

Ufuk Akcigit (JPE, 2017)

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Reading group
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The Past

Physical capital accumulation

- Theory: Neoclassical growth model (Ramsey 1928, Cass 1965, Koopmans 1965)
 - Endogenizes the savings rate compared with the classic Solow model (Solow 1956, Swan 1956)
 - Production function: $Y_t = AK_t^\alpha L_t^{1-\alpha}$
 - Short-run growth through capital accumulation due to decreasing returns
 - Prediction: Convergence in per capita income
- Empirics: (Barro & Sala-i-Martin (1992))
 - Convergence at the state level
 - Mixed results in cross-country data → “conditional convergence”

Spillovers

- Growth resulted from capital accumulation and spillovers
 - Learning by doing: $A_t = \gamma K_t$ (Romer 1986, Stokey 1988, Lucas 1988, Glaeser et al. 1992)
- AK model: Rebelo (1991)
 - Production technology linear in capital: $Y_t = AK_t$
 - Generates long-run growth

Innovation-based growth

- R&D efforts → new technologies → new product variety (Romer 1990) / improved existing product or technology (Aghion & Howitt 1992, Grossman Helpman 1991)
- Key ingredients:
 - Individuals work either in goods production (L) or in research (R)
 - Production function for ideas: $\dot{A} = \delta A_t R$
 - Free-entry condition pins down the allocation of workforce: $w_t = V_t \delta A_t$
 - Equilibrium L and R determine level of production and knowledge growth (thus capita income) respectively

Further remarks

- **Romer (1990):**
 - Abstracts from competitive, firm exit, firm turnover
 - Features uninternalized spillovers through idea production function
 - Generates underinvestment in R&D and calls for research subsidies
- **Schumpeterian models:** (Aghion & Howitt 1992, Grossman Helpman 1991)
 - Introduces firm exit and competition → essential in mapping models to firm- and inventor- level micro data
 - Brings in “business stealing” effect
 - Calls for empirical estimates of the spillovers and business stealing externality

Basic or applied research

- Two steps in creating innovation: theory-oriented and abstract “basic research” by universities, labs, private firms → data-oriented and end product-oriented “applied research” by profit-seeking innovators and companies
- Questions: What are incentives to do basic research? (Nelson 1959)

Revisit the R&D production function and the “scale effect” debate

- Critique: scaling / market size effect exhibited in endogenous growth models (Chad Jones 1995)
- Modified idea production function: $\dot{A} = \delta A^\phi R^\lambda$ where $\phi, \lambda \in (0, 1)$
- Long-run growth rate could be derived: $g = \frac{\lambda n}{1-\phi}$ where n is the exogenous population growth rate
- Alternative remedy: product proliferation (Young 1998, Howitt 1999)

Technology adaption

Why do some countries adopt new technologies while others do not?

- **Murphy, Shleifer, and Vishny (1989):**
 - Theoretically formalize the “big-push” hypothesis by Rosenstein-Rodan (1943)
 - Market size effect through complementarities between different sectors
 - Individual firm might not find it profitable to adopt new technology
 - Calls for coordinated action among firms
- **Parente & Prescott (1994):**
 - Macroeconomic implications of barriers to technology adoption
 - Incorporates firm investment for technology adoption
 - Generates income gaps across countries through country-specific barriers to technology adoption
- **Katz & Shapiro (1986):**
 - Size of network in technology adoption

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Human capital and fertility

- The Malthusian framework (Malthus 1789) is not empirically supported
- Neoclassical growth models focuses on capital accumulation rather than fertility choice
- Fertility choice introduced into (endogenous) growth models (Becker & Barro 1988, Barro & Becker 1989, Becker, Murphy, & Tamura 1990)

The Present

Better models to match micro-level data

- Modified Schumpeterian growth offers a more realistic firm dynamics setting (Klette & Kortum 2004)
- Heterogenous internal and external innovations by firms (Akcigit & Kerr 2018)
- Nonlinear impact of taxation on growth in presence of talent heterogeneity (Jaimovich & Rebelo 2017)
- Differential innovation efforts by entrants and incumbents help explain increase in top income inequality (Jones & Kim 2018)
- Role of human interactions in growth (Lucas & Moll 2014, Perla & Tonetti 2014)
- Various aspects of economic growth: trade and innovation (Atkeson & Burstein 2010, environment (e.g., Acemogelu et al. 2016), institutions (e.g., Acemogelu et al. 2017), etc.

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The Future

Better computational power and data

- Data
 - Firm- and individual-level micro data
 - Digitized large-scale historical records
- Stronger computational power