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PRODUCTION NETWORKS IN AN ECONOMICALLY INTEGRATED REGION

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1. **Introduction**

The process of regional integration has tended to follow a fairly set pattern. In the early stages, the focus is on liberalizing trade in goods. Subsequent initiatives address trade in services, the movement of labor and capital, coordination of regulatory and other policies, and monetary union. Each successive stage makes its inroads on national sovereignty and policy independence. Still, it is not typically until the very end of a long and drawn-out process that market segmentation may be said to have been effectively eradicated and that the region can be truly called a single market. This paper argues that the nations of Asia might benefit from reversing the order of regional integration.

There are significant reasons to doubt that a small grouping among any subset of countries in the Asia-Pacific region provides the basis for a viable preferential trade area of the traditional variety. Even when the static framework is broadened to allow for dynamic elements such as scale economies and endogenous growth, most arrangements would not pass muster on strictly economic grounds.

An important characteristic of the traditional approach to regional integration is that structural and market transformation are initially quite limited, so that the benefits of trade liberalization depend almost entirely on the extent to which existing resources can be used more efficiently. Significant changes in industrial structure typically do not take place until economic integration has reached the deeper stages. In the European Union, for example, the Single Market project (“Europe 1992") occurred decades after the creation of the original customs union (EEC) and free trade area (EFTA) in the 1950s. It represented the community’s response to the failure of the earlier phases of integration to eliminate market segmentation. This paper examines an

approach to regional integration which allows industrial structure to change early in the process. The structural change envisaged here involves creation of a regional production network and dispersion of manufacturing processes across national frontiers. Regional economic integration is more likely to be welfare-improving if it includes market integration based on cross-border production networks.

Section 2 develops the basic idea and establishes a benchmark example of traditional integration against which to evaluate the effects of the proposed alternative. Section 3 introduces regional production into the framework and assesses the welfare gains. Section 4 discusses varieties of cross-border procurement and the role of foreign direct investment (FDI) and multinationals in the context of regional production networks. Section 5 deals with trade liberalization in the presence of production networks to show how the latter tend to create pressures favoring non-discriminatory trade liberalization. It also considers the effect of offshore procurement on wages and employment. Section 6 considers dynamic factors like scale economies. Section 7 concludes.

2. **Creating a Regional Economy**

Regional economic integration has been an important part of the globalization of many national economies. While Europe provides the most complex example of the interplay of multilateral and regional forces, both the Western Hemisphere and the Pacific Rim have seen significant regional initiatives. Unlike Europe, however, most of these approaches have been more cautious, with members wary of becoming too involved with their trading partners and losing too much sovereignty and economic policy autonomy in the process. Although Mercosur in the Southern Cone of Latin America has opted for customs union, most initiatives have been more circumspect. In the North American Free Trade Area (NAFTA), for example, members were content to settle for a free trade area and thus to retain greater trade policy independence. Although some observers have called for deepening of NAFTA, including monetary integration, the political sentiment does not in general appear to be ready for that level of commitment to the

regional option.[1]

This reluctance to commit more fully to the regional idea prevails in the Pacific area as well. In part, such sentiments are driven by concerns over the loss of national sovereignty, but in part they also reflect the fact that the standard regional arrangement may not be so obviously superior to less discriminatory, more plurilateral or multilateral approaches. There is general agreement among expert observers, for example, that the Association of South East Asian Nations (ASEAN) and its trade arrangement, the ASEAN Free Trade Area (AFTA), does not constitute an optimal economic area, because the elements of trade diversion are likely to dominate those of trade creation.

The countries of the Pacific Rim are quite aware of this constraint inherent in the traditional model of regional integration. They have reacted by exploring alternative approaches, which seek to contain the forces of trade diversion and to encourage trade creation. This is the avowed objective of "open regionalism," which strives for better balance between the benefits of preferential trade liberalization and the costs of damaging trade linkages with the rest of the world. The search continues for strategies that are less openly discriminatory than the traditional approach.

Any grouping of small countries in Pacific Asia along traditional lines is bound to exclude the world's low-cost producers in many product categories and thus to ensure that trade diversion will dominate. AFTA is no exception: a preferential trade arrangement which excludes Europe, the United States, Japan, Korea, Taiwan, and China is a virtual guarantee that trade diversion will dominate trade creation.

