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# A NEOCLASSICAL VIEW OF TRADE LIBERALIZATION

by

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Abstract

This paper attempts to provide a balanced view of the neoclassical economists' perspective on trade liberalization, with an emphasis on the agricultural sector. I review the basic arguments in favor of competitive markets in general and free trade in particular. These arguments are based on restrictive assumptions which often fail to hold. Under more realistic assumptions, the arguments in favor of free trade are invalid. Economists remain skeptical of the benefits of trade restrictions, but this is a nuanced judgment, rather than a theoretical certainty. I describe a number of situations where market failures imply that trade restrictions can improve efficiency.

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# A Neoclassical View of Trade Liberalization

## Executive Summary

Economic arguments in favor of liberal markets in general and free trade in particular are frequently misrepresented in policy debates. Widely cited principles are based on restrictive assumptions. Economists' appreciation of the limitations of these assumptions and of the conclusions that result from them, is usually obscured in public discussion. A large part of economic theory investigates the effect of policy reform under more realistic assumptions about market imperfections. The results of this theory are often ambiguous, but nevertheless provide useful insights about policy reform. Unfortunately, this theory is virtually unknown in policy-making circles. This paper provides an overview of the relevant economic theory for trade liberalization, with an emphasis on the agricultural sector. The theory is also useful for evaluating policy reform not directly related to trade.

Chapter II discusses the Principle of Comparative Advantage and the fundamental theorems of welfare economics, which comprise the basic economic arguments in favor of unregulated markets. This material will certainly have a ring of familiarity to most non-economists involved with policy debates. However, these ideas remain poorly understood. I explain what economists mean by efficiency, how they measure welfare for producers and consumers, and how to measure the efficiency gain of trade liberalization. Although trade liberalization can have large effects on the distribution of economic welfare, the benefits and losses largely balance. The net efficiency gain resulting from trade liberalization is likely to be small.

Chapter III explains how and why the inclusion of market imperfections changes the basic conclusion that free trade promotes efficiency. The theory of the second best states that in an economy with two or more market failures, or distortions, correcting one of them may not improve efficiency. Since the real world contains many market failures, abstract theory does not provide a basis for the uncritical acceptance of trade liberalization. Economists nevertheless are skeptical of using trade restrictions to correct market failures.

The Principle of Targeting says that market failures should be attacked directly, a prescription which seldom involves trade restrictions. However, the Principle of Targeting is subject to caveats. Its application requires a careful description of the "target", i.e., the policy

objective. For example, achieving the target of food security may require domestic production in some circumstance, or liberal trade in others.

A given objective can usually be achieved using a variety of policies, such as tariffs or production subsidies. Different policy instruments involve different secondary distortions, i.e., economic costs. Often some of these costs are obvious and others are disguised, so it is important to compare them carefully. For example, economists regard the consumption distortion associated with a tariff as an obvious economic cost, and consider a production subsidy relatively benign - if the objective is to increase production. A politician, on the other hand, regards the production subsidy as an obvious cost to the treasury, and may view a tariff as relatively benign.

Finally, it is important to consider the possibility that the level of the target responds to the choice of policy instrument. In a political-economy equilibrium, the amount of lobbying that special interest groups undertake may depend on the choice of policy instrument. In this situation, an apparently second-best policy may be better than an apparently first-best policy.

Three fundamental ideas, the Principle of Comparative Advantage (or more generally, the welfare theorems), the theory of the second-best, and the Principle of Targeting, are the core ingredients of the neoclassical theory of trade policy. Only the first idea is common currency in policy discussions, and that idea is frequently misunderstood.

Chapter IV presents a series of six examples of market failures under which trade intervention can improve welfare. These examples include: missing insurance markets in the presence of random supply, market imperfections with adjustment costs, political motivations for trade policy, and the failure to internalize production externalities. Each of these examples is intrinsically important for reform of the agricultural sector. They are also useful as illustrations of how economic logic can be applied to situations where there are market failures, i.e., to the real world.

# I. Introduction and Statement of Objectives

Advocates and opponents of trade liberalization frequently misrepresent economic arguments. The economic principles that favor unregulated markets in general, and free trade in particular, are based on restrictive assumptions. Advocates of free trade sometimes invoke the principles without recognizing the assumptions that limit their validity. Opponents claim that these limitations render the principles irrelevant, but sometimes do not understand either the limitations or the principles. The two sides of the debate seldom go beyond either stating the principles or insisting on their irrelevance. Both sides are certain that the discipline of economics is squarely on the side of free trade.

Most *economists* favor liberal trading rules, partly because of the intellectual force of free-trade arguments, and partly a result of professional socialization. However, *economics*, as an intellectual discipline, does not give unquestioned support to liberal trade. Some parts of the theory support free trade and other parts call it into question. Professional economists, at least those trained in trade theory, are aware of both parts, and decide which they regard as more persuasive. However, we do not decide in a vacuum. We are first taught, as undergraduates, the theory that endorses unregulated markets. Usually we are taught that there are exceptions when government intervention is warranted, but these are not emphasized. The circumstances in which markets fail, and the proper remedy for that failure, is, however, a major area of economic research. This material, taught at the graduate level, is not widely known. It often leads to ambiguous conclusions - unlike the principles which endorse unregulated markets. The public debate on government regulation (and free trade) uses only a few of the tools of economic theory. The exclusion, from the public arena, of other parts of economic theory leads to the mistaken impression by some that economics categorically endorses liberal trade, and by others, that economics is irrelevant.

Economic logic is a powerful tool for understanding the proper role of government policy in general, and trade policy in particular. This paper discusses and illustrates those parts of the theory of trade policy most relevant to reform in the agricultural sector.

Chapter II presents the fundamental economic arguments in favor of free trade. I illustrate the principle of comparative advantage using a numerical example, and then discuss the theorems that provide the basis for thinking that competitive markets yield desirable outcomes. I explain what economists mean by efficiency, how we measure producer and consumer welfare, and how we estimate the efficiency gains of trade liberalization. This

material is a review of undergraduate welfare economics and an introduction to trade theory. It offers the kinds of conclusions usually associated with economics. A reader interested in understanding the more complex and ambiguous view that economics takes toward policy reform, needs to understand this material.

Chapter III asks what kinds of conclusions are reached when we introduce more realistic assumptions. In a world where there are market failures or government policies which we cannot change, what is the effect of reforming those policies that we can influence (e.g. liberalizing the agricultural sector)? The general answer, known as the theory of the second best, explains why partial reform may not improve efficiency. The second part of the chapter explains the Principle of Targeting, which helps to eliminate some policy choices on the grounds of efficiency.

Chapter IV is a series of six example which illustrate the material in the previous two chapters. The examples include: (a) the situation when agricultural policies can be changed, but non-agricultural policies are fixed; (b) dynamic learning by doing; (c) random production; (d) adjustment costs; (e) environmental externalities; and (f) strategic political considerations.

## II. The Economic Argument for Free Trade

This chapter presents the basic arguments for free trade. In the first section I explain the principle of comparative advantage. In the second section I discuss the definition of efficiency and the two fundamental theorems of welfare economics. These two theorems, which are more general than the principle of comparative advantage, are the basis for thinking that unregulated markets - including free trade - lead to an efficient outcome.

### II.a Comparative Advantage

One of the most widely cited and poorly understood ideas in economics is the Principle of Comparative Advantage. Many people who appeal to this principle would explain that it means that a county tends to export those goods which it can produce more cheaply than its partners; they may then go on to say that the principle does not apply in circumstances where one country is less efficient at producing *every* good, relative to its trading partners. This view confuses two concepts: absolute and comparative advantage.

