Charitable Contributions, Endowments and Inequality in Higher Education

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Introduction

Donations and Endowments...

- ... are extremely unequally distributed across colleges
- ... are subject to special tax treatment
  - Income tax deduction for charitable contributions
  - Endowments are tax exempt
- ... (increasingly) attracts a lot of public attention
  - Tax avoidance for the wealthy
  - Income tax deduction is a regressive subsidy
  - Strong positive correlation between average parental income of students and amount of donations/endowment income $\Rightarrow$ Very local redistribution
  - Adversely affects hiring incentives and behaviors of colleges: legacy, sports
  - Inefficient hoarding of endowment

What I do

- Gather and construct facts about distribution of donations and endowments
  - Classical measure of distribution: Gini, top share
  - Document origin and destination of flows of donations
- Tractable framework that links
  - donations, endowments,
  - allocation of students across colleges,
  - income distribution, intergenerational mobility
- Use the theory to examine effects of tax regimes regarding charitable contributions and endowments
  - Focus mainly on distributional implications
  - Implications for sorting of students across colleges
- Key modeling difference with Capelle (2019)
  - Allow colleges to build L-T relationships with donors
  - ...and accumulate wealth over time

My Main Points

Empirical Findings

- Donations & Endowm. extremely unequally distributed across colleges
  - Gini donations and endow. is .7 and .8 resp. (HH income is .45)
  - Correlated with other college revenues: amplifies dispersion resources
- Disproportionately benefit students from rich families
  - Tax regime (deduction for donation and tax exemption for endowment) is regressive

Theoretical Findings

- Deduction for Charitable Contributions has ambiguous effect on sorting of students, income ineq. and mobility. Through 3 channels
  1. Relax reliance of colleges on tuition (more merito. admissions)
  2. Increases incentives to attract students who will be generous donors
  3. Increases inequality of resources across colleges
- Tax exemption of endowments also have an ambiguous effect: (1) vs (3) but (2) disappears.

Literature

Theoretical and structural literature

- Transmission of human capital, social mobility and inequality
  Becker et al. (1986), Fernandez et al. (1996), Benabou (2002)
- Pricing behavior of colleges and sorting
  Rothschild et al.(1995), Epple et al.(2006, 2017), Cai et al.(2019) More.
- Higher education in structural GE
  Restuccia et al. (2004), Abbott et al. (2013), Lee et al. (2019), Capelle (2019)

Empirics of Charitable Contributions and Endowments

- Charitable contributions and tax regimes
  Clotfelter (1997,2017), Duquette (2016), Landais and Fack (2012)
- College endowment accumulation behavior
  Tobin (1974), Hansmann (1990), Brown (2018)

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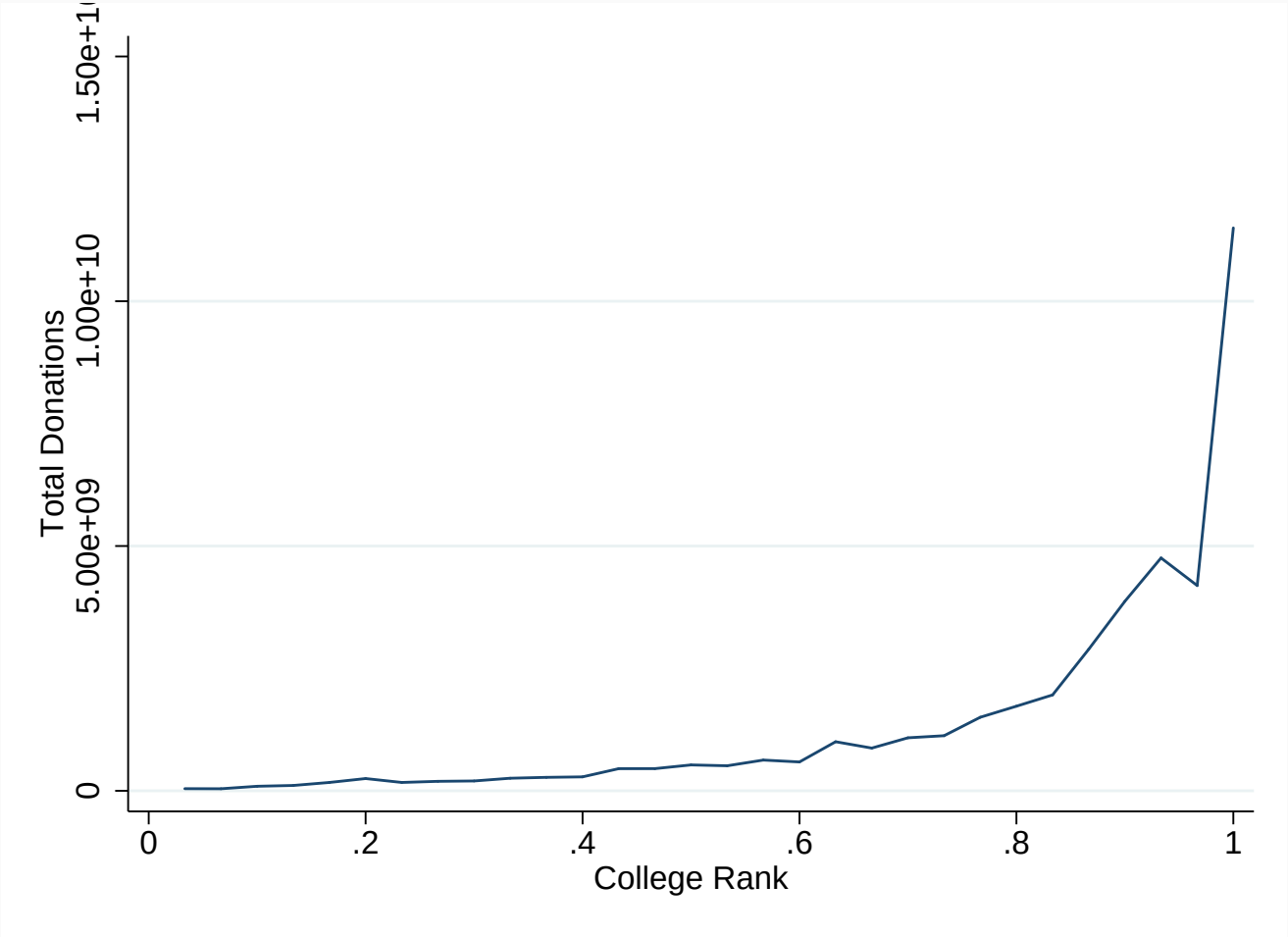
Stylized Facts

