EFFECTS OF TARIFFS AND QUOTAS ON PRICES

(Explanation of Charts by J.W. Evans)

This traditional presentation of a supply and demand curve is shown simply by way of review and to lay the theoretical background required for comprehension of the later graphs. The curve S-S is merely a graphic representation of the fact that normally the supply of a product at a given price will be greater than the supply that will be offered at lower prices and that the supplies offered will increase progressively with the price. The vertical axis to the left labelled 0-P represents various price levels, and the horizontal axis 0-Q represents various quantities. The former progresses from bottom to top and the latter from left to right.

This graph is not intended to take into account changes that may occur over a period of time. It can either be looked upon as a graph representing the various amounts, already produced, that will be offered at various prices at a given instant in time or as a graph of the respective costs of producing various quantities leaving out of consideration changes that may take place over time such as the introduction of additional production facilities. The typical case of the former is the operation of an organized commodity market dealing in a homogeneous commodity of recognized grades. It is clear that in any given day's trading a larger amount of copper will be offered on the London copper market at a price of 2s. 6d. than at a price of 2s. A price of 2s. 7d. will purchase more copper than 2s. 6d. and a price of 2s. 8d. will bring out still more. Our graph represents these marginal prices required to bring out marginal quantities. For example, using the scale arbitrarily selected for the graph, at a price of 6 the quantity offered will be 5. An increase of the price to 7 will bring out a total of 7 3/4. Thus, by comparing the total quantities that will be offered at two adjacent prices, we determine the marginal quantity that will be offered as a result of the higher price as well as the total amount that will be offered at that price. The shape of the curve is not particularly important for our purpose, but it is drawn to illustrate the fact that a point is eventually reached where higher and higher prices will bring forward loss and less marginal quantities, and eventually, unless new productive facilities are brought into the picture, additional increases in price will bring out no further quantities. In other words our supply curve will have become vertical and the supply at these price levels will be "inelastic".

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As indicated above the supply curve can also be conceived of as a curve of production costs for varying quantities in a period during which the factors of production do not change. So conceived, the curve as drawn indicates that the lowest cost of production for the smallest possible quantity is 5. As it becomes necessary to squeeze more and more production out of the existing productive plant, for example by the use of more expensive materials or by paying labour overtime, the amount of additional production that will be forthcoming at each increment in price becomes less. Thus, at larger and larger quantities the curve becomes more nearly vertical and if extended enough would reach the point at which no increment of production would be possible no matter how high the price. In other words, in its upper reaches the supply of the commodity, based on production costs, becomes totally inelastic.

The blue curve on the chart similarly depicts the quantities that will be purchased on the market at varying prices. Unlike the supply curve, the typical demand curve declines from left to right. In other words, larger quantities will be purchased only if the prices at which they are offered are less. Each separate segment of the curve represents the marginal demand - in other words the amount of additional supply that will be purchased in view of a given decrease in the price.

The point at which these two curves cross is the point at which, ideally, transactions will take place since it represents the only price at which the amount that the suppliers are prepared to sell is equal to the amount which the buyers are prepared to buy. As in the case of every point on this graph the point where the two curves cross represents both a price and a quantity. Thus, it represents not only the equilibrium price but also the equilibrium quantity. In other words the quantity at which the price offered by buyers is equal to the price demanded by the sellers. The equilibrium quantity is shown on the graph by the horizontal red line. As you will see, it represents in the case chosen a quantity of about 1/2 units. The equilibrium price is represented by the vertical red line and in our chart represents a price of slightly below 9. Of course, I have oversimplified. You may object that the price arrived at in the chart cannot possibly be as described because not all sellers will insist on the same price and because not all buyers will be prepared to pay the same price. This is, of course, true and it is why it is more accurate to refer to these curves as marginal demand and supply curves. If we take a price slightly below the equilibrium price transactions will take place. Thus, at a price of 8 there are sellers who would be prepared to sell about 1/2 units, but at a price of 9, an additional 1/2 unit would be offered, which is just enough to meet the demand at that price. Thus, the point E on the supply curve represents not the price that would be demanded for all of the production but the amount that is required in order to bring out the final or marginal unit in order to make up the total of 1 1/2 units. The same can be said of the difference between any other two points on the curve, however small the difference between them. Thus, the curves represent marginal amounts and marginal prices.
Fortunately, this marginal concept does not destroy the usefulness of our curve for practical purposes. For in a perfect market all of the commodity which is sold at all under the conditions described, namely, at a single point in time or over a short period when conditions do not change, will be sold at the same price. Thus the point E on the chart represents not only the total amount sold but the price at which all units will be sold. And the value of the total sales will be represented by the square bounded on top by the horizontal red line and at the right by the vertical red line.

