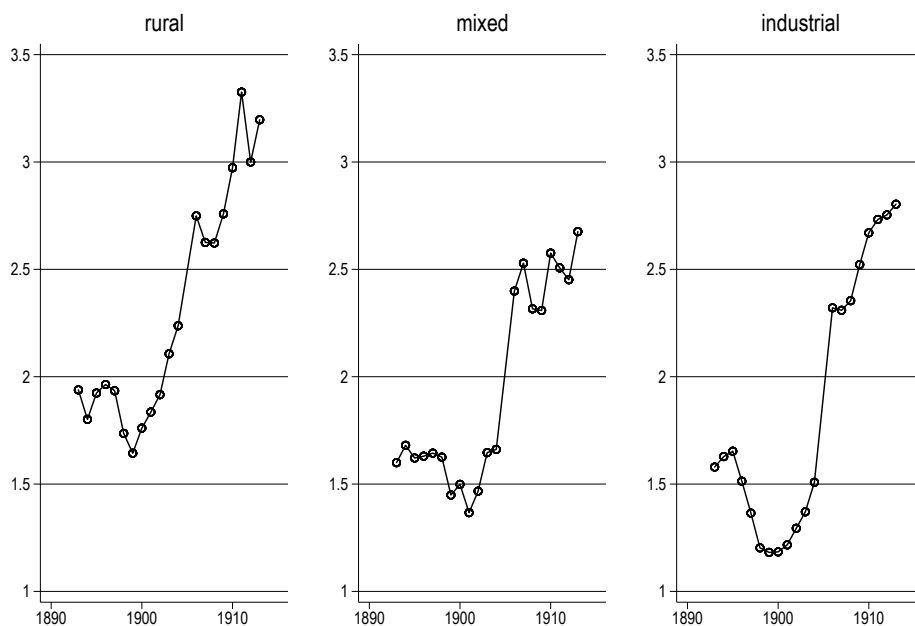
We use the capital income recorded in income tax statistics as an estimate for capital income from interest and distributed profits. We argue that capital income almost exclusively accrued to this top group so that the income composition data miss a negligible share of capital income. We add undistributed profits using the share of undistributed profits in total profits as estimated for Prussian corporations by [Hoffmann and Müller \(1959, p.28\)](#). According to their estimates, this share reached about 35% in 1891 and 1913, but varied. We add the capital share of self-employment income following [Bengtsson and Waldenström \(2018\)](#).⁶ Finally, we add government's capital income. In order to compute district government capital income, we compute the share of Prussian government capital income in national income as documented by [Hoffmann and Müller \(1959\)](#) and apply this share to district income. National income is the sum of total private income (see Appendix Section [C.4](#)), government's capital income and undistributed profits.

⁶[Bengtsson and Waldenström \(2018\)](#) compute the capital share of self-employment income as $0.33 \times \text{share of self-employed} \times \text{total labor income}$ using national self-employment shares from [Hoffmann \(1965\)](#). We use [Hoffmann \(1965\)](#) national self-employment data by sector and compute district self-employment shares by weighting national sector self-employment shares with the district sector employment shares.

C.6 Capital Concentration Using Tax Data

We also construct a measure of profit concentration among highly profitable firms using corporate tax statistics, which are available since the introduction of corporate taxation in 1891. One should note that corporate taxation since 1891 disproportionately increased the tax burden on the new industrial elite with respect to the old landed elite because firm owners were taxed twice on the corporate and on the personal level (Mares and Queralt, 2020). The Half-Squared Coefficient of Variation (HSCV) is declining until 1900 and then sharply increases (see Appendix Figure C.4). We do not make further use of this measure for three reasons. First, only a negligible share of firms were incorporated, meaning that the concentration of corporate profits is not representative for capital concentration in Prussia. Second, several districts have less than ten corporations in total. Third, the tax reform of 1906, which introduced limited liability companies (*GmbHs*) causing the number of corporations to increase two- to three-fold in all parts of Prussia, creates a serious break in the series.

Figure C.4: Firm Profit Concentration, 1893-1913



Notes: Half-squared coefficient of variation using grouped income taxes of corporations (*nicht-physische Personen*). Limited liability corporations (*GmbHs*) included since 1906.

Sources: See Appendix A.

D Additional Tables and Figures

Table D.1: Summary Statistics

	mean	sd	p50	p25	p75
County					
Δ capitalshare (in pp), 1895-1907	0.39	2.42	0.38	-1.13	1.73
Δ top 1% (in pp), 1895-1910	0.93	1.67	0.71	-0.13	1.81
Δ rate firm size (log), 1895-1907	0.19	0.14	0.18	0.11	0.27
Annual growth rate industry capital (in %), 1895-1910	1.77	1.82	1.99	0.65	2.66
Observations	544				
Constituency					
Growth Votes SPD (in pp), 1893-1912	8.04	7.41	6.92	2.53	12.81
Annual growth rate industry capital, 1895-1910	1.60	1.68	1.87	0.58	2.53
Observations	229				

Sources: See Appendix [A](#).

Table D.2: Reduced Form and First Stage, Hypothesis 1-3

	(1)	(2)
Δ Capital Share, 1895-1907 (in pp)		
Least Distance to Carbon Field in km for county c	0.007** (0.003)	0.006** (0.003)
Mean dependent variable	0.39	0.39
SD dependent variable	2.42	2.42
R-squared	0.06	0.09
Δ Top % Income Share, 1895-1910 (in pp)		
Least Distance to Carbon Field in km for county c	0.005** (0.002)	0.004** (0.002)
Mean dependent variable	0.93	0.93
SD dependent variable	1.67	1.67
R-squared	0.08	0.12
Δ Firm Size, 1895-1907 (logs)		
Least Distance to Carbon Field in km for county c	-0.000* (0.000)	-0.000 (0.000)
Mean dependent variable	0.19	0.19
SD dependent variable	0.14	0.14
R-squared	0.05	0.08
Δ Vote Share SPD (in pp)		
Least Distance to Carbon Field in km for county c	-0.026*** (0.007)	-0.025*** (0.008)
Mean dependent variable	8.04	8.04
SD dependent variable	7.41	7.41
Observations	229	229
R-squared	0.13	0.13
First Stage: Annual growth rate industry capital. 1895-1910		
Least Distance to Carbon Field in km for county i	0.007*** (0.002)	0.007*** (0.002)
Mean dependent variable	1.77	1.77
SD dependent variable	1.82	1.82
Observations	544	544
R-squared	0.19	0.26

Notes: Unit of analysis: county (Panel 1-3; 5) and constituency (Panel 4). Standard errors clustered on the district level reported in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. For convenience, we report the number of observations only in Panel 5 (and not in Panel 1, 2 and 3 because the first stage is identical). Further control: population (in logs) as of 1895. In column (2), we control in addition for population growth and share of urban population. Panels 1-4 report the reduced form effect. Panel 5 reports the first stage.