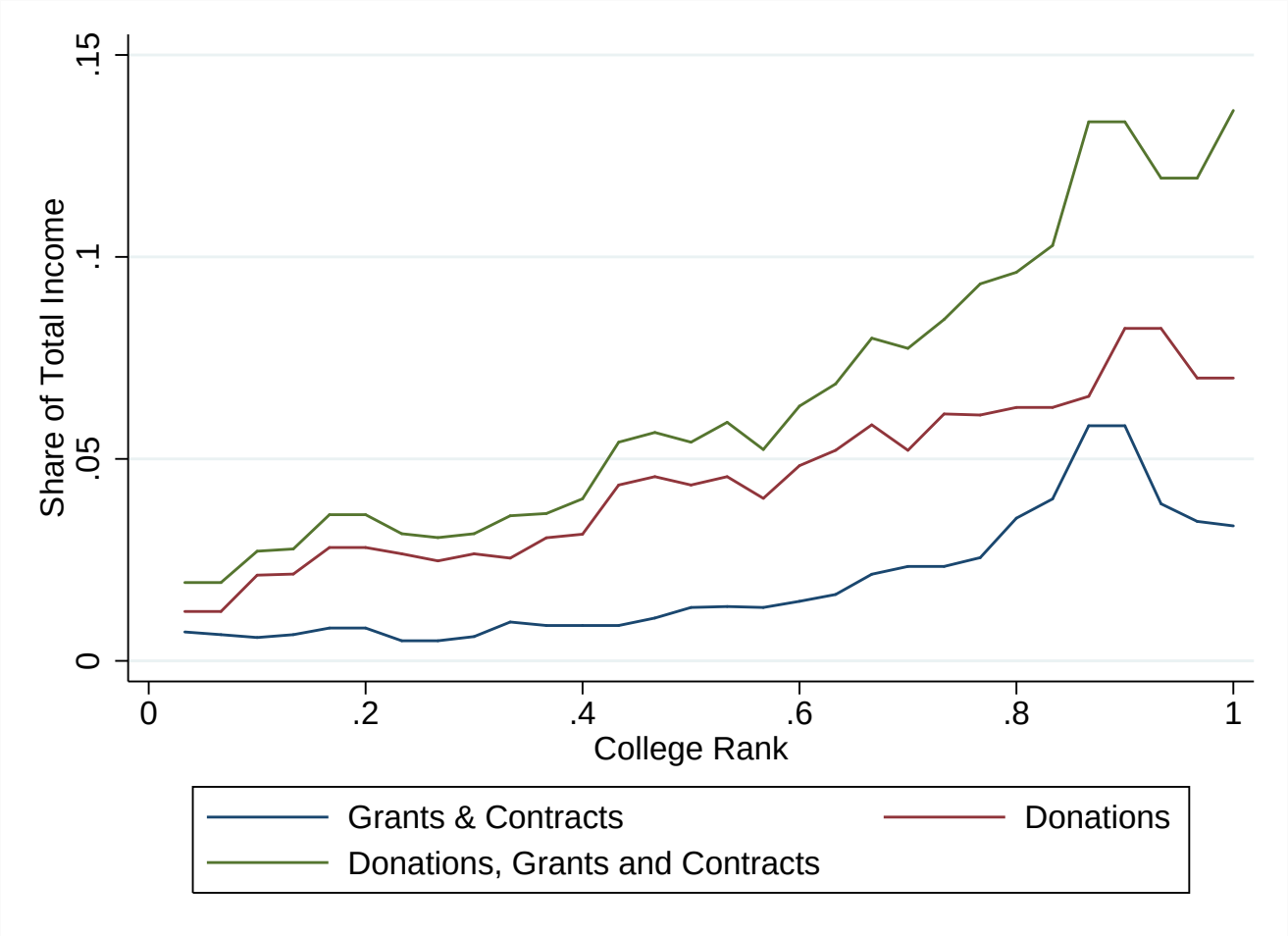
Donations by College Rank (enroll. weighted)



Rank colleges quality by total spending per student. Weighted by enrollment.

Sources: IPEDS, 2016, own computations

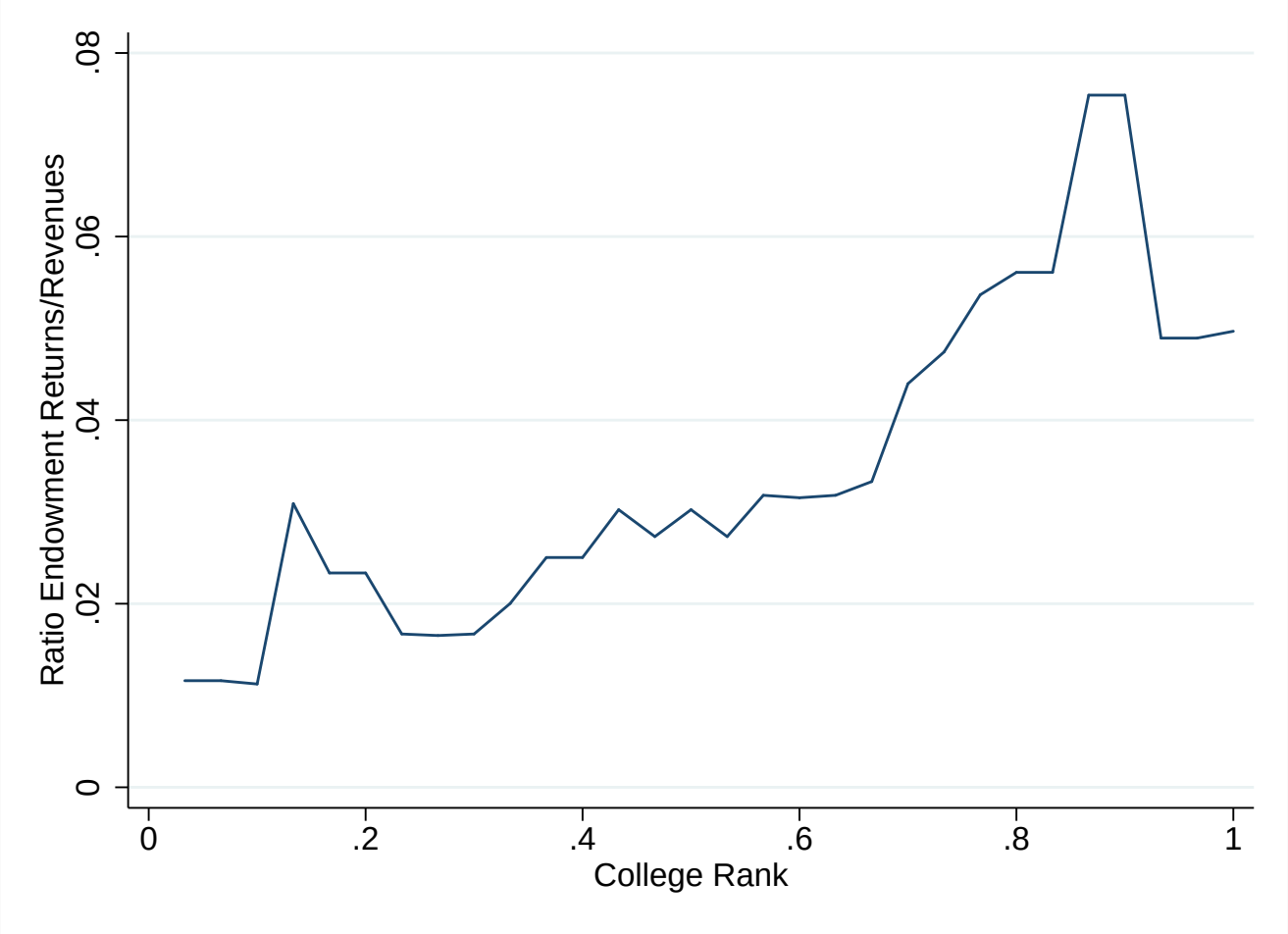
Donations as a Share of Tot. Revenues by College Rank (enroll. weighted)



