Top Incomes in the Long Run of History

by Anthony B. Atkinson, Thomas Piketty, and Emmanuel Saez
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I. Summary

This paper overviews the litereature on the distribution of top income and inequality over the long run using income tax statistics.
Started by Piketty (2001, 2003), the series of studies have constructed top income share series over the long run for more than twenty countries.
The data used is *income tax data*, which allow us to explore the dynamics for a longer period than the household survey does.
This paper discusses the estimation methods and issues (e.g. income definition and comparability over time and across countries, and tax avoidance and evasion).
Besides, it provides the key empirical findings on the pattern of top income share dynamics, such as a dramatic decline in top income share in the first half of the 20th century and heterogeneous increasing pattern of the shares across countries.
Furthermore, it discusses the theoretical and empirical models proposed to explain the empirical facts.

II. Motivation

The share of income of top income groups has gone up substantially in the past several decades in many countries including the US: Figure 1, 2, and 3 (pp. 6, 7, 8)

II.I. Why Do the Increases in Top Income Shares Matter?

We consider three economic reasons:

1. Their impact on overall growth and resources
2. Their impact on overall inequality

3. Their global significance

1. Impact on Overall Growth and Resources

- The textbook definition fo income by economists: "command over resources"
  - $\rightarrow$ Does the rich make a difference to the overall control of resources?
    1. In the US, the top 1 percent captures more than a fifth of total income in 2007
    2. The surge in top income groups' shares has a significant impact on measured economic growth in the US: Table 1
       - Domestically and internationally, they do matter

2. Impact on Overall Inequality

- Remeber a Lorenz curve and the Gini coefficient
  - the overall Gini coefficient can be approximated by $S^* + (1 - S^*)G$
    - S^*: income share of a top group
    - G: the Gini coefficient for the population excluding the top group
    - $\rightarrow$ the increases in top incoem shares raise the total Gini coefficient

3. Top Incomes in a Global Perspective

- The global Gini coefficient and a fraction of super rich: Figure 4
  - the coefficient has risen gradually throughout the 20th century
  - "Global rich": defined as those with mroe than 20 times the mean world income
    - A fraction of global rich is estimated with the constructed distribution of income amongst world citizens and a Pareto imputation for the top of the distribution
    - Its fraction went down during the first part of the 20c but increased in recent decades
      - The US seems to contribute to half of this increase between 1970 and 1992

When it comes to the design of public policy, it is important to understand the extent of top income shares and the contribution of different factors to the top share evolution

III. Methodology and Limitations

III.I. Methodology

- The recent development of top income share estimation relies on the use of **tax data**

    - Tax authorities in most countries have been publishing tabulations based on income tax returns record: Table 2
- Kuznets (1953) is the pioneering research that employs the tax data to estimate top income shares
- Consider three methodological problems in the estimation of top income shares with the tax data
    - Need of interpolation estimation with the tabulations by ranges
    - Need to relate the number or persons to a control toal to define the number of tax filers for a given fractile
    - Definition of income and need to relate it to an income control toal (the denominator of top income shares)

1. Pareto Interpolation

- When using the tax data in the grouped tabulation form, we need **interpolation**
    - In some cases, the extrapolation (both up/downwards) is used
- The Pareto law for top incomes provides a way of this interpolation:
  $1 - F(y) = (k/y)^{\alpha} \quad (k > 0,\ \alpha > 1),$
    - α: the Pareto parameter
    - The key property of Pareto distributions: $y^*/y = \beta, \quad \beta = \alpha/(\alpha - 1)$
        - (y^*: average income of individuals with income above y
        - β: the inverted pareto coefficient
        - a higher $\beta \Rightarrow$ a larger income shares and higher income inequality
    - Possible to check the validity of Pareto interpolations with large micro data
        - In the US case since 1960, the errors are typically small if the number of brackets is large enough and if the income aounts are also reported

2. Control Total for Population

- Tax unit is different across time and space:
    - individual
    - family
    - adult individuals except married females
- Need to care about a possible *discontinuity* when moving from family-based to individual-based system

3. Control Total for Income

- How to estimate the denominator of the top income share?

