Overview and Plan of the Course

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Human Capital, Markets, and the Family

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Course Description

- This course examines the theory and evidence about inequality and social mobility (within and across generations). We focus on skills, how they are produced, their pricing, and their supply to the market.

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Figure 1: Larrimore (2014): Estimated Average Annual Percentage Change in the Size-Adjusted Household Income Gini Coefficient Attributable to Factor Components by Business Cycle

	1979–89	1989–00	2000–07	1979–07
(1) Actual Gini average annual percentage change	0.97	0.08	0.10	0.40
Average annual percentage change accounted for by:				
(2) Marriage rates	0.13	0.05	0.10	0.09
(3) Male head employment	0.03	–0.02	0.05	0.02
(4) Male head earnings distribution	0.65	0.36	–0.35	0.29
(5) Female head employment	–0.15	–0.16	0.08	–0.10
(6) Female head earnings distribution	0.09	0.01	0.17	0.08
(7) Spouses' earnings correlation	0.14	0.02	–0.05	0.04
(8) Non-head labor earnings distribution	–0.01	–0.10	–0.02	–0.05
(9) Non-head labor earnings correlation	0.03	–0.03	–0.02	0.00
(10) Private non-labor income distribution	–0.09	0.04	0.08	0.00
(11) Private non-labor income correlation	0.08	–0.01	–0.01	0.02
(12) Public transfers distribution	0.01	–0.06	0.02	–0.02
(13) Public transfers correlation	0.06	–0.01	0.03	0.02

Notes: References to male and female head employment and earning refer to those of both the household head and his or her spouse. Due to changes in the March CPS data collection procedures between 1992 and 1993 that limit comparability between those years, inequality changes from 1992 to 1993 are suppressed using the procedure from Atkinson et al. (2011) and described in the main text.

Will Consider the Following Topics:

I. Inequality and Social Mobility
   A. Measures (wealth, income, earnings, health, employment, and labor supply)
      1. The evidence and quality of evidence
      2. Units of measurement (person, household, extended family)?
      3. Debates on measures of income and income mobility and their consequences
   B. Roles of
      1. Skills and prices (including discrimination); skill prices vs. rates of return
      2. Family structure and demography
      3. Transfers, social insurance, and the growth of the welfare state
      4. Asset market constraints: Lending and borrowing
      5. Sorting, peer effects, and neighborhoods

Will Consider the Following Topics:

I. Inequality and Social Mobility (Continued)
   C. Which skills?
      1. Schooling
      2. On the Job Training
   D. Tasks and Skills
      1. Traits and skills
      2. Definition of tasks and relationship with skills
      3. Hedonic models, sorting, and endogenous tasks
   E. Life Cycle Skills
      1. Tradition human capital models (OJT; schooling)
      2. Learning by doing
      3. Production of traits and skills
      4. Imitation and emulation

Will Consider the Following Topics:

I. Inequality and Social Mobility (Continued)

F. Markets and Technology

1. Monopsony and monopoly
2. Technology: AI and innovation; role of robots; skill-biased technical change

G. Families

1. Marital sorting
2. Fertility
3. Location choice
4. Parental influence: parenting, parental styles

H. Neighborhood and Peer Effects: Is Zip Code Destiny?

1. Influences on child investment?
2. Choice of neighborhoods and sorting

Important Background:
The Roy Model and the Generalized Roy Model

- The Roy Model and its generalization are basic tools of applied economics and econometrics. I will draw on your knowledge of it in this course. Economics 312 and other courses teach this model. It helps you interpret the statistical estimates reported in many applied papers estimate in terms of well-posed economic models instead of ill-defined "effects."

Link to Roy Model

Grading and Course Participation

This is a seminar-style course based on weekly student participation by all students guided by faculty lectures and TA review sessions. For each topic, we will select a few leading papers which will be discussed by the entire class. Different students will be designated to lead discussions. In addition, each week all students will be asked to assess the papers discussed in a concise, 2-3 page summary. Student engagement in the weekly reports will receive credit. In addition,there will be homework exercises to cement understanding of the material. This may entail some empirical work applying the methods learned. There will be a take-home final synthesizing class material. Grades are determined as follows:
Weekly reports: 30%
Homework: 20%
Final exam: 50%

Bonus credit will be given for quality participation.

