Introduction

Introduction to "New Trade Theory":

Trade with imperfect competition

- Intro and facts
- Basics of imperfect competition
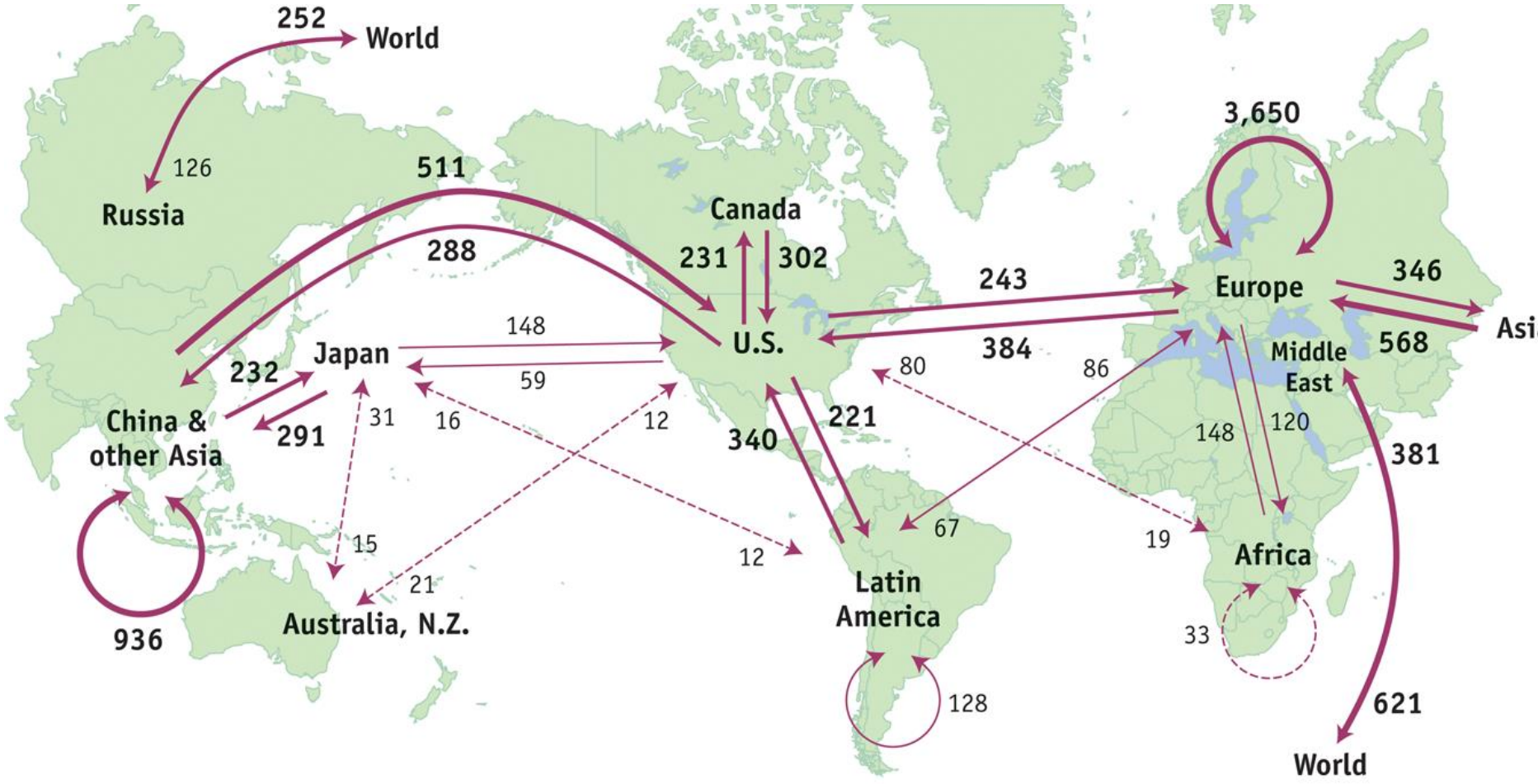- Trade with monopolistic competition

Extensions:

- Heterogeneous firms
- Role of trade costs

Introduction

Two countries trade more when they are more _dissimilar_ :

a) True for both H-O and Ricardian model

b) True for H-O but not the Ricardian model

c) True for the Ricardian model but not H-O

d) False for both of these models.

252 → World

126 → Russia

511

288

232 Japan 148

59

291 31 16 12

Canada

231 302

243 Europe 3,650

346

384 Asia

568

Middle East

China & other Asia

U.S.

221

340 80 86 120

936

15 21

Australia, N.Z.

67

19

148

Africa

381

Latin America

12

33

128

621

World

Total world trade flows in 2006: $11,600 billion

World Trade in Goods

-------- < $50 billion

———— $50–150 billion

━━━━ $150–500 billion

━━━━ > $500 billion

Introduction

	Share of World Trade (%)		Share of World Trade (%)
Europe (internal trade)	31	Asia (exports)	27
Europe (internal) plus trade with the U.S.	37	Middle East and Russia (exports)	9
Americas (internal trade)	11	Africa (exports)	3
Europe and the Americas (exports)	60	Australia and New Zealand (exports)	1.4

Introduction

In the data:

- There are large trade flows between similar countries

Introduction

In the data:

• There are large trade flows between similar countries

And furthermore:

• There are imports and exports of very similar good
    (e.g.: Golf clubs, cars, machines, etc.)

➔ Most trade look like "shipping coal back to Newcastle"!