Just to complete our understanding of the nature of these curves, one more point becomes obvious from the previous one. Namely, that sellers will receive for all the quantities less than the quantity E, more than the price at which they would have been willing to sell that quantity. Or, if we think of the supply curve as a curve of production costs they will have received more than the cost of production for every unit up to but not including the final or marginal unit.
This graph is a continuation of our elementary review of supply and demand and the way in which they determine price. It merely illustrates further certain costs referred to in the discussion of graph I. Again, we have a marginal demand curve represented by the blue line DD, and the marginal supply line represented by the black line SS (it happens that these curves have not been drawn identically with the curves in graph I, for example, you will notice that the supply curve begins slightly below 4 units instead of at 5 units. This was merely to make life more interesting for the draughtsmen and does not in any way affect the argument or the conclusions to be drawn from the curve).

Again we have an equilibrium price at the point at which these two lines cross. Why do I refer to it as an "equilibrium price" instead of simply "the price"?

As indicated before, it is both theoretically possible and in actual practice happens that transactions may take place at a price other than the equilibrium price. Usually this is accidental. A seller has misjudged the market and offered his production at less than the buyers would have been prepared to pay, or a buyer has offered a higher price than would have been required to bring forward the necessary supply. But let us look at what happens in either of these cases. The price indicated as $P_1$, that is where the horizontal and vertical blue lines join, is a price at which a certain number of suppliers are prepared to sell a quantity represented by the length of the horizontal blue line or about 5½ units. If we follow the dotted blue line across the chart to the point where it intercepts the demand curve we find that purchasers would have been prepared to take a much larger supply at that price, namely about 11½ units. If the market, through one accident or other actually established a market price at the point $P_1$ we clearly have a position of disequilibrium, since a substantial part of the demand remains unsatisfied at a time when buyers would have been prepared to pay more in order to satisfy that demand. What happens? Naturally the price tends to rise as the unsatisfied buyers bid up the price in order to obtain fulfillment of their demand, and this tendency will continue until the equilibrium price is reached, at which all the demand at the higher price can actually be satisfied.

Let us look at the reverse situation. The price $P_2$ represents a price at which producers are receiving a very much higher price than they would have required, but at which a substantial part of the supply that would have been forthcoming at that price remains unsold because not sufficient demand exists. Again we have disequilibrium and the tendency will be for the suppliers to lower their price until the equilibrium price is reached and they can actually sell the maximum quantity which they would have been willing to sell at that price.
At this point it seems necessary to stress the fact that these charts describe a situation existing under conditions of more or less perfect competition. If in the case of the price of $P^2$ there were a single seller or if all the sellers were bound together into a cartel so that they did not compete between each other, it might have been more profitable for them to maintain the price at $P^2$ and to obtain a higher level of price for a smaller number of units. Whether they would have been willing to do so would depend on the cost to them of producing the marginal number of units represented by the increase in quantity between $P^2$ and $E$, that is, the number of units between the vertical black line and the vertical red line or between 1 and 3/4 units on our chart.

But under conditions of real competition sellers would not have this choice. For if one seller tried to hold out for the higher price of $P^2$ some other seller would find that it would be profitable for him, at a very slight reduction in his price, to obtain a substantial part of the business of his competitor, and the competition between sellers will tend to force the price down to the equilibrium price.

This chart also illustrates what happens if a government attempts to establish a price which is either above or below the equilibrium price and to enforce it through its police powers. In our chart let us assume that the government has established a ceiling price of $P^1$. This is the kind of situation that existed during the war when many governments, because of the overall shortage of commodities and the necessity for avoiding an inflationary spiral of prices, found it necessary to establish price ceilings. Under these conditions transactions will take place at $P^1$, but a large body of consumer demand, represented by the dotted blue line from $P^1$ to the demand curve, remains unsatisfied. Sooner or later, the price ceiling is almost certain to break down. Black markets spring up or political pressure by dissatisfied consumers eventually force the government to remove its price ceiling and permit the price to rise to $E$.

