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Cross-Border Production Sharing and Exchange Rates in East Asia

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Abstract

Economic integration in East Asia is proceeding along two tracks. One involves discussions among governments and focuses on formal agreements covering bilateral and regional free trade areas, as well as cooperation at the level of macroeconomic stabilization. The other is informal and driven mainly by market forces, as part of the larger process of globalization and the growing integration of national economies into the world economy. A key feature of that process is the spread of cross-border production networks. The paper examines the implications of this development for official integration and concludes that its effects are negative for the suitability of traditional free trade areas and customs unions, but positive for “single-market” policies. *De facto*, market-oriented integration diminishes the sensitivity of trade flows to exchange-rate changes, which may be interpreted as reducing the case for floating rates and favoring (or facilitating) monetary cooperation.

Keywords: Fragmentation; cross-border production networks; regional integration; currency areas.

JEL Codes: E32, F11, F15, F31

1. Introduction

Although regional economic cooperation at both trade and macroeconomic levels continues to be a topic of discussion among East Asian governments, the extent and depth of formal integration have been rather limited, particularly when compared with the European experience. Meanwhile, however, market-driven integration is proceeding apace, particularly in the area of cross-border production sharing. As this process continues, it may help clarify the issues and rearrange the options for official policy cooperation.

It is becoming increasingly clear that the European customs union is not a model for East Asia. The EU as a customs union offers a variety of important lessons, but it is not a model to be imitated, not least because important trading partners like the United States (in an East Asian set-up) and the U.S., Japan and China (in a narrower South-East Asian arrangement) would be excluded. Similarly, the accumulating evidence suggests that NAFTA is not a workable model for East Asia either, particularly if it is encumbered by restrictive rules of origin (ROOs). The European Single Market, on the other hand, interpreted as non-discriminatory elimination of a variety of barriers and harmonization of regulatory policies and standards, contains the seeds of a workable approach toward regional integration. At the level of macroeconomic policy and exchange-rate regimes, EMU may also be unsuitable as a model as concerns over instabilities due to fiscal policies multiply.

In the following pages, we assess the options for intensified regional policy cooperation in light of changing circumstances. Section 2 reviews the specifics of market-based integration, particularly with respect to cross-border production networks. Section 3 discusses the implications of production sharing for the sensitivity of trade flows to exchange rates and for the choice of exchange-rate regime. Section 4 concludes.

2. Regional Integration in an Age of Globalization

Regional integration in East Asia, and even more so in South-East Asia, has always faced problems associated with the costs of exclusion. A strict regional interpretation of preferential trade arrangements would require the exclusion of countries with whom trade shares were large. Any arrangement limited to South-East Asia, for example, would exclude Japan and the U.S., and probably China, while an agreement covering East Asia would exclude the U.S.¹ It is for this reason that the countries in the region have favored some form of “open regionalism,” which, though never fully articulated, had the objective of furthering regional cooperation without impairing relations with important extra-regional trading partners.

While the region’s policy makers have struggled with the issue, considerable de facto market integration has taken place, stimulated in part by continuing multilateral trade liberalization and by the ongoing process of globalization. The latter has been facilitated by the rapid decline in communication and transportation costs. Not only has intra- and inter-regional trade grown rapidly, but the production of goods and services has been internationalized by the spread of cross-border production sharing. Unlike the European model, which was dominated by traditional trade liberalization, regional integration is made “deeper” in the Asia-Pacific region by virtue of the rapid spread of cross-border production networks. The “problem” with this process of production integration is that it is not confined to the region, but involves important linkages to countries outside the region.

The effects of cross-border production sharing, also known in the literature as cross-border fragmentation of production, have received considerable attention in recent years.² In principle, the welfare benefits can be substantial and are likely to exceed the potential gains

from further traditional preferential as well as multilateral trade liberalization. But the welfare effects depend on the nature of the trade regime in which they take place. They are unequivocally welfare-enhancing under free trade and in the context of an existing preferential trade area. But since a free-trade area may be welfare-creating or diverting, the welfare benefits of cross-border production sharing may be offset if the associated FTA is trade-diverting. Put somewhat differently, cross-border fragmentation will mitigate, but cannot always fully offset, the welfare-reducing effects of a trade-diverting free trade area. A full negative outcome is more likely as the FTA's rules of origin become more restrictive.

