Lecture 3:
Trade and Income Distribution in the Short Run
Specific Factors Model Model

Econ 355 - Introduction to International Trade

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Motivation

- In the Ricardian model:
  - There are gains from trade for all workers
  - All workers can move freely from one sector to the other
  - There are no issues regarding income distribution within the country
- It may be the case that although overall gains from trade are positive some people gain and some lose from opening to trade
- In the Specific Factors Model we study the impact of trade on income distribution in the **short run** (when some factors of production cannot move between sectors)

Economist - The human cost of cheaper towels

A short article posted on Connect tells a model story of a community hurt by trade

- North Carolina small town Kannapolis
- 4300 workers lost a job on a single day when the local textile giant shut down due to import competition
- Technology and service sectors are booming
- Workers cannot switch easily from one sector to the other
- Trade Adjustment Assistance (TAA) program
  - helps transition to other jobs
  - retraining
  - wage support during retraining

Participation question

I am asking for your *opinion* (no right answer here) on the following issues. For these questions keep in mind that the programs they mention need to be paid for with taxes.

Do you think Canada should subsidize workers of Canadian firms losing their job due to competition from other Canadian firm (e.g., Arc'teryx workers fired due to competition from Canada Goose)?
A) Yes
B) No

Participation question

Do you think Canada should subsidize workers of Canadian firms losing their job because of entry into Canada of foreign-owned companies (e.g.,Telus workers fired due to expansion of Wind)?
A) Yes
B) No

Participation question

Do you think Canada should subsidize workers losing their job because of import competition (e.g., Arc'teryx workers fired due to import competition from REI)?
A) Yes
B) No

Model Setup

- 2 industries: Manufacturing and Agriculture
- 3 factors of production:
  - Labor L used in both sectors and **mobile** between sectors
  - Capital K specific to Manufacturing (**immobile**)
  - Land T specific to Agriculture (i**mmobile**)
- Can think of the setup as representing short run
  - In the short run it is easier to move some factors than others
  - In the long run all factors can move across sectors

Production

- Focus on the Home country
- Production functions (constant returns to scale):

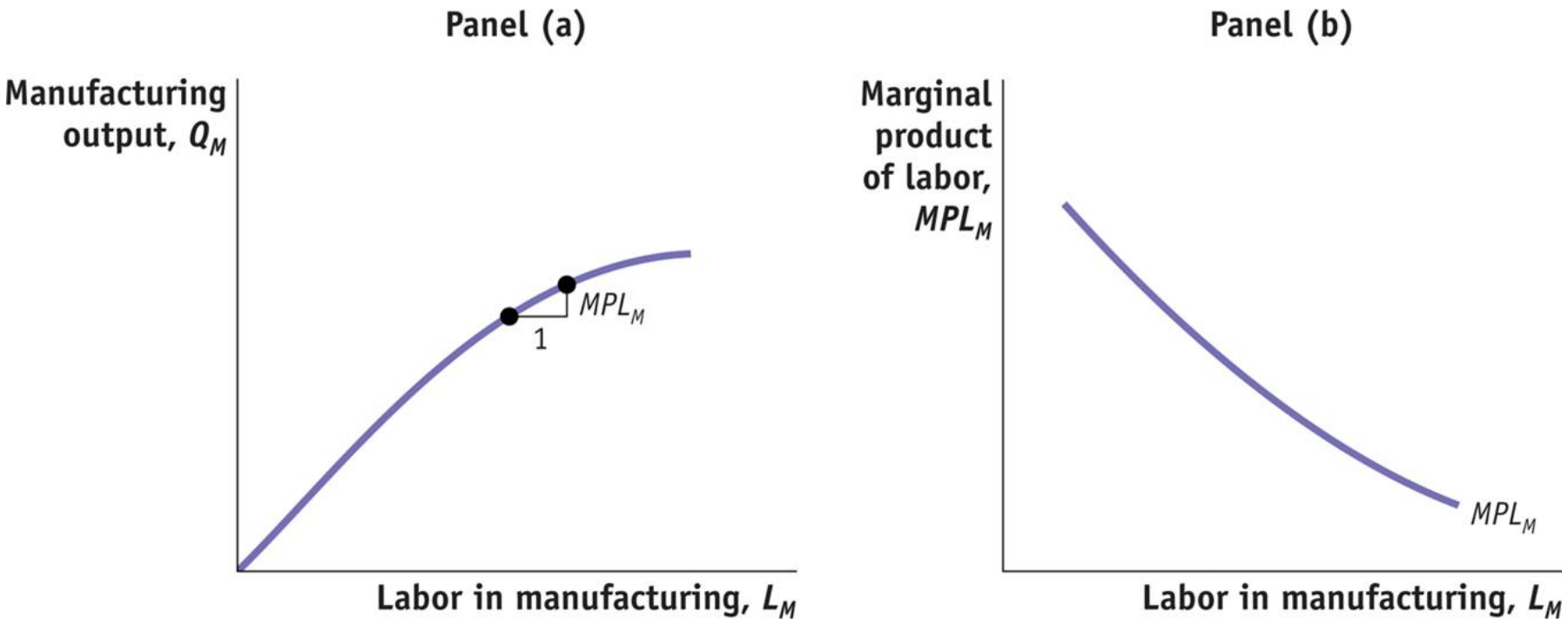
$$\begin{aligned} Q_M &= f_M(K, L_M) \\ Q_A &= f_A(T, L_A) \end{aligned}$$

