Entrepreneurship in Black and White

Preliminary and Incomplete

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Motivation

- Entrepreneurs: job creation (Haltiwanger (2012)); wealth accumulation and social mobility (Quadrini (1999, 2000))

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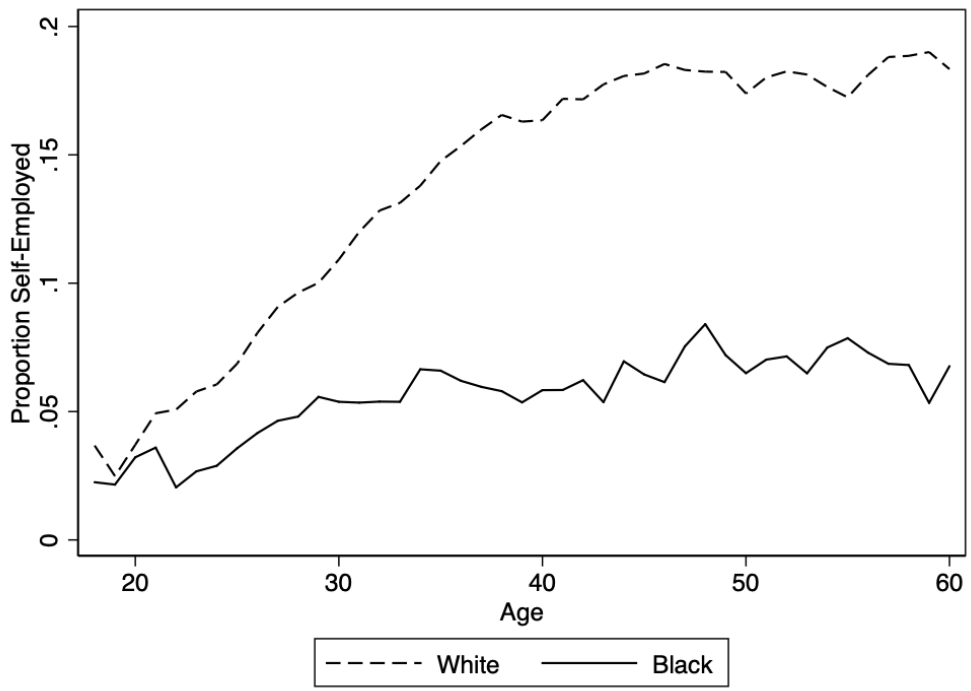
- Entrepreneurs: job creation (Haltiwanger (2012)); wealth accumulation and social mobility (Quadrini (1999, 2000))
- Racial gap in entrepreneurship:



  - White males 2.5x more likely to be self-employed
  - 25 % Blacks (v 52% Whites) have ever tried self-employment
- **This paper: Why?**

Broader Research Questions

- Causes: What explains the wide gap in entrepreneurship across race?
  1. Access to capital (collateral constraints)
  2. Initial human capital and assets
  3. Returns from experience on the job
  4. Idea profitability and demand factors
  5. Non-pecuniary benefits of being an entrepreneur
  6. Attitudes towards risk
- Consequences: What are the consequences of the racial gap in entrepreneurship, in terms of income per capita, inequality?

Contributions

1. Build a dynamic model of entrepreneurship with financial frictions to incorporate accumulation of idea profitability during a spell
    - Evans and Jovanovic (1982), Buera (2009), Cagetti and DeNardi (2006), Hincapié (2020), ...

2. Estimate the model separately on Blacks and Whites to decompose the racial gaps in entrepreneurship
    - Large labor literature on racial and gender differences in paid-employment

3. Quantify the aggregate income/ output cost of the racial gaps
    - Hsieh, Hurst, Jones and Klenow (2019)

Today

- Key empirical facts
- Life-cycle model of occupational choice with financial frictions, endogenous human capital accumulation, asset accumulation, and idea profitability
- Estimate the partial-equilibrium model on Black males using Panel Study of Income Dynamics (PSID, 1968-2015)
- Question: What happens if Blacks had
  1. Initial human capital and assets as whites?
  2. Returns from experience and idea profitability as whites?
- Preview of Initial Results:
  1. Close to 90% of the racial differences in self-employment rates can be reduced
  2. 15-40% gain in income per capita of Blacks

Key Empirical Patterns

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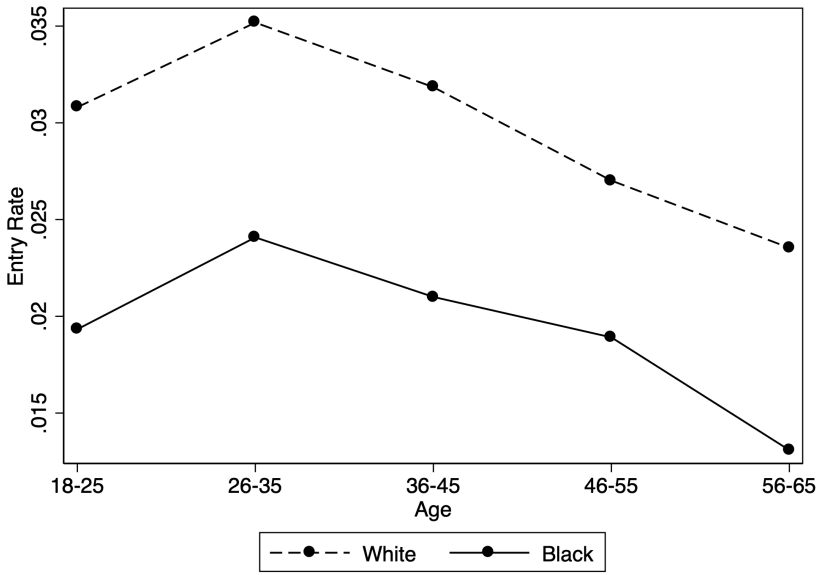
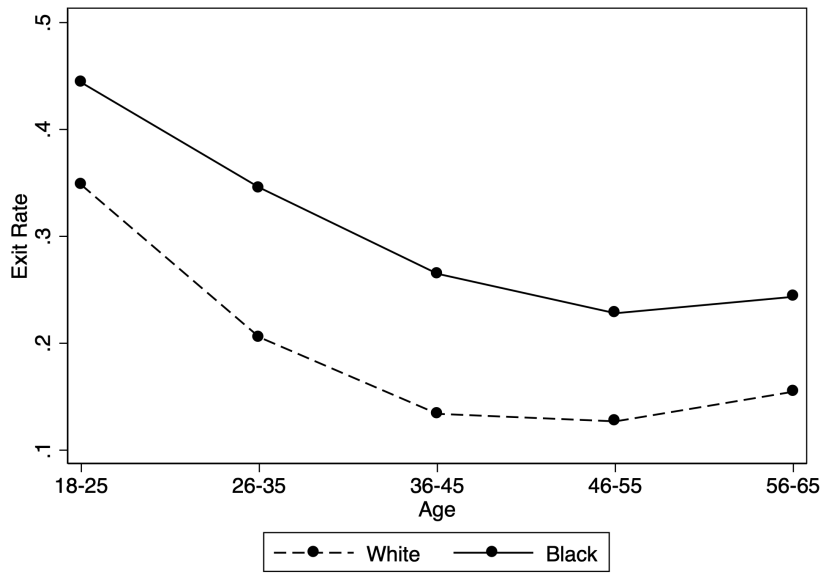
1. Blacks have lower SE entry rates and higher SE exit rates, compared to Whites

Blacks have lower entry rates and higher exit rates



(a) Entry Rates



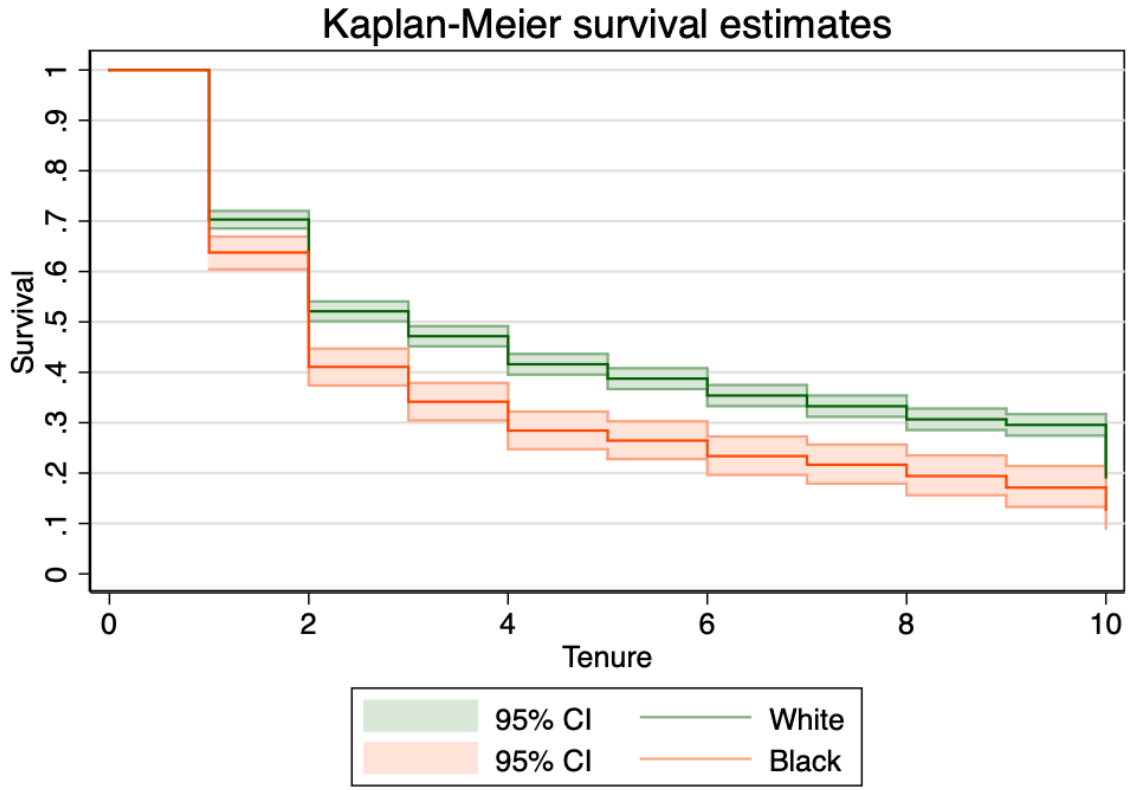
(b) Exit Rates

Key Empirical Patterns

1. Blacks have lower SE entry rates and higher SE exit rates, compared to Whites

2. Conditional on entering self-employment, survival rates are significantly lower for blacks

Survival Rates are lower for Blacks than Whites



Source: Authors' calculations from *PSID*

Key Empirical Patterns

1. Blacks have lower SE entry rates and higher SE exit rates, compared to Whites

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3. College-educated individuals are more likely to be self-employed

College-educated individuals most likely to be self-employed

	Whites				Blacks			
	LHS	HS	SC	Col	LHS	HS	SC	Col
PE	69.0	76.2	78.6	78.7	69.3	74.9	78.1	83.9
SE	14.2	14.3	14.4	16.2	5.7	5.3	6.3	8.2
NW	16.8	9.5	7.0	5.1	25.1	19.8	15.6	7.9
Percent in Group	10.1	30.9	23.9	34.8	21.1	40.0	26.0	12.4

Note: 1. A man is categorized as SE if he is self-employed only or if he is both self-employed and works for someone else. 3. The age group is restricted to 25 to 58 years.