Introduction

(b) EXPORTS

Rank	Country	Value of Imports (millions)	Quantity of Golf Clubs (thousands)	Average Price ($/club)
1	Canada	$64.9	837	77
2	Japan	41.7	430	97
3	United Kingdom	35.8	446	80
4	Korea	33.9	419	81
5	Australia	14.1	189	75
6	Singapore	6.8	65	104
7	Hong Kong	6.7	72	92
8	Argentina	2.7	35	77
9	Malaysia	2.5	31	83
10	South Africa	2.3	25	93
11	Netherlands	1.8	18	102
12	Thailand	1.7	22	77
13-83	Various countries	11.3	136	83
	All 83 countries	226.2	2,725	83

Introduction

(a) IMPORTS

Rank	Country	Value of Imports (millions)	Quantity of Golf Clubs (thousands)	Average Price ($/club)
1	China	$254.2	14,482	18
2	Thailand	13.5	132	102
3	Vietnam	7.2	504	14
4	Japan	5.8	47	125
5	Taiwan	1.1	69	16
6	Malaysia	1.1	12	89
7	Mexico	0.3	40	8
8	Hong Kong	0.3	16	18
9	Macao	0.2	5	43
10	United Kingdom	0.1	12	10
11	Canada	0.1	3	25
12	Korea	0.1	1	54
13-25	Various countries	0.1	11	8
	All 25 countries	284.2	15,335	19

Introduction

In the Heckscher-Ohlin and Ricardian models, *dissimilar* countries trade more.

If two countries are *identical*:

- They have the same relative price in autarky
- Hence the world price with trade is the same as in autarky
- Production and consumption are the same with or without trade
- ➔ There is no trade (and no gain from trade)

Introduction

What are we missing?
Why countries both import and export golf clubs?

Introduction

A golf club story:

- Golf clubs are in facts not all alike: all brands are different.

Introduction

A golf club story:

- Golf clubs are in facts not all alike: all brands are different.

→ countries produce different brands

→ Gains from having access to different varieties!

Cheese!
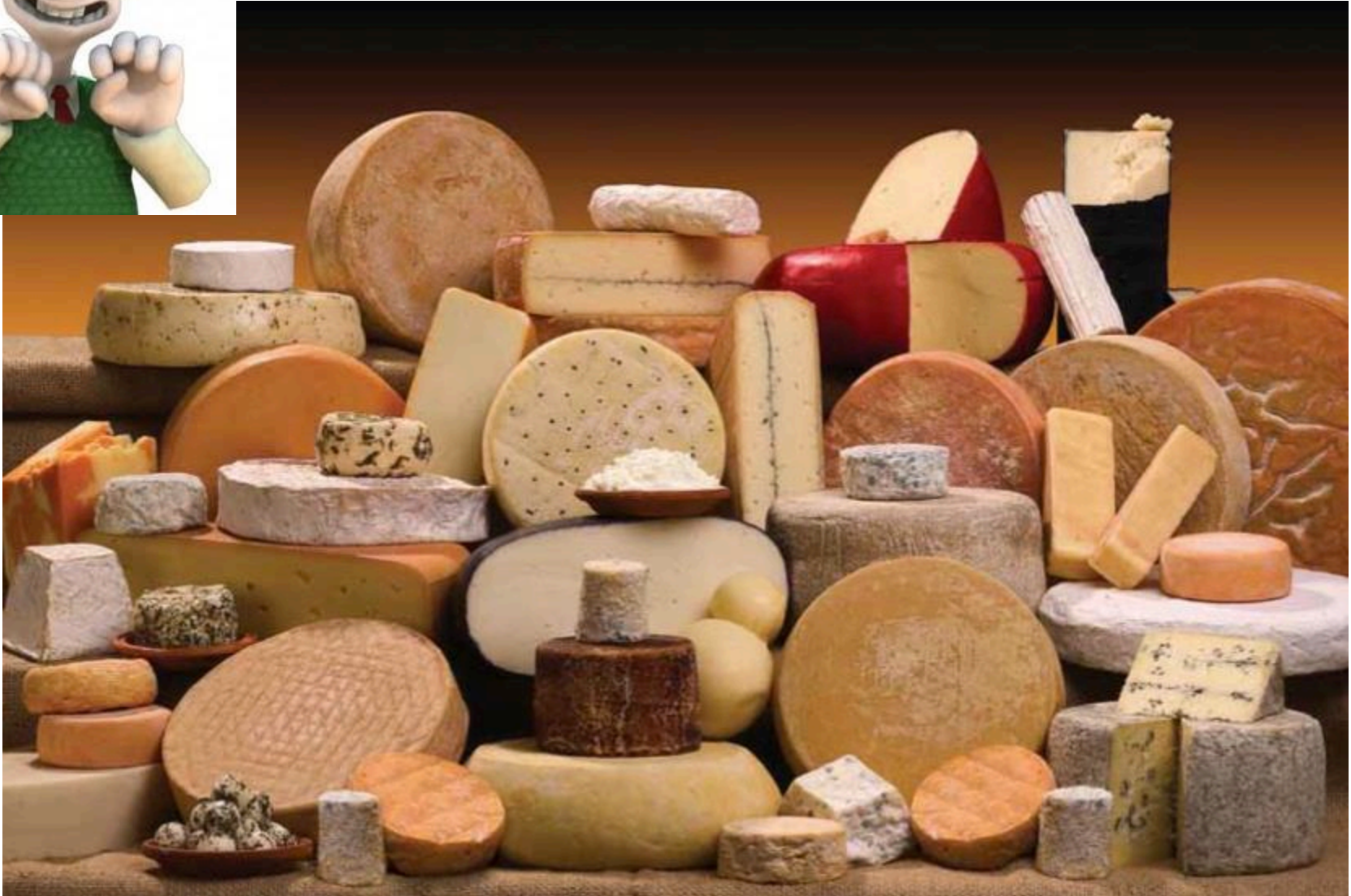
Introduction

A golf club story:

- Golf clubs are in facts not all alike: all brands are different.

