International economics
2007-2008

At the conference *Challenges of Globalisation*, organised by the Dutch Social and Economic Council – September 3, 2007 --, Mandelson (EU Trade Commissioner) said: *"On both left and right and in the opportunistic centre - people are too often being told… that an open economy is the starting line in a race to the bottom - a race that Europeans can no longer win because others do not play fair or abide by the rules. Nationalism and populism and protectionism feed on these arguments". Mandelson argued that in Europe: "we still haven't really worked out how to be political about globalisation - except, in most cases, by opposing it. And that's our problem".*

Preview

• What is international economics about?

• Gains from trade

• Explaining patterns of trade

• The effects of government policies on trade

What Is International Economics About?

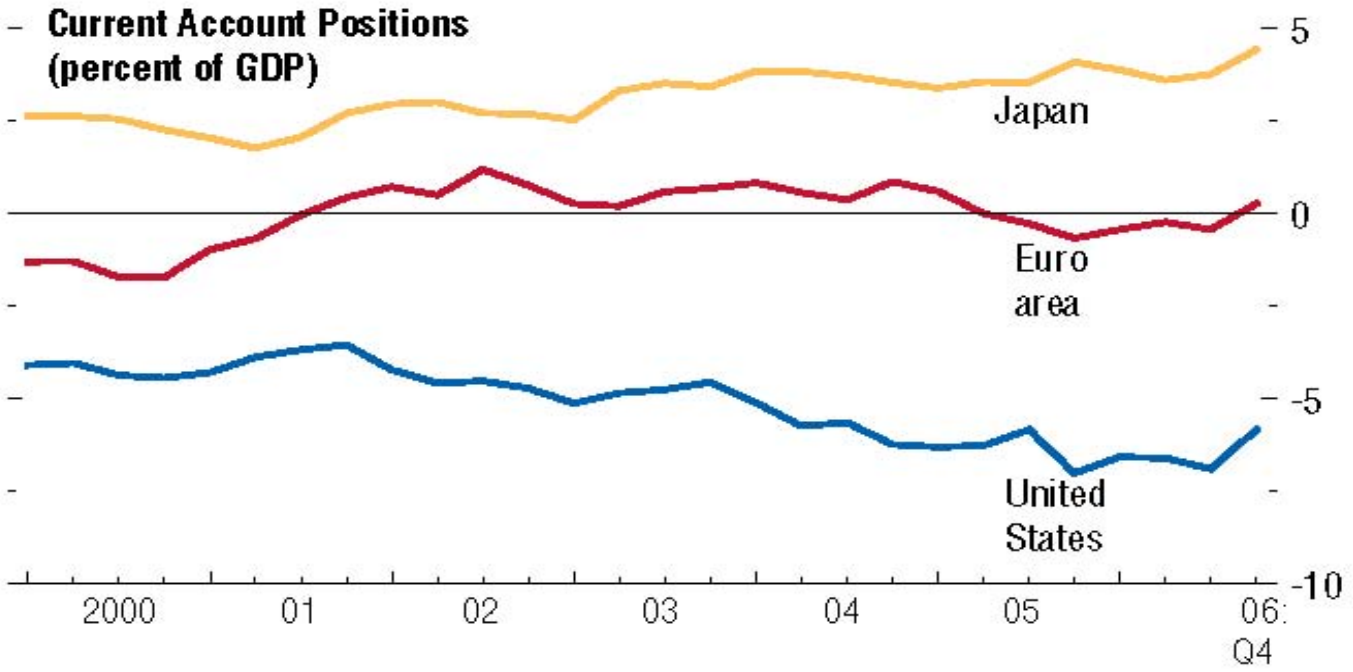
• International economics is about how nations interact through trade of goods and services (through flows of money and through investment).

• International economics is an old subject, but it continues to grow in importance as countries become tied to the international economy.

• Nations are more closely linked through trade in goods and services (through flows of money, and through investment than ever before).

• International trade as a fraction of the national economy has tripled for the US in the past 40 years but imports is still only 15% of GDP.

- For Japan, imports are only 10% of GDP.
- Compared to the US and Japan, other countries are more tied to international trade.
- Europe’s share of imports to GDP is 40%
- China’s is 30%
- Singapore’s and Hong Kong’s is > 100%

