

Learning Objectives

- Use the HO model to examine the political and economic rationales for imposing tariffs on imports.
- Use the Stolper-Samuelson theorem to explain the income distribution effects of tariffs.
- Apply the demand and supply tools developed in Chapter 1 to examine the effects of tariffs on net global and individual country welfare levels.
- Show that tariffs may yield *higher* welfare than free trade for the importing country.
- Explore international trade legislations governing tariffs as well as some actual trade data related to tariffs.

3.1 Motivation

In Chapters 3 and 4, we turn our focus to trade disputes. Countries engage in trade wars and disagreements rather often. The well-known cases include the Canada-US softwood lumber dispute, Canada-Brazil regional jets controversy and EU-US genetic modified products dispute. From Chapter 2, we know that factors used intensively in the import-competing sectors would suffer real income losses and hence would have incentives to lobby against free trade and create disputes. If import restrictions are put into effect, such factors would gain but consumers would lose because prices will rise. We will show, however, that a country may actually gain as a whole from launching a dispute. In addition to factors of production, governments may also have incentives to start trade wars to gain at the expense of their trading partners. The conclusion, however, is consumers will pay the price when trade disputes are launched. Trade restrictions can save jobs, but consumers will pay for such jobs.

A country can use many different types of tools to impede trade and increase its own total surplus. In Chapter 3, we will focus on tariffs or import taxes. In Chapter 4, we will analyze other tools such as quantity restrictions, export subsidies, and “unfair” trade policies. To analyze these tools, we will use the consumer and producer surplus concepts, which we have examined in Chapter 1. Behind our demand and supply models is the HO model, in which there will be two factors of production. With labour and capital owners, we can examine income redistribution effects as a result of trade disputes.

Let us summarize the different settings that we want to analyze. **Figure 3.1** shows the comparison of autarky (1) versus free trade (2), which we discussed in Chapters 1 and 2. The old situation was autarky and the new situation was free trade. We examined the changes by comparing the consumer surplus and producer surplus under the new versus the old situations. We now move onto free trade (2) versus tariffs (3). We will begin with free trade as the old situation and tariffs as the new situation. We will compare the surplus changes under these two situations.

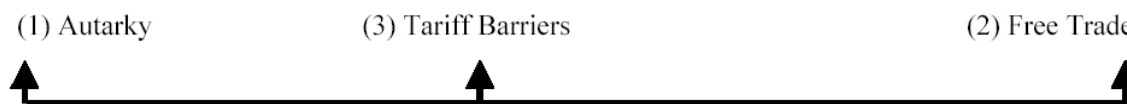


Figure 3.1 Comparison of Total Surplus under Different Settings

3.2 Background Tools

Deriving World Import Demand (MD)

To develop the analytical tools that we would use to analyze different trade dispute instruments, we begin with deriving the import demand and export supply of a particular good, say, X_1 , in the world market. Because we only have two countries, H and F, one country is the importer and the other is the exporter. Suppose H imports X_1 . **Figure 3.2** shows that at the autarkic equilibrium price P_1^H , H does not import ($X_1' = 0$), and hence this price is the vertical intercept of the world import demand curve (MD). At the lower $P_1^{H''}$, H imports X_1'' . By linking these two sets of price and import quantity combinations, we can plot the MD curve. The MD curve is negatively sloped, very similar to a regular demand curve.

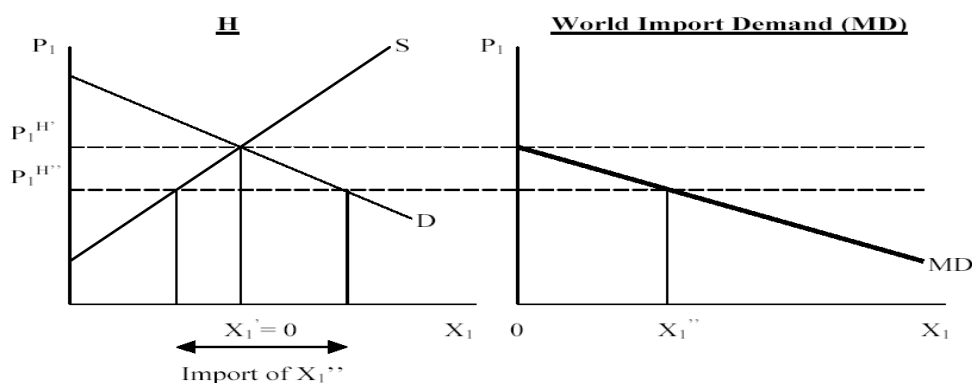


Figure 3.2 Derivation of the World Import Demand (MD)

