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International Economics

Theory & Policy

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will, other things being equal, be more efficient in that industry than a country with a small industry. Or to put it differently, external economies can give rise to increasing returns to scale at the level of the national industry.

While the details of external economies in practice are often quite subtle and complex (as the example of Silicon Valley shows), it can be useful to abstract from the details and represent external economies simply by assuming that an industry's costs are lower, the larger the industry. If we ignore possible imperfections in competition, this means that the industry will have a **forward-falling supply curve**: The larger the industry's output, the lower the price at which firms are willing to sell their output.

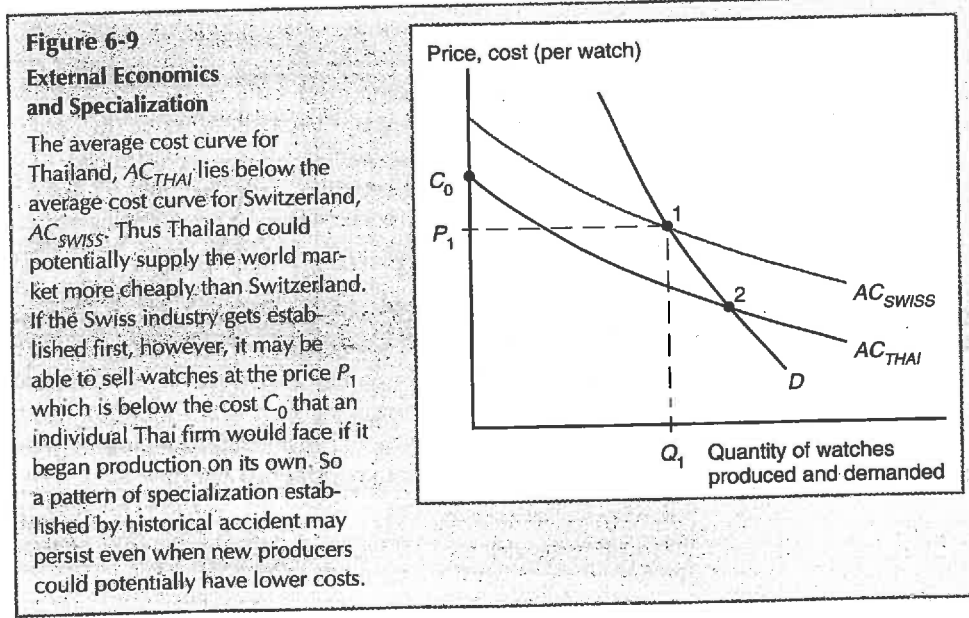
External Economies and International Trade

External economies, like economies of scale that are internal to firms, play an important role in international trade, but they may be quite different in their effects. In particular, external economies can cause countries to get "locked in" to undesirable patterns of specialization and can even lead to losses from international trade.

External Economies and the Pattern of Trade

When there are external economies of scale, a country that has large production in some industry will tend, other things equal, to have low costs of producing that good. This gives rise to an obvious circularity, since a country that can produce a good cheaply will also therefore tend to produce a lot of that good. Strong external economies tend to confirm existing patterns of interindustry trade, whatever their original sources: Countries that start out as large producers in certain industries, for whatever reason, tend to remain large producers. They may do so even if some other country could potentially produce the goods more cheaply.

Figure 6-9 illustrates this point. We show the cost of producing a watch as a function of the number of watches produced annually. Two countries are shown: "Switzerland" and "Thailand." The Swiss cost of producing a watch is shown as AC_{SWISS} ; the Thai cost as



AC_{THAI} . D represents the world demand for watches, which we assume can be satisfied either by Switzerland or by Thailand.

Suppose that the economies of scale in watch production are entirely external to firms, and that since there are no economies of scale at the level of the firm the watch industry in each country consists of many small perfectly competitive firms. Competition therefore drives the price of watches down to its average cost.

We assume that the Thai cost curve lies below the Swiss curve, say because Thai wages are lower than Swiss. This means that at any given level of production, Thailand could manufacture watches more cheaply than Switzerland. One might hope that this would always imply that Thailand will in fact supply the world market. Unfortunately, this need not be the case. Suppose that Switzerland, for historical reasons, establishes its watch industry first. Then initially world watch equilibrium will be established at point 1 in Figure 6-9, with Swiss production of Q_1 units per year and a price of P_1 . Now introduce the possibility of Thai production. If Thailand could take over the world market, the equilibrium would move to point 2. However, if there is no initial Thai production ($Q = 0$) any individual Thai firm considering manufacture of watches will face a cost of production of C_0 . As we have drawn it, this cost is above the price at which the established Swiss industry can produce watches. So although the Thai industry could potentially make watches more cheaply than Switzerland, Switzerland's head start enables it to hold on to the industry.

