

Econ 230B – Graduate Public Economics

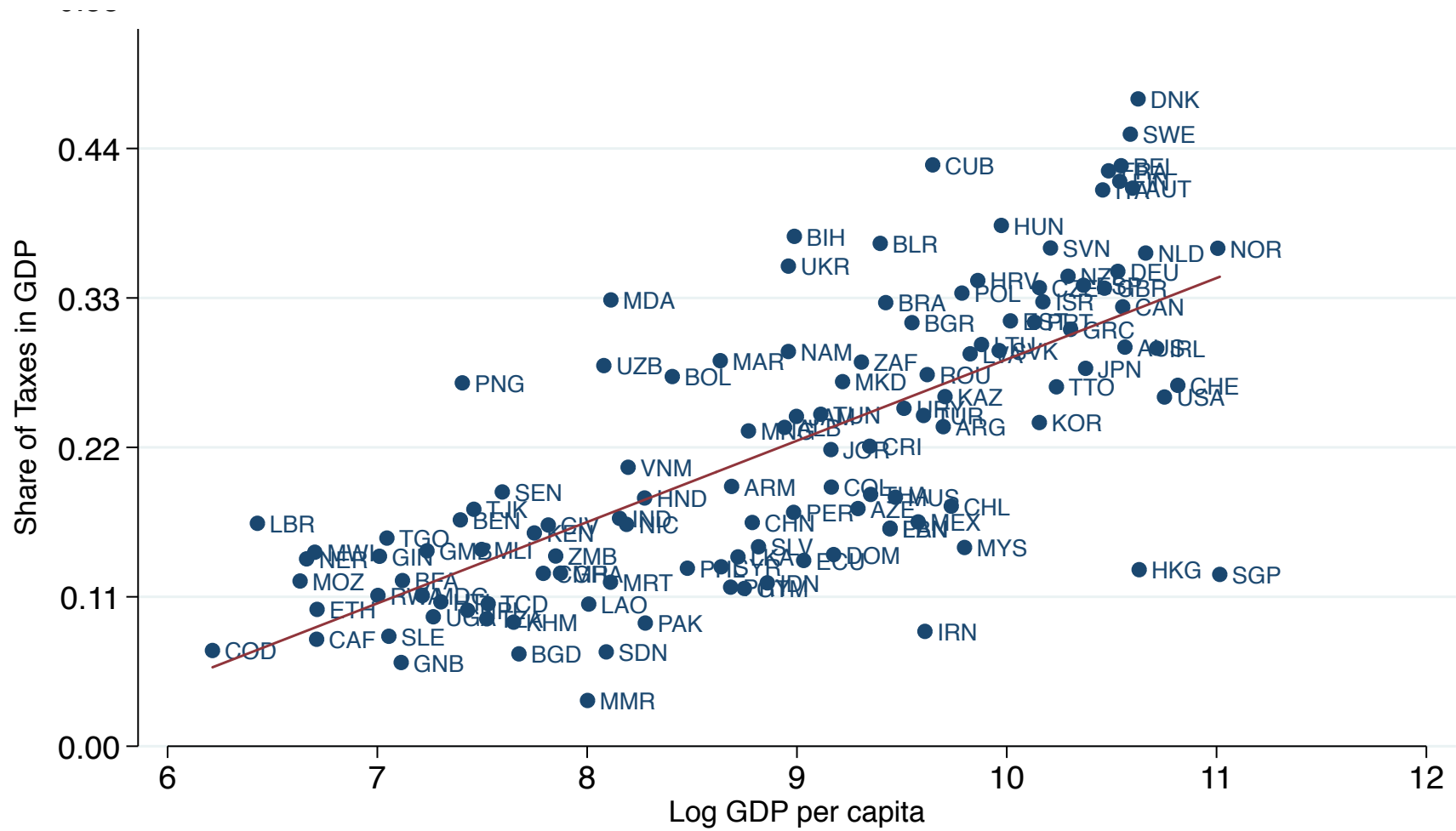
Taxation in developing countries

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Roadmap

1. Taxes over the path of development
2. The structure of taxation in developing countries
3. Tax base elasticities and investment in tax capacity



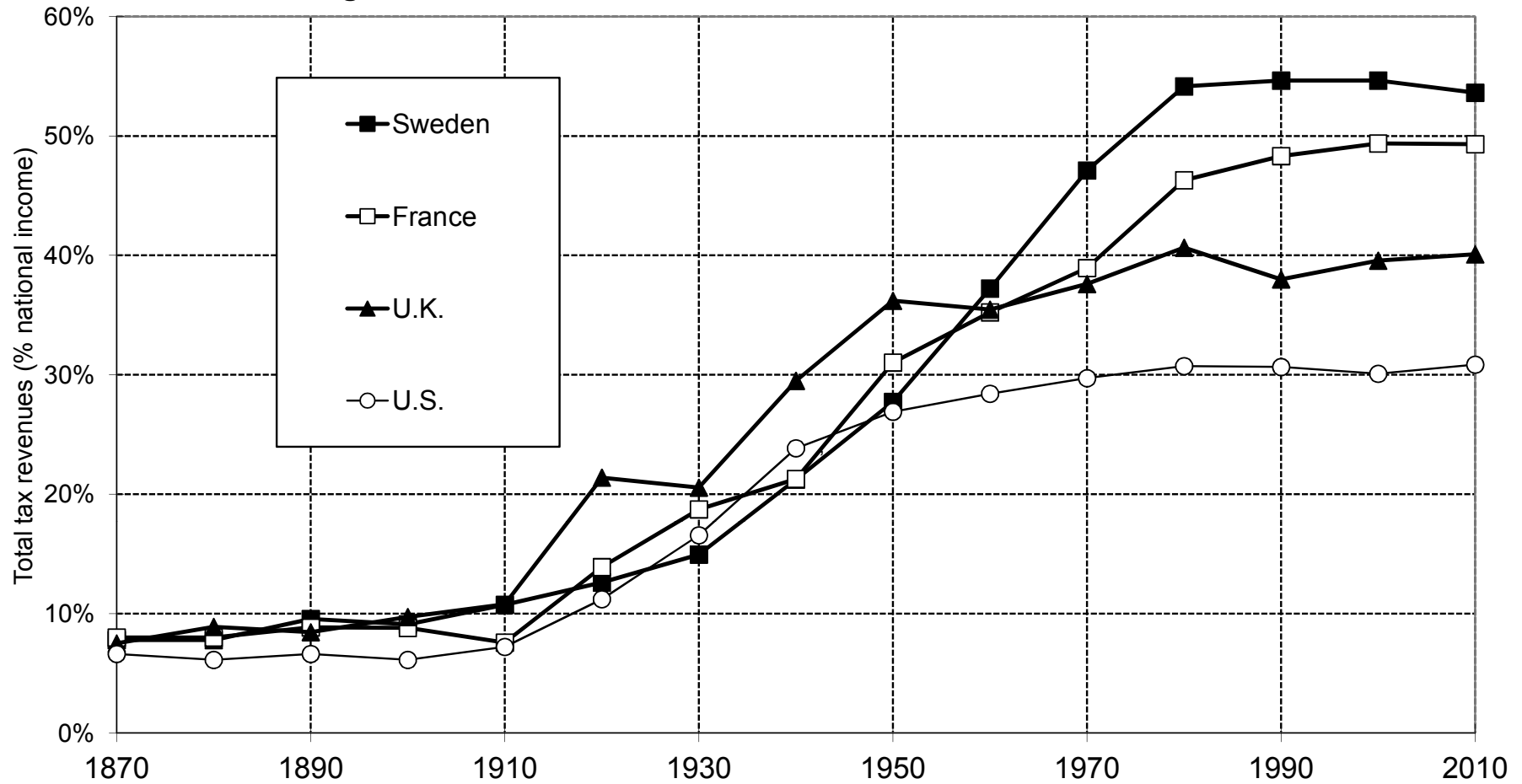
Key question in taxation & development: how does a gov. go from raising 10% of GDP in taxes to raising around 40%? Two views:

- Pessimistic view: it takes mass-mobilization wars or revolutions (e.g., Scheve & Stasavage 2012; Scheidel 2017)
- Optimistic view: as countries develop, easier to collect taxes (e.g., tax enforcement simpler as businesses grow bigger & more formal)
- To shed light on this debate, useful to study how today's developed countries have achieved high tax rates
- And important to study recent trends in developing countries

1 Taxes over the path of development

- During 20th century, big rise of tax revenues in today's rich countries: from 10% to 30-50% of national income
- Part of this jump happens during and just after World Wars
- Previous wars had seen some increase in gov. size (Tilly 1975: "war made the State and the State made war"), but not persistent
- Specificity of mass-mobilization wars: led to development of major new institutions (public pensions, Welfare State) → ratchet effect

Figure 13.1. Tax revenues in rich countries, 1870-2010



Total tax revenues were less than 10% of national income in rich countries until 1900-1910; they represent between 30% and 55% of national income in 2000-2010. Sources and series: see piketty.pse.ens.fr/capital21c.