- All mobile workers (skilled workers) have to be employed by either one or the other sector

$$L_M + L_A = L$$

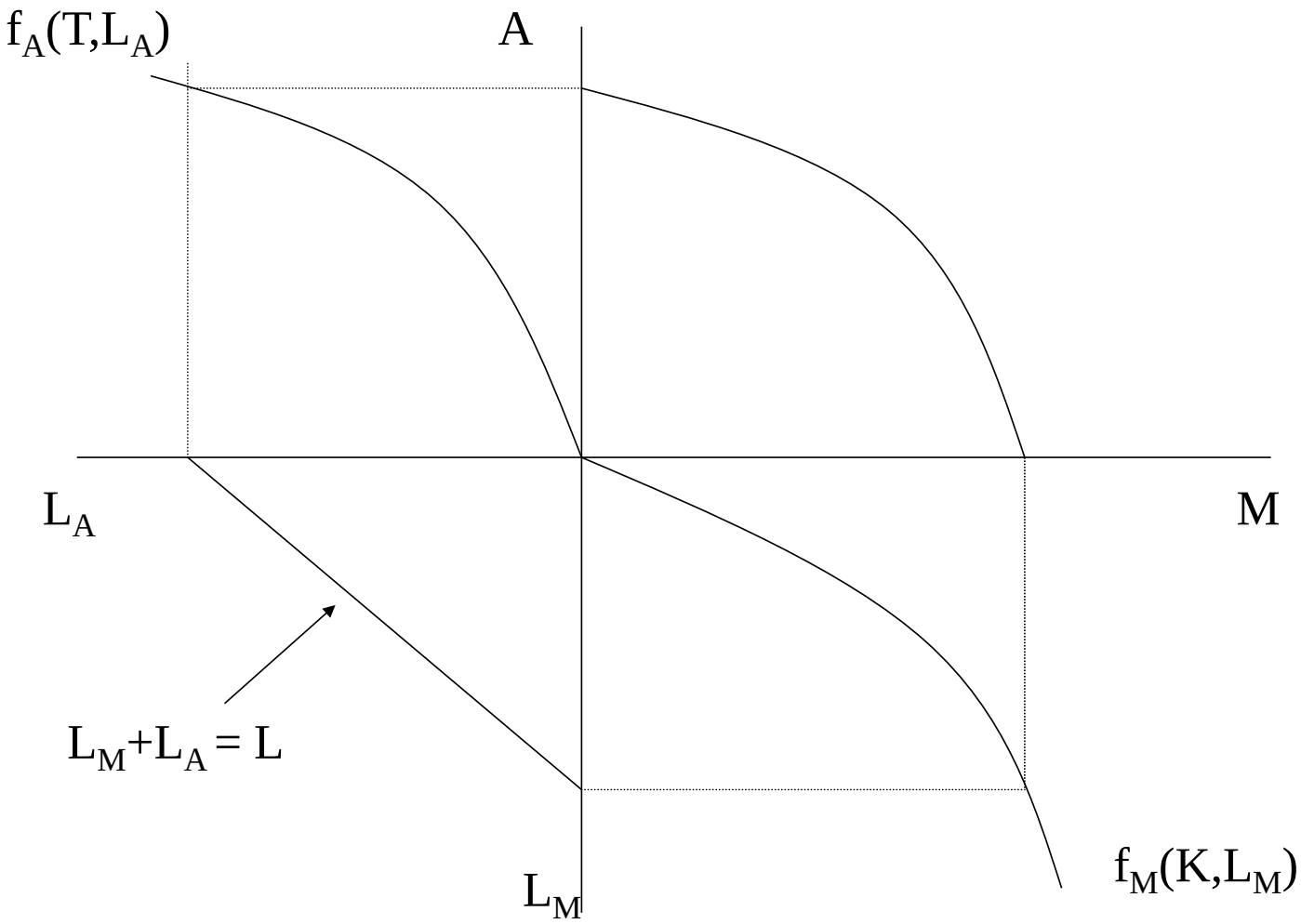
Properties of the Production Function

- Plot the production function holding capital K fixed and varying the mobile input L_M