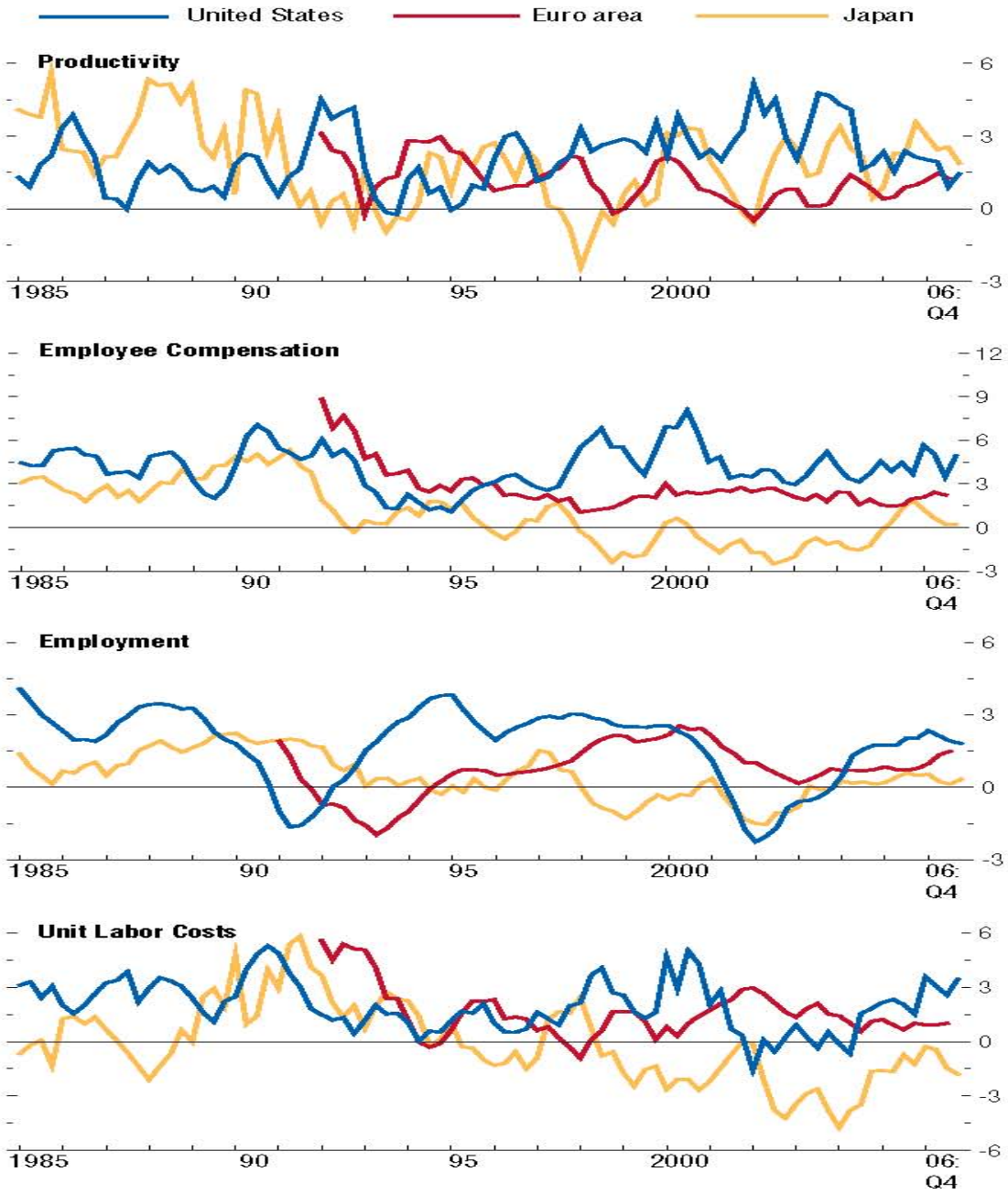


Sources: Haver Analytics; and IMF staff calculations.

Figure 1.11. Productivity and Labor Cost Developments in Selected Advanced Economies[1]

(Percent change from four quarters earlier)

Slowing productivity and rising compensation have put upward pressure on unit labor costs in the United States. However, unit labor cost increases have moderated in Europe—as productivity performance has strengthened—and continue to fall in Japan.



Sources: Haver Analytics; OECD, *Economic Outlook;* and IMF staff calculations.
[1]Estimates are for the nonfarm business sector for the United States, and the whole economy for the euro area and Japan.

4

Gains from Trade

- Several ideas underlie the gains from trade:

1. When a buyer and a seller engage in a voluntary transaction, both receive something that they want and both can be made better off.
   - Norwegian consumers could buy oranges through international trade that they otherwise would have a difficult time producing.
   - The producer of the oranges receives income that it can use to buy the things that it desires.

2. How could a country that is the most (least) efficient producer of everything gain from trade?

   - With a finite amount of resources, countries can use those resources to produce what they are most productive at (compared to their other production choices), then trade those products for goods and services that they want to consume.
   - Countries can specialize in production, while consuming many goods and services through trade.

3. Trade is predicted to benefit a country by making it more efficient when it exports goods which use abundant resources and imports goods which use scarce resources.

4. When countries specialize, they may also be more efficient due to large scale production.

5. Countries may also gain by trading current resources for future resources (lending and borrowing).

- Trade is predicted to benefit *countries as a whole* in several ways, but trade may harm *particular groups within a country*.

  - International trade can adversely affect the owners of resources that are used intensively in industries that compete with imports.
  - Trade may therefore have effects on the distribution of income within a country.
  - Conflicts about trade should occur between groups within countries rather than between countries.

Patterns of Trade

• Differences in *climate and resources* can explain why Brazil exports coffee and Australia exports iron ore.

• But why does Japan export automobiles, while the US exports aircraft?

• Differences in *labor productivity* may explain why some countries export certain products.

• How *relative supplies of capital, labor and land* are used in the production of different goods may also explain why some countries export certain products.

The Effects of Government Policies on Trade

- Policy makers affect the amount of trade through
  - *tariffs*: a tax on imports or exports,
  - *quotas:* a quantity restriction on imports or exports,
  - *export subsidies*: a payment to producers that export,
  - or through other regulations (e.g., product specifications) that exclude foreign products from the market, but still allow domestic products.

- What are the costs and benefits of these policies?

- Economists design models that try to measure the effects of different trade policies.

- If a government must restrict trade, which policy should it use?

- If a government must restrict trade, *how much* should it restrict trade?

- If a government restricts trade, what are the costs if foreign governments respond likewise?

- Governments measure the value of exports and imports, as well as the value of international financial capital that flows into and out of their countries.

- Related to these two measures is the measure of *official settlements balance*, or the balance of payments: the balance of funds that central banks use for official international payments.

- All three values are measured in the government's *national income accounts*.

World Trade: An Overview

Preview

- The leading exporters and importers of merchandise trade in the world
- Gravity model:
  -- influence of an economy's size on trade
  -- distance and other factors that influence trade

- Borders and trade agreements
- Globalization, then and now
- Changing composition of trade
- Multinational corporations and outsourcing

- The leading exporters and importers of merchandise trade in the world

Leading Exporters and Importers of Merchandise Trade in the World (2006) excluding intra-EU Trade

	The Major Importers				The Major Exporters				The Major Trader Partners			
Rank.	Imports	billion €	% World	Rank.	Exports	billion €	% World	Rank.	Imp.+Exp.	billion €	% World
	World	**7,501**	*100.0*		**World**	**7,177**	*100.0*		**World**	**14,678**	*100.0*
1	USA	1,491.6	*19.9*	**1**	**UE25**	**1,166.1**	*16.2*	**1**	**EU25**	**2,516.6**	*17.1*
2	**EU25**	**1,350.5**	*18.0*	**2**	USA	804.8	*11.2*	**2**	USA	2,296.5	*15.6*
3	China	559.2	*7.5*	**3**	China	752.8	*10.5*	**3**	China	1,312.1	*8.9*
4	Japan	443.2	*5.9*	**4**	Japan	478.3	*6.7*	**4**	Japan	921.5	*6.3*
5	Canada	301.4	*4.0*	**5**	Canada	308.2	*4.3*	**5**	Canada	609.6	*4.2*
6	Hong Kong	245.8	*3.3*	**6**	South Korea	251.6	*3.5*	**6**	South Korea	496.1	*3.4*
7	South Korea	244.5	*3.3*	**7**	Hong Kong	246.1	*3.4*	**7**	Hong Kong	491.9	*3.4*
8	Mexico	190.7	*2.5*	**8**	Russia	230.5	*3.2*	**8**	Singapore	385.8	*2.6*
9	Singapore	177.4	*2.4*	**9**	Singapore	208.4	*2.9*	**9**	Mexico	374.4	*2.6*
10	India	149.1	*2.0*	**10**	Mexico	183.7	*2.6*	**10**	Russia	335.0	*2.3*
11	Switzerland	138.3	*1.8*	**11**	Saudi Arabia	144.7	*2.0*	**11**	Switzerland	249.8	*1.7*
12	Australia	113.3	*1.5*	**12**	Malaysia	124.0	*1.7*	**12**	India	243.9	*1.7*
13	Turkey	107.5	*1.4*	**13**	Brazil	112.2	*1.6*	**13**	Malaysia	221.9	*1.5*
14	Russia	104.6	*1.4*	**14**	Switzerland	111.6	*1.6*	**14**	Australia	206.3	*1.4*
15	Thailand	98.0	*1.3*	**15**	Thailand	101.1	*1.4*	**15**	Saudi Arabia	200.3	*1.4*
16	Malaysia	97.9	*1.3*	**16**	Norway	96.4	*1.3*	**16**	Thailand	199.1	*1.4*
17	U.A.Emirates	89.8	*1.2*	**17**	India	94.9	*1.3*	**17**	Brazil	193.0	*1.3*

