Universal Basic Income and Endogenous Labor Supply

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Introduction

- A key concern about feasibility of large UBI is impact on labor supply
  - Large UBI $\Rightarrow$ higher tax rates $\Rightarrow$ people work less and GDP falls
- Although this point is often made qualitatively, quantitative analyses of UBI with endogenous labor supply are lacking
  - Existing quantitative analyses tend to focus on gross vs. net costs (e.g., Widerquist 2017) with exogenous labor supply
- Given response of labor supply to tax changes, is it possible to fund a large UBI ?
  - We examine this question in a workhorse optimal taxation model, estimated to fit empirical labor supply estimates and the key features of the U.K. current tax-transfer system and income distribution

James Mirrlees, Whose Tax Model Earned a Nobel, Dies at 82

His research on "Optimum Income Taxation," dating from the late 1960s, was peppered with arcane equations and graphs, but he maintained that much of economics is "in a way quite simple."

The New York Times

Questions for Today

1. Given response of labor supply to tax changes, is it possible to fund a large UBI (considering any incentive-compatible tax system)?
2. Could a large UBI be funded by taxing the highest earners (top 10% or 1%)?
3. Could a large UBI be funded from a "simple" tax system (flat tax)?

Questions for Today

1. Given response of labor supply to tax changes, is it possible to fund a large UBI (considering any incentive-compatible tax system)? **Yes**

2. Could a large UBI be funded by taxing the highest earners (top 10% or 1%)? **No**

3. Could a large UBI be funded from a "simple" tax system (flat tax)? **Yes**

Insights

- In addition to quantitative results, analysis delivers three broader qualitative insights:
  - A large UBI is feasible but it **cannot be funded by top earners alone** $\Rightarrow$ important to build broad-based support
  - Key feature of tax systems that can support a large UBI is that **phase-out rate at the bottom is large**, which reduces work incentives at the bottom $\Rightarrow$ tradeoff between large UBI and encouraging work near bottom
  - A large UBI is feasible; beyond utilitarianism, which **normative principles** make it desirable?

Model and Data

Basics

- Let c be post-tax income, wl pre-tax income, and $T(wl)$ total taxes paid
- A UBI can be interpreted as a lump-sum transfer b
- In a tax system where taxes paid increase with income, *de facto* we get a negative income tax scheme:

$$y = b + wl - T(wl)$$

- Moreover, a negative $T(0)$ can be interpreted as UBI
- In this setting with $T' > 0$, the tax scheme is progressive; only those above some threshold z^* pay more taxes than they receive in transfers, where z^* is defined as

$$z^* = b + z^* - T(z^*)$$

Mirrlees 1971 Setup

- Standard labor supply model: Individual maximizes

$$u(c, l) \text{ s.t. } c = wl - T(wl)$$

where c is consumption, l labor supply, w wage rate, $T(.)$ income tax

- Individuals differ in ability w distributed with density $f(w)$; **ability is not observed**

- Govt maximizes social welfare function:

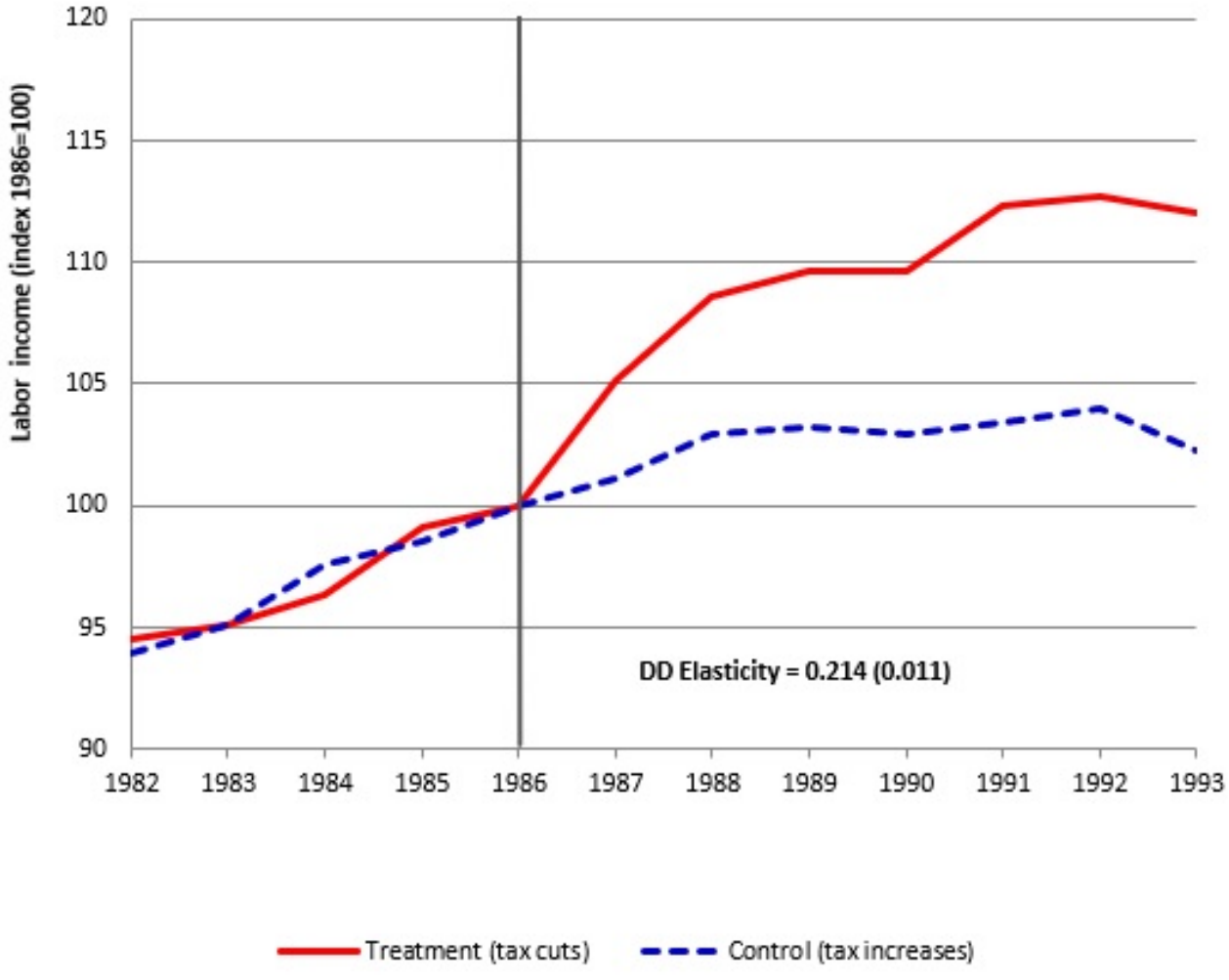
$$\begin{aligned} SWF &= \int G(u(c,l))f(w)dw \\ \text{s.t. resource constraint} &\quad \int T(wl)f(w)dw \geq E \\ \text{and individual FOC} &\quad w(1-T')u_c + u_l = 0 \end{aligned}$$

where $G(.)$ is increasing and concave – governs preferences for redistribution

Data

- How large are labor supply elasticities ?
  - Large literature in labor/public economics: when wage increases by 1%, labor supply increases by 0.3%

