

Immigration vs. Outsourcing: Effects on Labor Markets

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Developed countries such as the United States have recently voiced concern over two aspects of today's globalization scenario that have a direct effect upon labor markets. The first refers to the impact on laborers of an increase in immigration, whether legal or otherwise. The second concerns the perceived increase in the amount of international outsourcing, especially when labor-intensive parts of local production processes get sent to less developed countries in which wages are much lower and fewer regulations interfere with an entrepreneur's control of conditions in the workplace. Is the threat to workers in developed countries the same in these two situations? Would policies that may be considered to slow down the extent to which fragments of the production process are outsourced to labor-abundant countries have the same effect as stemming the flow of immigrants into developed countries? Basic economic reasoning should shed some light on these questions, and in what follows I emphasize the applicability of simple models found in the theory of international trade.

1. Inflows of Labor

In low-dimensional models of a competitive economy, with, say, homogeneous labor and capital as the only two productive factors, an inflow of labor either serves to lower the wage rate or, in certain circumstances, to leave it unchanged. This latter possibility is familiar to students of international trade theory who have studied the two-factor, two-

commodity (and two-country) scenarios in which two countries might find that if they share the same technology and engage in free trade, wage rates (and returns to capital) could be brought into equality between countries *despite* a difference in the endowment of capital relative to the labor force in the two countries. That is, a country might absorb an inflow of labor without any deterioration in the wage rate if commodity prices do not change (say they are determined in a larger world market) as long as the composition of produced output is sufficiently altered in favor of the labor-intensive commodity. That scenario entails the labor market clearing via the *extensive* margin (changed composition of output) instead of the *intensive* margin (altering labor intensities by changing factor prices). However, if the number of factors exceeds the number of commodities, changing the composition of output would prove insufficient and such a labor inflow would lower the wage rate.

This account does little justice to real-life episodes in which labor inflows have been encouraged. A prime example is the guest-worker program adopted by several of the more developed European countries in the decades after the Second World War. This phenomenon is best understood in a background of many heterogeneous types of labor as well as job skills required. In particular, Europeans were seeking workers from less developed countries willing to serve in the more menial, and lower paid, occupations shunned by many members of the local workforce. A wage rate that seemed unattractive to locals might represent a tripling of the alternative wage that could be earned at home by foreign migrant workers. Similarly, for years American farmers in the southwest have relied on migrant labor coming from Mexico in order to compete effectively in markets

for their produce, not to mention the demand for relatively low-paid labor to provide household services in southern California.

Crucial to the theoretical argument that such immigration might be beneficial to a country's labor force is the heterogeneity of various types of labor and occupations. Although in a two-factor setting (labor and capital), an increase in the labor supply cannot raise wages, in a many factor setting complementarity may be widespread. Thus inflows of certain types of labor might serve to *raise* the marginal productivity and pay-offs to other types of labor.

The specific-factors model (Jones, 1971, Samuelson, 1971) illustrates how immigration may actually raise the real wage of the local native labor supply if immigrants are sequestered into certain occupations (e.g. agriculture), with local labor mobile between occupations (and with capital, say, specific to industrial activity). If commodity prices stay relatively unchanged, an increase in immigration would tend to lower migrant wage rates, as well as the return to capital, and to raise the real return to mobile national labor. It is important to note that such a beneficial outcome for the local labor supply is more general than required in the specific-factors model. As proved by Roy Ruffin (1981) and Jones and Stephen Easton (1983), in a three-factor, two-commodity model with *all* factors mobile, if the ranking of industries by factor intensities reveals immigrant labor most intensively used in, say, agriculture, and capital most intensively used in industry, with national labor the "middle" factor, immigration serves to lower migrant wages, raise native wage rates, and lower the return to capital if

commodity prices are fixed. Differences in degrees of factor substitution do not affect this result. Historical examples are discussed in Stanley Engerman and Jones (1997).

In the American context much concern is expressed with the increase in social and public expenditures required to provide education, health care and other mandated services to new immigrants, legal or illegal. Although the increased tax burden this represents serves to lower real incomes for national labor, it may be more than compensated for by taxes and insurance payments made by working immigrants. This consideration becomes especially important if, as is the case in much of Europe today (and some other countries such as Japan), demographic asymmetries distinguish immigrants and the local population. In these areas immigration may be relied upon to raise the fraction of the population young enough actually to be engaged in gainful employment, therefore easing the burden represented by social retirement benefits to the local elderly.