Lecture Notes

- Lecture notes for each week will be posted on the Canvas site in advance of each lecture on the website. The handouts distill and complement the readings.

Supplemental Reading List

- Background material on methodology and additional readings on each topic are available on the Supplemental and Super-Supplemental Reading List.

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Week by Week General Topics

1. Inequality and social mobility
2. Skills and Schooling
3. Preferences/Skills/Preference and Habit Formation
4. Skills, Tasks and Occupations
5. Discrimination and Disparities
6. Role of Firms/Monopsony
7. Life Cycle Models and Dynamics
8. Family Influence
9. Neighborhood and Peer Effects: Chetty and Beyond
10. Evaluating the Welfare State

Reports by Week

- Week 1 – March 30, 2022
  - Measures of Inequality and Social Mobility
  - Skills and Schools
- Week 2 – April 6, 2022
- Week 3 – April 13, 2022
  - Tasks, Skills, Occupation, and Preferences
- Week 4 – April 20, 2022
  - Discrimination and Disparities
- Week 5 – April 27, 2022
  - Role of Firms and Monopsony

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Reports by Week, Cont'd

- Week 6 – May 4, 2022
  - Life Cycle Dynamics
- Week 7 – May 11, 2022
  - Family Influence and Genetics
- Week 8 – May 18, 2022
  - Peers: Power of Place
- Week 9 – May 23, 2022 (4:30pm–7:30pm)
  - Summary: Welfare State (Bruce Meyer and Robert Moffitt)

Flow and Development of Topics in Course

Notes on Roy Models and Generalized Roy Model (Extract)

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Basic Framework of Roy Model

- Agents possess advantages in tasks associated with sector j, $j \in \mathcal{J}$.
- They get an income Y_j for participating in sector j. ($Y_{j,i}$ for agent i)
- There may be a cost C_j of participating in the sector ($C_{j,i}$ for person i).
- A one-period model (will extend to multiple periods later)
- When making their choices, they are uncertain and have information set $\mathcal{I}_i$.

- For notational simplicity, drop the i subscript.
- Agents select sector $\hat{j}$ such that

$$\hat{j} = \underset{j \in \mathcal{J}}{\text{argmax}} E\{\{Y_j - C_j\} \mid \mathcal{I}\}$$

- Toss a coin in the event of a tie.
- Ties are often assumed away as negligible events (i.e., absolute continuity is assumed).

- Ex post agents may regret their choices.
  E.g.,

$$Y_{\hat{j}} - C_{\hat{j}} < 0$$

  or even

$$(Y_{\hat{j}} - C_{\hat{j}}) < (Y_j - C_j)_{j \in \mathcal{J} \setminus \{\hat{j}\}}$$

- The Y_j can be a variety of outcomes.
  Examples:
  1. Different labor force states (work, not work)
     and C_j is cost of working

     $$e.g., Y_1 = \text{ value of market time}$$
     $$Y_0 = \text{ value of home production}$$

     so if $C_1 = 0$ and $C_0 = 0$
     Y_1 is the market wage
     Y_0 is the reservation wage
     Reservation wage can come from
     1. Search Theory (see, e.g., Shimer, 2010)
     2. Value of Time in the home (see, e.g., Heckman, 1974; Mulligan and Rubinstein, 2008)
  2. Earnings in different countries
     (Borjas, 1987)

3. Earnings in different occupations
   (Miller, 1984; Jovanovic, 1979a,b; Pavan, 2008)
4. Earnings at different schooling levels
   (e.g., Willis and Rosen, 1979; Keane and Wolpin, 1997, 2011;
   Heckman, Lochner, and Taber, 1998; Johnson, 2013;
   Heckman, Humphries and Veramendi, 2018.)
5. Randomization bias (Kline and Walters, 2016)

- Under the earnings interpretation, let π_j be the price of skill j (the rental rate or the return)
- The quantity of skill j is S_j
- $Y_j = \pi_j' S_j$ (gross earnings)
- $Y_j - C_j = \pi_j' S_j - C_j$ (net earnings)

The Roy Model: Example

Two sector Roy model. (sectors $j \in \{1, 2\}$)

Income maximizing agents possess two skills $S_1 = s_1$ and $S_2 = s_2$ with associated positive skill prices π_1 and π_2.