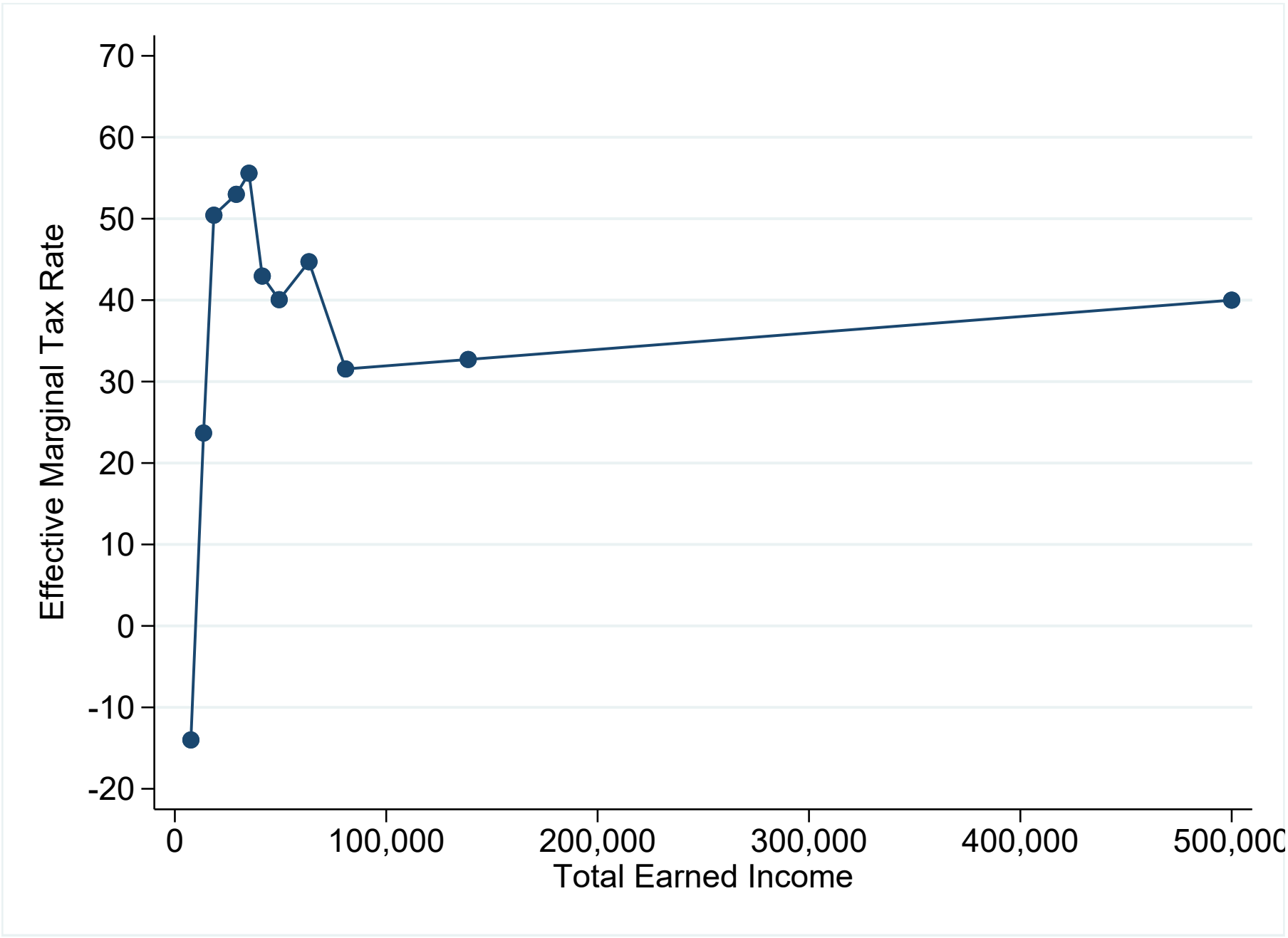
Elasticity of Taxable Income from 1987 Danish Reform: Kleven and Schultz 2014



Data

- What is the existing tax and transfer system in the U.K?
  - Use newly released data from ONS for fiscal year 2017-2018
  - For each household income decile, get comprehensive picture of income, benefits in cash (incl. job seeker allowance, employment allowance, incapacity benefit/support, child benefits, tax credits, housing benefit, disability allowances) and taxes (incl. income tax, employee/employer NI, council tax, VAT)
  - Also get information on total revenue that must be raised for benefits in kind (incl. education, NHS, social care, housing/rail/bus subsidies, school meals)

