Contemporary Models and Underdevelopment

EC 390 - Development Economics

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Contemporary Models

So far we have seen that development is **possible but difficult to achieve**

The theory models we have seen use very **strict assupmtions**

- This is done to simplify the model and bring it down to a handful of variables that can change
- However the world is not simple

Newer theories relax some of these assumptions

- Perfect information
- Insignificance of externatilities
- Uniqueness/optimality of equilibria

Contemporary Models

These models attempt to incorporate more realistic observations of the developing world

A major theme is the inclusion of:

1. **Binding Constraints**
2. Coordination of **Economic Agents**

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- The **main thing holding you back** from growth
- If this limitation was to be relaxed, we would see accelerated growth (or an increased amount in whatever target we have)

2. Coordination of **Economic Agents**

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2. Coordination of **Economic Agents**

- A participant that chooses an action to maximize an objective
  - Firms, Workers, Consumers, Government Officials, etc.

Coordination Failure

Important Terms

Complementarity:

- An action taken by an agent, that increases the incentives for other agents to take similar actions

Coordination Failure

- A situation where the **inability** of agents to coordinate their **behavior** leads to an **outcome** that leaves everyone worse off than in an alternative situation that is also an **equilibrium**

Coordination Failure is essentially where agents do not work optimally together to reach the **best possible** outcome

Expectations

Let's quickly introduce the important economic concept of **Expectations**

- **Agents** hold **beliefs** of what **they think will happen**
  - You **expect** that studying hard will improve your grades
  - You **expect** the empty restaurant will not be good
- These **beliefs** then **shape your behavior**
  - You **study more**
  - You **go eat somewhere else**

Complementarities

Expectations are an important component of **complementarities**

> **Complementarities** will often involve investments where returns depend on **other investments being made**

- An important example is the presence of firms using special skills by agents and those agents acquiring those skills
- Later we will see a model that directly deals with worker skills complementing each other in production

Coordination Between Agents

Coordination gets more difficult/unlikely as the number of agents increases

There can also be added **limitations to coordinating behavior**

- Agents may **not be able to coordinate at all → Where-to-Meet Dilemma**
- Even if agents can coordinate, it may be difficult to convince them to

Price of Fish Example

Reading on Site

- Central Issue: Fishermen in India were not sure what the local prices were
  - A good catch might not fetch a lot of money if a fisher man chooses a **saturated market**
  - This led to surpluses and shortages
  - **Coordination Failure**

Price of Fish Example

> Central Issue: Fishermen in India were not sure what the local prices were

- The most basic supply and demand curves **require full information for all agents**
- Without information, volatility and uncertainty enter the market
- The fishermen have no information on the local prices, and they were not sure where to sell
- This leads to volatile prices in the market
- With cell phones, information became accesible
- Cell phones also allowed them to **coordinate**
- **"Law of One Price"** emerged

Price of Fish Example

> **How did cellphones allow agents to overcome the coordination failure?**

- They allowed fishermen to **communicate with buyers and other sellers**
- They could call a number of markets and find out where the price was highest
- Generally aware of where buyers had high **Willingness to Pay**
- Sellers were able to spread out across the different markets in an optimal way
- Eliminated inefficiencies like guessing