For many of Asia's economies, trade relations with countries unlikely to become members of a regional preference area are often more important than trade with neighbors. Countries may be neighbors, but their geographic proximity is often greater than their economic interaction. The United States and Japan may be farther away geographically, but they loom large as key trading partners. Recognition of this reality is one reason for the existence of the Asia-Pacific Economic Cooperation forum (APEC), which covers a much larger area and

includes all the major players of the region. But APEC has thus far not been able to solve the problem of how to make its vision of "open regionalism" work. There are at present more dreams than workable proposals for implementing the concept.[2]

The debate has followed traditional lines, which start with liberalization of trade in goods. There is hope, of course, that increased trade will spur industrial growth and development, but growth and industrialization are typically considered at the national level. Each country formulates trade expansion and growth policies according to national priorities. There is little or no coordination of policies among countries. It follows that national policies will at times be in cross-border harmony, but in conflict at others. Inasmuch as countries in the area are very similar, their growth goals will be similar and their policies and actions will possess significant competitive elements.

Most emerging economies in the region have been pursuing export-led growth strategies in which selling into the US and other advanced-country markets has played a major role. Their exports are very similar, because they all cater to demand developments in the same markets. When world demand rises for a product - steel, textiles, apparel, consumer electronics, computer components, and so on - every nation moves to expand capacity in order to raise exports. Every country behaves quite properly as the small, price taking member of the global economy, whose own capacity expansion will have no effect on world market conditions. But when the actions of all are cumulated, the impact on world markets and prices may not be trivial after all.

The products involved are "national" in the sense of being made more or less entirely inside a particular nation. Firms do, of course, engage in outsourcing, but such outsourcing rarely crosses national frontiers. Cross-border sourcing is rare because trade and other policy barriers, as well as communication and transportation costs, tend to be higher between than within nations. Cross-border production is even rarer, especially among the emerging Asian economies.

An important aspect of the current wave of globalization, however, is precisely the role that trade liberalization and innovations in communications and transportation technologies have

played in facilitating it. Cross-border sourcing and production of parts is now easier than ever. The main theme of this paper is that the nations of Asia stand to reap welfare gains and improve competitiveness if they move away from the "national" model of industrialization policy toward more regional, collaborative perspectives.

The basic idea is to think of the region rather than the nation as the production base and to spread component production around the region in accordance with comparative advantage. The object is to raise efficiency, reduce production costs, and increase competitiveness, and thereby to gain market share for all the region's players. The key features of this argument are developed below in the context of a standard trade model.

2.1 The Welfare Effects of Component Trade

It is well-known that the move from MFN tariffs to preferential trading arrangements may raise or lower national welfare.[3] The outcome generally depends on the relative magnitudes of the trade-creating and trade-diverting effects. The former arise in the shift from domestic production to more efficient sources in the FTA partner country; the latter are associated with the shift from low-cost, non-member suppliers to higher cost, less efficient producers in the partner country. Net trade diversion becomes more likely as the cost differentials between partner country and non-members rises.

The following analysis starts with traditional static considerations of trade in end products. Dynamic elements are taken up in a subsequent section where it is shown that they, too, are more likely to be stronger in a properly constituted regional production network. The basic structure of the argument is illustrated in Figure 1, where curve TT represents the production possibility set of a small country. Prior to creation of the preference area, the country has a most-favored-nation tariff (MFN) on imports of good Y. The world price ratio is given by P_w, so that P_d is the tariff-inclusive domestic price ratio. The country produces at Q and consumes at C on indifference curve I, exporting final good X in return for imports of final good Y.

After implementation of the preference area, the relative commodity price will lie somewhere between the world price, P_w, and the initial MFN tariff-inclusive domestic price P_d. Let that price be P_{pta}. In general, the preference area is more likely to be trade-diverting as P_{pta} approaches P_d and thus moves away from P_w. Intuitively, net trade diversion takes place as the additional resource cost implicit in the difference between the world price and the preference area price exceeds the gain from the reduced cost implicit in the difference between the MFN price and the preference area price.

In the figure, the preference area is depicted to be trade-diverting, i.e., welfare-reducing. Production has moved to Q', while consumption is now located at C' on a lower indifference curve, I'. This is a well-known result which does not require extensive commentary. Its role is to serve as a benchmark for assessing the effects of cross-border component sourcing. Suffice it note here that for many country groupings around the Pacific Rim the outcome is more likely to be welfare-reducing than welfare-creating because the world's low-cost producers of goods affected by the preference area will too often remain on the outside. The nations of ASEAN are well aware of that problem.