Key Empirical Patterns

1. Blacks have lower SE entry rates and higher SE exit rates, compared to Whites

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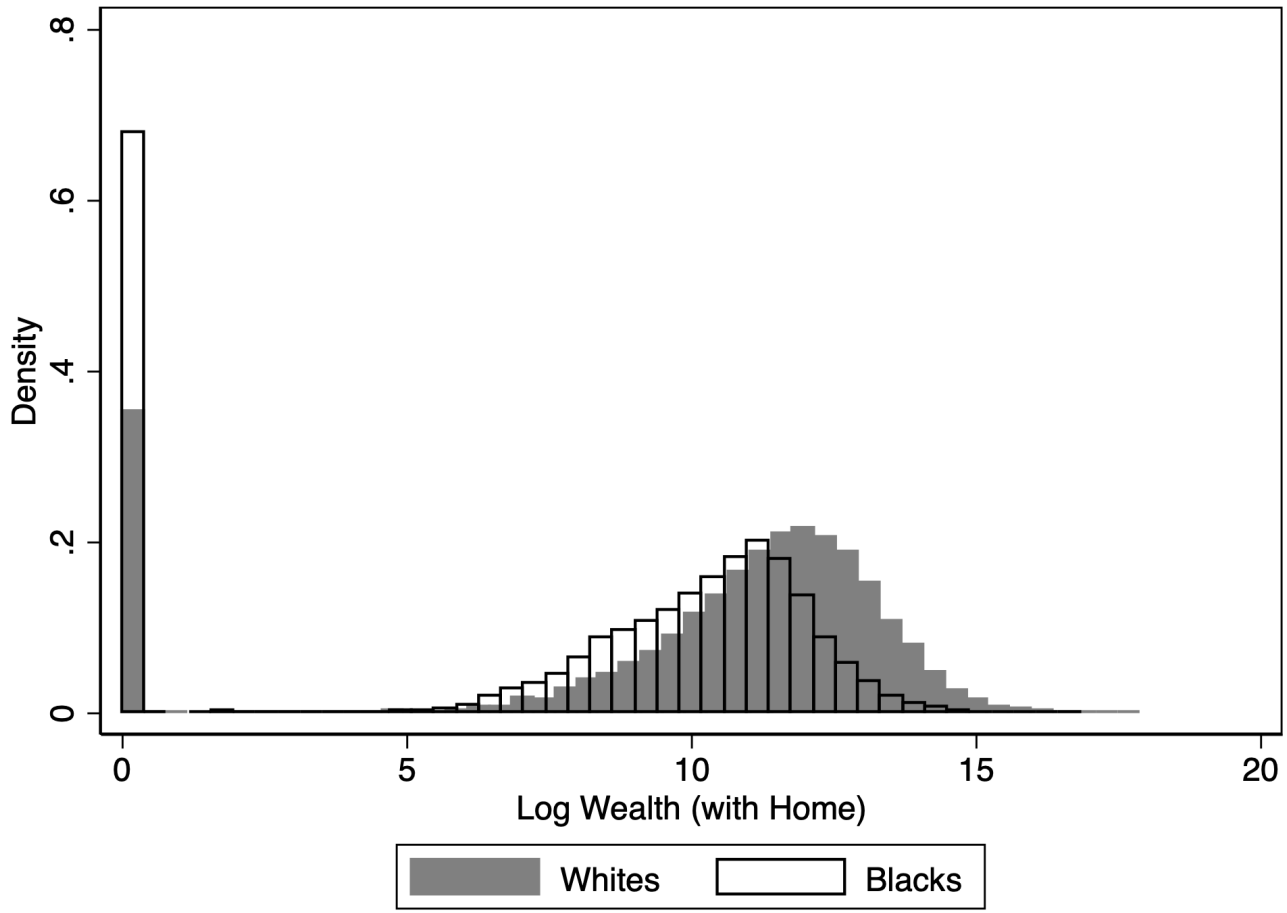
4. Blacks have lower wealth than Whites

Large Wealth Gap between Whites and Blacks



Key Empirical Patterns

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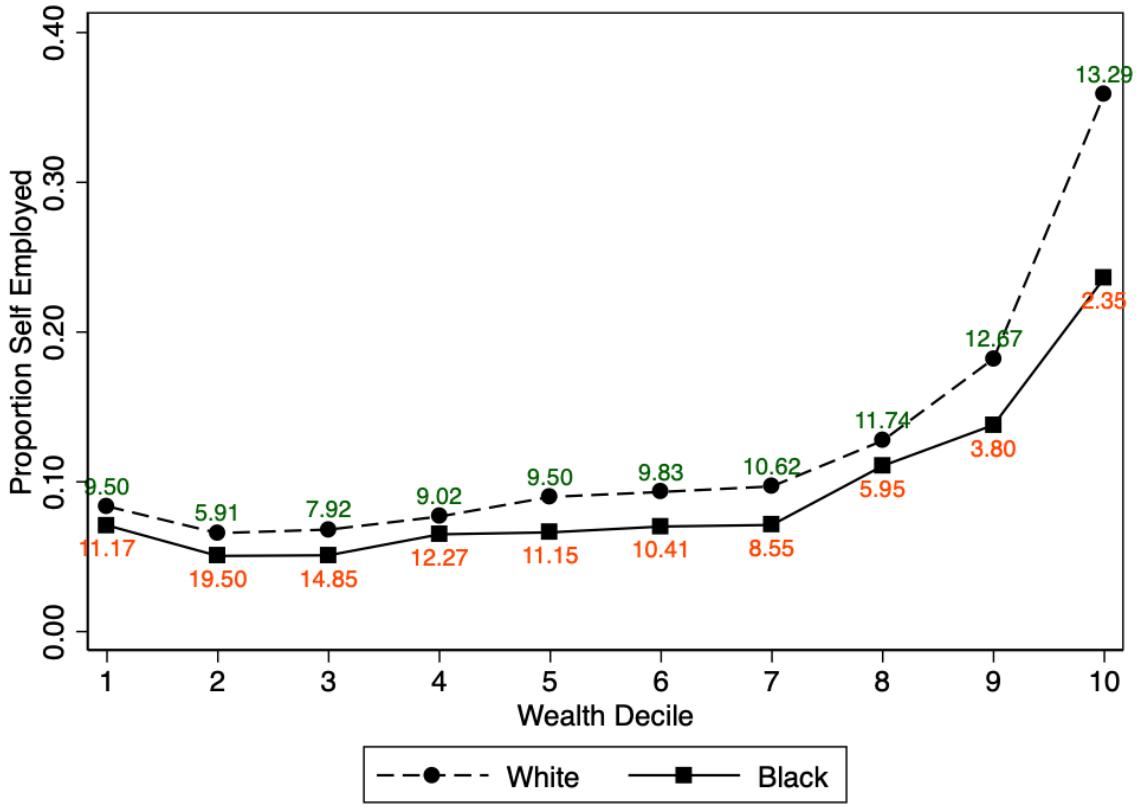
SE Racial Gap Widens at the Top Decile



Entry Rates | Exit Rates | Entry Rates - Quantile | Exit Rates - Quantile

Key Empirical Patterns

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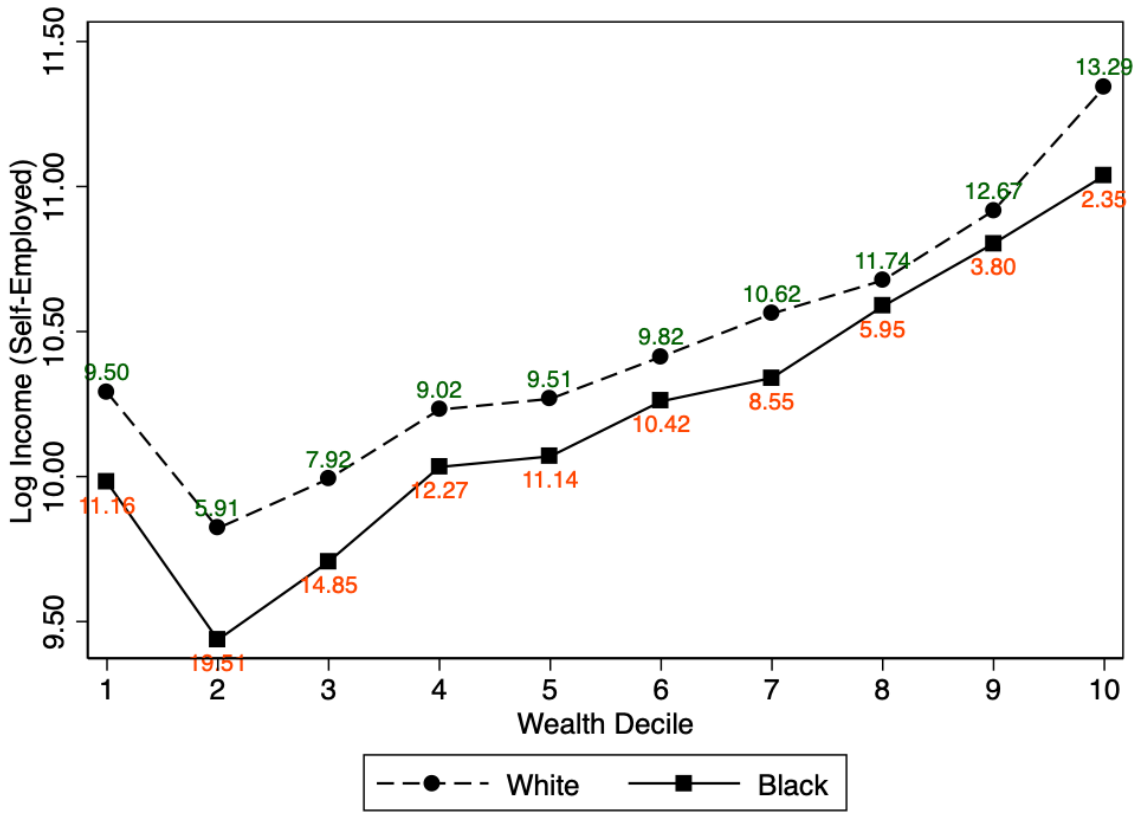
6. SE income gap persists at all levels of wealth