Left out of account in these brief remarks is the fact that new immigrants may not be typical in reflecting the existing ethnic or religious characteristics of the country's population. Countries in many ways resemble clubs that wish to protect the kind of society they have created and would balk at attempts to open the floodgates to outside entrants. On the other hand, diversity of the population base often leads to gains. For example, in major cities in Canada locals often point to the increased real income stemming from the much wider portfolio of restaurants available both to locals and

tourists made possible by the significant increase in immigration, especially from Asia, in recent decades.

Many years ago Prof. Harry Johnson (1967) presented an argument based on an extremely simple setting in which the inflow of any immigrants would benefit the local population regardless of the amount of capital they would bring in. The argument was based on the “gains-from-trade” reasoning found in the beginning of any international economics text, *viz.* that some trade is better than no trade. However, the setting ignores the fact that with the country already engaged in trade, immigration may worsen some terms of trade, and, more importantly, gains to the country may not be reflected in gains to labor. It is this potential distributional consequence of immigration that is currently catching attention in the globalization debate. If full employment is maintained, immigration often puts downward pressure on wage rates; if these wage rates are sticky, the local unemployment rate would increase. However, as argued above, if immigrants are primarily engaged in a set of occupations shunned by most locals, who have more mobility in other occupations, immigration may directly benefit national wage levels even without the extra consideration of new tax revenues they provide.

2. International Outsourcing

One of the more recent terms to enter the debates about globalization is “international outsourcing.” To some this represents the departure abroad of a firm or industry that previously produced within the country. A more narrow meaning is adopted here. A *fragment* or part of a nationally located production process may be moved offshore –

perhaps still under the control of a national (or the same multinational) firm or, alternatively, sold off to a different firm operating overseas. In developed countries this is often a labor-intensive fragment, so that the pressure on local labor markets is, some would argue, similar to that of having foreign immigrants join the labor force. As I now argue, this scenario may not accurately reflect the impact of international outsourcing on local wage rates.

The line of argument I will pursue is that laid out originally in Jones and Henryk Kierzkowski (1990). Consider a vertically integrated production process as an activity consisting of one or more *production blocks*, which are connected by coordinating *service links*. As output expands, economies of scale are to be obtained in a way emphasized as early as Adam Smith, *viz.* greater specialization and division of labor. Producing all parts under one roof, and by a single firm, yields to a process whereby different production blocks are *outsourced* to different locations, perhaps under the rubric of the same firm, or perhaps to a different firm. The attraction of such outsourcing rests on two principal possibilities: (i) the productivities of labor or other factors may be different in different locales (or countries), the kind of variation stressed in Ricardian types of models, or (ii) countries or regions may be endowed with different relative supplies of capital, labor, or land, with corresponding differences in relative factor prices, and with different fragments (or production blocks) requiring factor inputs in different proportions, as stressed in Heckscher-Ohlin models. In either case, marginal costs of production could be reduced by a more refined assignment of production blocks to locales with a better fit of productivities and factor prices. However, such outsourcing

requires the use of coordinating service links, e.g. of transportation, communication, financial arrangements, etc. that afford a smooth integration of activities in the network. These service links are costly, but are subject to strong increasing returns. For example, the costs of communicating and arranging a shipment of one thousand units between locales would not be very different from arranging for ten thousand units. Adding together the costs of production blocks and service links reveals increasing returns with respect to increases in output as techniques of production change with greater degrees of outsourcing or *fragmentation*.