Let us take the reverse case. A government, in the interests of a favoured group of producers establishes a floor price of $P^2$ below which no transactions are permitted to take place. In this case there is a body of unsatisfied supply. The volume of supply represented by the dotted black line from $P^2$ to the supply curve remains unsatisfied, that is, cannot be sold. We have a situation of disequilibrium. This is the situation that exists in the United States today in the case of domestic agricultural production. The volume of surplus agricultural products in the hands of the United States Government represents an accumulation of these differences between supply and demand at an arbitrarily high price. In that particular case the suppliers were satisfied because the government bought the surplus. Therefore, the natural tendency for producers to curtail their production until the price falls to $E$ has been frustrated. But the disequilibrium exists, and the attempt to establish a price above the equilibrium level has left unsolved problems which have been postponed so far only by the tremendous financial resources of the United States Government.
One final point about this chart. If you compare quantities represented by the horizontal blue line and the horizontal black line with the horizontal red line you will notice that they are both smaller than the quantity that will be sold at the equilibrium price. In other words, any attempt to establish an arbitrary price at other than the equilibrium price will result in a smaller volume of sales than at the equilibrium price. In one case there will be a body of unsatisfied demand, in the other case there will be a body of unsatisfied supply. Only the equilibrium price will permit both supply and demand to be satisfied.
This chart introduces into our examination for the first time the concept of imports. Up to now we have been arbitrarily assuming a single market - that is a market in which there is free competition between supply and demand and in which price is influenced only by the conditions of supply and demand in that market alone. Under conditions of free competition throughout the world our two previous charts could apply equally well to a world market. But in fact this situation does not actually exist. The erection of trade barriers throughout the world means that in almost any given national market the supply from foreign sources will be subject to different conditions than the supply from domestic sources. Even if this were not true, natural factors often limit imports which do not apply within the domestic market area. This is especially true if you assume a domestic market in which the producers and consumers are sufficiently close together so that there are no transport costs to distort the picture. Thus, to obtain a more realistic picture of the influences of supply in a given domestic market we will need for the purpose of our further study to treat separately the supply that comes from domestic production and that which comes from abroad. The purpose of this chart is to suggest the method of constructing a supply curve made up of these two separate elements.

In our chart we illustrate the domestic supply by the red line DS. The blue line IS represents the supply which will be offered at various prices on the domestic market by importers. You may ask why this curve has been drawn differently from the curve of domestic supply. The difference shown is not essential for our argument and it does not necessarily represent the conditions that will prevail in all cases. It does illustrate some more or less typical differences between an import supply curve and a domestic supply curve. You will notice that the supply curve begins at a lower price. This was based on the assumption that the commodity we are dealing with is one in which there are many more producers in other parts of the world than in the domestic market concerned. Because of these many more producers the likelihood of some supply being offered at prices at which no domestic producer is able to produce exists. In this respect the curve may be considered typical of the import supply situation in a relatively under-developed country, where there are few domestic producers or where the only domestic producers have not yet attained the efficiency of producers in larger industrial countries abroad. The curve also assumes that transportation costs are relatively small in comparison with the value of the product concerned. If we were dealing with a bulky raw material which can be produced both domestically and abroad, the likelihood is that our import supply curve will begin at a higher price than the domestic supply curve. In other words, that some domestic production will be available at prices at which no-one could afford to import because of the cost of transportation.

You will also notice that I have drawn the import supply curve less steeply than the domestic supply curve. In the terminology of economic theory the import supply curve which I have drawn is more elastic than the domestic supply curve.
This is likely to be true where there are many more foreign suppliers than domestic suppliers. But, as I have said, neither the position nor the shape of this import supply curve as compared with the domestic supply curve is essential to what follows, and the conclusions will be equally valid if the import supply curve began at any point on the vertical axis OP and rose gradually from left to right.

Since we are examining the supply and demand for a single commodity, one in which there is no appreciable difference between one unit and another, it is quite clear that neither the domestic nor the import supply curves can be considered separately. There would not be a single equilibrium price for import and a different equilibrium price for the domestic production, as would appear to be the case if we look at the points at which the two supply curves cross the demand curve. No buyer is going to pay $1.5 units of price for the marginal unit of supply, as shown by the red line on the chart if he could obtain the same product for 6.5 units of price as shown by the blue curve. What will actually happen is that the domestic supply and the imported supply will be added to each other in order to form a new joint supply. This supply has been indicated in our graph by the black line which we have labelled JS-TS. It has been constructed simply by adding for each given price the horizontal distance to the import supply and the horizontal distance to the domestic supply. If you will look at the area on the vertical axis between 3.5 and 5 you will find there is no domestic supply. In other words we have assumed the case where the lowest possible domestic production cost is 5. Thus, the beginning of our joint supply curve is identical with the import supply curve. But at prices above 5 we have added at each price of the import supply curve the corresponding amount of domestic production that would be offered at that price. Thus, at every price above five the supply, that is the amount that will be offered, is more than either the import supply or the domestic supply taken separately.