The example in Table 1, based on the Ricardian model, illustrates the difference between these concepts. Suppose that labor is the only mobile input in production, and

Canada and the US can produce two goods, corn and umbrellas. The Table shows the amount of labor needed to produce one unit of each good in the two countries. The amount of labor needed to produce commodities in the two countries is different, because of differences in technology or in fixed factors such as land and capital. We treat these differences as constant. I have chosen the numbers in this example to emphasize the difference between absolute and comparative advantage. Less labor is needed to produce either good in the US: the US has an *absolute advantage* in the production of both commodities. In this circumstance, why would the US ever want to trade with Canada? If for some reason they do trade, is the weaker country (here, Canada) somehow disadvantaged by trade? The answers to these questions turn on comparative advantage.

| | Labor needed per unit of production | |
|---|---|---|
| | Corn (Good 1) | Umbrellas (Good 2) |
| United States | $1 = a^U_1$ | $1 = a^U_2$ |
| Canada | $3 = a^C_1$ | $6 = a^C_2$ |

Table 1: Illustration of Comparative and Absolute Advantage

The amount of labor needed to produce a commodity provides one measure of the costs of production, but this is not the relevant measure to understand trade. For this, we need the concept of *opportunity cost*, i.e, the amount of one commodity that must be sacrificed in order to obtain a unit of the other. In order to produce one more unit of corn in Canada, three units of labor must be taken from the umbrella sector, resulting in half a unit less of umbrella production. Thus, the opportunity cost of a unit of corn in Canada is $a^C_1/a^C_2 =$ 1/2 umbrella. Similarly, the opportunity cost of corn in the US is $a^U_1/a^U_2 = 1$ umbrella. Canada has a lower opportunity cost of corn, and therefore Canada has the *comparative advantage* in the production of corn. A country has the comparative advantage in the good for which it has the lower opportunity cost. The US has the comparative advantage in the production of umbrellas. If the two countries trade, the US will export umbrellas in exchange for Canada's exports of corn. From this example we see that *a country always has the comparative advantage in the production of one commodity, regardless of whether it has an absolute advantage in either commodity.*

This example also illustrates why both countries can benefit from trade. Suppose that the US wants to consume one more unit of corn. Under autarky (no trade) it needs to sacrifice one umbrella. If, instead, the US offered this umbrella to Canada, Canada could shift six units of labor into the corn sector, producing two extra units of corn. If Canada gives one of these to the US it has one left over, leaving the US just as well off as under autarky and making Canada strictly better off (by one unit of corn). If Canada gives both additional units of corn to the US, the latter is better off under trade and Canada is just as well off as before. In the intermediate case, Canada gives part of the additional unit to the US and keeps part of it, so that both countries are better off with trade. The point is that trade has the possibility of making at least one country, and possibly both countries, better off.

This example shows that trade can benefit both countries, or benefit one of them without harming the other. In order to show that under trade one of these outcomes actually occurs, we need to study how the (ideal) market works. If producers are competitive, equilibrium requires that there be zero (excess) profits[1] in both sectors. If, to the contrary, profits were positive, additional factors would be attracted to the sector, causing factor prices to rise and/or output price to fall, until profits returned to zero. In Canada, let the price of commodity i be $P_i^C$ and the wage $w^C$. The zero profit conditions for the two sectors says that average revenue ($P_i^C$) must be no greater than average costs ($w^C a_i^C$). In symbols: $P_i^C - w^C a_i^C \leq 0$. If $P_i^C - w^C a_i^C < 0$, profits in sector i are negative, so production in that sector is zero. If production is positive, it must be the case that $P_i^C - w^C a_i^C = 0$. Suppose, under autarky, that Canada produces both goods. In that case, we can take the ratio of the two equations for corn and umbrellas, and obtain the autarkic relative price (the price of corn over the price of umbrellas), $P_1^C/P_2^C = a_1^C/a_2^C = 1/2$. Note that if the relative price were greater than 1/2, the zero profit conditions would imply that the umbrella sector closes down, and for relative prices less than 1/2, the corn sector closes down. Using the same argument for the US (and again the assumption that in autarky the US produces both goods), we find that the US autarkic

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[1] The "zero profit condition" may seem either absurd or alarming to non-economists. This assumption is short-hand for saying that there are no "excess" profits, i.e. a return over and above the amount required to pay for rents and compensate for risk-bearing. In our simple model, none of these other considerations arise, so "zero profits" can be interpreted literally.

relative price is $a_1^U/a_2^U = 1$. When the countries begin to trade, (assuming zero transport costs and no trade barriers), the world relative prices of the two goods must be between 1/2 and 1: $1/2 \leq P_1/P_2 \leq 1$.

Figure 1 illustrates the gains from trade for Canada. Suppose that Canada has 120 units of labor. Using the example in Table 1, we see that Canada can produce 20 umbrellas (point A) or 40 units of corn (point B) or any combination on the line AB. The slope of this line is 1/2, which as we have seen is the opportunity cost of corn (in units of umbrellas) and also the autarkic price in Canada. Under autarky, Canada will produce and consume at some point on the line AB, but not at point A or B (because of the assumption that it consumes some of both goods).

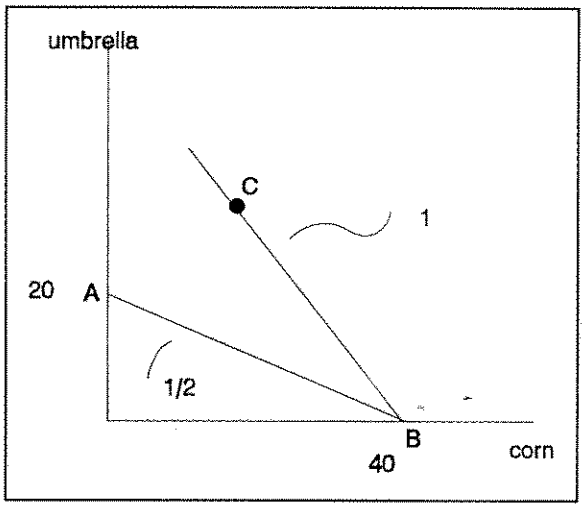


**Figure 1**: The gains from trade

Now let Canada begin to trade. We explained above that the price lies between 1/2 and 1. If the world equilibrium relative price (of corn) happens to be the same as the Canadian autarkic equilibrium, trade has no effect on Canadian welfare. Suppose, instead, that the world relative price (again, of corn) is strictly above 1/2. Given the zero profit conditions we discussed above, at a relative price greater than 1/2, all labor moves to the corn sector, and the umbrella sector closes down. In terms of Figure 1, production moves to B.

Equilibrium requires trade to balance, i.e. the value of imports must equal the value of exports. Since imports of a good equals consumption minus production of that good, and exports equal production minus consumption of the other good, we can also think of the balance of trade condition as saying that the value of production equals the values of consumption.[2] Geometrically, this condition means that consumption must occur on the line segment through the production point B, with slope equal to the world price. Figure 1 shows

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[2] In symbols, let $P_i$ be the price of good i, $Q_i$ the production of i, and $D_i$ the consumption of i, i = 1, 2. If Canada exports good 1 (corn) balance of trade requires value of exports = $P_1(Q_1-D_1) = P_2(D_2 - Q_2)$ = value of imports. Rewriting this equation we obtain value of production = $P_1Q_1 + P_2Q_2 = P_1D_1 + P_2D_2$ = value of consumption.

a situation where the world price happens to be the autarkic price of the US, 1. The geometric version of the balance of payments constraint is the line through B and C. In this case, consumption occurs at a point on this line. More generally, as long as the world price is greater than 1/2, Canada's balance of payments constraint lies above the line AB. Consequently, with trade Canada is able to consume a basket of goods which would not have been feasible under autarky. The situation for the US is analogous.

To summarize, this model illustrates the following important ideas: 1) A country always has the comparative advantage in some commodity. 2) Comparative advantage does not imply, nor is it implied by absolute advantage. 3) The world equilibrium relative price lies between the countries' autarkic relative prices. 4) A country gains from trade if and only if the world relative price is *different* from its autarkic price. 5) Trade generates gains because it enables a country to use its comparative advantage to increase its national income, and thereby consume a basket of goods not attainable under autarky.

II.b A Short Course in Welfare Economics

The previous subsection explained how free trade enables a country to consume at levels that are not feasible under autarky, and thus reach a higher level of welfare. Of course, countries do not consume, individuals do. In the model we used, labor was the only input that received a payment, and competition insures that all labor receives the same wage. An increase in the value of consumption is equivalent to an increase in the real wage, i.e., welfare. Labor is the only agent in that model, and the sense in which both countries are at least as well off under trade is therefore unambiguous. In order to determine the effects of trade on different groups in a country, we obviously need a model in which there are different types of agents in each country.

We can begin by recognizing that there are different factors of production, i.e. different types of human and physical capital, and not every individual has equal shares of these. A movement from autarky to trade, or any liberalization, changes the prices of commodities, which in turn changes the returns to factors (e.g. wages, the rent on capital). Some agents are made better off by the change, and some worse off, so it is no longer possible to make unambiguous statements about "the country's" welfare. The recognition that trade liberalization generally produces losers as well as winners does not blunt the economist's enthusiasm for it. Economists distinguish between efficiency (the size of the

pie) and distribution, or equity (the manner in which the pie is shared). The basis for preferring free trade rests entirely on efficiency considerations: free trade increases the size of the economic pie. Free trade might increase the unfairness with which the pie is distributed, but (presumably) society has other means, e.g. income taxes and government transfers, of changing the allocation of income. An outcome is said to be *efficient* if there is no other *feasible* outcomes that makes every agent at least as well off, and some agent(s) better off.

