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THE IMPACT OF MIGRANT WORKERS
ON THE JAPANESE ECONOMY:
TRICKLE VS. FLOOD

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ABSTRACT

This paper analyzes the economic impact of temporary and unskilled migrant workers in Japan, who are illegal according to the current Japanese immigration law but who have been dramatically increasing in recent years. The analysis, using a simple CGE model, reveals the quadruple impact of the admission of migrant workers on the welfare of the host country which has often been neglected in the orthodox theory: (i) cheaper foreign labor effect; (ii) trade barrier effect; (iii) nontradable income effect; and (iv) nontradable consumption effect. Moreover, it is shown that, if Japan is to benefit from admitting foreign labor, the scale of admission should be large and the admission should be accompanied by trade liberalization.

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1. INTRODUCTION

One of the most heatedly debated issues in Japan these days is whether or not she should admit unskilled guest workers from low-wage, labor-surplus developing countries in Asia. Although the number of migrant workers in Japan is smaller than that in major countries, it is rapidly increasing in recent years. Since the mid-1980s, more and more Asians have come to Japan to find work, mostly as unskilled labor in construction and service industries. Because current Japanese immigration law does not allow foreigners to work as unskilled labor except for some special cases, most of them are working illegally. Faced with the dramatic increase in illegal foreign workers and the fact that the Japanese population is rapidly aging, heated debates have emerged about whether Japan should legalize foreign unskilled workers in order to cope with the unskilled labor shortage both at the present time and in the future. Unfortunately, there are few, if any, formal studies of the impact of migrant workers on the Japanese economy to evaluate the validity of these debates. In view of this, the major purpose of this paper is twofold: (i) to analyze the economic impact of migrant workers on the host country under a somewhat more realistic framework than the traditional theory of international factor mobility; and (ii) to apply the analysis to the Japanese experience in recent years. This paper focuses on *temporary guest workers* who come to work in Japan for a few years and remit most of their incomes to their home countries, because it is this type of migrant worker that has been rapidly increasing in Japan.

In section 2, salient features of migrant workers in Japan are presented first in order to give some background facts. It is shown that since the middle of the 1980s a greater number of Asians have been employed illegally as unskilled workers in the production of *nontraded goods* such as construction and services, and that the surge of the inflow of migrant workers in the

1980s was due to a coincidence of push force in Asian sending countries and pull force in Japan.

In section 3, a formal model for the economic analysis of migrant workers in Japan is presented. While the model is an extension of traditional general equilibrium theory of international factor mobility¹, it incorporates three important realities: (i) a possible change in factor prices (e.g., a decline in wage rates) by admission of foreign labor; (ii) an existence of nontraded goods; (iii) an existence of trade barriers. Although previous studies have occasionally dealt with (i) or (iii), the present paper tries to consistently incorporate the three realities. The analysis using the model shows that, while a small scale admission (or a trickle) of them definitely gives a negative impact, a large scale admission (or a flood) of migrant workers can give a favorable welfare impact on the host country, and that the smaller the degree of trade barriers is, the more likely it is that the admission has a favorable welfare impact.

In section 4, the model is calibrated to quantitatively analyze how the Japanese economy is affected if a certain number of unskilled guest workers are legally admitted. The calibration of the model suggests that the admission of the scale often discussed in Japan (e.g., one percent of the Japanese labor force) is likely to give a substantial negative effect on the Japanese economy. However, if Japan substantially reduces the trade barriers, it is possible to formulate a welfare-improving guest worker program.

In section 5, the alleged benefits and costs of emigration are discussed. I will discuss four aspects of the effects of emigration: (i) income creation through remittances; (ii) relief to domestic unemployment; (iii) transfer of knowledge and skills; and (iv) brain drain.

¹ See Ruffin (1984), for example, for a summary of existing studies of international factor mobility.

In section 6, I will summarize the results and discuss their policy implications. While a guest worker program would give various, some positive and some negative, effects on the Japanese economy, the program does not seem to be very wise labor policy in Japan. As Paul Schultz (1995) points out, a utilization of female labor seems to be more promising to cope with future labor shortage in Japan.

2. SALIENT FEATURES OF MIGRANT WORKERS IN JAPAN

Although the number of migrant workers (both legal and illegal) in Japan is less than half a million, or less than one percent of her labor force (see Table 1), the rate of increase in the number of *illegal* foreign workers has been dramatic since the mid-1980s. As Table 2 shows, the number of illegal foreign workers apprehended by the authorities has sharply increased from 2,339 in 1983 to 64,341 in 1993. Although the number declined in 1994 due to the severe recession of the Japanese economy, the magnitude of the decline is small. Needless to say, these numbers represent only a small part of the total illegal foreign workers in Japan.

Just as most illegal aliens in the United States come from Mexico, most illegal foreign workers in Japan come from neighboring Asian countries (See Table 3). Since the wage rate in their home countries is extremely low, even an unfairly low wage by the Japanese standard means a lot to these workers.

The recent influx of Asian workers is markedly different from earlier migrations. Until the middle of the 1980s, most of the illegal foreign workers were women who worked as bar hostesses (so-called "Japayuki San (Miss Japan-going)"). In 1983-84, for example, more than 90 percent of the illegal foreign workers were female. But, the number of male workers dramatically

increased to about 70-80 percent of the total illegal immigrants.

As seen in Table 4, in 1994, about 40 percent of the illegal male workers were construction workers, and a little over a quarter were factory workers. In other words, most of the illegal male aliens are doing work for which there is a high demand due to the recent boom in the Japanese economy, but work that few Japanese want to do because of unfavorable working conditions. It should be noted that about two-thirds of the illegal migrants are working in the nontraded goods sector, such as construction and service industries.