Sources: IPEDS, 2016, own computations

Endow. Revenues as a Share of Tot. Rev. by College Rank

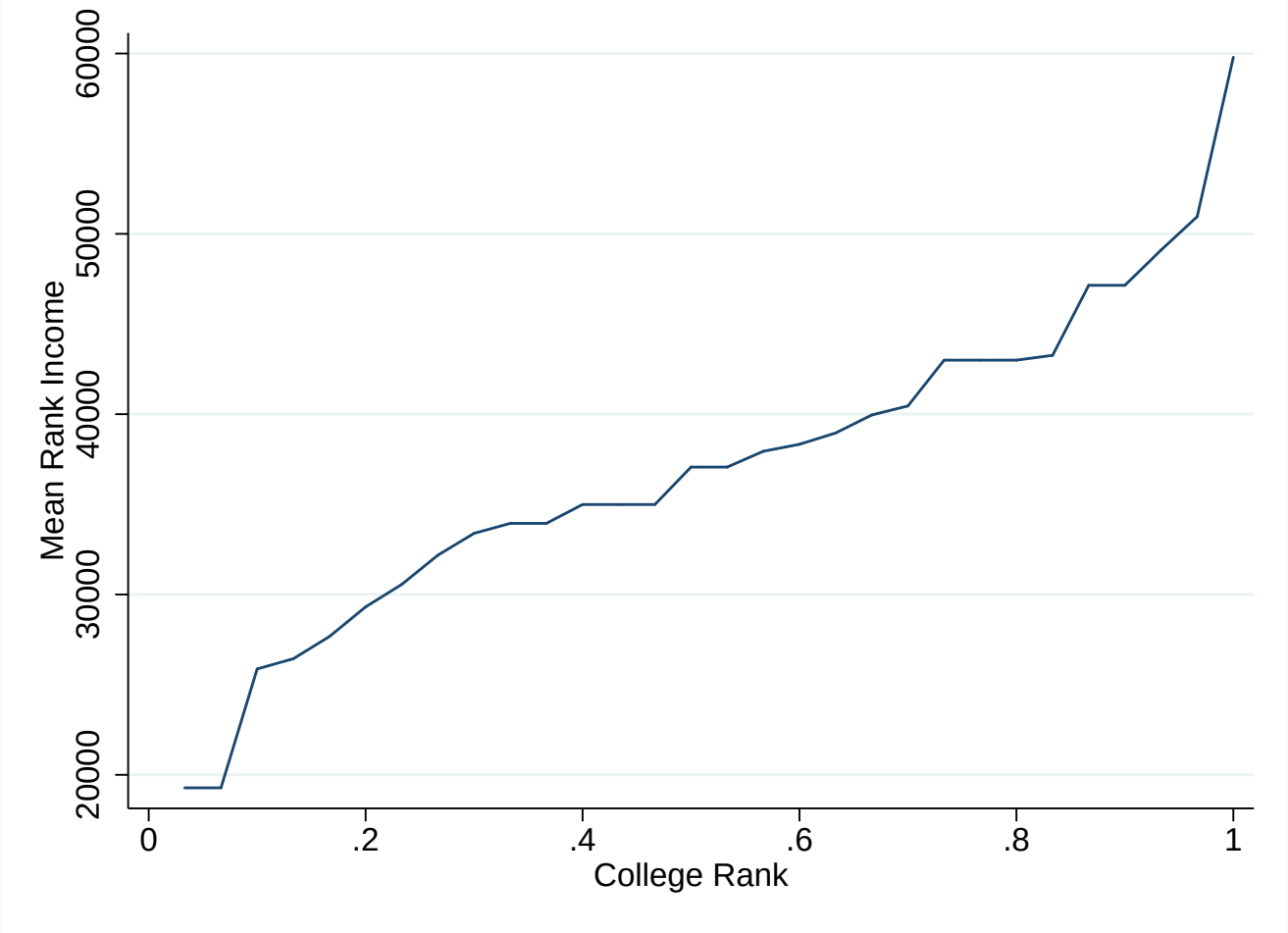
(enroll. weighted)



Sources: IPEDS, 2016, Nabuco Study of Endowment, own computations

Rate of Returns Stock of Endow

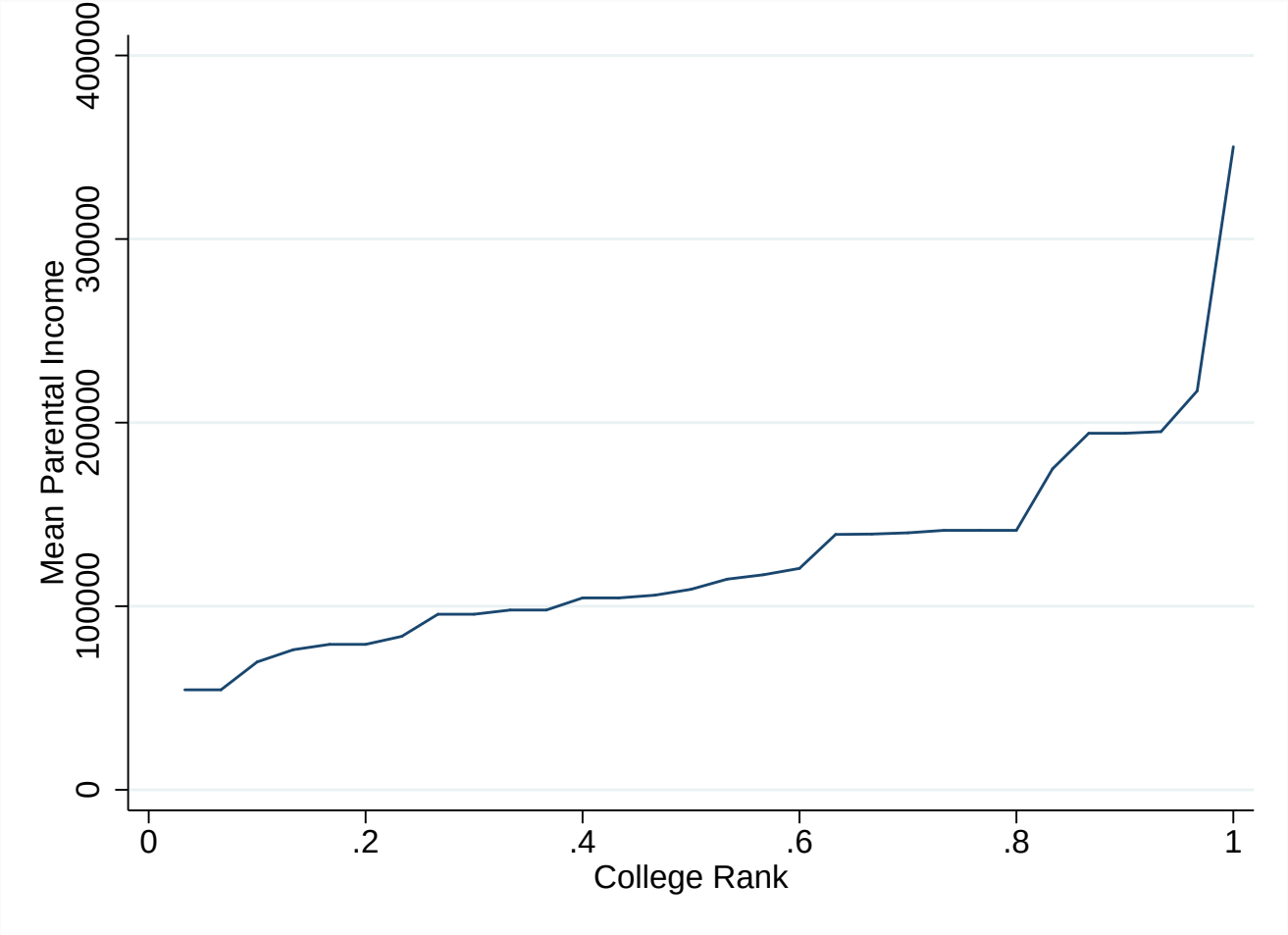
Kid Mean Income by College Rank (enroll. weighted)



Legend: The mean income of kid who attended a college at the 20% percentile is slightly below 30000.

