Development Economics

Slides 15

Debraj Ray, NYU

Labor Markets

A substitute for land markets:

- Instead of the land going to the tenant
- The tenant goes to the land (as a laborer)

Sometimes complementary with land markets

- E.g., both follow the bullock distribution when that market collapses
- Or both can follow the wealth distribution
- In these cases, employers can rent in land and hire in labor.

Two Types of Hired Labor

- **Casual laborers:**
- Hired for some prespecified short duration.
- Hired to carry out easily observed tasks, such as harvesting and weeding.
- **Often paid a piece rate** so that they don't need to be closely supervised.

$$w_c(y) = \text{Base wage } + \pi y$$

- Sometimes **even placed into competition** with each other ...
- ...though this could backfire

Labor Markets

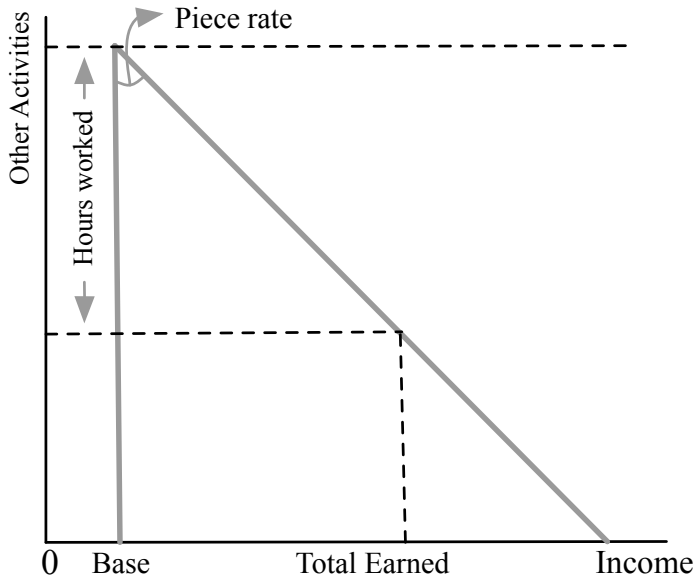
- **Permanent laborers:**
- Have (implicit or explicit) long-term contract with their employer.
- May serve in a supervisory capacity.
- Perform tasks that **require special care** and are **harder to monitor**:

  e.g., application of fertilizer, pesticides or water.
- In addition, they might perform "standard" tasks along with casual hires

  e.g., participating in the harvesting process.

Casual Labor

- Casual workers often do observable tasks, but still need to be incentivized.
- Suggests that payment might be in **piece rates**, perhaps on top of a base wage.