It is often asserted that the repercussions enumerated above are too static and depend too much on existing conditions and structures. In particular, it is argued that a variety of dynamic effects, including scale economies and endogenous growth, can more than compensate for the poor showing of the static analysis. While there is doubtless something to that argument, even the dynamic effects will often be limited by the small scale of national markets and the geographic area encompassed by the regional arrangement. Creation of a regional economy, with regionally structured production networks, is likely to be more beneficial than preferential trade liberalization which leaves the member economies segmented. We turn to that issue in the next section.

3. **Trade Integration vs. Market Integration**

While end products have traditionally played a dominant role in international trade,

offshore sourcing of components and offshore assembly have grown rapidly in recent years.[4] This growth has been made possible in part by reductions in trade barriers and in part by innovations in transportation and telecommunications technologies, which have sharply reduced the cost of coordinating cross-border sourcing and production.

The welfare implications of cross-border production have received considerable analytical attention recently.[5] It has been shown in a variety of modeling contexts that offshore sourcing or production of components can be strongly welfare-enhancing. It has been further shown that such foreign procurement creates jobs and expands output in the industries in which it occurs and that it frequently raises wages.

While the factors which determine these outcomes vary across models and empirical instances, the intuition is simple and compelling. If foreign sourcing of a component is cost-saving, then it improves the competitiveness of the end-product of which it is a part. If the firm which makes the end product is a price taker, then the reduction in production costs increases profitability and creates an incentive to expand output. If the firm is a price maker in end-product markets, the reduction in costs brought about by offshore sourcing enables it to lower price and thus gain market share. Once again, output rises.

In a Heckscher-Ohlin framework, competitiveness is equivalent to comparative advantage and comparative advantage depends on resource endowments and factor intensities. When final products consist of multiple components whose production technologies differ, then factor intensities will vary across components. The factor intensity of the product itself is simply the weighted average of the factor intensities of its constituent parts. Varying factor intensities across components mean that countries' comparative advantage will vary across components, just as it varies across final products. A labor-rich, low-wage country will possess comparative advantage in labor-intensive components, and so on. These considerations apply with equal force to the factor-intensity of product assembly.

It follows that if countries involved in the regional trading initiative specialize in component production according to the dictates of comparative advantage, welfare will rise all

around. The effect on productive efficiency of component specialization is similar to the effect of technical progress. In the industry or sector in which foreign sourcing of components takes place, a given input of resources is able to produce a larger output. In the context of the production possibility curve depicted in Figure 1, the effect of foreign sourcing is to shift out the curve along the axis representing the industry or sector in which it occurs. In the figure, that sector is taken to be the X-sector, which is this country's export sector. On the assumption that the country is a price taker in goods markets, the effect of the outward shift of the production possibility curve is to move production from Q' to Q" and consumption from C' to C" on indifference curve I". This represents an improvement in national welfare relative to regional integration without component specialization. It is clear that preference arrangements accompanied by component specialization are more likely to be welfare-enhancing than those which are not.

Note that the move to foreign sourcing shifts the output mix away from the import good, Y, to the export good, X, as is evident in the relative positions of production points Q' and Q". In other words, offshore sourcing enables the X industry to raise output.

Foreign sourcing may, of course, take place in either or in both sectors. If it occurs in the Y-sector only, then the production possibility curve shifts out along the vertical axis. It is easy to see that this restructuring is also welfare-improving relative to a preference arrangement without components trade. In this case, production of Y expands while production of X declines.

If foreign sourcing or production takes place in both sectors, then the outward shift of the production possibility curve will be less biased and welfare will improve once again relative to preference arrangements without component trade. In the context of a balanced expansion, output will tend to rise in both sectors, while employment of both factors will shift into the sector which uses the country's scarce factor relatively intensively.

An important feature of this regional rearrangement of production is that every country which moves to offshore procurement of components in which it has comparative disadvantage will experience an outward shift of its production possibility curve and a welfare improvement

relative to the traditional case in which each country produces the entire product at home.

4. **Varieties of Cross-Border Sourcing**

Offshore procurement of components can take place at arms length or through the activities of multinationals. The former approach will be most appropriate in the case of standardized parts sold in organized markets. This type of trade already exists, but more would take place if policy barriers and transactions costs were to fall further.