Observed Tax Schedule

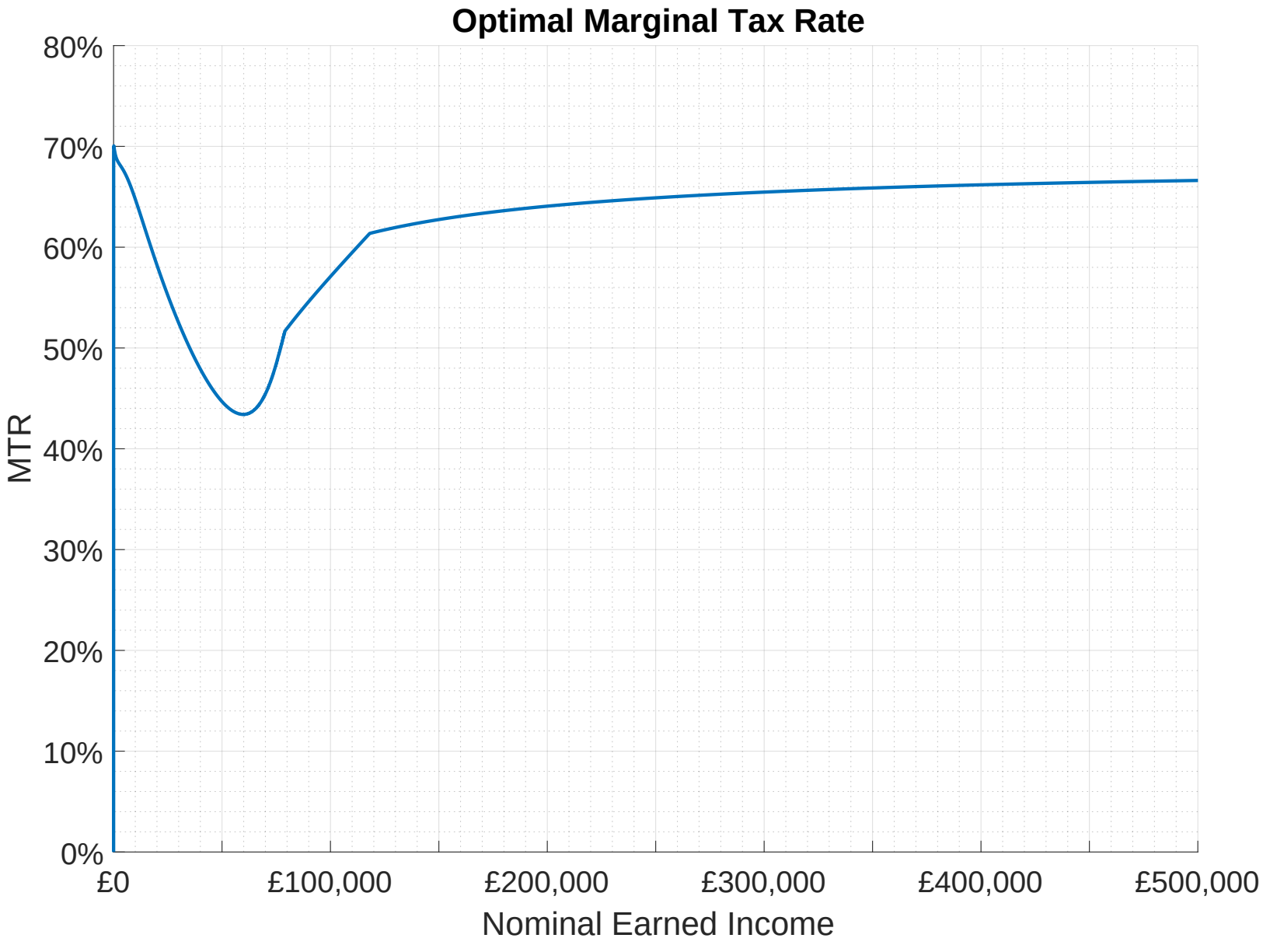


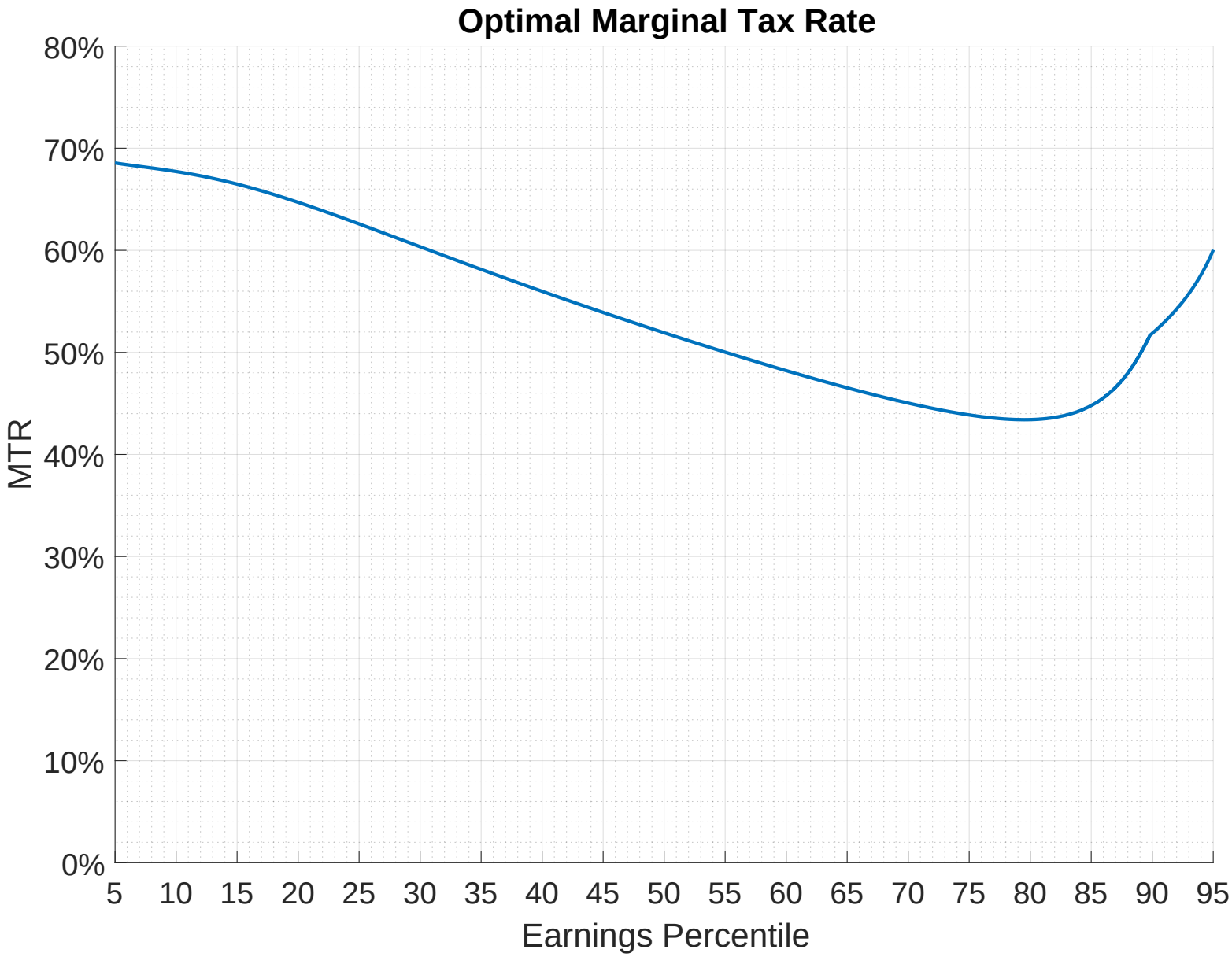
Results

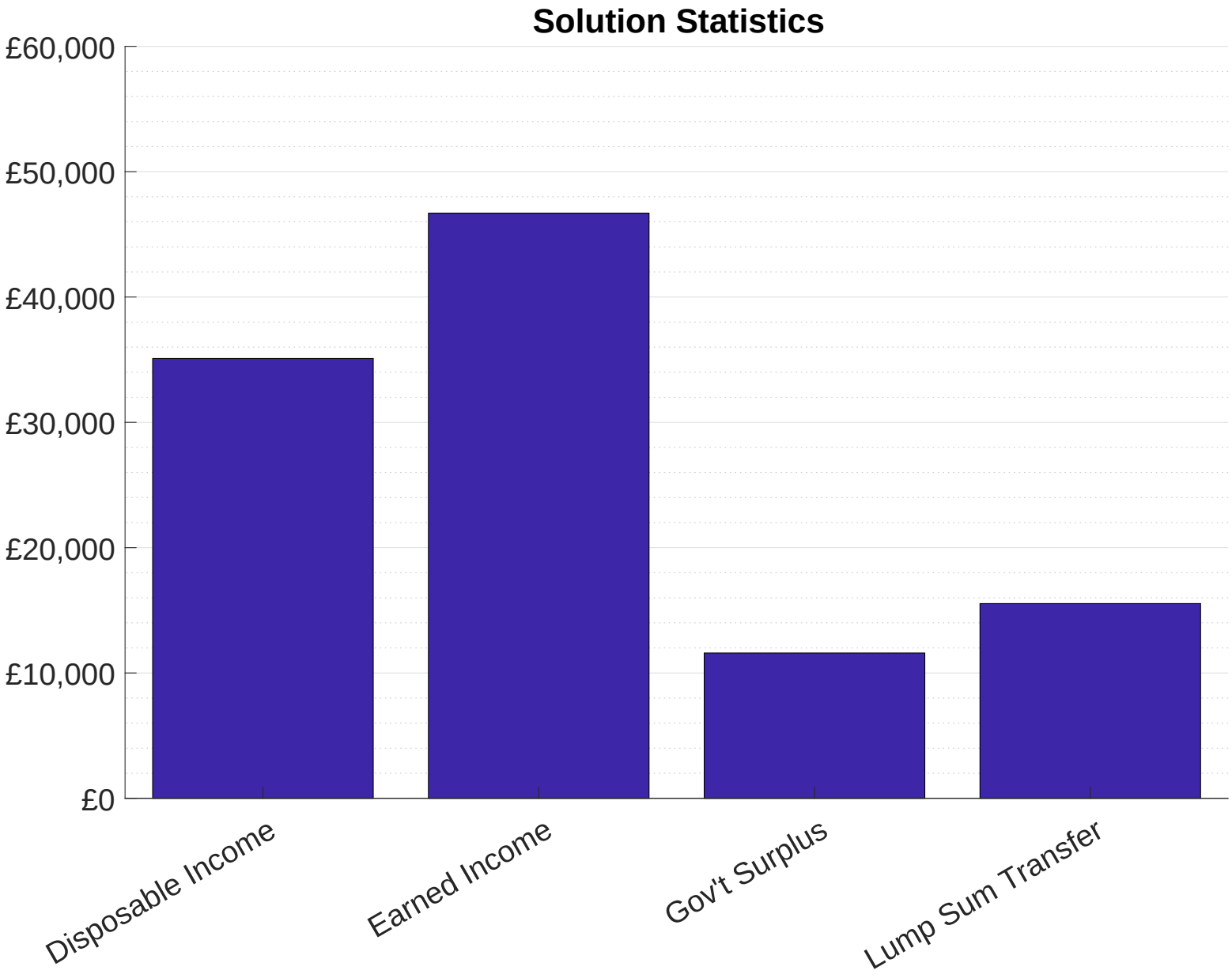
Optimal Tax Schedule and Redistribution

- Start by describing the optimal tax schedule and overall redistribution with standard social preferences for redistribution (log social welfare function)

- Results:
  - Optimal redistribution takes the form of a UBI (i.e., a transfer at zero earned income)
  - The UBI is large
  - Marginal tax rates are also high, including at the bottom of the distribution


Optimal Marginal Tax Rate
80%
70%
60%
50%
40%
30%
20%
10%
0%
MTR
£0
£100,000
£200,000
£300,000
£400,000
£500,000
Nominal Earned Income


Optimal Marginal Tax Rate
80%
70%
60%
50%
40%
30%
20%
10%
0%
MTR
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90
95
Earnings Percentile


Solution Statistics
£60,000
£50,000
£40,000
£30,000
£20,000
£10,000
£0
Disposable Income
Earned Income
Gov't Surplus
Lump Sum Transfer

