

Markets, Inequality and Development

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BREAD Summer Workshop Lecture Notes

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OVERVIEW

- Discuss theoretical literature linking inequality and development
- First lecture: overview of three principal approaches in the literature
- Second lecture: synthesis of the three approaches; extensions, applications

Introduction

- Traditional neoclassical theory predicts convergence at the macro level (Ramsey, Solow theory), and does not have a determinate theory of income distribution at the micro level
- Explains per capita income differences across countries in terms of rates of capital accumulation, demographics, and (exogenous) technical progress
- Inequality *per se* does not matter for growth or differences in living standards (except through its effects on savings or population growth)
- This theory has difficulty explaining facts concerning cross-country differences (Lucas (1988), Banerjee-Duflo (2004))
- Also, need to have a micro-level theory of income distribution given interest of development economists in poverty and inequality; Arrow-Debreu theory provides no particular predictions for income distribution, and takes distribution of endowments as given rather than endogenously determined by parental bequests
- Between 1950–80 theories of income distribution (Champernowne, Simon-Bonini, Shorrocks) were based entirely on stochastic shocks rather than economic behavior

- Since then, substantial literature on theories of inequality at the micro level, with macro implications as well
- All are explicitly dynamic, incorporate capital market imperfections, as well as endogenous bequests
- Meta-questions: does a market economy have an intrinsic tendency to equalize living standards across families or economies, when agents are credit-constrained? Or are there poverty traps?

- Common view of credit constraints: they bind, and more severely for the poor
- Suggests one reason why markets could be disequalizing: families or countries that are wealthier are less credit constrained, so invest more, causing gap between wealthy and poor to grow over time
- However, there could be countervailing effects: credit constraints could motive the poor to save more; rate of return on investments of the poor could be higher
- For example, the one sector Ramsey growth model could be viewed as a story of savings and growth of households without any access to the capital market, and there the poor catch up with the rich owing to higher savings and higher rates of return
- So effects of credit constraints on the evolution of inequality, or on the effects of poverty on growth, are not obvious *a priori*: need a theory explaining differences in savings rates, in rates of return between the poor and the rich

- Three principal approaches to the literature:
 - **“Exogenous” Inequality Theories:** (Becker-Tomes (1979, 1986), Loury (1981)) Markets are equalizing; history does not matter in the long-run; inequality results from heterogenous ability, luck
 - **“Neutral” History-Dependence Theories:** (Banerjee-Newman (1993), Galor-Zeira (1993), Lloyd-Ellis-Bernhardt (2000), Matsuyama (2000, 2003), Ghatak-Jiang (2002)) Markets can be equalizing or disequalizing; history matters in the long run; historical inequality/equality gets perpetuated
 - **“Endogenous” Inequality Theories:** (Ljungqvist (1993), Freeman (1996), Mookherjee-Ray (2003)) Markets are disequalizing; inequality is inevitable and persistent in the long run even in the absence of heterogeneity or luck
- This lecture will be devoted to samples of each approach
- Next lecture: try to assess what is driving the differences

- Common features of the different models:
 - *Dynasties and Intergenerational Bequests*: economy is composed of a set of dynasties or families, one representative in each generation, generation t parent decides how to allocate lifetime wealth between consumption and investment in child
 - *Capital market imperfection*: parents cannot borrow from future earnings of children to pay for their investments in them; children are credit constrained or pay interest rates that depend on how much wealth they inherited
 - *Investment* takes the form either of education, or financial bequests (sometimes both)
 - *Equilibrium*: Dynamic competitive equilibrium with perfect foresight, typically unique for given history; consequently nature of coordination ‘failure’ at economy-wide level concerns existence of multiple steady states with varying levels of per capita income and investment
 - *Inequality*: concerns differences in income, consumption, utility between families (micro-inequality); in per capita income or investment across economies (macro-inequality)