1. Estimate with the income tax data and some corrections for those not covered in the data
    - Need of the nonfiler income imputation or the use of existing estimates
2. Use external source, such as the national accounts
    - Need to correct for the nonhousehold elements in the national accounts and for the difference in the income definitions

4. Adjustments for Income Definition

- Income definitions in the tabulations may change over time within a country
    - e.g. shifts from net income (income after deductions) to gross income (income before deductions)
    - e.g. capital gains to creaate the tabulation with and without the gains
        - Micro-data can be used in these cases

Summary of the details in methodology: Table 4

III.II. Possible Limitations

Doubts on the use of tax data by economists

1. Tax data is NOT collected for the use in research
    - $\Rightarrow$ Difficulties for comparisons across countries and across time
2. Tax avoidance and tax evasion exist so that the tax data could be unreliable
3. Simple reliance on the tax data limits the ability to interpret and understand changes
    - No information on the industrial composition of top incomes

Because of these shortcomings, we cannot use it to describe the whole income distribution but still can estimate the upper part

- Why not using household surveys?
    1. HH surveys also have shortcomings
        - e.g. sampling error, differential nonrespnse and incomplete response, measurement error, top coding
    2. HH surveys cannot be traced back to the long time ago (data availability)
        - Impossible to describe the long run dynamics

Comparison of Tax and HH Survey Data in the US

- Table 5 (CPS data and top 1% share)

    - The CPS estimates match the tax data estimates closely for the top 10% excluding top 1%
    - For the top 1%, quanlitatively close but quantatively different
        1. The CPS estimates are consistently lower
        2. The magnitude of the share increase is smaller with the CPS estimates
        3. Almost half of the increase in the CPS estimates is due to changes in measurement methodology
        4. Tax-based estimates may exaggerate the increase owing to the shift in income unit definition
- Table 6 (CPS data and Gini coefficients)

The Definition of Income

- Income definition in the tax data may be different form a *preferred* one
    - The problem should be more serious in a cross-country comparison
        - e.g. transfers, capital gains, corporate tax systems, tax deductions
        - In a single country study, the erosion of capital income from the progressive income tax base may be the most important
            - Share of capital income included in the series has decreased over time
            - $\Rightarrow$ Underestimation of top income shares
            - *One of the main shortcoming of this data set*
        - Treatment of capital gains and losses (Figure 7)

Tax Avoidance and Tax Evasion

- This is the standard objection to the use of income tax data
    - Underreporting of income and different prevalence of tax evasion $\Rightarrow$ difficulties in cross-country comparison
    - Chaning extent of evasion over time $\Rightarrow$ difficulties even in a within-country comparison
- Incentives to underreport one's income *vs* administrative control over tax compliance
    - Both seem to have increased over time $\Rightarrow$ tax evasion may not be that serious for the top income share estimation
    - One way to avoid personal income tax is to keep it in companies
        - Income including capital gains can mitigate the impact of such activities
    - Intertemporal shifting of income
    - Relocation and sending money abroad
        - Some studies suggest that these may be limited

- Overall, they have quantitative effects on the top income share estimates
    - The authors' view is that legally tax-exempt capita income should be more serios

IV. Empirical Findings

- Top 1% share of toal gross income for 22 countries: Figure 8-11
    - Grouping based on proximity of the historical evolution of top income shares as well as of culture and geography
    - Note that capital gains are excluded
- Different evolution of top 1% income share:
    - Figure 8: U-shape curve
    - Figure 9: L-shape curve
    - Figure 10: in between
    - Figure 11: emerging economies
- Comparison of the shares between around 1949 and 2005: Table 6
    - 1949
        - Top 1% share is similar... median value 10% and 20% error
        - Top 0.1% share and β also take similar values
    - 2005
        - Top 1% share: median value is similar to 1949 but more dispersed
        - Top 0.1% share and β: also more varying across countries

IV.I. Before 1949

Top 1 & 0.1% shares for certain key periods: Table 7

1. Top income shares are significantly higher before 1949 compared to 1949
    - Shares got halved b/w 1919 and 1949 in half of the countries
2. Suggestive evidence of upward trends before 1914

IV.II. The Postwar Picture (After 1949)

- Diversion of the top income share paths: Table 8
    - top 1% share $\Rightarrow$ 2% change: 6/17 rose, 5/17 unchanged, and 6/17 fell
    - 2 groups: 6 *flat* countries and 9 *U-shaped* countries
        - *U-shaped*: the size of the initial fall was limited
        - Some countries exhibit the rebound in recent years (e.g. Japan & Singapore)
        - Upward trends in the countries with shorter time coverage

IV.III. Composition of Top Incomes

- What have been driving these trends?
  - A surge in top wage incomes but likely coexistence of top wage earners and capitalists in the US
  - The importance of wage and capital incomes changed over time
    - The former have strengthened its presence in top income share composition for the long run
    - Some countries have experienced a rise in the capital income importance in recent decades

V. Possible Explanations: Theory and Empirics

- In some cases, a single event can explain major changes
- In general, likely multivariate
  - Difficulties in empirical analysis for the causality b/w some factor and top income share
    - e.g. Progressive income taxation
  - Some scholars supplement statistical analysis with historical narrative
  - Some relies on economic theory and simulation models of capital accumulation
    - How to model?

