Economics 448: History, Expectations, and Dependence

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Introduction

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Increasing Returns
  Introduction
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Other roles for history

Summary
Transitional Chapter

▶ This chapter is uniquely Ray’s perspective. Connect historical perspective and economic analysis.

▶ Modern neoclassical economics (mainstream) assume: Economic agents are forward looking, ⇒ behavior is driven by their (subjective) expectations and beliefs.

▶ Expectations are informed by what has happened in the past, i.e., history.

▶ Path Dependence. History defines current institutions and hence opportunity set.

▶ These issues are particularly important for economic development.
Consider China and England 1800

- China had labor intense agricultural system, involved (ess) only human power. Extremely labor intensive. Population pressure could not spare land for pasture.
- Agricultural revolution in England sending excess labor to putting–out system and cities.
- 1850 height of British Empire (Crystal Palace Exposition).
- Qing dynasty corruption, losing control of society. Not able to defend itself from West, Opium War 1830, Taiping Rebellion mid–century, 30–40 million killed in civil war.
- Not pre–determined or deterministic but takes decades (and longer) consequences of history to unwind.
Path Dependence and Strategic Complementarities

- Path dependence obvious, yet subtle.
- Importance aspect of timing involves concept of complementarities.
Complementarity

- A particular type of *externality* that may be positive or negative.
- Two projects may complement one another, but done by different groups. Highest payoffs if both done. Losses involved if only one (either) project.
- Big box store (e.g., Walmart) and city roads. City center and transportation system (rail, metro). An investment has higher payoff if other is done.
- Timing and coordination important.
QWERTY

- Ray uses QWERTY as an example of Complementarities.
- QWERTY invented to slow speed in mechanical typewriters.
- Has the value of being first history. And has a large (virtually all) base of users.
- Other keyboards may exist (Dvorak) that may be ergonomically better.
- But the adoption cost declines with the number of users. Thus there is an externality and specifically a complementarity.
- Lock-in because the number of users is so large it is difficult to switch to a new system.
Green Revolution

- Hybrid seeds more productive and produce higher crop yield per unit of land.
- Yet use of new technology represents a change from traditional ways.
- Social Norms or “culture” may inhibit adoption of new technology.
- Psychic costs decline with proportion of local adoptees.
Green Revolution

Expect the social cost of adopting the new technology to decline with the proportion of local adoptees.

Each adopter thus has the direct effect of increased individual production, and the indirect positive effect of propensity to adopt by others.
A strategic complementarity affects the ranking of alternatives, and not the level of utility or financial reward.

Importantly, complementarity reduces the cost as the number of users increases. The number of users then affects the ranking, how likely this alternative is the best more so than the actual payoff.

Example: Vaccination. Externality: but key is relative effect on others. Your getting vaccinated makes others more likely to be vaccinated as the greater fraction of the population vaccinated makes the vaccine more effective.
Multiple Equilibrium

- The existence of Complementarities may generate multiple equilibriums.

- Vaccination: one equilibrium is that no one (few) gets vaccinated; each individual has subjective belief others unlikely to get vaccinated.

- Vaccination: another equilibrium is that all (most) get vaccinated.
Multiple Equilibriums

One equilibrium could be if no one adopts the technology (QWERTY)

Or everyone may adopt.

Or somewhere in between. Critical point equilibrium may not be stable.
Unstable Equilibrium

Small changes in condition may induce large changes in outcomes (i.e., switch from one equilibrium to another)

Opportunity for Policy.
Family Planning Policy

Birth control, contraceptive practice in developing countries in which there are cultural and social norms against contraception. (e.g., concern over a woman’s health)

Government intervention program — family planning distribute contraceptives and knowledge about contraceptives.

At start, perhaps zero usage of contraceptives.

Target village leaders; get them to adopt. Then through normal lines of communication (through kin mostly). As use of contraception increases the social cost declines. Each adopter lowers the cost on subsequent women.

Equilibrium shifts over time from zero to a high fraction of women using contraceptives (though not everyone).
Increasing cost in adoption

If an externality increases the cost on others of use, then a complementarity is not possible.

Example congestion. New road opens up. Commuters arbitrage and use new road until incremental travel times are equal.
Definition of Coordination Failure

Coordination: when groups get their act together.

Failure: When groups can not get their act together.

Investment: requires an expectation of future benefit, but profitability depends on what others do. If coordinate action raise payoffs for all.

One view of underdevelopment is that underdevelopment is the result of coordination failure.

Coordination failure offers an explanation for why two countries follow different (development) paths over time.
Forward and Backward Linkages

Consider a heavy industry such as steel making. It depends on coal and iron as inputs. And transportation system to get inputs to mill and outputs (steel) from mill to customers.

Forward linkage: affects the ease of supply of another product.

Backward linkage: $A \rightarrow B$ as coal to steel. Then an increase in $B$ (steel) increases the demand for $A$ (coal).

Forward linkages are like “pushes” while backward linkages are like “pulls”.
Policy

Interdependences require coordination for development of the economy.

Government policy — Big Push — simultaneous coordinated investment in many critical industries to “jump start” the economy.

This is the same Big Push discussed in the last chapter of GEH.

Which sectors? Could have balanced growth — more or less same growth in sectors.

More likely to have unbalanced growth — selectivity promote the development of certain key sectors, and the linkages among these sectors and the rest of the economy will enable the market to respond to imbalances (arbitrage/profit opportunities).
Which Sectors? (Think Social Planner)

- Notion of Intrinsic Profitability. Should the government invest in the most profitable industries?

- Answer: No. Arbitrage opportunities in the most profitable sectors are likely to attract market response.

- Government maximizes the chances of overcoming coordination failure by investing in the least profitable activity, provided that the activities have linkages.