There are two fundamental theorems in welfare economics, which rest on a number of assumptions, including: (i) no agent has market power, i.e. all agents take prices as given, (ii) markets are "complete" in the sense that there is a market for any sort of exchange individuals might want to make, and (iii) there are no "externalities", so that agents pay for all the (valuable) resources that they use and are paid for all the valuable things they produce. Given these, and a number of other technical assumptions, the two theorems state that: (i) a competitive equilibrium is efficient, and (ii) any efficient equilibrium can be reached as a competitive equilibrium by choosing agents' endowments, e.g., using income transfers (Varian, 1978). I examine the assumptions in more detail in the following two chapters. Here we note their implications for trade, *when the assumptions hold.* The first theorem implies that free trade is efficient. The second theorem implies that we can use free trade together with income transfers to achieve an outcome that is both efficient and equitable.

The key to the second theorem is the idea that it is possible to change individuals' endowments, i.e., change their level of income, without changing the prices upon which they base their production and consumption decisions. Market prices are signals firms use to determine their level of output and input mix, and consumers use to allocate their income. Government intervention, such as a tariff, interferes with these signals. When the free trade equilibrium is efficient (i.e., in the absence of any other market imperfections), a tariff causes a reallocation of factors of production and a change in consumption, leading to an inefficient outcome.[3] The tariff is a government-induced *distortion.* It causes the competitive

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[3] A tariff causes the domestic price ratio between two commodities to differ from the world price ratio. In a competitive equilibrium, the domestic price ratio equals the economy's ability to "transform" one commodity into the other, by shifting factors of production - the marginal rate of transformation. At a social optimum, this marginal rate of transformation should equal the economy's ability to "transform" one commodity into another by means of trade - the world price ratio. Therefore, the tariff drives a wedge between the world price

equilibrium to be inefficient, as do other market failures. The term "distortion" refers to any market failure or government intervention which prevents an efficient outcome from being achieved.

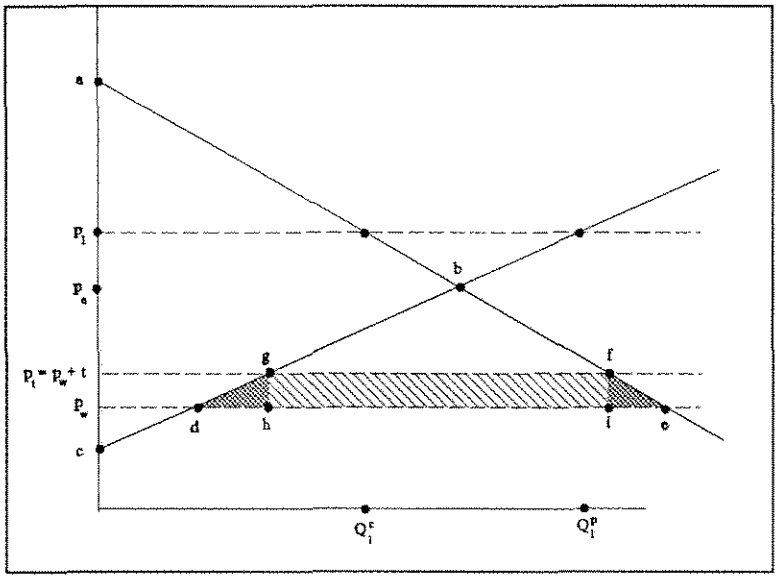


**Figure 2**: Welfare measures and tariff effects

We can use Figure 2, which shows a supply and demand curve for a particular commodity, to illustrate the welfare effect of a tariff. In order for this explanation to be intelligible, the reader needs to understand that the area above the supply curve and beneath the horizontal line at an arbitrary price (say $p_1$ in Figure 2) provides a measure of producer profits at that price. This measure is called producer surplus. The area underneath the demand curve and above the horizontal line measures consumer welfare at that price. This measure is called consumer surplus. Appendix A explains why producer and consumer surplus are appropriate measures of producer and consumer welfare.

In the absence of trade, the autarkic equilibrium price is $P_a$, where supply equals demand. Consumer surplus is the triangle $abP_a$ and producer surplus is the triangle $cbP_a$. Social surplus is the sum, the triangle abc. Now suppose that the country can trade at world price $P_w$, which is lower than the autarkic price. Production occurs at point d, the point where domestic marginal cost equals world price, and producer surplus is reduced to the triangle $cdP_w$. Consumption occurs at point e, and consumer surplus rises to the triangle $aeP_w$. The amount by which the increase in consumer surplus exceeds the decrease in producer surplus is the triangle deb. This triangle provides a measure of the gains from trade. These gains are maximized under free trade.

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ratio and the domestic marginal rate of transformation, resulting in a production distortion. The tariff also causes a consumption distortion. These two distortions result in an inefficient allocation of factors of production and consumption.

We can use Figure 2 to demonstrate the welfare effects of a tariff. Suppose that the country imposes a tariff of t, causing the domestic price to rise from $P_w$ to $P_t = P_w + t$. The increase in domestic price benefits producers, hurts consumers, and generates tariff revenues equal to t times the quantity of exports. The tariff revenue, shown as the lightly shaded area in Figure 2, represents a social gain, since the government presumably does something useful with it. The change in consumer and producer surplus and the tariff revenue are all measured in units of money, so we can add them to obtain the total effect of the tariff on social welfare. If we add the gain in producer surplus (the area $P_wdgP_t$) to the tariff revenue and subtract the loss in consumer surplus (the area $P_wefP_t$), we are left with the net loss to society, the two small heavily shaded triangles. This loss is referred to as the "deadweight loss" of the tariff. The triangle dhg is the welfare cost of the production distortion, since it is caused by having producers face a price different than the world price. The triangle efi is the consumption distortion, since it is caused by having consumers face a price different than the world price.

Figure 2 shows that tariffs have large distributional effects, but small efficiency effects. In other words, the change in producer and consumer welfare and the tariff revenue due to the imposition of the tariff, are of the same order of magnitude as the tariff. However, the net loss to society is of a smaller order of magnitude. Geometrically, the areas representing the change in producer and consumer surplus and tariff revenue are large, but the two triangles measuring the deadweight loss to society are small.

We can obtain an approximate formula for the deadweight loss as a fraction of national income. Let $\eta$ be the elasticity of demand for imports, i.e. the percentage change in imports due to a percentage change in domestic price; let $\alpha$ be the value of imports as a fraction of national income; finally, denote the *ad valorem* tariff as $\tau$. The approximate deadweight loss as a fraction of national income is $\tau^2\eta\alpha/2$. Even if the tariff is quite large, e.g. $\tau = .3$ (a tariff rate of 30%), for "reasonable" estimates for $\alpha$ and $\eta$ (.25 and .2, respectively), the dead-weight loss as a fraction of GNP is very small: less than 1/2 of 1%. We can think of the single good in this partial equilibrium model as representative of all imports, so that the average tariff rate in this example is 30%. With this interpretation, the example suggests that *moving from a restrictive trade regime to free trade has small*

*efficiency effects*, even though the distributional effects are large. More complicated models, which do not rely on approximate measures, reach the same kind of conclusion.[4]

Finally, I will use Figure 2 to illustrate how economists compare the welfare costs of different commodity support programs. Some support programs use target prices maintained by subsidies, and others use tariffs. For a given level of producer price, the two policies have the same effect on producer welfare, but they have different effects on consumer welfare and on the cost to taxpayers. A target price program requires government financing for the subsidy (or deficiency payment), but has no direct effect on consumers. A tariff, on the other hand, raises consumer price and reduces consumer welfare, but contributes to the public treasury.

Which of these policies is a more efficient means of raising producer prices, i.e., which imposes a smaller welfare cost on society? Under a tariff which raises producer price to $p_t$, we saw that the welfare cost to society consists of the two heavily shaded triangles in Figure 2. Suppose that a producer subsidy is used to raise producer price to $p_t$, leaving *consumer* price unchanged at $p_w$. Relative to the free trade equilibrium, consumers' welfare is obviously unchanged, since the price they face is unchanged; consumers prefer the subsidy to the tariff. The subsidy increases producer surplus by the area $p_w dgp_t$, exactly as with the tariff, so producers are indifferent between the tariff and the subsidy. However, the subsidy program costs the government treasury t times the amount of domestic production, which is the area $p_w hgp_t$. The welfare cost to society of the subsidy is the cost to the treasury minus the benefit to producers, which is the small triangle dhg. Thus, the welfare cost of the tariff is greater than the welfare cost of the producer subsidy by the amount efi. The conclusion is that a tariff and a subsidy which result in the same producer price, result in different levels of social welfare costs, and different distributions of that cost. The cost of a tariff is born by consumers, and the cost of the subsidy is born by taxpayers. However, the welfare cost of the tariff is unambiguously larger.

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[4] Like most important results in economics, this one needs to be qualified. Some models show that trade reform has large efficiency effects. These models typically incorporate imperfect competition and/or economies of scale. Under these conditions, relatively small price changes can induce large reallocations of production, and thus cause large welfare effects.