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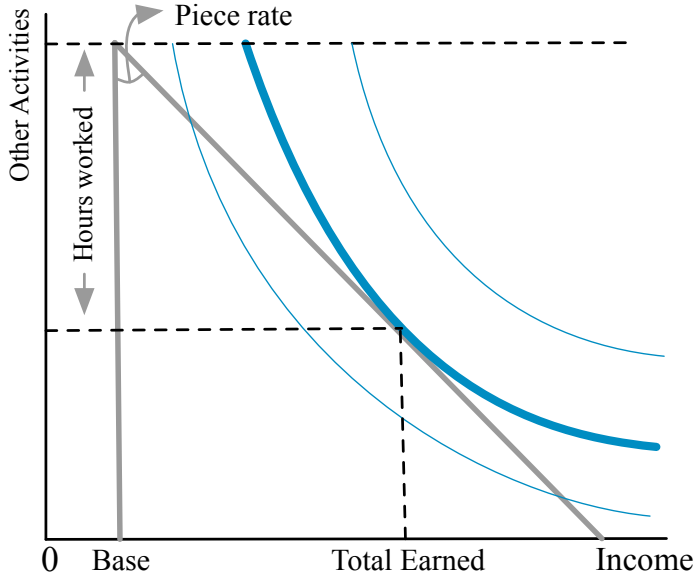
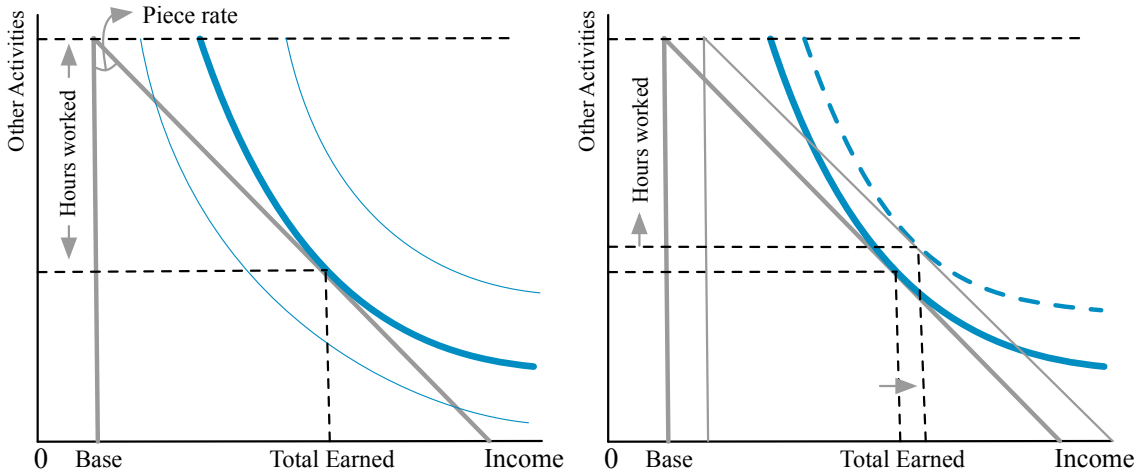


Casual Labor

- The effects of base wage and piece rates on work incentives:



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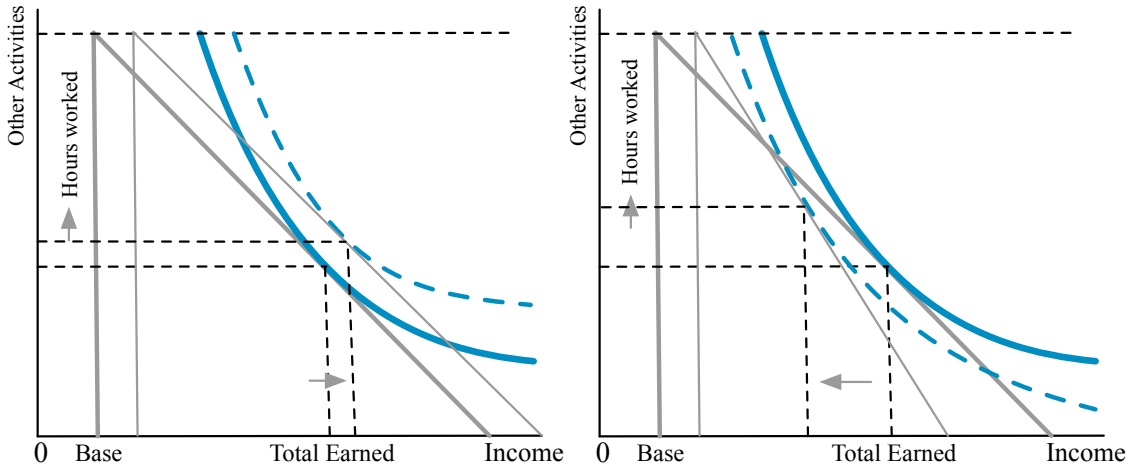


Example: A Tea Plantation in Southern India

Example: A Tea Plantation in Southern India

Jayaraman et al 2018

- **Plantation:**
  - Owned by a large producer in Southern India.
  - Dominant source of low-skilled employment.
  - One of several in the local tea-growing region.
- **Plucking:**
  - Several hundred fields, 2000 workers.
  - Tea grows in rows pruned to resemble 1m tall hedges.
  - Plucked by hand or shears, leaves collected in individual bags.
  - 70% female (so are the supervisors)
  - 65% permanent (median tenure 21 years)

Example: A Tea Plantation in Southern India

- **Work Setup:**
  - Pluckers pre-assigned to “gangs” of 20–40 members.
  - Each gang has one supervisor.
  - Assigned to fields and plucking method; pre-determined schedule.
- **Contracts:**
  - Fixed baseline wages + piece rates
  - Bags weighed daily: wages calculated on this basis.
  - Wages paid monthly.