At the other end of the spectrum lies trade in components that are custom-made for particular products. Boeing and Airbus procure components abroad that are made specifically for particular airplanes and thus have no alternative uses. The maquiladora operations of American and other foreign firms in Northern Mexico represent an example of offshore final-product assembly. Assembly is procured offshore because it is relatively labor-intensive. In these instances, foreign procurement consists of foreign production carried out by partner companies or affiliates. This is where multinationals play an important role and where flows of foreign direct investment (FDI) typically precede the flow of components.

The essential point here is that when costs of component production vary across countries, industrial strategies that rely on production sharing and production networking across national borders will generate welfare benefits that will exceed those available under strictly national approaches. For this approach to work, however, countries must not only remove border barriers to the flow of components, but coordinate and harmonize regulatory and product standards, facilitate the movement of persons across borders, provide services infra-structures needed for cross-border coordination, and so on. The nature and purpose of such an exercise is somewhat akin to the European Union's Single Market project (Europe 1992). At its completion, countries will be specialized in producing components for use not only at home, but throughout the region. Production runs will thus be longer as firms are able to supply their own and partner country needs. This will enable many to capture scale economies that would not be available at lower, strictly nationally oriented, output levels. The cost savings generated by scale

effects will increase competitiveness and thus permit output levels of final goods that will be larger than otherwise.

Component specialization clearly works well when end products are homogeneous, for it allows markets in components to develop. But it also applies to products which are differentiated by variety and thus have custom-made components. To the extent that consumers value variety, differentiated models of a given product type may be produced in different areas of the region, but component specialization can nevertheless play an important role in reducing costs and increasing efficiency and competitiveness. There may not be scale economies present in assembly of the final, differentiated product, or in the production of its customized components, but scale economies in the common components can contribute to cost savings.

5. **Market Opening Through Component Specialization**

As noted earlier, Asia's policy makers are seeking to avoid regional arrangements which upset their global trading partners. They are under pressure from the United States, the European Union and other advanced countries to open up their economies to imports. Their reluctance to comply is often based on the fear that without some protection from the competition of imports from advanced countries, they will not be able to move up the value chain toward more technologically complex, skill- and capital-intensive products.

While this argument has some merits, import protection may not be the best way to solve this problem. Tariffs imposed on imports of the end-product protect all components, without distinguishing between components in which a country has comparative advantage and those in which it does not. It places the emphasis too heavily on making the entire product, rather than making the parts in which the country possesses comparative advantage. It is not necessary for a country to produce the entire product in order to become a world player in new, more advanced industries. The focus should be on parts and components, as well as assembly, which use intensively the factors of production and the technologies with which the country is relatively well endowed. Thus, when assembly of the end product is skill-, capital- and technology-

intensive, it is most efficiently carried out abroad and the country should not try to make the entire product. It should choose instead to become a supplier of the components in which it has comparative advantage. Even when assembly lies within its comparative advantage domain, it may eschew production of the entire product, opting instead to import components in which it suffers comparative disadvantage.

The essentials of the argument are illustrated in Figure 2, in which good Y, measured vertically, is the country's import good. We suppose that this is the product in the manufacture of which the country wishes to become more proficient. Suppose that, in pursuit of that goal, the country has imposed an MFN tariff on imports of full product, as a result of which the home price ratio, P_d, has risen relative to the world price, P_w.

In the figure, two tariffs of different magnitude are considered. In order to minimize clutter in the figure, the two tariffs are assumed to produce the same domestic, tariff-inclusive price. That means that the larger of the tariffs is imposed on a lower world price of good Y, P_w. This tariff creates a large wedge between the world price, P_w and the home price. The smaller tariff creates the slimmer wedge between the domestic price and the world price P_w'. In the initial situation, production is at Q and consumption, respectively, at C and C_1.

Suppose that the Y-industry implements outsourcing of components in which it has comparative disadvantage, with the consequence that costs fall and the production possibility curve shifts out to TT'. For a small, price-taking country, relative world prices are unaffected by this move, and if tariff rates remain unchanged, then the domestic commodity price ratio is also unaffected. As a result, production moves to point Q' in both the high- and the low-tariff scenario. In the latter, consumption moves to point C_1' on a higher indifference curve; in the former, consumption moves to point C' on a lower indifference curve. It is clear that the high tariff is inimical to the country's own welfare considerations.

