The long run effects of taxes and tax competition on top income shares:

am empirical investigation

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0. Main Points

Empirical Analysis:

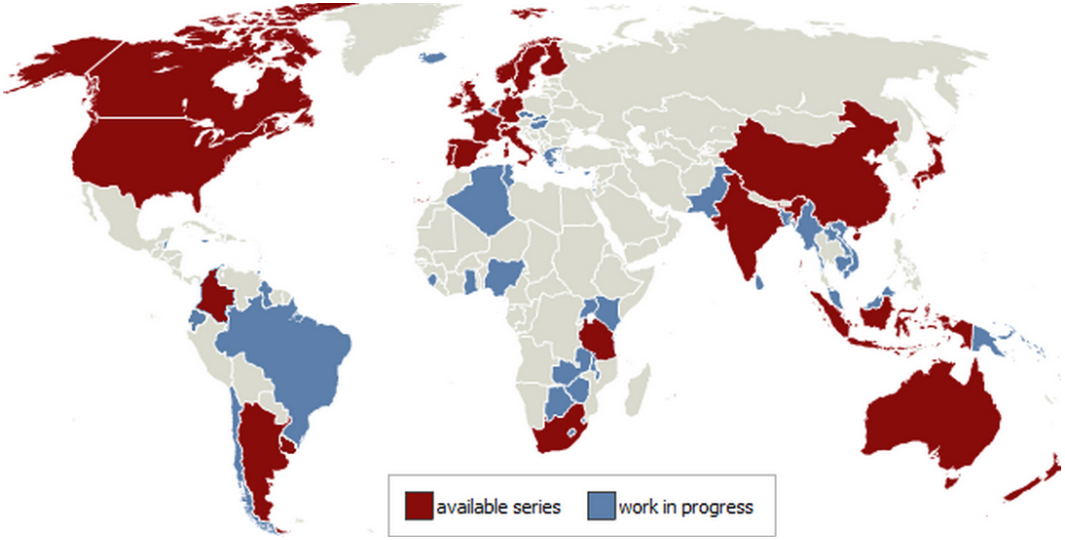
- Panel covering all Swiss cantons from 1917 to 2009
- Top Income Shares: Heterogeneity among Swiss cantons
- Tax Policy: Considerable autonomy of Swiss cantons
- Analysis of the effect of cantonal tax policy on income concentration

Findings:

- Negative effect of the tax burden on top income share
- Tax competition is a driving force behind the income shares of the top 1, 0.5 and 0.1 percent.
- Expansion of the influence of tax competition to the very top incomes since the 1980s

1. Data on income concentration

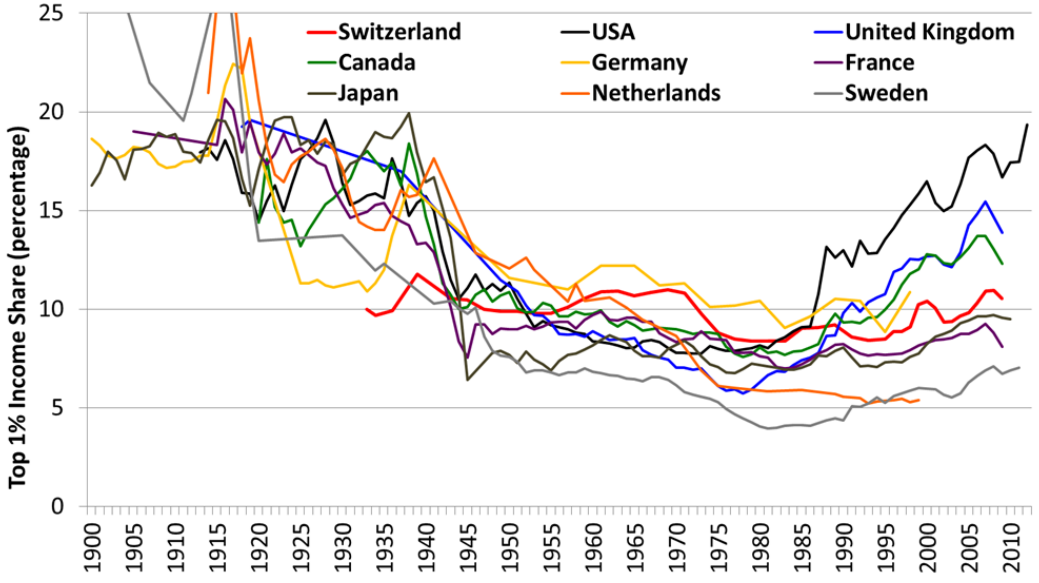
Alvaredo, Atkinson, Piketty & Saez, **The World Top Income Database**