Some producer groups in the US and the EC have endorsed their domestic policies which rely on trade restrictions on the grounds that the policies do not require government funds. The example in the previous paragraph shows why that argument is misleading. It emphasizes treasury costs and ignores costs to consumers. A proper social accounting needs to consider both of these costs.

Five important conclusions emerge from this brief discussion of welfare economics: 1) Trade liberalization creates winners and losers. 2) Free trade is efficient, meaning that in principle winners from trade liberalization could compensate losers, making both groups better off. 3) A tariff creates a distortion in both production and consumption, and tends to cause the market outcome to be inefficient. 4) The loss in efficiency due to trade restrictions is likely to be a small fraction of national income, and is small relative to distributionâl effects. 5) In comparing the social costs of different policies we need to include the costs to all groups, not just to producers and taxpayers.

## III. A Closer Look at Trade Theory and Welfare Economics

The previous chapter set out the basic neoclassical arguments in favor of free trade. One might conclude from that exposition either that there is an unassailable case for free trade, or that neoclassical models are so remote from reality that they have nothing interesting to say about the real world. Many people with a modest acquaintance of the discipline reach one of these conclusions, but both are incorrect. In fact, neoclassical economics adopts a considerably more nuanced view of trade liberalization. The assumptions required for the two fundamental welfare theorems, which form the core of the neoclassical preference for free trade, are unlikely to be satisfied. Those theorems can therefore be regarded only as suggestive of tendencies of market economies, but not predictions of the outcome of such economies.

The next section describes the neoclassical theory of market imperfections. The following section explains why, in spite of important reservations, the neoclassical preference for free trade remains. The final section tries to strike a balance between the apparently contradictory implications of theory.

### III.a The Theory of the Second Best

The two fundamental welfare theorems assume that markets are perfect, in the sense that they are complete and that there are no externalities. If there were a single market imperfection, then correcting that imperfection would increase economic efficiency. For example, suppose that the only "distortion" (or market failure) in the economy is a tariff; reducing or eliminating this tariff increases efficiency. We can observe this result in Figure 2. There, the size of the triangles that measure the deadweight loss of the tariff decreases as the tariff is reduced and domestic price falls to the world price.

Policy-makers often consider changing the level of a particular policy instrument, or set of instruments, in isolation form other possible policy reforms. For example, they consider changing the target price of a commodity or group of commodities, holding fixed the policies for other commodities or other sectors. From a practical standpoint, this kind of piecemeal policy reform is sensible. However, treating other government policies (or other market failures) as fixed should not be confused with treating them as non-existent. The uncritical conclusion that trade liberalization necessarily increases efficiency is sometimes based on exactly this confusion. It makes sense to regard a tariff as a distortion, i.e., something that keeps the economy from achieving an efficient outcome, *if there are no other distortions in the economy*. When there are other distortions, a particular tariff may improve efficiency.

The theory of the second best states that if there are two or more market imperfections, correcting one of them may either increase or decrease welfare.[5] For example, if there are two tariffs, eliminating one may not increase welfare. This conclusion is "negative" in that it tells us what we cannot say, rather than what we can say. The most pessimistic interpretation is that it implies that economic theory allows us to reach no conclusions about real world markets, since we know that these are subject to many imperfections. A more moderate interpretation is that we cannot *uncritically* use economic theory to conclude that a particular reform, such as trade liberalization, necessarily improves efficiency. Understanding the theory of the second best is essential for assessing the relevance of economic arguments for trade liberalization. We first provide a simple example

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[5] Baumol (1977) states the following theorem of the second best: It is not necessarily worse for society if a large number of optimality conditions are violated than if a few are violated.

of the theory, which illustrates the basic argument behind it. We then present a graphical treatment which shows the generality of the argument.

Imagine an economy in which there are only two market failures, both of which are present in a particular sector. The first failure is that production of the commodity damages the environment, but the producer does not pay for this damage (i.e. there is a negative environmental externality). The second failure is that the producer is a monopolist, rather than a price taker. These two market imperfections "cut in opposite direction". The first causes the market outcome to result in excessive production, from the standpoint of society. The second causes the market outcome to result in too little production, since the monopolist reduces output to increase price. At this level of generality, we do not know whether there is too little or too much production on balance. We cannot conclude that welfare would be higher if we removed one of the imperfections, e.g., by forcing the monopolist to produce where price equals marginal cost in order to mimic the competitive outcome. The salient feature of this example is that each distortion effects the welfare cost of the other distortion.

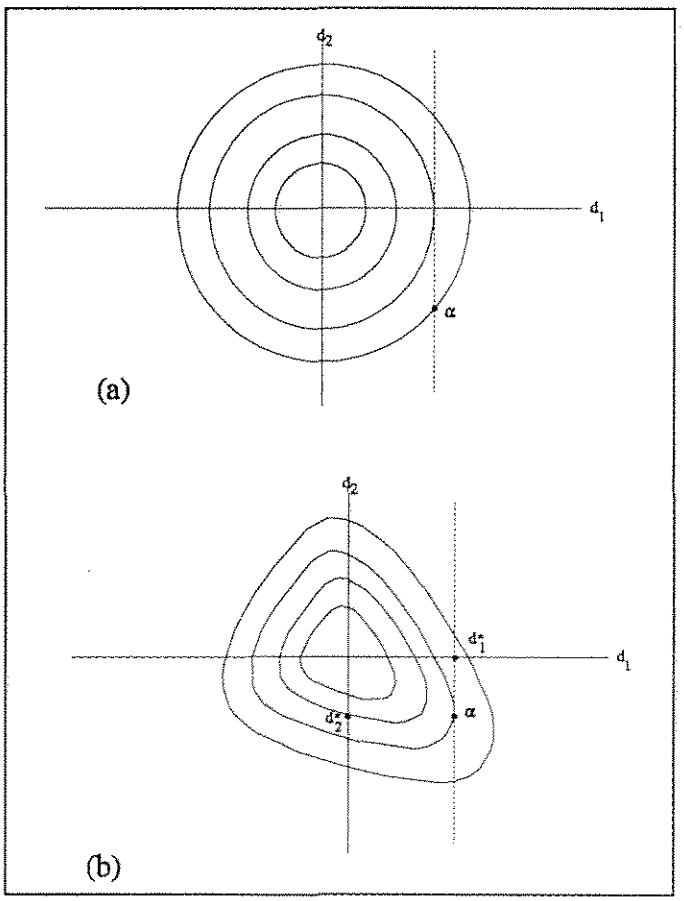


**Figure 3**: Illustration of Theory of Second Best

Figure 3 illustrates the theory in a more abstract setting, showing its generality. The figure contains two panels which illustrate two possibilities. In each panel, the axes $d_1$ and $d_2$ represent two distortions. A larger (absolute) value of $d_i$ is a larger distortion. For the example in the previous paragraph, we can think of $d_1$ as the gap between price and marginal cost (the monopoly distortion) and $d_2$ as the amount of environmental damage not internalized by the firm. In another setting, we can think of $d_1$ and $d_2$ as the tariffs in two sectors. (If $d_i < 0$, sector i imports are subsidized.) Both $d_1$ and $d_2$

are "distortions", i.e. policies or market failures that cause a competitive equilibrium to differ from an efficient outcome.

The curves in Figure 3 are "iso-welfare curves", with higher welfare on curves closer to the origin. The maximum welfare is achieved when both distortions are completely removed: $d_1 = d_2 = 0$. The curves are analogous to altitude lines on a topographic map. Higher welfare corresponds to a higher altitude, and the altitude increases as we move toward the origin, which is the "peak of the mountain" (the highest level of welfare). In both panels of Figure 3, welfare increases as we move along either axis toward the origin: we pass through higher iso-welfare curves on this trajectory. If we are on the $d_1$ axis, for example, the other distortion ($d_2$) is constant at 0. In that case, we are in a world with only one distortion, and decreasing that distortion raises welfare.

We represent a world with two distortions by a point off the axes, such as point $\alpha$. Once again, removing both distortions, i.e. moving to the origin, increases welfare. Suppose, however that we hold $d_1$ fixed at $d_1^*$ and consider the piecemeal reform of removing only the second distortion. The geometric representation is that we move North along the dotted vertical line beginning at $\alpha$, until $d_2 = 0$. In panel a of Figure 3, this piecemeal reform improves welfare, because as we move along the dotted line away from $\alpha$, toward the horizontal axis, we pass through higher iso-welfare curves. In panel b, the corresponding trajectory takes us through lower iso-welfare curves. Lowering $d_2$ lowers welfare: Removing the "distortion" $d_2$ decreases efficiency. In panel b, the original point $\alpha$ gives the optimal level of $d_2$, given that $d_1$ is fixed at $d_1^*$. Any movement along the vertical dotted line away from $\alpha$, decreases welfare. In general, there is no reason to think that panel a is more plausible than panel b.

