CHAPTER 12

The Political Economy of Trade and Development

The notion that globalization needs a human face ... is wrong. Globalization has a human face, but we can make that face yet more agreeable.

— Jagdish Bhagwati (2004)

THE DOHA ROUND of world trade negotiations began in November 2001 in an atmosphere of heightened anticipation. The 148 members of the World Trade Organization began the round of talks (named after the capital of Qatar where the kickoff meeting was hosted) with an objective that was both lofty and noble: The Doha round was to incorporate the poorest countries of the world into a free and fair global trade system. The talks sought to rectify a long-identified bias against the poor countries in international trade – the forbidding shield of protection erected by the rich countries to defend domestic farmers against foreign agriculture. The sheer size of agricultural protection in the OECD[1] countries is staggering. Recently calculated at $279 billion, it equals 30 percent of total agricultural receipts, and six times the amount spent on foreign aid to the developing countries.[2]

Serious reductions in agricultural protection in the Doha round would have momentous implications for economic growth in the developing world. Indeed, as the Doha round began, the World Bank had estimated that better poor-country access to rich-country markets would increase world income by $520 billion, and would lift 144 million people out of poverty by 2015.[3]

Benefiting most directly by a Doha trade agreement would be the rural poor in the less-developed countries (LDCs). As the United States, the European Union, and Japan slashed tariffs, quotas, and export subsidies on agricultural products, it would create, finally, a level-playing field in world agricultural trade. It would be a world in which the small producer in Africa or Latin America could finally compete with the North American farmer riding atop his thirty-foot harvester, no longer benefiting from the added protection of Uncle Sam's thick wallet. But after almost two years of negotiations, it appeared that this was a world not to be.

As the Doha talks dragged on, trade negotiators from the developing countries grew increasingly frustrated over the recalcitrance of the rich countries. The developing countries found the rich countries lacking the domestic political resolve needed to end the agricultural trade wars between themselves, in which the developing countries often wound up as the primary casualties. The developing countries' exasperation with the Doha round reached a boiling point at the now-infamous September 2003 meetings in Cancún, Mexico. During the Cancún talks, a group of twenty-one developing countries known as the G-21, headed by China, India, and Brazil, united in responding to what they viewed as hypocritical trade policy by the rich countries.

The G-21 directed much of its venom at the European Union's CAP or "Common Agricultural Policy." Much anger was aimed specifically at the intransigence of France, where farmers have a habit of turning the Parisian streets into vegetable salad at the very mention of EU tariff reductions on agricultural products. Japan and its pampered rice farmers, protected by an import-killing 490 percent rice tariff, also received much of the blame for the stalled talks. Not to be outdone by its major trading partners, the United States had recently passed the enormous 2002 Farm Bill, which allocated $248 billion of U.S. taxpayer money over ten years to subsidize and protect U.S. agricultural products such as barley, corn, cotton, rice, and wheat. The bill represented an 80 percent increase in agricultural spending over the Clinton administration's Freedom to Farm Act of 1996.[4] The G-21 repeatedly singled out one of the most egregious clauses in the Farm Bill, a $3 billion agricultural subsidy bestowed on 25,000 U.S. cotton farmers. This single item was believed to have caused world cotton prices to drop so substantially that it has rendered the cotton crops of extremely poor West African nations such as Guinea and Mali noncompetitive in world markets. The perspective of the developing countries was well summarized by the representative from Bangladesh: "We are told that this is a development round. We are yet to see concrete manifestation of the desire of the Membership to meaningfully help the LDCs."[5] Amazed at their unwillingness to seriously consider tariff reductions in agriculture, World Bank President James Wolfensohn labeled the dialogue of the rich countries in the Doha round as "the dialogue of the deaf."[6]

The G-21 began to collapse when American lawmakers such as U.S. Senator Charles Grassley, chairman of the Senate Finance Committee, insinuated that no country in the G-21 would be able to negotiate a bilateral trade deal with the United States.[7] Shortly after, Costa Rica, Guatemala, Peru, Colombia, and Ecuador, eager to implement the Central American Free Trade Agreement (CAFTA) and other accords with the United States, sheepishly withdrew from the G-21. Though some progress has since been made between the European Union and the United States in attempting to end their agricultural subsidy war, it appears unlikely that agricultural

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[1] Organization of Economic Cooperation and Development, a group of thirty rich industrial nations.
[2] *The Economist*, June 21, 2005; April 11, 2003.
[3] Elizabeth Becker, "Poorer Countries Pull out of Talks over World Trade," *New York Times*, September 15, 2005, p. A1.

[4] Mittal (2002).
[5] Fatoumata and Kwa (2004).
[6] *The Economist*, April 11, 2003.
[7] *The Economist*, October 18, 2003.

protectionism in the rich countries will end anytime soon. Protection is likely to continue in some form through the Doha round and beyond.

Is a world of unfettered free trade really worth all of this fuss? Most economists believe so, as the underlying arguments for trade are powerful, simple, and convincing. Indeed, they form the basis for economic exchange in general, not merely international trade. While trade negotiations are messy, trade theory is wonderfully elegant. And its fundamental insights are something on which the vast majority of economists are willing to bet the house. Moreover, trade theory predicts that the most substantial gains may be realized among trading countries that are most different from one another, such as developed and developing countries.

Why Trade?

The brilliant mathematician Stanislaw Ulam, famous for his work with Edward Teller on the hydrogen bomb, once challenged economist Paul Samuelson: "Name me one proposition in all of the social sciences which is both true and non-trivial." Samuelson responded to Ulam by explaining David Ricardo's theory of comparative advantage: "That it is logically true need not be argued before a mathematician; that it is not trivial is attested by the thousands of important and intelligent men who have never been able to grasp the doctrine for themselves or to believe it even after it was explained to them."[8]

As a backdrop for exploring the political economy of international trade between developed and developing nations, it is worth reviewing Ricardo's luminous insight. Suppose that the number of labor hours required to produce an automobile in one country (call this country North) is ℓ_{NA}, and in another country (South) it is ℓ_{SA}, and the number of labor hours required to produce a bushel of beans in North is ℓ_{NB} and in South, ℓ_{SB}. Here the opportunity cost of automobile production (in terms of beans) in each country is given by ℓ_{NA}/ℓ_{NB} and ℓ_{SA}/ℓ_{SB}, respectively. Without trade, these opportunity costs represent the true "prices" of automobiles in each country, while the inverse of these fractions represents the nontrade price of beans. Suppose that $\ell_{NA}/\ell_{NB} > \ell_{SA}/\ell_{SB}$, or that the nontrade price of automobiles is higher in North than South. In that case, North can gain from trade by specializing in beans and South by specializing in automobiles, trading with one another at a price ratio for automobiles and beans, p_A/p_B, that lies between the internal nontrade prices in the respective countries. Notice that before trade, North was forced to give up ℓ_{NA}/ℓ_{NB} bushels of beans in order to "purchase" one automobile; after trade, a single automobile costs only p_A/p_B. Similarly, before trade South was able to obtain only ℓ_{SA}/ℓ_{SB} bushels of beans for a single automobile; after trade, South is able to obtain p_A/p_B bushels of beans. Both countries win. Furthermore, the result holds even when the labor requirements of one country are higher, even multiple times higher, for *both* goods than in the other country. As Ricardo himself pointed out,

[8] Samuelson (1969).

this insight is particularly helpful for thinking about trade between developed and developing countries, where opportunity costs differ most substantially.