A Contract Change on the Plantation, 2008

- **A twist:** Government-mandated increase in base wage.
- Over 30% increase in base wage: from Rs 77 to over Rs 100.
- Planter petitions sought a stay on the increase.
- Dismissed by the State High Court on August 27, 2008.
- In response, planters flattened the piece rate structure.
- Lack of deep pockets

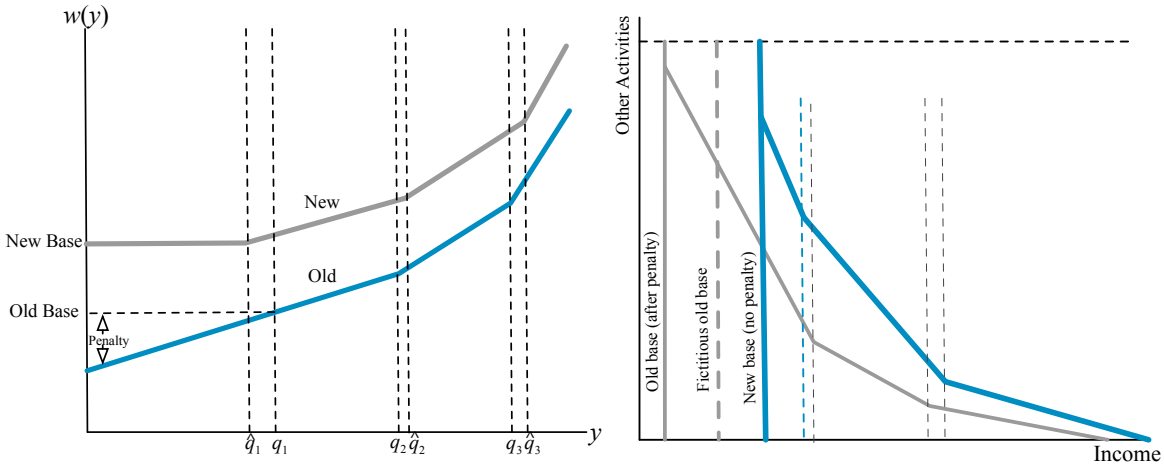
Old Contract

	SubStandard		Standard		Threshold 2		Threshold 3	
	Hands	Shears	Hands	Shears	Hands	Shears	Hands	Shears
Yield Class 2	0	0	23	28	34	39	50	55
Yield Class 3	0	0	28	33	44	49	59	64
Piece Rate (Rs.)	0.40 →		0.40 →		0.55 →		0.85 →	

New Contract

	SubStandard		Standard		Threshold 2		Threshold 3	
	Hands	Shears	Hands	Shears	Hands	Shears	Hands	Shears
Yield Class 2	0	0	22	28	36	43	52	59
Yield Class 3	0	0	27	33	46	53	61	68
Piece Rate (Rs.)	0 →		0.40 →		0.55 →		0.85 →	

A Contract Change on the Plantation, 2008



Structural Model

- Idea:
  - Estimate a "standard" model off the pre-contract data.
  - Apply it "out of sample" to the post-contract data.
- Model
  - Observe a shock μ, then choose y to maximize

$$w(y) - \frac{\mu}{\theta}\left[e^{\theta y} - 1\right]$$

linear u convex cost

  - minus a supervisory penalty for not meeting absolute output minimum.
  - θ measures curvature of effort disutility.
- Exercise. Given $w(y)$, estimate θ and parameters of μ.

Estimation Procedure using 2007 Treatment Plantation

[simplified]

Step 1. Estimate μ. Fix θ. Estimate scale and shape parameters for μ separately for each worker.