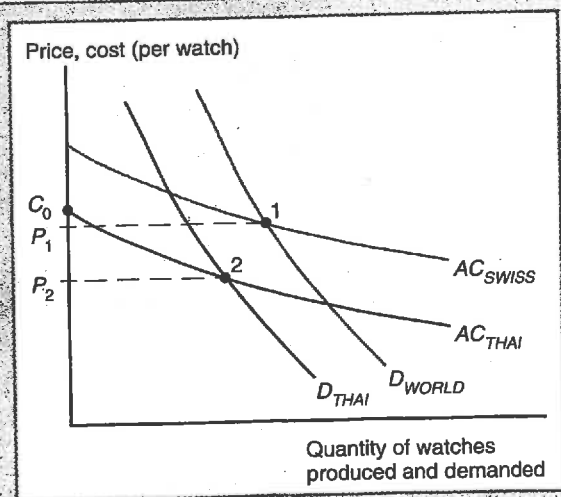
As this example shows, external economies potentially give a strong role to historical accident in determining who produces what, and may allow established patterns of specialization to persist even when they run counter to comparative advantage.

Trade and Welfare with External Economies

Trade based on external economies has more ambiguous effects on national welfare than either trade based on comparative advantage or trade based on economies of scale at the level of the firm. There may be gains to the world economy from concentrating production in particular industries to realize external economies. On the other hand, there is no guarantee that the right country will produce a good subject to external economies, and it is possible that trade based on external economies may actually leave a country worse off than it would have been in the absence of trade.

Figure 6-10
External Economies and Losses from Trade

When there are external economies, trade can potentially leave a country worse off than it would be in the absence of trade. In this example, Thailand imports watches from Switzerland, which is able to supply the world market (D_{WORLD}) at a price (P_1) low enough to block entry by Thai producers who must initially produce the watches at cost C_0 . Yet if Thailand were to block all trade in watches, it would be able to supply its domestic market (D_{THAI}) at the lower price P_2 .



An example of how a country can actually be worse off with trade than without is shown in Figure 6-10. In this example, as before, we imagine that Thailand and Switzerland could both manufacture watches, that Thailand could make them more cheaply, but that Switzerland has gotten there first. D_{WORLD} is the world demand for watches, and, given that Switzerland produces the watches, the equilibrium is at point 1. However, we now add to the figure the Thai demand for watches, D_{THAI} . If no trade in watches were allowed and Thailand were forced to be self-sufficient, then the Thai equilibrium would be at point 2. Because of its lower average cost curve, the price of Thai-made watches at point 2, P_2 , is actually lower than the price of Swiss-made watches at point 1, P_1 .

We have shown a situation in which the price of a good that Thailand imports would actually be lower if there were no trade and the country were forced to produce the good for itself. Clearly in this situation trade leaves the country worse off than it would be in the absence of trade.

There is an incentive in this case for Thailand to protect its potential watch industry from foreign competition. Before concluding that this justifies protectionism, however, we should note that in practice identifying cases like that in Figure 6-10 is far from easy. Indeed, as we will emphasize in Chapters 10 and 11, the difficulty of identifying external economies in practice is one of the main arguments against activist government policies toward trade.

It is also worth pointing out that while external economies can sometimes lead to disadvantageous patterns of specialization and trade, it is still to the benefit of the *world* economy to take advantage of the gains from concentrating industries. Canada might be better off if Silicon Valley were near Toronto instead of San Francisco; Germany might be better off if the City (London's financial district, which, along with Wall Street, dominates world financial markets) could be moved to Frankfurt. The world as a whole is, however, more efficient and thus richer because international trade allows nations to specialize in different industries and thus reap the gains from external economies as well as the gains from comparative advantage.

Dynamic Increasing Returns

Some of the most important external economies probably arise from the accumulation of knowledge. When an individual firm improves its products or production techniques through experience, other firms are likely to imitate the firm and benefit from its knowledge. This spillover of knowledge gives rise to a situation in which the production costs of individual firms fall as the industry as a whole accumulates experience.

Notice that external economies arising from the accumulation of knowledge differ somewhat from the external economies considered so far, in which industry costs depend on current output. In this alternative situation industry costs depend on experience, usually measured by the cumulative output of the industry to date. For example, the cost of producing a ton of steel might depend negatively on the total number of tons of steel produced by a country since the industry began. This kind of relationship is often summarized by a **learning curve** that relates unit cost to cumulative output. Such learning curves are illustrated in Figure 6-11. They are downward sloping because of the effect of the experience gained through production on costs. When costs fall with cumulative production over time, rather than with the current rate of production, this is referred to as a case of **dynamic increasing returns**.

Like ordinary external economies, dynamic external economies can lock in an initial advantage or head start in an industry. In Figure 6-11, the learning curve L is that of a country that pioneered an industry, while L^* is that of another country that has lower input