But how can any economically developed country participate in a world of free trade with the rock-bottom wages given to workers in many developing countries? To address this important question clearly, we can extend Ricardo's basic model to incorporate wages and exchange rates by including three additional relationships into the model. The first is that the inverse of a labor-hours requirement is simply the marginal product of labor, or $mp_\ell = 1/\ell$. The second is that, in labor market equilibrium, the wage paid to a worker in any industry is equal to the value of the marginal product of that worker, that is, the price of a good multiplied by what a worker adds to the total production in one hour, $w = p \cdot mp_\ell$. Finally, we can compare prices between one country and another by converting the prices in North to the currency of South through an exchange rate, such that $e \cdot p_N = p_S$. By substituting $1/mp_\ell$ for the labor requirement ℓ for beans in each country in Ricardo's basic model, and multiplying each side by the price of automobiles (adjusted for the exchange rate) we see that, for example, North will export beans to South if the opportunity cost of producing beans in North is lower, or $\ell_{NB} \cdot w_N \cdot e < \ell_{SB} \cdot w_S$.[9] This is often called the Monetized Ricardian model, the basis of a well-known framework for understanding trade developed by Rudiger Dornbusch, Stanley Fischer, and Samuelson at MIT.[10]

Some have come to describe global trade as a "Race to the Bottom," where countries with the lowest wages win all the exports. But what the Monetized Ricardian model implies is that the exports of a country are determined by a confluence of factors: labor productivity across different industries, domestic wages, and the strength of a country's currency. Even though developing countries generally have lower wages, developed countries will be exporters in industries where worker productivity outweighs the disadvantage of higher wages. It is impossible for, say, South to export everything; if it did, North's currency would depreciate (e would fall), allowing more of North's goods to satisfy the export condition. As the number of goods North exports begins to grow, it will put upward pressure on e, which then begins to choke off North's exports, bringing trade back into balance.[11]

Research by Stephen Golub of Swarthmore College and others has illustrated the strong correlation between wages and worker productivity across countries, such that a higher average wage in a country nearly always implies higher average productivity, and vice versa.[12] This makes sense, because wages in a given country are directly tied to the marginal productivity of labor. The higher wages in the industrialized countries stem from the greater accumulation of capital, education, and technology in these economies. Although higher wages imply greater worker

[9] Appleyard, Field, and Cobb (2006).

[10] Dornbusch, Fischer, and Samuelson (1977).

[11] Of course under a fixed exchange-rate regime, a positive trade balance will lead to the accumulation of foreign reserves, unless it is counterbalanced by a corresponding deficit in the exchange of assets between countries. This analysis assumes a balance in the "capital account," the trade in *assets* as opposed to goods and services. Growing foreign reserves, nevertheless, will also lead to pressure for a revaluation (strengthening) of the domestic currency.

[12] Golub (1998).

productivity, which boosts exports, they also imply higher production costs, which reduce exports. The playing field of world trade levels itself more naturally than most people think.

Diminishing Terms of Trade for Developing Countries

What is clear from Ricardo's basic theory is that two nations will simultaneously benefit from trade when the terms of trade, the prices at which goods are exchanged, lies between their respective opportunity costs of producing the two goods. Yet the closer these terms of trade lie to a country's own internal opportunity costs of production, the less a country benefits from trade. Thus it is possible that a country may continue to trade while facing terms of trade, determined in world markets, that leave it only marginally better off than it would be under autarky, while trade partners benefit substantially.

Historically, the exports of many developing countries followed the pattern of comparative advantage established during the era of colonization, producing and exporting basic commodities such as fruits, tea, coffee, sugar, rubber, and minerals. In many countries, exports of a single commodity often comprised an enormous percentage of annual export earnings, for example in Ghana (cocoa 50–60 percent), Venezuela (petroleum 90–95 percent), Bolivia (tin 45–55 percent), and the Ivory Coast (coffee 40–60 percent).[13] Developing countries exported such commodities in world markets in exchange for manufactured goods produced in the industrialized countries.

But by the middle of the twentieth century, developing countries became increasingly concerned that the terms of trade were turning against them. The catalyst for this growing commodity export pessimism was influential papers by Raul Prebisch and Hans Singer, which attempted to demonstrate empirically declining terms of trade for LDCs, and to explain the causes for this decline.[14] They viewed the main causes to be (a) increasing world income, which increased the demand for manufactured goods relatively more than the demand for food commodities, and (b) the introduction of synthetic substitutes for nonfood commodities such as rubber and tin.[15]

Meanwhile, the Green Revolution of the 1960s had brought about higher agricultural output in developing countries by introducing new high-yield-variety strains, fertilizers, and intensive cultivation techniques to the LDCs. Many developing nations eagerly adopted the new agro-technologies in hopes of meeting domestic consumption needs as well as boosting commodity exports. But in some respects the Green Revolution actually worked against commodity-exporting LDCs: Higher worldwide agricultural output led to lower commodity prices, further deteriorating

[13] LeClair (2000).
[14] See Prebisch (1950) and Singer (1950). The empirical research has been criticized by some such as Robert Baldwin (1955) and others who argue that declining transportation costs could have accounted for apparently declining terms of trade from the perspective of the LDCs.
[15] Singer (1987).

terms of trade against the developing countries, a phenomenon labeled by Jagdish Bhagwati as "immiserizing growth."[16] In the end, the agricultural technologies introduced in the LDCs by the industrialized nations may have principally benefited the industrialized nations.

Especially by the 1960s, calls began to arise in the developing world to reverse the downward trend in commodity terms-of-trade and its associated economic malaise. In 1964, a group of seventy-seven developing countries established the United Nations Conference on Trade and Development (UNCTAD). By 1974, UNCTAD had led the General Assembly of the United Nations to declare a "New Economic Order." Part of this New Economic Order would include a concentrated effort by the commodity-exporting LDCs to shift terms-of-trade toward developing countries through the creation of cartels for a number of basic commodities including rubber, sugar, cocoa, and coffee.

There was good reason to believe such a strategy might work. Only recently before, the Organization of Petroleum Exporting Countries (OPEC) had succeeded in quadrupling the price of oil from about $3/barrel in 1972 to about $12/barrel in 1974, creating a class of high-income Arab countries virtually overnight. This was the first time that a group of low-income countries had effectively stared down the industrialized world, dramatically shifting the terms of trade in its favor. Gasoline prices skyrocketed in the United States and Western Europe, and OPEC had become an inspiration. The commodity-cartel strategy glittered with promise.

The cartel strategy seemed appealing because commodities such as coffee are similar in important respects to gasoline (my own home brew, in particular). More generally, however, for caffeine addicts and gas-guzzling automobiles alike, there are no good substitutes for the real thing, whether it be a hot cup of java or petroleum-based fuel. The lack of substitutes for such commodities renders their consumers vulnerable to cartel-type behavior.[17]

But the problem with cartels is that the more successful they are at jacking up prices (and profits to their members), the more apt they are to implode. The reason is that cartels function by encouraging members to abide by quotas that restrict output on world markets, causing a commodity price to skyrocket if demand is sufficiently inelastic. (Demand is liable to be inelastic if there are few available substitutes for the commodity, as in the case of coffee or gasoline.) This allows cutbacks in production to exhibit their maximum leverage on prices. But the problem is that when prices are higher, it creates an added incentive for a single producer to cheat by producing more than it is supposed to.

The following example illustrates this dilemma. As the market for oil is dominated by a handful of large oil-producing countries, the world market for coffee is

[16] Bhagwati (1958).
[17] Debora Spar (1994) lists four other important structural factors that favor cartelization of commodities include (1) concentration of production (few producers), (2) high barriers to entry in the market, (3) only a small number of fringe producers who could bypass the cartel, and (4) nondifferentiation in the commodity, so that producers will not engage in nonprice competition while simultaneously trying to maintain above-market prices.
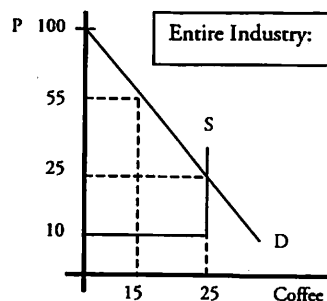
Figure 12.1a. Supply and Demand for Coffee, Industry

Figure 12.1b. Supply and Demand for Coffee, Processor

dominated by a handful of large *processors*. This group of large multinational companies includes Kraft, Nestlé, Procter & Gamble, Sara Lee, and a European firm, Tchibo.[18] Let's construct an example in which the world price of processed coffee is equal to US$100 per sack minus three dollars for every million sacks processed and released on the world market, or $P = 100 - 3S$. Suppose that there are ten coffee processors, each with constant average costs of $10/sack with a capacity of processing up to 2.5 million sacks. With each firm processing and marketing at full capacity, the world price of coffee would then be equal to $P = 100 - 3(10 \cdot 2.5) = \$25/sack$.