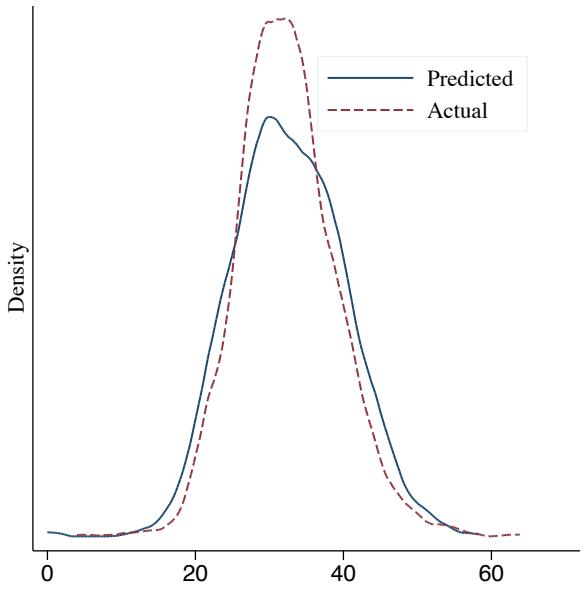
Step 2. Simulate 2007 output. For each worker, generate optimal output using draws from μ.

- Optimality captured by first order condition for effort.

Step 3. Choose best fit. Repeat Steps 1–2 for 200 possible values of θ on a grid.

- Match simulated data to actual 2007 data.
- Obtain $\theta = 0.9$, select as estimate.

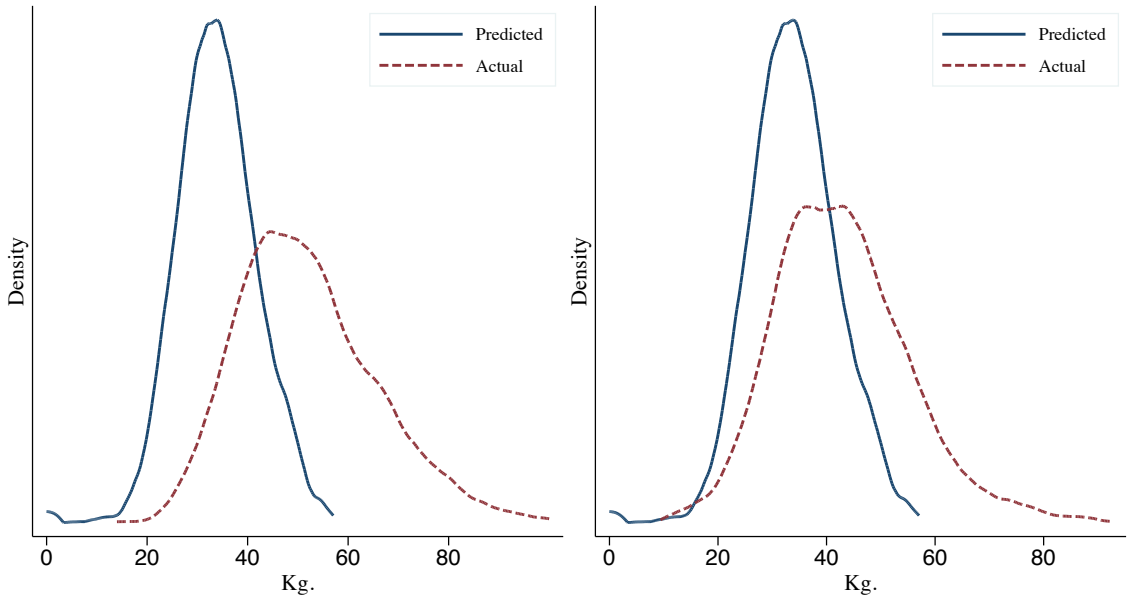
Actual Vs Simulated, 2007



Data	Mean	Median	SD	Skewness	Kurtosis	Interquartile Range
Actual	32.39	32.00	6.61	0.35	3.89	8.43
Simulated	32.65	32.36	7.54	0.03	3.27	10.39