Sources: Opportunity Insights, own computations Rank

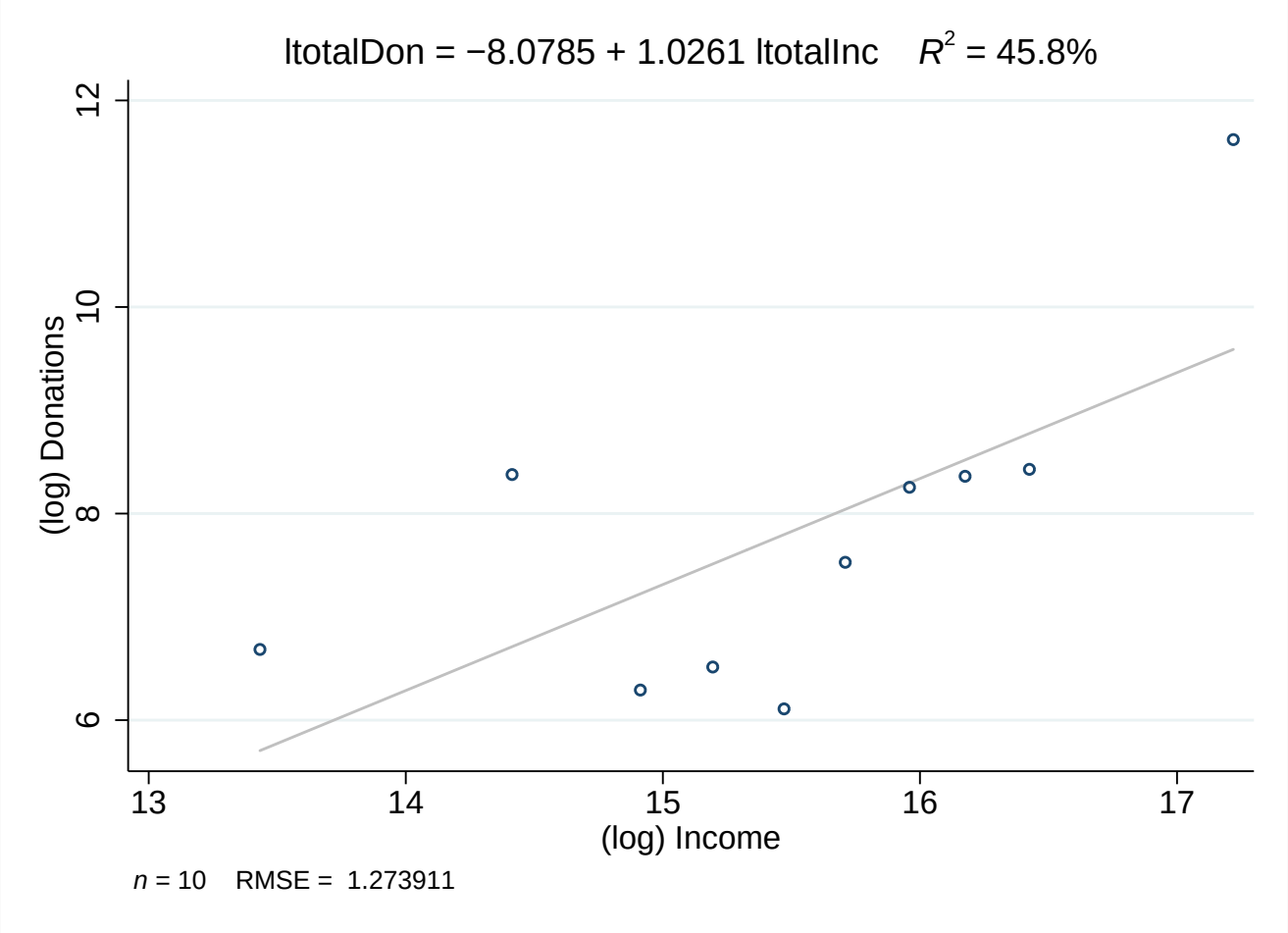
Parental Mean Income by College Rank (enroll. weighted)



Legend: The mean parental income of a kid in college at the 20% percentile is slightly below 100000.

Sources: Opportunity Insights, own computations Rank

Elas. of HH Donations to Higher Ed. w.r.t. their Income is 1

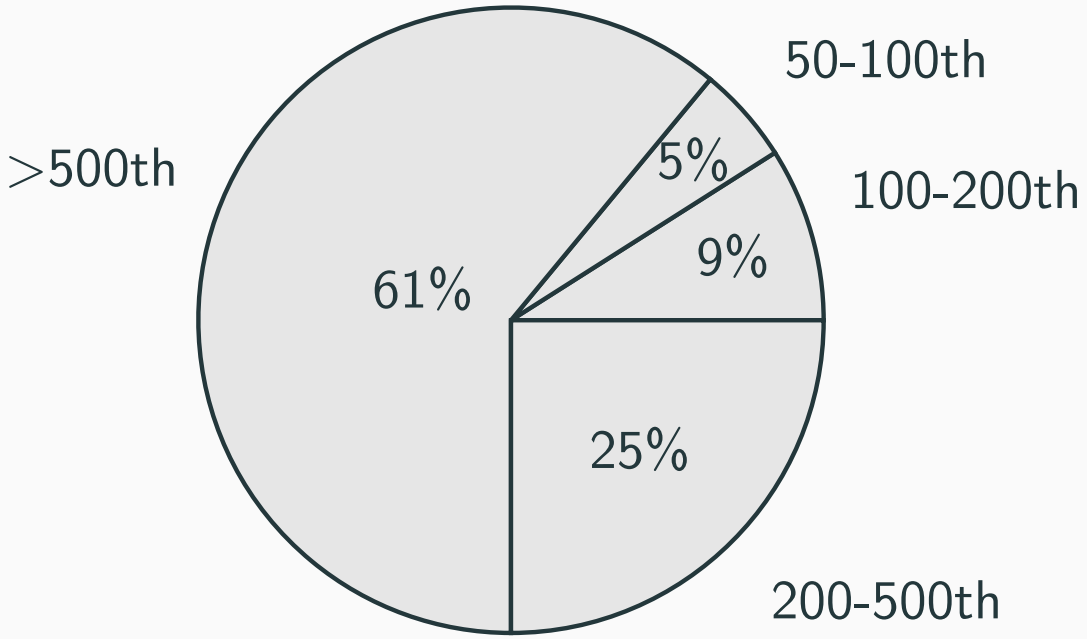


Legend: (log) average gross income of HH in 7th decile is 16 and they donated 8.2 in log average donations.

Sources: Philanthropic Panel Study, PSID, 2007, own computations

Subsid. to Charit. Donations to Higher Ed. by Income

- 95% of donations to higher ed. are fully subsidized through deductions on income tax $\simeq \$25Mn$ in 2011
- Mainly benefit large income donors: 61% of subsidies goes to HH with AGI> \$500th



Legend: HH with AGI between 200 and 500 thousand dollars received 25% of all income tax deductions.