Sources: See Appendix A.

Table D.3: Inequality, the end of the anti-socialist law and votes for the SPD, 1874–1912

	(1)	(2)
Top 1% share	-0.749 (0.629)	0.868 (0.588)
Post1890 $\times$ Top 1% share		-1.380*** (0.456)
Year FE	✓	✓
District FE	✓	✓
Further Controls	✓	✓
R-squared within	0.80	0.89
R-squared overall	0.72	0.65
Observations	336	336
Districts	28	28
Elections	12	12
Mean Outcome	11.71	11.71
SD Outcome	12.76	12.76

Notes: The unit of observation is the district. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Controls: Urban population (in %), income per capita, and turnout. We include all elections between 1874 and 1912 (elections were held in 1874, 1878, 1878, 1881, 1884, 1887, 1890, 1893, 1898, 1903, 1907, and 1912).

Sources: See Appendix A.

Table D.4: County-Year Income Inequality and Successful Strikes excl. Berlin, 1899-1905

	Top 1% Share		Bottom 95% Share		Top 1% Mean Income	
	(1)	(2)	(3)	(4)	(5)	(6)
Successful strikes	-0.126** (0.048)	-0.144*** (0.044)	0.163** (0.060)	0.189*** (0.056)	-0.010** (0.004)	-0.013*** (0.004)
Strikes	-0.003 (0.046)	-0.000 (0.036)	-0.004 (0.056)	-0.005 (0.041)	0.001 (0.005)	0.000 (0.004)
Year FE	✓	✓	✓	✓	✓	✓
County FE	✓	✓	✓	✓	✓	✓
Further Controls		✓		✓		✓
R-squared within	0.20	0.40	0.12	0.36	0.22	0.43
R-squared overall	0.00	0.35	0.00	0.48	0.00	0.47
Observations	3801	3801	3801	3801	3801	3801
Counties	543	543	543	543	543	543
Years	7	7	7	7	7	7
Mean Outcome	12.41	12.41	75.86	75.86	9.41	9.41
SD Outcome	3.67	3.67	5.08	5.08	.41	.41

Notes: The unit of observation is the county. Number of successful strikes and top 1% mean income are in logs. Further controls include urban population share, firm size, agricultural employment share. Standard errors clustered on the district level displayed in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

Sources: See Appendix A.

Table D.5: County-Year Income Inequality and Successful Strikes in Construction, 1899-1905

	Top 1% Share		Bottom 95% Share		Top 1% Mean Income	
	(1)	(2)	(3)	(4)	(5)	(6)
Successful strikes	-0.164*** (0.058)	-0.147** (0.055)	0.249*** (0.075)	0.233*** (0.077)	-0.015** (0.006)	-0.014** (0.006)
Strikes	-0.091 (0.060)	-0.126* (0.069)	0.099 (0.074)	0.132 (0.078)	-0.008 (0.006)	-0.012 (0.008)
Year FE	✓	✓	✓	✓	✓	✓
County FE	✓	✓	✓	✓	✓	✓
Further Controls		✓		✓		✓
R-squared within	0.21	0.41	0.13	0.37	0.22	0.43
R-squared overall	0.00	0.34	0.02	0.46	0.00	0.47
Observations	3808	3808	3808	3808	3808	3808
Counties	544	544	544	544	544	544
Years	7	7	7	7	7	7
Mean Outcome	12.41	12.41	75.86	75.86	9.41	9.41
SD Outcome	3.67	3.67	5.08	5.08	.41	.41

Notes: The unit of observation is the county. Number of successful strikes and top 1% mean income are in logs. Industry-specific controls include Number of strike days per year. Number of firms of respective industry per county. Industry share is share of county's employees in respective industry. Share of strikes among industry's employees. Further controls include urban population share, firm size, agricultural employment share in the county. Standard errors clustered on the district level displayed in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Sources: See Appendix A.

Table D.6: County-Year Income Inequality and Successful Strikes in Mining, 1899-1905

	Top 1% Share		Bottom 95% Share		Top 1% Mean Income	
	(1)	(2)	(3)	(4)	(5)	(6)
Successful strikes	-0.284*** (0.092)	-0.314*** (0.102)	0.356*** (0.109)	0.396*** (0.123)	-0.025*** (0.008)	-0.028*** (0.010)
Strikes	0.006 (0.092)	-0.009 (0.112)	0.006 (0.121)	0.032 (0.133)	0.002 (0.009)	0.000 (0.009)
Year FE	✓	✓	✓	✓	✓	✓
County FE	✓	✓	✓	✓	✓	✓
Further Controls		✓		✓		✓
R-squared within	0.20	0.39	0.11	0.35	0.22	0.43
R-squared overall	0.00	0.36	0.00	0.47	0.00	0.47
Observations	3808	3808	3808	3808	3808	3808
Counties	544	544	544	544	544	544
Years	7	7	7	7	7	7
Mean Outcome	12.41	12.41	75.86	75.86	9.41	9.41
SD Outcome	3.67	3.67	5.08	5.08	.41	.41

Notes: The unit of observation is the county. Number of successful strikes and top 1% mean income are in logs. Industry-specific controls include number of strike days per year, number of firms, industry's employment share in the country, share of strikers among industry's employees. Further controls include urban population share, firm size, and agricultural employment share. Standard errors clustered on the district level displayed in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Sources: See Appendix A.

Table D.7: County-Year Income Inequality and Successful Strikes including Lags, 1900-1905

	Top 1% Share		Bott. 95% Share		Top 1% Mean Income	
	(1)	(2)	(3)	(4)	(5)	(6)
Successful	-0.098 (0.066)	-0.114** (0.044)	0.133 (0.081)	0.151*** (0.049)	-0.006 (0.007)	-0.009** (0.004)
L.Successful	-0.077 (0.094)	-0.098 (0.061)	0.100 (0.110)	0.125* (0.067)	-0.007 (0.010)	-0.010* (0.006)
L2.Successful	0.005 (0.079)	-0.031 (0.048)	-0.018 (0.096)	0.030 (0.060)	0.001 (0.009)	-0.003 (0.005)
Year FE	✓	✓	✓	✓	✓	✓
County FE	✓	✓	✓	✓	✓	✓
Further Controls		✓		✓		✓
R-squared within	0.22	0.47	0.11	0.44	0.32	0.60
R-squared overall	0.00	0.02	0.02	0.02	0.00	0.01
Observations	2720	2704	2720	2704	2720	2704
Counties	544	544	544	544	544	544
Years	5	5	5	5	5	5
Mean Outcome	12.31	12.35	75.96	75.91	9.41	9.41
SD Outcome	3.62	3.60	5.04	5.02	0.41	0.40

Notes: The unit of observation is the county. Number of successful strikes and top 1% mean income are in logs. Further controls include urban population share, firm size, and agricultural employment share. Standard errors clustered on the district level displayed in parentheses. * p<0.1, ** p<0.05, *** p<0.01. Sources: See Appendix A.