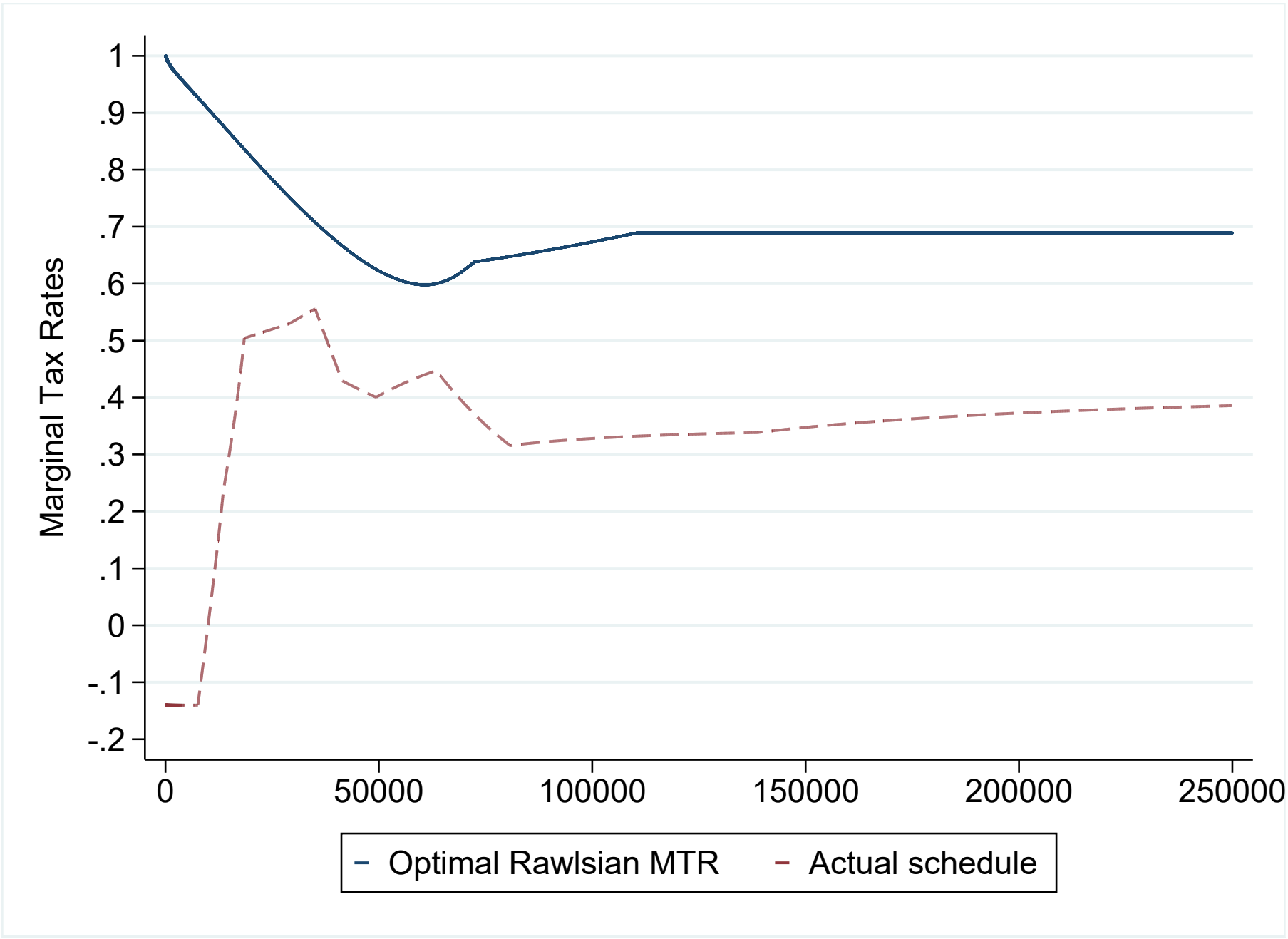
Robustness

- Results are similar with
  - Other preferences for redistribution
  - Other labor supply elasticities
  - Additional features such as innovation dynamics

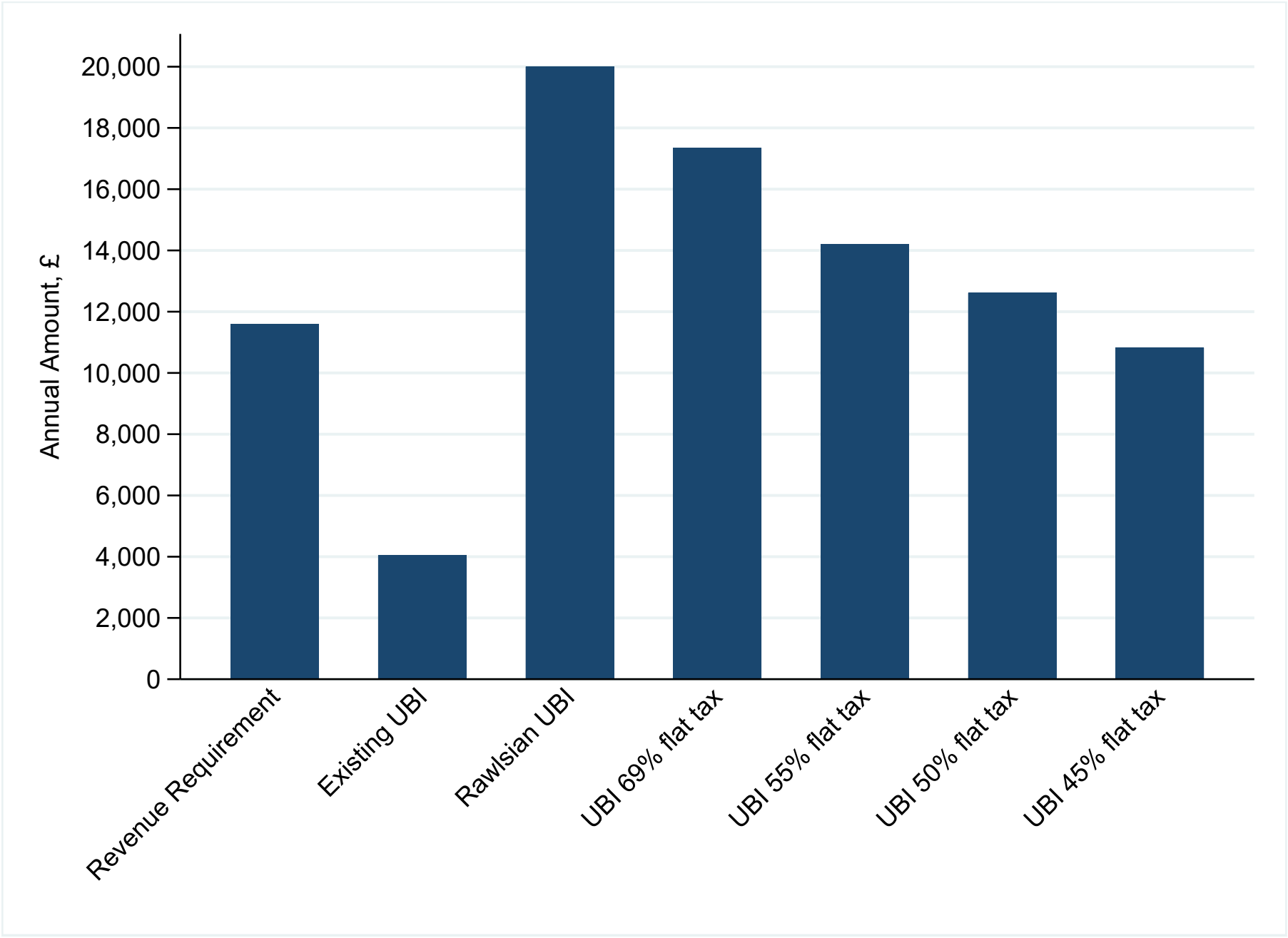
Other Cases: Rawlsian & Flat Tax

- Next, consider variations on the baseline model:
  - Rawlsian preferences: social planner only values redistribution to agent with zero earned income; gives upper bound on feasible UBI
  - Flat taxes: how much can be raised with a flat tax?