Source: CBO, IRS, own computations

The Model

The Model

Outline

Outline of the Model

- Continuum of heterogeneous households: choose colleges and donate
- Colleges
- Government implements progressive income taxation with deduction for charitable donations

The Model

Households

Households (simplified model, no government)

- Parent with HK h, Kid with ability h_s

$$h_s = (\xi_b h)^{\alpha_1} \qquad \text{Child's High School Ability}$$

- Market earning function:

$$y = Ah^{\lambda}\ell \qquad \text{Earning Function}$$

- Consumption, College Quality and Donation subject to Lifetime BC

$$y = c + e(q, y, h_s) + d \qquad \text{Household Lifetime Budget Constraint}$$

- HH has propensity to donate ζ to its *alma mater* j

HH solves

$$\ln U(h, h_s, j, \zeta) = \max_{c,\ell,q,d} \left\{ (1-\beta)\left[(1-\zeta)\ln c + \zeta \ln d - \ell^{\eta}\right] + \beta E\left[\ln U(h', h'_s, j', \zeta')\right] \right\}$$

$$\text{with} \quad h' = h_s q^{\alpha_2} h^{\alpha_3} \xi_y \qquad \text{Child's Post-College Human Capital}$$

$$\ln \xi_b \sim \text{i.i.d.}\mathcal{N}\left(\mu_b, \sigma_b^2\right) \qquad \ln \xi_y \sim \text{i.i.d.}\mathcal{N}\left(\mu_y, \sigma_y^2\right)$$

The Model

Colleges

Colleges (simplified no endowment)

Technology: A college delivers a quality to its students

$$\ln q = \ln I^{\tilde{\omega}_1} \theta^{\tilde{\omega}_2} - H - \gamma_0 \zeta^{\gamma} \qquad \text{Production Func. of Quality}$$

with two inputs

$$\ln \theta = E_{\phi(.)}[\ln(h_s)] \qquad \text{Average Student Ability}$$

$$p_I I = E_{\phi(.)}[e_u(q, h_s, y)] + D \qquad \text{Educational Services}$$

Objective: Taking the tuition schedule $e(q, y, h_s)$ and p^I as given, a college solves

$$\max_{I,\theta,Y,D,\phi(.),\zeta'} \ln \mathcal{V}(D) = \ln q + \beta \ln \mathcal{V}(D')$$

$$\text{with } D' = E_{\phi(.)}\left[d'(\zeta')\right] \qquad \text{Average Future Donations}$$

The Model

Government

Government

- Income tax deduction for charitable deductions

$$y = (1 - a^y) y_m^{1-\tau^y} T_y e^{\tau_d \frac{d}{y}} \qquad \text{Household After-Tax Income}$$

where T_y is a normalizing aggregate endogenous factor ensuring that a_y=average income tax rate.

  - $\tau_d = 0$ = no tax rebate
  - shifter of the progressive tax schedule (Benabou 2002, Capelle 2019)
  - captures well actual income tax schedule

The Model

Equilibrium: Tuition Schedule, Sorting Rule and Law of Motion

Restrictions

- Steady-state
- Distribution of HK is log-normal
- Colleges are indifferent between all student types (interior F.O.C.)

Tuition Schedule and Sorting Rule

Proposition

In equilibrium, the sorting rule is given by

$$e^u(q, h_s, y) = h_s^{-\epsilon_{e,h_s}} y^{\epsilon_{e,y}} \kappa_q q^{\nu_q}$$

$$q(h_s, y) = \left(s_t y^{1-\epsilon_{e,y}} h_s^{\epsilon_{e,h_s}} \frac{1}{\kappa} \right)^{\frac{1}{\nu_q}}$$

$$\epsilon_{e,h_s} = \frac{\tilde{\omega}_2}{\tilde{\omega}_1(1-\omega_D)} + \frac{\beta_u \omega_D}{(1-\omega_D)} \lambda(1-\tau^y)$$

$$\epsilon_{e,y} = -\frac{\beta_u \omega_D}{(1-\omega_D)} \alpha_3$$

$$\nu_q = \frac{1 - \tilde{\omega}_1 \omega_D \lambda(1-\tau^y)\alpha_2}{\tilde{\omega}_1(1-\omega_D) + \tilde{\omega}_1 \omega_D (1-\beta^u) \left(\frac{\lambda(1-\tau^y)}{\tau^m + \epsilon_{e,h_s}} + \left(\alpha_3 - \frac{\alpha_1}{\epsilon_A} \epsilon_I \right) \bar{\nu}_Y(\Sigma) \right)}$$

$$\omega_D = \text{Share Donations In Colleges' Revenues} = \frac{\int D_j dj}{\int (E_j^u + D_j) dj}$$

Effect of Tax Deduction, $\tau_d \uparrow$

Step 1

- Increase in $\tau_d \Rightarrow$ increase in ω_D
  ω_D = Share Donations In Colleges' Revenues = $\frac{\int D_j dj}{\int (E_j^u + D_j) dj}$

Step 2

- Increase in ω_D has ambiguous effects on sorting of students. Works through 3 channels:
  1. Relax reliance of colleges on tuition, $\nu_q \uparrow$ (more merito. admissions)
  2. Increases incentives to attract students who will be generous donors $\epsilon_{e,hs}, \epsilon_{e,y} \uparrow$
  3. Increases inequality of resources across colleges $\nu_q \downarrow$

Intergenerational Mobility and Income Inequality

$$h' = \xi_y \underbrace{(\xi_b h)^{\alpha_1}}_{h_s} \left(\underbrace{\left(s_t y^{1-\epsilon_{e,y}} h_s^{\epsilon_{e,h_s}} \frac{1}{\kappa} \right)^{\frac{1}{\nu_q}}}_{q} \right)^{\alpha_2} h^{\alpha_3}$$

$$\ln h' = \alpha_h \ln h + \ln \xi_y + \epsilon_A \ln \xi_b + X$$

with α_h the intergenerational elasticity.

$$\alpha_h = \alpha_1 + \alpha_3 + \alpha_2(\epsilon_A + \epsilon_I)$$

$$= \underbrace{\alpha_1}_{\text{Before College}} + \underbrace{\alpha_3}_{\text{After College}} + \underbrace{\alpha_2\left(\underbrace{\frac{\epsilon_{e,h_s}}{\nu_q}}_{\text{Ability-Sorting Channel}} + \underbrace{\frac{1-\epsilon_{e,y}}{\nu_q}}_{\text{Income-Sorting Channel}} \right)}_{\text{College}}$$

Special case, $\gamma_0 \to +\infty \Rightarrow$ no donation, $\omega_D = 0$

$$\alpha_h = \alpha_1 + \alpha_3 + \alpha_2 \left(\omega_2 + \omega_1 (1 - \tau_y) \lambda \right)$$

Comparative Statics

Result 1: Effect of Income Tax Deduction

For reasonable parametrization

- $\tau_d \uparrow \Rightarrow$ rise in income inequality, in IGE, in dispersion of college quality and in donations

But *a priori* ambiguous

Result 2: Amplification of Rise in Inequality

- Keeping ω_D, share of donations constant, $\lambda \uparrow \Rightarrow$ rise in income inequality, in IGE, in dispersion of college quality and in donations
- $\lambda \uparrow \Rightarrow \omega_D \downarrow$

Extension with Endowment

Endowment (model)

- College objective with love for wealth (Hansmann, 1990) and social objective

$$\max_{\substack{I,\theta,Y,D,\phi(.)\\ \chi,\zeta',\mathcal{A}'}} \ln\mathcal{V}(D,\mathcal{A}) = \underbrace{\ln q + \omega_4 \ln \mathcal{A} - \tilde{\omega}_3 \ln Y}_{\text{Flow Value}} + \beta_u \ln \mathcal{V}(D',\mathcal{A}')$$

- College Budget Constraint:

$$p_I I_j = E_{\phi(.)}[e_u(q, h_s, y)] + D_j + \chi_j \mathcal{A}_j$$

with χ_j payout rate out of endowment $\mathcal{A}_j$.