III.b The Principle of Targeting

There is nothing odd about the two examples we gave above, in which the reduction of one "distortion" lowers welfare. Thus, the theory of the second best may appear to make economic theory powerless to prescribe reform, since in the real world there are always other distortions which policy-makers reasonably regard as fixed. Nevertheless, economists are broadly united in favor of liberal trade, and skeptical of second-best arguments for trade

restrictions. The main reason for this position is based on a set of theoretical results known as the Principle of Targeting.[6]

The Principle of Targeting (Bhagwati and Srinivasan, 1992) merely states that distortions, or market failures, should be "targeted" as directly as possible. For example, suppose that policy-makers believe that domestic agricultural production provides security which benefits society. Consumers do not pay for, nor are producers compensated for, this security. The security conferred by domestic production is a positive externality. The unregulated competitive equilibrium results in too little domestic production, from the standpoint of society, because producers do not "internalize" this benefit. In this situation, an agricultural import tariff (or export subsidy) improves the competitive equilibrium. Such a tariff or subsidy is a "second-best" policy: it ameliorates the distortion caused by producers' failure to internalize the positive production externality, but in the process it creates a consumption distortion. On balance, the second-best tariff improves welfare, but it does so at a cost. The "first-best" policy in this example is an agricultural *production subsidy*. The "target", after all, involves the level of production. A production subsidy achieves this target without generating other distortions.[7] Trade restrictions are seldom a first-best policy.[8] For most plausible scenarios, other policies can correct the fixed distortion or achieve the target at lower cost.

It is worth digressing in order to point out that *first-best policies might affect the level of trade*, as with the example of the production subsidy used to achieve food security. This

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[6] Political judgment is an additional reason for economists' skepticism of second-best arguments for government intervention. Such intervention *might* improve a market outcome, but the possibility of political capture by lobbyists creates the danger that the government will promote narrow interests at the cost of social welfare. In this case, it might be better to tie the hands of politicians and bureaucrats, removing the possibility that they will do good, as well as the danger that they will misbehave.

[7] We might argue that the "target" is not really domestic production, but rather food security. There may be cheaper ways of achieving this security than by promoting domestic production. Thus, when invoking the Principal of Targeting, one has to be careful to select the correct target.

[8] An exception is if the country has the potential to change world prices by changing its imports or exports. For example, if an importing country can decrease the price it pays for imports by decreasing imports, the first best policy is a tariff. The optimal tariff (or export tax) argument has little relevance to agricultural trade.

subsidy reduces imports or increases exports. In general, the first-best policy might be "trade-distorting", in the sense in which that term is commonly used. In the parlance of agricultural trade negotiations, the first-best policy is not necessarily "de-coupled". If the social goal is to maintain producers' *income*, then the Principle of Targeting implies that the optimal policy is "de-coupled". However, the first best policy is seldom a direct trade restriction, such as a tariff or quota.

The Principle of Targeting has to be interpreted carefully. In the example of food security, I claimed that a production subsidy was the first best policy because it achieved the target without causing a secondary distortion, in contrast to the tariff which causes a consumption distortion. Using the same logic, I showed geometrically in Chapter II.b that a subsidy is more efficient than a tariff in raising producer surplus. In drawing this conclusion, I took into account the fact that the subsidy requires government funding, which uses tax revenues. However, I ignored the fact that every tax system creates economic distortions. My calculation assumed that the social cost of 1 ECU of government funding is 1 ECU, which is equivalent to the assumption that the government can raise revenue without imposing distortions. This assumption is incorrect: taxes not only raise revenue, they create distortions. If these distortions are taken into account, the social cost of the subsidy I discussed using Figure 2 is the nominal cost, $p_w hgp_t$, plus some amount to account for the tax distortion (the social cost of raising government revenue), minus the benefit to producers. Thus, the net social cost of the subsidy is the triangle dhg (as before) plus an amount (not shown in the figure) to account for the tax distortion. The subsidy almost certainly imposes smaller social costs than the tariff[9], but once we account for the tax distortion needed to finance the subsidy, the comparison is no longer so overwhelming. In comparing the social cost of programs it is important to include both the disguised and the obvious costs.

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[9] The basis for this belief is that raising the producer price of a commodity above the world price always represents a transfer from some part of society to producers of that commodity. If the transfer is raised from general government revenues, i.e., with a government financed producer subsidy, the cost is born by taxpayers at large. A tariff, on the other hand, concentrates the entire direct costs on to consumers of that commodity. The tariff is equivalent to a very narrow tax. Broad-based taxes tend to have lower efficiency costs than taxes with narrow bases.

A second qualification of the Principle is that we have to consider whether the target is endogenous, in the sense that it depends on the policy that is used (Rodrik, 1987). To continue with the food security example, suppose that policy-makers decide that security implies a target of a certain quantity of domestic food production. Suppose also that there is no distortionary cost associated with raising government revenue, so that the production subsidy is "first-best" in the sense described above. The level of the production target deemed necessary to achieve security, may be influenced by lobbying of domestic producer groups. The resources these groups are willing to devote to lobbying may depend on the degree of success they expect to obtain.

Producers do not care whether a price increase is due to a production subsidy or a tariff. The distinction matters to the government, however. If the government uses the "first-best" policy, it can achieve the target without creating the consumption distortion. If it is forced to use the second-best tariff, meeting the target creates a real cost. Therefore, if the government has to use a tariff, it may choose to achieve the target only partially. In this case, when the producers anticipate that the government will use a tariff, they recognize that their lobbying will be less effective. They therefore devote fewer resources to lobbying, resulting in a lower target (or less pressure to reach the target). In this example, the target is endogenous. Here, government commitment to use an apparently a second-best policy instrument, and producers' belief that the government will honor that commitment, changes the equilibrium level of the target. The change may be great enough that welfare is higher than under an apparently first-best policy.

III.c Striking a Balance

The theory of the second best is an antidote to the uncritical acceptance of the fundamental welfare theorems of neoclassical economics. The real world is unlikely to satisfy the assumptions of those theorems, as neoclassical economists recognize. Most economists nevertheless support liberal trade, largely because of the belief that policies *other than trade restrictions* are more likely to increase welfare. Other policies can correct market failures while imposing fewer additional distortions. If the theory of the second best is a remedy for "a little learning [being] a dangerous thing", the Principle of Targeting is the proper response to the wholesale rejection of economic theory.

In using the Principle to compare the effects of two policies we need to be careful to include both the obvious and the disguised secondary distortions. We also need to consider whether the magnitude of the distortion we are trying to remedy is changed by the choice of the policy instrument. Since social organization is complicated, we should be suspicious of a theory without nuance. Economic theory is useful because it is capable of analyzing complex situations - even if the theory is not always presented in this light.

## IV. Examples of Policy Analysis

Chapter II explained the economic argument in favor of liberal markets in general and free trade in particular. Chapter III showed that economic theory recognizes that real world considerations may imply that government intervention, including trade intervention, can increase efficiency. There remains a "theoretical bias" in favor of free trade, but this is a nuanced judgement rather than an article of faith. This chapter shows, by means of several examples, how the welfare theorems, the theory of the second best, and the Principle of Targeting are combined in policy analysis.

### IV.a The Effect of Non-agricultural Distortions on Agriculture

We explained that the welfare effects of reducing one tariff can depend on the level of other tariffs and the interaction among these. This result implies that non-agricultural policies may determine the welfare effect of the reform of agricultural policies. It makes sense for agricultural policy-makers to treat as fixed non-agricultural policies, but this does not mean that they should ignore them. Does government intervention in non-agricultural sectors create a rationale for intervention in agriculture?

The theory of the second best assures us that there can be no general answer to this question. Our inability to model the economy perfectly means that empirical models can provide only estimates of the answer. Beghin and Karp (1992) address the question using a general equilibrium model of the US economy consisting of 38 sectors, 7 of which are agricultural. Tariffs and production subsidies are the only distortions or market imperfections considered by the model. The only second-best argument for government intervention in agriculture, under this assumption, is the existence of tariffs or subsidies outside of agriculture. For three of the agricultural sectors there was enough data to decompose the total

amount of protection (the production subsidy plus the tariff) into its two parts.[10] The final column of the Table in Appendix B (constructed from Tables 1 and 2 in Beghin and Karp) shows the total amount of protection for the seven US agricultural sectors in 1982.

The remaining columns show optimal subsidies and tariffs under different assumptions. The first column shows the optimal tariff when the sector-specific production subsidies in agriculture are (incorrectly) assumed to be 0. The second set of columns show the optimal tariff and protection rate when the subsidy levels are taken as given at their historical levels. The third and fourth sets of columns show, respectively, optimal subsidies taking historical tariffs as given, and optimal policies for both instruments.

The empirical results show that non-agricultural distortions justify agricultural protection, but at lower than historical levels. Thus, the theory of the second best, as it was applied in this study, provides only weak support for agricultural policies. The results also show that the optimal level of protection depends on the policy variable (either a tariff or production subsidy, or both). Different models, assumptions, and data, would of course lead to quantitatively (and perhaps qualitatively) different conclusions. However, this study illustrates the type of results that can be obtained in an empirical model based on the theory of the second best.