Skills are scalar (for now)

Agent chooses sector 1 if his earnings are greater there

$$W_1 = Y_0 = \pi_1 S_1$$
$$W_1 = Y_1 = \pi_1 S_1$$
$$\pi_1 S_1 > \pi_2 S_2$$

Proportion of the population working in sector one,

$$P_1 = \Pr(\pi_1 S_1 > \pi_2 S_2):$$
$$P_1 = \int_0^\infty \int_0^{\pi_1 s_1/\pi_2} f(s_1, s_2) ds_2 ds_1 \qquad (1)$$

Density of skill employed in sector one differs from the population density of skill. (selection problem)

The latter density:

$$f_1(s_1) = \int_0^\infty f(s_1, s_2) ds_2.$$

Former density:

$$g(s_1 \,|\pi_1 s_1 > \pi_2 s_2) = \frac{1}{P_1} \int_0^{\pi_1 s_1/\pi_2} f(s_1, s_2) ds_2$$

Density of earnings in sector 1 (using $w_1 = \pi_1 s_1$):

$$g_1(w_1) = \frac{1}{P_1 \pi_1} \int_0^{w_1/\pi_2} f(w_1/\pi_1, s_2) ds_2$$

Similarly, the density of skill employed in sector 2 is:

$$g(s_2 \,|\pi_2 s_2 > \pi_1 s_1) = \frac{1}{P_2} \int_0^{\pi_2 s_2/\pi_1} f(s_1, s_2) ds_1$$

The density of earnings in sector two is:

$$g_2(w_2) = \frac{1}{P_2 \pi_2} \int^{w_2/\pi_1} f(s_1, \frac{w_2}{\pi_2}) ds_1 \tag{2}$$

The overall density of earnings is:

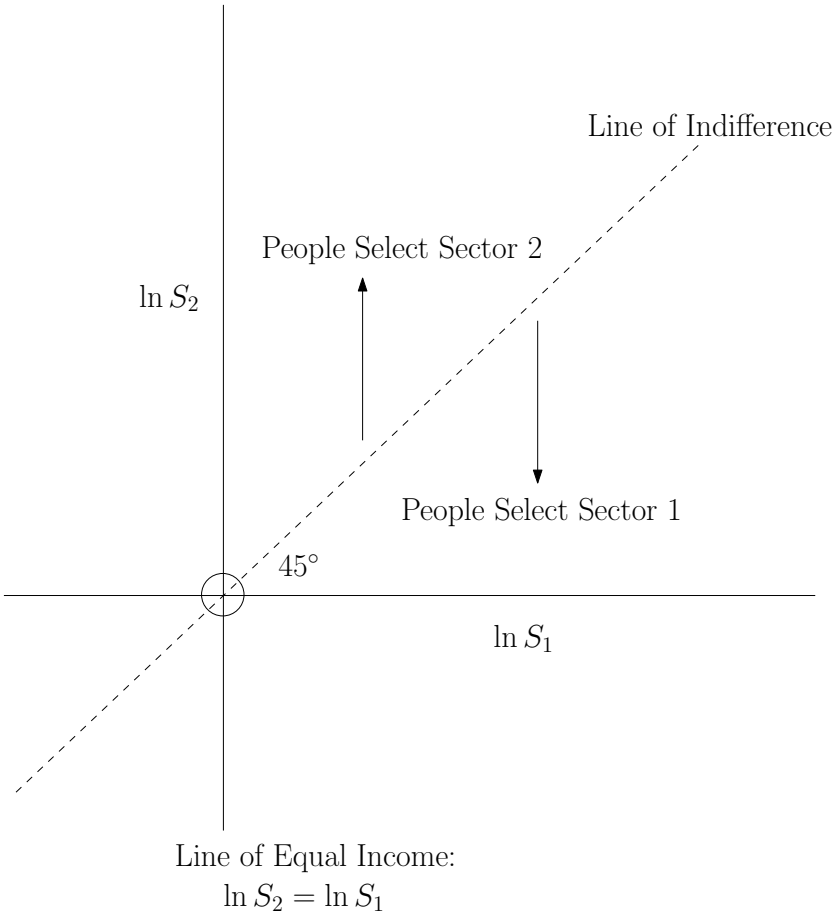
$$g(w) = P_1 g_1(w) + P_2 g_2(w)$$

(A mixture of two densities)

Set $\pi_1 = \pi_2 = 1$

Take logs:

Partitions of $(\ln S_2, \ln S_1)$ space:



- As $\pi_2 \uparrow$, line shifts down in parallel fashion.

Normal Roy Model: Some Illustrations

$$(\ln S_1, \ln S_2) \sim N(\mu_1, \mu_2, \Sigma)$$

$$\begin{aligned} E(\ln S_j) &= \mu_j \\ \ln S_j &= \mu_j + U_j \\ \Rightarrow \ln W_j &= \ln \pi_j + \mu_j + U_j, \ j = 1, 2 \end{aligned} \tag{3}$$

$$\begin{pmatrix} U_1 \\ U_2 \end{pmatrix} \sim N\left(\begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{bmatrix} \sigma_{11} & \sigma_{12} \\ \sigma_{21} & \sigma_{22} \end{bmatrix} \right)$$

Define

$$\sigma^* = [Var(U_1 - U_2)]^{1/2} = \sqrt{\sigma_{11} + \sigma_{22} - 2\sigma_{12}}$$

$$c_1 = (\ln(\frac{\pi_1}{\pi_2}) + \mu_1 - \mu_2)/\sigma^*.$$

Define:

$$\Phi(t) = \int_{-\infty}^{t} \frac{1}{\sqrt{2\pi}} e^{\frac{-q2}{2}} dq$$

$$P_1 = P(\ln W_1 > \ln W_2) = 1 - \Phi(-c_1) = \Phi(c_1)$$

Choice equation (can be of very general functional form)

Line of Indifference:

$$\ln W_1 - \ln W_2 = \ln(\frac{\pi_1}{\pi_2}) + \mu_1 - \mu_2 + U_1 - U_2$$
$$L = U_1 - U_2$$
$$c_1^* = \ln(\pi_1/\pi_2) + \mu_1 - \mu_2.$$

$$E(\ln W_1 \mid \ln W_1 - \ln W_2 > 0) \tag{4}$$
$$= \ln \pi_1 + \mu_1 + \underbrace{E(U_1 \mid L > -c_1^*)}_{\text{Selection Bias Term}}.$$

(For estimation: Control Function)

Selection operates through the dependence between U_1 and $(U_1 - U_2)$.

More generally through the unobservables in the ln W_1 and the decision equation. $(I = Y_2 - Y_1 - (C_2 - C_1))$

Observe Y_2 if $Y_2 - Y_1 - (C_2 - C_1) > 0$
(Censoring condition and Y_2 is a censored random variable)

Observe Y_1 otherwise

Can We Get Negative Selection in Sector 2?