- Law of Motion of Endowment

$$\mathcal{A}' = e^{rH}(1-\chi)\mathcal{A}$$

- Progressive Taxation of Endow. (a_a is average rate, τ_a is slope)

$$\mathcal{A}' = e^{rH}(1-a_a)\, T_a \left[(1-\chi)\mathcal{A}\right]^{1-\tau_a}$$

Endowment (characterization)

In the limit without donation, $\gamma_0 \to +\infty$:

$$\epsilon_I = \tilde{\nu}_q^{-1}(1 \underbrace{-\omega_A}_{(1)})\lambda_t(1-\tau^y)$$

$$\epsilon_A = \tilde{\nu}_q^{-1}\alpha_1\left(\frac{\omega_2}{\omega_1}\right)$$

$$\tilde{\nu}_q^{-1} = [(1-\omega_A)\nu_q]^{-1} = \omega_1 + \underbrace{\frac{\omega_A}{1-\omega_A}\omega_1(1-\tau_u)\bar{\nu_A}(\Sigma)}_{(2)}$$

$$\bar{\nu}_A = \frac{\Sigma_{\mathcal{A}}}{\sqrt{\left(\alpha_1\epsilon_{e,h_s,t}\right)^2\sigma_b^2 + \left((1-\epsilon_{e,y,t})\lambda_t(1-\tau^y) + \alpha_1\epsilon_{e,h_s,t}\right)^2\Sigma^2}}$$

ω_A = Share Endowment Income in Total Higher Ed. Income

Ambiguous effect of increasing ω_A

1. increase in ω_A relaxes reliance on tuition: decline in income-sorting channel, ϵ_I
2. increase in ω_A increases inequality of resources across colleges if endowments initially more unequally distributed than tuition

Endowment (comparative statics)

Proposition

Assume $\gamma_0 \to +\infty$. In the limit where $\omega_4 \to 0$, endowment income is a vanishing share of total revenues, and if

$$\Sigma_{\mathcal{A}} \geq \frac{\Sigma_q}{1 + \frac{\alpha_1 \omega_2}{\omega_1 \lambda (1 - \tau_y)}},$$

then permanently increasing the love for wealth, ω_4, and/or the market interest rate r, and/or decreasing the average endowment tax a_a and/or temporarily decreasing the progressivity of the endowment tax, , τ_a leads to

- *an increase in the dispersion of human capital and income,*
- *an increase in the Intergenerational Elasticity of Income,*
- *an increase in the dispersion of college quality,*

and the dispersion of endowment across colleges remains the same except in the case of a temporary decrease in the progressivity of the tax schedule $\tau_a > 0$, which decreases the dispersion of endowment.

Conclusion

Findings

- Deduction for Charitable Contributions has ambiguous effect on sorting of students, income ineq. and mobility. Multiple channels
  1. Relax reliance of colleges on tuition (more merito. admissions)
  2. Increases incentives to attract students who will be generous donors
  3. Increases inequality of resources across colleges
- Tax exemption of endowments also have an ambiguous effect: (1) vs (3) but (2) disappears.

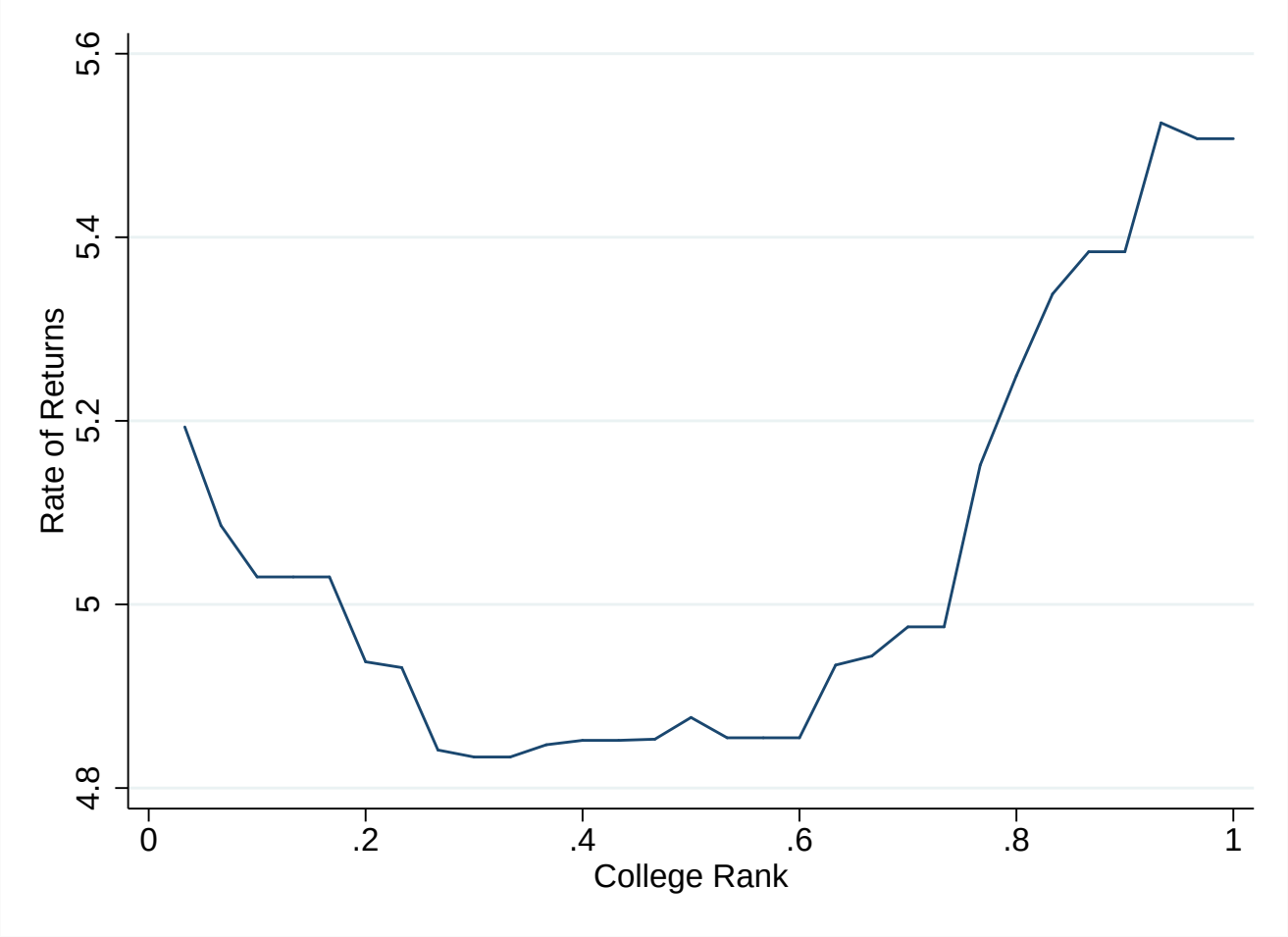
Future

- Quantitative findings: at this stage only hypothesis
  1. Donations & Endowm. contributes to accentuating income inequality because extremely unequally distributed across colleges .
  2. Improve allocation of students and efficiency
- Looking for ways to get implicit transfers of tax income deductions to colleges without relying on strong assumptions

References

Appendix

Rate of Returns on Endowment by College Rank (stud. weighted)