Rise of taxes during 20th century corresponds to change in the form of taxation:

- Before 20th century: mostly archaic indirect taxes
- First half of twentieth century: birth of progressive income and wealth taxation
- Largely as a response to world wars, communist revolution, high inequality
- Second half: broad-based VAT and Social Security contributions to fund welfare State (education, health & means-tested transfers)

Archaic indirect taxes

Key source of revenue since the Roman Empire. Two main forms:

1. Taxes on trade: for using roads, crossing bridges, arriving in harbor...
2. Taxes on consumption: on goods sold, on salt, on slaves...

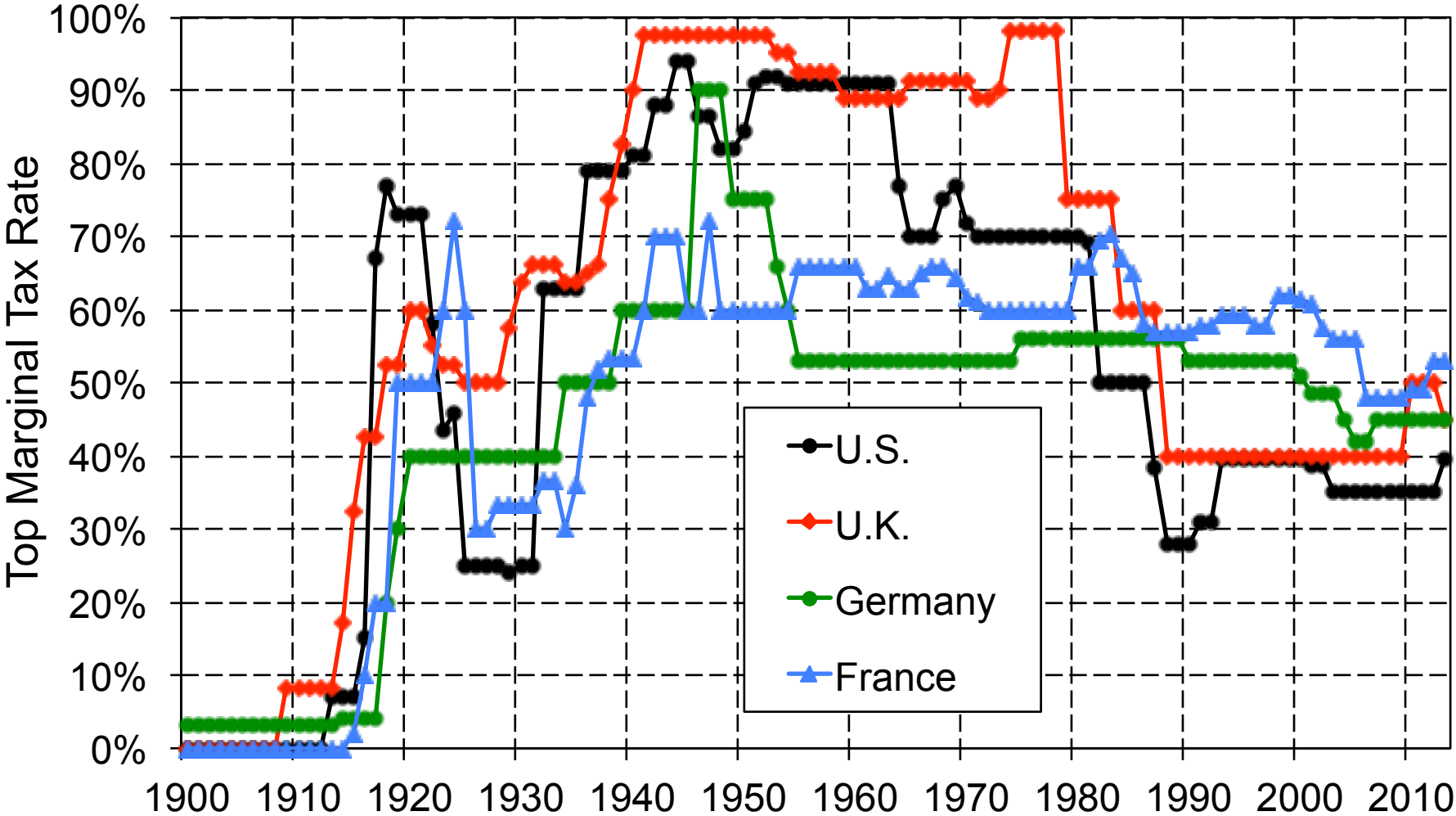
Middle-Ages: role of trade fairs where exchanges are concentrated → makes it easier for governments to impose sales taxes

Indirect taxes still very high up to late 19th century: 60% of tax revenue in France just before World War I