- *Technology, Trade*: Given (unchanging) technology; closed economy
- Differences concern:
 - *Bequest motive*: Dynastic (*a la* Barro-Becker), Paternalistic (*a la* Becker-Tomes), Warm-Glow
 - *Heterogeneity/randomness* in ability, income (Becker-Tomes, Loury, Banerjee-Newman, Mookherjee-Napel), absent in all others
 - *Externalities*: independent dynamics (Becker-Tomes, Loury, Galor-Zeira) or interdependent dynamics, depending on whether there are pecuniary externalities
 - *Investment Technology*: indivisibilities, return structure convex or nonconvex, exogenous or endogenous
 - *Specific Context*:
 - * Human Capital and Labor Markets (Loury, Galor-Zeira, most endogenous inequality models)
 - * Financial Capital (Becker-Tomes)
 - * Occupation Choice (Banerjee-Newman, Matsuyama, Lloyd-Ellis-Bernhardt, Ghatak-Jiang)
 - * Firm Size and Credit Markets (Piketty, Matsuyama, Banerjee-Duflo)

Notation

t will denote a generation, so $t = 1, 2, \dots$: will typically appear as a subscript on the subsequent variables:

y_t : income of a generation t agent

b_t : bequest left by a generation t agent to his child

e_t : endowment or education level of a generation t agent

w_t : wage rate or return to education (or endowment) of a generation t agent

x_t : wealth of a generation t agent

c_t : consumption of a generation t agent

“Exogenous” Inequality Models

Becker-Tomes (JPE 1979)

- paternalistic bequest motive:

$$U(c_t^i, x_{t+1}^i) = (c_t^i)^{1-s} (x_{t+1}^i)^s \quad (1)$$

- budget constraints:

$$c_t^i + b_t^i = x_t^i, x_{t+1}^i = w_{t+1} \left[\frac{b_t^i (1+r)}{w_{t+1}} + a_{t+1}^i + u_{t+1}^i \right] \quad (2)$$

where e : endowment, w : (exogenous) rate of return, a : ability, u : luck, r : exogenous interest rate

- ability follows mean-reverting process:

$$a_t^i = (1-h)\bar{a} + ha_{t-1}^i + v_t^i \quad (3)$$

where $h \in (0, 1)$, v_t^i is iid

- Hence investment technology is linear, exogenous, independent across families; investment is in financial assets
- Perfect capital markets (no nonnegativity restriction on bequests), but this is not essential

- Wealth evolution of wealth from parent to child in any family:

$$x_{t+1}^i = \beta x_t^i + sw_{t+1}[(1-h)\bar{a} + ha_t^i + v_t^i + u_t^i] \quad (4)$$

where $\beta \equiv s(1+r)$ denotes intergenerational persistence parameter

- **Key assumption:** $\beta \in (0, 1)$
- Empirical estimates of β in US range from 0.1–0.6, depending on measure of x , dataset
- Implies that in the absence of randomness in ability or luck, wealths converge across families (at speeds that depend on β)
- Hence inequality is caused entirely by luck and heterogeneous ability, whose effects are mitigated by endogenous bequests
- Important distinction between immobility and (cross-sectional) inequality: lower β associated with higher mobility and higher inequality

Loury (Eta 1981)

- Main Differences from Becker-Tomes:
 - no borrowing
 - human capital, with strictly convex investment technology
 - Dynastic bequest motive

- Returns to education:

$$y_t^i = g(e_t^i, a_t^i) \quad (5)$$

where g is strictly concave in $e \geq 0$, a is ability drawn from iid distribution

- Parent maximizes $\sum_{k=t}^{\infty} \delta^{k-t} u(y_t^i - e_{t+1}^i)$ where $\delta \in (0, 1)$, u is strictly concave
- Reduces to stochastic version of neoclassical growth model (Brock-Mirman): income process is ergodic; in the absence of ability shocks incomes converge
- However, scope for policy interventions that simultaneously increase efficiency and reduce inequality: poor parents invest less in their children, so rate of return to investing in children in poor families is higher

“Neutral” History-Dependent Theories

Nonconvex Ramsey Models; Galor-Zeira (RES, 1993)