Income Gap between Blacks and Whites Persists



Model

Model Setup

- Forward-looking, risk-averse agents
- Lives until age $\tilde{t}$; life cycle is split into a working period $[\underline{t}, \bar{t}]$ and a retirement period $(\bar{t}, \tilde{t}]$.
- An individual i, enters the labor market at age $\underline{t}$ with human capital $h_{i\underline{t}} \in \mathbb{R}_{++}$, assets $a_{i\underline{t}} \in \mathbb{R}$ jointly distributed $G(h_{\underline{t}}, a_{\underline{t}})$
- Decide not to work ($d_{nt} = 1$), work in one of two sectors: paid-employment ($d_{pt} = 1$) or self-employment ($d_{st} = 1$). $\sum_{k \in \{p,s,n\}} d_{kt} = 1$ for all $t \in [\underline{t}, \bar{t}]$ based on z_t, h_t, a_t

Income (Working Age)

- If working in self-employment, $\ln(y_t) = \ln(z_t k_t^\theta - r k_t) + \sigma_s \epsilon_{st}$
- If working in paid-employment, $\ln(y_t) = \ln(h_t) + \sigma_p \epsilon_{pt}$
- If not working, $y_t = b$
- $\epsilon_{st}, \epsilon_{pt} \sim$ iid $\mathcal{N}(0, 1)$

Capital Choice

- Given $\underline{a}_t$ and a borrowing constraint λ, the agent maximizes:

$$\max_{k_t \leq \lambda \underline{a}_t} \; z_t k_t^{\theta} - r k_t$$

- Given setup, this can be solved independently. Hence, the optimal capital choice is given by:

$$k_t^* = \min \left\{ \lambda \underline{a}_t, \left(\frac{r}{\theta z_t} \right)^{\frac{1}{\theta - 1}} \right\}$$

Human Capital Evolution (LBD)

- Human capital h_t evolves (à la Voena (2015)) as follows:

$$h_{t+1} = h_t * \exp\{-\delta + \Delta h_t\}$$

where

$$\Delta h_t = \sum_{k \in \{p,s\}} d_{kt} \left(\phi_{k0} + \phi_{k1} t\right)$$

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- Choose No Work: $\ln(h_{t+1}) = \ln(h_t) - \delta$
- Choose Paid Employment: $\ln(h_{t+1}) = \ln(h_t) - \delta + \phi_{p0} + \phi_{p1}.t$
- Choose Self Employment: $\ln(h_{t+1}) = \ln(h_t) - \delta + \phi_{s0} + \phi_{s1}.t$

Evolution of Entrepreneurial Idea Profitability

- Idea profitability z_t evolves according to:

$$z_{t+1} = \left[d_{st} \left(z_t \left(\frac{h_{t+1}}{h_t} \right)^{\gamma_s} \right) + (1 - d_{st}) \, h_{t+1}^{\gamma_p} \right] \exp\left\{ \sigma_z \epsilon_{zt} \right\}$$

  where $\epsilon_{zt} \sim$ iid $\mathcal{N}(0, 1)$.

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  where $\epsilon_{zt} \sim$ iid $\mathcal{N}(0, 1)$.

- Start Self-Employment: $\ln(z_{t+1}) = \gamma_p [\ln(h_{t+1})] + \sigma_z \epsilon_t^z$

- Continue Self-Employment:
  $\ln(z_{t+1}) = \ln(z_t) + \gamma_s [\ln(h_{t+1}) - \ln(h_t)] + \sigma_z \epsilon_{zt}$

- $\gamma_p, \gamma_s \geq 0$: returns to idea profitability from human capital with new and continuing business

Preferences

- Utility is defined as:

$$u(c_t, d_t; \rho, \alpha) = u^c(c_t; \rho) + \psi(d_t; \alpha)$$

where

$$u^c(c_t; \rho) = \frac{c^{1-\rho}}{1-\rho}; \qquad \psi(d_t; \alpha) = \alpha_s d_t^s - \alpha_n[\mathbb{1}(d_{nt} = 0)]$$

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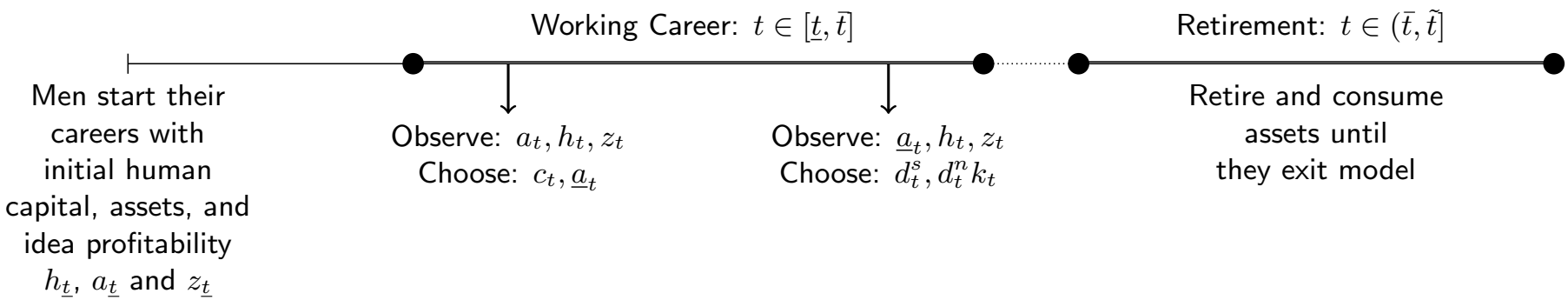
- Choose No Work: $u(c_t, d_t) = \frac{c_t^{1-\rho}}{1-\rho}$
- Choose Paid Employment: $u(c_t, d_t) = \frac{c_t^{1-\rho}}{1-\rho} - \alpha_n$
- Choose Self Employment: $u(c_t, d_t) = \frac{c_t^{1-\rho}}{1-\rho} - \alpha_n + \alpha_s$

Timeline of Model



Value Function

- Budget constraint is given by:

$$a_{t+1} = y_t + (1 + r)(a_t - c_t)$$

- Value function of the individual's problem is:

$$V_t(a_t, h_t, z_t) = \max_{c_t, d_t} \Big\{ u(c_t, d_t) + \beta E_\epsilon \Big[V_{t+1}(a_{t+1}, h_{t+1}, z_{t+1}) \mid a_t, h_t, z_t \Big] \Big\}$$

- This can be written as:

$$V_t(a_t, h_t, z_t) = \max_{c_t} u^c(c_t; \rho) + V_{t+\frac{1}{2}}(\underline{a}_t, h_t, z_t)$$

where $\underline{a}_t = a_t - c_t$

Employment Choice

- Following the consumption choice, the employment choice is written as:

$$V_{t+\frac{1}{2}}(\underline{a}_t, h_t, z_t) = \max_{d_t} \Big\{ u^d(d_t; \alpha) + \beta E_\epsilon \Big[V_{t+1}(a_{t+1}, h_{t+1}, z_{t+1}) \mid \underline{a}_t, h_t, z_t \Big] \Big\}$$

  subject to the budget constraint, and the evolution of human capital and idea profitability.

Retirement

- Agent's problem after retirement is given by:

$$V_t(a_t, h_t, z_t) = \max_{c_t} \{u^c(c_t; \rho) + [V_{t+1}(a_{t+1}, h_{t+1}, z_{t+1}) \mid a_t, h_t, z_t]\}$$

subject to $a_{t+1} = (1 + r)(a_t - c_t)$

- Terminal value $V_{\tilde{t}+1}(a_{\tilde{t}+1})$ allows for a bequest motive:

$$V_{\tilde{t}+1}(a_{\tilde{t}+1}) = \frac{a_{\tilde{t}+1}^{1-\rho}}{1-\rho}$$

Estimation

Estimation

- Black males between the ages of 25 and 58 years Data
- Denote by Λ_1, Λ_2 the collection of parameters that need to be estimated. Λ_1 is given by:

$$\Lambda_1 = \{\delta, \phi^p, \phi^s\}$$
$$\Lambda_2 = \{b, \theta, \lambda, \gamma_s, \gamma_p, \sigma_s, \sigma_s, \sigma_z, \rho, \alpha^s, \alpha^n\}$$

- Use a two-step estimator:
  1. Estimate Λ_1 using a Heckman two-step estimator
  2. Estimate Λ_2 using the following minimum distance estimator:

$$\hat{\Lambda_2} = \arg\min \left[\frac{m_{sim}(\Lambda_2)}{m_{data}(\Lambda_2)} - 1\right]^T \left[\frac{m_{sim}(\Lambda_2)}{m_{data}(\Lambda_2)} - 1\right]$$

Estimation

- For this estimator, we target the following sets of moments:
  1. Employment choice: overall, and for each age group 26-35, 36-45, 46-55
     - Self-employment rates
     - Non-working rates
  2. Entry and exit rates into self employment - overall, and for each age group 26-35, 36-45, 46-55
  3. Self-employment income to assets ratio for the top 50 percentile
  4. Mean and Variance of self-employment and paid-employment income
  5. Inequality measures - 90/10 ratio, 50/10 ratio of self-employment income

First Stage Methodology

- Observable in Data: $y^p_{i,t}$
- Take spells starting and ending with paid employment
- Let us consider spell: PE, SE, PE:

$$\ln y^p_{i,t+2} - \ln y^p_{i,t} = -2\delta + \phi^p_0 + 2\phi^p_1 + \phi^s_0 + \phi^s_1 + \sigma^p(\epsilon^p_{t+1} - \epsilon^p_t)$$

- Say, PE is repeated after n periods among which n_{SE} were SE periods.

$$\begin{aligned} \ln(y^p_{it+n}) - \ln(y^p_{it}) &= -n\delta + \phi^p_0 + \phi^p_1(t+n) \\ &+ n_s\phi^s_0 + \beta^s_1 \sum age_s \\ &+ \epsilon_{it+n} - \epsilon_{it} \end{aligned}$$

Key assumption: Assets move participation but not labor income.