→ countries produce different brands

→ Gains from having access to different varieties!

- Brands and product differentiations are essential in most industries

2013 Rank	2012 Rank	Brand	Brand Name	Region/Country	Sector	Brand Value ($m)
1	2	Apple	Apple	United States	Technology	98,316
2	4	Google	Google	United States	Technology	93,291
3	1	Coca-Cola	Coca-Cola	United States	Beverages	79,213
4	3	IBM	IBM	United States	Business Services	78,808
5	5	Microsoft	Microsoft	United States	Technology	59,546
6	6	GE	GE	United States	Diversified	46,947
7	7	McDonald's	McDonald's	United States	Restaurants	41,992
8	9	Samsung	Samsung	South Korea	Technology	39,610
9	8	Intel	Intel	United States	Technology	37,257
10	10	Toyota	Toyota	Japan	Automotive	35,346
11	11	Mercedes-Benz	Mercedes-Benz	Germany	Automotive	31,904
12	12	BMW	BMW	Germany	Automotive	31,839
13	14	Cisco	Cisco	United States	Technology	29,053

14	13	Disney	Disney	United States	Media	28,147
15	15	HP	HP	United States	Technology	25,843
16	16	Gillette	Gillette	United States	FMCG	25,105
17	17	LOUIS VUITTON	Louis Vuitton	France	Luxury	24,893
18	18	ORACLE	Oracle	United States	Technology	24,088
19	20	amazon	Amazon	United States	Retail	23,620
20	21	HONDA	Honda	Japan	Automotive	18,490
21	23	H&M	H&M	Sweden	Apparel	18,168
22	22	pepsi	Pepsi	United States	Beverages	17,892
23	24	AMERICAN EXPRESS	American Express	United States	Financial Services	17,646
24	26	Nike	Nike	United States	Sporting Goods	17,085
25	25	SAP	SAP	Germany	Technology	16,676
26	28	IKEA	IKEA	Sweden	Home Furnishings	13,818

27	27		UPS	United States	Transportation	13,763
28	36		eBay	United States	Retail	13,162
29	34		Pampers	United States	FMCG	13,035
30	29		Kellogg's	United States	FMCG	12,987
31	31		Budweiser	United States	Alcohol	12,614
32	33		HSBC	United Kingdom	Financial Services	12,183
33	32		J.P. Morgan	United States	Financial Services	11,456
34	39		Volkswagen	Germany	Automotive	11,120
35	30		Canon	Japan	Electronics	10,989
36	37		Zara	Spain	Apparel	10,821
37	35		Nescafé	Switzerland	Beverages	10,651
38	38		Gucci	Italy	Luxury	10,151
39	42		L'Oréal	France	FMCG	9,874

40	41	Philips	Netherlands	Electronics	9,813
41	43	Accenture	United States	Business Services	9,471
42	45	Ford	United States	Automotive	9,181
43	53	Hyundai	South Korea	Automotive	9,004
44	48	Goldman Sachs	United States	Financial Services	8,536
45	51	Siemens	Germany	Diversified	8,503
46	40	Sony	Japan	Electronics	8,408
47	44	Thomson Reuters	Canada	Media	8,103
48	50	Citi	United States	Financial Services	7,973
49	52	Danone	France	FMCG	7,968
50	47	Colgate	United States	FMCG	7,833
51	55	Audi	Germany	Automotive	7,767
52	69	Facebook	United States	Technology	7,732

Introduction

Trade with brands

- Even if countries are similar, they are producing different brands

This can help answer two key questions:

- What generates trade between countries?
- What are the gains from trade?

Introduction

What determines brands and brand value?

Model?

Introduction

What determines brands and brand value?

- Consumers enjoy being able to choose among a large _variety_ of golf clubs

- There are costs involved in creating a new brand.

- Each brand has a _monopoly power_ over its own golf clubs but competitors would still negatively affect demand and prices.

Introduction

Key ingredients for the new trade model
(Krugman 1979, Nobel prize in 2008)

1) Goods are **differentiated**, i.e. not strictly identical.

2) We allow for **imperfect competition**: "Monopolistic competition" firms can influence the price they charge, *but no strategic interaction.*

3) Firms enjoy **increasing returns to scale**, by which we mean that the average costs for a firm fall as more output is produced.

2- Monopolistic Competition

"Monopolistic competition"

- Firms don't take their price as given

→ Firms account for how their production affects prices

- But take the price of their competitors as given

→ Greatly simplifies equilibrium

→ "Brands" in an almost a competitive environment

2- Monopolistic Competition

Assumptions of the model of monopolistic competition:

Assumption 1: Firms produce using a technology with increasing returns to scale.

- There is a constant marginal cost MC = c
- There is a fixed cost F > 0

2- Monopolistic Competition

Assumptions of the model of monopolistic competition:

Assumption 2: Firms produce differentiated goods

➔ *Each firm faces a downward-sloping demand curve for its product and has some control its price*

Assumption 3: There are "many" firms in the industry

➔ *Firms take the average price across firms as given*

2- Monopolistic Competition

Assumptions of the model of monopolistic competition:

Demand:

$$Q = S \cdot \left[1/n - b \, (P - \overline{P}) \right]$$

- S: total industry output (assumed fixed)

- n: number of firms

- Q: quantity produced by each firm

- b: sensitivity of demand to prices

2- Monopolistic Competition

Assumptions of the model of monopolistic competition:

Assumption 4: Because firms can enter and exit the industry freely, *profits are zero in the long run*.

- Firms will enter as long as it is possible to make monopoly profits, and the more firms that enter, the lower profits per firm become.