This can raise particularly thorny issues for narrowly defined preferential trade agreements among nations in South-East Asia, where those nations are involved in "offshoring" networks with Japan, China, and the United States. Restrictive rules of origin, designed to limit the deflection of components imports from non-members, could very quickly generate net trade diversion. A broader arrangement that included East Asian countries, would still exclude the United States and thus contain the threat of reduced welfare gains.

If cross-border production sharing is introduced in the context of an MFN tariff regime, its welfare effects may be positive or negative. In Figure 1, the initial production and consumption equilibria are given at Q_0 and C_0 , respectively, where an existing MFN tariff has introduced a wedge between the domestic price, P_d , and the world price, P_w . When cost-reducing offshore procurement of components is introduced in the import industry, X , the effect is to shift out the production possibility frontier along the horizontal axis from point T to point T' .³

For a small country with a given tariff, there is no change in either the world price or the domestic price. The production point (Q_1) is displaced in a south-easterly direction along

the Rybczynski line in a manner which raises output in the outsourcing sector and reduces it in the other sector. Consumption recedes to point C_1 on a lower indifference curve. Thus, introduction of cross-border production sharing has reduced welfare.

The situation depicted in Figure 2 is much the same, except that the tariff is smaller, so that the wedge between domestic and world prices is smaller. Here, implementation of production sharing raises welfare as consumption shifts from C_0 to C_1 . Whether the spread of production networks is welfare-enhancing or welfare-reducing thus depends on the tariff regime in the context of which it occurs. This, in itself, is an argument for non-discriminatory removal of tariff barriers.⁴

What is relevant to the ongoing process of production sharing in Asia Pacific is that it may in places be generating negative welfare effects, especially where inefficiencies and distortions inherent in existing tariff structures are significant. This is an argument in favor of further tariff liberalization, in order to allow market-driven integration to proceed in the presence of undistorted price signals. It is, however, mainly an argument in favor of non-discriminatory tariff liberalization. Preferential liberalization, particularly in the context of an FTA, will make the situation worse if it is net trade diverting and if it comes with tough rules of origin.

Investment Liberalization and Regulatory Harmonization

Typically, full exploitation of the benefits of cross-border production sharing requires factories to be built and facilities to be set up. Often, that involves the flow of foreign direct investment (FDI) and that means that liberalization must go beyond trade liberalization to encompass facilitation of investment and production. It is important, therefore, for trade

liberalization to be accompanied by regulatory and other policies designed to create an environment supportive of production sharing.

As Kimura and Ando (2003) have shown, Japanese multinationals have been playing a key role in the establishment of production networks in South-East Asian countries. U.S. multinationals are also involved and some countries in the region, like Singapore and Hong Kong, have moved into China to establish production operations to take advantage of low-cost labor.

This is a development, which not only did not exist in Europe, but which changes the nature of the regional integration problem. It is easy to see why a traditional customs union is inappropriate, unless it exempts components from discriminatory tariffs and facilitates FDI, movement of persons, ownership, etc. Similarly, a traditional FTA is inappropriate because it creates the costs and trade diversion associated with rules of origin.⁵

The focus should be instead on creation of an integrated regional market, which does not discriminate against extra-regional participants. Key agenda items should include harmonization of regulatory policies, including technical and other standards, rules pertaining to establishment of business operations, work permits, etc; facilitation of cross-border production coordination; tax policies; and related issues.

Trade and cross-border production coordination place special requirements on financial markets and financial institutions. Some aspects of trade and production finance benefit from centralization and agglomeration, while others benefit from localization and fragmentation. An optimal regional financial system would consist of a mix of agglomeration and fragmentation. This suggests that integration of financial sectors, too, will benefit from cross-border production sharing. Such cooperation is needed not only to provide efficient financing of production and trade, but to compete in the provision of financial services with the world's

leading financial centers and institutions. Since service links probably offer scale economies, region-wide institutions are needed. The objective is to create an efficient, large regional market, which avoids inefficient centralization by fragmenting the production of specific services components around a regional production network. In addition to providing financial services in the region, the arrangement can serve as a basis for financial services exports.