Optimal Rawlsian Tax Schedule



UBI Levels

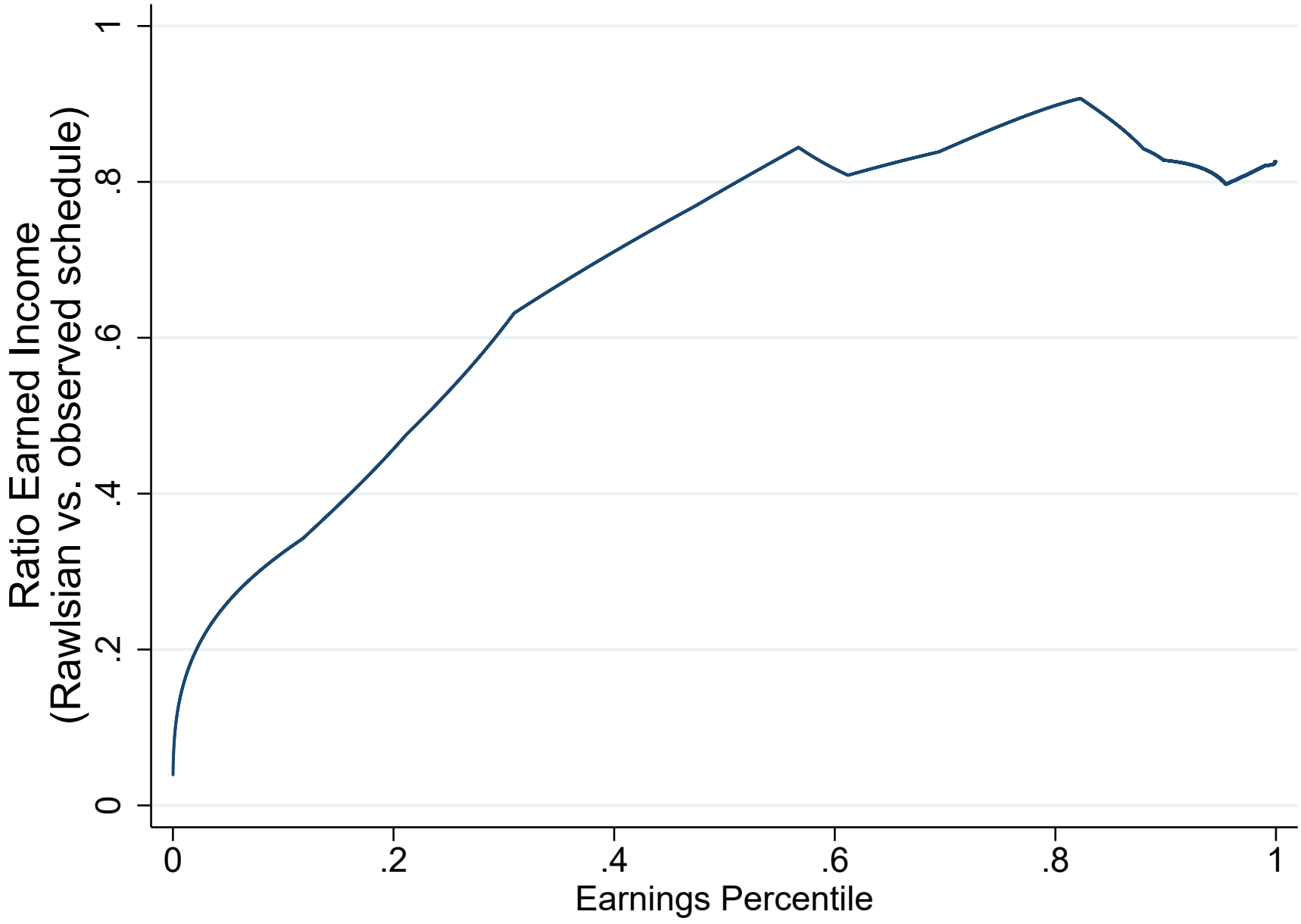

Annual Amount, £
20,000
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
Revenue Requirement
Existing UBI
Rawlsian UBI
UBI 69% flat tax
UBI 55% flat tax
UBI 50% flat tax
UBI 45% flat tax