This would leave each processor with $37.5 million in net revenues. But could the processors do better? Yes, because fortunately for people marketing coffee, a large number of the world's coffee drinkers are willing to pay whatever it takes to get their coffee fix. Imagine that each of these ten coffee processors agreed to form a cartel by cutting the amount of coffee on the market by a million sacks to only 1.5 million each. Reducing the world coffee supply to 15 million sacks would cause coffee prices to zoom from $25/sack to $55/sack. The cartel action would increase total net revenues from $375 million to $675 million, as seen in Figure 12.1a, and to each of the ten coffee processors from $37.5 million to $67.5 million.

Unfortunately for the cartel, the higher cartel price of $55/sack creates a strong incentive for each member to cheat. Although Figure 12.1a shows the total coffee industry demand, Figure 12.1b shows the *individual* demand faced by each processor if the others happen to abide by the quota. Again, it shows net revenues to any individual firm abiding by the quota to be ($45 × 1.5 million) = $67.5 million. But even this looks diminutive in comparison to the $105 million windfall that can be obtained through cheating by increasing one's own output to capacity, since the world price falls only by $3/sack when just a single processor cheats ($42 × 2.5 million = $105 million). Since each individual firm faces the same incentives, the whole scheme is likely to unravel, bringing the world coffee supply back to
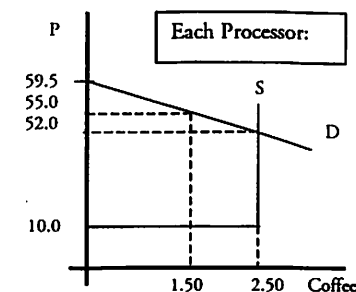
25 million sacks. The incentive structure behind cartels contains all the pitfalls of the classic Prisoners' Dilemma.

As a result, cartels are effective only if they can establish discipline within their organization, that is, catch and punish cheaters. Because cheating causes the world price to fall, knowing that *someone* is cheating is easy. Identifying the culprit is usually more difficult. To identify cheaters, cartel members must acquiesce to some level of monitoring. Moreover, once a cheater has been identified, punishments must be clear and certain. In the context of a repeated game, this would ostensibly involve other members retaliating by flooding the market with the commodity in question. But such threats hurt not just the cheating member but *all* members, and thus it may be more convenient to avoid actually carrying out such punishments, making them less than credible. Cartels are inherently unstable.

In practice, the most effective commodity cartels maintain discipline through an "enforcer," a big and powerful member who assumes the responsibility and costs of punishing cheaters. Typically, the "enforcer" role is assumed by the player who has the most to lose if the cartel falls apart. There is some evidence, for example, that Saudi Arabia plays such a role in OPEC. Empirical studies present evidence that Saudi Arabia has periodically engaged in tit-for-tat retaliation with other members of the oil cartel if cheating exceeds a given threshold.[19] This was particularly evident during the mid-1980s when high oil prices in the 1970s had encouraged new oil exploration, and cheating in the cartel became particularly egregious. Rejoicing in their gushers, the new oil-rich countries flooded the world market with oil. The resulting oil glut, of course, caused world prices to plummet. In response, the data seems to indicate that during 1983–86 Saudi Arabia actually carried out threats to temporarily exceed their own normal production levels in order to punish other OPEC members for refusing to cap some of their wells.

Like Saudi Arabia in the world of oil, DeBeers, leader of the diamond cartel, has been remarkably successful on a number of fronts. On the demand side, it has so effectively convinced prospective grooms-to-be that "diamonds are forever,"

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[18] Oxfam (2002).

[19] See Yang (2004) and Griffin and Nielsen (1994).

that most now shudder at risking a proposal with a diamond-less engagement ring. Meanwhile, on the supply side, DeBeers has become the definitive example of a ruthless cartel "enforcer." The cartel operates through the Diamond Trading Company (formerly called the Central Selling Organization), through which DeBeers purchases stones from the cartel's members and resells them on the world market.[20] Few in the diamond market have risked approaching other potential buyers. One brave exception was President Mobutu of Zaire, who in 1981 proclaimed brashly that his country would begin to sell its industrial-grade diamonds outside DeBeers to Belgian and British diamond brokers. As economist Debora Spar relates:

> Just two months after Zaire's diamonds entered the market independently, about one million carats of industrial diamonds from undisclosed sources suddenly flooded the market, causing the price of Zairian diamonds to drop from $3 per carat to less than $1.80 . . . (DeBeers) was accepting this financial burden to punish a supplier whose production had accounted for only about 3% of its total receipts. For DeBeers, though, stable long-term profits were more important than short-term losses, and the principle of unity had to be maintained. The cartel would be preserved, and defectors would be punished. (1994, pp. 62, 63)

To relate the cartel enforcer idea to our present example, suppose that there are only seven coffee processors, one considerably bigger than the other six (call it Big Coffee). Big Coffee differs from the smaller processors in two respects: First, it is bigger, with the capacity to place 12 million sacks on the market in any season. Moreover, like many cartel leaders it holds much of its marketable commodity in reserves. Suppose that half of Big Coffee's 12 million sack capacity is harbored as Everest-sized mountains of beans in its warehouses. As the cartel leader, suppose that Big Coffee allocates the same annual quota to each smaller member of 1.5 million sacks, with 6 million sacks per year for itself. By the Folk Theorem, a myriad of Nash equilibrium threats, strategies, and outcomes can occur in the repeated game, and the following is but one interesting possibility.

Suppose that the small processors agree to abide by their quota as long as Big Coffee keeps its reserves in its warehouse; if it puts its reserves on the market without cause, the cartel agreement is over and each processes at capacity. Big Coffee, meanwhile, conveys to the other members that if even one small member were to cheat and cause the world price to dip below $55/sack, it will immediately dump its reserves onto the world market for a season. In this way, Big Coffee removes the incentive for a small firm to cheat. Monitoring in the scheme is relatively easy: Big Coffee monitors the world price; the small processors keep an eye on Big Coffee's warehouse.

Notice that, absent a rare degree of myopia, Big Coffee itself has little incentive to cheat on the scheme. Its optimal cheating strategy would be to place 10.5 million sacks on the market if the small processors abide by their quota of 9 million sacks; this would increase its net revenues from $270 million to $330.75 for one season. (Placing any more than 10.5 million sacks would lower the world price to

20 An excellent history of the DeBeers cartel is given in Spar (2006).

such an extent that Big Coffee's own profits would fall.) With cartel breakdown, however, the small members of the cartel would process at their collective 15-million-sack capacity. Big Coffee's optimal response would be to place only 9 million sacks on the market, in which case the world price falls to $28, yielding it only ($18 × 9 million =) $162 million in net revenues thereafter. Little enforcement is required for the enforcer, since the enforcer has little to gain from cheating and much to lose. With the Grim Trigger strategy, Big Coffee will stick to its quota of 6 million sacks if $330.75 + \delta 162/(1 - \delta) < 270/(1-\delta)$, or $\delta > 0.355$. This kind of behavior is consistent with what we observe in commodity cartel leaders; because they have so much at stake in keeping prices high, it is more often the smaller suppliers that are the cause of cartel instability. Experience has shown that when cartels lack a central enforcer like a Saudi Arabia or DeBeers, they tend to have little success in boosting prices.