Figure 1 illustrates the process.¹ Here I make extreme assumptions about returns to scale: Each production block exhibits constant returns to scale, while each service link entails costs that are fixed with respect to output. Line 1 reflects total costs in a stage of production in which all output takes place in a vertically integrated process with constant returns to scale. In line 2 such production is broken down into two production blocks, adding up to a lowering of marginal costs, but necessitating service link activities reflected in fixed costs of OA . Further degrees of fragmentation are shown by lines 3 and 4, in each case illustrating the trade-off between higher fixed costs of connecting service links and lower marginal costs of outsourcing to locales with a better fit of costs and the nature of production blocks. Line 4, in particular, could represent the situation with international outsourcing of one or more production blocks. Factor prices and productivities may well differ more internationally, but so also might the costs of connecting service links. The bold inner locus shows the optimal cost curve, with higher levels of output leading to more fragmented production processes. That is, if incomes

¹ This diagram appears in Jones and Kierzkowski, 2004.

and outputs are growing in the global economy, this scenario predicts greater degrees of international outsourcing.

One of the most significant developments affecting world trade in the past few decades has been the great advances made in reducing the costs of service links as well as the reduction in regulations and taxes (both domestic and international) adversely affecting trade. As well, business firms now are better informed about working conditions abroad and the increased density and competitiveness found in foreign markets lowers the dangers of being held up by intentional stoppages abroad or poor timing of deliveries. In short, with reference to Figure 1 cost functions are shifting downwards. The cost of international communication has virtually vanished; transport costs have been reduced; and technical progress in the production (as well as productivity) of service links themselves help to account for such cost changes. The consequence: the extent of outsourcing of production activities to the international market has greatly increased. Furthermore, such outsourcing not only refers to the location of production blocks but also takes place in the provision of service link activities.

What have been the effects of such fragmentation and international outsourcing on a developed country's labor markets? Here I follow the kind of argument developed in Jones and Kierzkowski (2001) in which a simplification is made that the country has only two productive factors, labor and capital (or skilled labor instead of capital if one wants to analyze the wage premium), and that off-stage there has been technical progress that

has reduced the costs of connective service links in one of several commodities that initially were in the set (the “composite Hicksian unit value isoquant”) of production possibilities for a country facing given world commodity prices. In particular, in Figure 2 I have assumed fixed production coefficients for producing \$1 worth of each of three commodities, 1, 2, and 3. For example, the combination of labor and capital shown by point *C* produces \$1 worth of the second commodity. Point *C* is assumed to be produced by a combination of fragment *B* and the more labor-intensive fragment *A*. Suppose the country’s endowment proportions are given by ray 0λ . Then the country is initially a producer of commodities 3 and 2 and the wage/rental ratio is shown by the slope of “tangent” line *DC*.

Pick up the story, now, after there has been technical progress somewhere in the world that for the first time allows international trade in the separate fragments involved in the production of the second commodity. To simplify, assume that no extra costs are incurred in combining the two fragments to produce commodity 2. Such a broadening of the scope of international trade from three “commodities” to four can be expected to change commodity prices. (Here I assume that the prices of commodities 3 and 1, in which there has been no fragmentation, remain constant.) The original world prices of commodities 2 and 3 determined wages and rents and thus the separate local *costs* of the two fragments. At these costs it would take input bundle *F* to produce \$1 worth of the capital-intensive fragment and input bundle *G* separately to produce \$1 worth of the labor-intensive fragment, *if* it were possible to trade these fragments at world prices reflecting these local costs. After technical progress in lowering the service link costs in

commodity 2, new world prices for the separate fragments are determined. I have assumed (arbitrarily) that the home country would not be competitive in world markets in the labor-intensive fragment if it could be separately traded. That is, the finer division of labor produced by international fragmentation has served to lower the world price of this fragment so that the country would face losses if it were to try to compete in its production. However, we also suppose that the home country is, relatively, an efficient producer of the capital-intensive fragment, so that the world price for this fragment separately has risen by the proportion HF/OF of the original home cost of producing \$1 worth (OF). After fragmentation the home country can successfully compete in producing the capital-intensive fragment, but can no longer compete in producing the (now) tradeable labor-intensive fragment necessary in the output of commodity 2. It can obtain this fragment more cheaply by trade.