World Export Supply (XS)

We can derive the world export supply (XS) in a similar fashion. F is the exporter, and hence the XS curve comes from the F market. **Figure 3.3** shows that at the autarkic equilibrium price P_1^F , F does not export ($X_1' = 0$), and hence this price is the vertical intercept of the world XS curve. At the higher $P_1^{F''}$, F exports X_1'' . By linking these two sets of price and import quantity combinations, we can plot the XS curve. The XS curve is positively sloped, very similar to a regular supply curve.

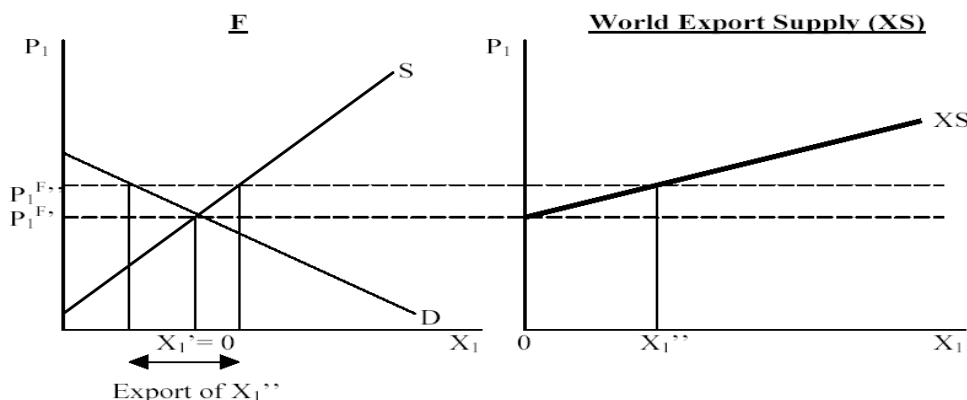


Figure 3.3 Derivation of the World Export Supply (XS)

World Market Equilibrium

In the world equilibrium, import demand is equal to export supply. The quantity of exports is equal to imports at X_1^{FT} , and the free trade equilibrium price is P_1^{FT} , as shown in Figure 3.4. We would begin with P_1^{FT} , and then we introduce an import tax or tariff into the model.

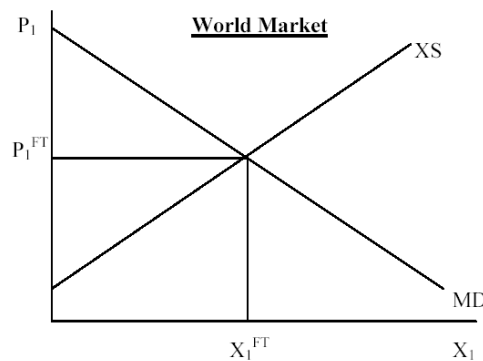


Figure 3.4 World Market Equilibrium

3.3 Unilateral Tariffs

A tariff is a tax imposed when a good is imported. Goods are traded at the world price before the imposition of a tariff. Domestic consumers who import the goods face the post-tariff price. Before we consider the case under trade, let's imagine we walk into a store in Canada. A product has a shelf price, the Goods and Service Tax (GST), and the total price when we check out. Note that the store receives and keeps the shelf price, the government receives the tax revenue, and we pay both the shelf price and the tax.

World Price, Tariffs and Total Import Price

In the context of trade, imagine we shop across the US border. The US sellers (exporters) receive the world price (i.e., what we pay them), we then bring the goods back to Canada. To go through customs, we pay the tariff, which the Canadian government collects. For Canadians, the total import price of cross-border shopping consists of both what we have paid to the Americans (the world price) and to the Canadian government (tariffs). Our decision to import from the United States would depend on both the world price and the tariffs.

Defining Tariffs

A tariff can be either a specific tariff, which is a fixed charge for each unit of good imported. For example, the H government can impose \$1 tariff per liter of liquor. A tariff can be *ad valorem* or a percentage tax. For example, the H government can impose a tariff rate of 25% on imported cigars. We would focus on *ad valorem* tariffs, which is similar to GST and provincial percentage sales taxes.