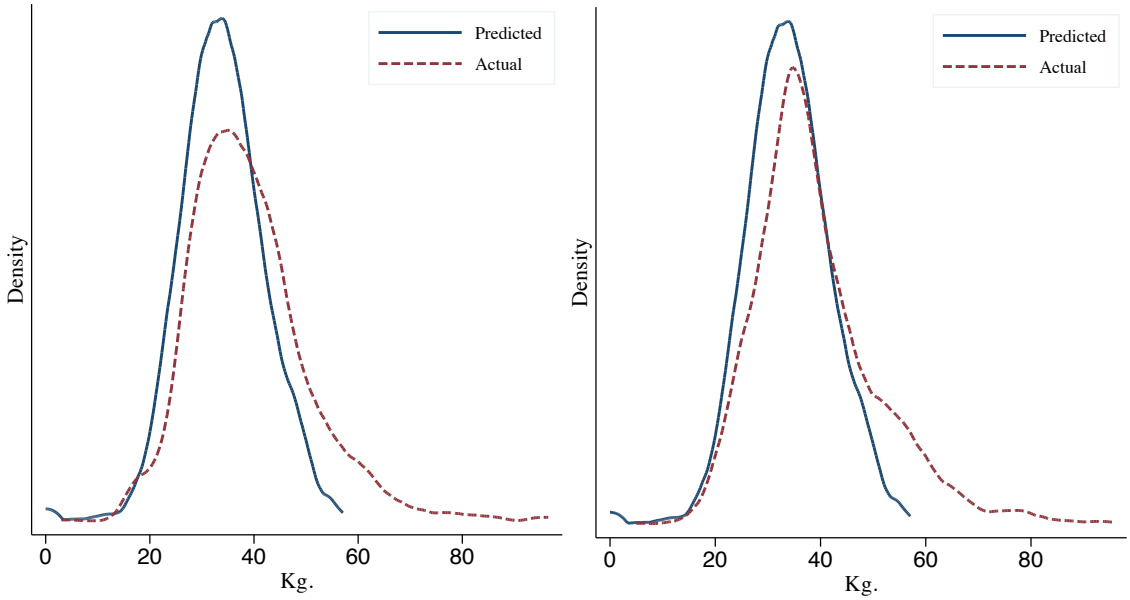
Predicting the 2008 Post-Contract Outcome