This, ironically, has been the case for the most part when coffee *growers* have tried to engage in cartel behavior, principally through the International Coffee Organization (ICO). Despite a series of agreements since its foundation in 1962, the cartel has had only sporadic success in elevating coffee prices at the grower level. For the most part, except for some successes at raising prices in the 1970s, the ICO's foremost achievement has been to reduce price volatility to its growers in member countries (LeClair 2000). The main reasons for the inability of coffee producers to exhibit strong cartel behavior on raising prices at the grower level are the large number of disparate producers with different incentives, and the inability of a cartel to control the entry of new producers, such as Vietnam, now the number two coffee producer in the world.

As a result, prices at the grower level have continued to plummet. Nevertheless, multinational processors have maintained high margins in the face of declining world coffee prices, largely through their ability to dominate the value-added supply chains that bring coffee to the consumer and new technology that has allowed them to remove the bitter flavor and aroma of lower-quality Robusta beans (grown largely in Vietnam) and substitute them for the more traditional and aromatic Arabica beans. The result has been increasing poverty among coffee growers of Arabica beans in Latin America and Africa, and increasing profits among the large coffee processors. A 2002 Oxfam study found the following:

> At the beginning of 2002, a Ugandan farmer received 14 cents (US) for 1 kg of beans. The local middleman who transported it to the mill took 5 cents profit as did the miller, and the cost of transport to Kampala added a further 2 cents, making the cost of the coffee when it arrived at the exporter's warehouse 26 cents. The exporter, operating on a tiny margin, added 19 cents to the kilo, taking the total value of a kilo up to 45 cents. Freight, and the importer's cost and margins took the price to $1.64 by the time it reached the factory of one of the giant roasting companies. But by the time the same kilo was sold in the shops in the form of instant coffee it was worth $26.40, 7,000% more than the farmer got for it.[21]

21 Data from Oxfam (2002). Text cited in "What Do Ecuadorean Bananas, Ugandan Coffee and English Apples, Have in Common? No Power," *UK Guardian*, May 17, 2003.

Tariffs and Quotas

The first section highlighted the immense amount of resources, $279 billion, devoted to protecting domestic producers of agricultural products in the OECD countries. The irony of such a figure is magnified in light of even the most fundamental economic models, which show that social welfare increases in both import and export markets with free trade. Figure 12.2a portrays a potential import market, in which the world price is lower than a country's domestic price. In contrast, Figure 12.2b shows a potential export market in which the world price is higher than a country's domestic price. If the economy moves to free trade in which commodities are exchanged at world prices instead of domestic prices, total social welfare (consisting of consumer surplus and producer surplus) increases in both import and export markets.

In the import market in Figure 12.2a we see that producer surplus, the difference between the price producers receive and the minimum price they would accept (reflected by the supply curve) shrinks from C + B to C. However, consumer surplus, the difference between the willingness to pay (reflected by the demand curve) and the market price, increases by the areas B + D. Cheaper imports, given by $Q_D - Q_S$, increase consumption from the original domestic equilibrium, but reduce both prices and domestic production. As a result, total social welfare increases by D. In
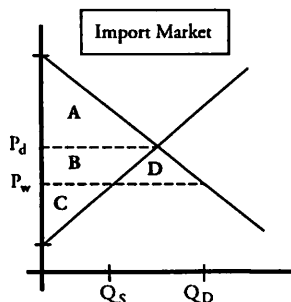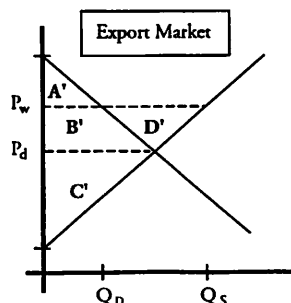

Figure 12.2a. Supply and Demand, Import Market

Figure 12.2b. Supply and Demand, Export Market

the export market of Figure 12.2b, prices rise as production increases to fuel exports, $Q_S - Q_D$, but the producer surplus increase of B' + D', outweighs the loss in consumer surplus equal to B'.

All of this raises the following question: If we believe that society is better off as a whole without trade protection, then why, perhaps especially in democracies, is there so much protectionism? What we will see is that although a strong case can be made against protectionism from an economic point of view, trade protectionism is primarily a political animal, and that instruments of trade protectionism, such as tariffs and quotas, often have their origins in the democratic political apparatus. In the end, trade policy is made not by economic theorists, but by politicians.

So what process shapes the political views of politicians, and thus a country's trade policy? The following example is inspired by Wolfgang Mayer's (1984) seminal paper on the political economy of international trade.[22] Consider a political campaign where, locked in hand-to-hand combat for a senatorial seat, are the incumbent, Paddington Porkmire, and his challenger, Soloman Swineheart. The central campaign issue is the import tariff on textiles.

The preferred textile tariff of the voters spans the political spectrum uniformly between zero and 50 percent.[23] On one end of the spectrum are voters whose relationship to the textile industry is such that they are likely to be hurt by free trade. This would include, of course, textile workers, many of whom would lose their jobs under free trade; they favor a job-saving 50 percent tariff. On the opposite end of the spectrum are consumers who enjoy wearing cheap T-shirts; they favor no tariff at all. Lying in between are people who feel the negative effects of the tariff only indirectly: a cheap-T-shirt-wearing voter with an aunt who is a textile worker, or the owner of the local mini-mart in a textile town. Figure 12.3a portrays the spectrum of voters ordered by their preferred tariff.

Swineheart, a (more or less) ideological free-trader by nature, begins the campaign by advocating a low 8 percent tariff. Porkmire plays to his base, staking out a position heavily in favor of local textile producers, and is quoted as supporting a 40 percent tariff. The two political positions are seen in Figure 12.3a.

Upon consultation with his political advisor, Swineheart begins to re-consider his position. By taking a stand for a higher tariff, Swineheart can capture all of the voters he had before, plus those that favor a higher tariff. Shortly thereafter, he is heard in speeches advocating a 35 percent tariff, and in the polls garners the votes of a whopping 75 percent of the voters (37.5/50), as shown in Figure 12.3b.

The experienced career politician Senator Porkmire, understanding that two can play at the tariff game, immediately responds by insisting that he was previously misquoted by reporters. He goes on record as supporting a 30 percent tariff, and basks in the glow of a dramatic pendulum swing in the polls, returning to his favor.

[22] Mayer (1984).
[23] Using the well-known Hecksher-Ohlin framework, Mayer demonstrates that each voter in his model has an optimal tariff rate that is influenced by his relationship to the factors used in production of tradable goods.
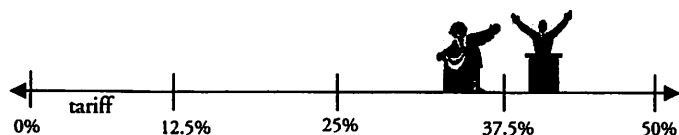
Figure 12.3a. Tariff Game, Stage 1
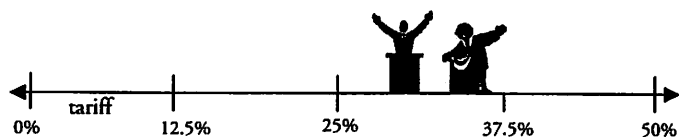

Figure 12.3b. Tariff Game, Stage 2

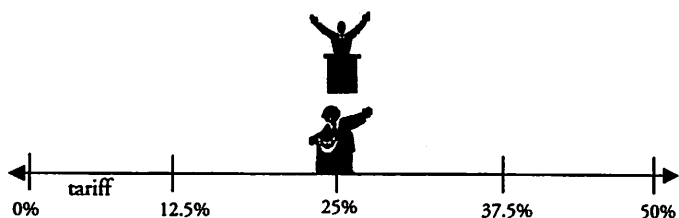Figure 12.3c. Tariff Game, Stage 3

Figure 12.3d. Political Equilibrium in Tariff Game

They show his position on the textile tariff now to be closest to the views of 65 percent (32.5/50) of all voters as seen in Figure 12.3c.

What is the result of all this political maneuvering? Clearly, each candidate has an incentive to leapfrog over the other's position until the Nash equilibrium has been reached that is portrayed in Figure 12.3d, in which each candidate takes the middle ground of the 25 percent tariff.