- Profits for each firm end up as zero in the long run

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- We will also examine what happens in the "short run", i.e. without adjusting the number of firms.

2- Monopolistic Competition

Equilibrium

We will describe the equilibrium with two key variables: price P and number of firms "n"

2- Monopolistic Competition

Equilibrium

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We will use two curves in the (P,n) space:

- "CC" curve: average cost as a function of "n"

- "PP" curve: average price as a function of "n"

2- Monopolistic Competition

Equilibrium

We will describe the equilibrium with two key variables: price P and number of firms "n"

We will use two curves in the (P,n) space:

- "CC" curve: average cost as a function of "n"

- "PP" curve: average price as a function of "n"

Equilibrium with zero profits:

P = AC   → Intersection between CC and PP

2- Monopolistic Competition

Equilibrium

Symmetric equilibrium:

Since all firms have the same costs and demand, all firms have the same P, Q, AC, etc.

Easy to retrieve quantities once we know "n":

Q = S / n

2- Monopolistic Competition

"CC" curve: Average cost

Combining:

- $AC = c + F/Q$

- and: $Q = S/n$,

→ We obtain the CC curve: $AC = c + n\,F/S$

Intuition: *costs are high when there are too many firms (each firm produces in small quantities)*

2- Monopolistic Competition

"PP" curve: MR = c

- Demand system: $Q = S.\left[1/n - b\,(P - \overline{P})\right]$

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  yields the following MR: $MR = P - \dfrac{Q}{b\,S}$

2- Monopolistic Competition

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  yields the following MR: $MR = P - \dfrac{Q}{b \, S}$

- Equilibrium imposes: c = MR = $P - \dfrac{Q}{b \, S}$

But then how to get a relationship between P and "n"?

2- Monopolistic Competition

"PP" curve: MR = c

- Demand system: $Q = S.\left[1/n - b\,(P - \overline{P})\right]$

  yields the following MR: $MR = P - \dfrac{Q}{b\,S}$

- Equilibrium imposes: c = MR = $P - \dfrac{Q}{b\,S}$

→ With *Q = S/n*, we obtain the PP curve: $P = c + \dfrac{1}{b\,n}$

Intuition: *Markups (P-c) are lower and prices are closer to MC (perfect competition) with many firms*

Equilibrium: P = AC – reached for (n₂, P₂)

2- Monopolistic Competition

What if we deviate from equilibrium P_2 , n_2?

Starting from $n_1 < n_2$:

- PP curve above the AC curve

- P > AC implies that there are positive profits:
  Costs are low (large quantities) and markup are large

→ New firms enter and "n" increases

2- Monopolistic Competition

What if we deviate from equilibrium P_2 , n_2?

Starting from $n_3 > n_2$:

- PP curve <u>below</u> the AC curve

- P < AC implies that there are <u>negative</u> profits:
  Costs are high (<u>small scale</u>), markup are low (<u>competition</u>)

→ Firms exit and "n" decreases

Equilibrium: P = AC
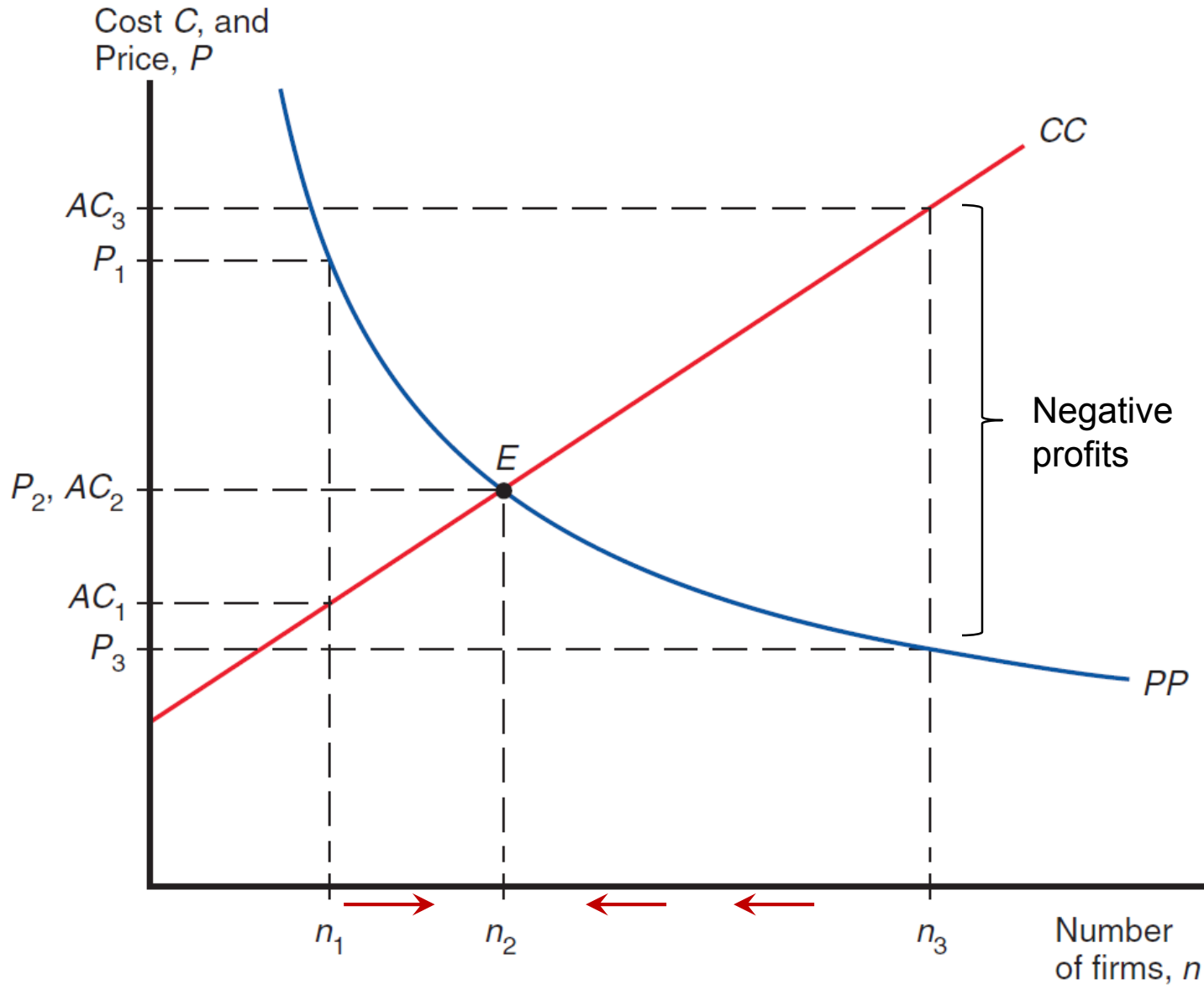
2- Monopolistic Competition