This chart has been presented primarily to illustrate how the joint supply curve is drawn as we must make use of it later. But there are a few simple conclusions that can be derived directly from the chart itself. The most important is that in the typical case the price for the commodity resulting from the joint supply will be lower than it would have been if there had been no import supply, and vice versa. From this it is possible to see directly that any action that is taken arbitrarily to eliminate or to reduce the imported supply will result in an increase in price.

Similarly, we can easily see that the quantity that will be sold, and therefore the quantity that will be received by consumers, is greater under conditions of joint supply than if either of the two elements of supply were eliminated. Here it is important to remember that we are talking about the situation at a single point in time and are not making allowances for the increase of productive facilities either domestically or abroad. Over the longer pull, it is possible that the elimination of import supply will result in a sufficient increase in domestic production so as to bring about a reduction of the price below the high point shown on this chart for domestic production alone. But even then the basic relationship shown by the chart should remain true. If there are any imports which would be offered under competitive conditions and if these imports are excluded the price will be higher than it would have been if the imports were permitted and a new joint supply curve thus created.
This chart looks more frightening than it really is. You will recognize that in part it merely reproduces chart III which you have just been looking at. The domestic supply curve DS-DS is the same as before and is represented by the solid red line. The import supply curve IS-IS is also the same and is represented by the solid blue line. The joint supply curve and the demand curve are represented by black lines as in our previous chart.

The purpose of this chart is to show what happens when imports are curtailed either through the application of an import tariff or through the application of an import quota.

Let us take the tariff first. For the purpose of our illustration I am assuming a specific tariff, namely one that is the same on each imported unit of the commodity concerned regardless of its price. The effect of such a tariff on the joint supply cannot be determined until we have constructed a new import supply curve. Clearly, to do so, we must add to that supply curve the additions in price which are necessitated by the tariff. Let us look at the supply situation with regard to 4 units of imports. Before the imposition of the tariff our importers were prepared to offer 4 units at a price of 5. Now our chart assumes a specific tariff of 4g. This means that the importers no longer offer these 4 units at 5 but must charge 9g. Thus, we have a point on our new import supply curve, namely 4 units at a price of 9g. By a similar conclusion at each point on the former import supply curve we find that we have constructed a new import supply curve which is roughly parallel to the first and which is 4g price units higher at each point on the horizontal or quantitative axis. Having established the new import supply curve we can derive from it the new joint supply curve in precisely the same manner as we constructed the joint supply curve in chart III by adding the units offered by importers at each price to the number of units that will be offered by domestic suppliers at the same price. This new import supply curve, which we have labelled JST-JST, is shown on the chart by the dotted black line. You will notice that for the first 3 units of price above 5 this curve is identical with the domestic supply curve. All this means is that we have raised from 3g to 5 the lowest price at which any imports whatever would be offered, and there will be no imports until the price is above 8. From then on upward our curve is a combination of the horizontal distances on the domestic supply curve and on the new import supply curve.

Now let us look at the effect of a quantitative restriction. An import quota is similar to an import tariff in one respect, namely that it restricts imports. But in terms of supply curves it is very different. Since it does not depend on price it will consist on our chart simply of a straight vertical line. I have not drawn this line for fear of adding an additional complication. But I can show you what it would look like if I had done so. For a purely arbitrary reason which I will explain in a minute I have chosen for the amount of imports that will be permitted under the quota 4 units. Now if the new import supply curve under these conditions were drawn on our chart it would consist of a vertical line parallel to the vertical axis and 4 units to the right of it. It would
not, however, run all the way to the bottom of our chart because that would mean that importers were prepared to offer 4 units however low the price. It would run from the top of the chart until it reaches the old import supply curve. It cannot go below that curve but it would follow that curve until the vertical axis was reached, that is down to the lowest point at which any quantity at all would be offered by importers. For our present purpose, however, we can disregard the portion of this straight vertical line which lies below the true import supply curve. In other words, we can construct our new joint supply curve beginning at the price of 5. Now, from that point on, as is shown by the new supply curve, 4 units and only 4 units can enter the domestic market from abroad. Furthermore, since in each case this is less than would have been offered by the importers at above the price of 5 this amount will always be forthcoming. What this means in graphic terms is that our new joint supply curve will be constructed by adding 4 units at every price to the number of units offered by the domestic suppliers. In other words, we draw our new line 4 units to the right of the domestic supply curve. This new joint supply curve is represented on our chart by the dotted red line.