A unilateral tariff means that only one country imposes a tariff on its imports. Because we have assumed that H imports X_1 , then H imposes a tariff on X_1 imported from F. For simplicity, the F country does not revenge or retaliate with its own tariff on its X_2 imports from H. We would focus on unilateral tariffs in

this course. More advanced courses in international trade theory will examine bilateral tariffs, such as when F retaliates with its own tariff on H's exports. The challenge with bilateral tariffs is that we would have to examine the "best response" tariff rate that F should impose, and given that H knows F would retaliate, H's optimal choice of tariff rate should also take this revenge into account. This means we need to use game theory. Game theory is typically covered in intermediate microeconomics courses. Bilateral trade war games are challenging but very interesting.

Suppose H imposes an *ad valorem* tariff on its imports of X_1 :

→ Let τ_1^H = ad valorem tariff rate on imports. For example, we have a tariff of 6%;

→ Let P_1^W = price of X_1 traded at the world market (i.e., the world price of X_1). F receives this price for its exports. For example, we pay \$2 for a unit of F product;

→ Let P_1^T = price of X_1^H that H consumers pay, i.e., $P_1^T = P_1^W(1 + \tau_1^H)$. This means all together, H consumers pay \$2.12 = \$2 (1 + 0.06), of which \$2 goes to F exporters and \$0.12 goes to the H government as tariff revenue.

Demonstrating Tariffs Graphically

How would the tariff affect our graph, specifically, the MD curve? **Figure 3.5** shows that the tariff would discourage imports and hence it would shift the MD inward. The new import demand is MD^T . The effect on the world price is that P_1^{FT} will drop to P_1^W . Intuitively, F exporters would absorb part of the tax by lowering their prices. Because if they did not do so, many H consumers will stop importing from F. F must offer H consumers a discount to encourage them to continue to buy. However, because H consumers still have to pay tariffs equal to $\tau_1^H P_1^W$, the total import price P_1^T is still higher than P_1^{FT} . The tariff imposed by the H government will clearly discourage imports and H consumers will pay more for imports. F firms will lose because both export quantity and the price they receive will fall.

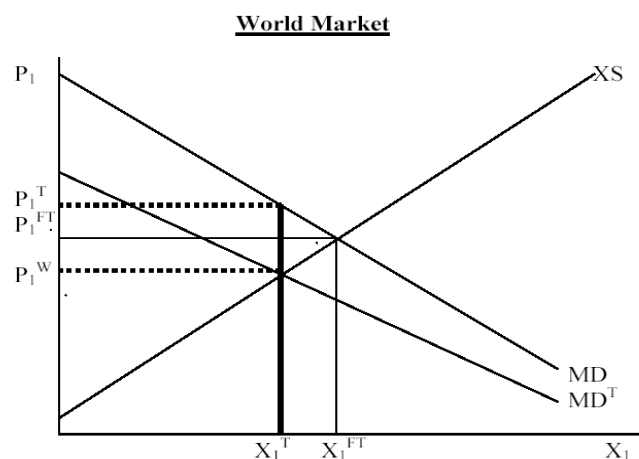


Figure 3.5 World Market Equilibrium with Tariff

The general effects of a tariff can be summarized as follows:

→ Trade volume drops from X_1^{FT} to X_1^T .

→ World price drops from P_1^{FT} to P_1^W → F exports less and receives a lower price

→ Import price rises from P_1^{FT} to P_1^T → H imports less and its import-competing sector faces less competition.

→ Tariff revenue = $X_1^T (P_1^T - P_1^W)$.

For simplicity, let us assume that the H government does not redistribute the tariff revenue back to the consumers. If it did so, the MD^T may shift due to income effect, depending on whether the imports are normal goods or inferior goods, which would complicate our graph above further. For simplicity's sake, we assume that the H government keeps this tariff revenue for itself and spends it on other goods.

We can also conclude that F will be adversely affected by H's tariff. It loses from losing a portion of its export market. To salvage the remaining export market, it can only command a lower price. F is very likely to fight back with its own trade restrictions on H's exports.