Table D.8: County-Year Income Inequality and Strikes in Construction, 2-Year-Periods

	Top 1% Share		Bottom 95% Share		Top 1% Mean Income	
	(1)	(2)	(3)	(4)	(5)	(6)
1899-1900						
Successful strikes	0.193 (0.153)	0.195 (0.185)	-0.177 (0.135)	-0.167 (0.166)	0.019 (0.015)	0.018 (0.019)
Further Controls		✓		✓		✓
Observations	950	950	950	950	950	950
1900-1901						
Successful strikes	-0.128 (0.095)	-0.021 (0.096)	0.139 (0.114)	0.017 (0.106)	-0.010 (0.009)	0.000 (0.011)
Further Controls		✓		✓		✓
Observations	930	930	930	930	930	930
1901-1902						
Successful strikes	0.070 (0.116)	0.084 (0.137)	-0.081 (0.163)	-0.112 (0.172)	0.011 (0.013)	0.007 (0.013)
Further Controls		✓		✓		✓
Observations	986	986	986	986	986	986
1902-1903						
Successful strikes	-0.262** (0.111)	-0.153* (0.084)	0.318** (0.137)	0.139 (0.098)	-0.019* (0.010)	-0.008 (0.008)
Further Controls		✓		✓		✓
Observations	988	988	988	988	988	988
1903-1904						
Successful strikes	-0.043 (0.086)	-0.042 (0.062)	0.091 (0.086)	0.075 (0.071)	-0.006 (0.010)	-0.005 (0.007)
Further Controls		✓		✓		✓
Observations	948	948	948	948	948	948
1904-1905						
Successful strikes	0.033 (0.059)	0.082 (0.074)	-0.025 (0.062)	-0.069 (0.074)	-0.002 (0.007)	0.003 (0.007)
Further Controls		✓		✓		✓
Observations	906	906	906	906	906	906

Notes: The unit of observation is the county. Standard errors clustered on the district level reported in parentheses. Sample into two-period samples 1899-1900, 1900-1901 etc. and restricted observations to counties that experienced no strikes in the first year. For some pairs of years, restricting observations to untreated counties in the first year leaves no observed strikes in the second year so that the coefficient is estimated as zero. Further controls: S total number of strikes, industry's employment share, agricultural employment share, share of urban population, and firm size. * p<0.1, ** p<0.05, *** p<0.01.

Sources: See Appendix A.

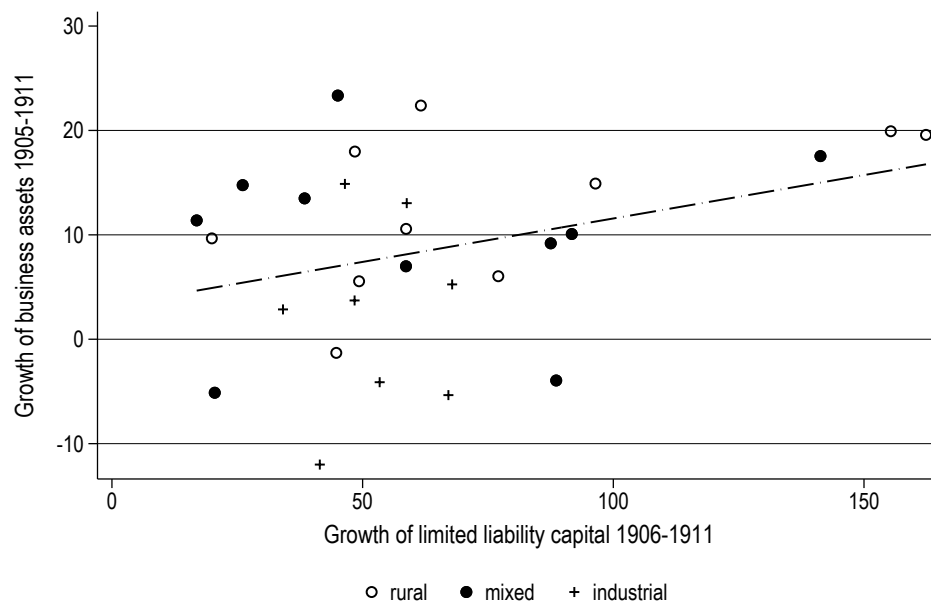
Table D.9: County-Year Income Inequality and Strikes in Mining, 2-Year-Periods

	Top 1% Share		Bottom 95% Share		Top 1% Mean Income	
	(1)	(2)	(3)	(4)	(5)	(6)
1899-1900						
Successful strikes	-0.171 (0.151)	-0.267 (0.279)	0.225*** (0.075)	0.277 (0.229)	-0.026** (0.011)	-0.028 (0.025)
Further Controls		✓		✓		✓
Observations	950	950	950	950	950	950
1900-1901						
Successful strikes	-0.254* (0.138)	-0.314*** (0.110)	0.161 (0.131)	0.195* (0.113)	-0.021 (0.013)	-0.027** (0.013)
Further Controls		✓		✓		✓
Observations	930	930	930	930	930	930
1901-1902						
Successful strikes	-0.169 (0.105)	0.357 (0.476)	0.240** (0.110)	-0.371 (0.544)	-0.020* (0.011)	0.039 (0.059)
Further Controls		✓		✓		✓
Observations	986	986	986	986	986	986
1902-1903						
Successful strikes	-0.182*** (0.055)	-0.052 (0.137)	0.212*** (0.072)	0.075 (0.171)	-0.025*** (0.006)	-0.016 (0.013)
Further Controls		✓		✓		✓
Observations	988	988	988	988	988	988
1903-1904						
Successful strikes	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Further Controls		✓		✓		✓
Observations	948	948	948	948	948	948
1904-1905						
Successful strikes	0.204 (0.344)	0.360 (0.332)	-0.151 (0.321)	-0.341 (0.312)	0.007 (0.027)	0.018 (0.025)
Further Controls		✓		✓		✓
Observations	906	906	906	906	906	906

Notes: The unit of observation is the county. Standard errors clustered on the district level reported in parentheses. Sample into two-period samples 1899-1900, 1900-1901 etc. and restricted observations to counties that experienced no strikes in the first year. For some pairs of years, restricting observations to untreated counties in the first year leaves no observed strikes in the second year so that the coefficient is estimated as zero. Further controls: total number of strikes, industry's employment share, agricultural employment share, share of urban population, and firm size. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Sources: See Appendix A.