Now, for the reason I arbitrarily chose 4 units as the amount of the import quota. At this stage I want to show complete impartiality between import quotas and tariffs. Therefore I chose the size of a quota which, under the demand conditions we have assumed, will bring us out with precisely the same equilibrium price as would result from the tariff of $4.5$ price units. In other words, I have chosen a tariff and a quota which will make the two new joint supply curves cross the demand curve at the same point. Now what conclusion is generally derived from this chart?

One is that although a tariff and a quantitative restriction will result in very different-looking joint supply curves, it is theoretically possible that at a given point in time they can have precisely the same effect on price and on the quantity that will be sold.

Another conclusion is that, even if the tariff and the quantitative restriction we consider are not so selected as to result in the same price, throughout the more normal range of the supply curves a tariff will result in a decrease in the total quantity purchased and sold and a quantitative restriction will result in an increase in the price. These are important conclusions, since there is a popular tendency to believe that it is possible to impose a tariff without reducing the quantities that consumers will obtain and that it is possible to impose a quantitative restriction without increasing the price. What our chart shows us is that in the short run neither of these results is possible and that even in the long run a tariff will result in a smaller volume than would otherwise have been the case and a quantitative restriction will result in a higher price than would otherwise have been the case.
Comparison of Tariffs and Quantitative Restrictions

In the remaining charts we are going to examine the differences between tariffs and quantitative restrictions and, therefore, to consider the relative usefulness of each for differing purposes of commercial policy. Let us consider in further detail first what happens when a government decides to impose a tariff. More precisely, let us examine the degree of precision with which it can forecast the effect of the tariff and let us assume for the moment that there will be no changes in the conditions of demand or the conditions of supply except as directly affected by the tariff. We will then make the same study of a quantitative restriction and when that is completed we will consider what may happen in both cases if changes in the demand or supply situation occur after the tariff or the quantitative restriction has been imposed.

This chart to begin with reproduces the same situation of supply and demand as in Chart IV. The government decides to impose a tariff and wants to predict the immediate effect on price and on quantity. In making its prediction certain factors are known. It can assume that the present joint supply and the present joint demand curves cross at a point approximately equivalent to the present price and the present total volume of sales. In other words it can approximately fix the point E on our chart. You will recall from Chart IV that the new joint supply curve resulting from a tariff is parallel with the original joint supply curve in terms of price, that is it is at all points higher in price by the amount of the tariff. Therefore, the new joint supply must pass through a point which lies directly above E. This point I have called M on the chart. The vertical distance that it lies above E I have called P.

The government is also justified in making two other assumptions, namely that the demand curve, which must pass through the present E, declines in slope, that is that the prices at which increasing quantities will be purchased will become progressively lower. Similarly it is justified in assuming that the new joint supply curve, which must pass through the point M, rises; that is, the amounts which will be offered by suppliers increase with increases in price.

Based on these facts we have drawn, in addition to the joint supply curve which we know to be correct, two alternative curves which meet these known facts. I have labelled these JST* and JST**. I could draw an infinite number of additional curves which meet the conditions but have chosen one which is extremely elastic and one which is extremely inelastic. The truth is likely to lie between these two extremes. Similarly, I have drawn, in addition to the actual demand curve, two alternative demand curves which I have labelled D1 and D2. Again, the truth is likely to lie between these two curves.
Now, if you spot all the points at which these joint supply curves cross the possible demand curves, you will find that all of them lie between two horizontal lines that pass respectively through E and M (the horizontal dotted green lines on the chart). That is, the new price must be higher than the present equilibrium price and cannot be quite as high as the equilibrium price plus P.

Unfortunately, we have no such certainty as to the effect on quantities. Some of our new equilibrium points lie quite close to the quantity currently being sold and measured by the horizontal distance to E. But others lie relatively far away and it is theoretically possible for the quantity to be anywhere between E and zero. The only limitation is that the quantity will not be greater than E.

Now, let us return again to the distance from E to M which I have called P. If it were possible to know in advance what that amount is it would be possible to determine with certainty the maximum increase that can take place as a result of the imposition of a tariff. Is there any way of predicting how much P will be? In the case we have chosen for an illustration it is considerably shorter than T, that is, the amount of the tariff itself. Unfortunately, as you can discover by experimentation there is only one fixed relationship between P and T, namely that P cannot be any larger than T. I have prepared a rough series of charts, numbered V^A, to illustrate the variety of possibilities. If you will study this you will find that two general principles seem to hold good:

1. When the supply curve for imports is more elastic than the supply curve for domestic production, the length of P will approach the amount of the tariff. On the other hand, when the domestic supply curve is more elastic than the import supply curve the opposite will be true and the distance P will be nearer zero.