Source: http://trade.ec.europa.eu/doclib/docs/2006/september/tradoc_122530.xls#'6'!A1

Leading Exporters and Importers of Merchandise Trade in the World (2006) including EU25 Member States and intra-EU Trade

	The Major Importers				The Major Exporters				The Major Trader Partners			
Rank.	Imports	billion €	% World	Rank.	Exports	billion €	% World	Rank.	Imp.+Exp.	billion €	% World
	World	**8,388**	*100.0*		**World**	**8,033**	*100.0*		**World**	**16,421**	*100.0*
	EU25	**2,358**	*28*		**EU25**	**2,430**	*30*		**EU25**	**4,788**	*29.2*
1	USA	1,491.6	*17.8*	**1**	Fr Germany	877.4	*10.9*	**1**	USA	2,296.5	*14.0*
2	Fr Germany	716.3	*8.5*	**2**	USA	804.8	*10.0*	**2**	Fr Germany	1,593.7	*9.7*
3	China	559.2	*6.7*	**3**	China	752.8	*9.4*	**3**	China	1,312.1	*8.0*
4	Japan	443.2	*5.3*	**4**	Japan	478.3	*6.0*	**4**	Japan	921.5	*5.6*
5	Utd. Kingdom	430.4	*5.1*	**5**	France	386.5	*4.8*	**5**	France	809.2	*4.9*
6	France	422.7	*5.0*	**6**	Netherlands	365.0	*4.5*	**6**	Utd. Kingdom	764.4	*4.7*
7	Italy	344.5	*4.1*	**7**	Utd. Kingdom	334.0	*4.2*	**7**	Netherlands	690.3	*4.2*
8	Netherlands	325.4	*3.9*	**8**	Italy	324.1	*4.0*	**8**	Italy	668.6	*4.1*
9	Canada	301.4	*3.6*	**9**	Canada	308.2	*3.8*	**9**	Canada	609.6	*3.7*
10	Belgium	279.9	*3.3*	**10**	Belgium	292.4	*3.6*	**10**	Belgium	572.3	*3.5*
11	Spain	250.1	*3.0*	**11**	South Korea	251.6	*3.1*	**11**	South Korea	496.1	*3.0*
12	Hong Kong	245.8	*2.9*	**12**	Hong Kong	246.1	*3.1*	**12**	Hong Kong	491.9	*3.0*
13	South Korea	244.5	*2.9*	**13**	Russia	230.5	*2.9*	**13**	Spain	412.0	*2.5*
14	Mexico	190.7	*2.3*	**14**	Singapore	208.4	*2.6*	**14**	Singapore	385.8	*2.3*
15	Singapore	177.4	*2.1*	**15**	Mexico	183.7	*2.3*	**15**	Mexico	374.4	*2.3*
16	India	149.1	*1.8*	**16**	Spain	161.8	*2.0*	**16**	Russia	335.0	*2.0*
17	Switzerland	138.3	*1.6*	**17**	Saudi Arabia	144.7	*1.8*	**17**	Switzerland	249.8	*1.5*

Source: http://trade.ec.europa.eu/doclib/docs/2006/september/tradoc_122530.xls#'6'!A1

Leading Client and Supplier Countries of the EU25 in Merchandise Trade (value %)

2006, excluding intra-EU trade

The Major EU Import Partners | **The Major EU Export Partners** | **The Major EU Trader Partners**