A key question in the design of regional cooperation pertains to the emerging role of China and the evolving role of Japan. The latter is a major trading nation, as well as a key investor. Its multinationals are playing a key role in fostering the development of production networks involving the smaller nations in Asia-Pacific.

China, meanwhile, is engaged in offshore sourcing of parts and components for use in its exports. Indeed, the domestic value-added contained in some Chinese exports can be quite low. This has important implications apart from the basic aspects outlined earlier in this section. It means that exports of a number of countries depend not on China's internal demand, but on China's exports.⁶ Hence, a trade dispute between the U.S. and China that curtails Chinese exports of finished products will spill over to those countries' exports of parts and components. Does this suggest a reason for trade policy cooperation among the countries involved?

It also has implications for exchange-rate policies. From China's point of view, one way to maintain export competitiveness in the U.S. market, when the renminbi appreciates, is to allow it to appreciate against the currencies of countries which supply the aforementioned components. In this way, the reduced yuan cost of imported components can be used to partly offset the rise in the dollar price of the finished export.⁷

3. Macroeconomic Integration and Exchange Rates

While the policy debate in Asia-Pacific has mostly focused on real-sector integration, the exchange-rate crises of the late nineties stimulated discussion of closer regional cooperation at the money/macro/exchange-rate level. An important concern has been provision of a regionally based first line of defense against financial and exchange-market shocks. Among the prominent options are reserve pooling, an Asian monetary fund, individual and coordinated basket pegs, etc. The most visible development has been the Chiang Mai initiative. On the whole, however, progress has been rather slow and limited.

Convergence of Business Cycles

Meanwhile, ongoing market-based integration, including the spread of production networks, is altering the framework conditions and redefining the options. While governments have not made much progress in terms of coordinating monetary policies and financial regulation, financial markets have become more open within and beyond the region. “Offshoring” by services industries is gaining increasing public attention.

One of the implications of cross-border production sharing is that it contributes to business-cycle convergence. Production sharing in the auto sector between the U.S. and Canada and the U.S. and Mexico, for example, implies that shocks to that industry will be felt in both countries. As production sharing spreads across sectors, symmetries expand and business cycles converge.⁸

This has implications for the performance of exchange-rate regimes, in the choice of which the role of structural and shock asymmetries among countries have been a key consideration. Generally speaking, structural and shock asymmetries have been viewed as

arguments against fixed rates and in favor of floating rates. Exchange-rate flexibility has been viewed as a key adjustment avenue for economies hit by country-specific shocks and the floating rate has been hailed as a buffer against certain types of external shocks. When prevailing shocks become more symmetric and structural similarities among economies rise, the exchange rate has less to buffer and less to adjust to.

It has long been understood that trade may exacerbate as well as mitigate cyclical asymmetries.⁹ When trade promotes inter-industry specialization, it tends to increase cyclical divergence, as understood in the traditional literature. Specialization based on intra-industry trade, on the other hand, fosters synchronization of business cycles by increasing the similarities in economic structure. The former type of specialization has generally been associated with trade between dissimilar economies, such as developed and developing countries, while the latter has been associated with trade among similar economies, with Western Europe as the primary example of similar end products moving in both directions across a country's borders.

Cross-border production sharing generates a new form of intra-industry trade, this time with components moving in one direction and finished products in the other, with both attached to the same industry. While this type of production sharing may take place between any two countries, it offers particularly effective means of cost-saving specialization between advanced and developing countries. In East Asia, where Japanese and American multinationals are engaged in production sharing with emerging economies, and where trade in components is also important among the emerging economies themselves, forces tending to synchronize business cycles and to reduce asymmetries are unleashed.

Synchronization of business cycles thus reduces the problems associated with asymmetric shocks. This, in turn, may be interpreted as enhancing the case for fixed exchange rates and reducing the case for floating rates. The main point of the argument would be that the reduction of asymmetries reduces the need for exchange-rate flexibility as a response mechanism. This would weaken or remove an important benefit of floating rates.