The birth of progressive taxation

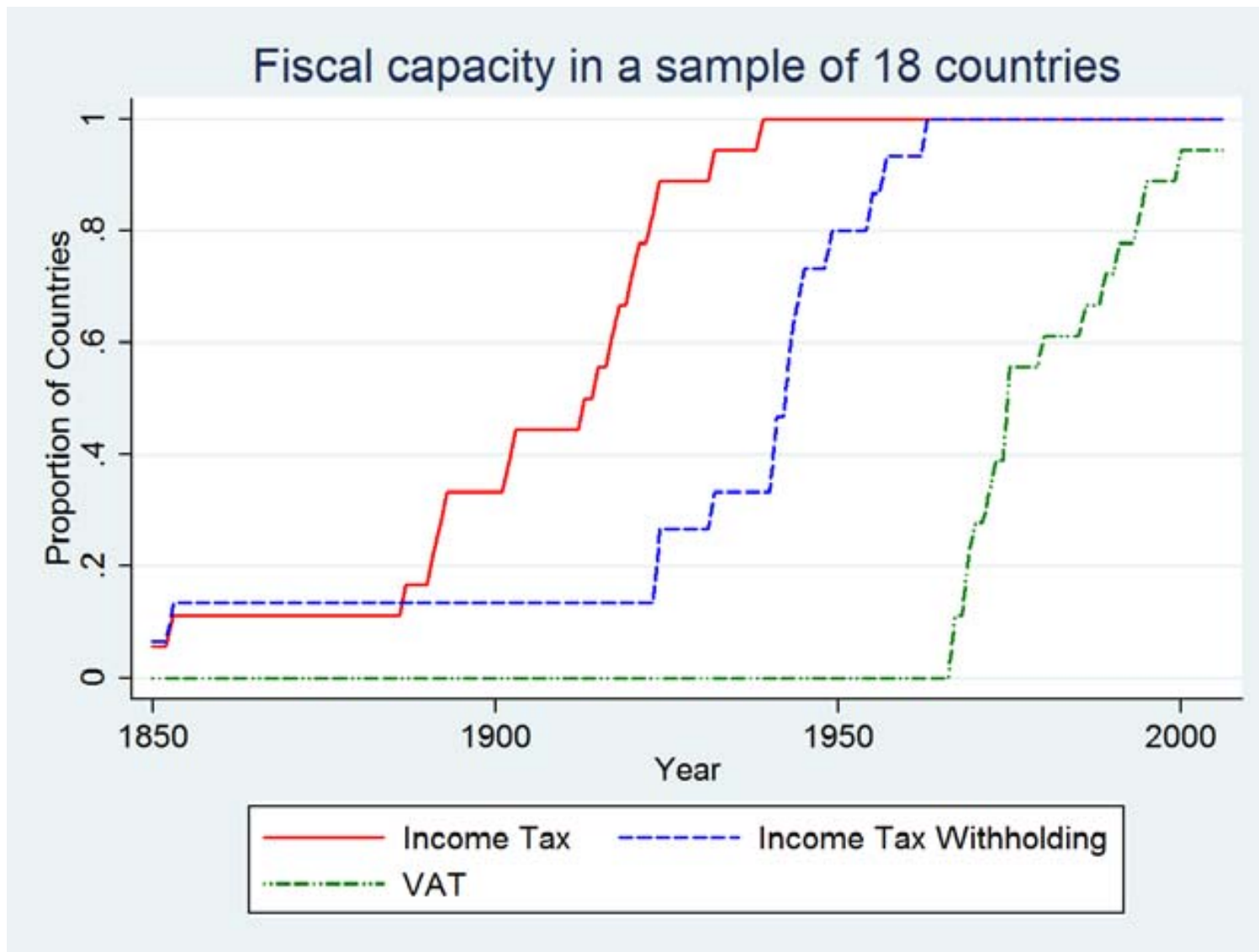
- Three forms of progressive taxes: progressive income taxes, progressive inheritance taxes, progressive estate taxes
- Before WW1: no or very limited progressive taxation
- Very high top marginal tax rates = a US invention in the late 1910s-1920s. Two motivations:
 - Confiscate excess profits from war (so as to discourage warmongering)
 - But also fear of becoming as unequal as Europe (Fisher, 1919)

Top marginal income tax rates, 1900-2013



The invention of the VAT

- Invented by French civil servant Maurice Lauré in the 1950s
- Introduced in France in 1954, then Denmark (1967), Germany (1968), Sweden (1969)...
- About 160 countries in total today have a VAT (exceptions: USA, Iraq, Saudi Arabia, Syria, etc.)
- Key property: firms can offset VAT on their purchases against liability on their sales → paper trail → low evasion

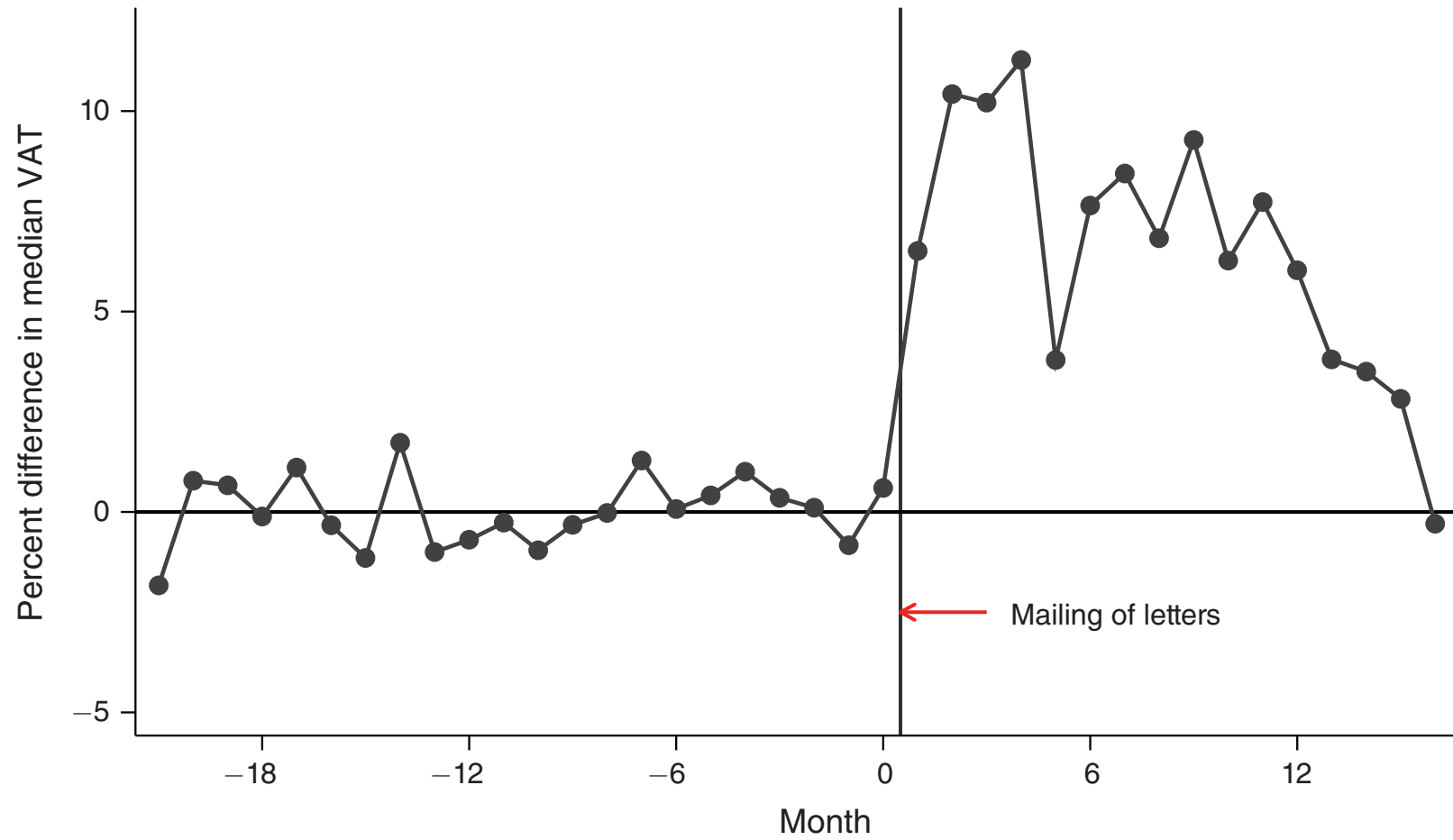


Source: Besley and Persson (2013)

Self-enforcing nature of VAT: Pomeranz (AER 2015)

- Randomized experiment with 445,000 firms in Chile: threat of VAT audit letters sent to sub-sample of businesses
- Significant effect of letters on VAT collection
- Smaller impact on reported transactions that already have a paper trail (intermediate sales) than on those that don't (final sales)
- Effect of random audit announcement is transmitted up the VAT chain, increasing compliance by firms' suppliers

Panel A. Deterrence versus control (median)



Source: Pomeranz (2015)

TABLE 4—LETTER MESSAGE EXPERIMENT: INTENT-TO-TREAT EFFECTS ON VAT PAYMENTS BY TYPE OF LETTER

	Mean VAT (1)	Median VAT (2)	Percent VAT > previous year (3)	Percent VAT > predicted (4)	Percent VAT > zero (5)
Deterrence letter × post	−1,114 (2,804)	1,326*** (316)	1.40*** (0.12)	1.42*** (0.10)	0.53*** (0.09)
Tax morale letter × post	−1,840 (6,082)	262 (666)	0.40 (0.25)	0.30 (0.22)	0.44** (0.20)
Placebo letter × post	835 (6,243)	383 (687)	−0.11 (0.26)	−0.19 (0.23)	−0.14 (0.20)
Constant	268,810*** (1,799)	17,518*** (112)	47.50*** (0.07)	48.27*** (0.07)	67.30*** (0.06)
Month fixed effects	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	No	Yes	Yes	Yes
Treatment assignment	No	Yes	No	No	No
Observations	7,892,076	1,221,828	7,892,076	7,892,076	7,892,076
Number of firms	445,734	445,734	445,734	445,734	445,734
Adjusted R^2	0.40		0.14	0.28	0.47

Notes: Column 1 shows a regression of the mean declared VAT on treatment dummies, winsorized at the top and bottom 0.1 percent to deal with extreme outliers. Column 2 shows a median regression of average VAT before treatment and in four months after each treatment wave. Columns 3–5 show linear probability regressions of the probability of an increase in declared VAT compared to the same month in the previous year, the probability of declaring more than predicted and the probability of declaring any positive amount. Observations are monthly in columns 1 and 3–5 for ten months prior to treatment and four months after each wave of mailing. The four months after the second wave excludes firms treated in the first. Coefficients and standard errors of the linear probability regressions are multiplied by 100 to express effects in percent. Monetary amounts are in Chilean pesos, with 500 Chilean pesos approximately equivalent to \$1. Standard errors in parentheses, robust and clustered at the firm level for columns 1 and 3–5.