To avoid confusion, Figure 3 shows separately the Hicksian composite unit-value isoquant for the home country before (solid broken line DCE) and after (dashed broken line DHE) reduced service link costs have allowed fragmentation and international outsourcing. Once again, the country's endowment ratio is assumed to be shown by the $O\lambda$ ray from the origin. However, note the effect of fragmentation on income distribution: the wage/rental ratio (and real wages for unskilled workers) has gone up, from the slope of DC to that of DH . That is, as the home country says *bon voyage* to the labor-intensive fragment that has now been lost to countries whose input efficiencies and lower wages makes them more competitive *in this fragment*, unskilled workers at home benefit. This seems to contradict the view that outsourcing has cut loose a chunk of the

labor force, and they will either be left without jobs or, as I am assuming, wage rates will change to clear markets. But note that outsourcing has taken place for a reason, and that reason translates into a change in world prices and a superior (*DHE*) unit-value isoquant in Figure 3. Activity *H*, whereby the capital-intensive fragment has replaced the original *integrated* activity encompassing both fragments (shown by point *C*), is like a technical progress in the economy's overall labor-intensive activity (producing commodity 2 at *C* originally, and capital-intensive fragment at *H* after outsourcing). This factor intensity must be compared to that of commodity 3 (at *D*), produced before and after outsourcing. The comparison illustrates a common proposition in the theory of international trade, *viz.* that technical progress in a country's labor-intensive activity improves the country's real wage rate. To solidify the argument note that after outsourcing a greater fraction of the country's unskilled labor force is employed in the original capital-intensive fragment (*DM/DH*) than was employed initially in the vertically-integrated second commodity (*DN/DC*). Why? Initially the country was a competitive supplier of commodity 2 on world markets *despite* the fact that it had to produce the labor-intensive fragment as well as the capital-intensive fragment. What fragmentation and subsequent outsourcing has done is to allow the country to go out of the business of producing the labor-intensive fragment, in which it does not possess a comparative advantage, and concentrate on what it does better – the capital-intensive fragment. This change takes place for a reason: Technical progress in reducing service link costs have for the first time allowed each fragment to be traded separately, and this has yielded a superior unit-value isoquant.

Figures 2 and 3 have illustrated a simple case in which international outsourcing of a labor-intensive fragment has confounded the popular wisdom that such a change must harm unskilled workers. The following remarks, however, need to be kept in mind:

(i) Suppose the country were a more labor-abundant country, say with capital/labor endowment ratio shown by ray $O\lambda'$ in Figure 3. Note that in such a case the wage/rental ratio would decline; workers would be worse off. The reason: Fragmentation and the substitution of activity H for activity C represents technical progress in the country's *capital*-intensive sector since the other commodity produced is commodity 1, which is the most labor-intensive commodity. This leads to a decline in the real wage rate.

(ii) Suppose that in producing the second commodity the home country's productivity in the labor-intensive fragment survives the new level of competition, with the capital-intensive sector outsourced. This need not change the conclusion that if the home country's endowment ray is $O\lambda$, outsourcing benefits the unskilled workers. The fragmented activity is still more labor-intensive than the other commodity produced (as it will be for more "capital" abundant countries),

This discussion has assumed that the reshuffling of the activities that a country can competitively produce after international fragmentation takes place involves the country *losing* one or more fragments to international competitors. However, fragmentation takes place in a number of sectors, and any particular country may be the recipient of newly tradeable fragments that previously were produced as parts of integrated processes abroad. That is, the phenomenon of "international *insourcing*" is as relevant for many countries as international outsourcing. Indeed, a recent article by Walter Wriston (2004)

points out that in the United States, “The number of jobs imported from abroad greatly exceeds the jobs exported overseas, as companies are attracted by the stable political environment, relatively low corporate tax rate and huge growth in American workers’ productivity.”

3. Immigration vs. Outsourcing

So far I have emphasized that immigration of labor, on the one hand, or outsourcing of labor-intensive fragments of production processes, on the other hand, do not necessarily lead to reductions in the wage rate for the national labor force. To appreciate how these two events, immigration and outsourcing, differ from each other, it is useful to recall the literature emerging from a famous (although initially neglected) two-page note by V. K. Ramaswami (1968). The question that Ramaswami posed concerned a choice between two strategies open to a capital abundant country able either to send some of its capital abroad, assuming its return is higher there, or invite some foreign labor to work in the home country, assuming it could be obtained at a lower foreign wage rate. He proved in extremely simple fashion that the option of inviting foreign labor to work at home was the preferred choice for increasing real national income at home. However, as pointed out by Jagdish Bhagwati and T. N. Srinivasan (1983), the argument presumes that foreign labor can on net receive only the lower foreign wage, with the discrepancy obtained in some fashion (e.g. by taxing foreign immigrants) by the home country. If, instead, a foreign worker receives the same wage rate as do local workers, the Ramaswami

conclusion gets reversed and pure capital exports become the optimal choice, with the door slammed on immigration.²