Why did many illegal foreign workers suddenly come to Japan after the middle of the 1980s? One of the most important reasons is that a push-force in neighboring Asian countries coincided with a pull-force in the Japanese economy in the 1980s, as discussed in detail below.

The inflow of Asian migrant workers is often attributed to the huge wage gap between Japan and neighboring Asian countries. Indeed, there is a huge income gap between Japan and Asian sending countries. It is often the case that the per capita income of Japan is 50 to 100 times higher than those of sending Asian countries. It should be noted, however, that the huge income differential had existed for many years. Although the sharp appreciation of the Japanese yen after September 1985 amplified the gap to some extent, the wage level of Japan had been high enough to constitute a strong incentive for Asian workers to migrate for many years. Therefore, the huge wage differential cannot explain the *surge* in the flow of Asian workers since the mid-1980s.

Probably, one of the most important reasons on the supply side for the sharp increase is that the destination of Asian migrant workers has shifted from the Middle East to Japan. In the 1970s, an increasing number of Asians had been recruited to work at construction sites in the oil producing Middle Eastern countries. When the price of crude oil quadrupled after the First Oil

Crisis, a construction boom occurred in the oil-rich countries because their oil revenue dramatically increased. But the population size of these countries is relatively small. Therefore, these rich countries recruited a large number of temporary immigrants mostly from southern Europe and Asia. As a result, the number of migrant workers from eight Asian countries (Bangladesh, India, Indonesia, Pakistan, Sri Lanka, the Philippines, Thailand, and South Korea) to the Middle East grew from a little more than 100 thousand in 1976 to more than 1.2 million in 1982. But, as the price of crude oil went down in the 1980s, the construction boom in the Middle East subsided, and some 400 thousand Asian migrant workers lost their jobs and had to return to their home countries.

The return of these workers was a serious blow to the Asian sending countries, because remittance from them was an important source of foreign exchange receipt. In Pakistan and Bangladesh, for example, remittance from migrant workers was almost as large as the total value of their exports. Moreover, the dependence of the migrant workers from these Asian countries on the Middle East for their destination was extremely heavy. Therefore, the decline in labor demand in the Middle East was a serious blow to many developing countries in Asia. Thus, by the middle of the 1980s, there emerged a large pool of Asian workers who lost jobs in the Middle East and were eager to find new jobs in some other countries. Probably, to these unemployed workers, one of their rich neighbors, Japan, must have looked like a land of opportunity.

The increase in the supply pressure coincided with the increased demand of Japanese businesses for the migrant workers. Due to the strong performance of the Japanese economy, the labor market in Japan became very tight since the mid-1980s. The labor shortage was especially keen in the construction and service industries. Moreover, an important source of the domestic

supply of marginal workers (i.e., a group of seasonal workers called "*dekasegi*") has shrunk, and therefore, the demand for migrant workers to fill the gap in this marginal labor market increased.

The performance of the Japanese economy after the middle of the 1980s was dramatic until very recent years: the annual growth rates of the real GNP in 1988, 1989, and 1990 were 6.2%, 4.7%, and 5.6%, respectively; those of industrial production in 1988, 1989, and 1990 were 9.5%, 6.1%, and 4.6%, respectively. Consequently, the labor market became very tight, and the job-opening/job-seeker ratio (one of the most commonly used indicators of the labor market condition in Japan) sharply increased. While the ratio nose-dived in 1975 (the First Oil Recession) and stayed at around 0.6 (i.e., only six jobs were available for every 10 job seekers), it began to increase after 1987. In 1988, the ratio exceeded one for the first time since 1974, and it went as high as 1.40 in 1990.

A typical practice of Japanese firms in boom years has been to increase the number of marginal workers, such as seasonal and temporary workers, because firms had at least a moral obligation to keep their *regular* employees on the payroll even in a recession. However, the construction industry is losing an important source of its supply of domestic nonregular workers. Until the end of the 1970s, the labor shortage in the construction industry in boom years had been largely filled by seasonal workers, *dekasegi*, who were mostly farmers in the northern part of Japan who came to metropolitan areas like Tokyo and Osaka to take temporary jobs in an attempt to supplement their farm incomes in the farmers' slack season. In the early 1970s, the number of *dekasegi* amounted to about 600,000. But, because of increased job opportunities in their home towns, that number has been steadily diminishing: only 142,200 *dekasegi* were reported in 1993. The decline in the supply of *dekasegi*, along with the recent construction boom, created a serious

labor shortage in the construction industry. The strong demand for marginal workers in the Japanese construction industry attracted an increasing number of foreign workers whose supply pressure had been increased by the decreasing demand in the Middle East.

Faced with the strong push-force and pull-force, illegal mediators between Japanese employers and Asian migrants (like the "coyote" figure for Mexican illegal aliens in the United States) have become prevalent. Although the details of their illegal activities are unknown, involvement of gangsters was often reported. According to an estimate by the Japanese Ministry of Justice, in 1990 about 70 percent of illegal migrant workers entered Japan with the help of such illegal mediators.

3. THE ECONOMIC EFFECT OF MIGRANT WORKERS -- THEORY

3.1. Basic Characteristics of the Model

The formal model developed below has three main characteristics, which are somewhat different from the traditional theory of international factor mobility. The following three features have been added in order to capture more realities for the analysis of the migrant workers in Japan: (i) a possible change in factor prices (e.g., a decline in wage rates) by admission of migrant workers even when the prices of tradable goods are constant; (ii) an existence of nontraded goods; (iii) an existence of trade barriers.