2. P represents the vertical distance between the old supply curve and the new supply curve only at the old equilibrium, at the quantity that was sold before the tariff was applied. But again, by looking at Chart V^A you will find that the vertical spread between the old joint supply curve and the new joint supply curve is not always the amount P but can vary considerably. You will find that this spread between the two curves tends to be at a maximum where imports are larger than domestic production and a minimum where imports become less than domestic production.

How can the government using a tariff for protection make use of this knowledge?

1. Because the increase in price cannot exceed P and because P cannot exceed T it can be sure that the increase in price cannot exceed an increase in the tariff. But will it be close to the amount of the tariff or will it be a very small fraction? To forecast this it is necessary to know something about the conditions of the market. If, at the equilibrium price, imports represent a very substantial part of total supply and if the supply of imports is more elastic than the
domestic supply, $P$ will closely approach the amount of $T$. This happens to be the situation which will normally prevail in the case of an underdeveloped country wishing to provide protection to a new industry. The domestic supply will be relatively inelastic compared with imported supply, and in the absence of protection imports would constitute the largest part of the total supply.

2. In order to determine whether the price increase will closely approach the amount of $P$, however, it will also be necessary to guess the shape of the demand curve. While it will never be possible to draw the curve accurately, a government will usually know whether it is dealing with a commodity with which the demand is highly inelastic or a commodity for which the demand is highly elastic. The more nearly the demand approaches the former condition, the more nearly will the increase of price approach the total amount of $P$.

If we put all these facts together we can see that it is possible to predict with a fair degree of accuracy the effect on price of a given increase in the tariff and that is especially true in the case which would be normal for an under-developed country.

On the other hand, suppose the government official wants to influence the quantity of imports. His only assurance is that the result of the tariff will be to reduce the total quantity but he has extremely little basis for estimating by how much. Since the total quantity which will result from the new joint supply is unknown it becomes even more difficult to estimate the amount of imports that will result, since the joint supply curve is a product of both domestic and imported supply and since the shape and position of the domestic supply curve is also unknown. Thus, the tariff is a very imprecise instrument when the purpose is to reduce by a specified amount the volume of imports.
The purpose of Chart VI is to make a similar examination of the characteristics of a quantitative restriction on imports under the same conditions as those described in Chart V. Again we assume conditions of domestic and imported supply and conditions of demand the same as those which we studied in Chart IV. But in this case the government official is contemplating the use of quantitative restriction both from the point of view of protection to domestic industry and from the point of view of limiting foreign exchange expenditures. How accurately can he estimate the effect of a given import quota?

In order to be sure of the effect he will, of course, need to know the shape and position of the demand curve and of the new joint-supply curve after the application of the quota. You will recall from Chart IV that in order to determine the latter he needs to know the shape and position of the domestic supply curve. How close to this knowledge can he come? He does know that the existing demand curve must pass through the present price if the present price is in equilibrium. If he knows enough about domestic costs he may also be able to determine one point on the domestic supply curve, that is the price below which there will be no domestic productions. Everything else is guesswork. As you will remember from Chart IV there is no fixed relationship between the existing joint-supply curve and the new joint-supply curve — that is no parallelism as in the case of a tariff. The present market price could result from any joint-supply curve which passes through that price, and the latter could be made up of any combination of domestic supply and import supply.

On our chart we have drawn three possible domestic-supply curves on the assumption that their starting point as to price is known. One is the actual domestic-supply curve which we know but which the government official cannot know. One has been drawn to show a highly inelastic domestic supply and one a highly elastic domestic supply. In practice the truth will normally lie somewhere between these two extremes. We have also drawn three possible demand curves (the red lines), one the actual curve, one showing a highly inelastic demand and one a highly elastic demand. All of them conform to the one known fact, namely, that the demand must pass through the present equilibrium point.

From the various domestic-supply curves we have constructed in each case a joint-supply curve (in blue) based on the same import quota.

Now, if we spot all of the points at which these possible joint-supply curves cross the possible demand curves we find no such restriction in the possible range of prices as we did in the case of the tariff. The price could theoretically be anywhere so long as it is above the present price. You will notice that the price shown by a combination of the demand curve D²
and the supply curve \( JSQ^2 \) is only slightly above the present price. On the
other hand, the price determined by \( D \) and \( JSQ^1 \) is so high as to be off our
chart entirely, and if \( D^2 \) and \( JSQ^1 \) in fact are extended they would meet only
at infinity. In practice, the first of these extremes is very unlikely and
the second would never arise. But these extremes illustrate the fact that the
policy maker can have no assurance of the practical limits within which the
resultant price will fall.