TABLE 6—INTERACTION OF FIRM SIZE AND SHARE OF SALES TO FINAL CONSUMERS

	Percent VAT > previous year				
	(1)	(2)	(3)	(4)	(5)
<i>Panel A</i>					
Deterrence letter × final sales share	1.61*** (0.26)			1.48*** (0.27)	1.43*** (0.26)
Deterrence letter × size category		-0.17*** (0.04)		-0.10*** (0.04)	
Deterrence letter × log employees			-0.45*** (0.11)		-0.29** (0.12)
Deterrence letter	0.68*** (0.16)	2.63*** (0.29)	1.66*** (0.13)	1.49*** (0.35)	0.92*** (0.19)
Constant	47.53*** (0.08)	48.87*** (0.08)	47.50*** (0.08)	48.89*** (0.08)	47.53*** (0.08)
Final sales share × post	Yes	No	No	Yes	Yes
Size measure × post	No	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes
Month dummies	Yes	Yes	Yes	Yes	Yes
Observations	7,308,631	7,116,590	7,340,994	7,084,823	7,308,631
Number of firms	406,834	396,135	408,636	394,367	406,834
Adjusted R^2	0.14	0.14	0.14	0.14	0.14

Source: Pomeranz (2015)

TABLE 7—SPILLOVER EFFECTS ON TRADING PARTNERS' VAT PAYMENTS

	Percent VAT > previous year (1)	Percent VAT > predicted (2)	Percent VAT > previous year (3)	Percent VAT > predicted (4)	Percent VAT > previous year (5)	Percent VAT > predicted (6)
Audit announcement × post	2.41** (1.14)	2.03* (1.11)				
Audit announcement × supplier × post			4.28*** (1.54)	3.92*** (1.50)	4.14*** (1.52)	3.83*** (1.52)
Audit announcement × client × post			-0.26 (1.64)	-0.28 (1.51)	-0.14 (1.67)	-0.28 (1.55)
Supplier × post			-0.64 (1.62)	0.34 (1.59)	-1.11 (1.67)	0.60 (1.64)
Constant	52.07*** (0.95)	49.06*** (0.94)	52.07*** (0.95)	49.06*** (0.94)	52.75*** (0.96)	50.11*** (0.96)
Controls × post	No	No	No	No	Yes	Yes
Controls × audit announcement × post	No	No	No	No	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	45,264	45,264	45,264	45,264	44,288	44,288
Number of firms	2,829	2,829	2,829	2,829	2,768	2,768
Adjusted R^2	0.05	0.11	0.05	0.11	0.05	0.10

Notes: Regressions for trading partners of audited firms. Columns 1, 3, and 5 show the probability of an increase in declared VAT since the previous year, columns 2, 4, and 6 show the probability of declaring more than predicted. The controls in columns 5 and 6 are firm sales, sales/input-ratio, share of sales going to final consumers, and industry categorized as “hard-to-monitor.” Observations are monthly for ten months prior to treatment and six months after the audit announcements were mailed. Coefficients and standard errors are multiplied by 100 to express effects in percent. Robust standard errors in parentheses, clustered at the level of the audited firm.

Why does third-party reporting work?

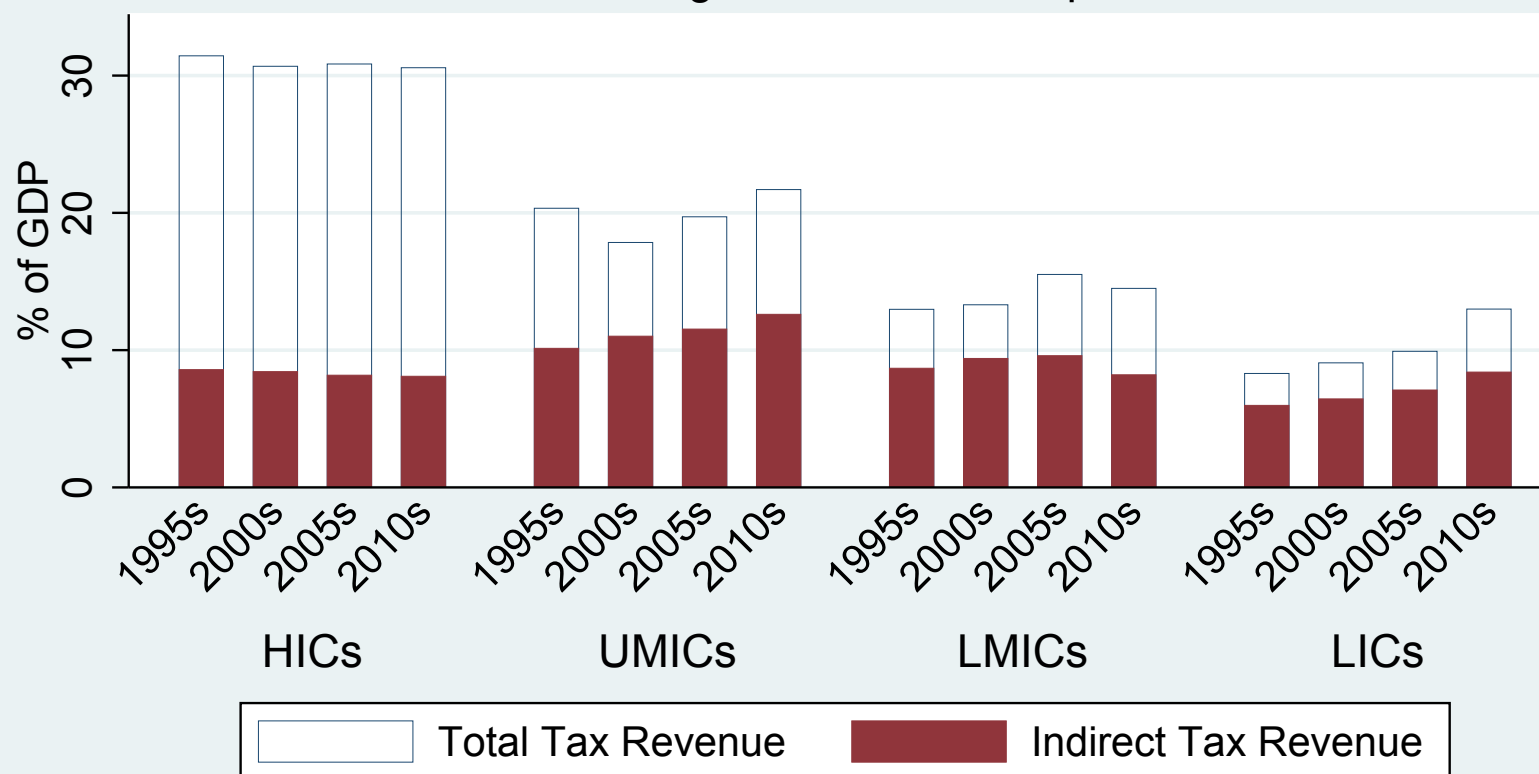
- In theory, employer and employee could collude to evade taxes
- In practice, such collusion is fragile in modern companies because
 - Accounting and payroll records are widely used within the firm
 - Whistleblowing: a single employee can denounce collusion between employer and employees.
- Kleven, Kreiner & Saez (2016): taxes can be enforced even with low penalties and low audit rates