In my discussion of immigration, I have assumed that foreign migrants obtain the local wage rate for the kind of work in which they are engaged. Immigration laws and the costs involved in circumventing them conspire to leave a positive gap between wage rates abroad and those in the advanced country. The home country does not receive an overall “gain from trade” by letting workers in at the local wage rate, although there may well be a change in the relative distribution of income among factors at home. By contrast, the discussion of outsourcing labor-intensive fragments abroad presumed that foreign workers employed in such fragments in their own country only receive the lower wage rate prevailing there. Why, then, did not more outsourcing take place initially? Because at prevailing output levels the service link costs of coordinating such outsourcing exceeded the gains from lowering marginal costs of production. In the scenario outlined earlier, it was an assumed lowering of such costs (a downward shift in the cost schedules shown in Figure 1) that encouraged an increase in outsourcing. This is like technical progress, and represented a gain to the advanced country. This gain would eventuate in a change in local income distribution actually favoring the country’s local labor force if that country is sufficiently capital (or skilled-labor) abundant.

² The proof is found in Jones, Isaias Coelho and Stephen Easton (1986).

4. Concluding Remarks

“Immigration of unskilled workers and /or international outsourcing of labor-intensive fragments of production processes will work to the detriment of the country’s unskilled labor force.” This is the oft-repeated mantra heard in many developed countries such as the United States. It seems to appeal to common sense and reasoning, and may indeed prove to be correct. But then again, it may not, and this possibility is what has been explored in this paper. If immigrant labor differs in certain qualities from the local relatively unskilled labor force, perhaps by a different willingness to work in particular occupations, the two groups may prove to be complements in production in that a greater inflow of immigrants could raise the marginal productivity of locals. As for outsourcing abroad of labor-intensive fragments of production, the relative and real wage rate of the country’s labor force would be raised if the country also produces a more capital (or skilled-labor) intensive commodity for world markets. The rationale lies in the fact that such international outsourcing occurs for a reason – the reduced costs of the necessary service links required to coordinate such outsourcing acts like technical progress, and if this occurs in a country’s less capital-intensive sector, unskilled labor will be the beneficiary.³

Although immigration and international outsourcing do differ in the manner in which local wage rates (or employment levels) are affected, the current scare scenarios need to be placed in context. Almost *any* shock to a nation’s economy will encourage some reallocation of resources. That is, some factors will initially lose their jobs. If the

³ Although my discussion of international outsourcing was undertaken in a context of the two-factor model, an analogous result can be obtained in the specific-factors model with labor the mobile factor. As shown in Jones (1996), technical progress that would serve only to reduce the required labor input in all industries at initial factor prices (a pure Hicksian labor-saving change) could nonetheless increase the real wage rate if elasticities of substitution are sufficiently great. The crucial value may well be less than unity.

argument stops there, without considering the subsequent creation of new job opportunities, it is possible to argue that steps should be taken to prevent or counter *any* change in the nation's allocation of resources. For an economist charged with considering policy alternatives, such limited reasoning is clearly inappropriate.