First Stage Estimation

	Whites		Blacks	
	OLS	Heckman	OLS	Heckman
Main				
δ	0.02987***	0.02911***	0.02671***	0.02632***
	[0.0071]	[0.0034]	[0.0099]	[0.0050]
ϕ_0^{SE}	0.02677***	0.02686***	0.00636	0.00612
	[0.0082]	[0.0046]	[0.0283]	[0.0159]
ϕ_1^{SE}	-0.00129**	-0.00123***	-0.00036	-0.00035
	[0.0005]	[0.0003]	[0.0016]	[0.0009]
ϕ_0^{PE}	0.07861***	0.11259***	0.06198***	0.08588*
	[0.0075]	[0.0343]	[0.0111]	[0.0462]
ϕ_1^{PE}	-0.00198***	-0.00199***	-0.00163***	-0.00166***
	[0.0001]	[0.0001]	[0.0002]	[0.0002]
Observations	73224	85096	28800	35380

Source: Authors' calculations from *PSID*.

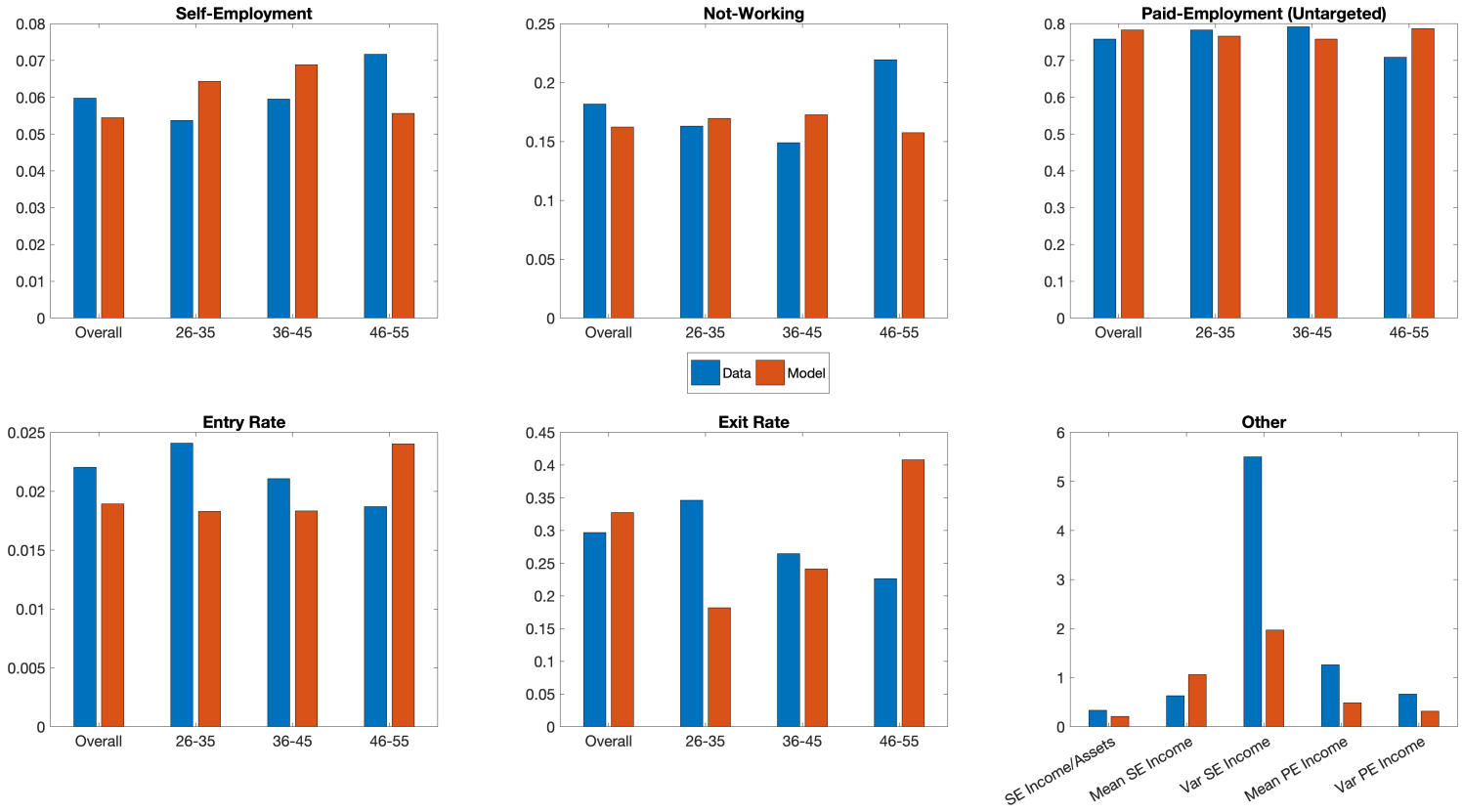
Note: 1. A man is categorized as SE if he is self-employed only or if he is both self-employed and works for someone else. 2. Assets L and H refer to assets above the median asset level for the population (H) and below the median asset level (L). 3. The age group is restricted to 25 to 58 years.

Initial Conditions

		White	Black
1	Mean, Assets	1.68	1.20
2	Variance, Assets	0.52	0.66
3	Mean, Human Capital	2.24	1.08
4	Variance, Human Capital	3.27	3.30
5	Correlation	0.13	0.28

Comparison

Model Fit - Blacks



Parameters

Results

What Happens If:

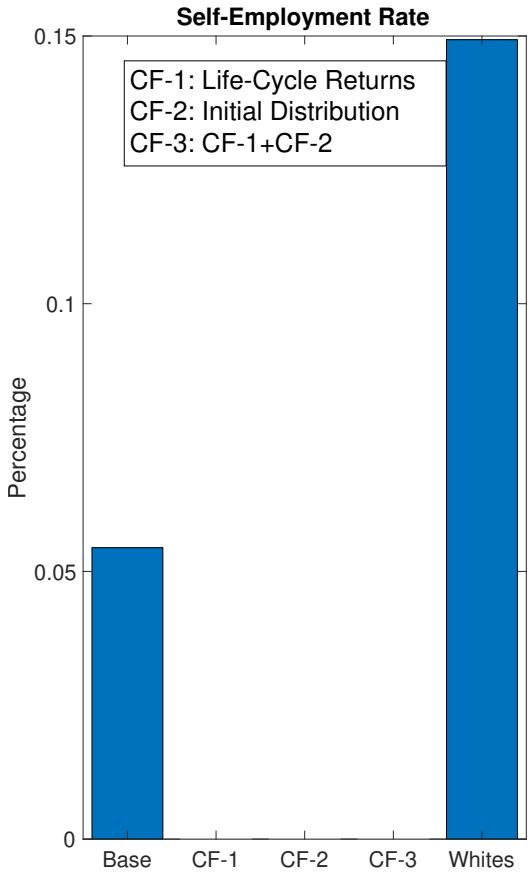
1. Blacks had same returns to experience and idea profitability as Whites? [CF-1]

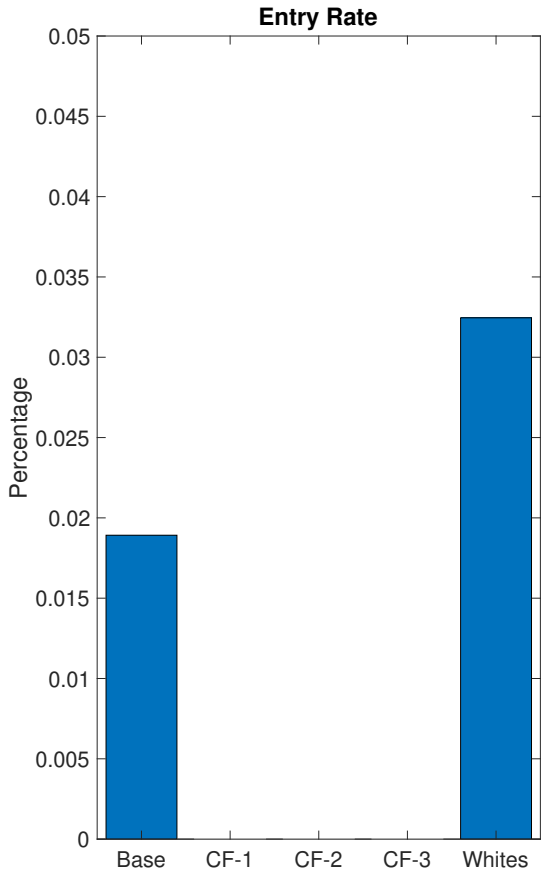
2. Blacks had same initial human capital and assets distribution as Whites? [CF-2]