Welfare Effects on H

H is very likely to have imposed the tariff on X_1 to protect its import-competing industry. The tariff can raise the import price and decrease import quantity. As the P_1^{FT} rises to P_1^T , we can tell that from the SST, factors of production will be affected. Specifically, the factor used intensively in the production of the protected X_1 will gain and the other factor will lose. Let X_1 be clothing, a labour-intensive good imported. SST predicts $\% \Delta W^H > \% \Delta P_1$, with $\% \Delta P_1 > 0$, and $\% \Delta r^H < 0$. Hence, workers will have a real income gain from lobbying for a tariff that would limit the amount of import competition they face. However, note that consumers will have to pay a higher price for X_1 , regardless of whether X_1 is imported from F or produced by H firms. This is because when the H firms see that imports are now coming in at a higher price P_1^T , they can also afford to raise their price.

Now the question is, how would this tariff affect the overall total surplus of H? We know that workers gain, capital owners lose, the H government gains from collecting tariff revenue, and H consumers lose because of higher prices. What about the total net effect? To answer this question, we can rely on our Chapter 1 tools of PS and CS and then examine the changes in these values. Figure 3.6 shows the effect on the H domestic economy. We will impose the world equilibrium values we have found in Figure 3.5 onto Figure 3.6 and then examine the change in TS.

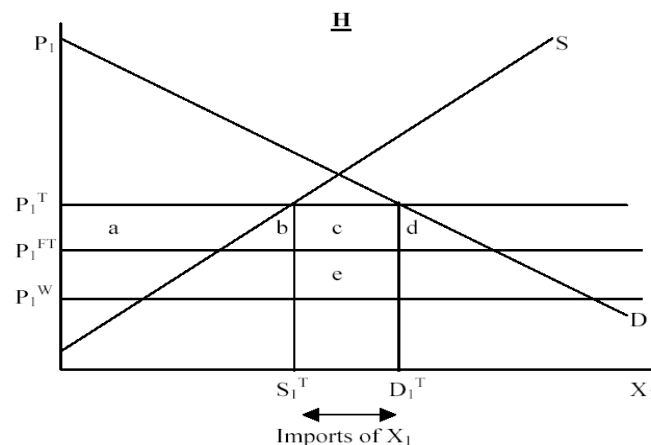


Figure 3.6 Welfare Effects on H as a Result of Tariffs

We can compare TS changes under tariff (new situation) with free trade (old situation):

$$\Delta CS = - (a + b + c + d) \quad (\text{Compare } P_1^T \text{ and } P_1^{FT}.)$$

$$\Delta PS = (a) \quad (\text{Compare } P_1^T \text{ and } P_1^{FT}.)$$

$$\Delta TR = (c + e) \quad (\text{Import Quantity} \times (P_1^T - P_1^W), \text{ where TR is tariff revenue.})$$

$$\text{Net } \Delta TS = e - (b + d), \text{ which can be positive, negative, or equal to zero.}$$

Note that the net change in TS cannot be easily signed, unless we calculate the numerical values of all the areas. Interestingly, ΔTS can be positive, which implies that H as a country can gain because of the tariff. We know that labour, the factor used intensively in this protected sector, will gain from the protection, but now we can see that H can gain as a country. Obviously, the larger the area of “e”, the more likely that H can gain. In contrast, the larger the areas of “b + d”, the more likely that H can lose. This means that H may have incentives to impose a tariff even in the absence of labour groups lobby efforts.

What is the intuitively interpretation of the area “e”? To answer this question, let’s define *terms of trade* (TOT) as a country’s export price divided by its import price evaluated in the world market (or purchasing power of our exports when compared to our imports.) This means for each unit that H sells, with the money that is earned, H can buy some imports. TOT is simply the “rate of exchange” of H’s exports to its imports. Clearly, the higher the TOT, the more valuable is H’s exports relative to its imports.