- **Weeks 4 and 8**

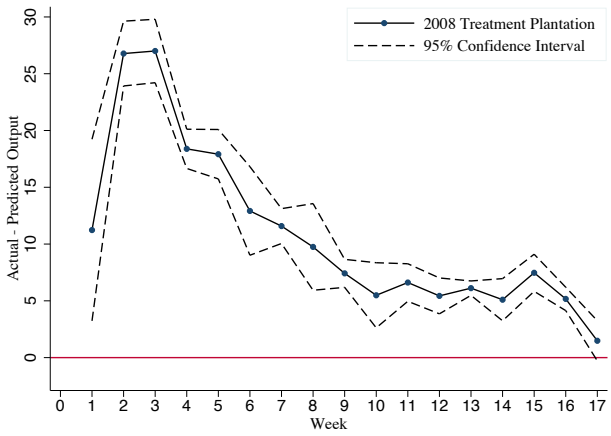


Predicting the 2008 Post-Contract Outcome

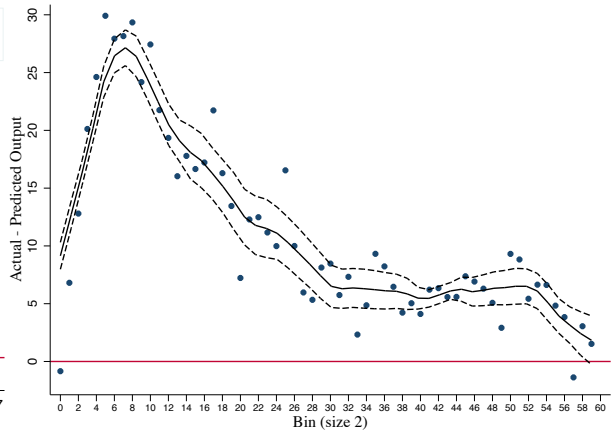
- **Weeks 12 and 16**



Prediction Minus Actual



Weekly average



Two-day moving averages

Summary of the Tea Plantation Story

- We study a **contract change** for tea pluckers in an Indian plantation.
- Raised baseline wages, but lowered marginal incentives.
- Followed near-immediately by a dramatic **increase** in productivity.
- Appears to directly contradict the predictions of standard model.
- And yet: a subsequent **reversal**:
- Initial increase is comprehensively eroded (4th month, last 2 weeks).
- Standard model estimated off pre-change data works well.
- **Classical incentives** appear to ultimately dominate
- despite a possibly “behavioral” response in the shorter term.

Permanent Labor

Recall two forms of income:

- casual w_c (overall value of base + piece rate − effort costs)
- permanent w_p, also with **effort cost** x.
- Immediate payoff to worker:
- $w_p - x$ if he works.
- w_p if he shirks, so x is also the gain made from shirking.
- Punishment for shirking:
- Can only get access to casual labor contracts thereafter.
- Can get access to permanent contracts with some probability (more complex)

Permanent Labor

A division of tasks between the two types of labor is to be expected.

- Some actions have longer-term consequences
- Fertilizer, pesticide, sowing
- A long-term employee can be held accountable
- But that argument leads to a question.
- In what way is the longer-term employee held accountable?
- Repay past wages? Very unlikely.
- Fire the employee? More likely.
- $\Rightarrow$ Long-run contracts $\mapsto$ **payments that strictly exceed outside options**.

Hard-To-Supervise Tasks and Labor Market Equilibrium

- **Self-enforcement constraint:**

$$\frac{w_p - x}{1-\delta} \geq w_p + \delta \frac{w_c}{1-\delta}$$

which on rearrangement yields:

$$x \leq \frac{\delta}{1-\delta}[(w_p - x) - w_c] \text{ or equivalently, } x \leq \delta(w_p - w_c).$$

- Both are exactly the same expressions, but the first one makes it clear that:
- There is an endogenous wage differential: $w_p - x > w_c$.
- **Variation:**
- Possible re-employment in permanent labor contract with probability q.
- First calculate the value after he is fired:

$$V = q\frac{w_p - x}{1-\delta} + (1-q)[w_c + \delta V]$$

Hard-To-Supervise Tasks and Labor Market Equilibrium

- Post-firing value:

$$V = q\frac{w_p - x}{1-\delta} + (1-q)[w_c + \delta V], \text{ and so}$$

$$V = q\frac{w_p - x}{(1-\delta)[1-\delta(1-q)]} + \frac{(1-q)w_c}{1-\delta(1-q)}. \quad (1)$$

- The self-enforcement constraint is:

$$\frac{w_p - x}{1-\delta} \geq w_p + \delta V = w_p + \frac{\delta q(w_p - x)}{(1-\delta)[1-\delta(1-q)]} + \frac{\delta(1-q)w_c}{1-\delta(1-q)} \quad (2)$$

- Combining (1) and (2) and after some elementary algebra:

$$x \leq \delta(1-q)(w_p - w_c).$$

- For any w_c, employer will offer w_p just enough for this to hold with "=".
- Again, note endogenous wage differential: $w_p - x > w_c$.