Suppose that in a deadlocked contest, the political tiebreaker becomes which candidate's toupee appears more "natural" on television. Swineheart thus emerges victoriously, and carries to the Senate a platform for a 25 percent textile tariff. In like

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fashion, each of the 100 victorious U.S. senators brings a preferred tariff to office derived from the preference of the median voter in his or her state.

In the final establishment of tariff policy, the game has a second level. Rank each of the 100 senators in order of their preferred tariff from lowest to highest. As various proposals are considered for textile tariffs, each proposal will compete for the senator's vote with the median tariff preference. As it happens, we find that Senator no. 51 is Wyoming's Senator Harry Hogsnout, who comes from a small state, but suddenly is a man with profound powers. For a trade agreement to pass, it must capture the vote of Hogsnout. Being the senator with the median tariff preference itself made up of median tariff preferences, it is extremely unlikely that Senator Harry Hogsnout's preferred tariff is zero.

This game of political maneuvering is a variant of Harold Hotelling's famous location game.[24] In the commercial version of Hotelling's game, two stores competing with one another over proximity to consumers end up locating adjacently in a city-center Nash equilibrium. In the political version of the game, the Nash equilibrium is characterized by politicians catering to the wishes of the median voter on political issues.

As a result, the social welfare-maximizing zero-percent tariff (free trade) is rarely the political Nash equilibrium. Though economic theory gives us good reason to believe that society as a whole will benefit from free trade, it also tells us that there are clear winners and losers within the process.[25] Though according to theory the winners from trade should be more than able to compensate the losers through monetary compensation or worker retraining, compensation to the losers is never perfect. Given that the political system insufficiently compensates the losers enough to attract their votes for free trade, the resulting political Nash equilibrium is likely to involve some level of protectionism, since winners and losers are equally allotted one vote.

There are other important factors that help us understand why the import-competing sector receives additional political weight in the creation of trade policy. A highly influential paper by 2002 Nobel Prize–winner Daniel Kahneman and Amos Tversky (1979) demonstrates, in a challenge to neoclassical consumer theory, that people place a greater weight on economic losses than they do on gains of equal magnitude around a reference point, such that most of us are characterized by some degree of "loss aversion." In other words, people appear to become more upset if something is taken away from them than they become happy if that same thing is given to them.

The "loss aversion" phenomenon is confirmed by some creative experimental studies. Kahneman, Knetsch, and Thaler (1990), for example, randomly handed out souvenir Cornell University coffee mugs that sold for $6 at the bookstore to half the subjects in a large room; the lucky recipients were allowed to keep their mugs or sell them to those who weren't given one. What they found was that the median

[24] Hotelling (1929).
[25] The seminal paper illustrating this point is Stolper and Samuelson (1941).

asking prices among those who had been given a mug were *more than twice* the median offering prices of the (mug-less) mug buyers. As a result, the volume of trade in mugs was only one-fifth as large as what would be predicted in the absence of loss aversion. The "loss aversion" phenomenon has important implications for international trade. If jobs lost via trade receive a disproportional weight in people's minds than jobs gained via trade, it will lead to a systematic political bias against the implementation of free-trade agreements.

Returning to the political process, we can uncover a further source of antitrade bias. Senators are not only influenced by the popular opinion of their constituents, but also by political lobbying. Suppose the fixed cost of political organization and lobbying by any individual affected by trade is equal to c. In most industries, the number of consumers of a product, let's call this number n, far exceeds the number of producers, m. This may seem like good news for tariff-free imports. But despite the overall welfare increases from international trade, the *gain* is markedly less concentrated than the *pain*. Since the benefits of free trade to consumers (B + D in Figure 12.2a) are spread over such a large number of individuals, n, it will not be worth the effort for the average consumer to lobby for lower tariffs if $c > (B + D)/n$. Although the loss to producers is only equal to B, the loss is felt more sharply because it is concentrated among fewer individuals, making it more likely that $c < B/m$, where lobbying by producers is worthwhile. This explains why relatively concentrated groups of producers such as in sugar and cotton wield a disproportionate influence on U.S. trade policy, and why protection in these industries continues to remain astonishingly high to the detriment of consumers. Concentrated pain is simply more noticeable, and it is usually the squeaky wheel that gets the political grease. A political campaign may be run on a platform of saving textile jobs (e.g., John Edwards's presidential bid of 2004), but no politician will run on a platform of reducing the price of T-shirts by a dollar.

Trade economist Robert Baldwin of the University of Wisconsin (1989) clarifies this general idea, noting that from the perspective of consumers, free trade is like a public good: Its benefits (in the form of lower prices) are both nonexcludable and nonrival. Consequently, the decision for consumers to contribute to a campaign favoring free trade has the structure of a Prisoners' Dilemma: Each consumer would benefit if import protection were eliminated, but would like to free-ride on the efforts of others to achieve such results.

Free-Trade Agreements

Suppose a U.S. President wants to negotiate a free-trade agreement with one or more developing countries, like the CAFTA reached in 2005 between the United States and the Central American nations plus the Dominican Republic. Even if a President's preference were to maximize social welfare by implementing a trade agreement with tariffs as low as possible, such tariffs are subject to the political constraint that the agreement must pass a representative Senate.
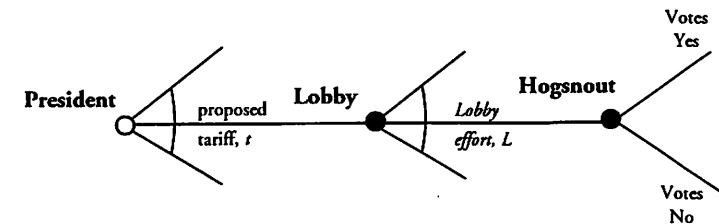
Figure 12.4. Political Effects of Lobbying

Let us assume that the total number of votes cast against the trade agreement is an increasing function of the resources used in lobbying against it, or $V(L)$. After incurring fixed costs of organization equal to mc, textile producers are willing to spend up to (B – mc) in political contributions to defeat the agreement. The most efficient lobbying tactic is to employ a kind of "triage" strategy: Senators on the high end of the preferred tariff spectrum, such as those from heavy textile producing states, need no further encouragement to vote against the trade agreement. Senators with a very low preferred tariff are too expensive to convince. The textile producer lobby thus begins by targeting a middle group, starting with the senator with the *highest* preferred textile tariff who initially would *favor* the agreement, then continuing down the spectrum until (it hopes) fifty-one senators are opposed to the trade agreement ratification.

If $V(B - mc) \geq 51$, then the President knows that a zero-tariff agreement will not fly in the Senate, and so he must seek a compromise in his first-stage negotiations.[26] Using backward induction, our economic-welfare-maximizing President will negotiate a trade agreement in an import-competing area, such as textiles, only if he knows that the agreement will be able to satisfy our median Senator Hogsnout, as seen in Figure 12.4.

The President can do this by negotiating some positive level of U.S. textile tariff that reduces the domestic price after the agreement merely to $P_w + t$, higher than the free-trade world price of P_w. This reduces the height of area B in Figure 12.2a from $P_d - P_w$ to $P_d - P_w - t$, and reduces its area and hence the total amount of resources textile producers are willing to spend in a lobbying effort against the agreement. Using backward induction, see that the optimal tariff level t^* chosen by the President in the first play of the game in Figure 12.4 forms a Nash equilibrium that shrinks the producer loss B to the point that $V(B - mc) = 49$.

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[26] Why wouldn't producers in the export market offer a competing lobby to counteract that of producers in the import sector? One reason, perhaps, is that expansion in the export sector would incorporate resources that are not fully identified. For example, there is likely to be uncertainty over which workers will be hired in as yet unbuilt manufacturing plants, or which workers will be hired to build the plants themselves. Such uncertainty reduces incentives for positive lobbying. In contrast, import competition directly impacts an identifiable group of existing producers.