http://topincomes.g-mond.parisschoolofeconomics.eu/, 01/04/2014

1. Development of income concentration (I)

Alvaredo, Atkinson, Piketty & Saez, **The World Top Income Database**



1. Development of income concentration (II)

Income concentration

- sharply decreased during the World Wars and the depression (mostly due to shocks to capital income) $\Rightarrow$ compatible with Kutznets (1953)?
- never recovered until the 1970s
- remained constant over the last quarter of the 20^{th} century in most of continental Europe
- reveals a U-shape in Anglo-saxon countries (distinct recovery since the 1980s)

- Piketty (2014) predicts increasing top income shares due to: $r > g$

1.1 Tax policy as a determinant

Empirical Evidence:

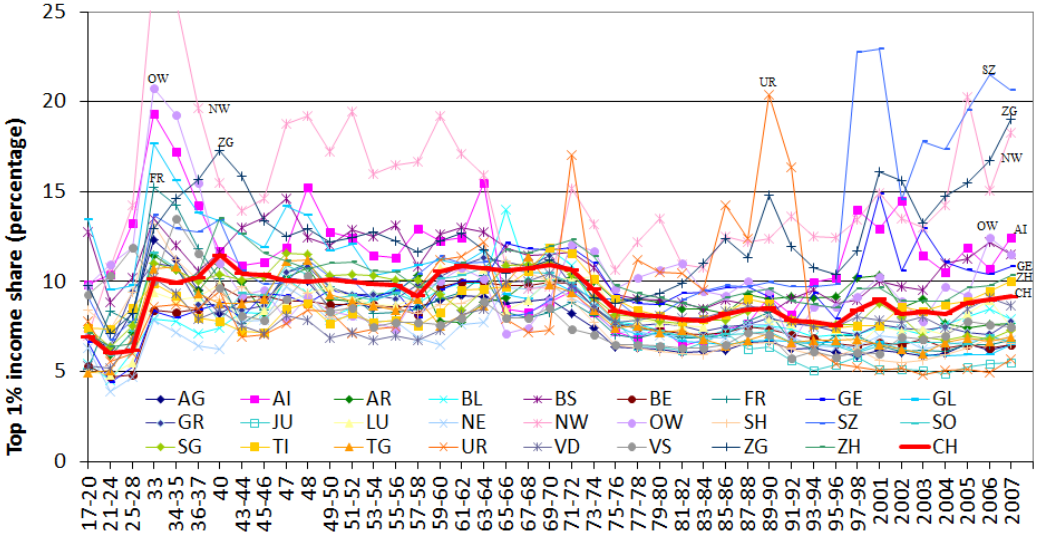
- single country / time series studies
  - Saez (2004) for the US, Saez & Veal (2005) for Canada, Moriguchi & Saez (2008) for Japan, Atkinson & Leigh (2008) for New Zealand, Roine & Waldenströem (2008) for Sweden.
- cross country / panel studies
  - Roine, Vlachos & Waldenström (2009), Saikat & Matti (2010), Atkinson & Leigh (2013)

New in our paper:

- influence of tax competition among jurisdictions
- sub-federal level: consistent definition of income and tax burden
- the long run: panel data from 1917 to 2009

2.1 Income concentration in Swiss cantons

Top income shares in 26 Swiss cantons 1917-2007 from tax return data (Schaltegger & Gorgas, 2011):