But convergence of cycles may also be interpreted the other way, as enhancing the case for floating rates. One of the key complaints against floating is that exchange-rate volatility inhibits trade, causing it to fall short of the welfare-maximizing optimum. To the extent, however, that reduction of asymmetries and cyclical convergence reduces the volatility of floating rates, it deflates an important argument against flexible rates. As we shall argue below, production sharing tends to reduce the sensitivity of trade flows to exchange rates and thus further diminishes the relevance of the excess-volatility argument.

In the Asia-Pacific context, this means that the spread of cross-border production is making the choice of exchange rate regime less critical and less difficult. It makes adoption of fixed rates easier if other considerations argue for them, but it also makes abandoning fixed rates less of an issue.

Exchange-Rate Sensitivity and Pass-through

Production sharing raises the importance of trade in parts and components in overall trade. Indeed, under a fully developed cross-border production network, goods-in-the-making may cross borders back and forth as they pass through various stages of production. This has important implications for the sensitivity of trade flows to movements in exchange rates. There is evidence from U.S.-Mexico trade, for example, that exports of U.S.-made auto

components to Mexico and imports of automobiles from Mexico are less sensitive to exchange-rate movements than trade in general.

When the peso depreciates against the dollar, the peso price of imported components rises, thereby raising the peso cost of producing automobiles in Mexico. This rise in cost would be passed through to higher dollar prices paid by U.S. importers. However, the depreciation reduces the dollar price of the peso and thus the dollar price of imported automobiles. Thus, the dollar-price of automobile imports will fall less than would have been the case if the product had been made in its entirety in Mexico. A given depreciation changes the dollar price less and thus generates less of a change in imports. (The full, or traditional, effect of peso depreciation thus applies only to the Mexican value-added contained in the final product.)

Furthermore, the diminished change in U.S. imports of automobiles (relative to what would be the case if the car were produced entirely in Mexico), tends to inhibit the extent to which Mexican imports of U.S.-made parts and components decline. Hence, as the share of U.S. value-added rises in U.S. imports of the final product, the reaction of U.S. component exports to the exchange-rate should decline.

The adjustments involved may be illustrated with the aid of Figure 3, where the left-hand and right-hand panels represent domestic demand and supply conditions in countries A and B, respectively, in the markets for product X. Country B is the low-cost producer and thus exporter of product X. Assuming an initial exchange rate (E) of unity between the two countries' currencies establishes trade at world price P_w . That price is determined by the intersection in the middle panel of country A's net import demand curve (D_{IA}) with country B's export supply curve (S_{EB}). (The price axis in the middle panel will be double scaled.)

When country B revalues its currency to E' , the effect is to shift country B's export supply curve up to S_{EB}' . The domestic-currency price rises to P_{XA} in country A and falls to P_{XB} in country B. (Purchasing power parity is assumed for simplicity.) Imports into country A fall. This is the outcome expected by U.S. policy makers, following a revaluation of the Chinese yuan.

If the yuan is revalued against the currencies of countries from which China imports components used in the making of X, then the decline in production costs discussed above has the effect of shifting the supply curve in the right-hand panel to S_{XB}' and the export supply curves in the middle panel to $S_{EB'}(E)$ and $S_{EB'}(E')$, respectively. This results in a new set of post-revaluation prices, namely, P_{XA}' in country A and P_{XB} in country B. The price of imports rises by less after the devaluation of country A's currency and imports shrink by less with production sharing than without. The extent of the difference depends on the importance of imported components in X- production in country B, that is, it is inversely related to domestic value-added in country B's exports. It also depends, as already noted, on the extent to which revaluation of country B's currency includes those third-country currencies.

In the context of trade in the Asia-Pacific region, a number of export-import scenarios come to mind. For example, end products exported by China to, say, the United States contain parts and components made in other countries in the region. Hence, the effect of a change in the RMB-dollar exchange rate on Chinese exports to the U.S. will depend on whether exchange rates between the yuan and the currencies of the aforementioned Asian countries change or remain the same. Thus, a yuan appreciation against the dollar that is accompanied by a yuan appreciation against the other currencies will have a weaker effect on trade volumes than one that is not. The yuan appreciation against the dollar should raise the dollar price of

Chinese exports, while its appreciation against the currencies of South-East Asian suppliers of components makes those components cheaper. This exchange-rate induced decline in input costs may serve as a partial offset to the rise in the dollar price of the yuan.¹⁰

4. Conclusion

Regional economic integration has been on the policy agenda among Asia-Pacific countries for several decades. Some important strides have been taken in terms of both real and monetary integration, although progress has been slow relative to Europe and even North America. There are very good reasons for this, including the need to avoid discriminating against important outside trading partners.