2 The structure of taxation in developing countries

- Tax/GDP ratio has slightly increased in recent decades, consistent with “optimistic view” of evolution of tax capacity
 - Two important qualifiers:
 - Substantial heterogeneity across countries
 - Increase in tax/GDP ratios mostly driven by rise in consumption taxes, not (progressive) income taxation
- does not seem to have substantially mitigated rise of pre-tax-and-transfer inequality

Trends in Weighted Indirect versus Total Tax Revenue

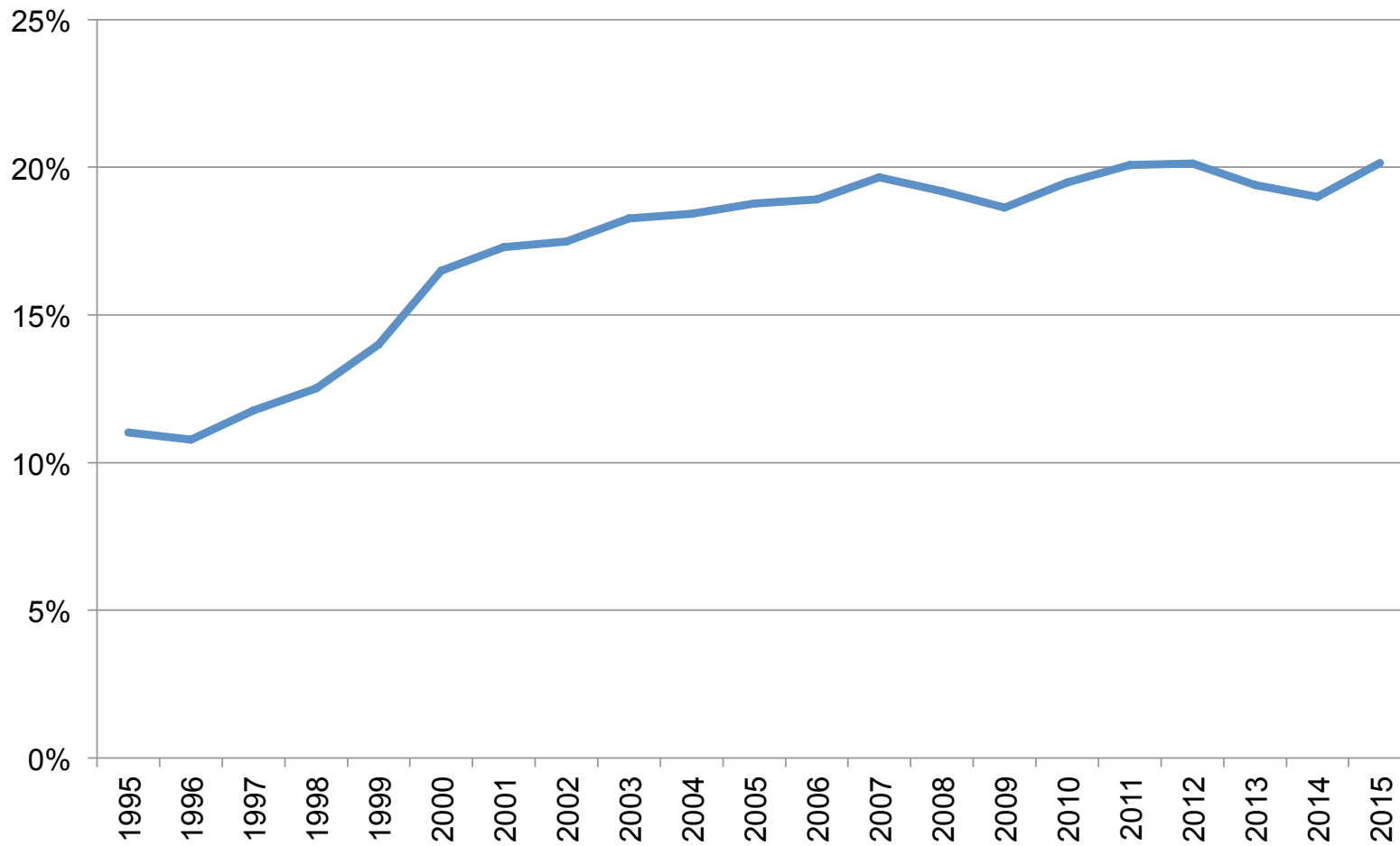
ICTD Half Decade Weighted Central Sample from 1995-2013



Sample contains an avg 115 obs per year. It excludes countries with missing observations for a full half decade in indirect and total tax revenue between 1995-2013; countries who are resource rich; and countries who have low populations. Total tax rev includes social contributions, not resource rev. Observations are aweighted by population.

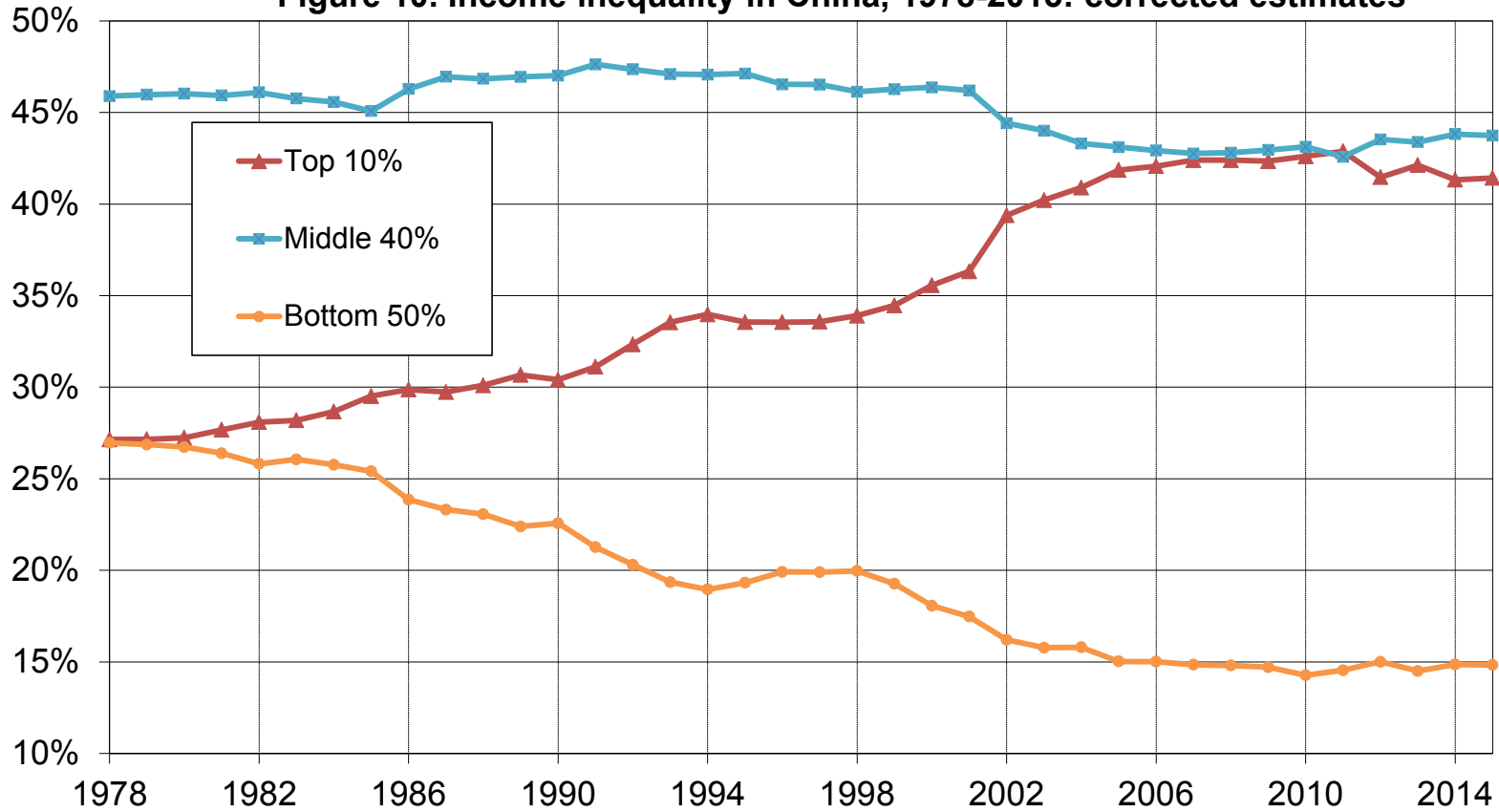
Indirect: Sum of taxes on G&S, trade, and other taxes (without resource revenue).