5.1 Production Networks, Wages and Employment

As noted above, employment and output will tend to expand in the sector which engages

in cross-border sourcing of components. The effect of cross-border sourcing on relative factor prices depends on the sector in which it takes place. In the Heckscher-Ohlin context, it does not depend on the factor-bias of the sourcing innovation. If cross-border sourcing takes place in the labor-intensive sector, the wage-rental ratio rises; if it takes place in the capital-intensive sector, the ratio falls.[6]

Thus, if countries in Asia-Pacific switch to offshore sourcing in their import sector, which will tend to be the capital-intensive sector, then the wage-rental ratio will move against labor. That does not mean that wages will fall absolutely, but that they will rise less rapidly than capital rentals (or the wages of skilled workers, if skilled workers are the other factor).

If, however, cross-border sourcing is combined with reduction of tariffs on the imported good, then the consequent reduction in the price of Y will tend to raise the relative wage. Hence, trade liberalization in the Y-sector, combined with offshore sourcing of the capital-intensive component by that sector, will reduce the extent to which relative wages decline and may raise them if the tariff reduction is significant.

6. **Scale Economies and other Dynamic Elements**

With some notable exceptions, the countries in Asia-Pacific tend to be small. The home market is too small to allow firms to fully exploit scale economies in many branches of manufacturing and services. While the region offers some opportunities for large-scale production, the similarity of many products marketed by the region's nations limits the market share any one of them can hope to garner. That is why access to the US market and to other large advanced economies is so important. It is also a reason, as noted above, why regional trade integration of the traditional type offers limited opportunities.

If countries abandon the notion that every product must be produced at home, regional specialization at the level of parts and components offers not only the static welfare gains discussed in the preceding sections, but new opportunities to exploit scale economies. When every country produces its own components, production runs are likely to be small for the

aforementioned reasons. But if production of a given component is allowed to take place in the country or countries where costs are lowest, then production runs will be larger and hence scale economies will become accessible.

For this structure to work, man-made and natural barriers must be removed and coordination and transportation costs must be brought down. Both policy makers and the private sector have a role to play in this respect. Governments must eliminate policy obstacles which prevent firms from producing anywhere in the region. This is task is obviously very different from the traditional focus on the removal of trade barriers. The point here is not simply to free up the flow of goods, but to create an integrated regional production arena.

For its part, the private sector must invest in services networks that will permit them to coordinate productive activities across borders. The optimality of plant location must be viewed from the regional rather than the national perspective. Politicians and the public must abandon the habit of viewing the outflow of investment capital as inimical to national welfare. There will be situations in which investment by a firm in country A in a component -producing facility in country B will be more beneficial to the regional and international competitiveness of that firm than investment of the same magnitude in the home industry. The investment outflow will make economic sense if, by reducing the cost of an imported component, it reduces overall costs more than any domestic investment alternative. The outflow of capital is thus a means of shifting out the domestic production possibility curve. Output and employment will rise when the industry invests abroad.

7. **Concluding Comments**

The countries of Asia-Pacific continue to search for ways of making regionalism work for them. The traditional approach to regional economic integration, of which the European Union is the best example, does not appear to offer much in the way of benefits, especially for groupings of smaller countries which exclude the region's larger economies. A weakness of the traditional approach is its preoccupation with trade liberalization and its neglect in the early

phases of the process of the need to create a single market. Trade liberalization alone cannot eliminate the segmentation of markets and thus cannot create the regional production arena that is essential for industrialization and development.

The approach suggested in these pages places the focus on development of regional production networks. Whereas the traditional approach emphasizes comparative advantage at the product level, the proposed approach is based on comparative advantage at the level of parts, components, and assembly. A production network based on component specialization will allow components to be produced and product assembly to be conducted according to the dictates of comparative advantage. This will reduce production costs throughout the region and thus make the region's producers more competitive in world markets. In addition, the larger production runs permitted by component specialization will make scale economies more accessible and thus add further to cost competitiveness.