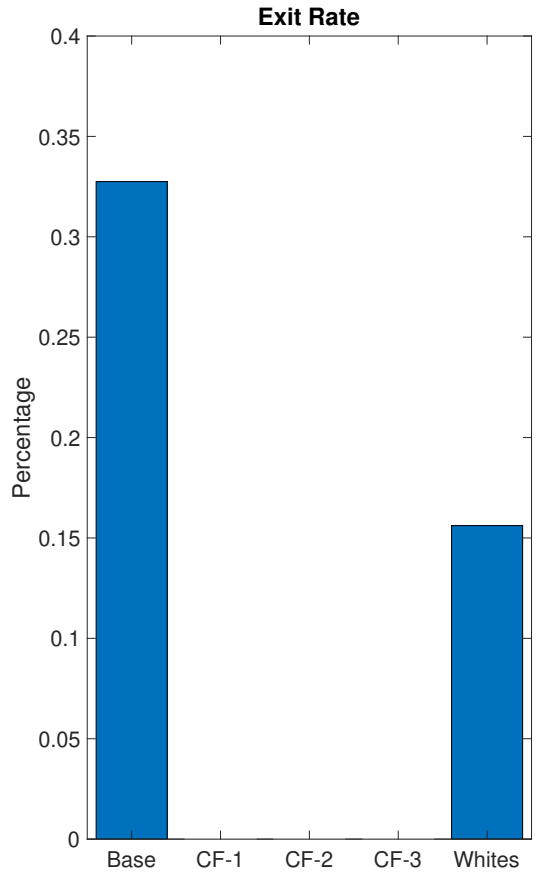
3. Blacks had same returns and initial conditions as Whites? [CF-3]

- Compare with Baseline (Blacks) and Whites

What Happens If:

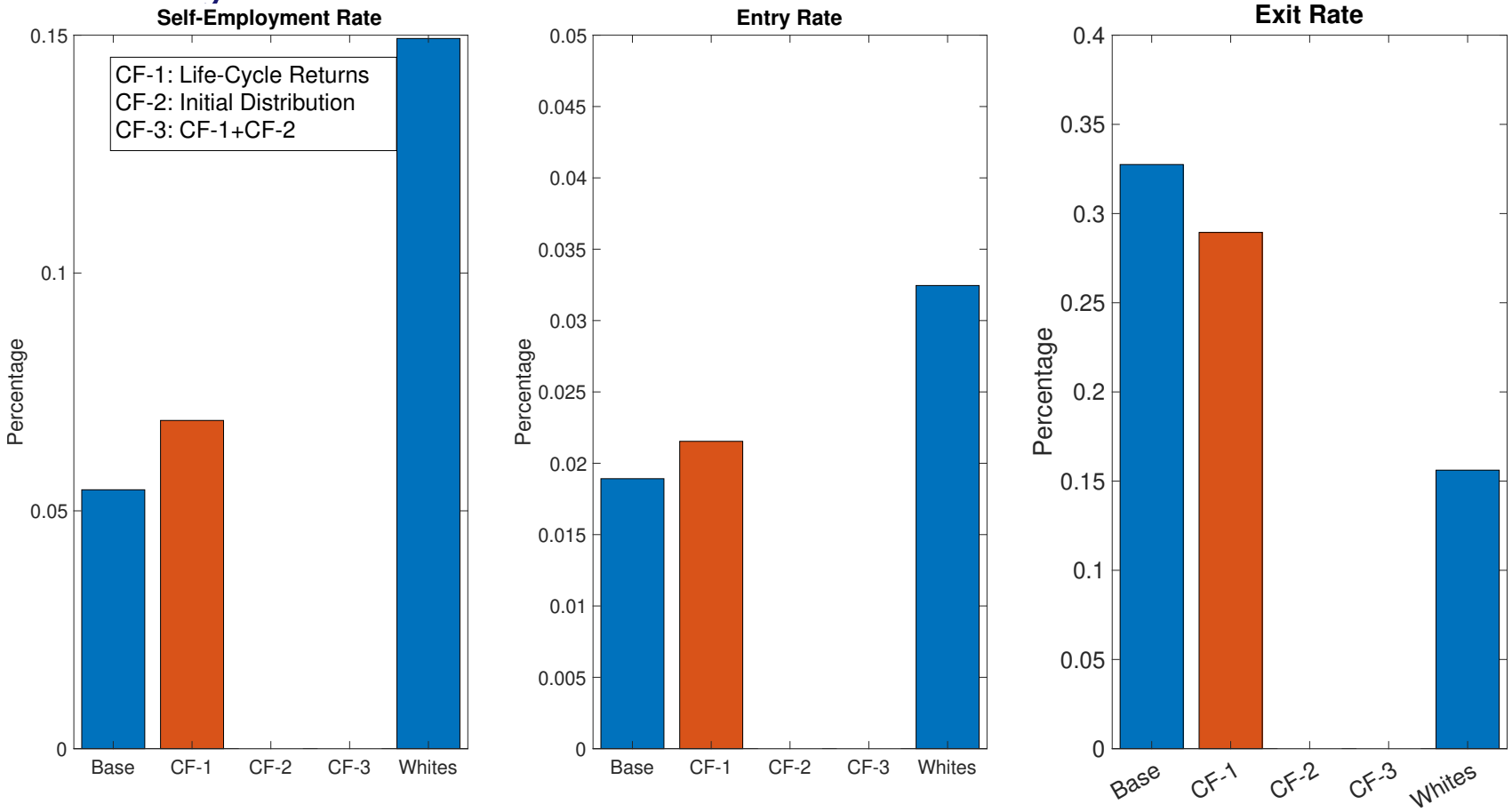






Table

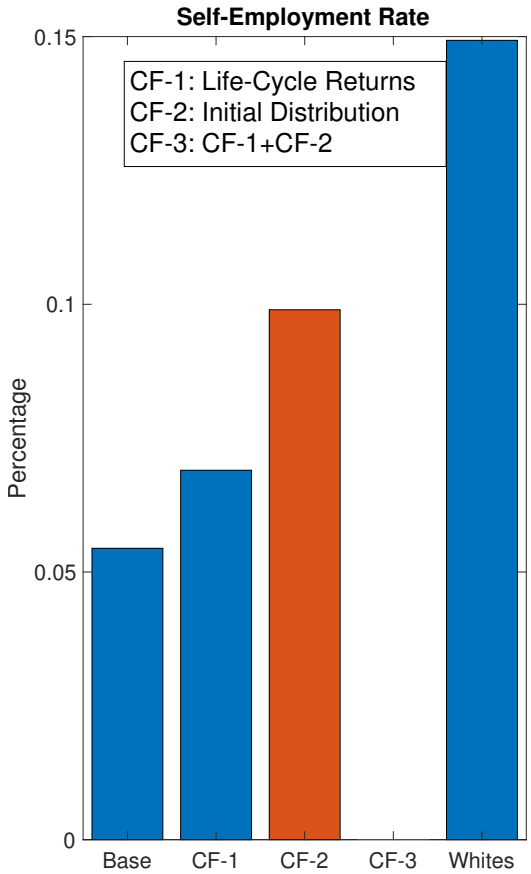
Blacks had same returns to experience and idea profitability as Whites?

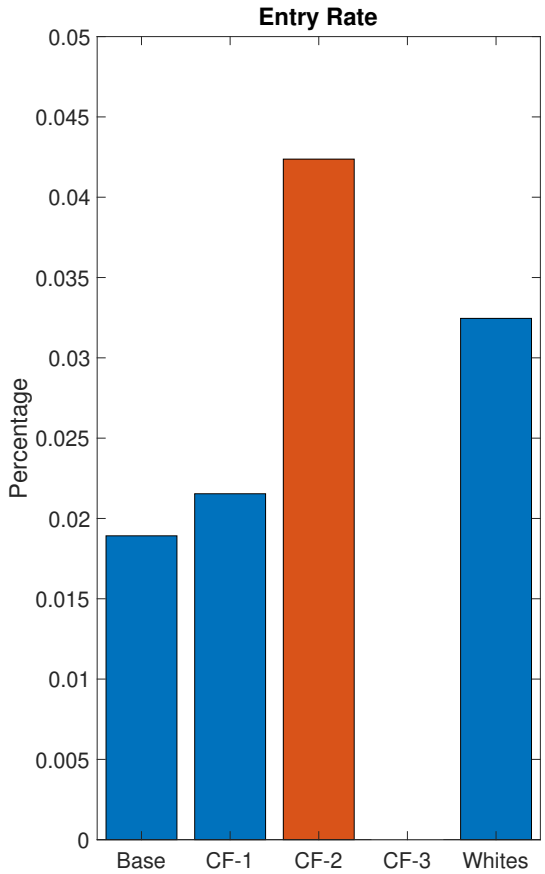


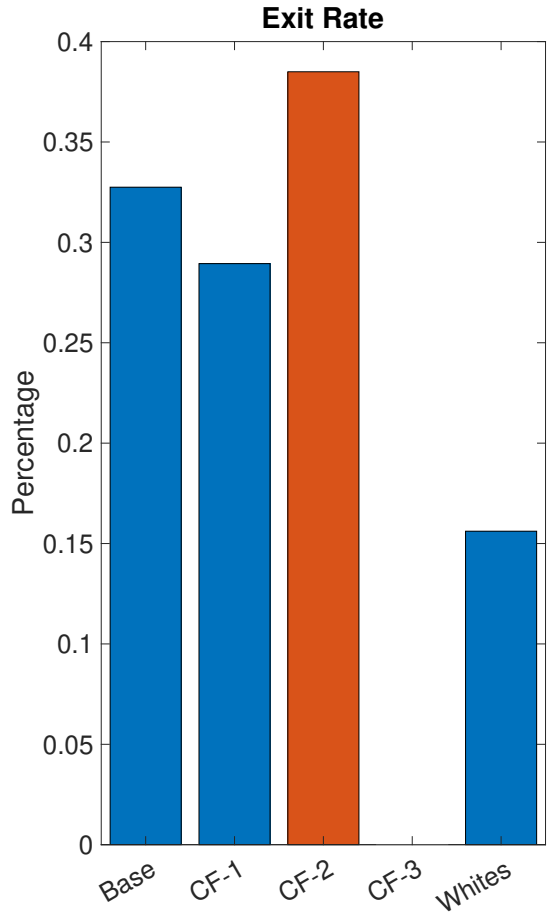
- Higher returns to self-employment $\rightarrow$ higher entry rates, lower exit rates

Table

Blacks had same initial human capital and assets distribution as Whites?