Government tax revenue in China (% of national income)



Source: Piketty, Yang, Zucman (2017)

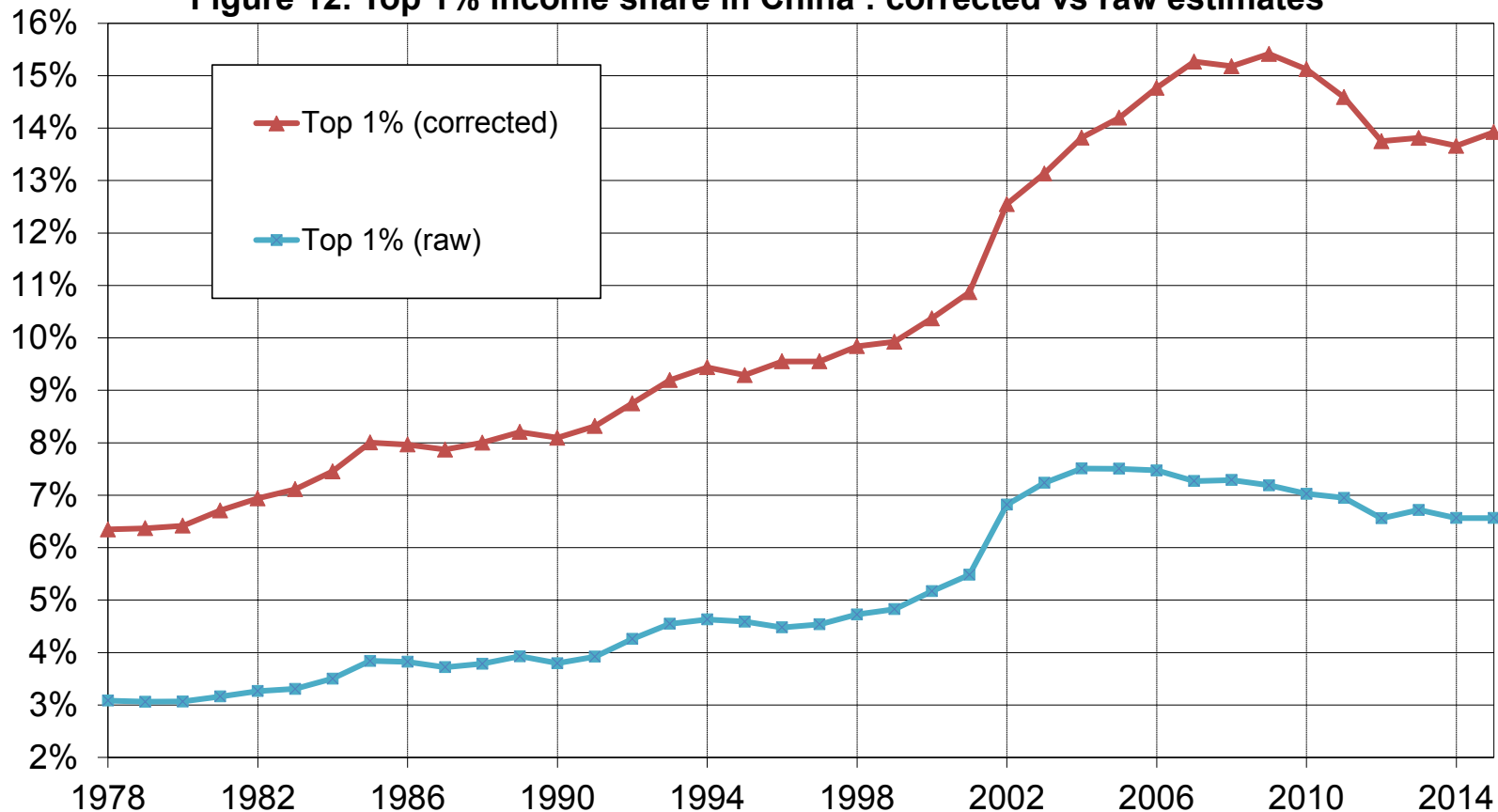
Figure 10. Income inequality in China, 1978-2015: corrected estimates



Distribution of pretax national income (before taxes and transfers, except pensions and unempl. insurance) among adults.
 Corrected estimates (combining survey, fiscal, wealth and national accounts data).
 Equal-split-adults series (income of married couples divided by two).

Source: Piketty, Yang, Zucman (2017)

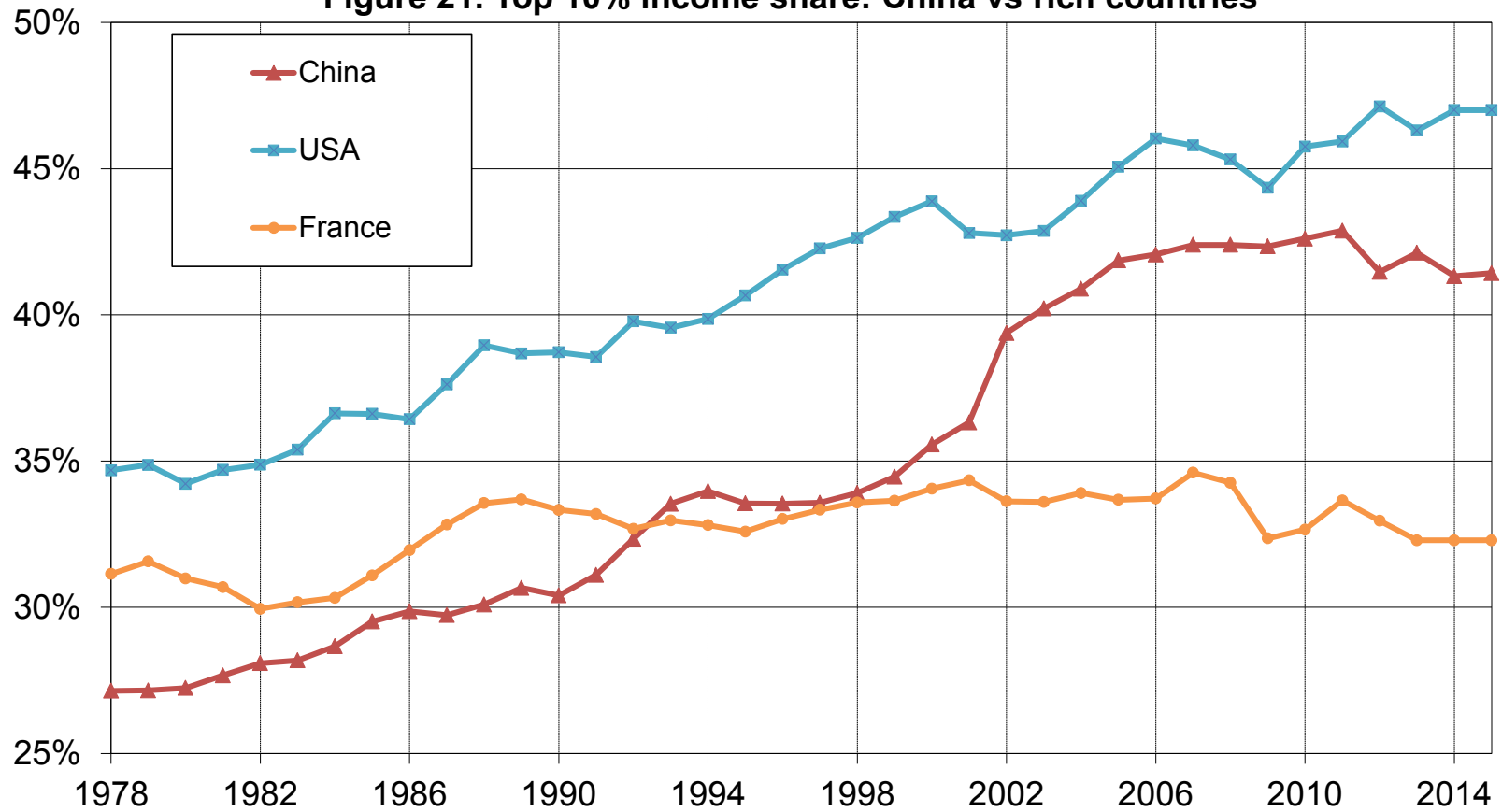
Figure 12. Top 1% income share in China : corrected vs raw estimates