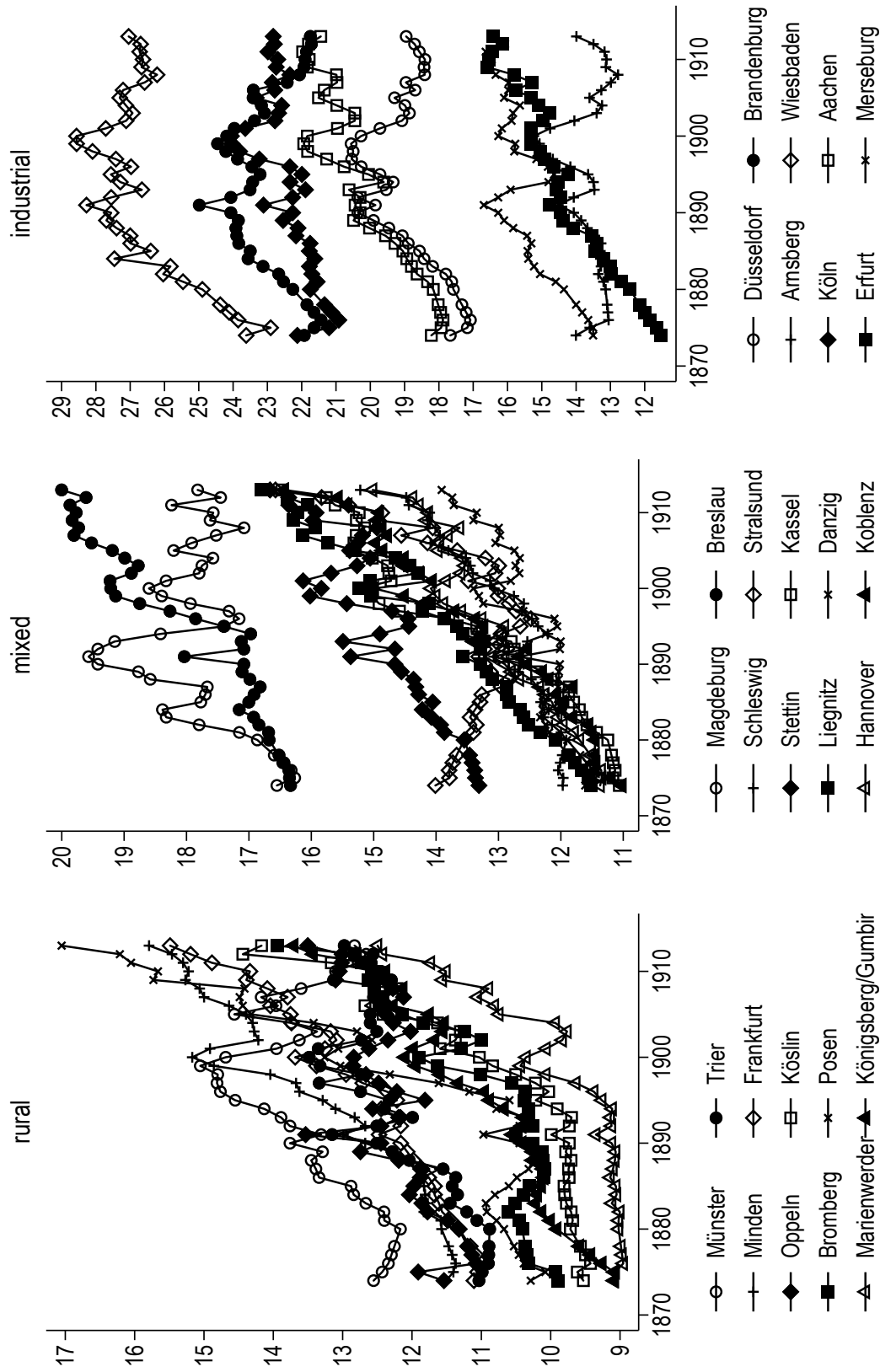
Figure D.1: Corporate vs. Non-corporate Capital Accumulation, 1905/06.1911



Notes: Aggregate capital growth in % compared to base year (1905 or 1906).

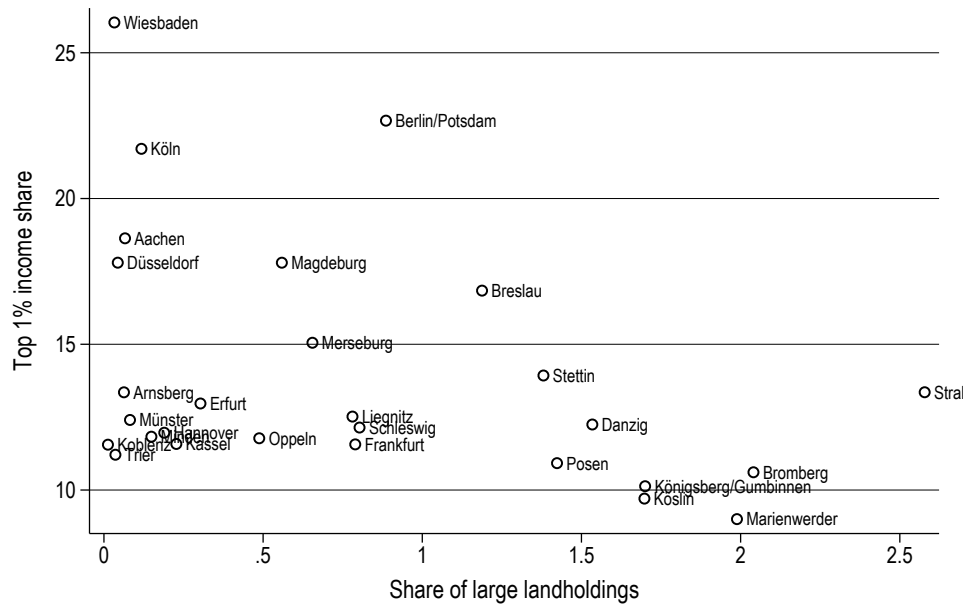
Sources: Limited liability capital (*Stammkapital GmbHs*) is from the *Statistisches Jahrbuch für den Preussischen Staat* 1907 (p.121) and 1912 (p.249). Business assets including all assets and rights of non-corporate firms operating in Prussia is from income tax records listed in Appendix A.26.