- Suppose there is a nonconvexity in the returns to education (e.g., marginal returns to college are higher than to high school)
- Suppose there are no ability shocks, and leave all other aspects of the Loury model unchanged: can then get multiple steady states, one at finishing high school, another at finishing college
- College educated parents will earn more, invest more in their children, who will also be college educated, while parents finishing high school earn less and find the sacrifice required to send their children to college too high to bear
- Galor-Zeira (RES 1993) pursue a variation of this, where the source of the nonconvexity is a capital market imperfection, combined with indivisibility in investment options

Galor-Zeira Model

- Warm-Glow bequest motive: generation t parent maximizes $u_t = c_t^{1-s} b_t^s$ where $s \in (0, 1)$ is the constant rate of investment out of lifetime wealth
- Indivisible investment options: each child decides whether or not to go to college, wages of skilled (w_s) and unskilled (w_n) exogenously determined, college cost $h > 0$ exogenous, and rate of return to college exceeds exogenous (lending) interest rate r
- Capital market imperfection: borrowing rate i exceeds lending rate r , no restrictions on borrowing
- Those who inherit little (relative to college cost) have to borrow at rate i to finance college, so sufficiently poor agents will not go to college, and become lenders (earning r on their inheritances)
- Those who inherit more than college cost can self-finance college, and will do so, and lend the remainder of their inheritance at rate r
- The middle class goes to college, financed by loans: they borrow at rate i

- Implied intergenerational wealth dynamic then acquires a nonconvexity:

$$x_{t+1}^i = \begin{cases} s[(1+r)(x_t^i + w_n) + w_n] & \text{if } x_t^i < f \\ s[w_s - (1+i)(h - x_t^i)] & \text{if } f \leq x_t^i < h \\ s[w_s + (1+r)(x_t^i - h)] & \text{if } x_t^i \geq h \end{cases} \quad (6)$$

- Responsiveness of child's inheritance to parent's inheritance is $s(1+r)$ for poor (below f) and rich (above h) who lend, and $s(1+i)$ for middle class who borrow
- Can generate two stable steady states, one low in the poor region and the other high in the rich region (require $s(1+i) > 1 > s(1+r)$), and one unstable steady state in between

- Low level poverty trap: any family starting with an inheritance below the unstable steady state converges to the low steady state; those starting above converge to the high one
- Inequality across economies can persist as well: historical distribution of inheritances determine where the economy ends up in the long run, so a continuum of steady states varying in per capita income and inequality
- But market process is ‘neutral’ to inequality: if families or countries start equal, they stay equal; for some pair of initial positions it magnifies inequality; for others it reduces inequality

Ghatak-Jiang (JDE 2002) version of Banerjee-Newman (JPE 1993) Model

- Occupational Choice: worker (W) or entrepreneur (E) in a modern sector, more productive than a traditional subsistence (S) sector
- S sector: people are self-employed and earn constant \underline{w}
- Modern sector: entrepreneurs hire workers to work in firms that require start-up capital $I > 0$
- One entrepreneur hires and supervises one worker, producing q
- Borrowing not possible; need to inherit at least I to become an entrepreneur, constant lending rate r , with $q - rI > 2\underline{w}$
- Those who inherit at least I can choose between three occupations E,W,S; those inheriting less choose between W,S

- Key endogenous variable: wage rate w for workers in modern sector, creates pecuniary externality in the wealth dynamic of different families
- For modern sector to function, there must be people willing to choose W over S ($w \geq \underline{w}$) and people willing to choose E over W ($w \leq \bar{w} \equiv \frac{q-rI}{2}$)
- Labor market equilibrium: $w = \bar{w}$ if there are more E's than W's (then they earn the same), and $w = \underline{w}$ otherwise (then E's earn more)
- Warm-glow bequests: fraction s of wealth is left as bequest
- Wealth dynamic now depends on the wage rate, hence on the entire wealth distribution (denoted by cdf G_t .)