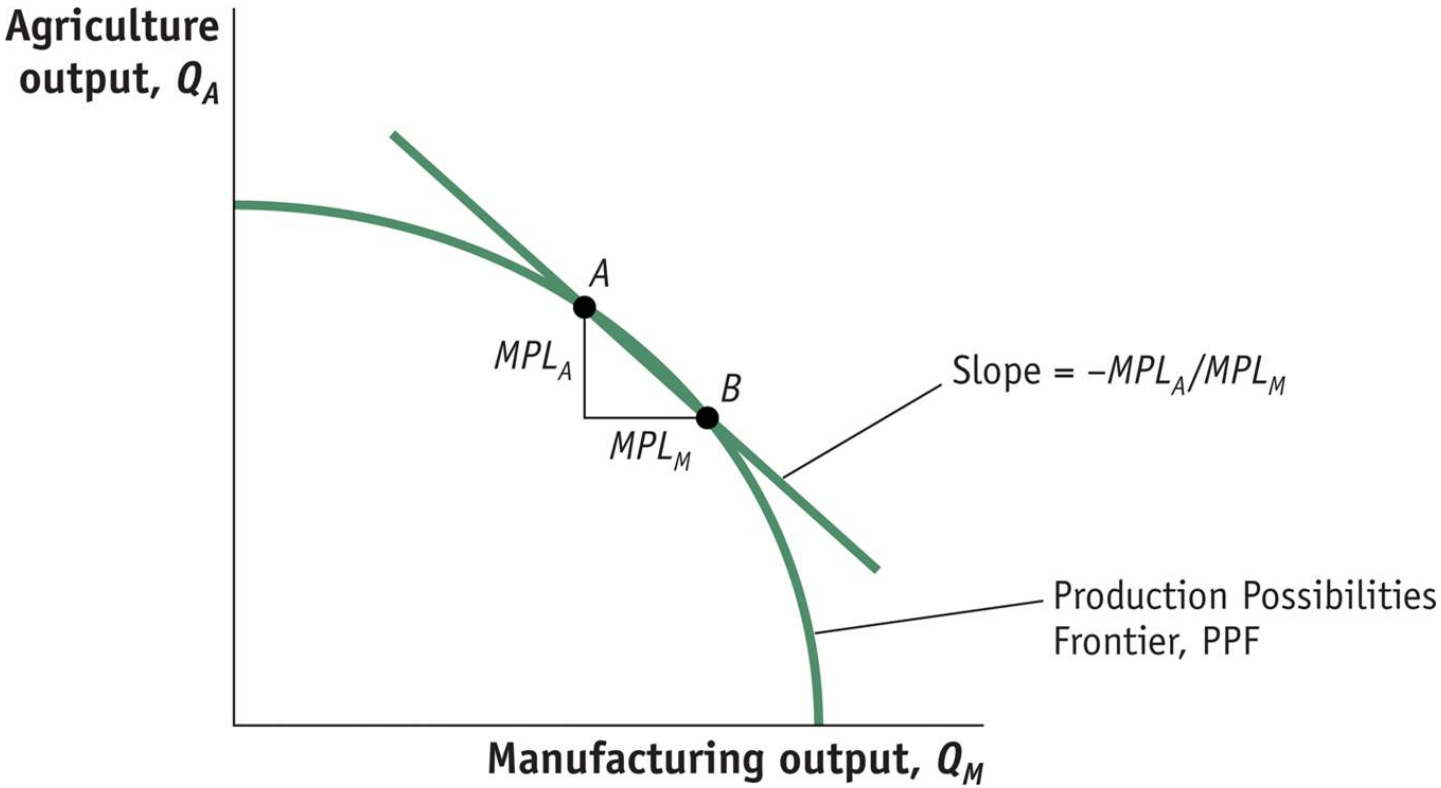
- For given K, as $L_M \uparrow$ production of $M \uparrow$ by less
- There are **diminishing returns** ($MPL \downarrow$ as $L_M \uparrow$)
- $MPL \uparrow$ when $K \uparrow$

Economy PPF



Economy PPF

- Slope of the PPF is not constant
  - 1 unit of labor leaves Agriculture for Manufacturing
  - Output of Agriculture drops by MPL_A
  - Output of Manufacturing increases by MPL_M
  - Slope of PPF is therefore $-MPL_A/MPL_M$
  - Can interpret as the opportunity cost of M in terms of A