Figure D.2: Top 1% Income Share in Prussian Districts, 1874-1913

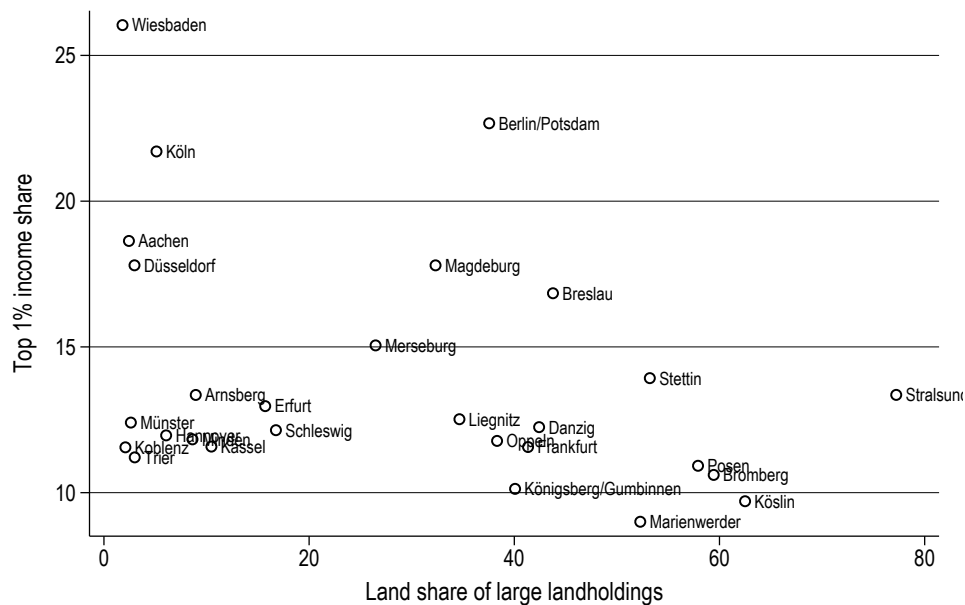


Notes: Top income share in %.
Sources: See Appendix A.

Figure D.3: Land Inequality vs. Income Inequality, 1882



(a) Large landholdings and top 1%

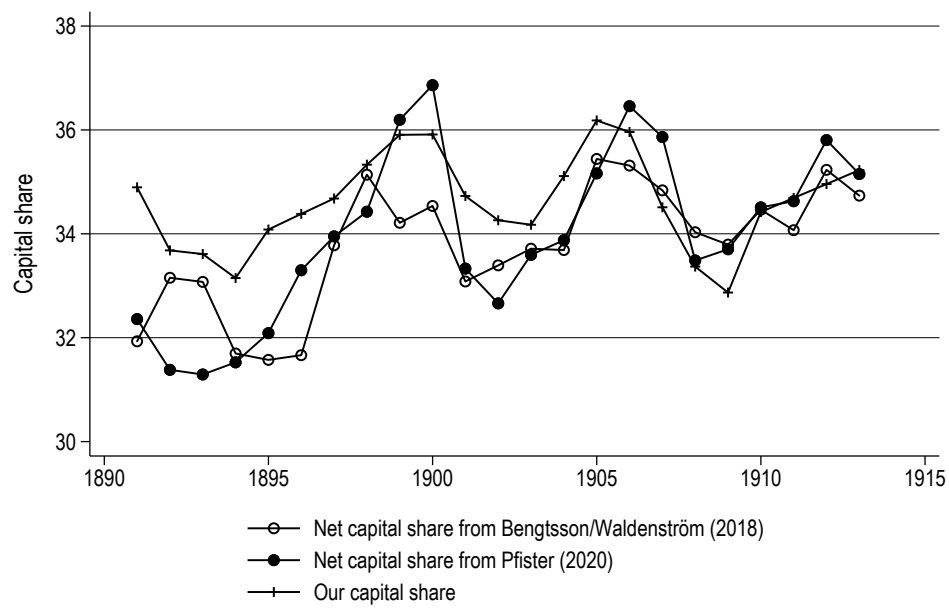


(b) Land owned by large landholdings and top 1%

Notes: Top income share in %. Share of large landholdings in % as of 1882 is computed following [Cinnirella and Hornung \(2016\)](#) by dividing the number of landholdings with more than 75ha by the number of landholdings. Share of land owned by large landholdings is calculated by dividing the land owned by large landholdings by the agricultural area in one district.

Sources: See Appendix A and [Cinnirella and Hornung \(2016\)](#).

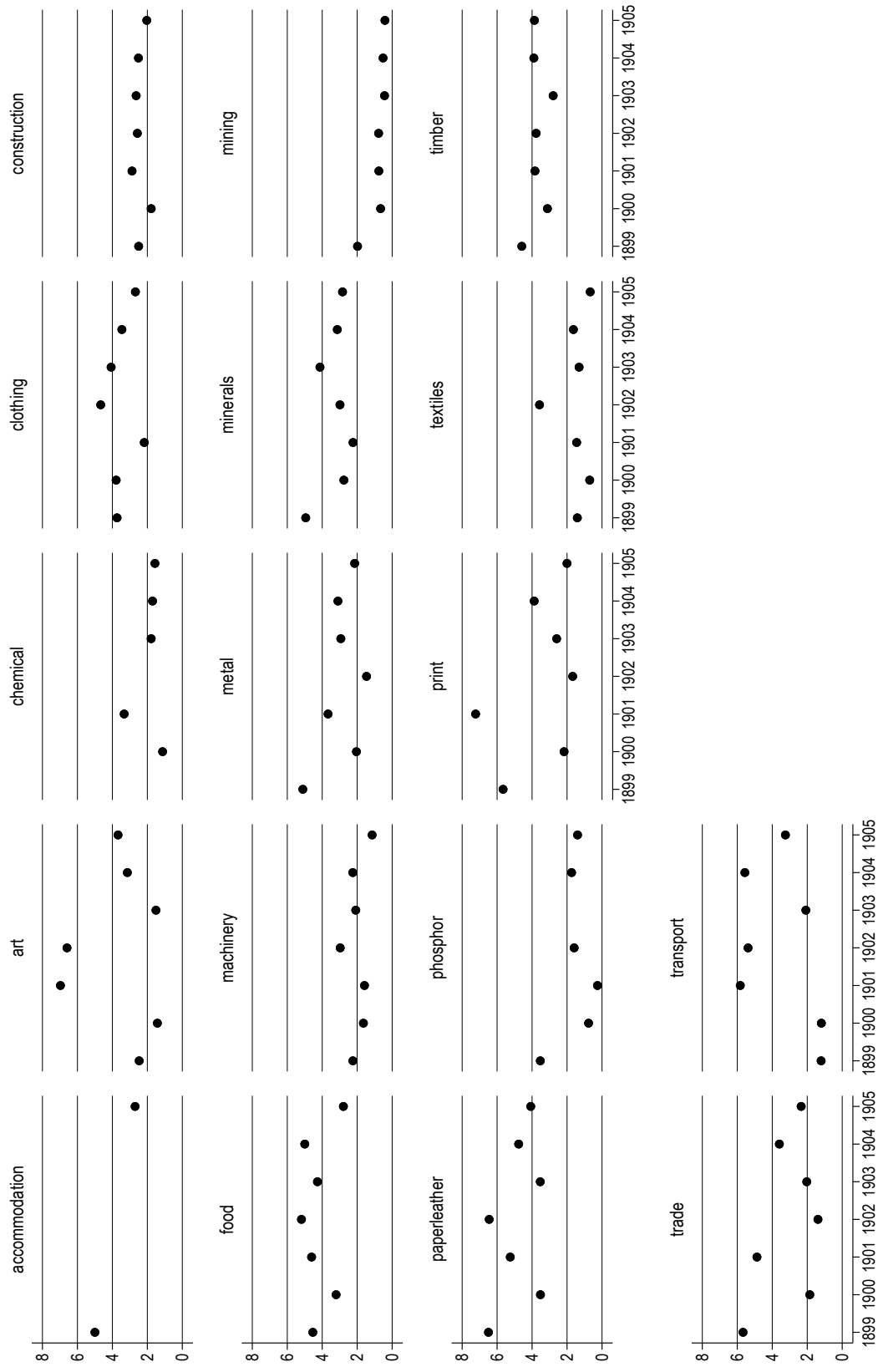
Figure D.4: Contrasting Different Capital Share Estimates, 1891-1913