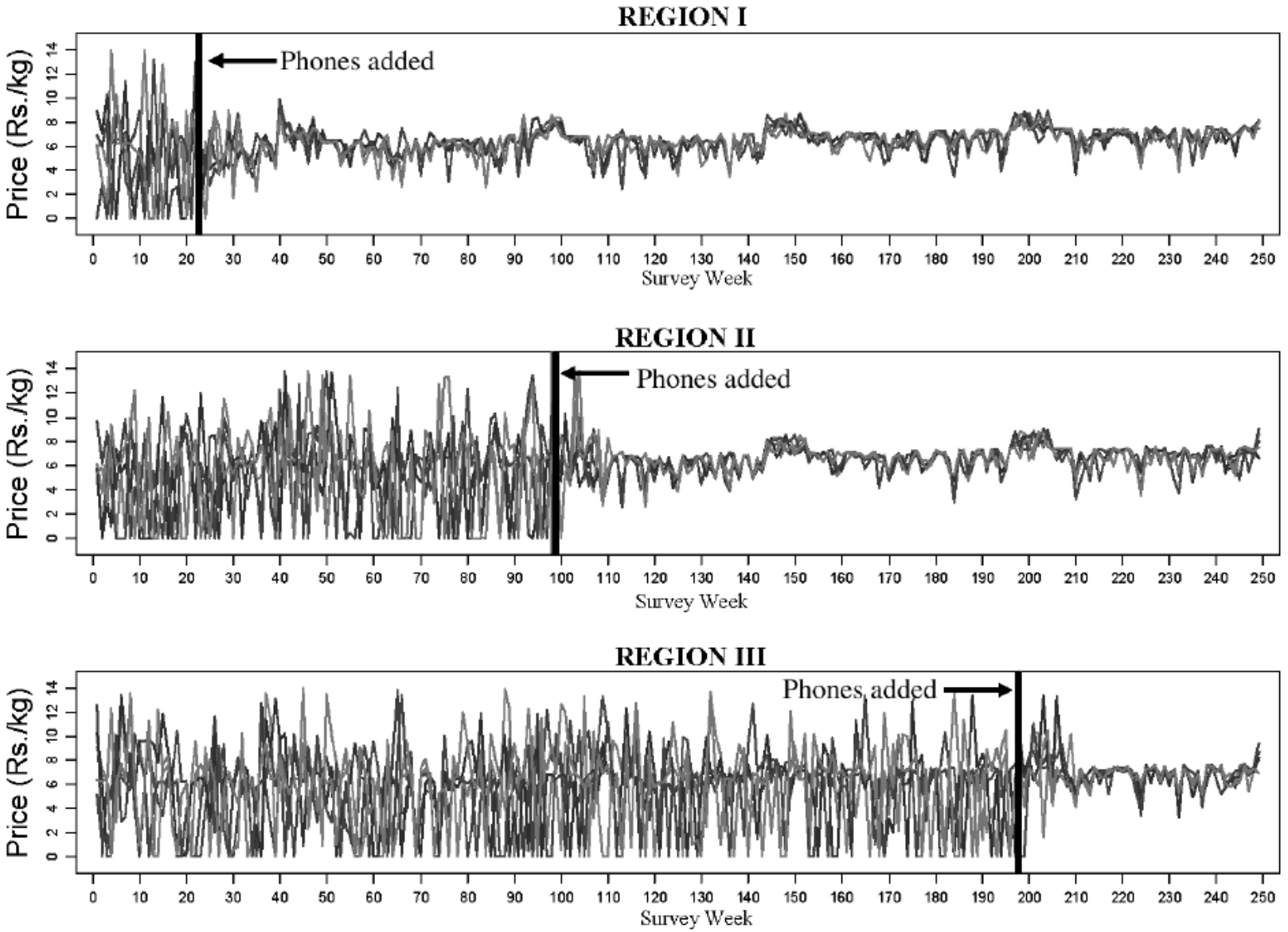


FIGURE IV
Prices and Mobile Phone Service in Kerala

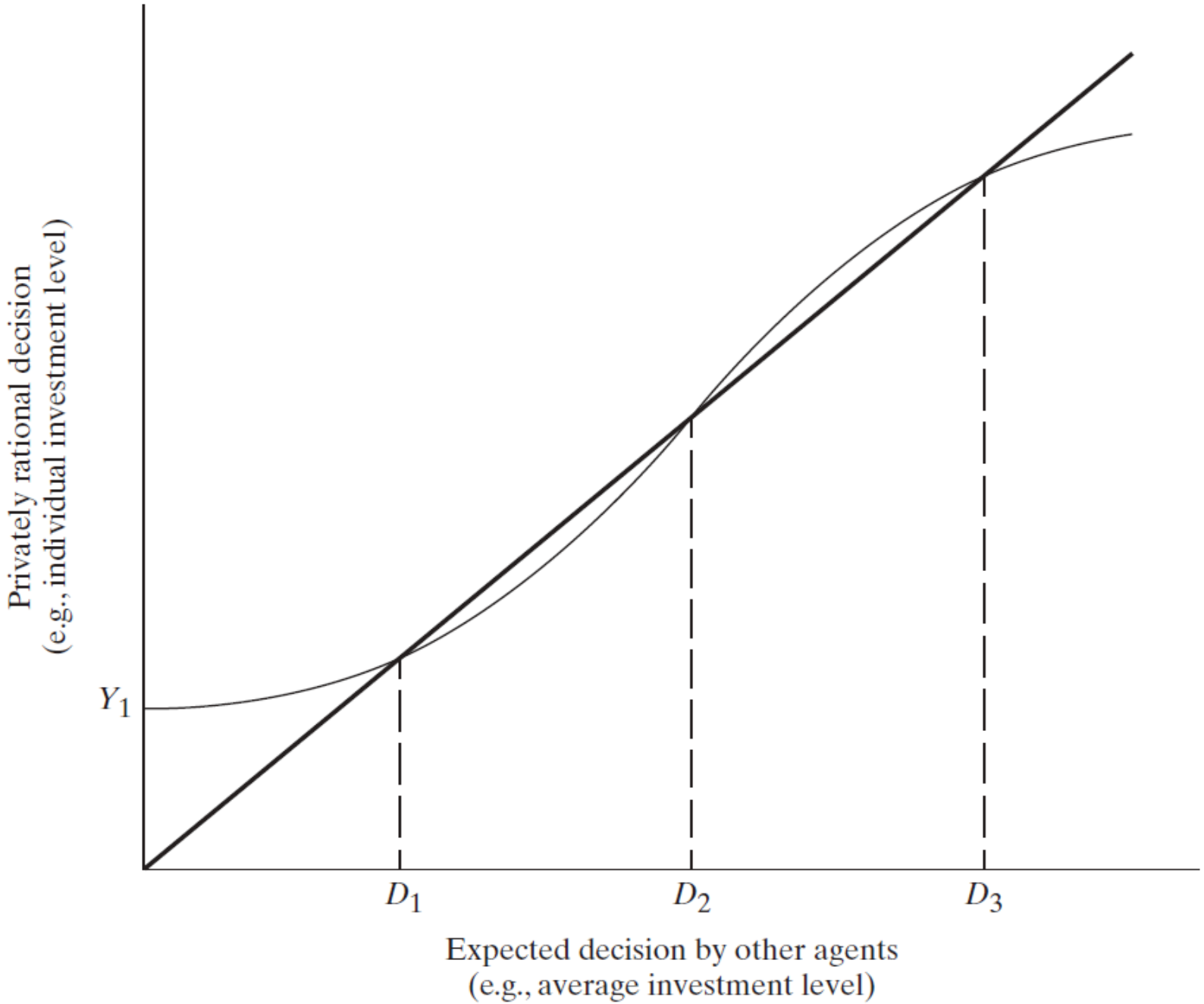
Multiple Equilibria

How Can There Be More Than One?

Basically, reflects a more (but not entirely) realistic possibility of outcomes

We will be matching **expectations** to **reality**

- Recall that **expectations** are not necessarily reality but they do inform it
- **Multiple Equilibria** is the condition where **more than one equilibria exists**
- These equilibria may sometimes be **ranked**, in the sense that one is preferred to another
- The standard diagram takes an S-shape around a 45 degree line


Privately rational decision
(e.g., individual investment level)
Y_1
D_1
D_2
D_3
Expected decision by other agents
(e.g., average investment level)

Multiple Equilibria

Components of the **S-Diagram**

Wavy Line → Private Decision Function

- Tells us the best decision an individual can make **given decisions of all other agents**