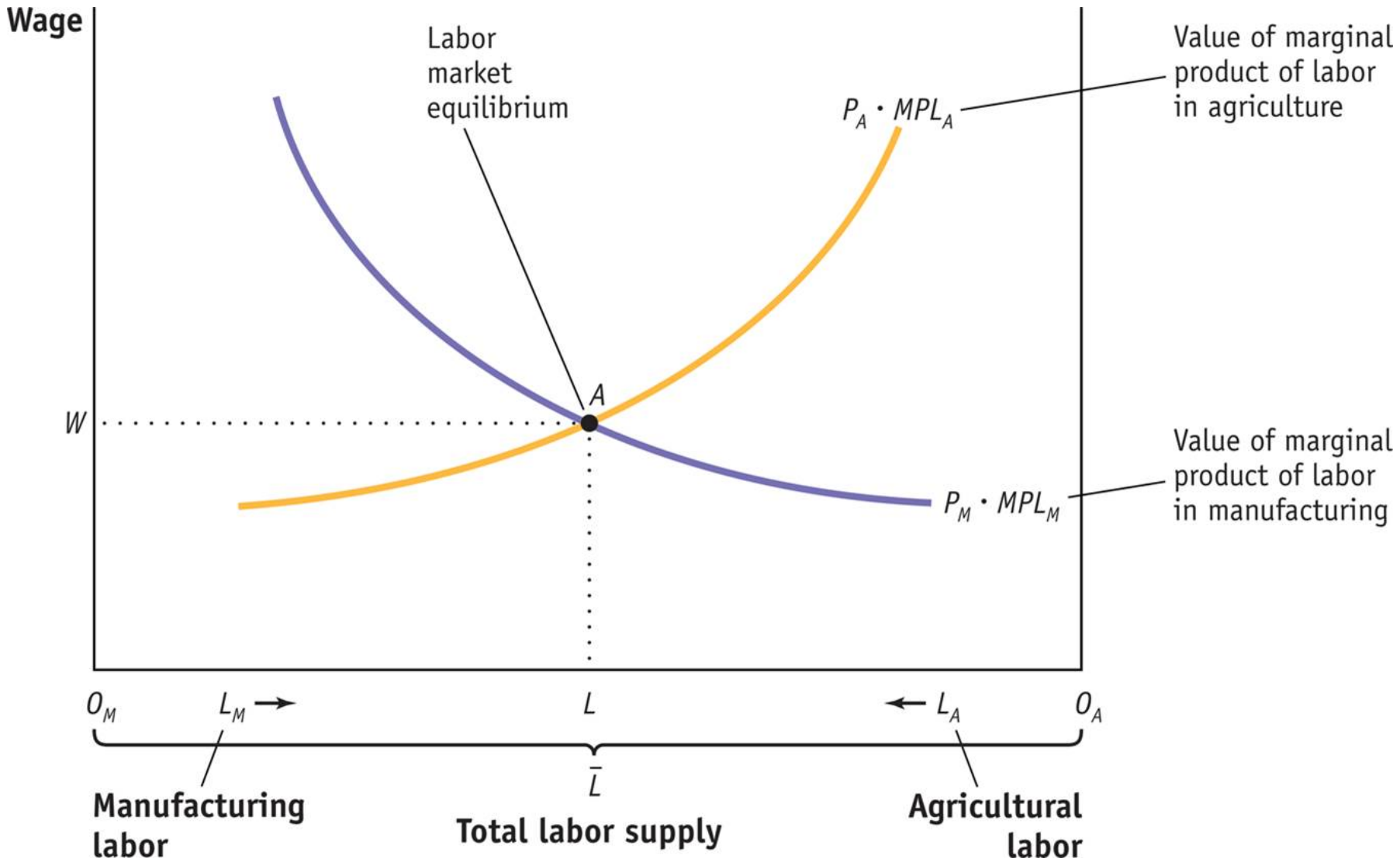


Production Mix

- How much of the two goods will be produced?
- Depends on where labor works (other factors are immobile)
- Assume given prices P_M and P_A
- Firms pay wages equal to the value of the marginal product of workers:
  - $W_M = P_M MPL_M$
  - $W_A = P_A MPL_A$
- Workers are free to move between sectors so in equilibrium must be indifferent

$$W = P_M MPL_M = P_A MPL_A$$

Allocation of Labor



Participation question

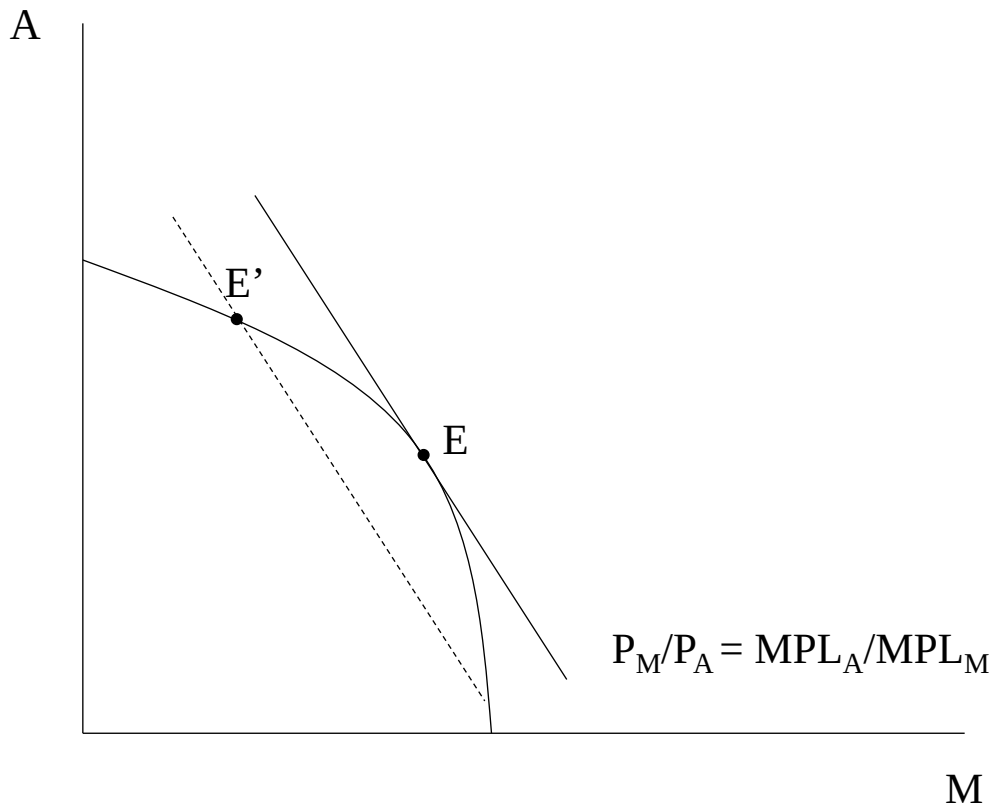
Assume $MPL_M = 15 - L_M$, $MPL_A = 10 - L_A$ and $L = 10$. If prices are $P_M = 1$ and $P_A = 2$ how many workers work in Manufacturing?