Hard-To-Supervise Tasks and Labor Market Equilibrium

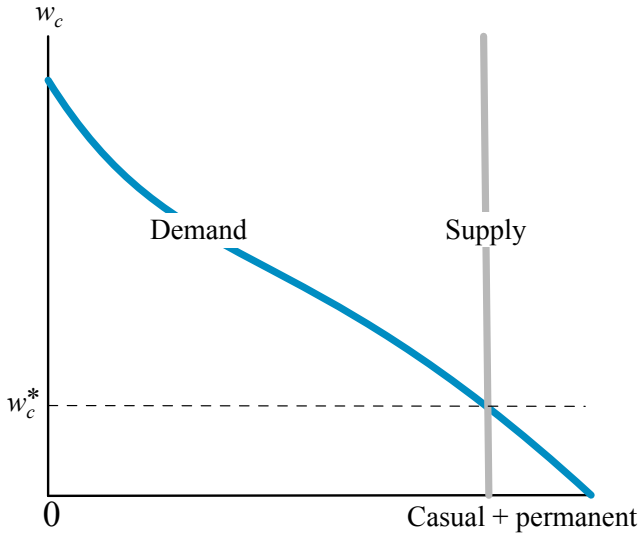
Endogenous wage differentials:

- Notice how the same person gets paid differently in different sectors:
- Everyone would like to work as a permanent laborer
- But they cannot credibly undercut the wage.
- The larger the effort cost x, the higher the wage **net** of effort cost!
- Can apply this observation over a cross-section of industries.
- Think about large firms, or more complex tasks, or group-based tasks
- Will typically command higher wages

Hard-To-Supervise Tasks and Labor Market Equilibrium

How to solve it:

- Recall $x = \delta(1-q)(w_p - w_c)$, so w_p moves in tandem with w_c.
- $\Rightarrow$ a downward-sloping labor demand curve for all labor combined.

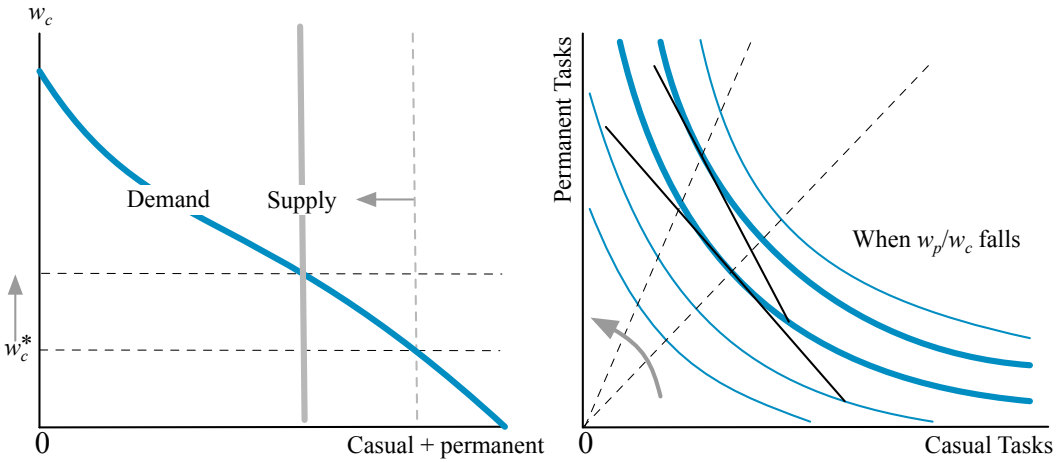


Hard-To-Supervise Tasks and Labor Market Equilibrium

Casualization? Recall $x = \delta(1-q)(w_p - w_c)$, so that:

$$\frac{x}{w_c} = \delta(1-q)\left(\frac{w_p}{w_c} - 1\right).$$

- So the **ratio** w_p/w_c moves inversely with w_c.



- Market **tightening** can lead to an **increase in permanent labor**.

Hard-To-Supervise Tasks and Labor Market Equilibrium

But economic development can also lead to casualization of labor:

- Information transmission falls:
- Past defaults are not easily monitored
- So may be easier to get a permanent job again.

  (This outcome can switch again with computerized tracking)
- So q rises, and using:

$$\frac{x}{w_c} = \delta(1-q)\left(\frac{w_p}{w_c} - 1\right),$$

- we see that w_p/w_c could now rise.
- $\Rightarrow$ **incidence of permanent labor could fall**.
- We return to a combination of these effects in the next topic.

A Variation: Involuntary Unemployment

- **Variation of the model applies to involuntary unemployment:**
- "Casual labor" = **unemployment**, $w_c = s$ is **subsistence wage**;

  Under this reinterpretation, s is some fixed number.
- "Permanent labor" = **employment**, $w_p = w$.
- q may or may not depend on the overall employment rate: $q(e)$.