While governments have proceeded cautiously, however, considerable integration has taken place at the level of markets for goods, services, and assets. This progress has been facilitated by multilateral trade liberalization and by technological advances which have sharply lowered the cost of communication and transportation. An important feature of this gradual globalization of many markets has been the spread of cross-border production networks.

This phenomenon is changing the way economies work and interact and thus has important implications for regional cooperation and integration at the policy level. As cross-border production sharing expands, the traditional types of trade integration - free trade areas and customs unions - become increasingly unsuitable for the region. MFN tariff structures are also inappropriate and can lead to costly welfare consequences in the wake of expanding production networks. Instead, policy makers should focus on the creation of regional markets, somewhat akin to the European Union's "Single-Market" project.

Cross-border production sharing tends to reduce the sensitivity of trade flows to exchange-rate changes. When two countries engage in production sharing, with components flowing in one direction and end products in the other, changes in currency values affect both imports and exports and in ways that are offsetting. When, for example, a country's currency depreciates, the home-currency price of its imports of the end-product rises, but the production cost expressed in the partner's currency falls as a result of the decline in the cost of imported components.

The repercussion holds as well when a country imports components from another country to be included in exports of end products to a third country, provided that its currency appreciates or depreciates against both of those countries. This has interesting implications for the current debate over the likely effects of the yuan's appreciation on the competitiveness of Chinese goods in the U.S. market. It will tend to weaken the effect on prices and quantities in the importing country.

The trade flows associated with cross-border production sharing represent a type of intra-industry trade. Such trade tends to foster convergence of business cycles and thus reduces the problems connected with asymmetric shocks and their implications for the choice of exchange-rate regime. As cycles are synchronized, an important objection to fixed rates is weakened, and with it an important argument in favor of the buffer function of floating rates. Added to the fact that cross-border production sharing reduces the sensitivity of trade flows to exchange-rate changes, this strengthens the case for some type of fixed-rate system.

End Notes

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1. This problem is not unique to the Asia-Pacific region, for it applies to Mercosur as well, and represents a major flaw in that arrangement.

2. See, among others, Arndt (1998, 2001), Deardorff (2001a,b), Feenstra (1998), Hummels et al. (2001), Jones and Kierzkowski (1990, 2001), Swenson (2004), and Yi (2003).

3. It has been shown that in the standard trade model offshore component sourcing has effects analogous to those of technical progress.

4. The effect of fragmentation also depends on the sector in which it takes place. Component sourcing in the export sector, Y , raises welfare unambiguously.

5. Recent research in Canada suggests that the costs of rules of origin are quite high. It also suggests that significant shares of U.S.-Canada and U.S.-Mexico trade do not take advantage of NAFTA status, because the costs of compliance exceed relevant MFN tariff rates. See, Papadaki, Hernandez, Lan and Merette (2005), Ghosh and Rao (2005), and Kunimoto and Sawchuck (2005).

6. There is evidence from NAFTA that Mexico's imports of automobile components from the United States are governed more by U.S. imports of finished automobiles than by Mexico's GDP, the variable of choice in the traditional trade equation.

7. The literature has dealt at length with the issue of exchange-rate pass-through. This is an additional reason for limited pass-through of exchange-rate changes to import prices.

8. See, for example, Torres and Vela (2003).

9. See Krugman (), Eichengreen () and Bergsten ().

10. Parenthetically, this argument has implications for the ongoing dispute between the United States and China over the foreign-exchange value of the yuan. The pattern of cross-border production sharing defined in this scenario suggests that a yuan appreciation or revaluation of a given magnitude will have a smaller effect on the bilateral trade balance than would be the case if the exports in question contained no foreign value-added.