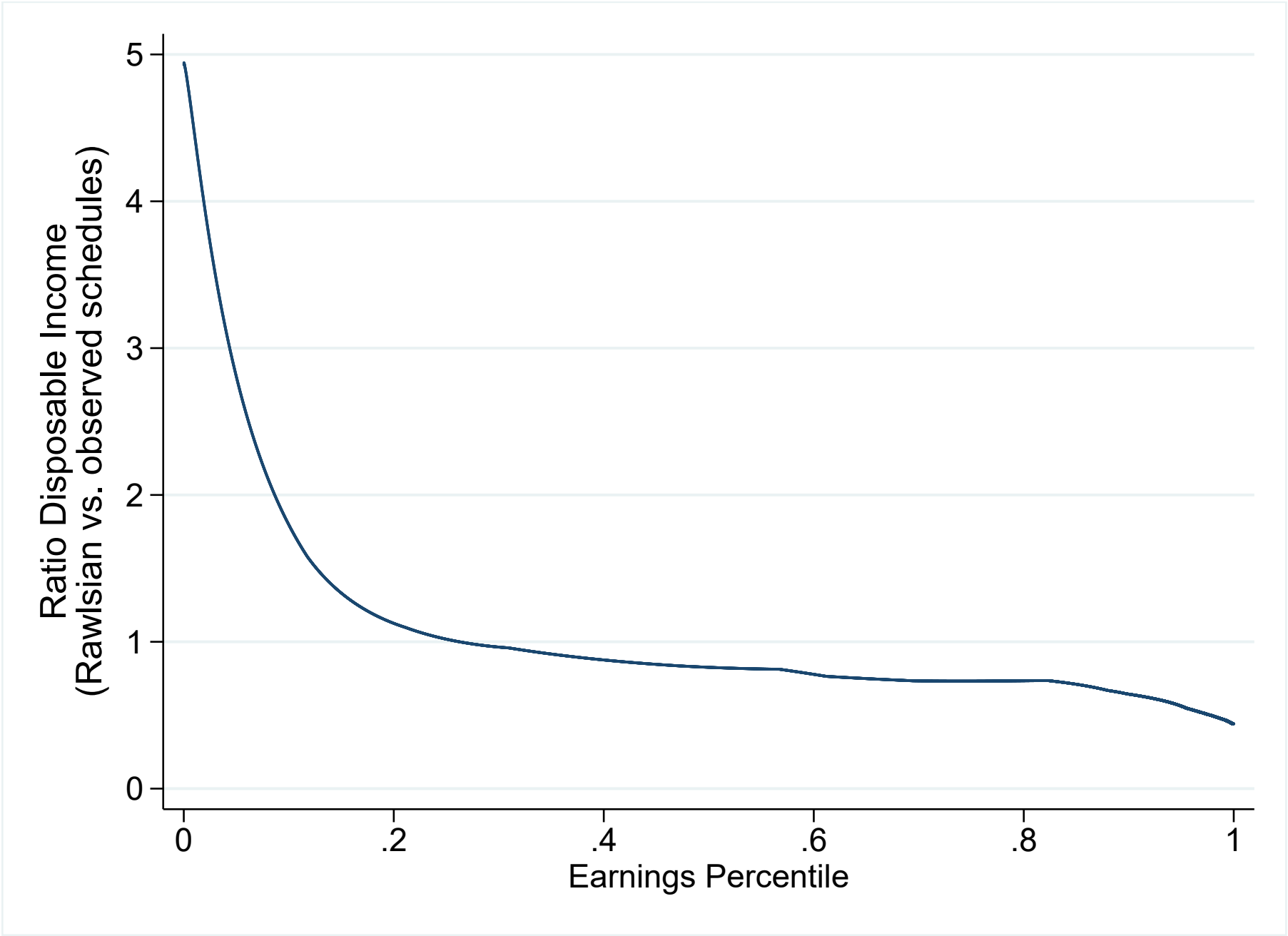
Takeaway

- Given empirical estimates of labor supply responses to tax changes, what level of UBI could be funded ?
  - Find that a UBI of up to £20,000/year could be funded
  - If society wants a large UBI, it can be achieved
  - But this requires strong social preferences for redistribution toward the bottom of the income distribution — is that desirable ?
- Let's zoom in and compare outcomes under existing tax schedule vs. Rawlsian tax schedule

Comparison: Rawlsian vs. Observed

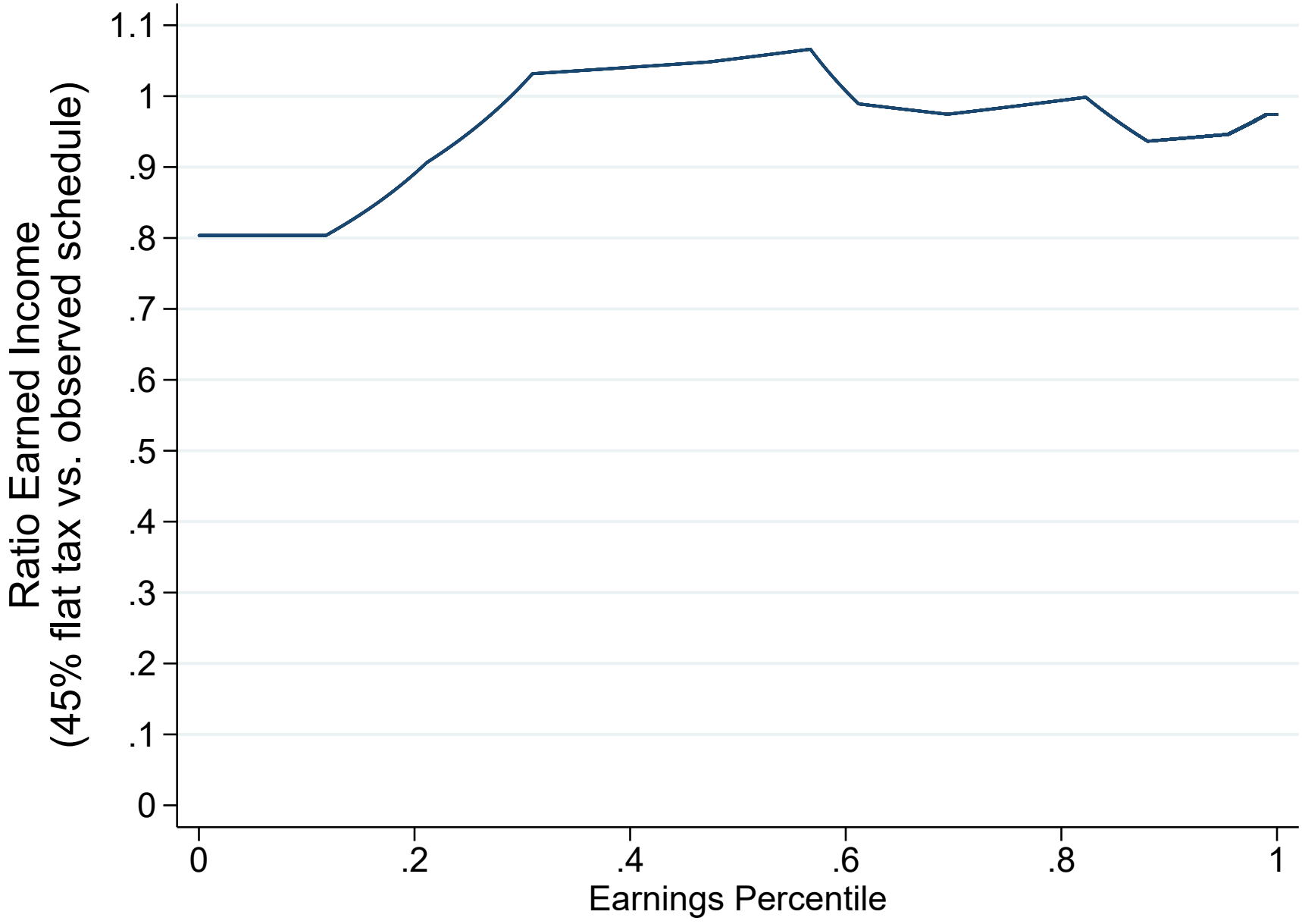
- Earned incomes fall from 51,000 at observed to 41,084 at optimal (-20%)
- Disposable income falls from 39,401 to 29,485 (-26%)
- But person-weighted disposable income increases by 7.31%
  - Which distributional effects drive this?

