Discussion of “Investment Opportunities and the Sources of Lifetime Inequality” by Athreya, Ionescu, Neelakantan, and Vidangos

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Brief Summary

Given the initial inequality, explore the determination of lifetime inequality in a PE quantitative life-cycle model

Conditional on (not) having the access to two investment opportunities

1. college education
2. stock market investment

Questions

1. source of lifetime inequality? initial variance vs. over-time earning dynamics
2. role for each investment opportunity?

Answers

1. initial variance (70 % for lifetime earning inequality and 76 % for wealth inequality)
2. college education option ↑ inequality & stock investment option slightly ↓ inequality
Model Overview

Time Line: Individuals’ Life-cycle

- **Initials**: $a, h_0, x_0$
- **Risk of Completion**: $\pi(h_4)$

- 0, 1, 4, $P$, $R$, Sorry, $t$
- Optional: College
- Repaying Student Loan
- May Work, Working...
- Retired
Model Overview

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Initials $a, h_0, x_0$
Risk of Completion $\pi(h_4)$

0 1 4 $P$ $R$ Sorry $t$

Optional

College
Repaying Student Loan

May Work Working... Retired

- shocks to an agent’s effective wage: $z_{i,t} h_t w_t (1 - l_t)$
- shocks to excess return of equity investment: $\tilde{R}_t = \mu + \eta_t$
Inspecting the Key Mechanisms

- College Education
  - ⇔ option to accumulate human capital when young and cheaper
    1. delay building $h$ incurs greater opportunity cost when working for $w_t = (1 + g_i)^{t-1}$
    2. “trend gain” for college graduates: $g_{cg} > g_{nc}$
  - risk: low type $a$ and low $h_0$ may fail to complete college for $\pi'(a|.) > 0$ and $\pi'(h_0|.) > 0$
  - risk + wealth-poor given college fee: less likely to enroll

- Implications
  1. All agents may quickly build human capital to optimal size of $h$ when young $\Rightarrow$ ↓ inequality of $h$ and earnings
  2. Low type agents are deterred from education $\Rightarrow$ ↑ inequality

(Effect 2 dominates: $\uparrow$)
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Inspecting the Key Mechanisms (Cont.)

- Stock Investment
  - Can happen at *any stage* $t$ of life
  - portfolio choice: wealth to stock, risk-free asset, and consume
  - interaction with college education: (high) low $a$ and $h_0 \Rightarrow$ (less) more likely to participate in stock investment

- Implications
  1. high type $a$, $h_0$, $x_0$ are wealth-rich and get richer $\Rightarrow \uparrow$ inequality
  2. b/c college investment option, low type agents may lift off earlier in life via stock investment $\Rightarrow \downarrow$ inequality

(Effect 2 dominates: $\downarrow$)
Stock Investment

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- Implications
  1. high type \( a, h_0, x_0 \) are wealth-rich and get richer ⇒ ↑ inequality
  2. b/c college investment option, low type agents may lift off earlier in life via stock investment ⇒ ↓ inequality (*Effect 2 dominates: \( \downarrow \)*)
A very interesting paper with a really nice framework relative to e.g. (Huggett et al., AER 2011):
- building $h$ in college paying a fixed cost (college fee) under completion risk vs. working-life accumulation

Investor sophistication link to stock investment performance?
- e.g. evidence and theory in Kacperczyk, Nosal and Stevens (2014)
- may attenuate the Effect 2 (stock) and reinforce the Effect 2 (college)
- or, some fixed cost of entering the stock market may do

What if the student loan is defaultable? or if the repayment schedule is not linear in time, e.g. a fraction of realized wage level after college?
- wealth effect may encourage both college and stock market participation?
# Some Data on Student Loan Defaults

## Default Rates

**Two-Year Cohort Default Rate**

Calculated based on BORROWERS and the two-year window after entering repayment. Cohort is based on fiscal year.