IV.b Learning as a Dynamic Production Externality

Production externalities can cause free trade to lower welfare. Matsuyama (1992) provides an example in a general equilibrium model consisting of two sectors, A and M. Technology in sector A is constant over time. Cumulative production in sector M, on the other hand, results in learning, which improves technology and lowers costs in that sector (i.e., there is "learning by doing"). Producers in both sectors are competitive. Since each producer is small in relation to the market, and the benefit of learning across the entire sector, producers in sector M cannot internalize the benefit of learning. In other words, they do not take into account the fact that increased production today lowers future costs. There is too little production of commodity M, from the standpoint of social welfare.

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[10] A tariff and production subsidy have different effects on the economy. A subsidy effects the sectoral price for producers, but under the small country assumption (which says that imports and exports do not affect a country's terms of trade) the subsidy does not affect the price consumers pay. Under a tariff, producers and consumers pay the same price.

Free trade can reduce efficiency if it exacerbates this market failure. The mechanism by which this loss occurs is straightforward. Under autarky the economy would produce both goods, and so over time costs in sector M would fall - even if not by as much as is socially optimal. Suppose that one country, call it Home, begins to trade with the Rest of World (ROW), and at the time trade begins Home has a comparative disadvantage in commodity M. As we saw from Chapter II, trade causes Home to produce less commodity M, since it imports this good in exchange for exports of commodity A. At every point in time, *given the cumulative production of M*, free trade increases Home's flow of welfare, for exactly the reason described in Chapter II. However, Home's trajectory of cumulative production, and thus its level of domestic costs, depends on the trade regime. Free trade, in this example, means that Home has higher production costs for M than it would have had under autarky. The higher production costs may more than offset the standard gains from trade, causing the net welfare effect of trade to eventually be negative.

The key to this result is that free trade exacerbates the distortion caused by the failure to internalize the positive production externality. This result is an example of the theory of the second best. Even though free trade is worse than autarky, trade restrictions are obviously not the first-best policy. The distortion is related to a production externality, and the Principle of Targeting tells us that the first best policy is a production subsidy.

IV.c Random Production

The fact that agricultural production depends on weather and is therefore random is often cited as a rationale for trade restrictions. The instability of world price generated from foreign supply shocks can cause fluctuations in domestic price under free trade, resulting in costs to domestic producers and consumers. We first illustrate the manner in which trade transfers price instability from one country to another, and then describe a model in which trade can reduce welfare *for every agent in every country* because of price instability.

Figure 4 shows a partial equilibrium model for trade with random supply. Panel a shows demand and random supply in one country, Foreign. Half the time supply is $S_1$ and half the time it is $S_2$; half the time the autarkic price in Foreign is $P_1$ and half the time it is $P_2$. Panel b shows supply and demand in Home. For simplicity, we assume that Home supply and demand are non-stochastic, so that the autarkic price in Home is the constant $P^*$. Panel c shows the (stochastic) free trade equilibrium. The difference between Home supply

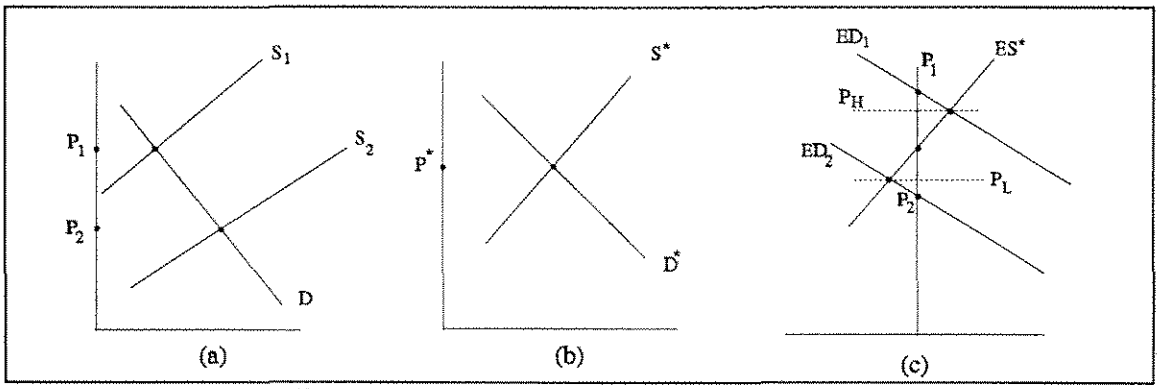


**Figure 4**: A trade model with random supply

and demand - its excess supply function - is the curve labeled ES*.[11] The difference between Foreign demand and supply - its excess demand functions - are labeled $ED_1$ and $ED_2$. The relevant excess demand function depends on whether Foreign supply is high or low. The equilibrium world price is $P_H$ half the time and $P_L$ half the time. These are the world prices that equate Home excess supply to Foreign excess demand in the two states of nature.

In this example, trade transfers price instability from Foreign to Home. Trade increases the price variability in Home and decreases the price variability in Foreign. (Compare the two equilibrium world prices, $P_H$ and $P_L$, with the two autarkic equilibrium prices in Foreign.) Trade reallocates risk, in much the same manner that it reallocates goods and services. If producers are sufficiently risk-averse with respect to fluctuations in profits, and consumers sufficiently risk averse with respect to fluctuations in real income, they dislike price risk.[12] In that situation, price instability erodes the usual gains from trade for Home, and increases those gains for Foreign. It would appear that Home may want to restrict trade.

This example with asymmetric countries is misleading, however. One country may import price instability for some commodities, and export price instability for other commodities. The increased price instability for some commodities may then be worth the

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[11] The excess supply function is the horizontal difference between the supply function and the demand function. The excess demand function is the horizontal difference between the domestic demand function and the domestic supply function.

[12] The situation in which producers and consumers are worse off under price risk may seem like the "obvious case". However, if individuals can make their decisions after they observe price, they may benefit from price variation. To avoid complications I do not discuss the possibility that agents have higher expected utility under price variability.

decreased instability for others. In order to use a single commodity model to illustrate this situation we need to treat Home and Foreign symmetrically, so that each has random supply. In such a model, each country's *average* exports (and imports) are zero, but in most states of nature they trade. Trade reduces price instability in each country; the amount of the reduction is negatively related to the correlation between supply shocks.[13]

The elaboration of the simple model, making supply stochastic in both countries, may appear to imply that in the symmetric case at least, price variability does not alter the standard argument for trade. That conclusion is incorrect, because it is based on the assumption that the supply functions are exogenous. If trade changes the distribution of prices, it can change producers' supply decisions, and thus change the supply function in every state of nature (e.g., weather condition). Newbery and Stiglitz (1984) explain how this situation can arise. They show that both producers and consumers in both (symmetric) countries *might* be worse off under free trade than under autarky.

In their model, there is a representative producer and a representative consumer in each country. The risk averse producer allocates his land (the only input) between a "safe crop" and a "risky crop". After the farmer makes his land allocation decision, the random weather shock occurs, determining the output of the risky crop. The output of the safe crop is deterministic, and depends only on the amount of land devoted to its cultivation. The consumer is risk neutral, and her preferences are such that her elasticity of demand for the risky crop equals 1.

First, consider the equilibrium under autarky. The assumption of unitary elasticity of demand for the risky crop means that a 10% decrease in supply causes a 10% increase in equilibrium price. Consequently, the farmer's revenue from the risky crop is non-stochastic under autarky. Any decrease in supply is exactly compensated by an increase in price. As long as the consumer's demand is downward sloping, the quantity supplied and the equilibrium price are negatively correlated, so a reduction in quantity tends to be "balanced" by an increase in price. Thus, in general, the market implicitly gives the farmer some degree of *revenue insurance* to offset fluctuations in supply; with unitary elasticity of demand, the implicit insurance provided by the market is "complete", in the sense that the farmer's

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[13] In the limiting case of perfect correlation of supply shocks, trade and autarky are equivalent for the symmetric countries, so trade causes no reduction in price variability.

revenue is certain. Given that the farmer faces no revenue uncertainty from producing the risky crop, he behaves as if has full insurance. He allocates the socially optimal amount of land to the risky crop.

Now consider the free trade equilibrium. Suppose that two countries are exactly the same, except that the random shock to supply is perfectly negatively correlated: when there is good weather in one country, there is bad weather in the other. Since the two countries are identical in each period, prior to the realization of their respective random variables, the farmers in each country make the same land allocation decision (before the weather shock is realized). However, given the negative correlation in the supply shock, when output is high in one country, it is low in the other. Thus, *aggregate output* of the risky crop is non-stochastic, so under free trade the price of the risky crop is also non-stochastic.