(i) Possible Change in Factor Prices

Under the standard Heckscher-Ohlin-Samuelson (H-O-S) framework, factor prices are completely determined by the prices of goods without regard to relative factor endowment.²

² See Ethier (1984) for a detailed discussion concerning this point.

Thus, for a small open economy where prices of goods are given, the factor prices are unchanged by the admission of foreign workers. This invariability of factor prices stems from the 2x2 (2 traded goods and 2 factors) nature of the H-O-S model. In reality, however, many empirical studies, including Morgan and Gardener (1982), found that the influx of foreign unskilled labor results in a depressing effect on the domestic wage rate.

In order to overcome the discrepancies between the theoretical prediction and the empirical findings, a Jones-type specific factor model is used in this paper. More specifically, capital is assumed to be fixed to each sector while labor is mobile between sectors. Under the specific factor model, the change in relative factor endowment due to an influx of foreign labor plays an important role in determining factor prices, as discussed in Sapir (1983). As it will become clear in the following discussion, the influx of labor causes a decline in wage rates, which agrees with the empirical findings.

(ii) Non-Traded Goods

In the real world, the share of the nontraded goods sector such as construction and services in the total economy is high³, although less attention has been paid to this by traditional trade theories. Further, as seen in Table 4, two-thirds of the foreign unskilled workers apprehended by the Japanese authorities are employed in the nontraded goods sector. Moreover, in Europe and the United States, it is often pointed out that migrant workers contribute to the lower prices of nontraded goods (e.g., maid service and street-cleaning).

While most formal studies of international labor mobility have been based on the two-

³ As discussed in Section 4, the share of non-traded goods in consumption in Japan is about 58 percent.

sector model (i.e., exportables and importables), the economy in the model here is assumed to consist of three sectors producing three kinds of goods: exportables, importables, and *nontradables*. Combined with the specific factors assumption, the model in this paper is a 3x4 (3 goods and 4 factors) model rather than the traditional 2x2 model. As seen below, the inclusion of nontraded goods yields additional insights into the economic effect of migration.

(iii) Trade Barriers

While most studies of international factor mobility have assumed free trade, in the model below international trade is assumed to be restricted by tariff and/or nontariff barriers (NTBs), as is often the case in many countries. This is an application of the framework developed by Brecher and Diaz-Alejandro (1977), which was used to analyze international capital mobility. As shown in their study, the economic impact of factor inflow under trade barriers is very different from that under free trade.

3.2. Specification of the Model

In the model, consumers are characterized by the Cobb-Douglas social utility function

$$(1) U = C_1^\alpha C_2^\beta C_3^\gamma, \quad \alpha + \beta + \gamma = 1,$$

where C_1 , C_2 , and C_3 are the amount of consumption of exportables (good 1), importables (good 2), and nontradables (good 3), respectively, and U is social utility. Consumers maximize the social utility function (1) subject to the budget constraint

$$(2) P_1 C_1 + (1+t) C_2 + P_3 C_3 = Y,$$

where P_1 and P_3 are the prices of exportables and nontradables, respectively, and Y is the national income. The world price of importables, which is the numeraire goods here, is set to unity. And t

is the rate of a domestic price markup of importables due to tariffs and nontariff barriers. In order to avoid further complications, it is assumed that the world prices of tradables are given to the economy (i.e., the "small country" assumption). From the above utility maximization problem, the demand functions are obtained as

$$(3) C_1 = \alpha Y / P_1 ,$$

$$(4) C_2 = \beta Y / (1+t) ,$$

and

$$(5) C_3 = \gamma Y / P_3 .$$

The producers in the three sectors are characterized by the following Cobb-Douglas production function

$$(6) Q_1 = K_1^a l_1^{1-a} ,$$

$$(7) Q_2 = K_2^b l_2^{1-b} ,$$

and

$$(8) Q_3 = K_3^c l_3^{1-c} ,$$

where $a > b > c$ holds.⁴

Q_i , l_i and K_i are, respectively, production, labor input and capital input in the production sector of the i -th good ($i=1,2,3$). Capital is assumed to be fixed to each sector in the equilibrium after foreign workers are admitted, although it was mobile before the initial long run equilibrium was reached.

⁴ Here, we assume that the country exports capital-intensive goods like automobiles while she imports labor-intensive goods like clothing, and that nontradable goods like haircuts are the most labor-intensive. This seems to hold for many developed countries like Japan. In fact, our estimate shows $a=0.4242$, $b=0.3785$, and $c=0.2234$ (See Section 4.1 for detail).

Producers maximize the profit function

$$(9) \pi_i = P_i Q_i - (r_i K_i + w l_i) ,$$

where π_i and r_i are, respectively, the profit and rental rate of the i -th production sector, and w is wage rate. Solving the profit maximization problem, the following equilibrium conditions are obtained:

$$(10) aK_1^{\alpha-1} l_1^{1-\alpha} P_1 = r_1 ,$$

$$(11) (1-\alpha)K_1^{\alpha} l_1^{-\alpha} P_1 = w ,$$

$$(12) bK_2^{b-1} l_2^{1-b}(1+t) = r_2 ,$$

$$(13) (1-b)K_2^b l_2^{-b}(1+t) = w ,$$

$$(14) cK_3^{c-1} l_3^{1-c} P_3 = r_3 ,$$

and

$$(15) (1-c)K_3^c l_3^{-c} P_3 = w .$$

Equations (10) to (15) show that factor prices are equal to their marginal value product in equilibrium.

Domestic labor supply is assumed to be given, i.e., there is no wage leisure tradeoff.