The equilibrium in the game can help us understand why even a social-welfare maximizing, tariff-minimizing President may have an incentive to bring a watered-down agreement before the Senate if it must be ratified by a majority vote. For example, to gain passage of CAFTA, trade negotiators made major concessions to the textile industry, maintaining nearly all of the 1983 Caribbean Basin Trade Partnership Act that requires U.S. textile imports to be produced from U.S. fabrics and yarn. Completely scrapping these requirements would have added another $9-$14 billion per year to U.S. consumer surplus.[27] In addition, though the U.S. sugar lobby did concede to 107,000 new tons of Central American sugar imports, the figure represented only 1.7 percent of total U.S. consumption and maintained a 100 percent U.S. tariff on sugar.[28] Although U.S. consumers ingest sugar at one of the highest rates in the world, the U.S. sugar-producer lobby is concentrated and powerful; after the agreement the United States will still pay more than twice the world price for sugar.

In light of the game in Figure 12.4, it is interesting that trade agreements so often barely slip by the ratification process. Once a Nash equilibrium tariff has been negotiated that can pass the Senate, the lobby no longer has an incentive to waste its resources trying to defeat it. If a trade agreement will be watered down sufficiently to gain a majority in the Senate, why bother to lobby against it?

The truth is that in tallying the final votes in Congress, even victorious trade deals often prove to be squeakers. In July 2005, for example, CAFTA was passed in the Senate by a vote of 54 to 45, and by the slimmest possible majority in the U.S. House of Representatives, on a vote of 217 to 215. One reason for this could be that many senators have already committed themselves to a "no" vote based on prior lobbying. Second, it could represent a (lost) gamble or a miscalculation by the producer-lobbyers, believing that they had swayed more lawmakers than was actually true. Third, it may be that politicians must commit themselves to interest groups in order to receive the necessary support for re-election; a "flip-flop" on an issue may not wear well with key constituents.

The World Trade Organization

When the Uruguay round of the GATT (General Agreement on Tariffs and Trade) concluded in 1994, it had reached substantive agreements on a number of issues: It achieved a more than one-third reduction in worldwide tariffs, made some progress in lowering agricultural subsidies in the developed countries, and wove the Multifiber Agreement (which had consisted largely of quotas) into an economically preferable tariff system. Remarkably, Japan and South Korea even promised to lower some barriers to rice imports. But the most enduring legacy of the Uruguay round was the metamorphosis of the GATT itself into the World Trade Organization (WTO), on January 1, 1995.

[27] Rotsko and Powell (2005).
[28] Ibid.

The WTO is a global institution that helps create, implement, and enforce trade agreements among its members.[29] Five guiding principles define its mission: (1) countries should engage in trade without *discrimination* either between their trade partners or between domestic and foreign-produced products; (2) *freer* trade is ultimately better for the world than restricted trade; (3) trade should be *predictable* and not subject to arbitrary barriers; (4) for the benefit of consumers, trade should operate in line with principles that foster *economic competition*; and (5) the priorities of *developing countries* allow them some special privileges in the formation of rules governing international trade. In shaping these principles into policy, the WTO operates through the consensus of its 148 members. Unlike other global institutions such as the United Nations and the World Bank, no major decisions are made without the collective agreement of all of the member countries. As a result, the WTO effectively operates with one gas pedal and 148 brakes. Considering its institutional design, it is impressive that WTO members have reached agreements on such a wide array of issues.

Another salient feature of the WTO is its dispute settlement mechanism. Under the old GATT system, rulings against a country could be implemented by consensus only, which theoretically made it possible for even the offending country to veto a ruling against it. Now within the WTO, dispute rulings can only be *blocked* by consensus, giving them much more force and making them harder to overturn.[30] Moreover, the entire dispute process is quicker, designed to take less than a year. Any WTO member country can take its trade grievance with another member country before a panel of experts appointed by the Dispute Settlement Body. After reviewing the issues involved in the dispute, the panel submits a ruling that recommends what actions, if any, should be taken by the offending nation. The priority is for the offending country to bring its policy in line with the recommendations made by the WTO panel. If it does not state in writing that it will do so within 30 days, it must open negotiations with the complaining country to find some means of compensating it for losses. If the two countries cannot reach such a settlement, the WTO ultimately grants the complaining country the right to impose limited trade sanctions against the offending country.[31] Ideally, these sanctions, which usually come in the form of retaliatory tariffs, should be imposed in the same sector as the dispute, but this is not always the case. Legal retribution for violation of a trade agreement in petrochemicals may sometimes result in retaliatory tariffs against underwear.

Thus while serving as a forum for new negotiations, the WTO also acts as a "sheriff" to enforce previous agreements, similar to the sheriff over the Commons described in Chapter Four. Real-life sheriffs are not always popular, and it is no different with the WTO. Indeed, partially through a general misunderstanding of the institution,

[29] World Trade Organization (2005). www.wto.org. (Accessed 7/31/07)
[30] World Trade Organization (2005b). http://www.wto.org/english/thewto/e/whatis/e/tif_e/org1_e.htm#council (Accessed 7/31/07)
[31] World Trade Organization (2005a). "Understanding the WTO." http://www.wto.org/english/thewto/e/whatis_e/tif_e/displ_e.htm (Accessed 7/31/07)

United States

		Imports: Open	Imports: Closed
China	Imports: Open	$A+B+C+D+$ $A'+B'+C'+D'$ $A+B+C+D+$ $A'+B'+C'+D'$	$A+\omega_u B+C+$ $A'+ B'+C'+D'$ $A+B+C+D+$ $A'+B'+C'$
	Imports: Closed	$A+B+C+D+$ $A'+B'+C'$ $A+\omega_c B+C+$ $A'+B' +C'+D'$	$A+\omega_u B+C+$ $A'+B' +C'$ $A+\omega_c B+C+$ $A'+B' +C'$

Figure 12.5. Trade Negotiation Game, U.S. vs. China

the WTO has become a favorite whipping boy of the antiglobalization movement. On the basis of some of its rulings, critics accuse the WTO of striving to create a world full of sweatshops and air pollution. Ostensibly, however, the WTO's purpose is not to promote poor working conditions or environmental degradation, but to hold countries to their trade agreements.

Governments have two main motives for establishing trade protection. The first is economic: If an import market is large enough, trade protection lowers world prices for the imported good, shifting the terms of trade in favor of the importing country. The second is political: As seen in our previous example, governments face heavy lobbying pressure from domestic producers forced to compete with imports, and therefore place a greater weight on these interests in calculating their own gains and losses in trade negotiations. But as Dani Rodrik (1995) and others have noted, trade is actually one of the most blunt and inefficient instruments for compensating domestic producers hurt by imports.[32] Why it is routinely used in favor of other far more efficient mechanisms of redress, such as lump-sum cash payments to affected workers, has long been a source of torment and sleepless nights for economists. Nevertheless, in practice the political motive for trade protection is by far the more dominant of the two, and so we examine it here.

To explore the incentives involved in trade relationships, consider the following example, which uses the basic game-theoretic framework employed by Kyle Bagwell of Columbia University and Robert Staiger of the University of Wisconsin.[33] In the following framework, the payoff to the respective governments is the politically weighted social welfare created in the markets for the two goods.

Consider a pair of WTO countries in a trade relationship, say, the United States and China. Suppose that each of the two countries has a strategy that is either "open" or "closed" to a particular category of foreign imports. The payoffs in Figure 12.5

[32] Rodrik (1995).
[33] See Staiger and Bagwell (1999), Staiger (1995), and Staiger and Bagwell (1990).

are given in terms of social welfare (consumer and producer surplus) as shown in Figure 12.2a and 12.2b.

As in Staiger (1995), assume that the government places a special weight $\omega > 1$ on producer surplus in the import-competing sector, e.g. petrochemicals in China, underwear in the United States. Focusing on cases in which ω is symmetric ($\omega = \omega_c = \omega_u$ in Figure 12.5), if $\omega B < D + B$, then each country has a dominant strategy to maintain open import markets, and there is no need for a WTO. The opposite extreme is when producer surplus in the import-competing sector carries extremely heavy political weight such that $\omega B > D' + D + B$. In this extreme case, the government payoff is higher if both countries are closed to imports than if both are open to each others' imports. Few examples of such hermit-like countries exist (perhaps one example might be North Korea). There is little scope for trade negotiations in this case.