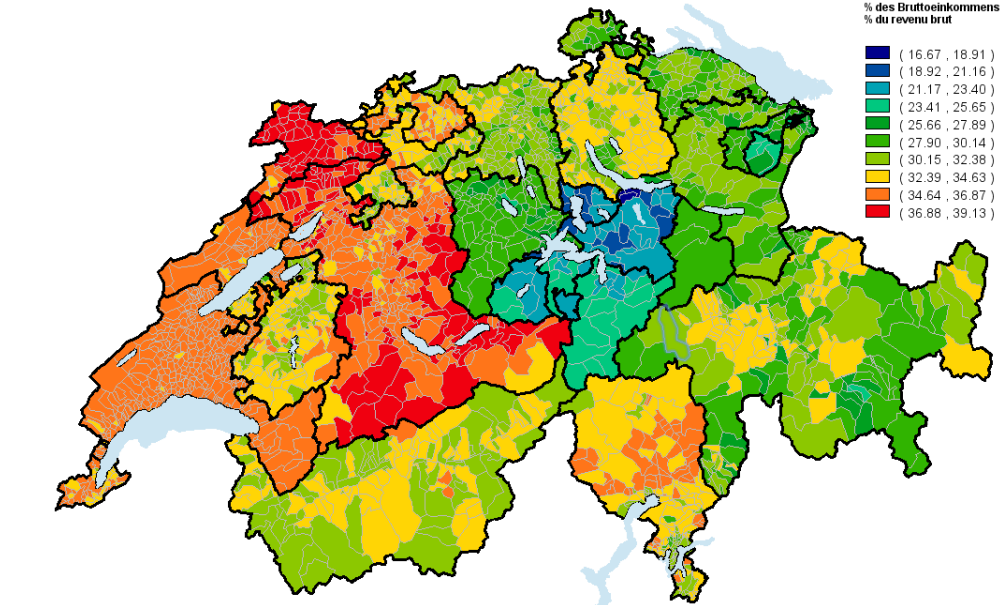


2.1 Income concentration in Swiss cantons

Heterogeneity of top income shares among Swiss cantons 1917-2009:

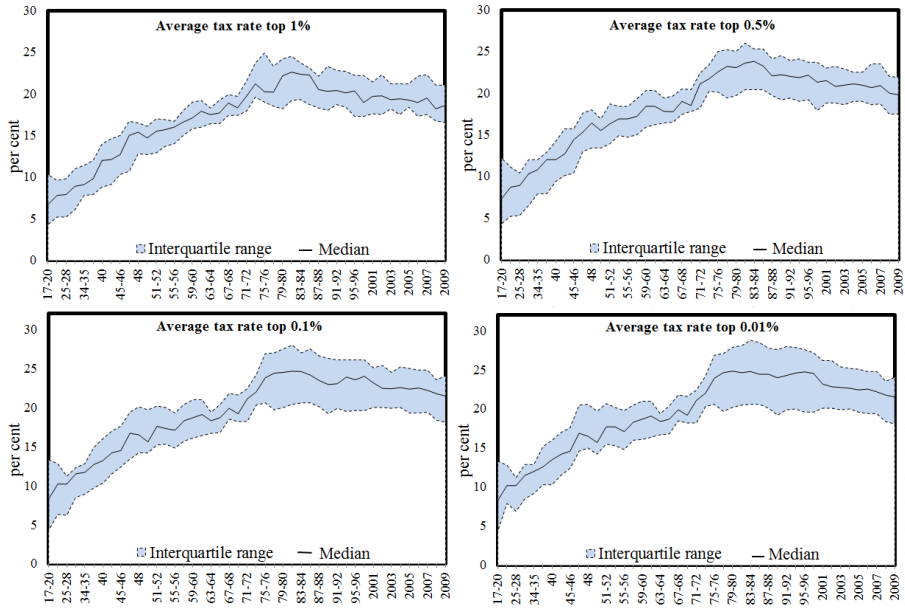
2.2 Fiscal autonomy and tax competition

Cantonal and community tax rate for an income of SFr. 1 Million:



2.2 Tax burden on top incomes

Income tax burden for top incomes in 26 cantons 1917-2009:



2.2 Tax competition and Tiebout income sorting

Evidence on tax competition

- Strategic tax setting behaviour among cantons (Feld & Reulier, 2009)

Evidence on Tiebout income sorting (endogeneous segregation):

- High income households choose their residence according to the local tax burden
- Feld & Kirchgässner (2001), Schmidheiny (2006), Schmidheiny & Hodler (2006), Schaltegger et al. (2011)

$\Rightarrow$ tax competition influences top income shares

3. Empirical analysis

Baseline model:

$$\text{Top p\% income share}_{it} = \alpha_i + \mu_t + tax_{it}\beta_1 + tax_{nt-1}\beta_2 + X'_{it}\beta + \epsilon_{it}$$

Definition of tax variable tax_{it}:

- tax burden on the respective top incomes in canton i and year t

Definition of tax competition variable tax_{nt}:

- average tax burden on the respective top incomes in neighbor cantons (analogous to the tax mimiking literature, e.g. Feld & Reulier 2009)

Behavioural reactions to higher income taxes

- supply side effect: weaker work incentives
- tax planning or tax evasion
- move to another juristiction (tax competition)

3. Empirical analysis

Baseline model:

$$\text{Top p\% income share}_{it} = \alpha_i + \mu_t + tax_{it}\beta_1 + tax_{nt-1}\beta_2 + X'_{it}\beta + \epsilon_{it}$$

- Year and canton fixed effects: α_i, μ_t
- Controll variables X_{it}:

Unemployment rate	*Expenditure*
Share of the Service Sector	*Federal Transfers*
Working age population	*Apartment construction*
Crime	*World War II*
Foreigners	*introduction of federal old age insurance*
Religion	*introduction of direct federal tax*
Population density	*introduction of federal tax harmonization*
Social Democrats	*introduction of federal debt brake*

3. Results: Baseline model

Table 1: Baseline regressions for cantonal income concentration

	1917-2009				1981-2009			
Variables	Top 1 %	Top 0.5 %	Top 0.1 %	Top 0.01 %	Top 1 %	Top 0.5 %	Top 0.1 %	Top 0.01
Tax top 1 %	-0.126***				0.0779			
	(-4.72)				(1.18)			
Neighbor tax top 1% (t-1)	0.115***				0.308***			
	(2.73)				(2.63)			
Tax top 0.5 %		-0.157***				-0.0225		
		(-7.11)				(-0.33)		
Neighbor tax top 0.5% (t-1)		0.111***				0.333***		
		(3.27)				(2.59)		
Tax top 0.1 %			-0.109***				-0.156***	
			(-7.28)				(-2.76)	
Neighbor tax top 0.1% (t-1)			0.0476**				0.197*	
			(2.15)				(1.86)	
Tax top 0.01 %				-0.0546***				-0.115**
				(-6.29)				(-2.86)
Neighbor tax top 0.01% (t-1)				0.00491				0.166**
				(0.38)				(2.03)
N	1120	1120	1120	1120	468	468	468	468
R^2	0.153	0.160	0.139	0.117	0.177	0.159	0.141	0.118
F	9.354	9.844	8.386	6.884	5.201	4.575	3.955	3.223

s: t statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

3.1 Identification strategy

Endogeneity of tax rates:

- Possible reverse causality
- Large tax base enables the authorities to set low tax rates

Instrumental Variable for cantonal tax rates: Dummy variables for Changes in the federal fiscal system

- Introduction of the value added tax
- Introduction of the new financial equalization mechanism

Validity of Instruments

- Significant effect on cantonal tax rates
- No direct effect on cantonal top income shares