Now, if you look at the quantities of sales that will take place at these
theoretically possible new equilibrium points, you will see that they too
range widely between the present equilibrium quantity and zero. But while
the policy maker cannot be sure of the total volume of sales resulting from
the application of the quota he can know with precision what part of those
sales will be supplied by imports. For by definition, the maximum import can
only be the amount of the quota. He will always know the outside limits of
imports, and if the quota has been set at less than present imports this will
also represent the actual imports. For, as we have seen, the equilibrium
price cannot fall as a result of the imposition of a quota and if there is no
decrease in price there can be no reduction in imports except as required by
the quota.

This brings us to our conclusion. Namely, that the quota is a very
imprecise instrument if the purpose is to provide a given measure of price
protection to domestic industry, but that it is a very precise instrument for
determining the quantities that will be imported. The latter makes the
quota a very useful device for a country which is in balance-of-payments
difficulties and which must limit its expenditures on imports.

Footnote: In the above discussion of Chart VI, as drawn, you will notice that
nothing has been said about the ability of the policy maker to estimate the
total domestic production that will be sold under a quota and, therefore,
nothing about the total sales in the domestic market constituting a combination
of domestic production and imports. When we examine this question we find
that the chart itself has exaggerated the difficulty of estimating what these
quantities will be. You will recall that I said there was only one known
fact, the present equilibrium point and one that the policy maker may be
able to estimate, namely the point at which the domestic supply curve begins,
and the chart was drawn on this basis. There is, in fact, one very important
additional bit of information available to the policy maker, namely the present
volume of domestic production at the equilibrium price. This means that,
whatever else its shape and position the domestic supply curve must pass through
that point. Since it is a fair assumption that the domestic supply curve will
rise from left to right, that is that the quantities offered will increase
with increasing prices, the domestic offerings cannot be less and will
probably be more as a result of the quota than there were before its imposition.
In other words, the policy maker can be sure that the minimum total quantity
will be at least the domestic production plus the amount of the quota.
Now, if you go back to Chart VI you will discover that this assumption rules out one of the possible domestic supply curves and joint supply curves we have drawn, namely the one to the left of the actual domestic supply. This in turn means that the two most exaggerated price increases we have depicted, namely those that fell off the chart entirely are impossible. Nevertheless, this does not alter our basic conclusion with respect to the impossibility of predicting the price. For the policy maker cannot know the shape of the domestic supply curve above the present equilibrium price. He cannot, therefore, determine where the maximum price will fall. And even if he were able to estimate the approximate slope of the domestic supply and of the demand the maximum price in the normal case will fall so far above the present equilibrium that even minor errors in his guesswork could lead to very wide differences in the resulting price.

**Tariff versus Quota under changing Conditions**

Up to now we have compared the precision of the tariff and the quota on the assumption that the demand and that conditions other than the tariff or quota affecting supply are the same after the imposition of the restriction as before it. But this clearly is not a realistic assumption. It was helpful to assume it in order to determine what would tend to take place as a direct result of the imposition of the restriction. By holding all other factors constant we were able to isolate the effects of the restriction and to examine it without confusion. Now, we must look at what happens when conditions of supply or demand change after the restriction has been imposed.

For the first part of this examination let us return to Chart IV. You have now had enough practice in the use of these curves to be able to visualize a change in the shape or position of a curve without actually drawing it. Let us assume that the demand for the commodity decreases throughout the various ranges of price. In graphic terms this simply means that we would move the curve DD bodily to the left so that for each price shown a smaller quantity would be demanded. You can see that our new curve would cut the curve JSQ at a much lower point than it cuts the curve JST. In other words, with a decline in demand the price will fall more rapidly from the... equilibrium point if imports are restricted by a quota than if they are restricted by a tariff.