Distribution of pretax national income (before taxes and transfers, except pensions and unempl. insurance) among adults. Corrected estimates combine survey, fiscal, wealth and national accounts data. Raw estimates rely only on self-reported survey data. Equal-split-adults series (income of married couples divided by two).

Source: Piketty, Yang, Zucman (2017)

Figure 21. Top 10% income share: China vs rich countries



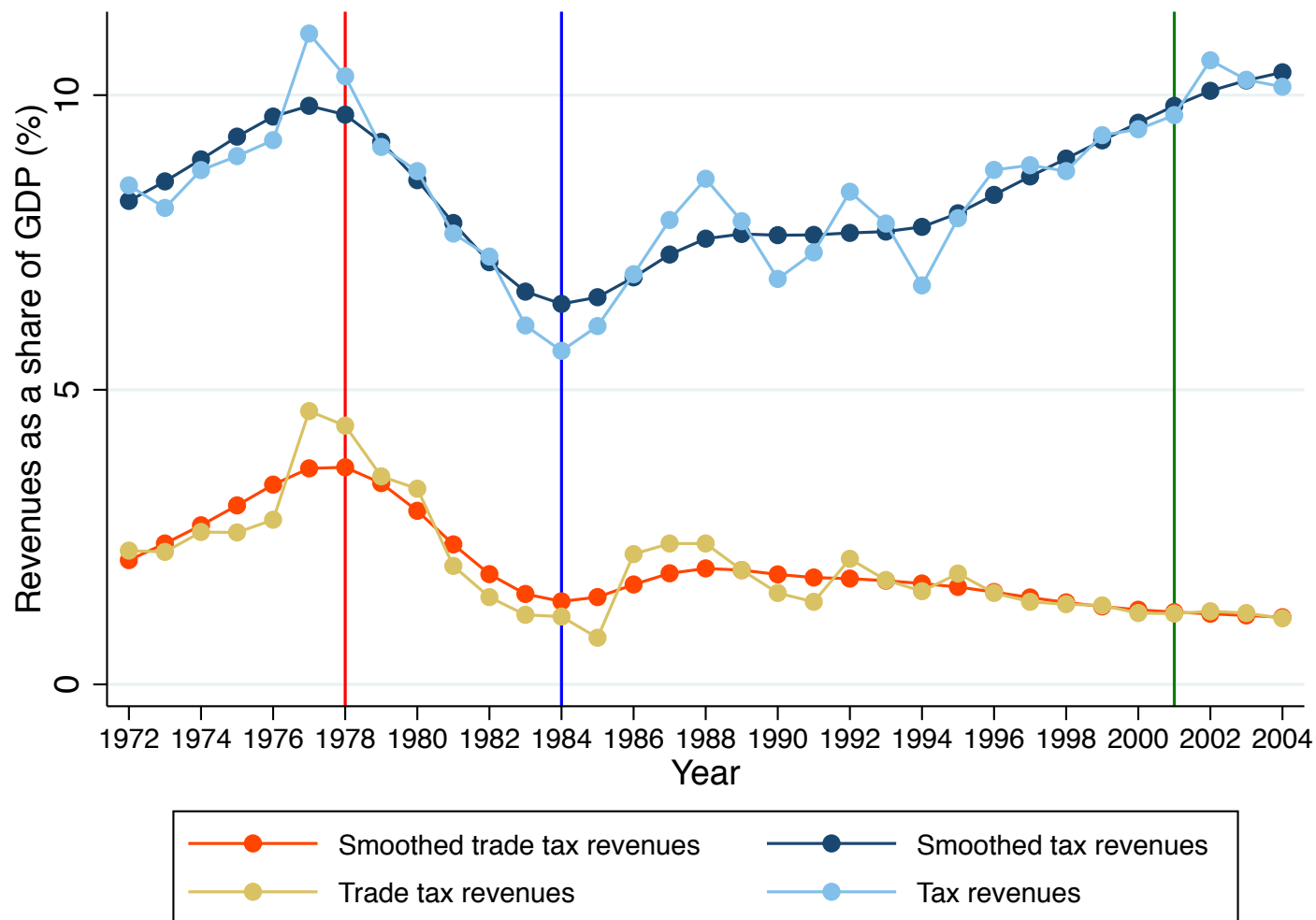
Distribution of pretax national income (before taxes and transfers, except pensions and unempl. insurance) among adults.
 Corrected estimates (combining survey, fiscal, wealth and national accounts data).
 Equal-split-adults series (income of married couples divided by two).

Source: Piketty, Yang, Zucman (2017)

Vanishing trade revenue: Cage and Gadenne (2016)

- Analyze 140 episodes of trade liberalization (during which trade taxes fall by more than 3% GDP) since 1970s
 - Leads to larger and longer-lived decreases in total tax revenues than in rich countries in the 19th and early 20th centuries.
 - Half the developing countries experience a fall in total tax revenues that lasts more than ten years after an episode
- fiscal cost of trade liberalization = decreases in trade tax revenues negatively affect governments' capacity to provide public services

Figure 2: Definition of trade liberalization episodes and fiscal recovery: example of Guatemala



Notes: The figure illustrates our method for constructing episodes of trade liberalization and the fiscal recovery variable. The vertical red line shows the start of the episode, the blue line its end and the green line the year of recovery. See the text for a description of the dataset used.

3 Tax base elasticities and investment in tax capacity

Why do developing countries rely so much on indirect taxes?

- Standard economic explanation: high elasticity of taxable income due to informality (Gordon and Li, 2009)
- Making the tax base less elastic requires investment in tax capacity (auditing, record-keeping, legal framework, etc.)
- Which begs the question: Why do some countries invest more or less in tax capacity?