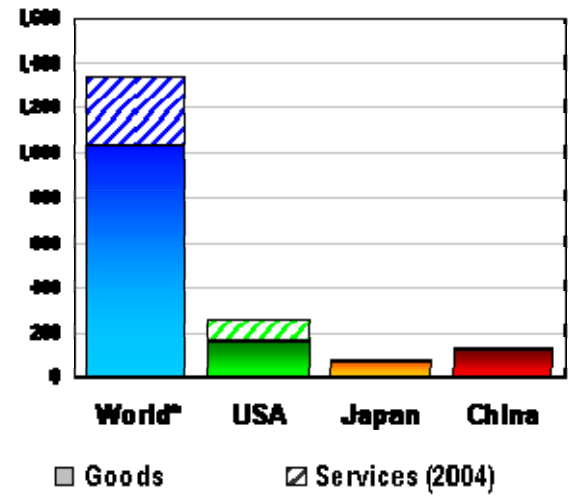
Rank.	EU Imports from	Mio euro	% world	Rank.	EU Exports to	Mio euro	% world	Rank.	Imports+Exports	Mio euro	% world
Source: Eurostat (Statistical regime 4)											
	World	**1,350,494**	*100.0*		**World**	#########	*100.0*		**World**	**2,516,604**	*100.0*
1	China	191,342	*14.2*	**1**	USA	267,672	*23.0*	**1**	USA	443,486	*17.6*
2	USA	175,813	*13.0*	**2**	Switzerland	86,392	*7.4*	**2**	China	254,590	*10.1*
3	Russia	136,847	*10.1*	**3**	Russia	71,791	*6.2*	**3**	Russia	208,638	*8.3*
4	Norway	79,019	*5.9*	**4**	China	63,248	*5.4*	**4**	Switzerland	157,214	*6.2*
5	Japan	75,631	*5.6*	**5**	Turkey	46,350	*4.0*	**5**	Japan	120,219	*4.8*
6	Switzerland	70,822	*5.2*	**6**	Japan	44,588	*3.8*	**6**	Norway	117,075	*4.7*
7	Turkey	38,488	*2.8*	**7**	Norway	38,056	*3.3*	**7**	Turkey	84,838	*3.4*
8	Korea	38,064	*2.8*	**8**	Romania	27,193	*2.3*	**8**	Korea	60,874	*2.4*
9	Brazil	26,175	*1.9*	**9**	Canada	26,473	*2.3*	**9**	India	46,355	*1.8*
10	Taiwan	26,139	*1.9*	**10**	United Arab Emir.	24,654	*2.1*	**10**	Canada	45,991	*1.8*
11	Libya	25,736	*1.9*	**11**	India	24,030	*2.1*	**11**	Romania	44,796	*1.8*
12	Algeria	24,125	*1.8*	**12**	Korea	22,809	*2.0*	**12**	Brazil	43,829	*1.7*
13	Saudi Arabia	23,440	*1.7*	**13**	Hong Kong	21,589	*1.9*	**13**	Saudi Arabia	40,839	*1.6*
14	India	22,326	*1.7*	**14**	Australia	21,274	*1.8*	**14**	Taiwan	39,364	*1.6*
15	Canada	19,518	*1.4*	**15**	South Africa	19,822	*1.7*	**15**	Singapore	38,877	*1.5*
16	Singapore	19,446	*1.4*	**16**	Singapore	19,430	*1.7*	**16**	South Africa	38,227	*1.5*
17	South Africa	18,405	*1.4*	**17**	Mexico	18,989	*1.6*	**17**	Algeria	33,927	*1.3*

Source: http://trade.ec.europa.eu/doclib/docs/2006/september/tradoc_122530.xls#'6'!A1

EU Trade in Goods and Services (2004)

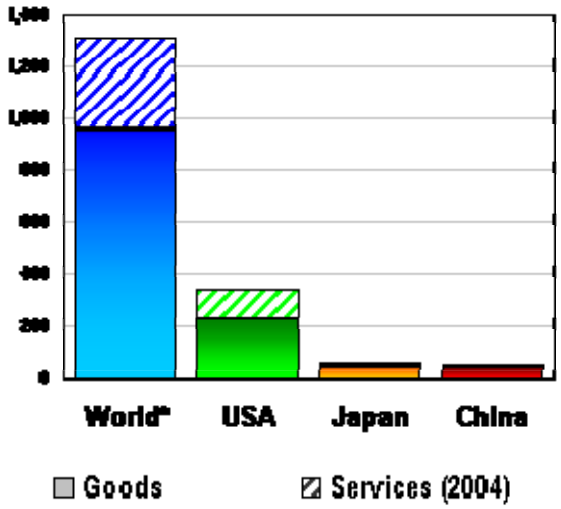
EU Imports from...

(billion euros)



EU Exports to...

(billion euros)

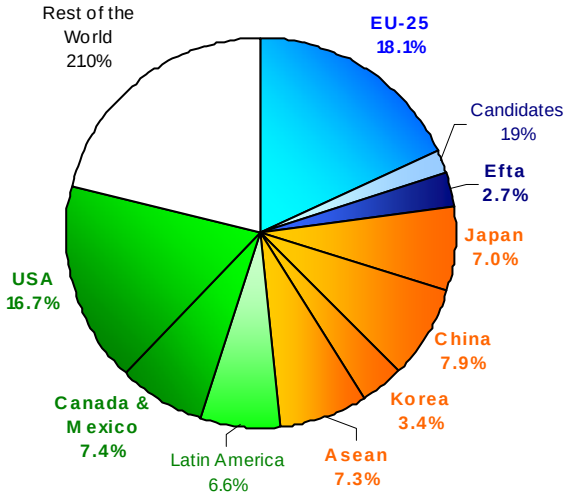


Source: Eurostat (Comext)

Share of World trade

(imports + exports)

Goods (2004)

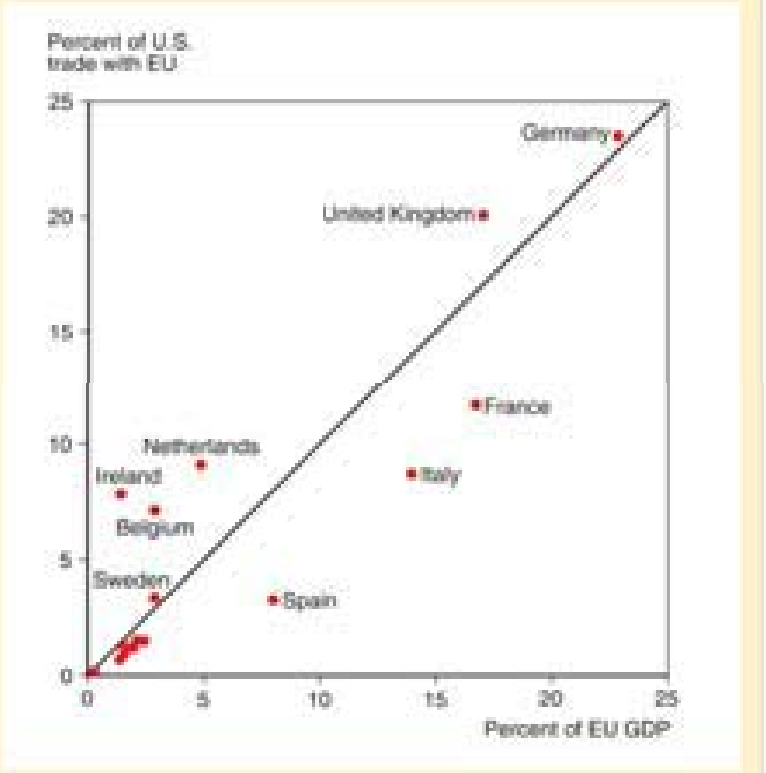


- The size of an economy is directly related to the volume of imports and exports.
  -- Larger economies produce more goods and services, so they have more to sell in the export market.
  -- Larger economies generate more income from the goods and services sold, so people are able to buy more imports.