A) 7.5
B) 5
C) 15
D) 10
E) $\sqrt{19}$

Equilibrium Production Mix

- At the optimal production point:

$$\frac{P_M}{P_A} = \frac{MPL_A}{MPL_M}$$

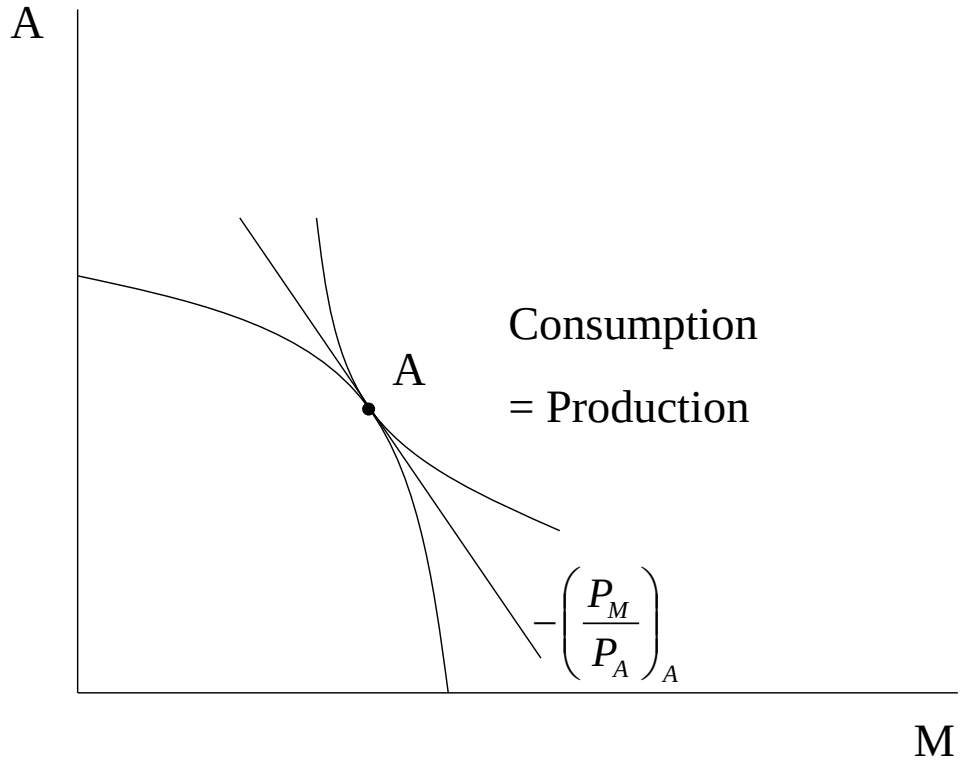


Participation question

At a point E':
A) $\frac{MPL_A}{MPL_M} < \frac{P_M}{P_A}$
B) The opportunity cost of making one unit of Manufacturing output is lower than the relative price of Manufacturing
C) Workers would want to move to Manufacturing
D) The value of output is not maximized
E) All of the above

Autarky Equilibrium in Home

- In autarky point A lies on the highest indifference curve, subject to the constraint given by the PPF
- Autarky relative price is the slope of the common tangent to the PPF and the indifference curve



International Trade

- Now add a Foreign country into the model
- Trade will occur if relative prices are different in the two countries
- Suppose that the autarky relative price of Manufacturing is lower in Home than in Foreign $\frac{P_M}{P_A} < \frac{P_M^*}{P_A^*}$
  - Home has comparative advantage in Manufacturing
- As in the Ricardian model the trade price $\left(\frac{P_M}{P_A}\right)_T$ will be between autarky prices:

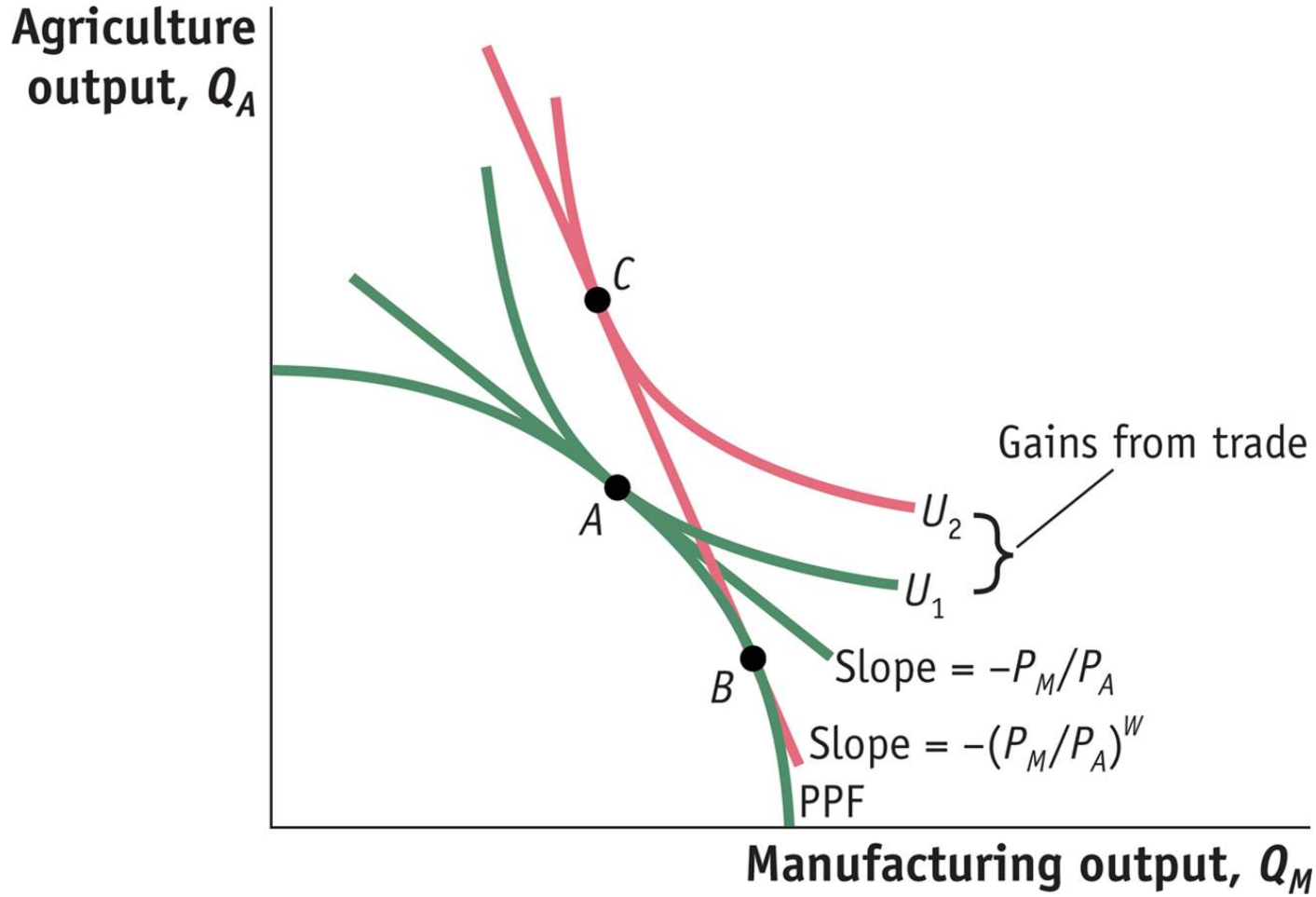
$$\frac{P_M}{P_A} \leq \left(\frac{P_M}{P_A}\right)_T \leq \frac{P_M^*}{P_A^*}$$

Participation question

Assume as before that in Home $MPL_M = 15 - L_M$, $MPL_A = 10 - L_A$ and $L = 10$. Autarky prices were $P_M = 1$ and $P_A = 2$. Suppose that after opening to trade $P_M = 2$. How many workers are there now in Manufacturing in Home?

A) 7.5
B) 5
C) 15
D) 10
E) $\sqrt{19}$

Home in Trade Equilibrium



Home in Trade Equilibrium

- Mobile factor reallocates to industry whose relative price went up
- Output increases in the comparative advantage industry and decreases in the other industry
  - But unlike in the Ricardian model, both goods are produced (there is incomplete specialization)
- Each country exports the good that had lower relative price in autarky (compared to the other country)
- Consumption possibility frontier expands relative to autarky
  - This means that there are **aggregate (overall) gains from trade**
  - Home is overall better off with trade than in autarky