Notes: Capital share in %. Our estimate for Prussia. Capital shares from [Bengtsson and Waldenström \(2018\)](#) and [Pfister \(2020\)](#) are computed for the German Empire.

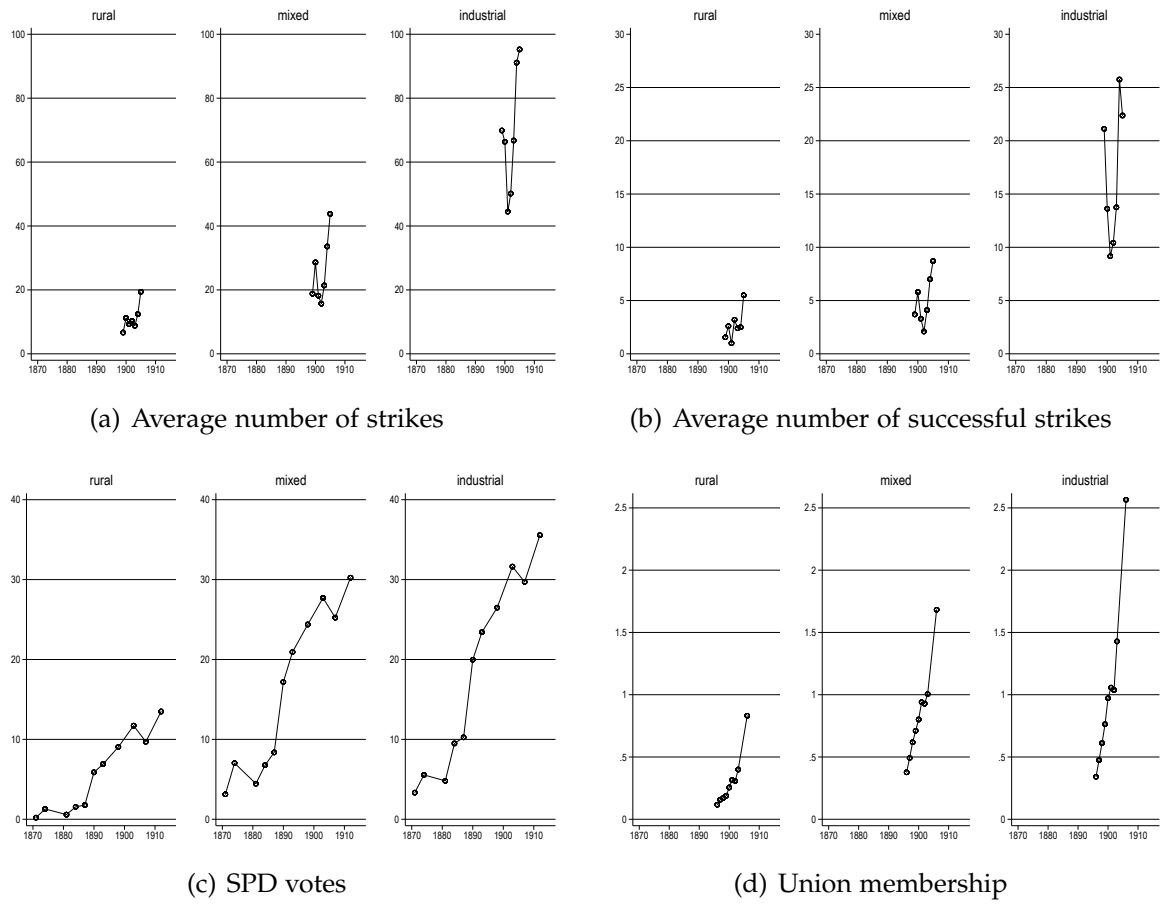
Sources: See Appendix [C.5](#), [Bengtsson and Waldenström \(2018\)](#) and [Pfister \(2020\)](#).

Figure D.5: Cross-county Average of Strikes per 100 Workers, 1899-1905



Notes: Strikes per 100 workers in each sector. Annual average across counties.
Sources: See Appendix A.