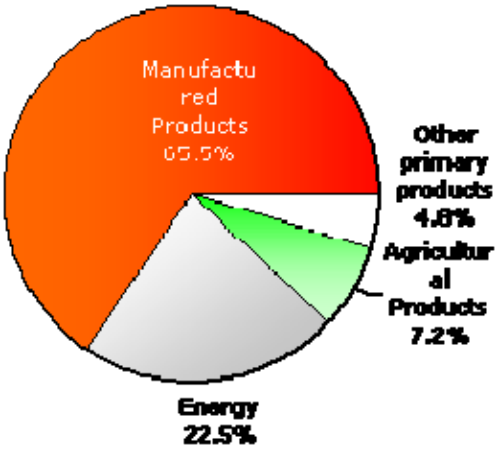
Figure 2-2

The Size of European Economies, and the Value of Their Trade with the United States

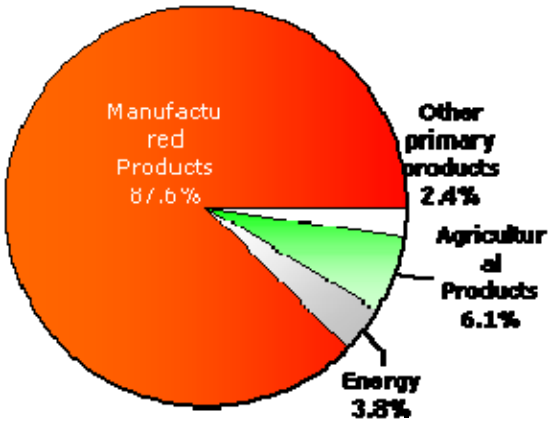
Source: U.S. Department of Commerce, European Commission.



EU Imports of Goods (2005)

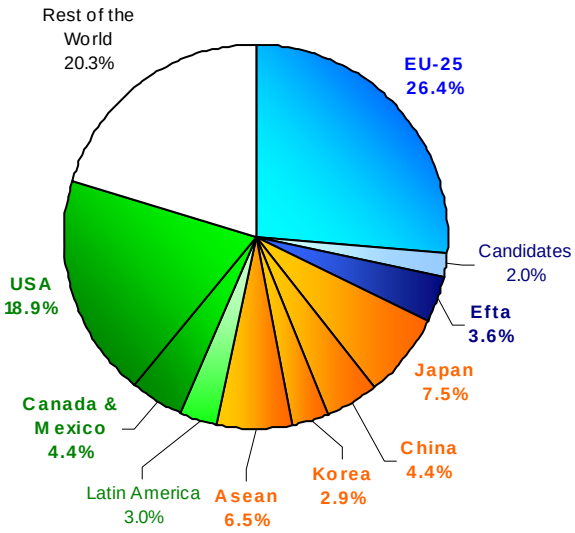


EU Exports of Goods (2005)



Source: Eurostat (Comext)

Services (2004)

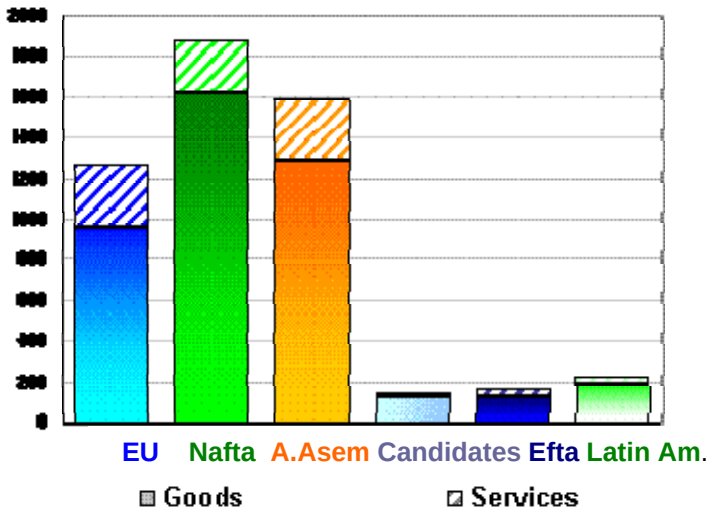


Source: IMF (Dots), Eurostat (Latin America excluding Mexico) *Source: WTO, Eurostat*

(Asean = Association of Southeast Asian Nations)
(Efta = European Free Trade Association - Iceland, Liechtenstein, Norway and Switzerland)
(Candidates = Turkey, Croatia, Macedonia)

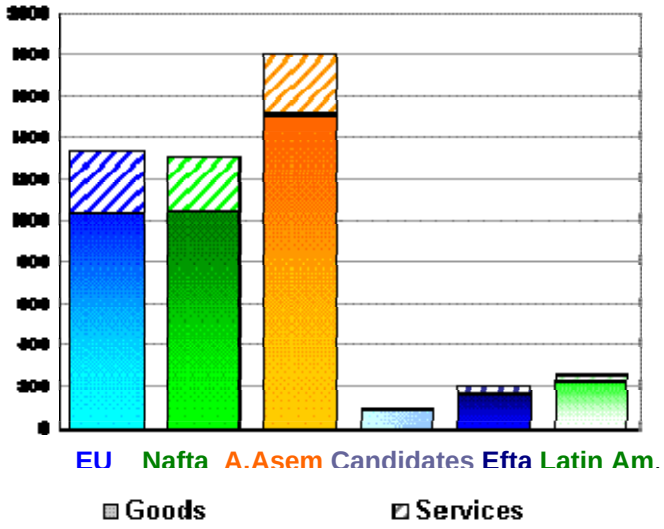
Trade in Goods and Services (2004)

Imports from the World
(billion euros)



Source: IMF (Dots), Eurostat

Exports to the World
(billion euros)



Source: WTO, Eurostat

Absolute and comparative advantage

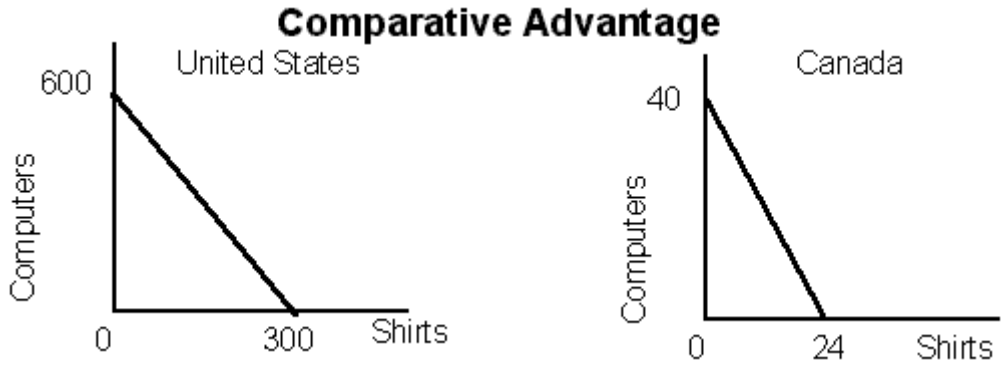
A. Absolute advantage exists when one nation can produce a good or service more economically than another.