3.1 Identification strategy

Table 2: Instrumental variables estimation for cantonal income concentration

	1917-2009				1981-2009			
Variables	Top 1 %	Top 0.5 %	Top 0.1 %	Top 0.01 %	Top 1 %	Top 0.5 %	Top 0.1 %	Top 0.01 %
First Stage:								
Excluded Instruments:								
Value added tax	-2.505***	-3.006***	-4.113***	-4.606***	-0.558	-1.408**	-1.351**	-1.974***
	(-3.75)	(-4.20)	(-5.19)	(-5.55)	(-0.87)	(-2.41)	(-2.35)	(-3.45)
New financial equalization	-1.198**	-1.640**	-1.354*	-1.434*	-1.121***	-1.529***	-1.194***	-1.276***
	(-1.97)	(-2.53)	(-1.87)	(-1.90)	(-3.19)	(-4.78)	(-3.78)	(-4.03)
N	1120	1120	1120	1120	468	468	468	468
F test of excluded Instruments	15.25***	20.88***	24.54***	27.24***	6.53***	18.23***	12.96***	18.46***
Sargan test	1.299	2.111	0.853	0.525	0.217	0.476	0.348	0.146
(p-value)	(0.254)	(0.146)	(0.356)	(0.469)	(0.642)	(0.490)	(0.555)	(0.703)
Kleibergen-Paap LM-Test	31.17	42.22	49.30	54.45	13.52	35.77	26.03	36.18
(p-value)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)

Notes: t statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

3.2 Spatial correlation

Possibility of cluster effects of cantonal top income shares:

- Spill-overs from the top income share may affect the attractiveness of neighboring cantons
- Regions of several cantons with high top income shares
- Possible Bias for the effect of tax rates

Possibility of omitted spatial variables:

- Spatially correlated error terms
- For example tourism regions in mountainous cantons

We specify our model following Anselin & Bera (1998)

- We can exclude a spatial lag of the dependent variable
- We employ a spatial error model (SEM) with a spatial process in the error term correction for spatial autocorrelation

3.2 Results: Spatial error model (with IV fist stage)

Table 3: Spatial error model regressions for cantonal income concentration

	1917-2009				1981-2009			
Variables	Top 1 %	Top 0.5 %	Top 0.1 %	Top 0.01 %	Top 1 %	Top 0.5 %	Top 0.1 %	Top 0.01 %
Tax top 1 %	-0.173				0.519			
	(-1.04)				(1.50)			
Neighbor tax top 1% (t-1)	0.135**				0.410***			
	(2.45)				(3.39)			
Tax top 0.5 %		-0.178*				0.212		
		(-1.70)				(0.99)		
Neighbor tax top 0.5% (t-1)		0.119***				0.367***		
		(2.78)				(2.83)		
Tax top 0.1 %			-0.127**				0.216	
			(-2.02)				(1.06)	
Neighbor tax top 0.1% (t-1)			0.0471*				0.290**	
			(1.93)				(2.28)	
Tax top 0.01 %				-0.0841**				0.132
				(-2.46)				(1.07)
Neighbor tax top 0.01% (t-1)				0.00411				0.194**
				(0.30)				(2.38)
Spatial lambda	-0.109**	-0.184***	-0.254***	-0.235***	-0.265***	-0.238***	-0.236***	-0.248***
	(-2.07)	(-3.47)	(-4.86)	(-4.85)	(-3.48)	(-3.13)	(-3.09)	(-3.24)
N	1125	1125	1125	1125	450	450	450	450
R^2	0.012	0.000	0.009	0.023	0.003	0.000	0.002	0.008

s: t statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

3.3 Results

Negative effect of the cantonal tax burden on top income share

Tax competition is a driving force behind the income shares of the top 1, 0.5 and 0.1 percent.

- Lower tax rates in neighbor cantons increase the competitive pressure and ceteris paribus reduce top income shares in the respective canton.

Expansion of the influence of tax competition to the very top incomes

- For the very top incomes (the top 0.1 and 0.01 percent) tax competition seems to be an issue of the last 30 years.

4. Conclusion

The influence of the tax burden on income concentration is confirmed

- over the long run, on the sub-federal level
- with homogeneously defined tax base and tax burden

We find an effect of tax competition on income concentration

- the effect of tax competition seems to expand within the last 3 decades to the very top incomes
- trend of increasing cantonal tax burdens stops in the 1980s
- widening of the spread between cantons
- increasing mobility of high income individuals

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