Arises if $\sigma_{22} < \sigma_{12} < \sigma_{11}$

Example: Set $\pi_1 = \pi_2$

- $D = \mathbf{1}\left(\ln S_1 > \ln S_2\right)$
- $\sigma_{22} \leq \sigma_{12} \leq \sigma_{11}$
- $\mu_1 = \mu_2$

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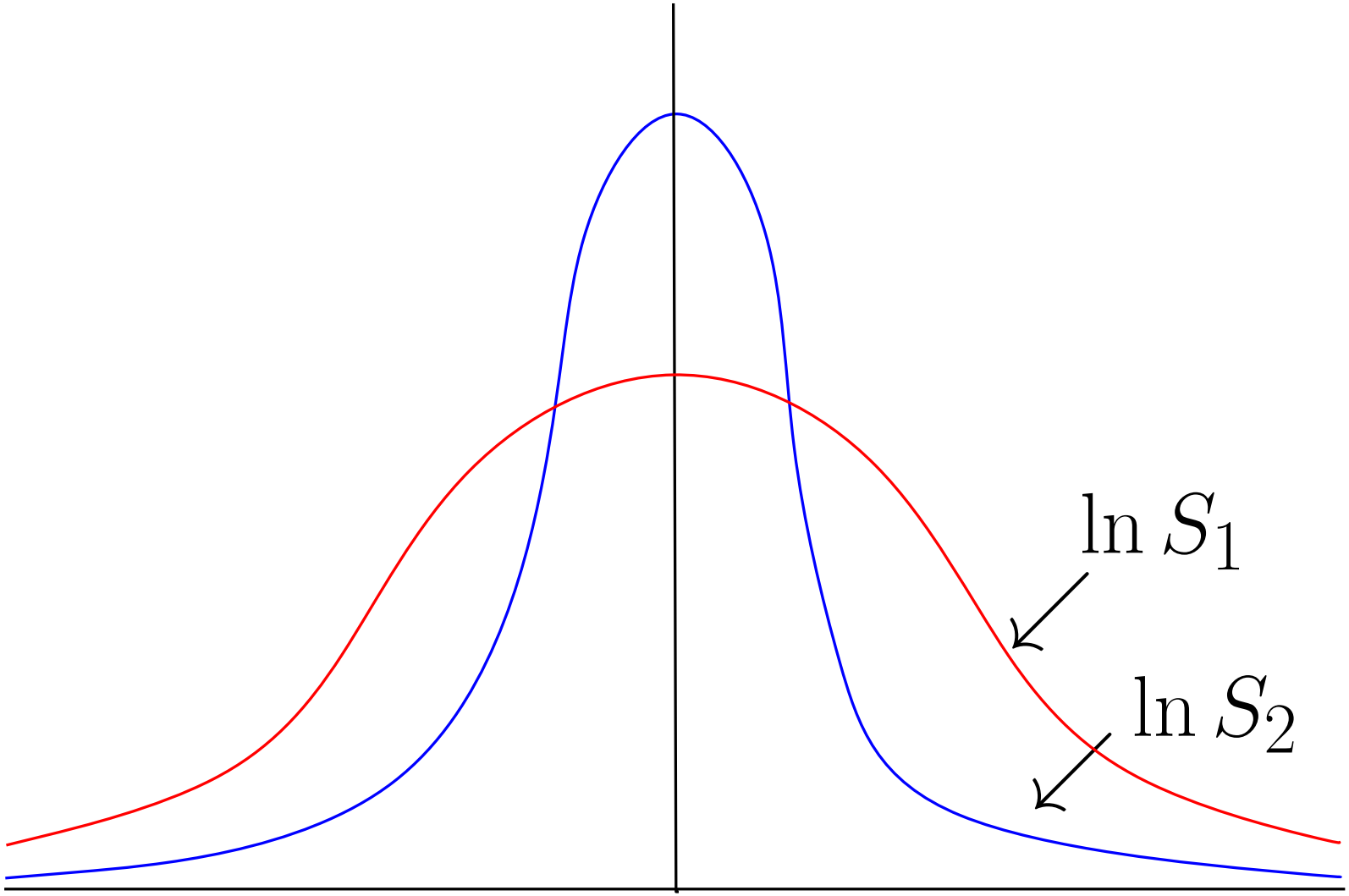