B. In the example below, the United States has an absolute advantage over Canada in the production of both computers (2 hours < 3 hours) and shirts (4 hours < 5).

	Hours to Produce		Hours Available (3)	Maximum Computers Produced 3/1	Maximum Shirts Produced 3/2
	Computers (1)	Shirts (2)			
U.S.	2 hours	4 hours	1200	1200/2 = 600	1200/4 = 300
Canada	3 hours	5 hours	120	120/3 = 40	120/5 = 24

C. Comparative advantage exists when one nation has a lower opportunity cost than another in the production of a good or service.

1. Constant opportunity costs will result in the linear production possibility frontiers (PPF) depicted below.



2. The opportunity cost of an item on the x-axis (shirts) is measured by the absolute value of the PPF's slope (2 and 5/3 respectively).

3. The opportunity cost of an item on the y-axis (computers) is the reciprocal of the x-axis slope, 1/2 and 3/5 respectively.

4. When deciding which country should produce

goods, the country with the lowest opportunity cost is said to be relatively more efficient and should produce the good.

5. Canada is relatively more efficient producing shirts (5/3 < 2) and the U.S. is relatively more efficient at producing computers (1/2 < 3/5).

International specialization increases economic growth

A. Assume the world has enough shirts, and gains from international specialization will be directed toward increased production of computers. Countries are currently producing at the midpoint of their PPF.

B. Canada, which has a comparative advantage in shirts, will produce only **shirts**.

C. The United States will produce enough shirts to keep total production at **162** shirts and devote the rest of her resources to the production of computers.

	Original Production (half time spent on each)		**After Specialization**	
	Computers	Shirts	Shirts	Computers

U.S.	600/2 = 300	600/4 = 150	**(162-24) =138 shirts** 138 x 4 = 552 hours	1200 - 552 = 648 hours 648/2 = 324
Canada	60/3 = 20	60/5= 12	120/5 = 24	0
Total	320	162	162	32**4**

1. Canada will produce 24 shirts (120 hrs / 5 hrs per shirt).

2. United States shirt production will be 138 (162-24), 12 less than before specialization and trade.

3. Net gain for the world is 4 computers.

Another Look at Comparative Advantages

The idea of specialization and the division of labor can be applied to more than individual labor; the concept can be related to an entire economy. Factors such as labor skills, resources, and technology determine the competitive relationship between two countries. An economy characterized by an educated and skilled workforce will enjoy a comparative advantage in the production of higher-technology goods, such as computers and semiconductors. In contrast, a country dominated by rich agricultural lands but a relatively low-skilled workforce will generate high volumes of grain output with minimal fertilizer inputs.

The Production Possibilities for Two Countries						
	United State's Production Possibilities			Japan's Production Possibilities		
Choice	**A**	**B**	**C**	**A**	**B**	**C**
Computers	0	30,000	100,000	0	40,000	80,000
Lumber	1,000,000	700,000	0	80,000	40,000	0

As an illustration of the advantages of specialization and trade, consider the table above. The table shows the hypothetical *production possibilities* of lumber and computers for two countries, the United States and Japan. For each country there are three points considered along a production possibilities frontier. The points consider the alternatives for each country in the allocation of resources entirely to the output of lumber, computers, or some combination of the two.

As the table illustrates, if both countries dedicate all resources to the production of lumber (point A), the U.S. has an **absolute advantage** (1 million board feet compared to 80,000 for Japan). If both countries dedicate their resources to computer production, the U.S. also enjoys an absolute advantage (100,000 to 80,000). Does the presence of an absolute advantage in the production of both goods lead us to conclude that the United States has no need for trade with Japan?

To answer the question, let us assume that both countries are self-sufficient in the production of lumber and computers (point B). The United States produces 30,000 computers and 700,000 board feet of lumber. Corresponding output levels for Japan are 40,000 computers and 40,000 board feet of lumber. Total world (U.S. + Japan) output of computers is 70,000 (30,000 + 40,000) and total world output of lumber is 740,000 (700,000 + 40,000).

Despite the absolute advantage the U.S. enjoys in the production of computers and lumber, each country will have a comparative advantage in the production of those goods in which they are relatively, not absolutely, more efficient. To show this, compare the marginal opportunity cost of switching resources from computer to lumber production for each country. As the United States moves from point A to possibility B it loses 300,000 board feet of lumber and gains 30,000 computers, yielding a ratio of -10 (-300,000/30,000). The corresponding opportunity cost for Japan as it substitutes computers for lumber is -1 (-40,000/40,000). Comparing the opportunity cost of giving up lumber for computers shows that the U.S. must give up a much greater amount of lumber than Japan. We can conclude that the United States has a comparative advantage in lumber production, Japan in computers.

A short summary is a good idea. Using the table shown above, assume that we move start at Point A for both countries.

When producing at Point A, the U.S. produces 1 million board feet of lumber and no computers.

When producing at Point A, Japan produces 80,000 board feet of lumber and no computers.

Now let us move from Point A to Point B for each country's production possibilities. The US will now produce 700,000 board feet of lumber and 30,000 computers at point B.

Likewise, for Japan at Point B lumber output is equal to 40,000 board feet and 40,000 computers.

In the switch in production from Point A to B, the US produces 300,000 fewer lumber (1,000,000 – 700,000) and Japan 40,000 less lumber (80,000 – 40,000)

But the US increases computer output from zero to 30,000 for a gain of 30,000 computers.

Japan increases computer output from zero to 40,000 for a gain of 40,000 computers.

Taking the ratio of the loss/gain for the US (= 10)

$\frac{\text{Loss}}{\text{Gain}} = \frac{300{,}000 \text{ lumber}}{30{,}000 \text{ computers}}$

Taking the ratio of the loss/gain for Japan (= 1)

$\frac{\text{Loss}}{\text{Gain}} = \frac{40{,}000 \text{ lumber}}{40{,}000 \text{ compute}}$

Since the US has the higher opportunity cost in terms of giving up lumber (10) to gain 1 more computer, the US has a comparative advantage in lumber production. It also follows that if the US has a comparative advantage in lumber production, Japan has a comparative advantage in computer production.