Optimal costs and number of Firms (brands)

- Why aren't there more firms?

- Why aren't there fewer firms?

2- Monopolistic Competition

Optimal costs and number of Firms (brands)

- Why aren't there more firms?

If there are too many firms, production scale is too small, markups are too small → negative profits

- Why aren't there fewer firms?

If there are too few firms, profits are positive

→ New firms enter

2- Monopolistic Competition

Quantitative analysis:

$$
\begin{cases}
\text{PP curve:} \quad P = c + \dfrac{1}{b\,n} \\[2em]
\text{CC curve:} \quad P = AC = c + n\,F\,/\,S
\end{cases}
$$

2- Monopolistic Competition

Quantitative analysis:

$$\begin{cases} \text{PP curve: } P = c + \dfrac{1}{b\,n} \\[2em] \text{CC curve: } P = AC = c + n\,F/S \end{cases}$$

Implies: $\quad c + \dfrac{1}{b\,n} = c + n\,F/S \implies n = \sqrt{\dfrac{S}{b\,F}}$

2- Monopolistic Competition

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Implies: $\quad c + \dfrac{1}{b\,n} = c + n\,F/S \implies n = \sqrt{\dfrac{S}{b\,F}}$

Example:

Doubling fixed costs ➜ Divide n by $\sqrt{2} = 1.414$

Doubling market size ➜ Multiply n by $\sqrt{2} = 1.414$

2- Monopolistic Competition

Quantitative analysis:

$$\begin{cases} \text{PP curve: } & P = c + \dfrac{1}{b\,n} \\[2em] \text{Nb. firms: } & n = \sqrt{\dfrac{S}{b\,F}} \end{cases}$$

Implies following markup: $\quad P - c = \sqrt{\dfrac{F}{b\,S}}$

2- Monopolistic Competition

Quantitative analysis:

$$\begin{cases} \text{PP curve: } P = c + \dfrac{1}{b\,n} \\[2em] \text{Nb. firms: } n = \sqrt{\dfrac{S}{b\,F}} \end{cases}$$

Implies following markup: $\quad P - c = \sqrt{\dfrac{F}{b\,S}}$

Example:

Doubling fixed costs ➔ Multiply markups by $\sqrt{2} = 1.414$

Doubling market size ➔ Divide markups by $\sqrt{2} = 1.414$

3- Trade under monopolistic competition

Trade

Next step:

What is the effect of trade on:
- production?
- Number of firms?
- prices?

3- Trade under monopolistic competition

Summary of assumptions:

Assumption 1: $TC = c.Q + F$

Assumption 2: Firms produce differentiated goods

Assumption 3: There are many firms in the industry

Assumption 4: Because firms can enter and exit the industry freely, _profits are zero in the long run_.

3- Trade under monopolistic competition

Trade

Free trade (for now): no transport cost

Both markets have the same technology and the same demand

3- Trade under monopolistic competition

Trade

Free trade (for now): no transport cost

Both markets have the same technology and the same demand

One market has a size S

The other market has a size S*

→ New market with total size S+S*

3- Trade under monopolistic competition

Preview of results from the model

1- When a country opens to trade, does the number of brands available to consumers increase?

a) Yes

b) No

3- Trade under monopolistic competition

2- When a country opens to trade, does production in each firm increase?

a)   Yes

b)   No

3- Trade under monopolistic competition

3- When a country opens to trade, does the number of firms in each country increase?

a) Yes

b) No

3- Trade under monopolistic competition

4- When a country opens to trade, do prices increase?

a) Yes

b) No

3- Trade under monopolistic competition

Trade = increasing market size:

How does an increased market size affect the equilibrium?

1) <u>Average cost</u> "CC" curve combines:

- $AC = c + F / Q$

- and: $Q = (S + S^*) / N$,

→ New CC curve: $AC = c + N\,F\,/(S + S^*)$

→ **CC curve shifts downward**

3- Trade under monopolistic competition

Trade = increasing market size:

How does an increased market size affect the equilibrium?