Therefore, the sum of labor input in the three sectors is equal to the sum of the domestic labor endowment (L) plus the number of admitted foreign workers (L_f).

$$(16) l_1 + l_2 + l_3 = L + L_f .$$

The domestic supply of nontradables must be equal to their domestic demand because, by definition, no international trade is allowed for them. Therefore, in equilibrium, we have

$$(17) C_3 = Q_3 .$$

Since the tariff revenue accrued to the government is assumed to be distributed to

domestic consumers in a lump-sum fashion, and since there is no profit in equilibrium, the national income (GNP rather than GDP), which does not include the income accrued to migrant workers, consists of payments to domestic factors and tariff revenue.

$$(18) \quad r_1K_1 + r_2K_2 + r_3K_3 + wL + t(C_2 - Q_2) = Y .$$

Note that, in the calibration in the next section, t includes the rate of a price markup by nontariff barriers (NTB) as well as by tariffs. Therefore, equation (18) might not be valid in some situations, because the government does not collect tariffs when import restrictions are given by NTBs. But, as long as the economic rent from the import restriction is accrued to domestic people, equation (18) is still valid. In fact, many studies have shown that, under the NTBs such as import quotas, the economic rent often accrued to the importers⁵. Therefore, equation (18) seems to be justified even when a part of import restrictions is imposed in the form of NTBs. By substitution, equation (18) can be rearranged into the following⁶:

$$(19) \quad P_1Q_1 + (1+t)Q_2 + P_3Q_3 - wL_f + t(C_2 - Q_2) = Y .$$

3.3. Quadruple Effects of Immigration on the Welfare of the Host Country

Because the model in the above section is complete, the economic impact of the admission of migrant workers on the Japanese economy can be *quantitatively* analyzed by calibrating the

⁵ See Goto (1990a) for a brief summary of previous studies of the issue.

⁶ Here, I am assuming that temporary foreign workers are paid in terms of exportables. This assumption seems reasonable because the temporary foreign workers in Japan are remitting a large portion of their incomes to the home country. For example, according to the survey by the Japanese Ministry of Labor (1991), one-third of the migrant workers are remitting more than half of their incomes to their home countries.

model. But, before the calibration, let us theoretically (or *qualitatively*) analyze the economic impact of migrant workers in order to obtain some insights into the welfare effect of labor inflow under the three realistic assumptions included in this model.

The following is an examination of the impact of the admission of migrant workers on welfare which is represented by the social utility (U) in equation (1) above. Substituting (3), (4), (5) into (1), we obtain

$$(20) \quad U = (\alpha/P_1)^\alpha (\beta/(1+t))^\beta \gamma^\gamma Y/P_3^\gamma .$$

Taking a natural logarithm of both sides of (20), we obtain

$$(21) \quad \ln U = \ln (\alpha/P_1)^\alpha (\beta/(1+t))^\beta \gamma^\gamma + \ln Y - \gamma \ln P_3 .$$

Differentiating equation (21) with respect to L_f , we get

$$(22) \quad (\ln U)' = (\ln Y)' - \gamma (\ln P_3)' ,$$

where the variables with the prime notations are defined as the derivative of those variables with respect to L_f . Similar shorthand notations are used throughout this paper.

From (22), we get

$$(23) \quad (\ln U)' = Y'/Y - \gamma P_3'/P_3 .$$

Equation (23) shows that the total welfare effect of admission of migrant workers can be broken down into the effect of the change in income and the effect of the change in the price of nontraded goods.

Tedious but straightforward substitution using equilibrium conditions yields the basic equation (24), which divides the total welfare effect into four sub-effects.

$$\begin{aligned}
(24) \quad (\ln U)'Y &= B(-L_3w') \quad \dots \text{Effect 1} \quad (\text{Cheaper foreign labor effect}) \\
&+ B(-tQ_2') \quad \dots \text{Effect 2} \quad (\text{Trade barrier effect}) \\
&+ B(Q_3P_3') \quad \dots \text{Effect 3} \quad (\text{Nontradables income effect}) \\
&- (C_3P_3') \quad \dots \text{Effect 4} \quad (\text{Nontradables consumption effect}),
\end{aligned}$$

where $B \equiv (1+t)/(1+t-\beta t)$. Note that B is greater than unity.

The first three sub-effects result from the effect on income. Following is a discussion of the above four sub-effects of the admission of migrant workers on the welfare of a host country such as Japan.

(i) Effect 1: Cheaper foreign labor effect (positive)

Since it can be shown that w' is negative, effect 1 has a positive impact on the welfare of the host country. In other words, the admission of foreign labor results in a positive sub-effect through the decline in wage rates. Figure 1 demonstrates an intuitive reasoning for this effect. In the figure, $ABEG$ shows the marginal value product of labor (MVPL) curve. Since wage rate is equated with the MVPL in equilibrium, the equilibrium before the admission of foreign labor is B , where total domestic labor (OD) is employed with the wage rate of w^0 . In this case, total labor income is $w^0 ODB$ and total capital income is Aw^0B . If the foreign labor of DF is admitted to the country, then, the new equilibrium point moves to E , and the wage rate decreases to w' . In this case, capital income increases to $Aw'E$, and total labor income accrued to the native workers and the income accrued to migrant workers become $w' ODC$ and $CDFE$, respectively. Thus, total income of domestic factors (capital and labor) is increased by the hatched area BCE . Note that the traditional 2x2 model overlooks this effect, while labor economists often emphasize it. Further, note that the magnitude of the (positive) cheaper foreign labor effect increases, *ceteris paribus*, as

the scale of the admission of migrant workers becomes larger.