45 Degree Line

- Shows all points where an **individual's decision is exactly the same as**

Multiple Equilibria

Stable vs Unstable Equilibria

Stable Equilibria

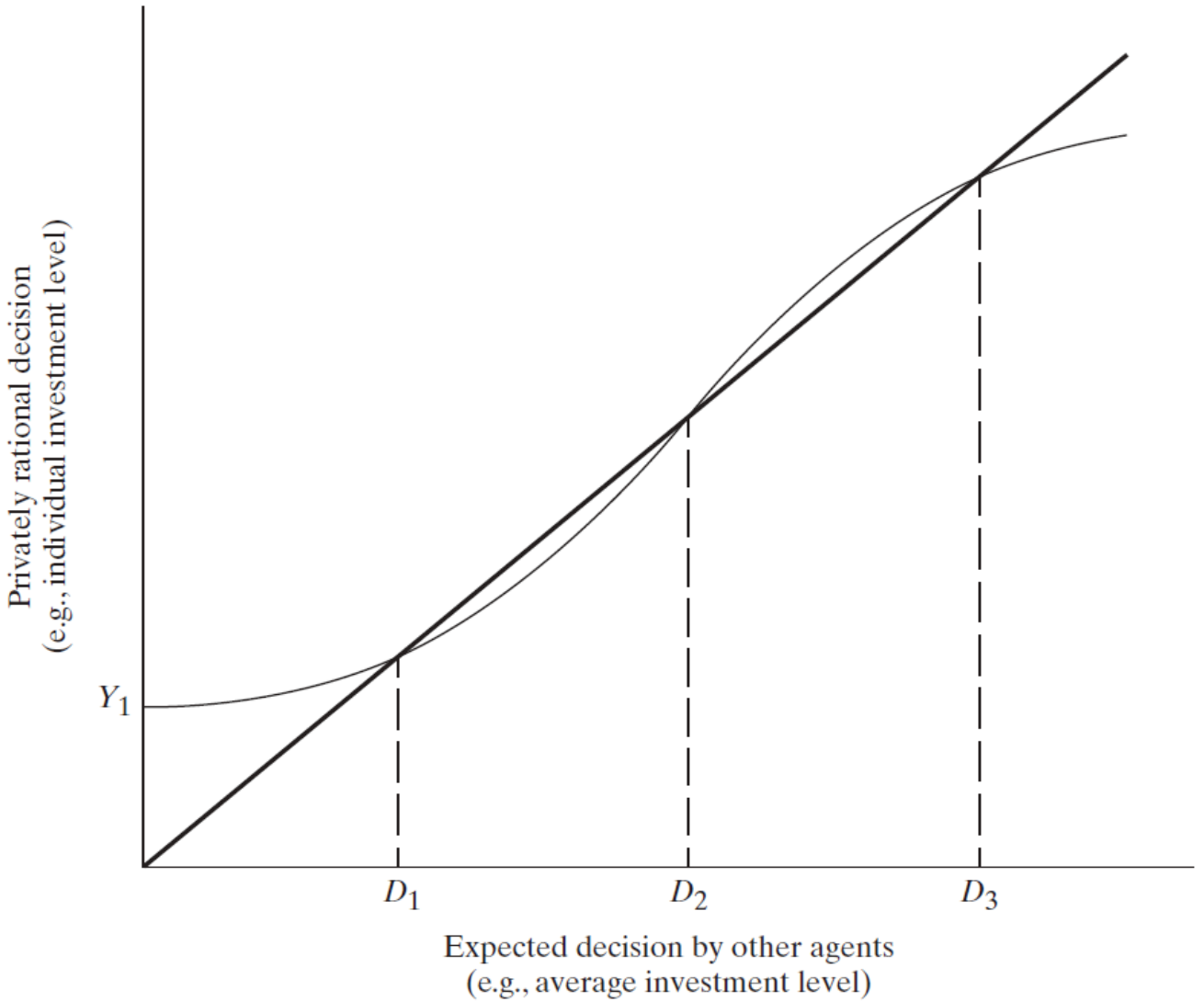
- An **equilibrium is stable** if it is the case that if we were to move away from it, then agents will eventually end back at that equilibrium

Unstable Equilibria

- An **equilibrium is unstable** if it is the case that if we were to move away from it, then agents will take actions that make it move further away from it

How can we tell if an equilibrium is stable/unstable?