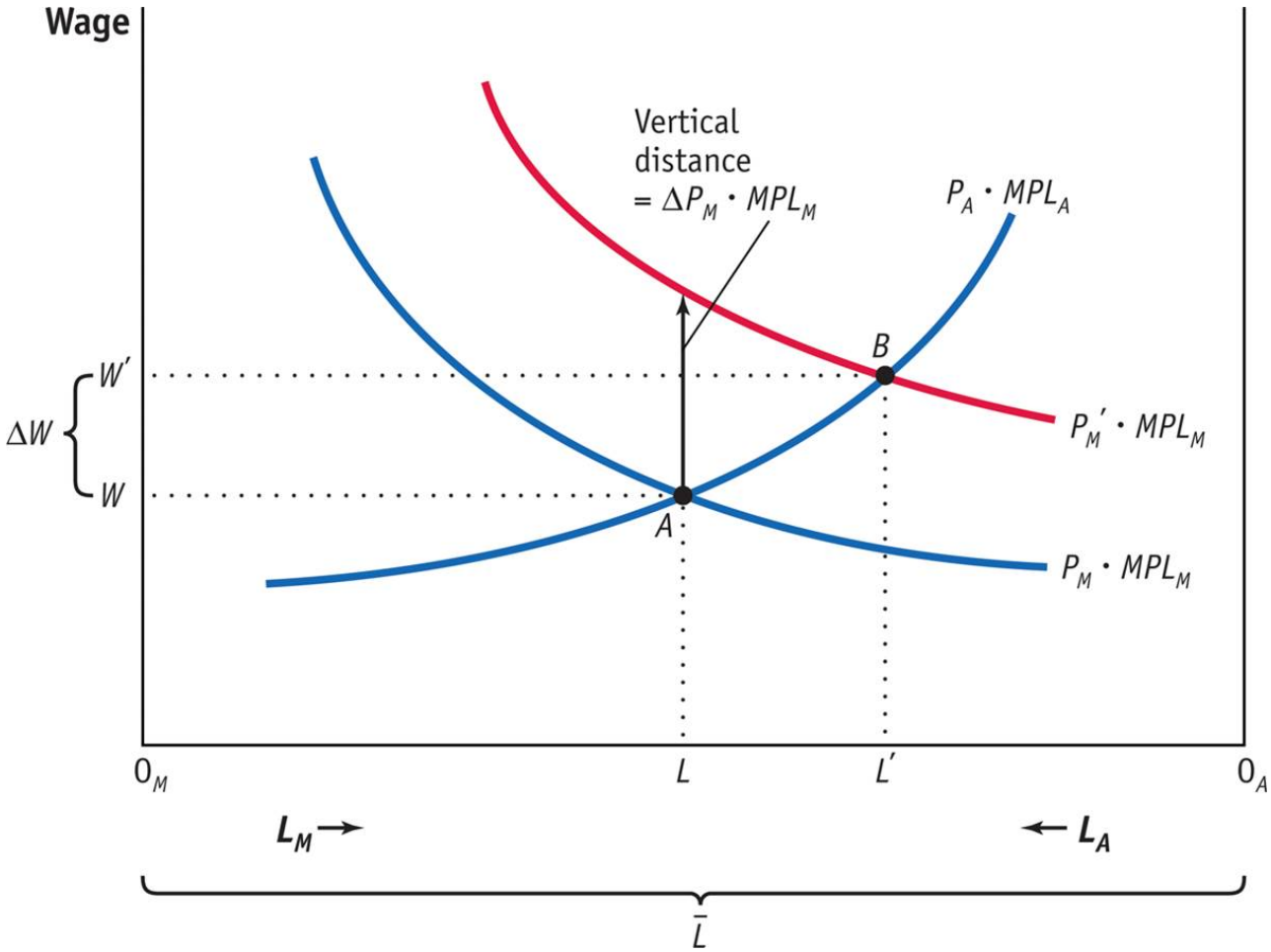
Aggregate Gains from Trade

- How do we measure GFT?
- Ideally we would want to see prices in autarky and with trade
  - But we cannot observe both simultaneously
- Two main approaches to deal with this issue
  - Use economic models to tell us what the autarky prices *would be* (making some assumptions on the way)
  - Use few episodes where there was a sudden and unexpected large change in openness to trade (natural experiment)
    - ★ Jeffersonian embargo 1807-1809
    - ★ Japan in 1850s
    - ★ Blockade in the Gaza strip more recently
- For large countries the estimates are often in the range of 5-10% of GDP
  - Is that large or small?

Distributional Concerns

- We have shown that there are overall GFT in the model
- But this overall gains may be a result of some groups gaining a lot while others are losing
- We need to look are real income of the three groups: workers and owners of capital and land
- Let's examine the effect of an increase in P_M while holding P_A fixed (so the relative price of Manufacturing $\frac{P_M}{P_A}$ increases)

Wages


Wage
Vertical
distance
= $\Delta P_M \cdot MPL_M$
$P_A \cdot MPL_A$
B
W'
ΔW
W
$P_M' \cdot MPL_M$
A
$P_M \cdot MPL_M$
0_M
L
L′
0_A
$L_M \rightarrow$
$\leftarrow L_A$
$\bar{L}$

Real Wages

- Wage W increases but by proportionately less than P_M

$$\frac{\Delta W}{W} < \frac{\Delta P_M MPL_M}{P_M MPL_M} = \frac{\Delta P_M}{P_M}$$

- So real wage in terms of the Manufactured good decreases
- Since W increases and P_A stays the same the real wage in terms of the Agricultural good increases
- Overall the effect on real wages is **ambiguous**
  - Workers lose if most of their spending is on Manufactures
  - Workers gain if most of their spending is on Agriculture

Participation question

Suppose that instead of P_M increasing and P_A staying constant, P_M stays constant while P_A decreases (so that the relative price of Manufacturing $\frac{P_M}{P_A}$ still increases). What happens now to the real wage of workers?

A) Increases in terms of Manufacturing and decreases in terms of Agriculture

B) Increases in terms of Manufacturing and increases in terms of Agriculture

C) Decreases in terms of Manufacturing and increases in terms of Agriculture

D) Decreases in terms of Manufacturing and decreases in terms of Agriculture

Real Income of Capital Owners

- Let R_K denote the rental rate for one unit of capital K
- With perfect competition capital owners are paid the value of the marginal product of capital

$$R_K = P_M MPK_M$$

- Since labor moves into Manufacturing each unit of capital has more labor to work with so MPK_M increases
- This means $\frac{R_K}{P_M}$ increases
  - R_K increases by proportionately more than P_M
- Real rental on capital also increases in terms of Agricultural good: $\frac{R_K}{P_A} \uparrow$
- Real income of capital owners increases in terms of *both* goods

Real Income of Land Owners

- Let R_T denote the rental rate for one unit of land T
- With perfect competition land owners are paid the value of the marginal product of land

$$R_T = P_A MPT_A$$

- Since labor moves out of Agriculture each unit of land has less labor working on it so MPT_A decreases
- This means:
  - R_A decreases
  - $\frac{R_A}{P_A}$ decreases
  - $\frac{R_A}{P_M}$ decreases
- Real income of land owners decreases in terms of *both* goods