To illustrate, let us examine the TOT of H and F under FT:

$$\begin{aligned} \text{H's TOT} &= \frac{P_2^{\text{FT}}}{P_1^{\text{FT}}} \text{ (H exports } X_2 \text{ and imports } X_1) \\ \text{F's TOT} &= \frac{P_1^{\text{FT}}}{P_2^{\text{FT}}} \text{ (F exports } X_1 \text{ and imports } X_2) \end{aligned}$$

Then we compare the FT TOT with the TOT under Tariff:

$$\begin{aligned} \text{H's TOT} &= \frac{P_2^{\text{FT}}}{P_1^{\text{W}}} > \frac{P_2^{\text{FT}}}{P_1^{\text{FT}}} \text{ (because } P_1^{\text{W}} < P_1^{\text{FT}}) \\ \text{F's TOT} &= \frac{P_1^{\text{W}}}{P_2^{\text{FT}}} < \frac{P_1^{\text{FT}}}{P_2^{\text{FT}}} \text{ (because } P_1^{\text{W}} < P_1^{\text{FT}}) \end{aligned}$$

TOT measures how much one unit of a country’s exports can buy in terms of its imports. H’s net welfare changes = e – (b + d), and “e” is H’s TOT gain. Intuitively, H uses its tariff policy to push down H’s import demand and causes a decrease in the world price from P_1^{FT} to P_1^{W} , which the F firms receive. H now pays less for each unit it still imports by forcing F firms to offer H a discount. F firms would do so to prevent a massive loss in H’s import demand. Hence, the larger the “e,” the cheaper are H’s imports, the larger the gains to H as a country. Note that even though H consumers pay a higher total price $P_1^{\text{T}} = P_1^{\text{W}} + \tau_1^{\text{H}} P_1^{\text{W}}$ for their imports, the tariffs $\tau_1^{\text{H}} P_1^{\text{W}}$ that the H consumers pay stay within the H country. However, paying less to F is a gain to H as a country. In a sense, H is exercising its buying power to command a lower world price from F.

The losses to H’s welfare are represented by the areas “b” and “d.” The area “b” is attached to the supply curve, and hence it corresponds to production efficiency loss. Intuitively, H imports X_1 because it has comparative disadvantage in producing this product. Now because of the tariff, H has artificially increased the price of X_1 . The domestic production of X_1 has increased, but this contributes to input allocation inefficiency. This is because more workers and capital have been moved from its X_2 export sector to produce X_1 . These inputs could have been more productive in the X_2 sector in which H has comparative advantage. Note that as we impose import protection to save some jobs in our shrinking import-competing industries, other industries in our country would suffer. A second source of total

surplus loss is the area “d.” This area is attached to the demand curve, and hence it is consumption efficiency loss. The interpretation of “d” is quite simple: H consumers lose because they have to pay a higher price for X_1 .

To conclude, H can increase its own welfare as a country by imposing a tariff if $e - (b + d) > 0$. FT is not always the best policy. This also implies that without punishment for violating free trade, countries are tempted to unilaterally impose import protection so that it gains total surplus at the expense of their trading partners.

Welfare Effects on F

Clearly, F will lose because of H's tariff. F's export price is now lower and its export volume is also lower. **Figure 3.7** shows the welfare effects on F as a result of H's tariff. The total surplus of F will undoubtedly fall. Note that the F firms have to sell to all consumers at the same price P_1^W . This is because if the F firms sell at P_1^W to H consumers and attempt to sell at a higher price to F consumers, F consumers can bribe the H consumers to walk into the stores and buy at P_1^W . F firms know this will happen, and hence they will charge the same P_1^W to all H and F consumers.

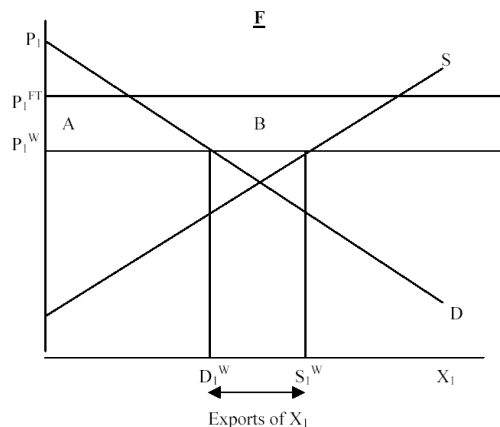


Figure 3.7 Welfare Effects on F as a Result of Tariffs

We can compare TS changes under tariff (new situation) with free trade (old situation):

$$\Delta CS = (A) \quad (\text{Compare } P_1^W \text{ and } P_1^{FT}.)$$

$$\Delta PS = -(A + B) \quad (\text{Compare } P_1^W \text{ and } P_1^{FT}.)$$

Net Δ welfare = $-B < 0$, which is always negative.

Because F will always lose from H's tariff, F will be very tempted to respond with its own tariffs on H's exports to F. This becomes a trade war, and war can never increase world total surplus.