(ii) Effect 2: Trade barrier effect (Brecher=Diaz-Alejandro effect) (negative)

Since it can be rigorously shown that Q_2' is positive (i.e., the amount of production of labor-intensive goods increases after foreign labor is imported), effect 2 has a negative impact on the welfare of the host country. This effect stems from the existence of trade barriers which was first pointed out by Uzawa (1969) and rigorously discussed by Brecher and Diaz-Alejandro (1977). The intuition behind effect 2 (trade barrier effect) is as follows: Although the *international price* of the importable is set to unity, its *domestic price* is higher $(1+t)$ due to trade barriers. Therefore, the MVPL of a migrant worker under the domestic price is $(1+t)dQ_2/dl_2$, which is higher than the MVPL under the international price (dQ_2/dl_2). Since wage rate w is equated with domestic MVPL instead of international MVPL, the admitted foreign labor is in some sense overpaid. Hence, the admission of one migrant worker results in the overpayment of tQ_2' , which tends to decrease the national income of the host country. We can show that the magnitude of the (negative) trade barrier effect decreases, *ceteris paribus*, as t decreases (i.e., as trade is liberalized). In the extreme, under free trade (i.e., $t = 0$) effect 2 disappears.

(iii) Effect 3: Nontradables income effect (negative)

Since it can be shown that P_3' is negative under a reasonable range of parameter values⁷, effect 3 is also negative. Since the national income consists of total values of the three goods

⁷ A sufficient condition for this is $b/(1-b) > t$. Since b is estimated as 0.37845 from the actual data (See section 4 for detail), the sufficient condition is that t is smaller than 0.6088, or the average tariff rate adjusted for coverage is lower than 60.88 percent, which is unbelievably high for the advanced country who imports labor from abroad. In fact, the estimated value of t in Japan is 13.28 percent, which is far below than 60.88 percent. Therefore, the proposition in the main text holds for reasonable values of t .

$(P_1Q_1 + (1+t)Q_2 + P_3Q_3)$ plus tariff revenue less payment to foreign labor, the decline in the price of nontraded goods (P_3) results in the depressing sub-effect on the national income, and therefore on the welfare of the host country. Note that the traditional 2 goods (exportables and importables) model cannot capture effect 3 which results from the change in the price of nontraded goods.

(iv) Effect 4: Nontradables consumption effect (positive)

Since P_3' is negative, effect 4 is positive. In some sense, effect 4 is the other side of the coin of effect 3. From the consumers' viewpoint, the decline in the price of nontradable goods is favorable because the same amount of income allows them to consume more goods. For example, the inflow of migrant workers enables consumers in the host country to enjoy cheaper maid service or street-cleaning.

However, note that the *net* nontradables effect (effect 3 plus effect 4) is negative. The proof of this proposition is straightforward. From (5) and (24), we obtain

$$\begin{aligned} (25) \text{ Effect 3} + \text{Effect 4} &= (B/Y)(Q_3P_3') - C_3P_3' \\ &= \gamma/P_3(B-1)P_3' . \end{aligned}$$

Since B is greater than unity, and P_3' is negative, the net effect is negative. In other words, while consumers enjoy gains from cheaper maid services and street-cleaning, the adverse effect resulting from the decline in income of native maids and native street-cleaners should be kept in mind.

Thus, although the model in this paper is more complicated than the orthodox 2x2 model under free trade, it reveals four important effects of the admission of migrant workers on the host country, which have been often overlooked. Furthermore, the inclusion of the four important effects will provide more accurate calibration results of the welfare impact of migrant workers on the host country.

3.4. Trickle vs. Flood

The next question is whether the net effect of the above four sub-effects has any systematic relationship to the level of admitted migrant workers (L_f) and the magnitude of trade barriers (t). The answer to this question is "yes." After some tedious algebra, it can be shown that the following two propositions hold under reasonable parameter values⁸:

- (i) *The welfare declines by the initial inflow of migrant workers, but after a certain number of admitted foreign workers (L_f^1) the welfare increases;*
- (ii) *The smaller the value of t , the smaller the value of L_f^1 . In other words, the less severe the trade barriers are, the more likely it is that the admission of a certain number of migrant workers is welfare-improving.*

Figure 2 summarizes the above two propositions. In the figure, the welfare level of host country (U) is plotted on the vertical axis, while the number of admitted foreign workers is plotted on the horizontal axis. Curve I plots the welfare level as a function of admitted migrant workers when the magnitude of trade barriers is t_1 . The admission of migrant workers decreases the welfare level of the host country first, but when the number of admitted foreign workers reaches $L_f^{1/1}$, the welfare level begins to increase, and exceeds the initial level when the number of admitted foreign workers exceeds $L_f^{2/1}$. In other words, the admission of a small number (or a *trickle*) of migrant workers produces a negative effect on the host country while a large number (or a *flood*) produces a positive impact on the host country. This finding implies that when migrant workers are admitted, the admission quota should be large if it is to produce a positive welfare impact. Curve II plots the welfare level when the magnitude of trade barriers decreases to

⁸ A sufficient condition for this is the same as that shown in footnote 7.

t_2 due to, for example, a successful implementation of the Uruguay Round agreement. The curve shifts upward and leftward, and therefore the trough of the curve also shifts leftward. In other words, a smaller number of migrant workers can be welfare-improving.