Distributional Effects of Trade: Summary

- An increase in the relative price of an industry's output will:
  - Increase the real rental earned by the factor specific to that industry
  - Decrease the real rental earned by the factor specific to the other industry
  - Have an ambiguous effect on the real income of the mobile factor
- Factors that are stuck in the industry shrinking due to import competition are the biggest losers from trade

Gainers, Losers and Protectionism

- There are aggregate gains from trade
  - It means that gainers should be able to compensate the losers and everybody would be better off
- Why then do we observe interest groups (import-competing workers and firms) lobbying for protection?
  - Often losers are not compensated
  - Those who lose are better organized
  - Losses are more concentrated (strong incentive to organize)
  - People tend to notice lower wages but not lower prices

Trade Adjustment Assistance (TAA) Program

- Part of the Trade Expansion Act of 1962 "to compensate workers for tariff cuts under the Kennedy Round of multilateral negotiations"
- Served two purposes:
  - reduce political opposition to new trade agreements
  - smooth the cost of temporary unemployment for workers moving from shrinking to growing sectors
- The version of 1962 had limited eligibility and benefits: very few applicants were certified
- The scope of the program gradually expanded over time
  - Now includes workers in upstream and downstream industries
  - Now also includes workers in services and (via a related program) in agriculture

TAA

- The current version is set to expire at the end of 2014
- Expect to hear about TAA during the heated political debate about the reauthorization of TPA (trade promotion authority, allows a yes-or-no voting on trade deals)
- From *Politico* news story from January 9th 2014:

  Both the New Democrats and the White House also called for renewal of Trade Adjustment Assistance, a program to help retrain workers displaced by trade that many conservative Republicans oppose.

- Report by *The Heritage Foundation* from January 8th 2014 titled "Trade Adjustment Assistance: Let the Ineffective and Wasteful Job-Training Program Expire"

Effect of Trade on Employment

- Beyond anecdotes, is there a systematic evidence of detrimental effect of trade on manufacturing employment in the US?
- Some estimates provided by a recent article by David Autor, David Dorn and Gordon Hanson: "The China Syndrom: Local Labor Market Effect of Import Competition in the United Satetes", *American Economic Review* (forthcoming)

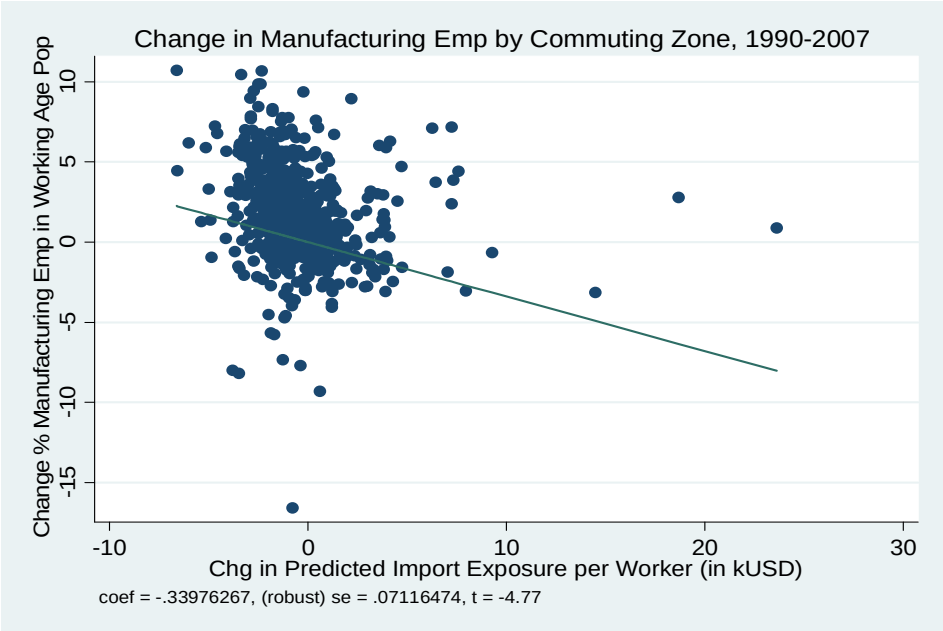


Figure 2.
Change in Import Exposure per Worker and Decline of Manufacturing Employment:

Effect of Trade on Workers

Autor, Dorn and Hanson find that for each extra \$1,000 worth of imports:

- unemployment $\uparrow$ by 4.9%
- labor non-participation $\uparrow$ by 2.1%
- transfer payments go up by \$58 per capita of which:
  - Social Security Disability Insurance $\uparrow$ by \$8 per capita
  - medical benefits $\uparrow$ by \$18 per capita
  - early retirement and other benefits $\uparrow$ by \$21 per capita
  - TAA $\uparrow$ by \$0.23 per capita

Canada

- General Adjustment Assistance Program: only guarantee loans to firms in distress and pay for consultant fees for adjustment to foreign competition
- Similar to *TAA for Firms* in the US:
  - firm is eligible if it experienced sales and employment declines at least partially due to imports over the last two years
  - fund improvements to production: outside consulting services (i.e. engineers, designers or other industry-specific experts)
  - maximum limit is $150,000 in total project costs, TAA pays maximum $75,000