$$x_{t+1}^i = \begin{cases} s[(1+r)(x_t^i + \underline{w})] & \text{if } x_t^i < I \text{ and } G_t(I) > \frac{1}{2} \\ s[q - \underline{w} + (1+r)(x_t^i - I)] & \text{if } x_t^i \geq I \text{ and } G_t(I) > \frac{1}{2} \\ s[\bar{w} + (1+r)x_t^i] & \text{if } x_t^i \geq I \text{ and } G_t(I) \leq \frac{1}{2} \end{cases} \quad (7)$$

- An equal SS exists iff $\bar{W} \equiv \frac{s\bar{w}}{1-s(1+r)} \geq I$: everyone in the population inherits \bar{W} and has the capacity to become an entrepreneur
- An unequal SS exists if $\underline{W} \equiv \frac{s\underline{w}}{1-s(1+r)} \leq I \leq s[q - \underline{w}]$: more than half the population inherit \underline{W} and become workers, rest inherit more than I and become entrepreneurs
- Continuum of unequal SS's: fraction of workers can be any fraction exceeding $\frac{1}{2}$
- “*Neutrality*” and *History Dependence*: Equal and unequal SS's co-exist (for intermediate values of I); competitive equilibrium dynamic depends on history: if more than half the population start with less than I , $w_t = \underline{w}$ for all t and economy converges to an unequal SS, otherwise $w_t = \bar{w}$ always and economy converges to the equal SS

Endogenous Inequality Theory: Mookherjee-Ray (RES 2003) model

- Set of occupations \mathcal{H} , admitting both case of finite number of discrete occupations, and continuum of occupations
- One consumption good, produced from different kinds of human capital according to CRS production function $y = f(\lambda)$, where $\lambda \equiv \{\lambda(h)\}_{h \in \mathcal{H}}$ is the occupational distribution
- Wages determined by marginal products: $\mathbf{w}(\lambda) = \{w(h; \lambda)\}_{h \in \mathcal{H}}$
- Education cost determined by CRS profit-maximizing education sector $e(h; \mathbf{w})$, can also be written as $e(h; \lambda)$
- Human capital only source of wealth: income == earnings
- No borrowing possible: parents must pay for children's education
- Dynastic bequest motive: generation t parent with occupation h chooses occupation h' for its child to maximize value function

$$V_t(w(h, \lambda_t)) \equiv u(w(h, \lambda_t)) - e(h; \mathbf{w}_t) + \delta V_{t+1}(w(h', \lambda_{t+1})) \quad (8)$$

where u is strictly concave and strictly increasing

General Properties of Steady States

- *Ordering of Occupations and Incentives:* Active occupations with the same (higher) educational cost must earn the same (more); those in occupations that earn more incur lower marginal cost of investing in children's education
- *Absence of Mobility:* Each family's earnings and educational investment must be stationary
- *Persistent Inequality:* Suppose there are at least two active occupations h, h' with distinct educational costs $e(h; \cdot) > e(h'; \cdot)$: then those in h must attain higher levels of utility, income and consumption
- Hence **markets are fundamentally disequalizing:** with minimal occupational diversity, inequality is inevitable: there cannot be any equal steady state
- Even if all families start equal, their fortunes must subsequently separate, to achieve sorting of population into occupations with distinct education costs

Macro (Steady State) Multiplicity

- History dependence at the economy-wide level depends on the existence of indivisibilities in range of investment options
- Suppose there are only two occupations: unskilled (n) requiring no education, skilled (s) requiring fixed training cost \mathbf{e} ; occupational distribution represented by skill ratio denoted by λ
- Wages w^n , w^s a function of λ ; former rising and latter falling in λ upto $\bar{\lambda} \in (0, 1)$ where their marginal products are equalized
- Steady state represented by property that children acquire skill if and only if their parents are skilled:

$$\begin{aligned} u(w_n(\lambda)) - u(w_n(\lambda) - \mathbf{e}) &\leq \frac{\delta}{1-\delta}[u(w_s(\lambda) - \mathbf{e}) - u(w_n(\lambda))] \\ &\leq u(w_s(\lambda)) - u(w_s(\lambda) - \mathbf{e}) \end{aligned}$$