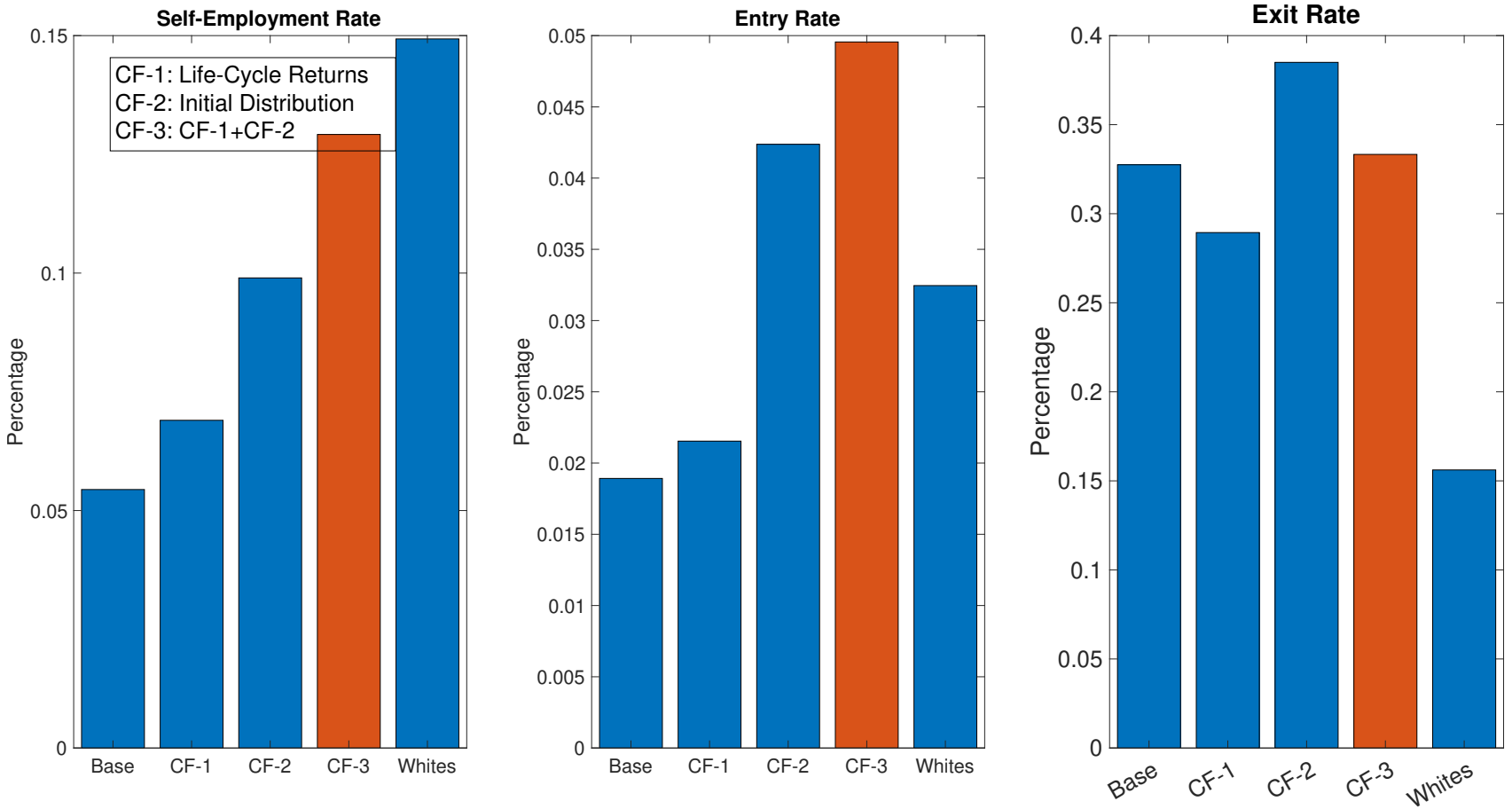




- Initial draws of asset, human capital higher $\rightarrow$ higher entry rates, *higher* exit rates

Table

Blacks had same returns and initial conditions as Whites?



- Higher self-employment rates but more turnover

Table

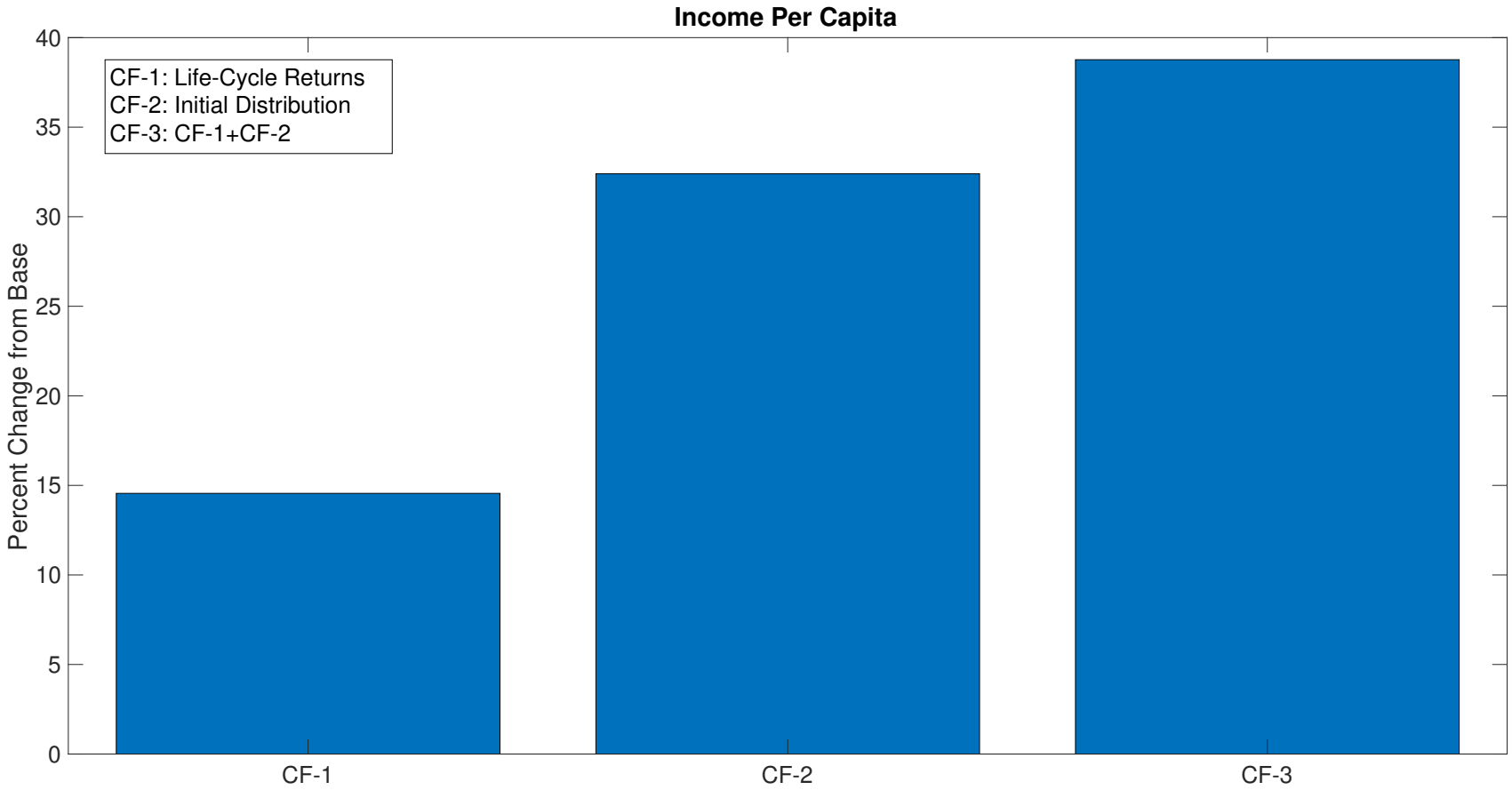
Summary of Results so far

1. Imposing White returns to human capital
   - First stage: Returns of SE experience to PE Income (human capital) low for Blacks (0.6%) compared to Whites (2.6%) at younger ages
   - Large cross-sector returns from paid employment to idea profitability ($\gamma^{PE} = 0.9$)
   - Higher returns $\rightarrow$ higher human capital accumulation, higher idea profitability, higher entry, lower exit

2. Imposed White initial assets and human capital distribution
   - Increase in means; lower correlation b/w assets and human capital
   - Higher assets $\rightarrow$ fewer financially constrained
   - *Yet* low increase in idea profitability due to low human capital accumulation $\rightarrow$ higher entry and higher exit

3. Close to 90% of the racial differences in self-employment rates can be reduced with both evolution $+$ initial distribution

What Happens to Income Per Capita?



Table

Conclusion...