2) <u>Price</u> "PP" curve combines:

- Equilibrium imposes: c = MR = $P - \dfrac{Q}{b\,(S + S^*)}$
- and: $Q = (S + S^*) / N$,

→ New PP curve = old PP curve: $P = c + \dfrac{1}{b\,N}$

→ **PP curve doesn't change**

Effect of a market size increase:

Cost, C and Price, P

CC_1

CC_2

P_1

P_2

1

2

PP

n_1 N

Number of firms, n
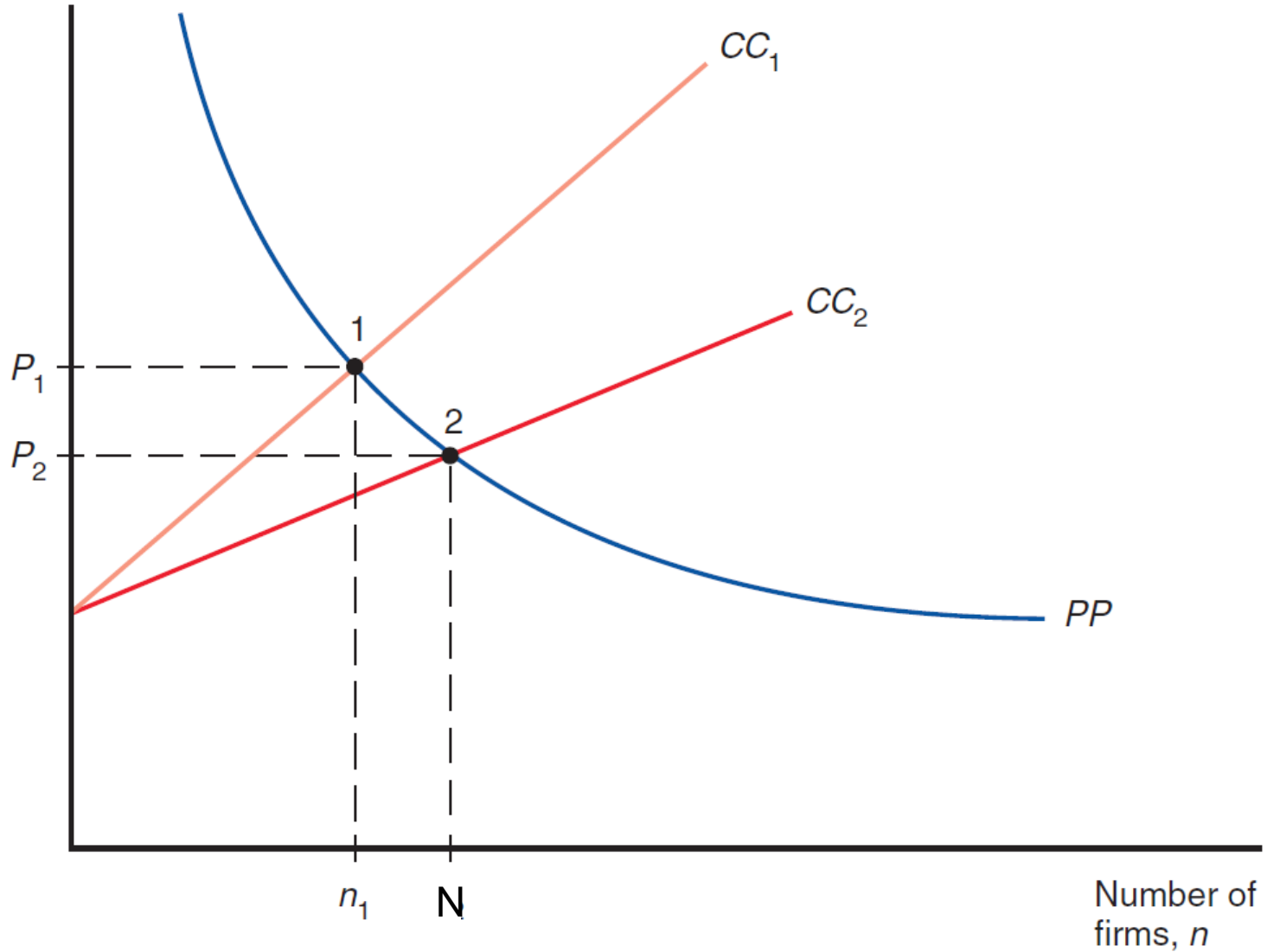
3- Trade under monopolistic competition

Effect of Trade

Gains for consumers?

3- Trade under monopolistic competition

Effect of Trade

Gains for consumers?