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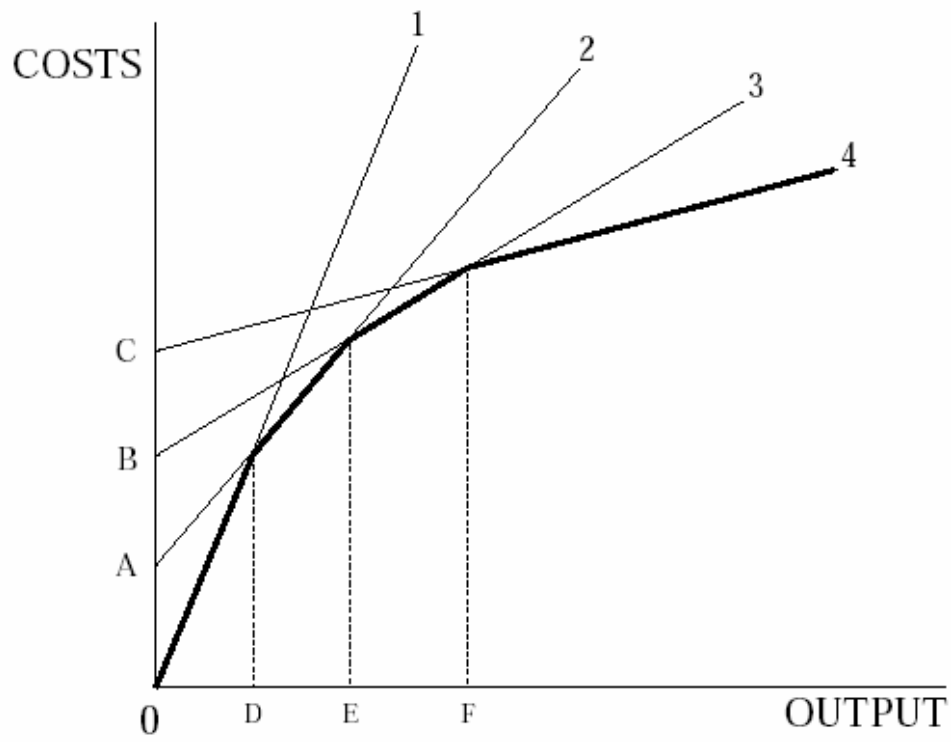


FIGURE 1

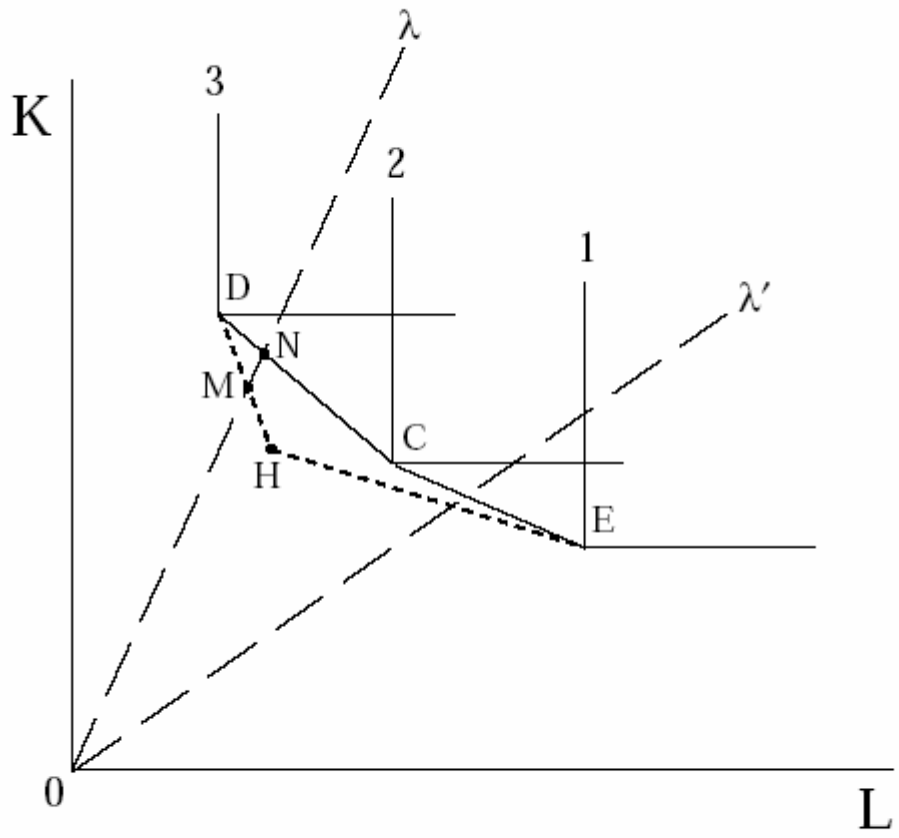


FIGURE 3