Under autarky the farmer faces price uncertainty but no income uncertainty. With trade, the farmer faces no price uncertainty, but substantial income uncertainty. Of course, the farmer cares about his income, not the price *per se*. Given his risk aversion, he allocates less than the socially optimal amount of land to the risky crop under free trade. On average the consumer is worse off with trade, because although trade provides price stability (which is unimportant to her in view of her assumed risk neutrality) it reduces the average supply of the risky crop. The farmer is worse off because he faces income risk with trade. Both of the agents in both of the countries have lower expected welfare with trade than under autarky.

This model incorporates many unrealistic assumptions, but these serve only to make the result (relatively) transparent. Any of the assumptions can be weakened. The intuition for the result is that there is no insurance market, i.e., markets are incomplete. This missing market is unimportant under autarky, since the spot market provides a perfect substitute for the missing insurance market. With trade, and non-stochastic aggregate supply, the spot market no longer serves this function. Trade opens up one market (international sales) but effectively "closes down" the (implicit) insurance market. In terms of Figure 3, we can view one "distortion" as the missing insurance market and the other distortion as a prohibitive tariff. Reducing the tariff to 0 can make all agents worse off, and thus decreases social welfare in both countries.

IV.d Adjustment Costs

It is simplest, and therefore most natural, to think of economic problems using static rather than dynamic models. A static model of trade reform, for example, compares welfare under the *status quo* and the post-reform scenarios. The difference in welfare is a measure of the benefit of reform. We mentioned in Chapter II.b that empirical estimates of the efficiency gains of reform are typically small (even though reform has large distributional effects). These static models usually do not take into account the cost of adjusting from one equilibrium to another. If this cost is significant, it may be inefficient to undertake the reform.

Another possibility, which has considerable popular appeal, is that reform should be undertaken slowly. For example, in Central and East Europe (CEE), there was nearly universal agreement that the economies should be liberalized in the post-communist era, but there was substantial controversy between proponents of the "big bang" and gradual reform. Similar disagreement occurs with regard to reform of agricultural policies in the West. The social and political dimensions of these questions may override economic considerations. However, even simple economic models can illuminate some important issues.

First, it is important to debunk a plausible but incorrect conjecture, which states that because agents incur adjustment costs (e.g., in switching crops, changing professions or moving geographically), and therefore tend to adjust slowly to changed circumstance, government policy should also change slowly. Suppose that - for whatever reason - there is too much labor in a particular sector, e.g. the "state sector" in CEE or agriculture or textiles in the West. It is not possible for large numbers of people to move to a different sector overnight, so adjustment must be gradual. Does this fact mean that there is an *efficiency argument* (as opposed to humanitarian, or social, or political reasons) for government protection of the shrinking sector during the transition? The answer is "no", just as the fact that there are "adjustment costs" in moving a ton of wheat from one location to another provides no basis for an efficiency argument for government support of the wheat transport business.

Adjustment costs are just like any other costs, and by themselves do not rationalize government support during transition. *Adjustment costs do not constitute market imperfections, but they may be associated with such imperfections.* The Principle of Targeting tells us that the appropriate policy should target the imperfection. If market

imperfections cause migration of labor between two sectors to be either too fast or too slow, from the standpoint of social welfare, the optimal policy is a tax or subsidy on wages or on migration. If adjustment requires the reallocation of some other factor of production, the optimal policy would be different. Such policies may not be feasible, so it is worth considering a second-best policy such as a tariff. As we have noted, a tariff can improve a market imperfection, but it carries with it the secondary cost of distorting relative prices faced by consumers.

I will discuss two scenarios.[14] In both of these, an individual's decision to migrate between sectors is based on a comparison of the present discounted stream of the future wage differential[15] - which is the benefit of migration - and the current cost of migration. Migration is like any other investment, in which costs are incurred in the present and benefits realized in the future. This fact is key to understanding the form of the optimal tariff. The wage differential at a point in time depends on the stock of labor in the two sectors and the tariff at that point in time.

In the first scenario, individuals' private cost of leaving the shrinking sector is less than the social cost. For example, when individuals move from the agricultural sector to manufacturing they also move geographically, requiring the construction of new infrastructure. The migrants do not bear the full cost of this; they do not "internalize" all of the costs of migration, so migration occurs too rapidly from the view of society. In this case, the optimal tariff begins at 0, since the *initial* tariff causes a consumption distortion but does not alter *future* wage differentials, upon which the current migration decision is based. *Future* tariffs, however, do affect *current* migration because they affect the value of being in a different sector. Therefore, it is optimal to protect the shrinking sector with tariffs in the future.

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[14] The first is based on Karp and Paul (1994) and the second is based on Terra (1997). Both papers consider a situation in which the government can either make credible commitments about its policies in the future, or can make no commitment at all. I discuss only the first situation, because it is simpler to explain and probably more applicable to Western economies.

[15] Thus, I assume that individuals are forward looking and have rational expectations. If they were myopic, they would act as if the current wage differential would persist, and therefore would base their migration decision on only the current wage differential and current costs.

Eventually, these tariffs should be eliminated as the steady state is approached. Optimal protection of the shrinking sector is phased in and then phased out.

In the second scenario, there are increasing returns to scale in the growing sector, which means that new workers in that sector increase the marginal productivity and thus the wage of those already there. Migrants fail to internalize this benefit, but they bear the full social cost of migration. In the first scenario, migrants do not internalize the full cost of migration, causing adjustment to occur too quickly from the standpoint of society. In the second scenario migrants do not internalize the full benefit of migration, causing adjustment to occur too slowly. In both cases there is a market imperfection. The initial parts of the optimal tariff trajectories both involve phasing in protection (for the shrinking sector in the first scenario, and for the growing sector in the second scenario). The long run equilibrium is reached in finite time in the second scenario, but only asymptotically (as time goes to infinity) in the first scenario. In the second scenario, it is optimal to continue protecting the growing sector *even after it has reached its steady state equilibrium.*[16]

These two models show that when there a is market imperfection associated with adjustment costs, a policymaker able to commit to future policy levels can improve social welfare by using future tariffs. Under some circumstances the optimal tariff trajectory eventually decreases to 0; under other circumstances it remains positive forever.

IV.e Environmental Externalities

The environmental lobby tends to oppose liberalized trade. The theory of the second best assures us that in the presence of environmental externalities, trade restrictions might improve welfare for all agents. Environmental externalities may, however, increase rather than decrease the gains from trade, as Anderson (1992) argues is likely for agriculture. The Principle of Targeting assures us that trade restrictions are seldom the best means of dealing with environmental externalities. Some environmentalists respond that trade restrictions provide the only leverage that developed countries have to change the environmental policies

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[16] The intuition for this result is as follows. We know that the steady state is reached in finite time, say at T. Suppose, contrary to the claim, that the optimal tariff is 0 at some time $t > T$. A small tariff at this time t would therefore have only a second order consumption cost. It would, however, have a first order effect on migration prior to time T, causing a first order increase in welfare. Therefore, from the standpoint of the policymaker at time 0, who is able to choose the entire trajectory of tariffs, setting the time t tariff to 0 is not optimal.

of developing countries. The following model illustrates some of the issues behind the free-trade versus environmentalist controversy (Karp et al, 1997).

Consider two countries, North and South, which have the same tastes and technology. Production of one good, say agriculture, uses an environmental input. In both countries there are negative production externalities, or imperfect property rights for the environmental asset. This market failure causes excessive resources to be devoted to the agricultural sector. By assumption, the market failure is worse in South. Environmental damage is local, which means that production decisions in one country damage the environmental asset only in that country. The environmental stock changes over time, in a manner which depends on the environmental stock (e.g., the natural regeneration rate) and the flow of environmental damages. Other things being equal, a larger environmental stock reduces the costs of agricultural production.

As with the previous examples, we can examine the effects of trade liberalization by comparing the autarkic and the free trade trajectory of equilibria. The direction of trade depends, as in all these models, on comparative advantage. However, here we need to distinguish between "real" and "apparent" comparative advantage. The former depends only on the relative environmental stocks in the two countries. "Apparent comparative advantage", on the other hand, also depends on the relative market failures in the two countries. It is possible, for example, for South to have smaller environmental stocks, but for its market failure to be sufficiently more severe, relative to North, that the private opportunity cost of agricultural production is lower in South than in North. In that case, South has an apparent comparative advantage in agriculture and exports the agricultural good under free trade, even though North has the real comparative advantage in agriculture. In this situation, free trade reduces aggregate (world) welfare relative to autarky even the short run, i.e. at a point in time.