<table>
<thead>
<tr>
<th>Institutional Category</th>
<th>Cohort Yr 2007</th>
<th>Cohort Yr 2008</th>
<th>Cohort Yr 2009</th>
<th>Cohort Yr 2010</th>
<th>Cohort Yr 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Public</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Less than 2 Yrs</td>
<td>7.5%</td>
<td>6.7%</td>
<td>9.9%</td>
<td>10.0%</td>
<td>9.3%</td>
</tr>
<tr>
<td>2-3 Yrs</td>
<td>9.9%</td>
<td>10.1%</td>
<td>11.9%</td>
<td>13.4%</td>
<td>15.0%</td>
</tr>
<tr>
<td>4 yrs +</td>
<td>4.3%</td>
<td>4.4%</td>
<td>5.2%</td>
<td>6.0%</td>
<td>6.8%</td>
</tr>
<tr>
<td><strong>Private Non-Profit</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 2 Yrs</td>
<td>12.6%</td>
<td>14.1%</td>
<td>14.5%</td>
<td>13.6%</td>
<td>14.0%</td>
</tr>
<tr>
<td>2-3 Yrs</td>
<td>8.1%</td>
<td>8.2%</td>
<td>10.0%</td>
<td>8.5%</td>
<td>8.2%</td>
</tr>
<tr>
<td>4 yrs +</td>
<td>3.6%</td>
<td>3.8%</td>
<td>4.5%</td>
<td>5.1%</td>
<td>5.1%</td>
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<tr>
<td><strong>Proprietary</strong></td>
<td></td>
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<tr>
<td>Less than 2 Yrs</td>
<td>12.0%</td>
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<td>15.4%</td>
<td>13.6%</td>
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</tr>
<tr>
<td><strong>Foreign Schools</strong></td>
<td>2.2%</td>
<td>2.2%</td>
<td>5.5%</td>
<td>2.9%</td>
<td>2.7%</td>
</tr>
<tr>
<td><strong>Overall</strong></td>
<td><strong>6.7%</strong></td>
<td><strong>7.0%</strong></td>
<td><strong>8.8%</strong></td>
<td><strong>9.1%</strong></td>
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</tr>
</tbody>
</table>

**Source:** U.S. Department of Education, Office of Federal Student Aid
### Repay Your Federal Perkins Loan

**Overview of Direct Loan and FFEL Program Repayment Plans**

**Repayment Plan**

- **Income-Sensitive (ICR)**
- **Income-Contingent**
- **Income-Based**
- **Pay As You Earn (PAYE)**
- **Revised Pay As You Earn (REPAYE)**
- **Extended Repayment Plan**

**Payments may be fixed or graduated.**

- **Up to 25 years.**

- **If you're a Direct Loan borrower, you must have more than $30,000 in outstanding Direct Loans.**
- **If you're a FFEL borrower, you must have more than $30,000 in outstanding FFEL Program loans.**
- **Your monthly payments will be lower than under the 10-year Standard Plan or the Graduated Repayment Plan.**
- **You'll pay more over time than under the 10-year Standard Plan.**

**Snapshot: Direct Loan and FFEL Program Repayment Plans**

<table>
<thead>
<tr>
<th>Extended Repayment Plan</th>
<th>Revised Pay As You Earn Repayment Plan (REPAYE)</th>
<th>Pay As You Earn Repayment Plan (PAYE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Direct Subsidized and Unsubsidized Loans</td>
<td></td>
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<tr>
<td>- Subsidized and Unsubsidized Federal Stafford Loans</td>
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<tr>
<td>- All PLUS loans</td>
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<td></td>
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<tr>
<td>- All Consolidation Loans (Direct or FFEL)</td>
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<tr>
<td>- Payments may be fixed or graduated.</td>
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<td>- Your monthly payments will be 10 percent of discretionary income.</td>
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<tr>
<td>- Your maximum monthly payments will be 10 percent of discretionary income.</td>
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<tr>
<td>- If you're a new borrower on or after Oct. 1, 2007, and must have received a disbursement of a Direct Loan on or after Oct. 1, 2011.</td>
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<tr>
<td>- Any Direct Loan borrower with an eligible loan type may choose this plan.</td>
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<tr>
<td>- Your monthly payment can be more than the 10-year Standard Plan amount.</td>
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<td>- You may have to pay income tax on any amount that is forgiven.</td>
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<td>- You must have a high debt relative to your income.</td>
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<td>- Your monthly payment will never be more than the 10-year Standard Plan amount.</td>
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<td>- Any outstanding balance on your loan will be forgiven if you haven't repaid your loan in full after 20 or 25 years.</td>
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<td>- If you're married, your spouse's income or loan debt will be considered only if you file a joint tax return or you choose to consider only if you file a joint tax return.</td>
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- selecting the high type $a$ and $h_0$ at $t = 0$ is equivalent to expecting a completion risk at $t = 4$?

Some room for improving the calibration: over-predicting the mean earnings for seniors above 55, due to the excessive exposure to stock market investments?

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Something More

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- a great paper!
Thank You Very Much!