V.I. Modeling Capital Incomes

- One example: the Kuznets iverse-U curve
  - Based on structural change in an economy from agricultural to indistrial
  - Only considers labour income
  - But he himself stressed the importance of *accumulation*
- Stiglitz's models: consider the generation to generation inheritance and accumulation
  - Different forms of inheritance lead to diffrent long run equilibria
  - Pareto distribution of wealth as a steady state distribution

V.II. Modelling Top Earnings

- Skill-biased technological change... seems little explanation for top percentiles
- Earlier studies:
  1. executive remuneration in a hierarchical structure
     - Pareto distribution for top earnings

2. *Superstart* theory: Globalisation and better communication techonlogy raise the rents of those with very high abilities
    - Together with the winner-take-all structure of labour markets
3. Effects of marginal tax rates on the earnings distribution
    - Elasticity of reported earnings w.r.t. net-of-tax rate: $z = z^0(1-t)^e$
        - classifical labour-leisture substitution channel
        - substitution b/w taxable cash compensation with other forms of compensation
        - discouragement of efforts to increase their pay in the corporate board
    - $\Rightarrow$ top income share is proportational to $(1-t_T)^e$
    - $\Rightarrow \log(Top\ Income\ Share) = \alpha + e\log(1-t^T) + \varepsilon$
        - Negative estimates are obtained in empirical studies

V.III. Combining Capital and Earned Income

- Need to incorporate these two income sources to a single model
    - Joint distribution? Need to make assumptions
    - Simple decomposition may be used in Equation (6)
- How to bridge the gap b/w theoretical models and empirical specifications?
    - Authors' view is micro-founded Pareto coefficients formulation should be promissing
    - Yet, data availability is another issue

VI. Possible Explanations: Major Themes

Consider the major explantory factors suggested by the theoretical models and by the individual country studies

VI.I. Politics and Political Economy

War

- World wars are associated with large falls in top income shares in most countries
- How wors caused such falls?
    1. Loss of capital income
        - Directly through physical capital destruction and indirectly through hyperinflation
        - Loss of territory/colonies in some countries
        - In Japanese case, the post-war reforms likely made the one-time income deconcentration persistent

2. Equalisation of earned incomes
    - Through wage control higher employment, for instance

Political Regime Transition

- Across different regimes: democracy, autocracy (dictatorships or millitary rule)
    - No clear relationship b/w political regime change and top income concentration
- Within democracies
    - Political variables may well explain the cross-country variation
        - e.g. liberal welfare state, corporatist-conservative welfare state, and social democratic welfare state
- Political independence (e.g. from colonies): little evidence

VI.II. Macroeconomics and Finacial Crises

- Key question: Distributional consequences of major recession?
    - The depression and the financial crises tends to reduce top income shares but still cross-country heterogeneity exists
- Another interesting point is the relationship b/w factor shares and top income shares

VI.III. Global Forces

- How do common factors across countries affect the evolution of top income shares?
    - e.g. degree of capital market integration and the movements in major commodity prices
    - Some studies show the cross-country correlation of the top income shares
    - Not yet many researches are done

VI.IV. Progressive Taxation

- Creation and development of the progressive income tax: a reason why some coutries do not recover from the large falls in the top income shares?
    - Note that we are talking about *gross* income (before tax)
    - It may prevented re-accumulation after the decline in the wealth concentration
- Yet, some studies show no conclusive evidence of the role of the contemporaneous taxation
    - Timing may matter: Possibly the present capital income reflects a weighted average of past tax rates

VII. Future Direction?

- Despite some serious limitations on the use of tax data, the authors argue that the data can still be used for the distributional analysis
- Top income share estimates are still missing for major countries
- Need combine the tax data with other sources of evidence
  - e.g. wealth inheritance, the long run corporate data (e.g. financial sector)
- World Inequality Database (https://wid.world/)
  - Data on a wider range of countries (and time periods?) are available and constantly updated
- Some critique, e.g. by Heckman (https://medium.com/@ArchbridgeInst/nobel-prize-winning-economist-dr-5550da1df5c3), has been provided
  - Inquality is *exaggerated* with estimates using the tax data?