The Gains From Trade				
Output Before Specialization and Trade				
	U.S.	Japan	Total	
Computers	30,000	40,000	70,000	
Lumber	700,000	40,000	740,000	
Output After Specialization and Trade				
	U.S.	Japan	Total	**Net Gain**
Computers	0	80,000	80,000	10,000
Lumber	1,000,000	0	1,000,000	260,000

If each country specializes in the production of the good in which they enjoy a comparative advantage, total world output of both goods increases. The table above summarizes this result, showing a net increase in world production of 10,000 computers and 260,000 board feet of lumber. The final result emphasizes that both countries should specialize in the production of those goods in which they have a comparative advantage, and they should engage in bilateral trade. Total world production (and consumption) of both goods increases as a result.

A Graphical Presentation of Comparative Advantage

We can show the gains from specialization and trade graphically as well. For illustrative purposes, let us assume that the United States and Japan have the same resources available, such as total labor supply. By making this assumption we can illustrate the differences in efficiency that determine both absolute and comparative advantage. In addition, the production possibilities frontiers shown in Figure 2-1 are linear, indicating a constant (vs. increasing) opportunity cost of shifting production from lumber to computers.

Figure 2-1 **Absolute and Comparative Advantage**

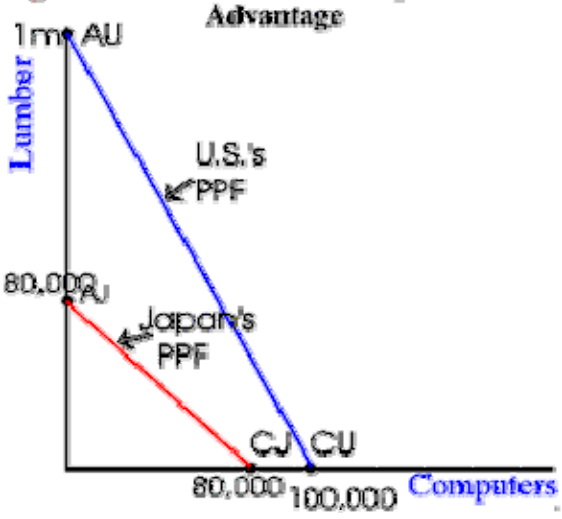


Figure 2-1 shows the production possibilities frontiers for both the United States and Japan. Since the United States has an absolute advantage in the production of both lumber and computers, the production possibilities frontier of the U.S. lies above the production possibilities frontier of Japan. This signifies that the U.S. can produce more of both goods given the resources available.

The Production Possibilities for Two Countries						
	United State's Production Possibilities			Japan's Production Possibilities		
Choice	**A**	**B**	**C**	**A**	**B**	**C**
Computers	0	30,000	100,000	0	40,000	80,000
Lumber	1,000,000	700,000	0	80,000	40,000	0

As shown in the table above, the United States has a comparative advantage in lumber production, Japan in computers. This concept is illustrated graphically by the relative slopes of the two lines. The slope of Japan's production possibilities frontier equals AJ/CJ = 80,000/80,000 = 1. This indicates that the opportunity cost of producing an additional computer is a unit of lumber.

For the United States, the slope of the production possibilities frontier is equal to AU/CU = 1,000,000/100,000 = 10. The U.S. must sacrifice 10 board feet of lumber to gain another computer. By comparing the opportunity cost for each country, we see that the U.S. must give up much more lumber than Japan to produce an additional computer. The production possibilities frontier for the United States is steeper than Japan's, indicating that the U.S. has a comparative advantage in lumber production, Japan in computers.

We can also conclude that the price of lumber is less than that for computers, since producers in the United States are willing to give up 10 board feet of lumber for a computer. The implications for the terms of trade is that the U.S. will specialize in lumber production and Japan in producing computers. The exchange of these items between the two countries will fall somewhere between 10 to 1 (the opportunity cost in the U.S.) and 1 to 1 (the opportunity cost in Japan). Depending on the deal the two countries make, the U.S. will export between one and ten board feet of lumber in exchange for one Japanese computer.

Let us assume that trade agreements determine that a 5 to 1 ratio is used (5 lumber for 1 computer). Under these terms, the United States gains a computer by giving up only 5 board feet of lumber. Contrast this to an isolationist policy, where the U.S. must sacrifice 10 board feet of lumber to increase computer consumption by one. By trading, Japan imports five board feet of lumber for each computer it exports, for a net gain of four lumber.

Figure 2-2 **Japan's Consumption Possibilities**

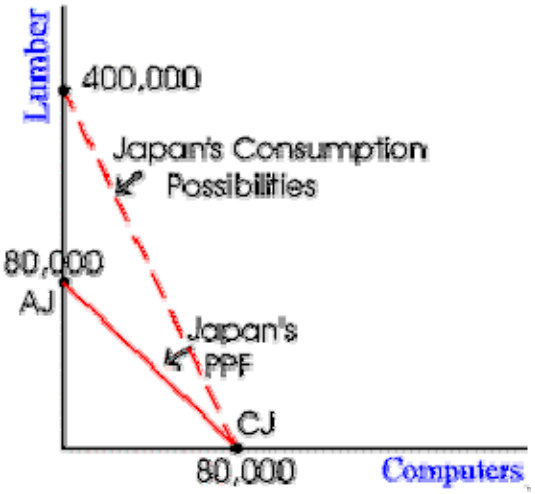
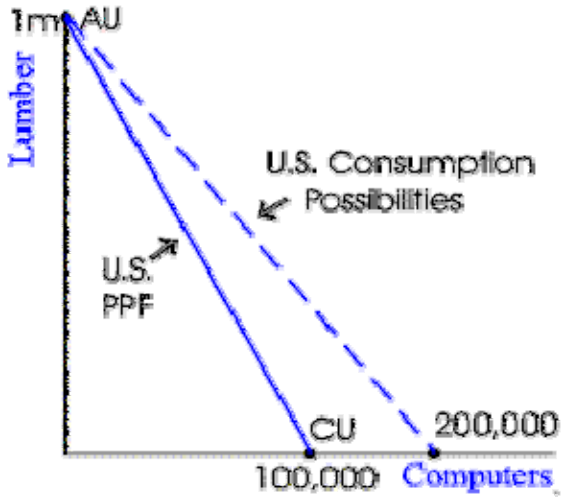


Figure 2-3 **U.S. Consumption Possibilities**



The effects on the consumption possibilities frontier for each country is shown in Figure 2-2 and Figure 2-3. Note in these graphs that although each country's production possibilities remain constant, with trade their consumption possibilities expands; specialization and trade allow for increased consumption by both countries. The boundaries of Japan's consumption possibilities shows the two extremes of consuming all the computers produced (80,000) or exchanging all computers for U.S. lumber at the five to one ratio specified above (80,000 x 5 = 400,000).