  Why might it? And what form would this dependence take?
- **New version of equilibrium equation:**

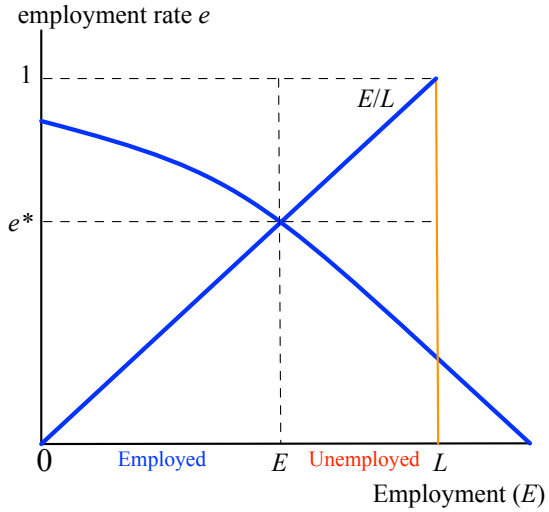
$$\frac{x}{s} = \delta(1 - q(e)) \left(\frac{w}{s} - 1 \right).$$

  where q increases with e.

A Variation: Involuntary Unemployment

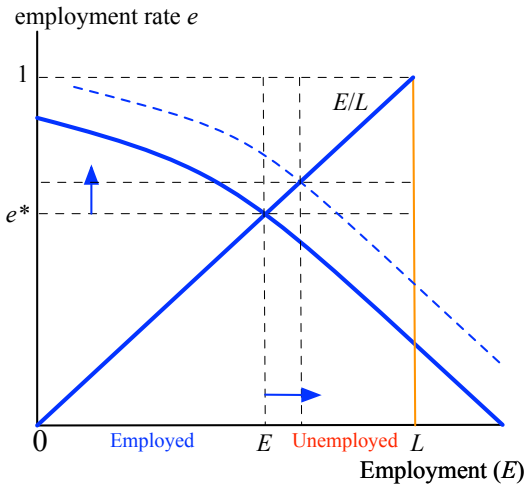
$$\frac{x}{s} = \delta(1 - q(e)) \left(\frac{w}{s} - 1 \right).$$

- Allows us to draw "supply-demand diagrams" in a different space:
- $e \uparrow \Rightarrow q \uparrow \Rightarrow w \uparrow \Rightarrow$ Labor demand $\downarrow$ as function of e.

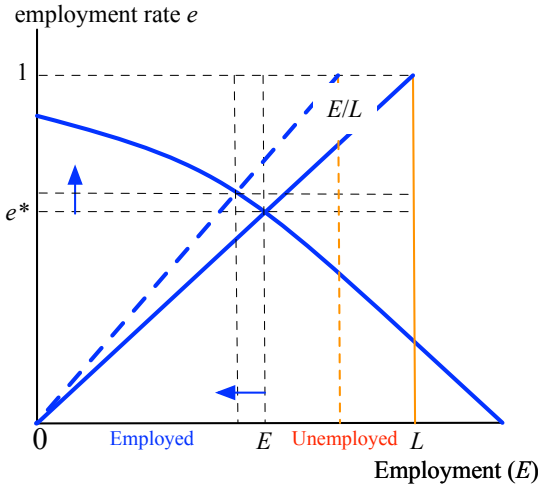


A Variation: Involuntary Unemployment

- **Changes in labor demand and supply:**



Increase in labor demand



Decrease in labor supply

Summary Comments on Land and Labor Markets

- These are not the usual supply-demand models!
- **Moral hazard** plays a central role
- Subtle interplay between employment and the outside option
- Involuntary unemployment and wage differentials are "natural" outcomes.

See also:

- insurance contracts with **reciprocity**
- land contracts with **eviction**

- Most importantly, what looks like a fractured market may well be a second-best response to deep problems of adverse selection and moral hazard.