What appears in practice to be the most likely case is that ω is of some intermediate value so that $D + B < \omega B < D + D' + B$, that is, that $(D/B) + 1 < \omega < [(D + D')/B] + 1$. In this intermediate case, the game in Figure 12.5 has the structure of a Prisoners' Dilemma. Although politicians may have a dominant strategy to maintain barriers against imports, politicians are happier (and social welfare is higher) if both countries lower barriers to imports than if they maintain trade barriers. It is in this final case where a global institution that fosters trade agreements and punishes violations of these agreements is important.

The institutional role of the WTO can thus be seen in light of a repeated version of game in Figure 12.5. Through rounds of trade negotiations, member countries come to essentially agree on (Open; Open) strategies. In the event that one country cheats on the agreement by playing "Closed" when the other plays "Open," as a last resort the Dispute Settlement Body of the WTO allows the cheated country to play "Closed" for T periods of the repeated game. Observe that, politically speaking, the threat to play "Closed" as a retaliatory mechanism constitutes a credible threat by a government since it represents a dominant strategy independent of the action taken by the partner country. Staiger (1995) notes that such strategies could be part of a "natural" trigger mechanism that would deter defections in a bilateral trade relationship. But retaliatory measures as approved and codified by the WTO's Dispute Settlement Body can be popularly viewed as legal, legitimate actions. This renders any retaliation as part of a legal framework, and thus less susceptible to an endless series of counter-retaliations, making trade relationships in the end more predictable.

An interesting case in Figure 12.5 is when one country, say China, is characterized by $(D/B) + 1 < \omega_c < [(D + D')/B] + 1$, but the other country, say the United States, is characterized by $\omega_u < (D/B) + 1$. In this case, China as a producer-oriented society, has a dominant strategy to maintain closed import markets, while the United States, as a consumer-oriented society, has a dominant strategy to maintain open import markets. This produces a Nash equilibrium (in the one-shot game) with the United States maintaining open import markets while China maintains closed import markets. Indeed it also makes the threat of retaliatory tariffs by the United States, even

in response to a ruling of the Dispute Settlement Body of the WTO, less credible; the proposed threat is not a Nash equilibrium. The consequence of this asymmetry is that it makes threats of trade barrier retaliation in the United States less credible than in countries when the political weight assigned to domestic producer surplus is higher. Such a case indeed does resemble the relationship between United States and China (as well as the United States and Japan), where the domestic producers receive greater political weight in the latter countries. An implication is that the consumer-oriented nature of the United States results in putting its producers in a worse bargaining position with respect to trade disputes. Nevertheless, a ruling against a foreign producer by the WTO may be beneficial in creating a domestic political environment in which tariff retaliation by a consumer-oriented country like the United States becomes more credible.

Some such as Thomas Hungerford (1991) have noted a further role played by dispute settlement procedures. Suppose that there is imperfect information in ascertaining whether a country has indeed cheated on a trade agreement (perhaps by enacting some less easily observable nontariff barrier) and that a drop in exports could have been caused by either. He argues that if retaliatory tariffs must be conditioned on an informative investigation to determine whether the drop in exports was unavoidable or a deliberate act of cheating, an important role of an institution such as the WTO is *information-gathering* as well as coordinating punishment strategies. Under these conditions, the dispute settlement process is able to avert trade wars that could have been ignited by unavoidable mishap rather than by deliberate cheating.

The "Race to the Bottom" in Environmental and Labor Standards

One of the greatest nightmares of those who fear increasing globalization is of a "Race to the Bottom" in worldwide environmental and labor standards. The basis for this fear is the assumption that footloose multinational corporations have an incentive to locate offshore plants wherever environmental standards are weakest (or least enforced) and where labor commands the lowest wages, and shows the least potential for organization. According to the Race to the Bottom, it is the country with the dirtiest environment and the most slave-like labor conditions that wins the foreign investment prize.

Figure 12.6 illustrates the plight of a small manufacturing-export country with the potential to enter the Race to the Bottom. Take the example of El Salvador, which exports around US$100 million annually in paper and cardboard products, potentially a very dirty industry. The country starts operating at supply curve S_1 which equals the marginal cost, MC_1, of the domestic industry. Because of the air, land, and water pollution associated with cardboard production, however, the *marginal social cost*, MSC, is greater than the simple marginal cost of production realized by producers. The difference between the bold MSC line and the $S_1 = MC_1$ line represents the total cost of the pollution at any given level of cardboard production, Q.
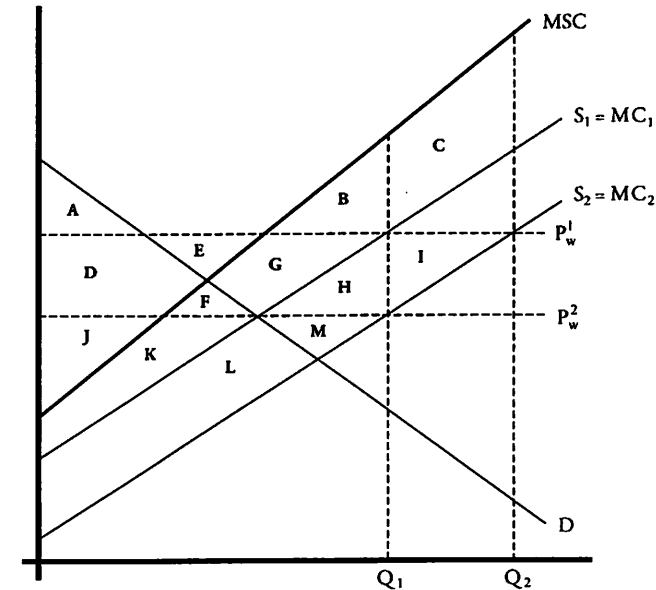
Figure 12.6. Environmental Externalities in Trade

Suppose that environmental standards for cardboard production can be either "high" or "low," and that El Salvador wants to gain an edge in attracting foreign investment by shifting its environmental standards to the latter. (We could tell virtually the same story if the country weakened its labor laws.) As the government relaxes pollution abatement requirements for cardboard producers, it transfers pollution costs from Salvadorian producers to Salvadorian society. Lower marginal costs shift the supply curve downward to the parallel line, $S_2 = MC_2$, but society now must endure more pollution per unit of cardboard output. (For ease of graphical exposition, Figure 12.6 assumes that marginal social costs, private costs plus pollution costs, remain constant.) This increases producer surplus from the area $D + E + F + G + J + K$ to the larger area $D + E + F + G + H + I + J + K + L + M$, assuming El Salvador is a sufficiently small exporter that its increase in exports does not significantly reduce the world price. However, facing the same incentives, if every other exporter does the same, the increased supply lowers the world price of cardboard from P_w^1 to P_w^2. This reduces producer surplus back to $J + K + L + M$, which is equivalent to the original producer surplus area $D + E + F + G + J + K$.

Consider the extreme example in which El Salvador engages in a mercantilist economic policy where producer surplus receives the entire political weight in formulating environmental and trade policies. In this case, we can represent the "Race to the Bottom" game by Figure 12.7 in which the strategic interdependence between

Other Cardboard Exporters

		High Environmental Standards	Low Environmental Standards
El Salvador	High Environmental Standards	D+E+F+G+J+K (2) D+E+F+G+J+K (2)	D+E+F+G+H+I+J+K+L+M (3) J+K (1)
	Low Environmental Standards	J+K (1) D+E+F+G+H+I+J+K+L+M (3)	J+K+L+M (2) J+K+L+M (2)

Figure 12.7. The "Race to the Bottom" Game

the environmental standards set by all cardboard exporters constitutes a Prisoners' Dilemma. Levels of producer surplus are ranked in the payoff matrix from highest (= 3) to lowest (= 1). Whether or not other cardboard exporters institute "high" or "low" environmental standards, each has an incentive to implement the low standards. Low environmental standards are a dominant strategy and form the Nash equilibrium, hence the Race to the Bottom.