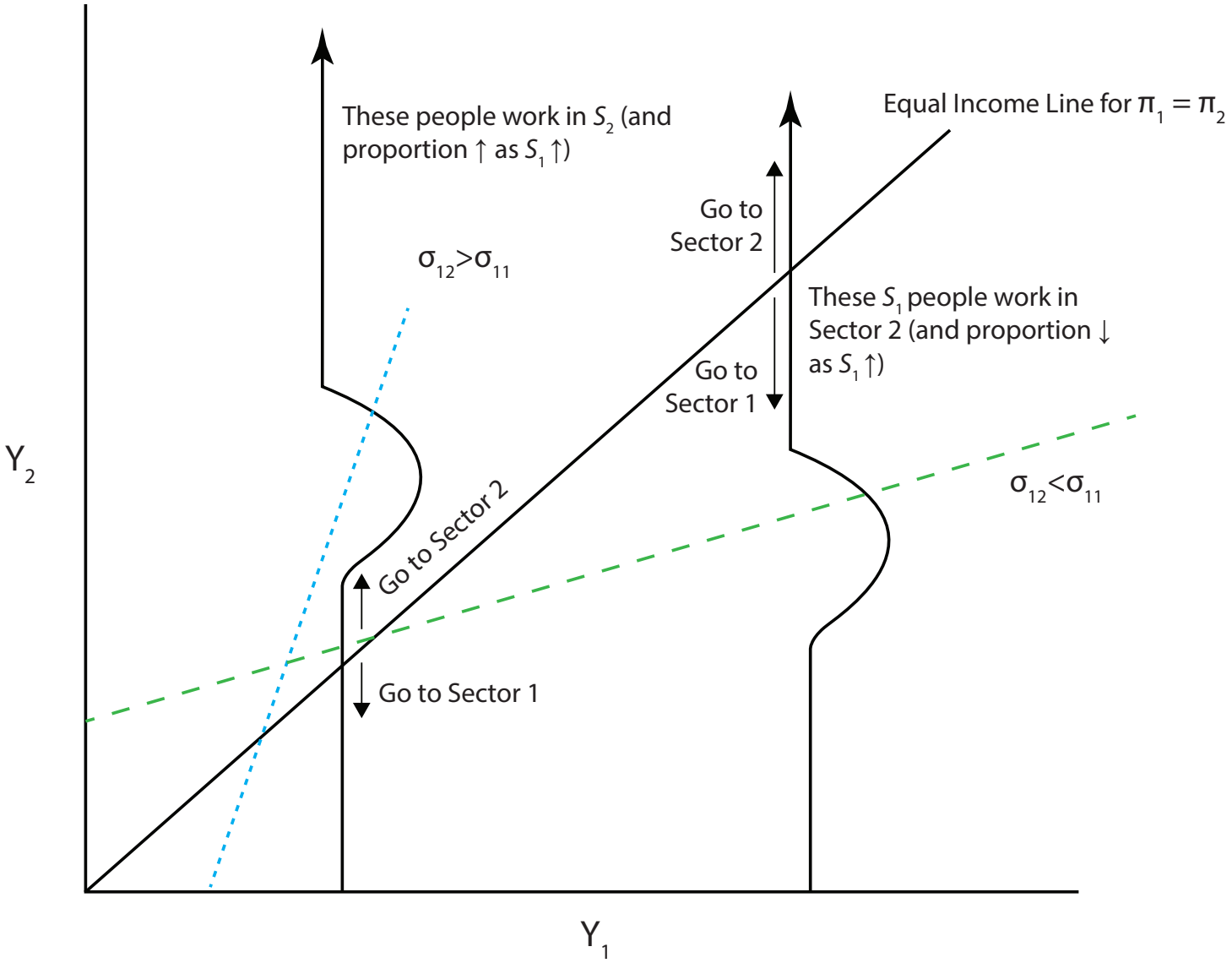


Densities of $\ln S_1$ and $\ln S_2$

- People selected into S_2 are below average in 2.
- People selected in S_1 are above average in 1.



$$Y_2 = \mu_2 + \frac{\sigma_{12}}{\sigma_{11}}(lnY_1 - \mu_1) + \upsilon_2$$

Return to Important Background