Welfare Effects on the World

From previous discussion, we can see that H may gain and F will always lose. Is it possible that H's potential gains to exceed the losses of F such that world total surplus will rise as result of H's tariff? **Figure 3.8** shows the welfare effects on the world as a whole.

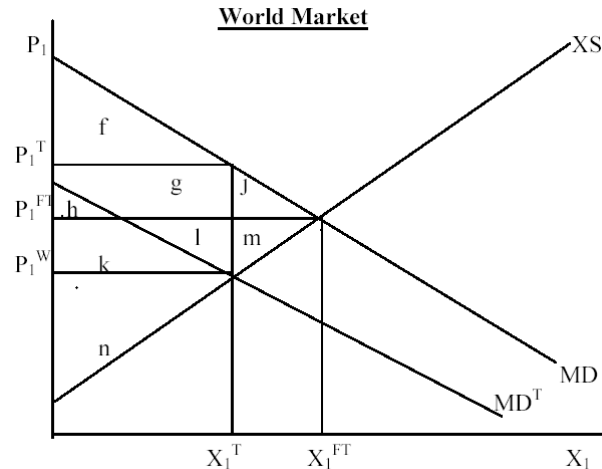


Figure 3.8 Welfare Effects on the World as a Result of Tariffs

We can compare TS changes under tariff (new situation) with free trade (old situation):

$$\Delta CS = f - (f + h + g + j) = - (h + g + j) \quad (\text{Compare } P_1^T \text{ and } P_1^{FT}.)$$

$$\Delta PS = n - (k + l + m + n) = - (k + l + m) \quad (\text{Compare } P_1^W \text{ and } P_1^{FT}.)$$

$$\Delta TR = (g + h + k + l) - 0 \quad (\text{Import Quantity} \times (P_1^T - P_1^W), \text{ where TR is tariff revenue.})$$

$$\text{Net } \Delta TS = - (j + m) < 0, \text{ which is always negative.}$$

It is not possible for the world total surplus to rise as a result of H's tariff. The loss in world total surplus is equal to $(j + m)$, which is the deadweight loss due to the tariff. Tariff is a tax, and the imposition of a tax is very likely to create deadweight losses. The deadweight loss is due to the drop in consumer surplus and producer surplus as a result of the tariff. Although the H government can gain by collecting tariff revenue on the traded quantities, tariffs cannot be imposed on products not consumed or produced. As a result, these losses in CS and PS are deadweight losses.

We can also conclude that, although a country may be tempted to unilaterally impose a tariff and selfishly gain at other countries' expense, the world as whole will lose as a result. This is the main reason why most economists support the idea of free trade, even though they are also aware that trade will create income redistribution effects.

3.5 Data and Interpretation

A Brief History of the General Agreements on Tariffs and Trade (GATT)

The Great Depression, which took place from 1929 to 1939, is the most catastrophic economic downturn in recent economic history. Real income dropped by around 35% between the years 1929 and 1935, and unemployment in the US and Europe exceeded 20%. Various economists believe that the Great Depression was worsened by the US tariffs on imports grouped under the Smoot-Hawley Tariff Act, which imposed an average tariff of 60%, covering more than 12,000 different products.¹ Countries that were exporting to the United States retaliated with their own tariffs on US goods, and world trade plummeted to one-third the 1929 levels. Such trade wars undoubtedly contributed to the Great Depression, and the economic hardship eventually contributed to, if not caused, World War II.

In an effort to prevent such trade war disasters from happening again, several international organizations and agreements were instituted after World War II, including the World Development Bank (which implements development projects in developing countries), International Monetary Funds (a global central bank in which central banks in different countries can obtain emergency loans), and the Bretton Woods fixed exchange rates regime. In the area of international trade, the General Agreements on Tariffs and Trade (GATT) was formed. Initially, world trade was supposed to be policed by the International Trade Organization (ITO), but the ITO was “killed” by the US Congress for fear of losing too much of its sovereignty in trade policies. GATT, which was not a formal organization, replaced the ITO and served as a vehicle to informal talks of trade policies for member countries or signatories.