Although the proof of the above propositions requires a cumbersome manipulation of the equilibrium conditions of the model, the intuition behind these propositions is obtained from the following, somewhat rough, argument: First of all, note that equation (24) can be rearranged to

$$(26) \quad (\ln U)' = (1/Y)(-L_f w' + t M'),$$

where $M \equiv C_2 - Q_2$ (i.e., the amount of imports). We already know that $-L_f w'$ (the cheaper foreign labor effect) is positive. It can be shown that M' is negative, i.e., the amount of the import of labor-intensive goods declines as the number of migrant workers (or the import of labor) increases, and therefore the second effect in equation (26) is negative. In equation (26), first note that, when L_f is zero, the first effect ($-L_f w'$) is also zero. Thus, the economic effect of the beginning influx of migrant workers is always welfare-worsening. Second, note that the cheaper foreign labor effect is the change in wage rate (w') multiplied by the number of foreign workers (L_f), and therefore the magnitude of the first effect tends to increase more rapidly than the second effect, as the number of admitted foreign workers increases. Therefore, at a certain level of admitted foreign workers ($L_f^{1,t}$ in Figure 2), the first effect begins to dominate the second effect, which means that an additional admission of migrant workers is welfare-improving. Third, the second negative effect (tM') seems to decrease as t decreases because it is M' multiplied by t . Therefore, the admission of the same number of migrant workers can produce a positive impact on the welfare of the host country when the magnitude of trade barriers is smaller.

The above analysis has the following policy implication for Japan: (i) *while small scale*

admission of foreign workers has a negative impact on Japan, a large-scale admission can be beneficial; (ii) the liberalization of trade barriers increases Japan's chance to benefit from the admission of foreign labor.

4. THE EFFECT OF MIGRANT WORKERS ON THE JAPANESE ECONOMY --

CALIBRATION

4.1. Data and Method of Calibration

In what follows, the impact of the *legal* admission of a certain number (e.g., one percent of the Japanese labor force) of foreign unskilled workers on the Japanese economy is calibrated using the formal model developed above. I also calibrate the model to find how much migrant workers must be legally admitted, if Japan is to economically benefit from the admission of them. I emphasize the word "legal", because the current policy debate in Japan concerns whether or not the Japanese government should amend the immigration law so that a large number of unskilled foreign workers could be legally employed by construction industry etc. When the government legalizes the foreign unskilled workers, it is her responsibility to ensure that there is no wage discrimination against migrant workers. So, in what follows, I will calibrate the model in which legally accepted foreign workers receive the same wage as the Japanese⁹.

The basic method of the calibration is as follows: Parameter values in the model are identified first, and the model is solved to obtain predicted values of endogenous variables in the base year. The model is then solved for a hypothetical situation where a certain number of foreign

⁹ Note that it is straightforward to include a wage discrimination into calibration model. All we have to do is to set the wage rate of migrant workers as $w_f (\neq w)$.

unskilled workers are legally admitted to the Japanese nontradable sector. Finally, values of the endogenous variables in the hypothetical situation will be compared with those in the base year in order to evaluate the magnitude of the impact of the admitted foreign workers on the Japanese economy.

I choose the year 1986 as the base year (i.e., the year before admitting foreign unskilled workers), because the problem of illegal migrant workers by that year was much less serious than in recent years. The Japanese economy in 1986 was assumed to be in the *long-run* equilibrium without *legal* unskilled workers from abroad (i.e., L_f in equation (16) is zero).

Before calibrating the model, we have to classify the Japanese industries into three categories (i.e., exportables, importables, and nontradables) to conform to the specification of the model. The classification was made according to the following criteria: (i) when both export share (the share of the value of exports in the value of total supply) and import share (the share of the value of imports in the value of total demand) are less than a threshold value (five percent), the industry is classified as a nontradable sector; (ii) the rest of the industries are classified as either an exportable sector or an importable sector, depending on which share (i.e., export share or import share) is larger. Table 5 shows the classification of industries in the Japanese economy obtained by the above method.

The next task is to identify the values of parameters in the model ($\alpha, \beta, \gamma, a, b, c, t, K_1, K_2, K_3, L, P_1$). First, capital stock in the three industries (K_i) and domestic labor supply (L) must be identified. Fortunately, actual data exist for these¹⁰. Second, $a, b,$ and c in the production function

¹⁰ Data compiled by the Economic Planning Agency and the Ministry of Labor in Japan were used.

(6)-(8) must be determined. Since it is very difficult to directly estimate these values, an indirect method has been taken: The actual situation in the base year (in 1986) was assumed to be in the long run equilibrium generated by the model, and the values of a , b , and c were calculated using actual (observed) values of endogenous variables (r_i , w , and l_i). I obtained $a=0.4242$, $b=0.3785$, and $c=0.2234$. Third, the values of P_f and t must be determined. By using equations (6) and observed values of Q_f , K_1 , l_1 , r_1 , and w , and noting that there are no profit in equilibrium, I obtained $P_f = 2.40$. Furthermore, using the data on the average tariff rate and the tariff equivalency of the NTBs, $t=0.1329$ was obtained¹¹. Fourth, the values of α , β , and γ in the social utility function (1) must be identified. Since the utility function is Cobb-Douglas, α is equal to the expenditure share of exportables, and a similar argument holds for β and γ . From this relationship, $\alpha=0.2232$, $\beta=0.1971$, and $\gamma=0.5797$ were obtained. In other words, more than half of the income is spent on nontradables. In view of the large expenditure share of nontradables in total consumption, the inclusion of the third sector in the model seems to be all the more important.

4.2. RESULTS OF CALIBRATION

(1) Point Estimates

With values for all parameters (obtained as above), the model can be solved for the sixteen endogenous variables. The model was solved for the following two sets of situations: (i) the base year case (in 1986), where the number of legal foreign workers was zero (i.e., $L_f = 0$); (ii) a

¹¹ The tariff rate of 0.03595 is obtained by using the National Income Account published by the Japanese Government. For the tariff-equivalency of non-tariff barriers in Japan (0.0936), an estimate by Laid and Yeates (1990) was used after adjusting for the Tokyo Round trade liberalization.

hypothetical case, where a certain number of foreign workers were legally admitted to the nontradable sector (i.e., L_f has some positive value). The impact of the admitted foreign workers on the Japanese economy was evaluated by comparing the equilibrium values of the endogenous variables in the two sets of situations. Note that, even though the foreign workers were admitted to the nontradable sector alone, the rest of the economy was also affected through the movement of domestic workers between sectors.