It is important to see where the breakdown occurs for a Race to the Bottom to exist. In this example, the real breakdown has occurred in the failure of domestic governments to formulate policy based on general social welfare rather than based on producer surplus. In the game in Figure 12.7, producer surplus is the same whether high or low environmental standards are maintained by each country. The level of pollution in each cardboard-producing country and total social welfare, however, is not. Under high environmental standards the cost of total pollution in each country in Figure 12.6 is equal to K + F + G + B; in the Race to the Bottom Nash equilibrium it is K + F + G + B + L + M + H. While consumer surplus increases from A to A + D + F from lower prices, total social welfare (the sum of consumer and producer surplus less pollution costs) falls from A + D + E + J − B to A + D + J − G − H − B, a net change of − E − G − H.[34]

Consequently, it is when governments pursue a mercantilist economic policy that a Race to the Bottom may result, which has a negative environmental impact and lowers total social welfare for host countries of foreign direct investment. Thus when a Race to the Bottom seems to exist in a certain industry, we can trace the roots in part to domestic political failure. What is less clear is whether the role of the

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[34] It can furthermore be seen in Figure 12.6 that even if all other producers engage in a "Race to the Bottom" it is still best from the standpoint of social welfare in an individual country for it not to lower environmental standards.

WTO should be to extend itself into domestic environmental policies, or whether in accordance with the principles of its charter it should limit itself to resolving trade disputes between its members.

The WTO and Labor/Environment Issues

Why is a supposedly fair-minded institution like the WTO the target of so much ill will from the political left in areas such as protection of the environment? The answer is illustrated by a couple of well-known trade disputes that have emerged in the WTO's Dispute Settlement Body and its predecessor in the GATT.

In the Pacific Ocean, dolphins and yellowfin tuna often swim near one another. Being mammals and not fish, schools of dolphins tend to swim near the surface, with the tuna below them. As a result, dolphins often lie between tuna fishermen and their prey, and they are frequently killed as they are unintentionally trapped in tuna nets. Years before the dispute, the U.S. Marine Mammal Protection Act established a policy that imposed a tuna embargo on any country not able to prove that it abided by dolphin protection standards. Mexico, a leading exporter of tuna to the United States, brought the case before a GATT trade dispute panel in 1991. The panel ruled against the United States, arguing that "GATT rules do not allow one country to take trade action for the purpose of attempting to enforce its own domestic laws in another country, even to protect animal health or exhaustible natural resources."[35]

A second dispute came about in 1995 as the United States implemented tighter environmental regulations over gasoline. It set higher standards regulating the chemical content of gasoline, but allowed domestic producers to regulate their content using a 1990 baseline level of chemical content. Venezuela and Brazil accused the United States of applying stricter rules to the chemical content of their gasoline than were applied to U.S. domestic producers. The Dispute Settlement Body of the WTO ruled against the United States, and forced the United States to negotiate a new set of import standards with gasoline-exporting countries.[36] Both of these rulings enraged environmentalists, who argued that the WTO was creating policies that were both anti-dolphin and pro-toxic gasoline fumes. But on closer examination, the root of the dispute with the WTO and the political left ironically lies in the WTO's policies (a) not to interfere in the domestic policies of sovereign nations; and (b) not to let differences in environmental and labor standards between countries be used as a basis for de facto protectionism. In the latter case, it is clear that if the United States had formulated a clean-air policy that did not discriminate between sources of fuel, the WTO would have had no basis for its ruling.

The position of the WTO is that environmental policy should be established by member countries themselves, but that these environmental policies should not favor domestic goods over imports. Most economists feel that it is not best to deal with labor and environmental issues via trade policy, but rather by policies focused

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[35] World Trade Organization (2005b).
[36] Krugman and Obstfeld (2006).

on labor and environmental issues directly. This point can be illustrated easily in the diagram of Figure 12.6. If there are negative spillover effects from cardboard production, the government should levy taxes on cardboard production such that the initial marginal cost ($MC_1 = S_1$) curve in Figure 12.6 increases until it reaches the MSC curve. In this way, the pollution tax "internalizes" the negative cardboard production externality. This yields a total social welfare equal to $A + D + J + E$, certainly greater than social welfare in the Race to the Bottom, $A + D + J - G - H - B$, and even greater than social welfare under "high" environmental standards in the game, $A + D + E + J - B$.

Kyle Bagwell and Robert Staiger (2001) have proposed a creative mechanism by which policies can be specifically targeted to directly address labor and environmental issues in international trade. Their intention is that it may help countries to implement stronger labor and environmental policies without jeopardizing export markets, and furthermore may help to ensure that environmental standards are not used as a guise for protectionism.

The essential feature of their idea is that under WTO rules, countries should be forced to neutralize the effect of any changes in environmental laws on domestic market access by their trading partners. In practice this would mean that if, for example, a developing country decided to relax its own environmental or labor standards in a way that would benefit domestic producers over foreign producers, it must make tariff concessions to those foreign producers in some other area that guarantees them the same market access as they enjoyed previously. Bagwell and Staiger also argue that if a country chooses to *raise* its environmental or labor standards, it should be entitled to raise tariffs in some other area that guarantees that foreign producers on the whole will not be able to take advantage of the policy change to the detriment of domestic producers. Such a mechanism has the potential to allow trade talks to continue to foster global economic openness, while simultaneously giving individual countries the opportunity to enact appropriate labor and environmental standards that take into account their level of economic development and their specific circumstances. This kind of creative mechanism is one more example of the potential for institutions to shape the incentives in a game for the benefit of the common good.

Appendix

THIS APPENDIX IS here to give you a little more background on the basic solution concepts and techniques used in game theory. A warning: This is only a brief overview, and it is somewhat terse. To delve into these concepts at a more satisfying level, I recommend several books that can serve as excellent introductions to game theory at the end of this section.

A game consists of two or more players, and often we index the players by a number or letter (e.g., 1, 2, 3, . . ., n), where n represents the number of players in a game. Each player in a game has a set of strategies. For example, in a game of peasant farmers we might represent the set of strategies available to Player 1 and Player 2 as $S_1 = S_2 = \{$Beans; Coffee$\}$ in a two-player, two-strategy game where the players have the same strategies. Any combination of strategies, one by each player in the game is called a "strategy profile." Here, each player i chooses one of the strategies in her strategy set, or chooses one particular strategy s_i that is part of S_i. Thus a strategy profile for n players is a combination of strategies, one by each player, $(s_1; s_2; s_3; \ldots s_n)$. The strategy profiles in our two-player, two-strategy game would be (Beans; Beans), (Beans; Coffee), (Coffee; Beans) or (Coffee; Coffee).

Each strategy profile yields a payoff to each of the players in the game. The payoff to a player is therefore determined by the strategy chosen by the player himself, and by the strategies chosen by the other players. If U_i represents the utility of player i, then U_i is a function of the strategy chosen by all players in the game, or $U_i (s_1; s_2; s_3; \ldots; s_n)$. To continue with our previous example, the payoff to Player 1 from growing Coffee when Player 2 grows Coffee, or U_1(Coffee; Coffee) might be 5, while the payoff U_1(Coffee; Beans) might be 4. The difference in payoffs might exist because there are economies of scale in coffee growing; perhaps wholesale buyers pay a higher price if they can collect more beans in one trip to a village. However, different phenomena might be operational here that determine the payoffs. Maybe with fewer coffee producers, the price of coffee is higher. In this case, the payoff U_1(Coffee; Coffee) could be 3 instead of 5. What matters in many cases is simply the ordinality, or rankings, of payoffs rather than the precise numerical values. The rankings of payoffs tell a story that captures the essence of the strategic interdependence in the