Tax base elasticity in developing countries

- Developing countries often rely on sub-optimal forms of taxation (e.g., taxes on turnover instead of profits)
- Hard to understand with standard models
- But makes sense if large behavioral responses to standard taxes → growing literature documenting such responses
- E.g., Kleven and Waseem (QJE 2013), Best et al. (JPE 2016), Carillo et al. (AEJ 2017), Bachas and Soto (2016)

GDP per capita	Tax Revenue (% of GDP)	Income Taxes (% of Revenue)	Corporate Income Tax (% of income taxes)	Consumption and Production Taxes (% of Revenue)	Border Taxes (% of Revenue)	Inflation Rate	Seignorage Income (% of Revenue)	Informal Economy (% of GDP)
< \$745	14.1	35.9	53.7	43.5	16.4	10.6	21.8	26.4
\$746-2,975	16.7	31.5	49.1	51.8	9.3	15.7	24.9	29.5
\$2,976-9,205	20.2	29.4	30.3	53.1	5.4	7.4	6.0	32.5
All developing	17.6	31.2	42.3	51.2	8.6	11.8	16.3	30.1
> \$9,206	25.0	54.3	17.8	32.9	0.7	2.2	1.7	14.0

Revenue is lower

Share of income tax is lower

Shares of corporate income tax, consumption taxes, border taxes and seignorage are higher

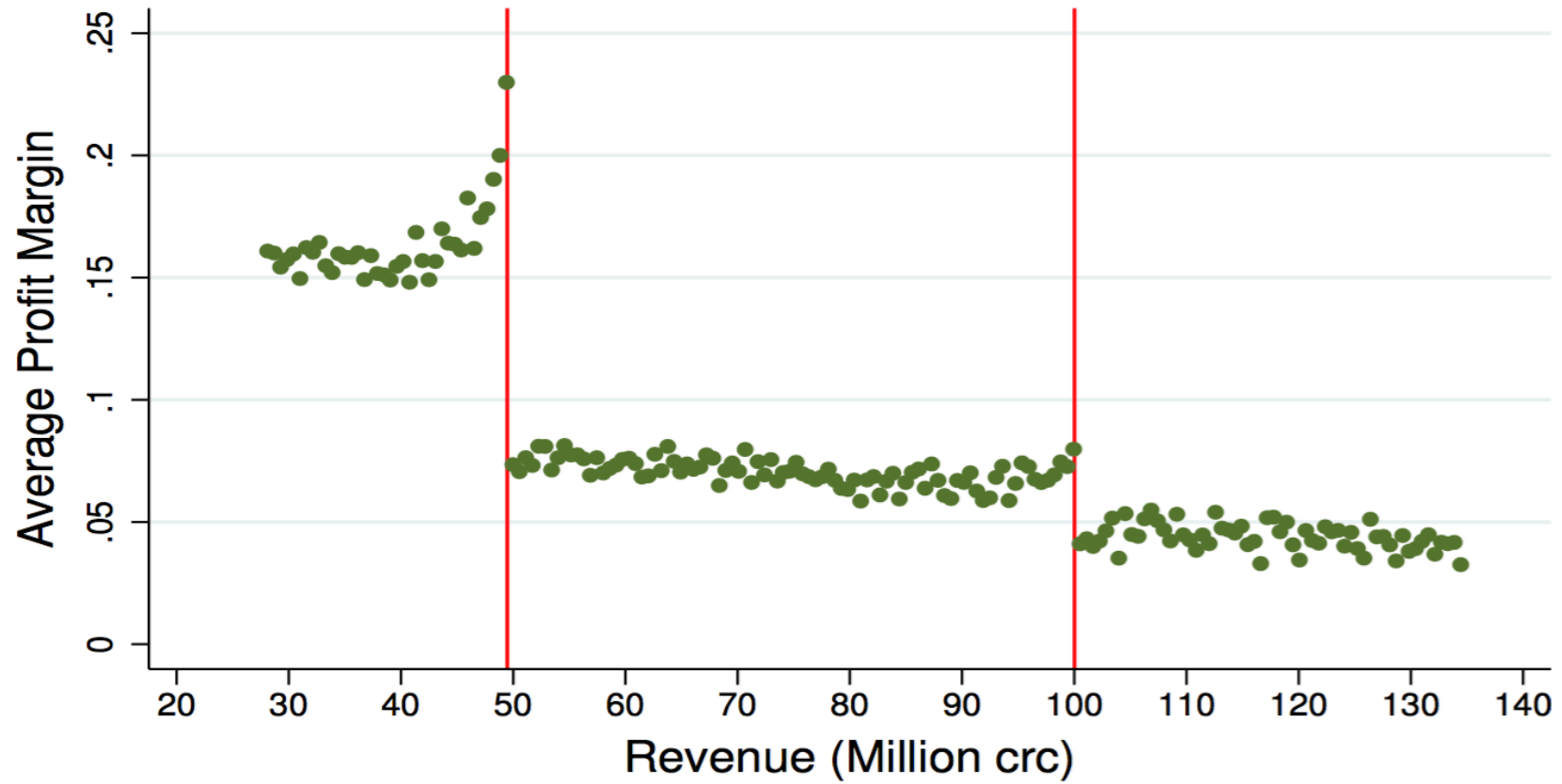
Informal economy is larger

Source: Gordon and Li (2009)

The elasticity of corporate profits: Bachas & Soto (2016)

- Use notch in tax schedule to estimate elasticity of reported profits in Costa Rica (see also Kleven and Waseem 2013)
- Very high elasticity (in between 3 and 5), an order of magnitude greater than in OECD countries
- Elasticity entirely driven by evasion → Costa Rican firms evade taxes on 70% of their profits when faced with a 30% rate
- Evasion in turn largely driven by cost-deductibility → provides support for taxing turnover (see also Best et al. 2016 in Pakistan)

Panel B: Profit Margin



Source: Bachas and Soto (2016)

Investment in fiscal capacity

- Tax base elasticities are not exogenous
- Besley & Perrson (2011, 2013): model of inv. in tax capacity
- Investments in State capacity depend on structural factors, e.g.,:
 - Rises with risk of external conflict (higher expected value of public goods)
 - Falls with degree of resource dependence
 - Rises with degree of political stability

References

Bachas, Pierre and Mauricio Soto, “Not(ch) Your Average Tax System: Corporate Taxation Under Weak Enforcement”, 2016

Besley, Tim and Torsten Persson, “State capacity, conflict, and development”, *Econometrica* 2010

Besley, Timothy and Torsten Persson, “Taxation and Development,” in Martin Feldstein, Alan J. Auerbach, Raj Chetty and Emmanuel Saez, eds., Handbook of public economics, vol. 5, 2013 (web)

Best Michael, Anne Brockmeyer, Henrik Jacobsen Kleven, Johannes Spinnewijn, and Mazhar Waseem, “Production vs Revenue Efficiency With Limited Tax Capacity: Theory and Evidence From Pakistan”, *JPE* 2016

Cage, Julia and Lucie Gadenne, “The fiscal cost of trade liberalization”, working paper 2016

Carillo, Paul, Dina Pomeranz, and Monica Singhal, “Dodging the taxman”, *American Economic Journal*, 2017

Gordon, Roger and Wei Li, “Tax structures in developing countries: Many puzzles and a possible explanation”, *Journal of Public Economics* 2009

Kleven, Henrik and Mazhar Waseem, “Using Notches to Uncover Optimization Frictions and Structural Elasticities: Theory and Evidence from Pakistan”, *Quarterly Journal of Economics*, 2013 (web)

Kleven, Henrik, Claus Kreiner, and Emmanuel Saez “Why Can Modern Governments Tax So Much? An Agency Model of Firms as Fiscal Intermediaries”, *Economica*, 2016 (web)

Pomeranz, Dina “No Taxation without Information”, *American Economic Review* 2015

Piketty, Thomas, Li Yang and Gabriel Zucman, “Capital Accumulation, Private Property, and Inequality in China 1978-2015”, NBER working paper 2017

Scheidel, Walter *The Great Levelling*, 2017

Scheve Kenneth & D. Stasavage, “Democracy, War, and Wealth: Lessons from Two Centuries of Inheritance Taxation”, *American Political Science Review*, 2012 (web)

Scheve Kenneth, and David Stasavage, “Taxing the Rich : A History of Fiscal Fairness in the United States and Europe”, Princeton University Press, 2016