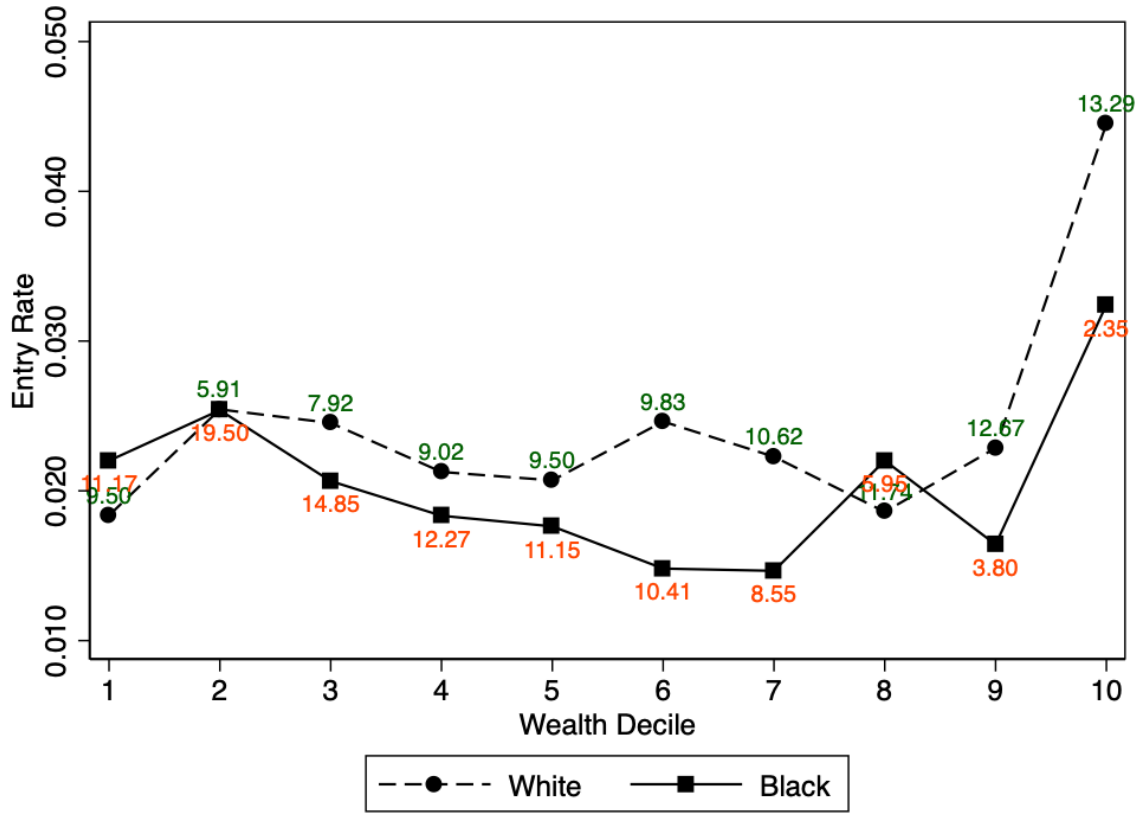
- Whites are 2.5x more likely to be self-employed compared to Blacks; gap maximum at top 10 percentile of wealth
- Develop a life-cycle model of occupational choice with endogenous idea profitability
- Estimate the model on Black males using Panel Study of Income Dynamics (PSID, 1968-2015)
- **Preliminary Results:**
  1. Suggestive of a large role played by initial human capital and assets
  2. Large aggregate income / output costs over the life-cycle ($\sim$15-30 percent)

... Stay Tuned!

- Refine estimates for Blacks
- Finalize estimation for whites
- Decompose the results into key mechanisms:
  - Effect of assets
  - Human capital - initial and evolution
  - Liquidity constraints
  - Non-pecuniary benefits
  - Risk-aversion

Thank You!

SE Racial Gap Widens at the Top Decile



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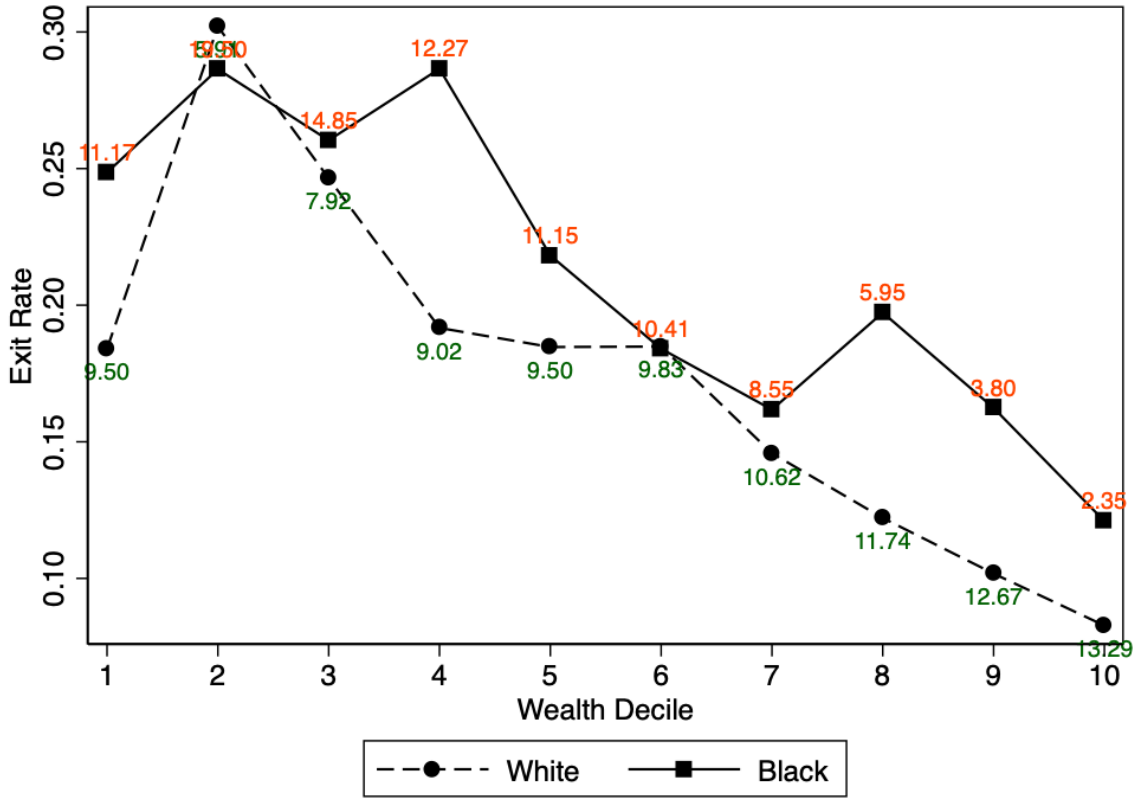

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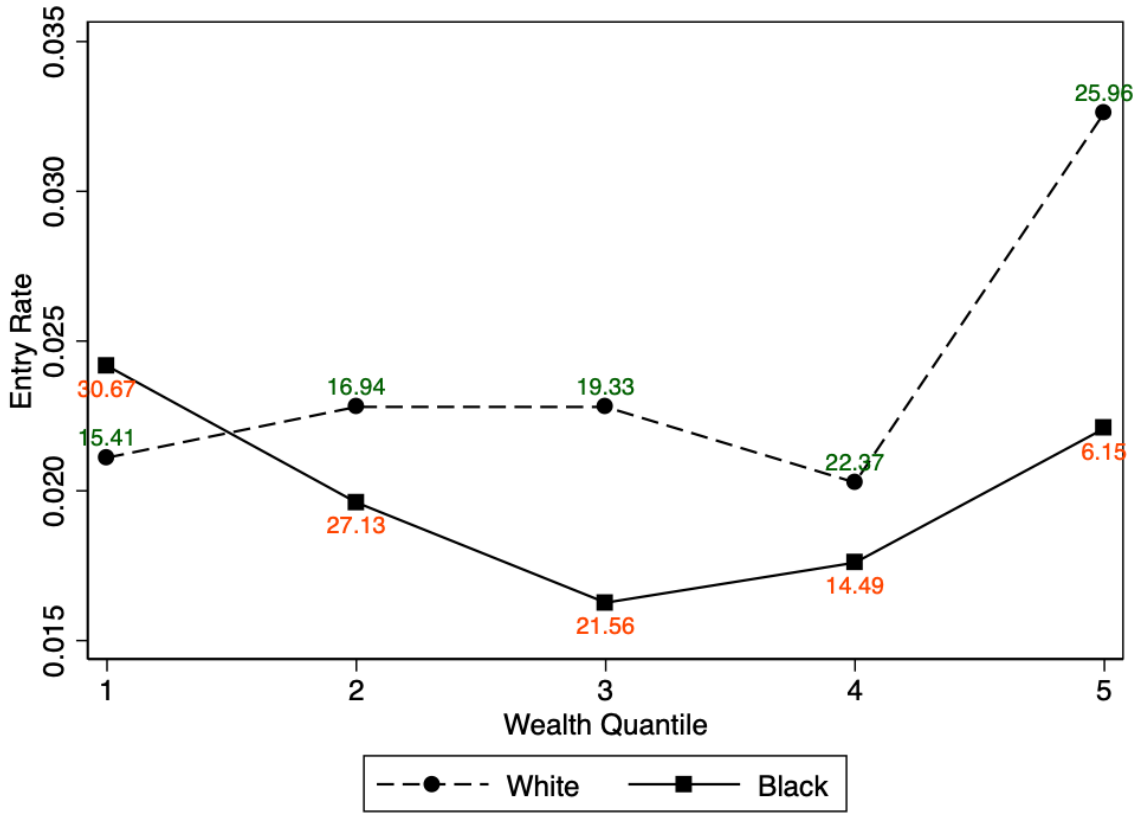