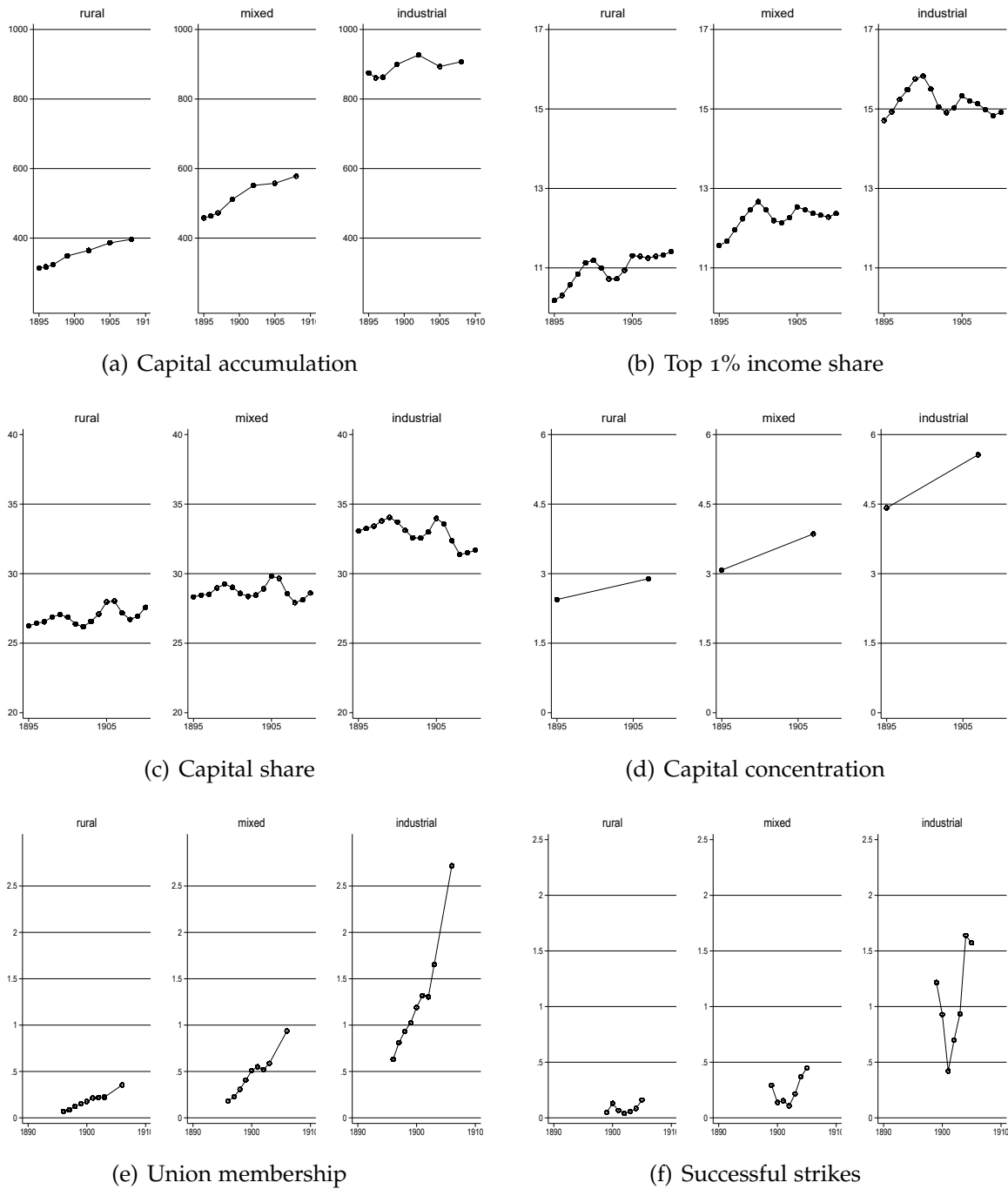
Figure D.6: Socialist Activity by District Type, 1874-1913



Notes: The graphs shows the average number of strikes (a), successful strikes (b), union membership among employees (c) by district type. Districts with more than 50% employment in agriculture in 1882 are classified as rural (left panel), districts with between 40% and 50% employment in agriculture in 1882 are classified as mixed (middle panel), and districts with less than 40% employment in agriculture in 1882 are classified as industrial (right panel).

Sources: See Appendix A.

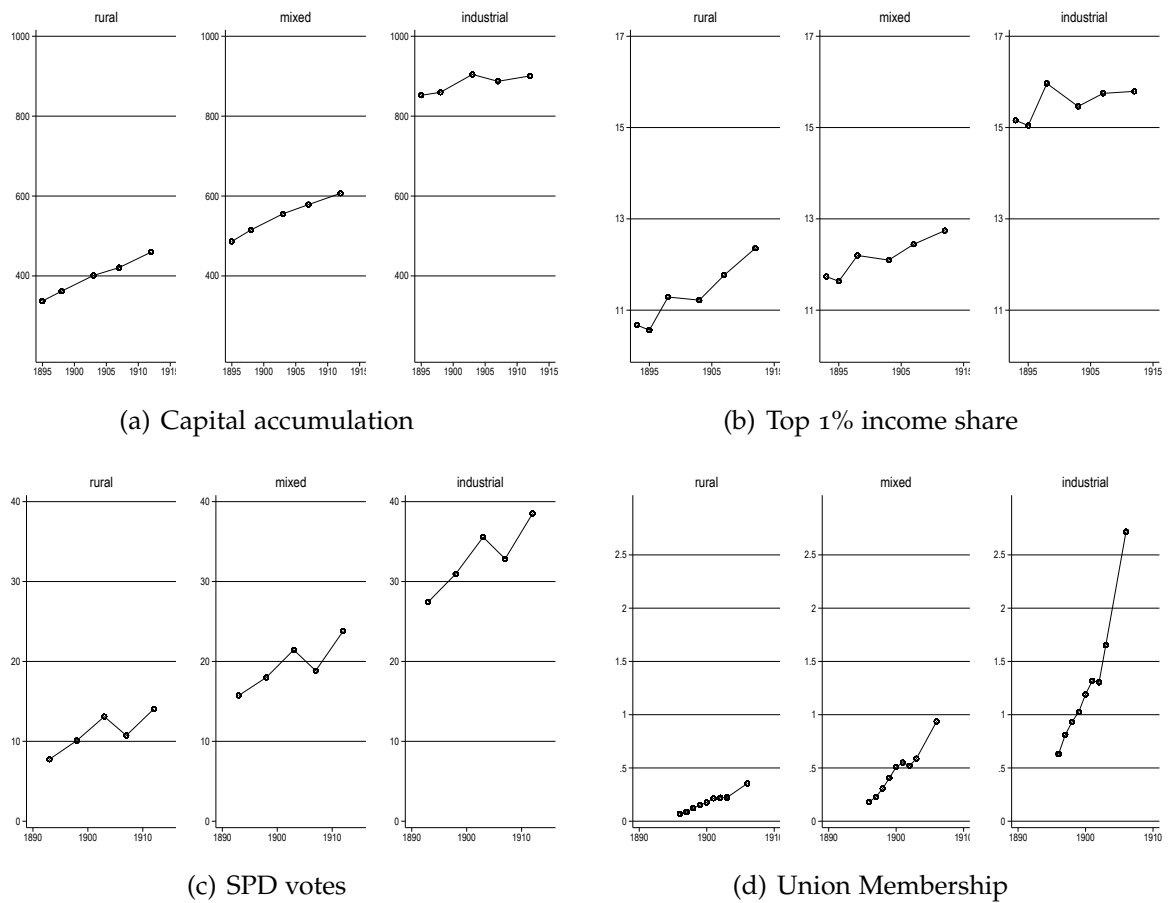
Figure D.7: Main Variables by County Type, 1895-1911



Notes: The graphs shows the top 1% income share (a), capital share (b), capital concentration (c), and votes for the SPD (d) by county type. Counties with more than 50% employment in agriculture in 1882 are classified as rural (left panel), counties with between 40% and 50% employment in agriculture in 1882 are classified as mixed (middle panel), and counties with less than 40% employment in agriculture in 1882 are classified as industrial (right panel).