The long run effects of free trade can be even more severe. There are many possible outcomes, one of which is consistent with the worst case scenario feared by some environmentalists. In this scenario, South begins with the comparative advantage in the agricultural good, so when trade begins, Southern production of agriculture increases and Northern production decreases. Since, under autarky, North was using its environmental stock too intensively, trade ameliorates the market distortion in North, and allows the Northern

environmental asset to improve. However, trade exacerbates the market distortion in South, and may cause such a serious deterioration in the Southern environmental asset that it is unable to recover. As the Southern environmental asset degrades and the Northern asset improves, comparative advantage gradually shifts to North, and production of agriculture increases there. Now trade exacerbates the environmental distortion in North, and may do so to such an extent that the Northern environmental asset is seriously degraded. In this scenario, free trade results in a short run improvement in North's environment, a deterioration in South's environment, and then a deterioration in North's environment. In the long run, trade can drive both nations to a dramatically worse equilibrium than they would have achieved under autarky.

The same model is capable of predicting other outcomes, for different parameter values. The scenario I described occurs when the environment in the two countries is sufficiently fragile, as environmentalists apparently believe is the case.

IV.f Trade Policies and Leverage in International Negotiations

The final examples concern the political uses of trade policy. Although these examples are not obvious applications of the theory of the second best, for each case we can view the use of trade restrictions as a means of achieving a goal not directly related to trade.

The first two examples concern the US use of trade policy to influence other nations. In the 1970s the US imposed a grain embargo on sales to the USSR in response to their invasion of Afghanistan. In the 1980s the US went to the other extreme with the Export Enhancement Program (EEP), which subsidized sales of grain (and other commodities) to a number of countries, eventually including the USSR. The EEP had several political and economic objectives, one of which was to increase the cost of the CAP to such an extent that EC negotiators would be willing to agree to reductions in export subsidies.

In other situations, countries have pursued apparently irrational trade policies in order to reward or stabilize allies. For example, US support for the International Coffee Agreement in the early 1960s was seen as a means of transferring income to Latin America and reducing the perceived threat of Castro. Even when this kind of transfer is not the objective of a policy, it may be a desired side-effect. US quotas on sugar imports maintain high domestic prices, making import quota rights valuable. Giving these rights to Caribbean nations is seen

as an instrument of foreign policy. Similarly, EC sugar policy is a means of transferring income to members of the Lome Convention.

The following theoretical model, used to describe recent US - Canada trade relations, 19th century relations between the US and Hawaii, and relations between Nazi Germany and Southeast Europe in the 1930s (McLaren, 1997), describes how anticipated trade liberalization can make a smaller country worse off. If individuals in a country anticipate trade liberalization, they have an incentive to move into the export sector. If their decisions are irreversible, or would require significant costs to reverse, then when the time comes to negotiate trade liberalization, the country has a weaker bargaining position and achieves fewer concessions. Its bargaining position is weaker because failure to reach an agreement has become more costly as a result of factors' previous migration to the export sector. In this case, it is not the trade liberalization, but agents' anticipation of it, that reduces welfare. If domestic politicians were able to make a credible commitment not to enter into a free trade agreement, as appeared to be the case in Canada during much of this century, the country would be better off.

The idea that a country may want to protect a sector for strategic reasons is familiar. Usually the strategic incentive turns on the possibility of embargoes against it or fluctuations in world price. In the example above, the strategic reason turns on future negotiations. This possibility takes us back to the US EEP program in the 80's. One of the declared objectives of EEP was to attempt to affect the future EC negotiating position. By the same token, it might have been rational for EC policymakers to believe that the CAP conferred strategic benefits to the EC in these negotiations.

## V. Conclusion

I have attempted to summarize the neoclassical view of trade liberalization, with emphasis on the reform of agricultural trade policies. There is a widespread view that neoclassical support for free trade is unambiguous and based on irrelevant abstractions. I think that neoclassical support for free trade is nuanced and that it is based on relevant abstractions. A caricature of the debate between an economist and an opponent of free trade might go as follows:

> Economist: The principle of comparative advantage assures us that free trade is a good thing. You obviously don't understand this principle. Let me explain it again.

> Opponent: I know what the principle says, but since it implies the wrong conclusion, it must be inapplicable. Economic models are so divorced from reality that they have nothing useful to say about trade liberalization.

This imaginary economist may be right about the opponent's understanding of the principle of comparative advantage, and the more general arguments that support liberal markets. No one who fails to understand these ideas is entitled to be taken seriously in the debate over free trade. Chapter II attempts to explain these ideas, so that the debate can move beyond sterile repetition.

The opponent is probably right that the economist has not justified his position using models which include important concrete facts, namely, market failures. It is not that economists have ignored market failures. These are the subject of much of contemporary economics, but economists have not been successful in disseminating the ideas. Chapter III explains economists' response to the recognition of market failure. Chapter IV illustrates examples of trade policy analysis that incorporates market failure of one kind or another.

I have implicitly represented the economist as an even-handed investigator. He takes a broad view to get the big picture (Chapter II), looks at the details more closely (Chapter III), applies these to specific problems (Chapter IV) and then comes down judiciously on the side of free trade. Of course, this picture is not quite right. Like everyone else, the economist is a creature of habit. As an undergraduate he is taught that markets are efficient, and in graduate school he is taught that there are many exceptions. Thus, he begins professional life with a bias in favor of free markets. Perhaps this bias is justified, but it is taught, rather than acquired after a neutral examination of all possibilities. Most politicians and businessmen have the opposite bias. They live in a second-best world. Market failures do not seem like the exception, but the rule.

Whatever the merits of the economist's conclusions, his language has become the *lingua franca* for discussions of government policy in general, and agricultural policy in particular. Adoption of this language does not pre-judge the conclusions. Proponents of government intervention in agriculture (or elsewhere) can use economic logic to select and defend appropriate forms of government involvement.

## Appendix A: The explanation of welfare measures

This appendix explains why the producer and consumer surplus measures, defined and used in Chapter II, are appropriate measures of producer profits and consumer welfare. First, consider producer surplus. Competitive (i.e., price-taking) profit-maximizing producers are willing to supply the amount that equates the market price, P, with their marginal cost. To see why this is true, imagine that they supplied a smaller amount. Producing one extra unit would increase their revenue by P and would increase their costs by the marginal cost, which by hypothesis is smaller than P. This change would increase profits, so the original level of production could not have been profit maximizing. Thus, the supply curve is given by the producer's marginal cost curve. Profits equal revenue, PQ, minus costs. For example, at an arbitrary price $P_1$, revenue is $P_1Q_1^p$ and (variable) costs are the area under the supply ($\triangleq$ marginal cost) curve, so profits (or "producer surplus") is the area of the triangle formed by the horizontal line at the market price, and the supply curve. This triangle gives the measure of producer welfare.

Now consider consumer welfare. To simplify exposition, we can imagine that each consumer buys either one or 0 units of the commodity. Each point on the demand curve gives the reservation price of the "marginal consumer", i.e. the consumer with lowest willingness to pay. For example, at the arbitrary price $P_1$ there are $Q_1^c$ consumers willing to buy the good at that price. The marginal consumer is indifferent between buying and not buying. The "infra-marginal" consumers, i.e., those to the left of $Q_1^c$ (with higher willingness to pay) each receive a surplus of the difference between their reservation price and the market price $P_1$. If we add up the surplus of each of these consumers, we obtain the total consumer surplus, the area underneath the demand curve, above the horizontal line at the market price.

# Appendix B: An Example of Optimal and Actual Agricultural Policies

| Sector nomenclature | (1) Optimum tariff ignoring subsidies | (2) Optimum tariff with fixed production subsidies | | (3) Optimum production subsidies with fixed tariff | | (4) Optimum tariffs and subsidies | | | Rate of Protection |
|---|---|---|---|---|---|---|---|---|---|
| | Tariff | Tariff | Total protection | Subsidy | Total protection | Tariff | Subsidies | Total protection | |
| 1 Dairy and poultry | 4.447 | 4.750 | 4.750 | 0 | 26.020 | 0.543 | 0 | 0.543 | 26.020 |
| 2 Meat and livestock | 4.428 | 4.400 | 4.400 | 0 | 27.370 | –0.555 | 0 | –0.555 | 27.370 |
| 3 Food grains | 2.732 | –3.722 | 3.498 | 11.863 | 4.743 | –85.792 | 89.089 | 3.297 | +0.100 |
| 4 Feed grains | 1.941 | 1.682 | 4.412 | 8.917 | 5.077 | –8.361 | 11.790 | 3.429 | –1.110 |
| 5 Cotton and oil-bearing crops | 41.000 | 37.518 | 46.358 | 8.177 | 5.937 | 92.929 | –88.817 | 4.032 | 6.600 |
| 6 Fruits and vegetables | 4.658 | 4.992 | 4.992 | 0 | 23.930 | 45.86 | 0 | 4.586 | 23.930 |
| 7 Tobacco, sugar, and other agriculture | 4.517 | 4.837 | 4.837 | 0 | 43.930 | 4.321 | 0 | 4.321 | 43.930 |

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