- Pair of incentive constraints, generally both strict, so small perturbations of λ will preserve them: there is a continuum of steady state skill ratios
- **Hysteresis:** Scope for temporary shocks or temporary policies of educational subsidy to raise long run per capita income, or relieve educational underinvestment

- On the other hand, *steady state is unique and efficient if there are no indivisibilities in investment options!*
- Suppose there is a continuum of active occupations h with smoothly varying education cost $e(h)$ over unit interval
- Steady state must involve every occupation reproducing itself: $h' = h$ must maximize

$$u(w(h) - e(h')) + \frac{\delta}{1 - \delta} u(w(h') - e(h')) \quad (9)$$

- First-order differential equation: $w'(h) = \frac{1}{\delta} e'(h)$
- Unique solution consistent with profit maximization (at most one value of $w(0)$, which generates boundary condition)
- No underinvestment (despite missing credit market): the unique steady state is Pareto-efficient: rate of return to education equalized across all occupations, to the discount rate
- Hence, **persistent inequality and history dependence only (and inevitably) at the micro level; at the macro level it requires indivisibilities in investment options**

Synthesis of the Three Approaches

- Three approaches emerge with radically different sets of conclusions concerning markets and inequality
- Many common assumptions, but also many differences in details. Which are the really key assumptions? Which assumptions are more defensible than others?
- ‘Exogenous’ inequality models promote the market equalization view, with paternalistic or dynastic bequest motive, financial and or human capital, convex investment technology, and independent dynamic across households
- ‘Neutral’ history-dependence models use warm glow bequest motive, financial and or human capital, indivisibilities in investment options, and either independent or interdependent dynamic
- ‘Endogenous’ inequality models use dynastic or paternalistic bequests, human capital, and flexible formulation of investment

- Concern with ‘exogenous’ inequality models: exogenous diminishing returns to investment, generating independent dynamic across households, with no pecuniary externalities
- With human capital, have to assume that different occupations correspond to differing ‘efficiency’ units, so are perfect substitutes for one another (Becker-Tomes JLE 1986)
- Implies that skill premia are determined by technology, hence independent of the occupational distribution
- Considerable empirical evidence to the contrary (e.g., Katz-Murphy QJE 1994)
- So have to take these pecuniary externalities seriously
- When skill premia are endogenously determined, convexity or nonconvexity of the investment technology becomes endogenous
- So it is unclear how their results are modified when skill premia are allowed to be endogenous

- Concern with history-dependent ‘neutral’ models: based on indivisibilities (only two occupations), and warm-glow bequest motive (no strategic saving)
- Load the dice in favor of poverty traps: only way to escape poverty is to make a large investment (so cannot build up assets little by little), which is prevented by borrowing constraints, and (owing to warm-glow bequests) agents are not motivated to save more to alleviate future credit constraints
- How will their results extend when we reduce the extent of indivisibilities, and increase the scope for strategic savings?

- Concern with the ‘endogenous’ inequality models: did not allow financial capital
- When human and financial capital co-exist, inequality is not inevitable
- Can induce agents to sort into occupations with disparate training or setup costs, and at the same time achieve wealth equality if financial and human capital investments are negatively correlated
- How would these models extend when we allow both kinds of capital to coexist?

A Synthetic Model: Mookherjee-Ray (2004)

- A model which embeds all three approaches
- Financial and human capital co-exist
- Flexible investment technology, allowing differing degrees of indivisibility, and returns to be interdependent
- Strategic savings (paternalistic altruism)

- Single consumption good, one physical capital good, set of occupations \mathcal{H} , training cost function $e(h)$
- Aggregate CRS production function $y = f(k, \lambda)$, where k is physical capital, and λ is the occupational distribution
- Minimal occupational diversity: production necessitates employment of at least two occupations with distinct training costs
- To simplify exposition, assume here that interest rate r fixed by international capital market
- In generation t , young person in family i inherits financial bequest $b_t(i)$ and occupation $h_t(i)$ from its parent
- Economy-wide factor aggregates: k_t, λ_t , leading to occupational returns $w_t(\lambda_t)$
- Wealth of i at t is $W_t(i) \equiv (1 + r)b_t(i) + w_t(h_t(i))$

Paternalistic bequests: i at t selects $b_{t+1}(i), h_{t+1}(i)$ to maximize

$$U(W_t(i) - e(h_{t+1}) - b_{t+1}) + V((1+r)b_{t+1} + w_{t+1}(h_{t+1})) \quad (10)$$

subject to the borrowing constraint $b_{t+1} \geq 0$.