- Role of government sometimes to take up intrinsically unprofitable activities/sectors.
History Versus Expectations

- In the presence of complementarities, payoffs depend on the number of others using the technology or engaging in the activity.

- However, we all prefer others to be first, as there is a lag between investment and payoffs.

- This can lead to more coordination failure.

- Everyone wants everyone else to go first.
Increasing returns means that total cost falls with increasing output.
Example of Automobile Producer

- Small country imports automobiles from international producer (e.g., Toyota).

- Local producer develops a car that is idea for local market, but is not competitive for other (larger) markets.

- To make a profit, need a large share of the local market (why?)

- Consumers will not instantaneously adopt the new car. Thus, local firm must suffer losses at start up.
If Perfect Capital Markets: No Problem

- Perfect capital market (definition) all profitable projects that produce a rate of return at least as high as the market interest rate are funded.

- The local car manufacturer could obtain a loan to cover the interim period of losses, while consumers shift to the new car.

- But if capital markets are imperfect or missing no loan is forthcoming.
Increasing Returns to Scale Critical

Three components interact:

1. Increasing returns to scale;

2. Delay in adoption by consumers;

3. Missing or incomplete capital markets.

But the increasing returns are the critical feature. In absence of increasing returns, firm with lower costs (better technology) can enter the market and sell a small quantity and make a profit.
Policy Implication

- If existing products from developed countries have a large share of the market, local firms may not be able to sustain losses over an interim period even if the local firms produce a superior (local) product.

- Gives possible role for government intervention. Offer loans to support local firm at early stages of new product.

- Can see that firms in developing countries must not only innovate, but must do so while competing with firms from developed country.
Previous analysis adopted a partial equilibrium analysis – assumed that the market was of given size.

Appropriate for analysis of single firm or small industry (small relative to size of national economy).

But there may be many activities so limited, demand for these activities will be affected through a feedback mechanism.
Roundaboutness

- Think of many intermediate products – or many stages of production between raw materials and production of final product for the consumer market.

- Ray uses the example of home construction.

- Another example: clothing manufacturer.

  - One production process done through labor intensive process, many individuals working with basic tools (needle, thread, scissors, ruler).
  
  - Another production process is heavily mechanized — automated cutting machines, sewing machines, sophisticated storage and inventory system.
Capital Intensive

- Production system requires a large market to amortize the cost of equipment (including set up cost).

- Many times intermediate goods produced under increasing returns to scale.

- Increasing returns benefit from scale, but also variety of input (see problem # 8 in Chapter 4).

- Increasing returns to variety because of division of labor—introduce a new variety of intermediate input, increase the division of labor to make it more efficient (Smith’s pin factory.)
To take an example from a trifling manufacture ... the trade of a pin maker ... [who] could perhaps ... make one pin in a day, and certainly could not make twenty. But in the way in which this business is now carried on ... One man draws out the wire, another straights it, a third cuts it, ... eighteen distinct operations, which in some manufactories, are all performed by distinct hands, though in others the same man will sometimes perform two or three of them. ... a small manufactory of this kind where ten men only were employed ... they could make about twelve pounds of pins in a day. There are in a pound upwards of 4,000 pins of a middling size. ... together could make upwards of 48,000 pins. Each person might be thought of making ... 4,800 pins in a day.

Multiple Equilibrium

- Back to the original discussion. See how the interaction of the production of process and market size can produce multiple equilibria.

- Economy may be “poor” low demand for final product. Intermediate goods too expensive for use, so adopt a labor intensive production process. Production low and keeps demand low.

- Virtuous circle. High demand for final product, intermediate goods can be produced via increasing returns, lower cost, raises demand for final product, increased substitution from labor to capital. Productivity of labor increases so income increases, raising demand for final product.
Increasing Returns of Intermediate Goods

- Central to the virtuous circle is the increasing returns of intermediate goods. Lowers price of intermediate goods, lower cost of final good (competitive market) lower price of final good.

- Notice the similarities between increasing returns and complementarities.
Externalities as Missing Markets

- Externalities can be viewed as imperfection in some markets or the lack of some markets.

- Example: entrepreneur builds mass transportation system in city. Raises real estate prices of locations near transportation system (externality).

- There is no competitive market in which potential real estate beneficiaries can compensate the entrepreneur for building the system.

- If so, the externality would be internalized. The system would be built if and only if it were socially beneficial.
Competitive Markets

- Competitive market: there is a price at which one can buy or sell unlimited quantities of a commodity (take prices as given and unaffected by your actions).

- Competitive markets fully internalize the benefits and costs at the fixed price and thus will not support coordination failure or inability to internalize backward and forward linkages.

- Competitive markets and price–taking behavior the notion that the size of the market imposes a limit to efficient production simply does not hold.
International Trade

- Does it make sense to presume that the seller can sell “unlimited” quantities of a good at any given price? Yes, if small relative to the overall size of the sector.

- Frictionless international trade competitive market assumption may be compelling.

- Yet, infrastructure is a **non-traded** good. Likewise, many intermediate goods are non-traded goods.

- Hence, issues of coordination failure and limited markets apply (if at all) for domestically produced and **non-traded goods**.
Other devices that may hinder development

- Social Norms.
- Status Quo.
Social Norms

- Social Norms evolve to reinforce the status quo, and within current system help to coordinate activities.

- Likely, not to change quickly. Hence may serve as a drag on development.
Development as in other forms of economic change has winners and losers.

If the winners gain enough to compensate the losers for their lost then change should be possible.

However, sometimes that isn’t enough. It may be that winners within each subgroup have to be able to compensate losers within the subgroup.

This is a high standard and difficult to obtain.
Summary

Presented ways of thinking about issues of development. We will see these ideas in many different forms for the remainder of the course.