Table 6 summarizes the result of the simulation for selected endogenous variables. The first column ("before") shows predicted values of selected endogenous variables in the base year (i.e., with no admitted unskilled foreign workers). The second column ("after") shows predicted values of the same endogenous variables under the hypothetical situation in which 650,000 (about one percent of the Japanese labor force) of foreign unskilled workers were legally admitted to the nontradable sector.

While main interest here is an estimate for the effect of 650,000 foreign workers (about one percent of the Japanese labor force) because it is the number often used when the future policy toward migrant workers is discussed in Japan, I report two additional cases for the purpose of a sensitivity analysis of my simulation. The sensitivity analysis is reported in Table 7. In addition to the case of 650,000 migrant workers, I did simulation for additional two cases: (i) the low case where the number of admitted migrants is 325,000 (or one-half of 650,000); and (ii) the high case where it is 1,300,000 (or double of 650,000). As Table 7 shows, the essence of the following argument is quite insensitive to the number of admitted migrant workers within these ranges. In fact, in Table 7 the magnitude of the impact of the admission seems to be almost proportional to the number of admitted migrant workers. In what follows, I will discuss the case

of 650,000 migrants (or one percent of the Japanese labor force), simply because "one percent of the labor force" is the number that is often proposed by proponents for the legalization of unskilled migrant workers in Japan.

(i) Adverse Effect on Workers

The Japanese workers would be adversely affected by the admission of foreign unskilled workers. When the foreign workers are admitted, labor becomes more abundant relative to capital than before, and therefore, the wage rate is decreased. Since the number of the Japanese workers is assumed to be fixed in the model, the labor income of the Japanese workers is also reduced after the admission of foreign unskilled workers.

According to our calibration, shown in Table 6, the annual income of every Japanese worker would be reduced by 69,000 yen (about \$700) to become 4,786,000 yen (about \$47,860) if 650,000 foreign unskilled workers were legally admitted to Japan. The losses to the Japanese workers as a whole amount to 2.7 trillion yen (more than \$27 billion) every year. The amount of the loss is about 1.5 percent of the labor income.

Note that, even when foreign workers were admitted to the nontradable sector alone, the Japanese workers in all sectors would incur a loss through the reduction of their own wages. Of course, in the very short run, workers in the nontradable sector alone would suffer. But, as time goes by, the impact would spread to the rest of the economy through the sectoral movement of labor. Hence, the Japanese workers in the traded goods sector, as well as the nontraded good sector may well be against the admission of foreign unskilled workers, because their income would decline after the admission.

(ii) Favorable Effect on Capital Holders

In contrast to the workers, the Japanese employers, who are considered to be representing the interest of capital holders, would gain because capital income ($r_1K_1 + r_2K_2 + r_3K_3$) increases after the admission of foreign workers. According to our estimate, the capital income would increase by 678 billion yen (or about \$6.8 billion) when 650,000 foreign unskilled workers were legally admitted to Japan.

Note that the above gain to the Japanese capital holder exists even if the migrant worker receives the wage equivalent to that of the Japanese worker. In reality, however, it is often reported that foreign workers receive substantially lower wage than the Japanese counterpart. If such wage discrimination were allowed, gains to the Japanese employers would be larger than the figure in Table 6.

The employer in the Japanese industry is very eager to push the government to legalize foreign unskilled workers, because capital income would be increased by the admission. However, note that the magnitude of the gain to capital holders (678 billion yen) is much smaller than that of the loss to the workers (2.7 trillion yen).

(iii) Adverse Effect on Consumers

Contrary to the popular belief often held by the Japanese economist, our simulation suggests that the Japanese consumers would lose if foreign unskilled workers were legally admitted to Japan. As Table 6 shows, since the social utility declines after the admission of foreign unskilled workers, Japanese consumers are worse off. But, the magnitude of the loss cannot be intuitively understood by looking at the change in the value of the social utility in Table 6, because the utility is ordinal (rather than cardinal) number. In view of this, I will compare the values of

national income, which constitutes the budget constraint to the utility maximization problem of consumers, in the two situations.

According to our estimate, the Japanese national income (in 1986 prices) would be reduced by 2.2 trillion yen (or about 22 billion dollars) to become ¥273.0 trillion (or about 2.7 trillion dollars) if 650,000 foreign unskilled workers were legally admitted. The magnitude of the decline (2.2 trillion yen) is equivalent to 0.8 percent of the Japanese national income. Of course, the decline in *real* GNP is smaller than 0.8 percent because the price of nontraded goods also declines after migrant workers are admitted. In other words, while the income of the Japanese consumer declines, he can purchase cheaper houses or services. But, it should be noted that the Japanese GNP declines even *in real terms* if migrant workers are admitted, as is indicated in Table 6 from the fact that utility is also declined.

Then, what is behind this apparently counterintuitive result (i.e., Japan will incur *economic* loss from accepting migrant workers)? As discussed in detail in section 3, the admission of migrant workers gives the quadruple effect on the host country. While effect 1 (cheaper foreign labor effect) and effect 4 (nontradables consumption effect) are positive, we have negative effect 2 (trade barrier effect) and effect 3 (nontradables income effect). When the number of admitted migrant workers remains the range shown in Table 7, the (often overlooked) negative effects dominate the positive effects.