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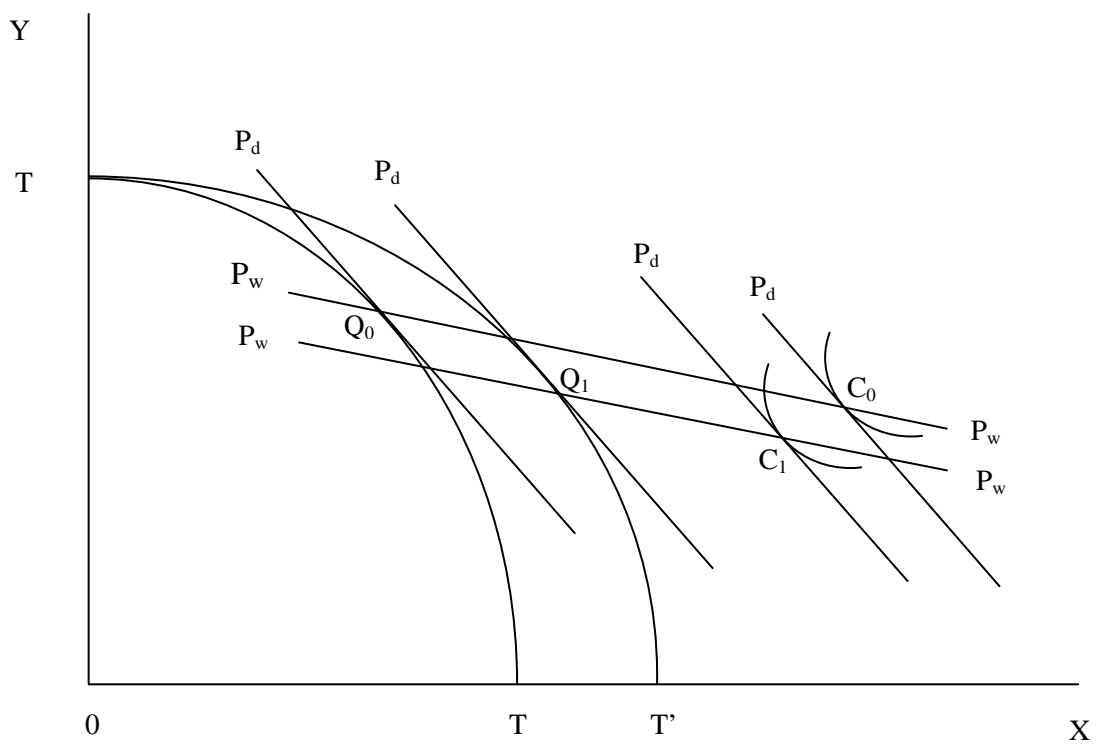