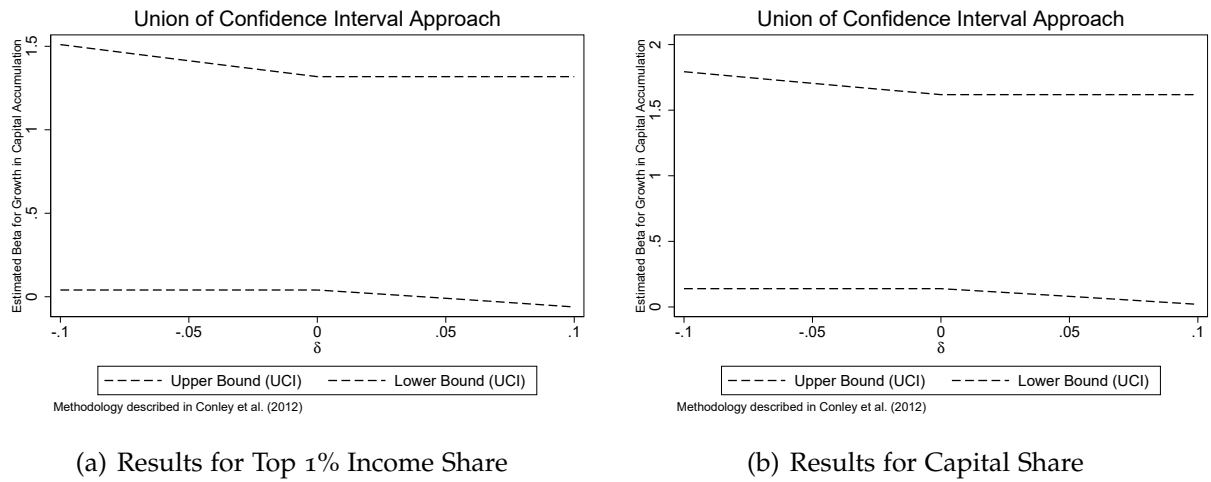
Sources: See Appendix A.

Figure D.8: Main Variables by Constituency Type, 1895-1912



Notes: The graphs shows the top 1% income share (a), capital share (b), capital concentration (c), and votes for the SPD (d) by constituency type. Constituencies with more than 50% employment in agriculture in 1882 are classified as rural (left panel), constituencies with between 40% and 50% employment in agriculture in 1882 are classified as mixed (middle panel), and constituencies with less than 40% employment in agriculture in 1882 are classified as industrial (right panel).
Sources: See Appendix A.

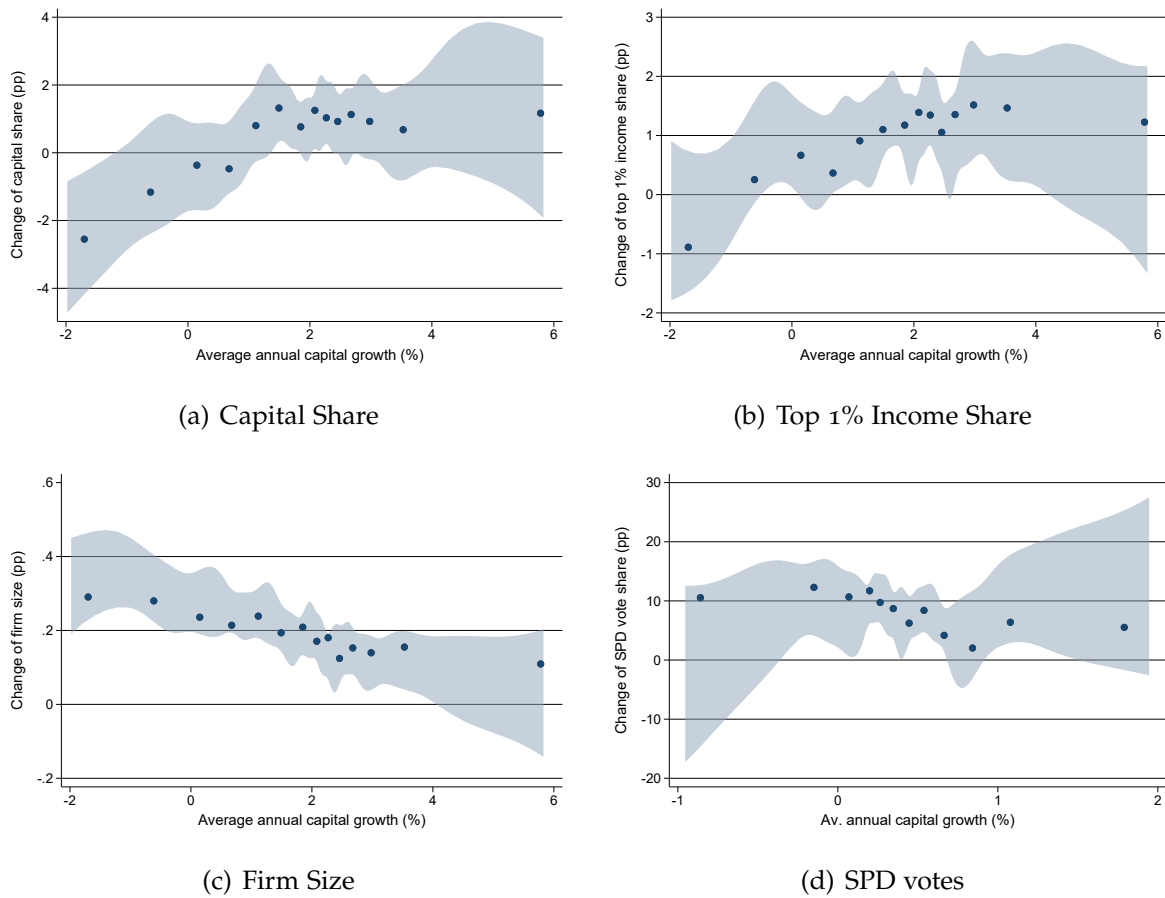
Figure D.9: Boundaries on IV Estimates under Plausible Exogeneity



Notes: This graph shows [Conley et al. \(2012\)](#) union of confidence interval boundaries for IV estimates of the impact of growth in capital accumulation on the top 1% income share (Panel a) and the capital share (Panel b). The specification corresponds to Table 2, panel 1, column 1 and Table 2, panel 2, column 1. We plot the estimated 95 percent confidence interval bounds for δ (-0.1, 0.1). To allow for better comparison, we standardize our instrument.

Sources: See Appendix [A](#).

Figure D.10: Binscatters for Hypotheses 1-3



Notes: The graphs show binscatters for Hypotheses 1-3 using the stata command *binsreg* (Cattaneo et al., 2022) with quantile-spaced binning and controlling for residuals from the first-stage regression of capital accumulation on distance to coal (equivalent to a control function approach as described in Wooldridge (2015)).
Sources: See Appendix A.

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