Three Main Purposes of GATT

The first purpose of GATT is to set the rules of conduct of international commerce and serve as an area for hearings to resolve international commercial disputes.² There are four main principles to the GATT rules: (1) reduction of trade barriers, (2) uniform trade barriers to be applied to every member countries (most favoured nation or MFN basis), (3) tariff cuts could not be rescinded without compensation to affected partners, and (4) trade disputes are to be settled by “consultation.” The main weakness of GATT is its dispute settlement procedures. If two countries have disputes, a third country will hear the case, but the results are not binding, i.e., the offending country can veto the proposed solutions. Because GATT lacks enforcement power, only around 330 disputes had been brought to GATT for consultation.

The second purpose of GATT is to transform itself, which is a provisional agreement, into a formal international organization. This task was completed when the World Trade Organization (WTO) was created on January 1, 1995. The WTO meets once every two years (Singapore, 1996; Geneva, 1998; Seattle, 1999; Doha, 2001; Cancun, 2003, Hong Kong, 2005). All WTO members (as of 2011, 153 countries) must accept all results from the previous GATT rounds of negotiations and guidelines.

The third purpose of GATT is to provide a forum for a series of multilateral trade talks aimed at lowering trade barriers, especially tariffs. The last round was the Uruguay Round in which the WTO was formed. The main results from the Uruguay Round include cuts in tariffs, replaces quotas (import quantity restrictions) on textiles and clothing with a 10-year phase-in period of tariffs, cuts agricultural subsidies, provides patent protection of 20 years and a 10-year phase-in period in developing countries, and provides quicker and tougher antidumping legislation.

¹ Charles Kindleberger, *The World in Depression, 1929–1939* (Berkeley and Los Angeles: University of California Press, 1973), p. 132.

² Information summarized from <http://www.wto.org>.

Cuts in Tariff Rates

The main accomplishment of the GATT negotiations was massive cuts in tariff rates. With the Smoot-Hawley Tariff rates at an average of 60%, the main purpose of GATT was to encourage its signatory countries to simultaneously cut back their tariffs. Tariff rates have fallen from post-World War II 60% to around 10% in recent years. **Table 3.1** shows a summary of tariff cuts during the GATT years. Tariff barriers to free trade have become less significant in recent years; however, various other forms of trade restrictions have been developed over the years. We will explore such impediments in Chapter 4.

GATT/WTO – 60 years of tariff reductions

(MFN tariff reduction of industrial countries for industrial products (excl. petroleum))

Implementation Period	Round covered	Weighted tariff reduction	Weights based on MFN imports (year)
1948	Geneva (1947)	-26	1939
1950	Annecy (1949)	-3	1947
1952	Torquay (1950-51)	-4	1949
1956-58	Geneva (1955-56)	-3	1954
1962-64	Dillon Round (1961-62)	-4	1960
1968-72	Kennedy Round (1964-67)	-38	1964
1980-87	Tokyo Round (1973-79)	-33	1977(or 1976)
1995-99	Uruguay Round (1986-94)	-38	1988(or 1989)

Table 3.1 GATT 60 Years of Tariff Cuts

Source: http://www.wto.org/english/res_e/statistics_e/its2007_e/its2007_e.pdf, page 207.

Current Tariff Rates

Even though the overall tariff rates have been significantly slashed from the post-World War II levels as a result of GATT negotiations, some products are still subjected to rather high tariff rates, and some countries still have substantial tariff barriers on imports. **Table 3.2** shows that Canada still has high tariff rates on textiles and clothing products as well as dairy and fruits. A similar picture emerges for the US, Japan, and the EU. Of the BRIC countries (Brazil, Russia, India and China), China and Russia have relatively low average tariffs, but Brazil and India are very restrictive towards imports. In Chapters 6 and 7 we will examine various reasons for such high levels of import protection in developing countries. World trade rules generally allow developing countries to retain higher tariffs because they joined the WTO rather late. Because of their lower per-capita GDP, they may also be granted additional time to cut back their tariffs. In Chapter 1, we learned that Hong Kong and Singapore are regarded as highly open economies, and Table 3.2 supports this view. Hong Kong has zero tariffs on the products we have selected, and Singapore has imposed low tariff rates except for tobacco imports.