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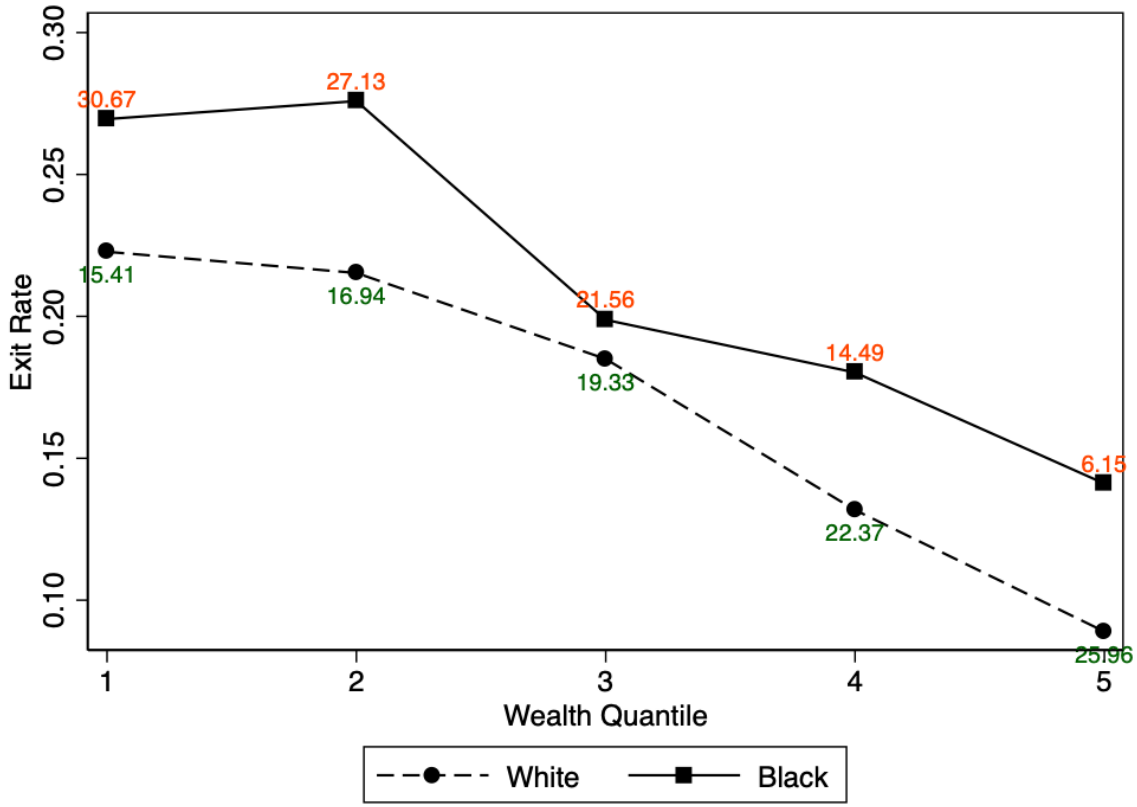
SE Racial Gap Widens at the Top Decile



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Data

- Panel Study of Income Dynamics, 1968 to 2015
- White and black males between the ages of 25 and 58 years - 67 percent of sample is white
- Categorized as SE: self employed, or self-employed and works for someone else
- Annual earnings: labor income, farming income, business income
- Assets: farm wealth, money in cash or checking accounts, real estate, stocks, vehicles, and other assets, less of debt

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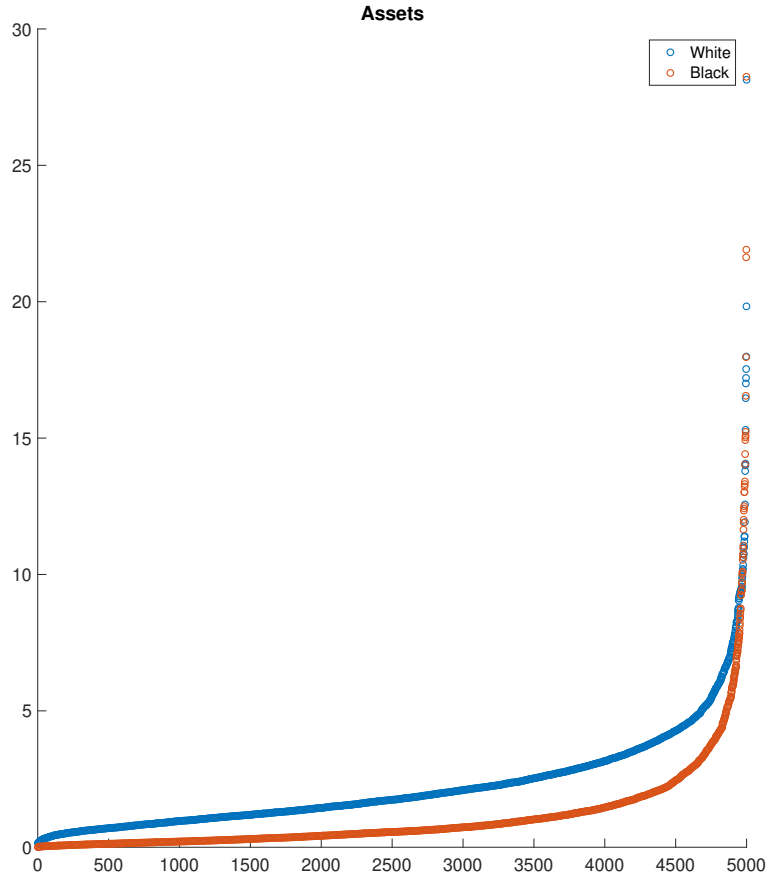
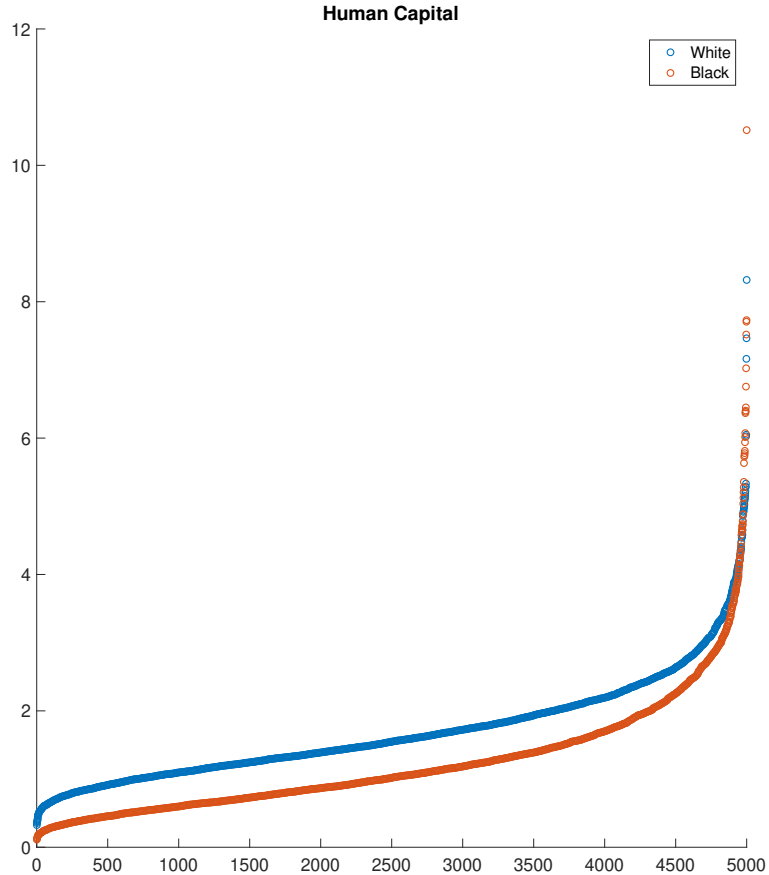
Initial Conditions - Comparison





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Parameter Estimates

1. CRRA Parameter $\rho = 2.16$
2. Capital Share $\theta = 0.34$
3. Liquidity Constraint $\lambda = 5$
4. Large cross-sector returns from paid employment to idea profitability ($\gamma^{PE} = 0.9$)

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Parameters

S.No	Parameter	Estimate
1	Returns to Capital (θ)	0.34
2	Liquidity Constraint (λ)	5.59
3	Non-Pecuniary Benefit from SE (α_s)	1.51
4	Variance of SE Income Shock (σ_s)	0.46
5	Variance of Idea Profitability (σ_z)	0.01
6	Variance of PE Income Shock (σ_p)	0.70
7	Returns to Idea Profitability if PE (γ_s)	0.00
8	Returns to Idea Profitability if SE (γ_p)	0.90
9	CRRA Utility Parameter (ρ)	2.16
10	Fixed Cost of Employment (α_n)	1.20
11	Unemployment Benefit (b)	0.39

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Counterfactuals

S.No.	Group	Blacks (Data)	Counterfactuals				Whites (Data)
			Base	CF-1	CF-2	CF-3	
1	SE (%)	0.060	0.054	0.069	0.099	0.129	0.149
2	NW (%)	0.182	0.162	0.193	0.136	0.204	0.081
3	Entry Rate (%)	0.022	0.019	0.022	0.042	0.050	0.032
4	SE Income/Assets	0.337	0.212	0.185	0.165	0.155	0.258
5	Exit Rate	0.297	0.327	0.289	0.385	0.333	0.156
6	SE, Age 26-35 (%)	0.054	0.064	0.075	0.113	0.136	0.114
7	SE, Age 36-45 (%)	0.060	0.069	0.083	0.128	0.156	0.168
8	SE, Age 46-55 (%)	0.072	0.056	0.078	0.104	0.150	0.180
9	NW, Age 26-35 (%)	0.163	0.170	0.191	0.132	0.214	0.065
10	NW, Age 36-45 (%)	0.149	0.173	0.217	0.158	0.250	0.064
11	NW, Age 46-55 (%)	0.219	0.158	0.183	0.133	0.177	0.101
12	Entry Rate, Age 26-35 (%)	0.024	0.018	0.019	0.038	0.040	0.035
13	Entry Rate, Age 36-45 (%)	0.021	0.018	0.017	0.044	0.041	0.032
14	Entry Rate, Age 46-55 (%)	0.019	0.024	0.030	0.056	0.074	0.027
15	Exit Rate, Age 26-35 (%)	0.346	0.182	0.147	0.220	0.169	0.205
16	Exit Rate, Age 36-45 (%)	0.265	0.241	0.174	0.297	0.211	0.134
17	Exit Rate, Age 46-55 (%)	0.226	0.408	0.355	0.472	0.407	0.128
18	Mean SE Income	0.634	1.065	0.979	1.065	0.969	1.245
19	Var SE Income	4.342	1.971	1.941	1.947	1.884	4.383
20	Mean PE Income	1.263	0.490	0.674	0.832	0.963	1.708
21	Var PE Income	0.666	0.319	0.330	0.125	0.131	0.557
22	Mean Income Per Capita		1.716	1.966	2.272	2.382	

Source: Authors' calculations from *PSID*.
Note: CF1: Changing Human Capital Parameters; CF2: Changing Initial Asset+Human Capital Distribution; CF3: CF1+Changing Initial Asset+Human Capital Distribution

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