Define (perfect foresight) dynamic competitive equilibrium recursively as before

PROPOSITION 1 *The wealth of (almost) all families is stationary in any given steady state.*

Reason: $W_{t+1} < (>)W_t$ implies $W_{t+2} \leq (\geq)W_{t+1}$, owing to monotonicity of investment incentive in parental wealth.

Implies lack of wealth mobility in any steady state.

Equal SS: a SS with a degenerate wealth distribution

Unequal SS: a SS with a non-degenerate wealth distribution

Note: Equal SS is now consistent with the model, as human capital and financial bequests can be negatively correlated

Becker-Tomes (BT) Model: Only Financial Bequests

Suppose there are only financial bequests: everyone earns fixed ω , and suppose the interest rate is fixed (BT 1979))

Parent with wealth W selects $b \geq 0$ to maximize

$$U(W - b) + V(\omega + (1 + r)b)$$

Let $W' \equiv \omega + (1 + r)b$. Then $W'(W; r, \omega)$ is increasing in W .

Assumption of Limited Wealth Persistence (LP):

$$\frac{\partial W'}{\partial W} \in (0, 1)$$

LWP implies $W'(W; r, \omega)$ is a contraction, with a unique fixed point, denoted $\Omega(\omega; r)$: hence market is equalizing

To facilitate comparisons, assume LWP holds from now on.

Existence of Equal Steady States

Define ‘occupational span’ as maximal disparity in training costs across distinct, essential occupations

Result 1: *An equal SS exists if and only if the occupational span is small relative to the strength of the bequest motive and the interest rate*

Intuitively, earning differentials should not be so large that they cannot be spanned or offset by financial bequests

More likely to hold for societies with high *levels* of wages; less likely for societies with high rates of growth of wages (where wage differences stem from differences in technology)

Hence, developing countries (with low levels but higher rates of growth of wages) less likely to satisfy the narrow span condition, and thus be more prone to inequality

Result 2: *If there is a continuum of (essential) occupations with continuous education costs, then the steady state is unique.*

Previous result on steady state uniqueness thus continues to hold

If the narrow span condition holds as well, then results of the Becker-Tomes-Loury theory apply: the equal SS is the unique SS, so *the market is always equalizing in this case*

But if the narrow span condition does not hold, then the results of the endogenous inequality theory apply, and the *market is always disequalizing*

Result 3: *If there are two occupations with distinct education costs, then there is typically a continuum of unequal SS's, and the equal SS also exists if the narrow span condition holds.*

In the presence of significant indivisibilities, the 'neutral' history-dependence theories apply

Can show that competitive equilibrium always converges to (some) steady state from arbitrary initial conditions

Interesting 'threshold' effects: countries that start with high per capita income and low inequality converge to the equal steady state; others converge to an unequal steady state

So whether markets are fundamentally equalizing or disequalizing depends not only on initial inequality: even if a country starts perfectly equal but poor, it can converge to an unequal SS

Essentially because the severity of the capital market imperfection is greater, the poorer the country or household: requirement of 'symmetry-breaking' to induce sorting into disparate occupations cannot be compensated via financial bequests

Extensions

Mobility

- Many of these models abstract from heterogeneity in ability or income risk, so end up with steady states without any mobility at all
- Exceptions: Becker-Tomes, Loury, Banerjee-Newman, Piketty, Ellis-Bernhardt, Maoz-Moav (EJ 1999)
- What are the effects of introducing heterogeneity into the two occupation human capital model with pecuniary externalities?
- Suppose agents learning abilities vary, are drawn iid from a given distribution. Then steady states typically involve mobility (both downward and upward).
- However, the set of steady states shrinks to a finite set generically, and sometimes to a unique steady state (Mookherjee-Napel (2004)). In general, however, there are a finite number of steady states ordered by per capita income, skill and mobility.
- So shocks reduce extent of history-dependence, but do not entirely eliminate it; however, hysteresis is eliminated