The same analysis applies to the United States. The U.S. can consume domestically all of the lumber that is produced (1,000,000) or exchange the entire output of lumber for Japanese computers (200,000) at the exchange ratio of one computer for five board feet of lumber. The likely outcome for both the U.S. and Japan is consumption between the two extremes. In fact, to make our analysis more accurate we need to modify the consumption possibilities curve for the United States since it can actually trade lumber for no more than 80,000 Japanese computers, the limit of computer production when Japan specializes in computer production.

Figure 2-4 **U.S. Consumption Possibilities**

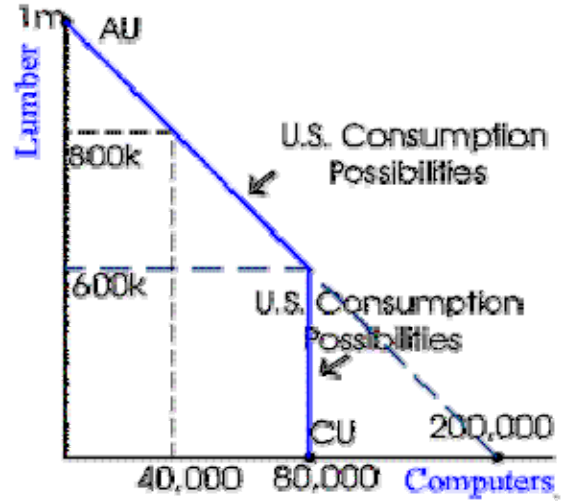


Figure 2-4 shows the modification that we need to make. At an exchange ratio of 5 lumber per computer, the U.S. can trade for no more than 80,000 Japanese computers which is Japan's capacity. The limit to exchange therefore will be 400,000 board feet of lumber for 80,000 computers. The vertical portion of the consumption possibilities frontier for the United States shows this. Note that the consumption possibilities frontier has a flatter slope (reflecting the 5:1 terms of trade) than the production possibilities frontier (given by the 10:1 domestic opportunity cost).

Despite this limitation, our analysis doesn't change. With specialization and trade, both countries consume greater amounts than they would without specialization and trade. The U.S. will always consume at least 600,000 board feet of lumber under our assumed terms of trade since Japan will have no additional computers to exchange. To show the consumption advantages with actual numbers, remember the production at choice B in the previous table. In this case, each country was producing both lumber and computers as follows:

Choice B on the original production possibilities frontier - no specialization and trade

	United States	**Japan**
Computers	30,000	40,000
Lumber	700,000	40,000

Now let us follow the previous analysis of comparative advantage, where the U.S. produces only lumber, Japan computers. In addition, we choose an *anchor*. Japan produces a total of 80,000 computers when it specializes, let us assume that Japan will keep 40,000 and trade 40,000 in exchange for 200,000 board feet of lumber under the 5:1 terms of trade. We can summarize the new levels of consumption as follows:

Consumption with specialization and trade

	United States	**Japan**
Computers	40,000	40,000
Lumber	800,000	200,000

Remember, the U.S. produces a total of 1 million board feet of lumber and trades 200,000 board feet for 40,000 Japanese computers. A comparison of before and post-trade outcomes shows that both countries end up consuming more of either or both goods when engaging in trade according to the principle of comparative advantage. To see this outcome graphically, refer to Figure 2-4 above.

In conclusion, we have shown that by the specialization of production in those goods in which a country has a comparative advantage and with free trade, world output levels and consumption both increase. Are we better off? In the sense that specialization raises worker productivity, incomes, and consumption, yes, we are better off. Yet the complications of the real world blur the analysis. Although society as a whole gains from the tradeoffs presented here, some individuals lose if their jobs are with industries that have a comparative disadvantage. Furthermore, although we can say total consumption increases, there is no guarantee that all citizens will share equally in the gains.

The problems of equity and fairness are important economic issues that go beyond the scope of the discussion here. Focus on the point made: countries that interact and trade with the rest of the world will enjoy greater growth and consumption than closed economies that seek to *protect* domestic jobs from foreign competition.

Factors Which Determine Comparative Advantage

We use comparative advantage to determine trade patterns between countries. Now we ask, what determines comparative advantage? There are a number of important considerations in discussing why a country may enjoy a comparative advantage in the production of certain goods. The reasons for a comparative advantage include:

- natural endowments such as resources,
- availability and use of technology,
- knowledge and human capital,
- specialization, and
- rapidly changing factors such as exchange rates.

Beginning with the first entry on the list, natural endowments, change occurs slowly, if at all. In this case, comparative advantage is a relatively static concept, as natural resources are fixed over long periods of time. For example, many Middle Eastern countries have large oil reserves buried beneath the sands of their arid countries. In contrast are the rich agricultural lands of countries like the United States, Argentina, and Australia. Climate, geography, and other natural endowments are very important in determining what type of products a country may enjoy a comparative advantage in.

Just because a country is lacking in abundant natural resources does not mean they will not benefit from specialization and trade. One country is resource poor, yet has a thriving export economy is Japan. Following the concept of comparative advantage, Japan imports scarce natural resources and exports goods which the highly skilled Japanese labor force produces with great efficiency and at low cost. A critical factor for the Japanese economy is a high rate of domestic savings by Japanese citizens. The abundant supply of savings is available for businesses to borrow at a low cost in order to use for investment in capital that can be used by Japanese workers to convert imported natural resources into goods with a greater value. For another example, read how the economy in China is evolving.

Technology changes at an increasingly rapid pace. But the education and skills required to effectively utilize the technology evolve much more slowly. In contrast are factors such as

exchange rates. Dramatic shifts in exchange rates can rapidly modify the relative prices of goods traded between two or more countries. For some goods, the historical relationship of comparative advantage based on endowments and skills can rapidly be altered because of changes in the comparable international prices of those goods.