Figure 1

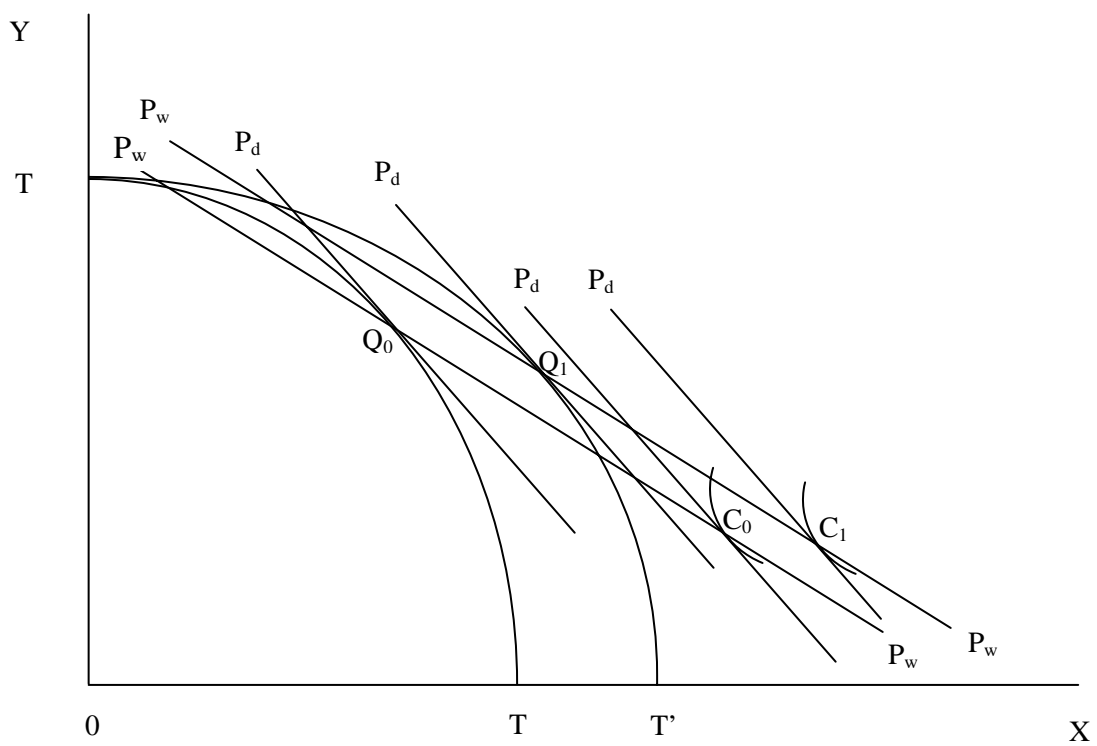


Figure 2

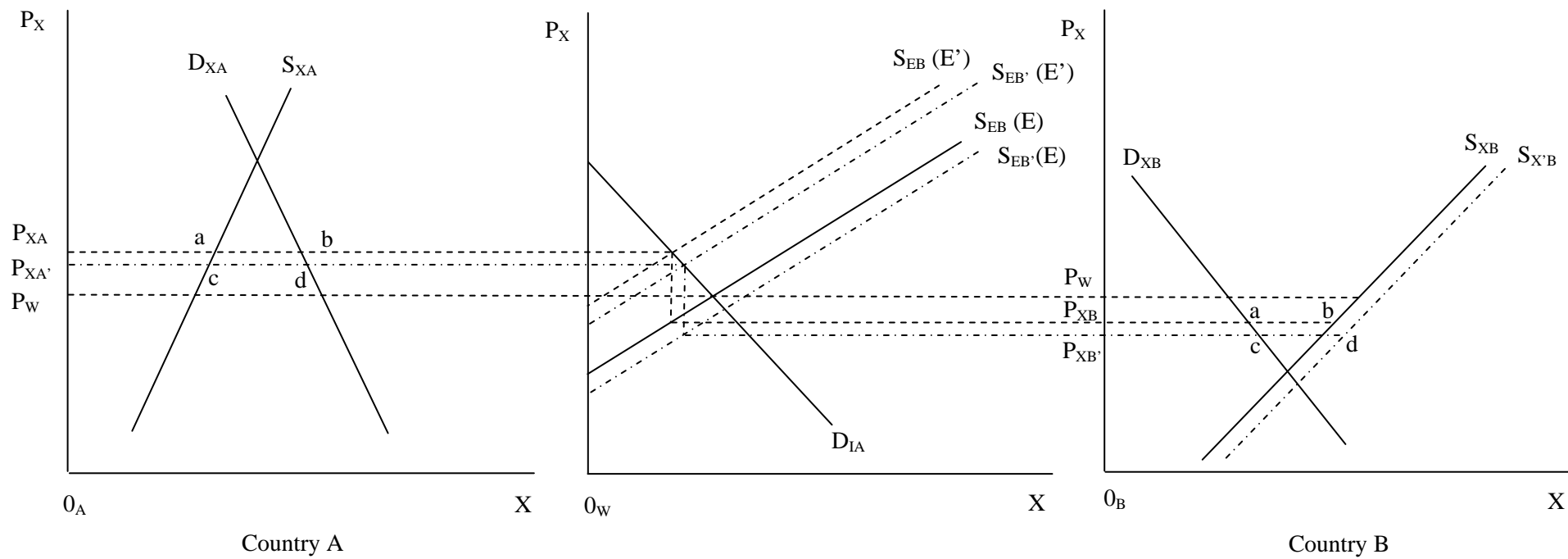


Figure 3