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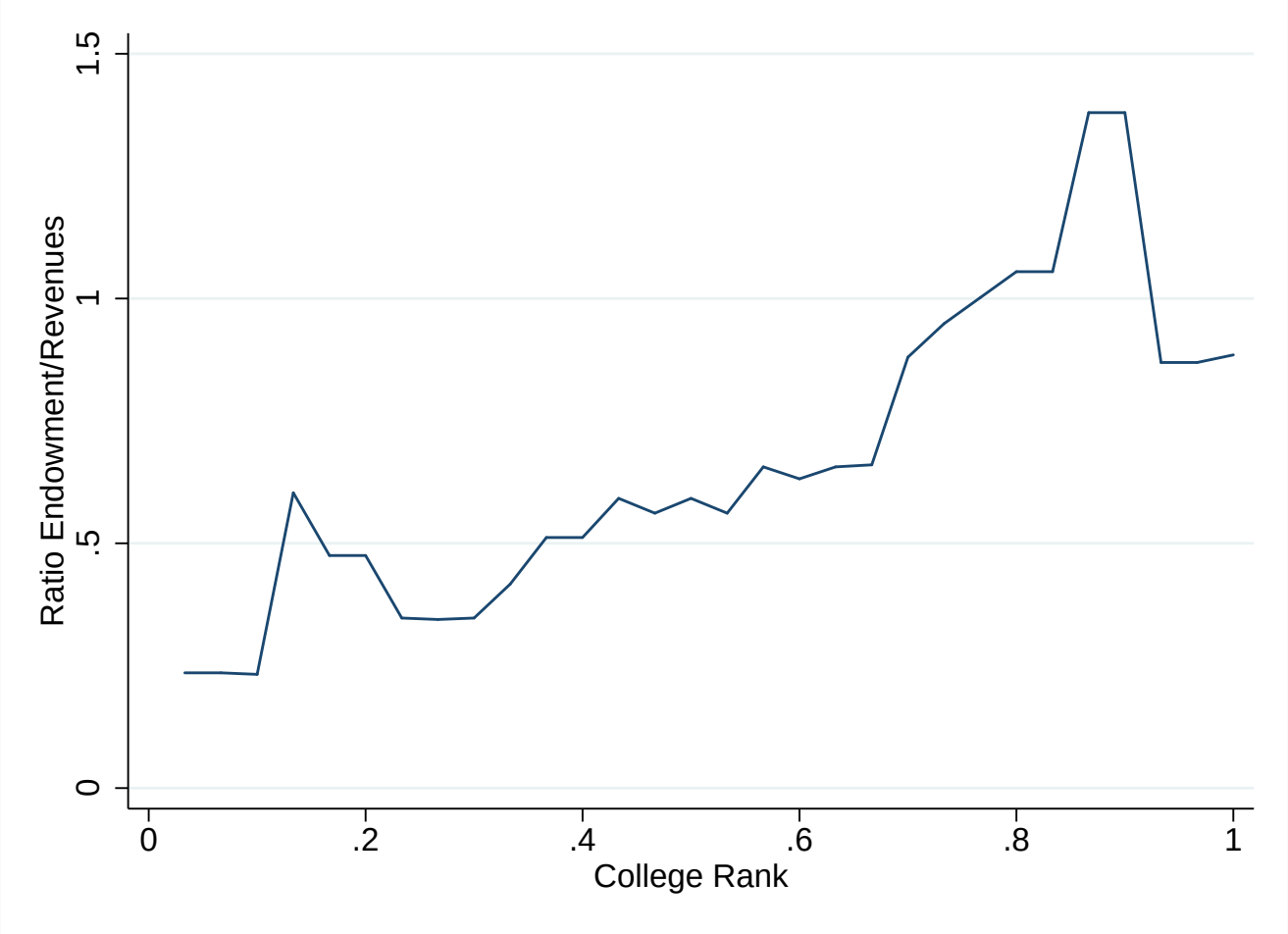
Endowment as a Share of Tot. Rev. by College Rank (stud. weighted)



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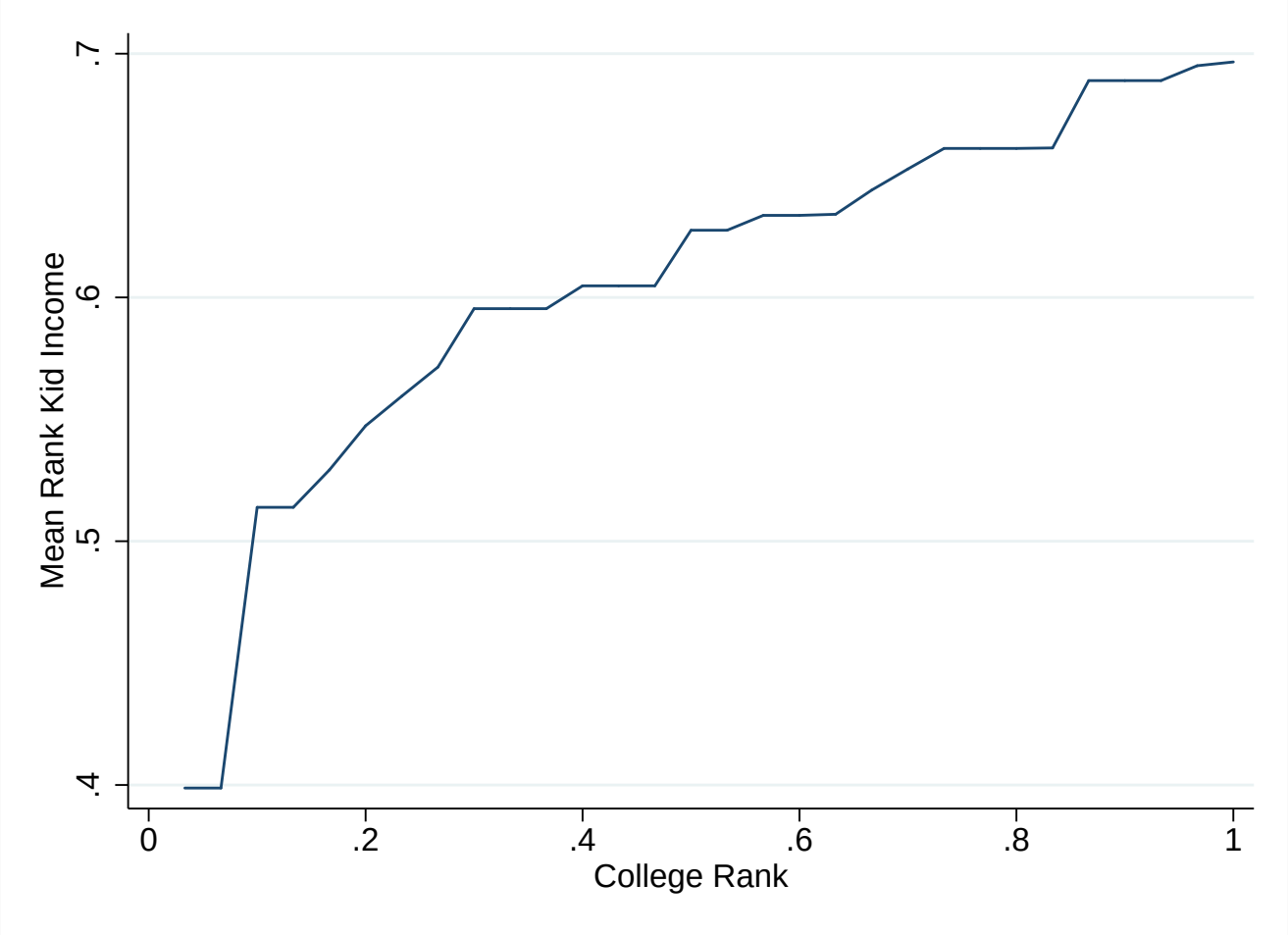
Kid Mean Rank Income by College Rank (stud. weighted)