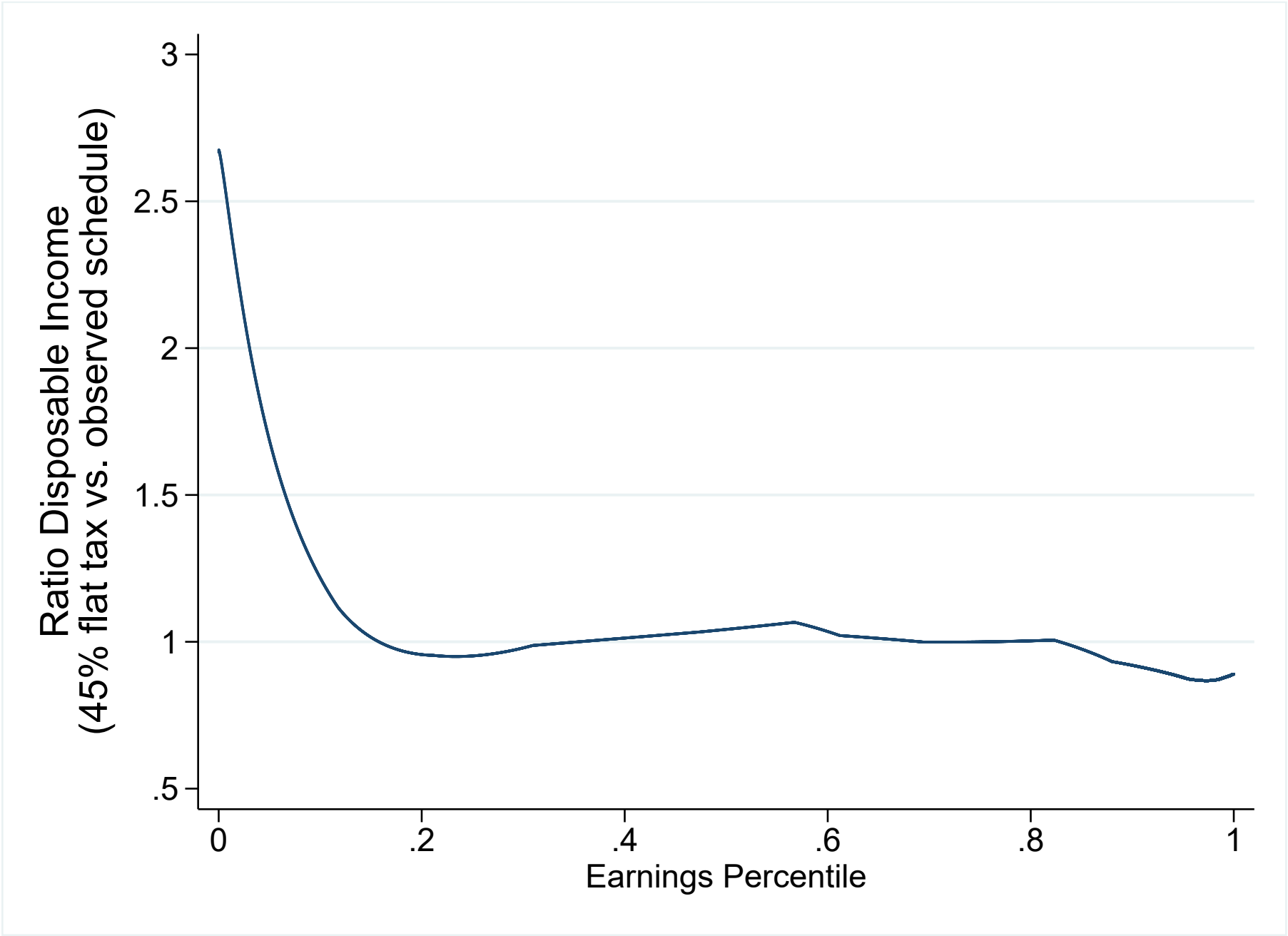

Ratio Earned Income
(Rawlsian vs. observed schedule)
0
.2
.4
.6
.8
1
0
.2
.4
.6
.8
1
Earnings Percentile


Ratio Disposable Income
(Rawlsian vs. observed schedules)
5
4
3
2
1
0
0
.2
.4
.6
.8
1
Earnings Percentile

Comparison: Flat Tax vs. Observed

- Consider equilibrium with flat tax at 45%
- Earned incomes fall from 51,000 at observed to 49,823 at optimal (-2.4%)
- Disposable income falls from 39,401 to 38,224 (-3%)
- Person-weighted disposable income increases by 7.23%


Ratio Earned Income
(45% flat tax vs. observed schedule)
1.1
1
.9
.8
.7
.6
.5
.4
.3
.2
.1
0
0
.2
.4
.6
.8
1
Earnings Percentile


Ratio Disposable Income
(45% flat tax vs. observed schedule)
3
2.5
2
1.5
1
.5
0
.2
.4
.6
.8
1
Earnings Percentile

Takeway

- Could a substantial UBI be funded by a "simple" tax system (rather than optimal Mirrlees schedule)?
  - Find that flat tax of 45% can fund a subsantial UBI while leaving GDP relatively unaffected

Role of Top Earners

- Could a substantial UBI be funded by increasing the top tax rate to 70% but leaving tax rates below median earnings unchanged?
  - No, find that UBI would remain modest at about £6,000, even with revenue-maximizing top tax rates
  - Tax systems with a large UBI must have a high phase-out rate at the bottom
    - ★ Ideally would want low-skill households to face a smaller phase-out rate at the bottom (e.g., conditional tax credits related to individual circumstances to ensure that only low-skill households get the tax credit)

Conclusion

Recap

1. Given response of labor supply to tax changes, is it possible to fund a large UBI (considering any incentive-compatible tax system)? **Yes**
2. Could a large UBI be funded from a "simple" tax system (flat tax)? **Yes**
3. Could a large UBI be funded by taxing the highest earners (top 10% or 1%)? **No**

Conclusion

- Many potential pros and cons of UBI are discussed in abstract
- In our view, it is instructive to:
  - Take a more quantitative approach informed by estimates of empirical parameters such as the elasticity of taxable income
  - Take a comparative approach and compare the relative costs and benefits of any transfer schemes