- If the **S-Curve** is **flatter** than the **45-Degree line** than it is **stable**
- If the **S-Curve** is **steeper** than the **45-Degree line** than it is **unstable**



In this previous example, D_1 and D_3 are **stable**

And D_2 is **unstable**

Big Push

This model helps us understand something like perpetual poverty or the middle income trap

Take for example a nation with a **low average investment**

- If nothing is done, investment will simply return to D_1 and there will be less and less economic activity
  - Recall what our previous models infer about low investments → **low output**
- If investment could be increased beyond the intermediate point D_2, then these models predict that investment would eventually end up at D_3

Examples of a Big Push

Intestinal works are prevalent among children in the poorest of developing countries

- Worms lead to sickness
- Sickness means missed school or missed work
- Worms spread from children to children in several ways
- **Coordination Failure:** If no one treats their child (or if they are unable to), why should I treat mine?
- Studies have shown that deworming medicine leads to a large increase in school attendance in Kenya, even among untreated children

Multiple Equilibria Problems

There are several other problems with multiple equilibria to consider

1. **Firm Incumbency**
2. **Behaviour and Norms**
3. **Linkages**

Multiple Equilibria Problems

1. Firm Incumbency

- Existing firms have an advantage over new firms
- This may be true even if they have relatively worse technology
- Take the entry of a modern firm, with better technology
- Even if the new firm has better tech, they run up against an economies of scale problem
- The local firm produces more output, so their per-unit cost is lower
- A new firm cannot just match production yet, even though they may produce output more efficiently
- Older firms can adjust and obtain the more efficient tech, **but can they?**
- If capital markets are poor, then they cannot invest properly and the economy is stuck with the inefficient production

2. Behaviour and Norms

Multiple Equilibria

1. Firm Incumbency
2. **Behaviour and Norms**

- Movement to a better equilibrium can be especially difficult when there are many agents to consider
- Some agents may have different and selfish incentives that make them act in corrupt ways
- Imagine how difficult it is to change someones mind from say corruption to a cooperative nature where working together benefits all

3. Inequality

Multiple Equilibria Problems

1. Firm Incumbency
2. Behaviour and Norms
3. **Linkages**

- A traditional view has been that **some inequality** may enhance growth because **the savings of the rich are higher than those of the poor**

- But in reality the poor save more than we think, or at the very least they do when we consider savings as investments in things like health, children's education, and home improvements
- Even more importantly, in high inequality settings, the poor may not be able to get loans due to their lack of wealth
  - With lack of access to credit, they may not be able to get loans that finance productivity increasing investments (efficient capital, educational investment, etc.)

O-Ring Theory

Introduction

This model leans in on **complementarities in production** in a strong way

- The notion is that modern production (comparative to tradiotional crafts production) requires **many activities be done well together** in order for any of them to amount to a high value

The name comes from the unfortunate 1986 **Challenger disaster** where one small and inexpensive part (the O-Ring) failed and caused the space shuttle to explode

Key Feature - Complementarities Among Inputs

Start by thinking of the model as describing what goes on inside a firm, but we can extend this to an industry or sector of the economy

- Suppose that production is broken down into n tasks
- For simplicity, we say that these tasks are ordered by the required level of skill to complete them, q, where $0 \leq q \leq 1$
  - The higher the skill, the higher the probability of it being **"successfully completed"**
- The production function is a simple one:
  - Output is given by multiplying the q values of each n tasks togehter, and this is then multiplied by a term B that is just a production scalar

O-Ring Production

$$BF(q_i, q_j) = q_i q_j$$

Let's make a simplifying assumption that $B = 1$ so then we just have

$$F(q_i, q_j) = q_i q_j$$

Now let's introduce other assumptions

- Firms are risk-neutral
- Labor markets are competitive
- Workers supply labor inelastically

HRV