Implementation of a regional system of production networks requires harmonization of regulatory and other policies and the removal of barriers to the flow of services, persons, and finance. These changes need to be implemented early in the process of regional integration. There is no particular need for preferential trade liberalization, because creation of a regional production arena will enable member countries to achieve many of the objectives associated with creation of the traditional preference area. If a traditional preference area is pursued nevertheless, then component specialization is needed to reduce the likelihood of net trade diversion. The key finding, therefore, is that the example set in Europe and elsewhere, which is to postpone creation of a "single market" until the regionalization process is far advanced, is not appropriate in Asia-Pacific. Creation of regional production networks is thus a means of implementing the goal of "open regionalism."

End Notes

1. See, for example, Courchene and Harris (2000) and Grubel (2000).
2. See Bergsten (1997) for an attempt to define the options under “open regionalism.”
3. See Johnson (1967).
4. See Yeats (2001).
5. See Arndt (1997, 1998), Deardorff (2001), and Jones and Kierzkowski (2000, 2001) for detailed analyses.
6. See, for example, Arndt (1997, 1998, 2001).

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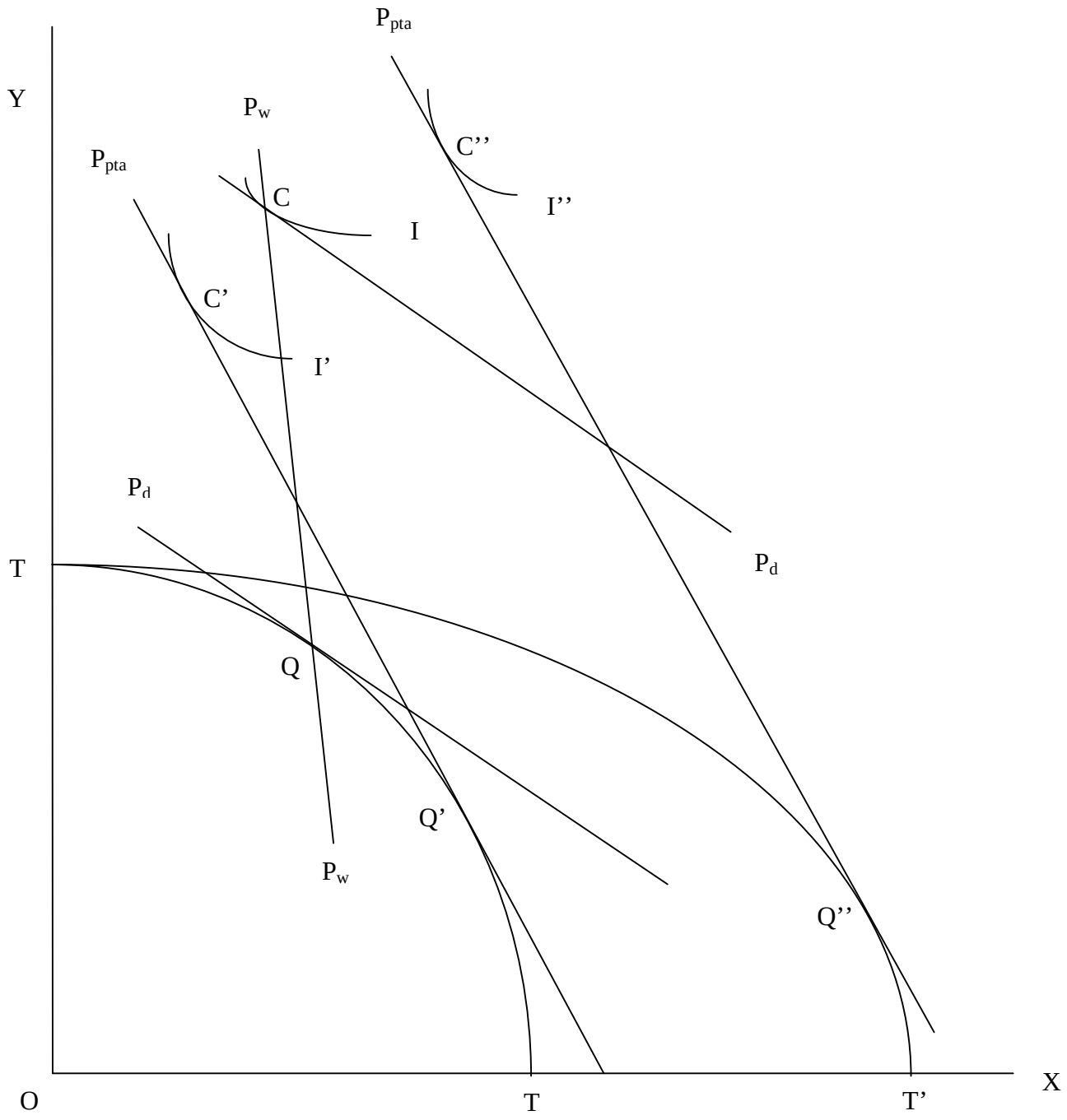