Let us now assume an increase in demand and move the demand curve to the right. It cuts JSQ at a higher point than JST. In other words, an increase in demand will bring about a larger increase in price if imports are restricted by a quota than if they are restricted by a tariff. In both cases, changes in demand create wider fluctuations in price under a quota than under a tariff. We have already found that the tariff provides greater precision in determining the resulting price than a quota, assuming that demand and supply conditions remain the same. What we have now seen is that any change in demand will compound any error made in the original calculations in either case but will throw off the calculations far more under a quota than under a tariff.
When we come to consider the changes that can take place in supply we are limited by the practical consideration that, in the case of the quota, no upward change in imported supply is permitted, and a comparison between the quota and the tariff in case the supply conditions abroad should change contributes nothing to what we already know. But important changes can take place in the domestic supply of a commodity. In order to examine what can happen under these conditions, we turn to Chart VII.
In Chart VII we have drawn a normal demand curve DD, and normal supply curves resulting from a tariff JST and from a quota JSQ, on the same assumption as that used in Chart IV, namely that these two new supply curves resulted initially in the same price. Now what happens if there is an increase in domestic costs of production? In our chart we have assumed an increase in marginal production costs throughout the domestic supply curve represented by the vertical distance between the curves DS¹ and DS². In other words, for each quantity of domestic production sold the price is raised by that amount and the domestic supply curve moves vertically through the area we have shaded in red, thus establishing a new domestic supply curve DS₂² - DS₂₁. Now we must examine what effect this increase in domestic production costs has on our two joint supply curves. As we have seen before, the joint supply under a tariff is determined by adding for each price the quantities that will be sold through imports and those that will be sold from domestic production. That being the case, all we need to do in order to determine the new joint supply curve under conditions of a tariff is to subtract from the total quantity shown on the present curve, at each price, the reduction in the quantity sold from domestic production at that price. In other words, we move our joint supply curve to the left by the same distance as the new domestic supply curve is moved to the left. The result is the new line shown on our chart as JST², the dotted blue line.

To arrive at the new joint supply curve under conditions of a quota the procedure is similar, but in this case the joint supply curve has been derived by adding the quantities permitted under the quota to the domestic supply at each price. Therefore, to obtain the new joint supply curve under a quota we again deduct the amount of the decrease in domestic supply at each price from the curve JSQ¹. Now, you will notice that, although the process has been similar, the effect has been quite different, for the vertical change that has taken place in the quote curve is the same as the vertical change that took place in the curve of domestic supply itself, whereas the vertical change that took place in the joint supply curve under the tariff is substantially lower. The reason for this is that, as shown by Chart IV, the joint supply under a tariff will be more elastic than the joint supply under a quota. And this in turn is true because the joint supply under a tariff parallels the normal joint supply curve, which is necessarily more elastic than the domestic supply curve.

You will also see from the chart that, just as the vertical increase in the new joint supply curve under a quota is substantially greater than the vertical increase in the tariff curve, the point at which the former crosses the demand curve must necessarily be higher than the point at which the tariff curve crosses it if, according to our assumption, we begin with two supply curves each of which would give us the same price.
Thus, once again, we have found that a change in conditions brings about a greater change in price under a quota than under a tariff. This conclusion is of much more than theoretical importance and has a real practical significance for officials responsible for commercial policy. Let us suppose that the market we are considering is that of an under-developed country and that the tariff or the quota has been imposed for the purpose of encouraging the growth of the domestic industry. As we show in Chart IV, the immediate effect of the increase in both cases was to reduce the imported supply and to increase the amount that might be sold by domestic producers. Thus, it is clear that either form of restriction would stimulate domestic industry, though this could be accomplished with more precision through a tariff than a quota. But now let us assume the passage of time. For any one of a number of reasons a tendency develops for the costs of the domestic producers to increase. The same tendencies exist among the producers in other countries. Those producers, however, are competing for markets all round the world and have a strong incentive to improve their methods of production or otherwise effect economies so as to keep their costs down. Will the same be true of the domestic producers in the market we are considering?

What our chart shows us is that an increase in domestic costs will result in some increase in the price and, therefore, that the incentive for domestic producers to keep down their costs will be less than if their selling price had remained the same. But the chart also shows that the increase in price under a quota will be greater than under a tariff and to that extent the incentive to keep costs down will be less under a quota that under a tariff. In fact, in our chart, the increase in price is almost as great as the total increase in domestic cost, while the increase in price under a tariff is less than half the increase in cost. This relationship will differ from case to case.

The incentive for domestic producers to keep their industry on an efficient level, that is to keep their costs as low as those of their foreign competitors will be based not only on considerations of price but also on considerations of total quantity sold. Here, by definition, the imposition of a quota removes a large part of any such incentive. For throughout most of the joint supply curve the quantities that will be imported will be constant and will not be affected by relative changes in domestic and foreign costs.

What this means for a country attempting to develop new industries is that the quantitative restriction, though there may be occasions in which it will be most effective in giving the initial start to a new industry, is a dangerous instrument to use for economic development over a longer period. If the new industry is insulated by the quota from most of the disadvantages of increasing costs, human inertia toward change will prevent the new industry from improving its production so as to keep pace with improvements abroad and the industry in the long run instead of contributing toward the total prosperity and standard of living of the developing country will prove to be a permanent drag on the country's economy which must be supported indefinitely at the expense of the tax payer or the consumer.