Endogenous Fertility:

- Prina (BU mimeo, 2005) shows that if utility has constant elasticity and generates quantity-quality tradeoffs in fertility choice, then even without any shocks to income or ability, steady states involve upward mobility, are generically finite and locally isolated.
- *Reason:* unskilled households have more children than skilled households, causing downward demographic drift to skill ratio; hence no interior steady state can survive
- In steady state there must be upward mobility among the unskilled to offset the downward demographic drift, tying down the skill ratio (IC for unskilled parents bind)
- Suggests steady state mobility determined by fertility patterns in part: countries with steeper fertility declines (as wages rise) will be more upwardly mobile

Other Extensions

Technical Change: Rigolini (JDE, 2004) considers effects of technological change on inequality: long run effects can be quite different from short-run effects (e.g. skill premia in the long run can fall or remain unchanged despite SBTC, owing to endogenous skill upgrading responses)

International Trade: Tanaka (NYU mimeo, 2003) considers effect of opening two closed economies with different steady state skill ratios to trade in final products: factor price equalization, plus possibly skill upgrading in both DC and LDCs; poor in LDCs gain, but gap between DC and LDCs may increase or decrease

Financial Globalization: Matsuyama (Eta, 2004) shows international capital flows can be disequalizing (interest rate gaps vanish, eliminating catch-up of LDCs)

Immigration: Cristobal, in progress, suggests long run effects may be quite distinct from short-run effects (e.g., descendants of domestic unskilled workers may gain from immigration of unskilled workers owing to induced skill upgrading responses)

Empirical Applications

- Banerjee-Duflo (2004) argue US-India differences in per capita income and productivity cannot be explained by neoclassical model which assumes perfect capital markets, given basic facts concerning differences in income, human capital, and interest rate distributions in the two countries
- Within-country dispersion in interest rates and rates of returns dwarf inter-country dispersion
- Suggest a S-shaped production function (with respect to capital) along with capital market imperfections needed to explain the data
- LDCs with wealth distribution concentrated at the bottom end and severe credit constraints, characterized by firms stuck in the low convex end; DC wealth distributions and financial systems permit larger more efficient firm scales
- Model has dynastic bequests, different firm sizes corresponding to different ‘occupations’, interdependence of returns arising through interest rate
- With continuum of firm sizes, steady state will be unique conditional on the interest rate; so macro-multiplicity relies on multiple steady state interest rates

- Jeong-Townsend (2003) calibrate the Ellis-Bernhardt model (which extends the Ghatak-Jiang occupation choice model to include heterogenous entrepreneurial talent (setup costs)) to Thai SES data for 1976–96
- Model picks up most of the change in growth and inequality, but for different reasons
- Model emphasizes effects of changing composition of population across occupational groups (S, W, E) and changing wage rates over time; data shows that intra-group changes (especially within W) are far more significant
- Suggests greater attention needs to be paid to human capital differences among workers
- Exogenous changes in financial sector intermediation explains a significant part of the growth (facilitating growth of E's)

Open Questions

- Effects of financial market reforms and international capital movements
- Effects of educational policy interventions
- Trade liberalization: can it increase skill premia in LDCs, if so under what circumstances (East Asia vs Latin America)
- Design of welfare systems to reduce long-run poverty, incorporating incentives among the poor to invest in skills and assets
- Welfare economics of mobility (contrast to inequality)
- Empirical significance of long-run effects arising from skill upgrading responses
- Empirical investigation of some of the key assumptions, concerning span and divisibility of investment options
- Models of endogenous occupational span (merge these theories with endogenous product/occupational variety in the growth literature)
- Role of aspirations – individual, group — in occupational choice or human capital; effects of past discrimination against certain minorities; effect of affirmative action programs