Figure 1

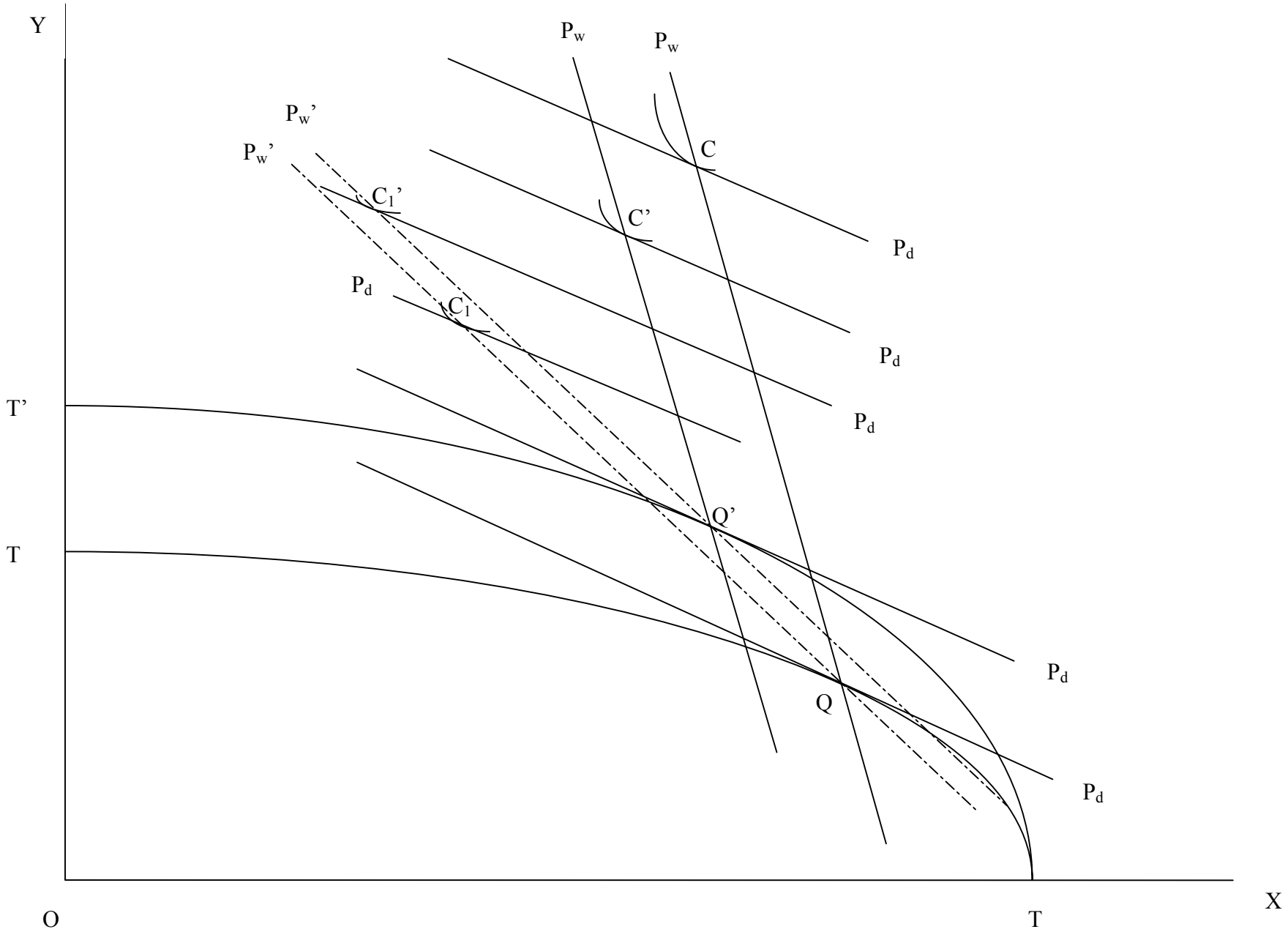

Figure 2