TWO sources of gains for consumers:
- Lower prices
- More brands to choose from

Hypothetical example: Auto industry
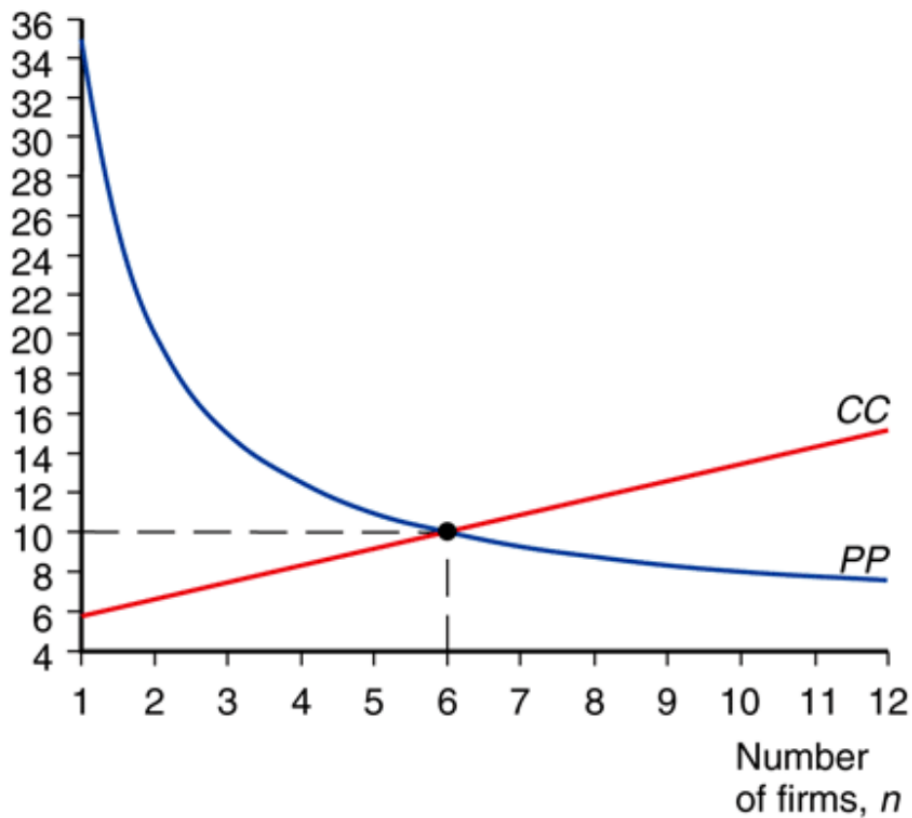

(a) Home
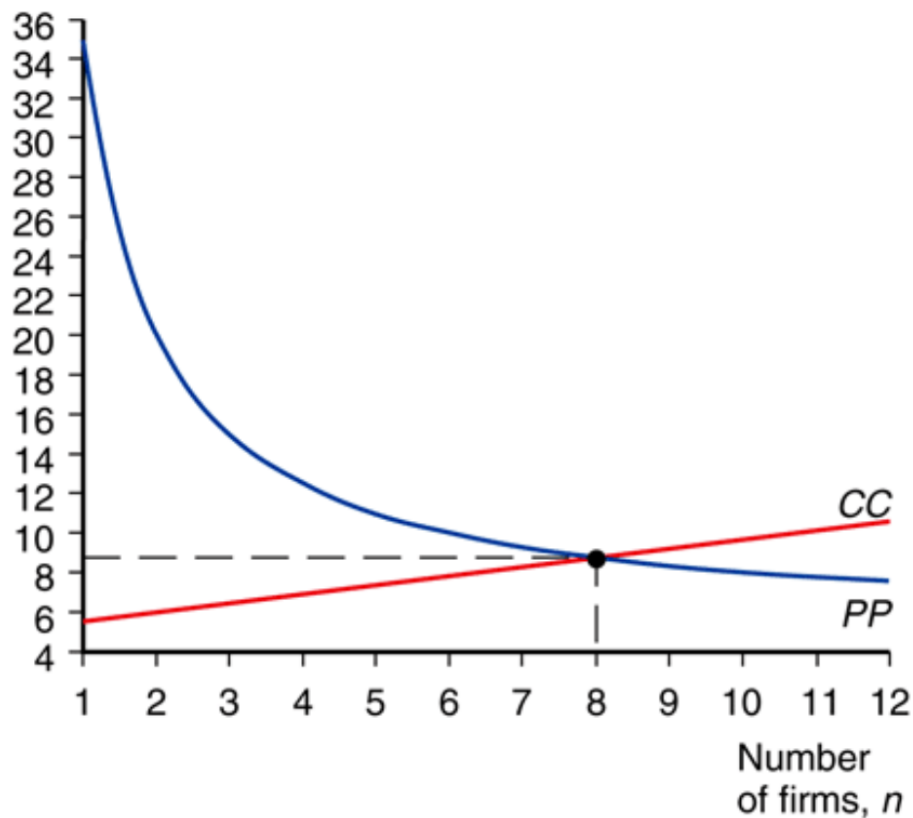
(b) Foreign

Hypothetical example: Auto industry
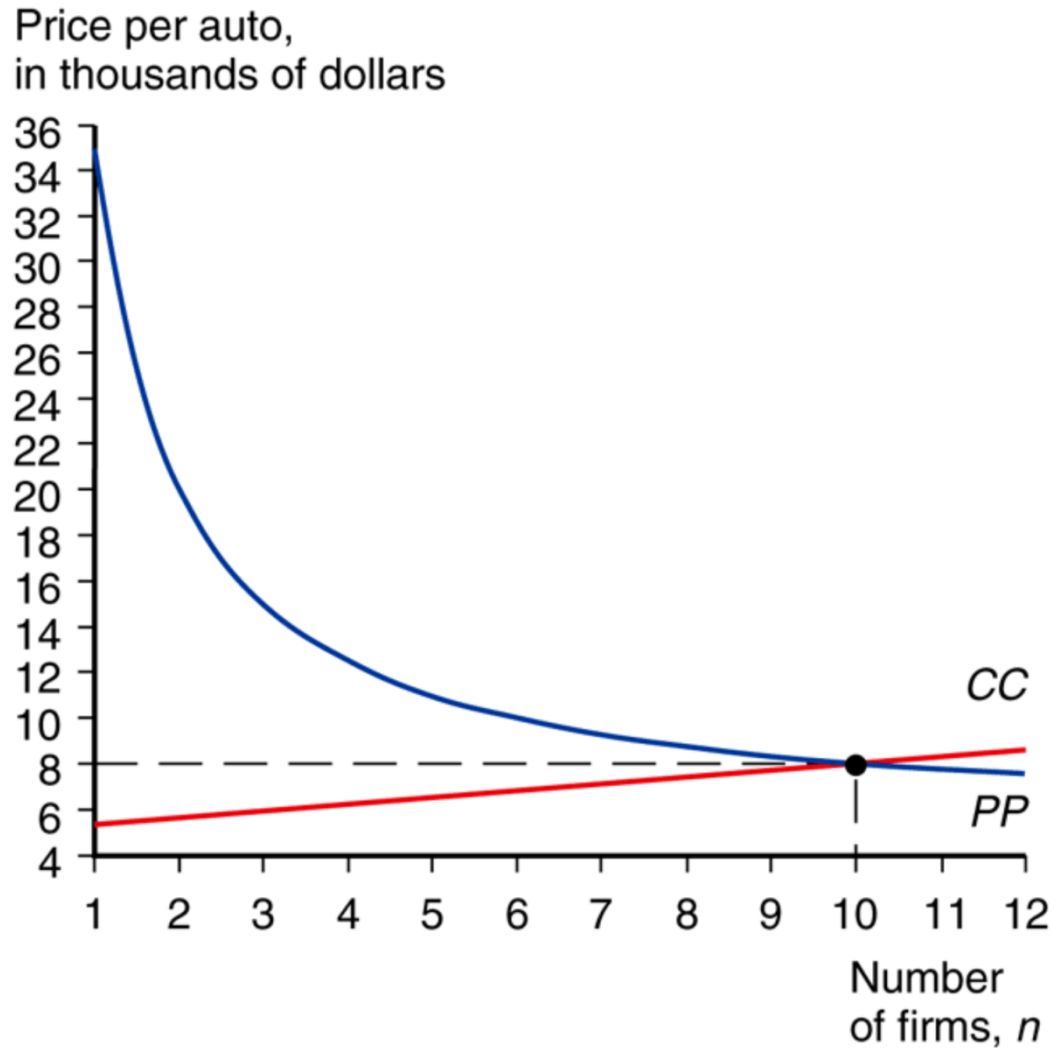
(c) Integrated