Tariffs on Selected Imports of Selected Countries (2010) in Percentages						
Country	Textile and Clothing	Dairy and Fruits	Metals	Machinery	Tobacco	Average
Canada	13.95	11.1	2.7	4.3	9.4	6.8
US	9.65	12.3	1.7	1.7	16.3	3.5
Japan	7.4	64.15	1	0.2	16.4	4.4
EU	9	30.25	2	2.4	20.1	5
Hong Kong	0	0	0	0	0	0
Singapore	9.95	8.3	5.9	5.4	228.7	9.9
China	12.95	13.55	8	9	23.2	10
Russia	11.4	13.8	10	7.4	31.8	9.5
India	33.9	82.2	38.3	27	120.5	48.7
Brazil	34.9	41.5	32.9	31.9	37.7	31.4
Mexico	35.05	50.55	34.4	34.8	44.2	36.1

Table 3.2 Tariffs of Selected Countries on Selected Products

Source: <http://stat.wto.org/TariffProfile/WSDBTariffPFRReporter.aspx?Language=E>

Table 3.3 shows the terms of trade (TOT) of some countries. TOTs are defined as the unit export price index divided by the unit import price index (similar to calculating consumer price index). The year 2000 is the base year. The table shows that from 1990 to 2009 the TOT of the US, Japan and Germany fell, while those of Canada rose. The main reason for the rise in the value of Canadian exports relative to our imports is the increase in the price of petroleum and other natural resources. Recall from Chapter 1 that about 60% of our exports are minerals and agricultural products. Our reliance on commodities also exposes our terms of trade to more fluctuations. The price elasticities for commodities tend to be rather low. Recall that price elasticity is defined as the percentage change in quantity demanded divided by the percentage change in the price of the product. A low elasticity implies that if the quantity demanded changes by a small percentage, the resulting change in the price is more than proportional to the quantity change. In other words, the elasticity, in absolute value, is less than one, or inelastic. For example, if the price of potatoes drops by 50%, it is unlikely that we would consume 50% more potatoes. As a result, the TOT of countries that rely on commodities as main exports, such as Canada, Australia and some developing countries, are quite volatile. The TOTs of Japan have deteriorated significantly between 2000 and 2009. The main reason for this deterioration is the intensifying competition in products such as electronics and automobiles from countries such as South Korea and China.

Terms of Trade of Selected Countries					
Country	1990	1995	2000	2005	2009
Canada	97.2	97.2	100	111.3	114.8
US	101.1	103.2	100	97.2	98.8
Japan	83.9	114.9	100	83.3	74.2
Germany	109.3	107.5	100	105.3	105.8

Table 3.3 Terms of Trade of Selected Countries in the Past Twenty Years

Source: <http://data.un.org/Default.aspx>

Welfare Costs of Tariffs

Our theoretical models suggest that tariff imposition will decrease the welfare of the country imposing the tariffs. Various studies have found that tariffs have led to GDP losses. For example, tariffs have led to a 7% annual drop in GDP for Brazil, 3% drop in Mexico, 6% drop in Pakistan, 4% drop in the Philippines, and 5-10% in Turkey.³

A classic study that has examined the changes in consumer surplus, producer surplus, and deadweight losses as a result of tariffs is G. Hufbauer and K. Elliot's "Measuring the Costs of Protection in the United States."⁴ They found that with a tariff rate of 10% on women's shoes, a job saved in the industry costs consumer surplus equal to \$102,000. This loss captures the higher prices and lower quantities that the consumers will pay and buy. The effect on glass and glassware is similar, with a loss in consumer surplus amounting to \$180,000. Patrick Messerlin⁵ estimated the effects for 22 highly protected industries in the EU for 1990 and found similar results. He found that the cost to a country for various industries for a single job saved to be \$175,000 for steel, \$206,000 for automobiles, \$61,000 for textiles, and \$100,000 for clothing. The monetary values capture the difference between the production value of each of the job saved versus the loss in consumer surplus due to lower quantity consumed and higher prices. These findings all point to the fact that, although import tariffs can restrict import competition and save some jobs, trade protection is very costly to the consumers.

³ Wilson B. Brown and Jan S. Hogendorn, *International Economics: In the Age of Globalization* (Peterborough, ON: Broadview Press, 2000), p. 149.

⁴ Gary Clyde Hufbauer and Kimberly Ann Elliot, *Measuring the Cost of Protection in the United States* (Washington, D.C.: Institute for International Economics, 1994).

⁵ Patrick Messerlin, *Measuring the Costs of Protection in Europe: European Commercial Policy in the 2000s* (Washington, D.C.: International Institute for Economics, 2001).