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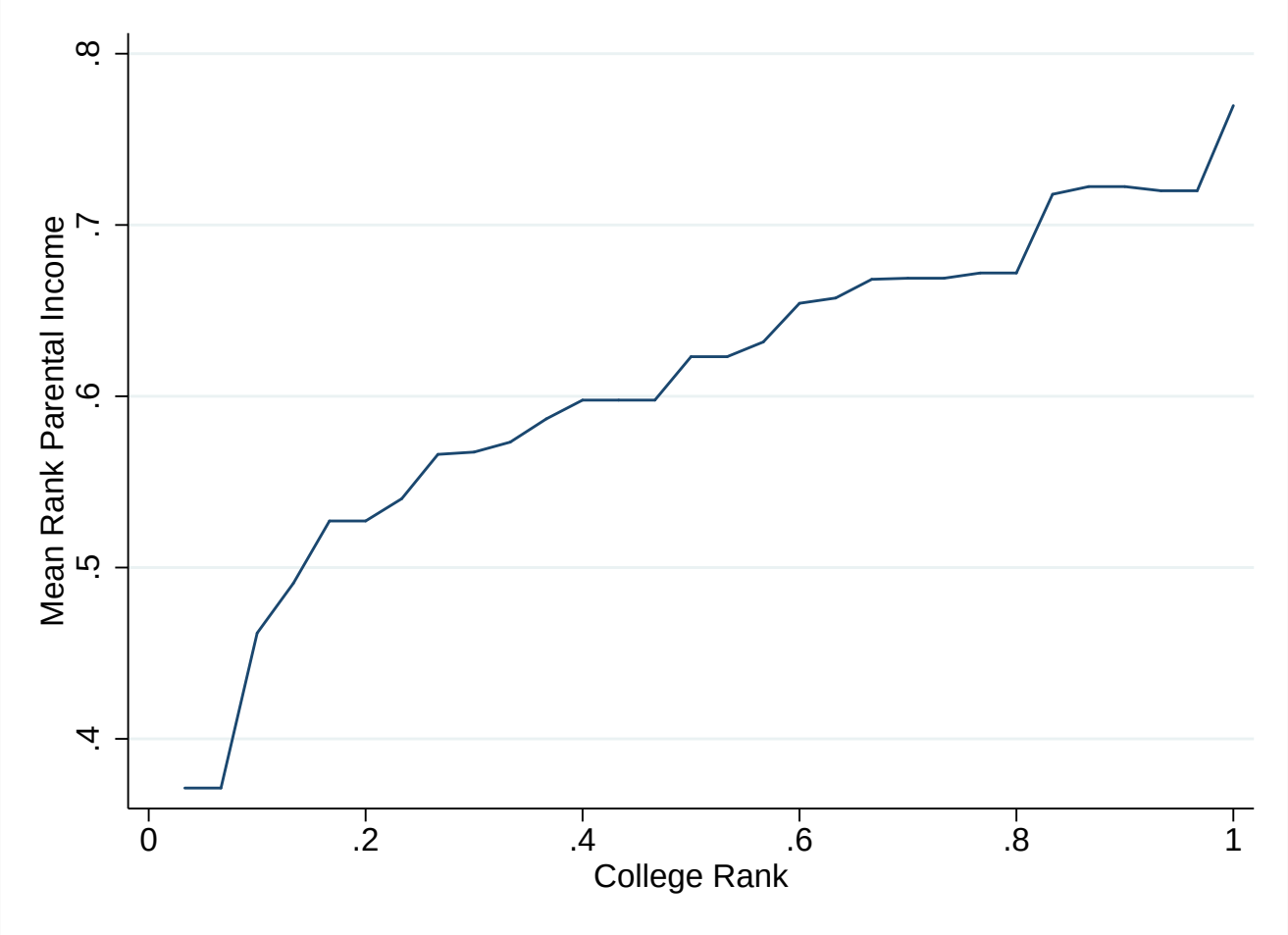
Parental Mean Rank Income by College Rank (stud. weighted)



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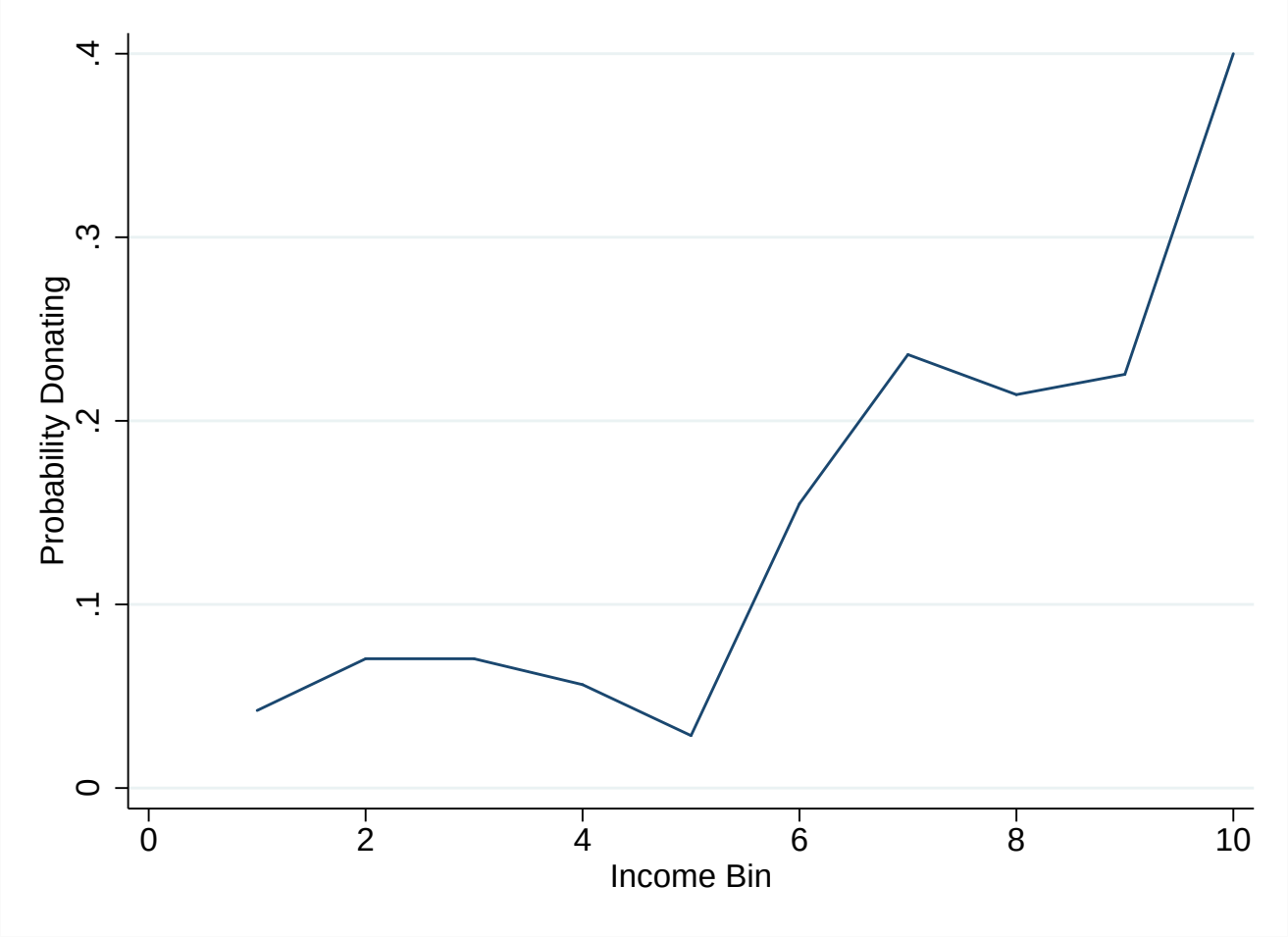
Proba. Giving by Income Rank



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