Hypothetical example: Auto industry

	Home Market, Before Trade	Foreign Market, Before Trade	Integrated Market, After Trade
Industry output (# of autos)	900,000	1,600,000	2,500,000
Number of firms	6	8	10
Output per firm (# of autos)	150,000	200,000	250,000
Average cost	$10,000	$8,750	$8,000
Price	$10,000	$8,750	$8,000

3- Trade under monopolistic competition

Effect of Trade

Gains for firms?

3- Trade under monopolistic competition

Effect of Trade

<u>Gains for firms?</u>

- Zero profits before trade liberalization
- Zero profits after trade liberalization
- → No change

3- Trade under monopolistic competition

Effect of Trade

Another important/subtle question:

Starting from two isolated markets, are there more firms before or after trade liberalization?

Suppose that we start from two separate markets (Home & Foreign) with n firms at Home and n* firms in Foreign. Also assume that n>n*. Now, with trade integration, the total number of firms N is such that:

a) n + n* < N

b) n < N < n+n*

c) n* < N < n

d) N < n*

Suppose that we start from two separate markets (Home & Foreign) with n firms at Home and n* firms in Foreign. Also assume that n>n*. Now, with trade integration, the total number of firms N is such that:

Answer:

3- Trade under monopolistic competition

Effect of Trade

Starting from two isolated markets, are there more firms before or after trade liberalization?

→ With trade, the combined market has more firms than each individual market

→ But there are fewer firms with trade than initially if we take the sum of the two markets

3- Trade under monopolistic competition

Effect of Trade

Starting from two isolated markets, are there more firms before or after trade liberalization?

→ With trade, the combined market has more firms than each individual market

→ But there are fewer firms with trade than initially if we take the sum of the two markets

→ **Trade induces an exit of firms in each market**

3- Trade under monopolistic competition

Effect of Trade

Initially:

Home has n firms with: $n = \sqrt{\dfrac{S}{b\,F}}$

Foreign has n* firms with: $n^* = \sqrt{\dfrac{S^*}{b\,F}}$

With trade, the total number of firms is:

$$N = \sqrt{\dfrac{S + S^*}{b\,F}} \quad < \quad n + n^*$$

3- Trade under monopolistic competition

Effect of Trade

Intuition:

- There are more brands available to each consumers, and therefore more competition

- To compensate, each firm has to produce in larger quantities in order to reduce average costs

→ If each firm produces more than in Autarky, the combined number of firms has to decrease!

$$(N < n + n^*)$$

3- Trade under monopolistic competition

Numerical example:

If we merge two identical markets:

- **Total number of firms?**

3- Trade under monopolistic competition

Numerical example:

If we merge two identical markets:

- **Total number of firms** multiplied by $\sqrt{2} = 1.414$

    → Number of firms is multiplied by LESS than 2
    → Survival rate: 1.41 / 2 = 71% in each market

- Consumer brands? Quantities?

3- Trade under monopolistic competition

Numerical example:

If we merge two identical markets:

- **Total number of firms** multiplied by $\sqrt{2} = 1.414$

  → Number of firms is multiplied by LESS than 2
  → Survival rate: 1.41 / 2 = 71% in each market

- Consumers have access to 41% **more brands**

- **Quantities** produced by each firm also increase by 41% (they are multiplied by $\sqrt{2} = 1.414$)

3- Trade under monopolistic competition

"Short-run" vs. "long-run" effects:

In the long-run: the number of firms adjusts so that firms have zero profits, with or without trade.

Questions:

- What if the number of firms does not adjust?
- Would there be positive or negative profits?

When a country opens to trade:

a)   In the short run, firms make positive profits and therefore the number of firms tends to increase, and firms become smaller

b)   In the short run, firms make positive profits and therefore the number of firms tends to decrease, and firms become bigger

c)   In the short run, firms make negative profits and therefore the number of firms tends to decrease, and firms become bigger

d)   In the short run, firms make negative profits and therefore the number of firms tends to increase, and firms become smaller

3- Trade under monopolistic competition

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$(N < n + n*)$

3- Trade under monopolistic competition

Effect of Trade

Summary of long-term effects of Trade:

→ Lower prices, lower markups

→ More brands available to consumers

→ Each firm produces more

→ But total number of firms decreases