Incidentally, note that the decline in the national income (2.2 trillion yen) is larger than the decline in labor income less the increase in capital income (2.0 trillion yen), because the change in the national income includes the third factor (i.e., the change in the tariff revenue distributed to consumers in the lump sum fashion).

Thus, contrary to the widely accepted verbal folklore that the admission of foreign workers would give a positive economic impact (although it may give negative social impact), our estimate suggests that Japan would suffer a substantial economic loss, if foreign unskilled workers were legally admitted, as long as the scale of admission is relatively small (e.g., around one percent of the Japanese labor force).

(2) Overall Welfare Effect -- Trickle vs. Flood

As discussed in section 3, the admission of guest workers can give a favorable economic impact on the host country, if the scale of admission is large. In view of this, the next question to ask is how much foreign workers must be admitted if Japan is to derive a favorable economic impact from the admission of migrant workers. In order to answer the question, the simulation is repeated for different number of admitted foreign workers, using the model and parameter values discussed above. Figure 2 is also the result of the numerous simulations. In the figure, the value of welfare (U) is plotted for various values of admitted migrant workers (L_f). According to the simulations, Japanese welfare continues to decline until L_f reaches 1.66 million (or about three percent of the Japanese labor force), and it is not until L_f reaches 3.43 million (or about five percent of the Japanese labor force) that the welfare recovers to the initial level without migrant workers (See Curve I in the figure). As discussed above, when the legalization of unskilled foreign labor is discussed in Japan, the proposed number is about one percent of the labor force (about 650,000). But, such a small scale admission is very likely to have a negative impact on the Japanese economy.

Table 8 shows that, if Japan adopts more liberal trade policy, a small scale admission of

foreign workers can be welfare-improving. While the base calibration reported in Table 6 uses $t=0.1329$, the simulation is repeated for the reduced values of t in order to incorporate the impact of trade liberalization which would be brought about, for example, by a successful implementation of the Uruguay Round agreement. As Table 8 shows, if Japan succeeds in reducing trade barriers by half (i.e., $t=0.066$), Japanese welfare turns to increase when 0.79 million foreign workers, which is a little more than one percent of the Japanese labor force, are admitted. When 1.61 million foreign workers (about three percent of the Japanese labor force) are admitted, the Japanese welfare level is even higher than in the case of no admission of foreign workers.

5. EFFECTS OF EMIGRATION ON ASIAN DEVELOPING COUNTRIES

So far, we have discussed the impact of migration on Japan, and found that a large scale admission of migrant workers accompanied by trade liberalization is the most favorable to Japan. In what follows, the alleged benefits and costs of emigration will be briefly discussed. We will concentrate on four aspects of the effects of emigration: (i) income creation through remittances; (ii) relief to domestic unemployment; (iii) transfer of knowledge and skills; (iv) brain drain.

(i) Income Creation Through Remittances

Since poor sending countries are often suffering from prolonged balance of payment problems, the remittance from emigrant workers is an important source of foreign exchange receipt to these countries. In fact, the sizes of remittances for some of Asian LDCs are remarkable. Table 9 shows the ratio of remittances to total exports in selected Asian sending countries. For example, in 1983, when the number of Asian emigrations to the Middle East was

the highest, the ratio of remittances to total export earnings of Bangladesh and Pakistan were as high as 73 percent and 94 percent, respectively. While the ratio has declined after that due to the return of emigrant workers from the Middle East, the remittance is a still very important source of foreign exchange earnings in these countries.

But, as OECD (1987) pointed out, a flow of remittances is often instable. When the host country is in recession, migrant workers are often the first to be fired, and therefore, in recessionary years, when sending countries particularly need foreign exchange receipts, the remittances tend to decrease. Further, it is often the case that, as more and more migrant workers decide to stay in the host country longer than initially expected and decide to invite families to join them, the remittances begin to decline. Entzinger (1987) reported such a decline of remittances from Turkish migrant workers in West Germany. Moreover, the remittance may not necessarily help sending countries improve their balance of payment. As Stahl (1982) reported, the marginal propensity to consumption (especially consumption of imported luxury goods) out of remittance income is very high.

(ii) Relief to Domestic Unemployment

It is often argued that emigration of labor should mitigate serious unemployment problems in sending countries. In many Asian sending countries, there exists enormous unemployment (and underemployment) problem in the rural agricultural sector and urban informal sector. Some argues that Japan should admit migrant workers from Asian LDCs in order to relieve unemployment problems in these countries.

But, it seems questionable whether emigration to Japan relieves unemployment problems in Asian LDCs to a greater extent. As Todaro (1986) rigorously showed using his three sector

model, while labor emigration may contribute to *a relief of overall domestic unemployment*, this favorable effect may be offset by *a costly rise in urban unemployment* caused by increased rural-urban migration. In other words, urban unemployment gets worse because more and more rural population move to the urban sector in the hope of further emigrating to Japan. Furthermore, the number of unemployment in Asian sending countries is too large to be relieved by the emigration to Japan. Probably, for a relief of unemployment, a creation of employment opportunities in these sending countries through a foreign direct investment and/or increase of exports of labor intensive goods to advanced countries would be more important than emigration.

(iii) Transfer of Knowledge and Skills

It has been also pointed out that emigration contributes to economic development and modernization of sending LDCs through the introduction of new knowledge and skills brought back by returned emigrants. But, a survey by the Philippine Government (see Table 10) suggests that this alleged benefit is questionable. According to the survey, two-thirds of the migrant workers (both skilled and unskilled) said that they acquired no skills. Mere 13.6 per cent of migrants said that they acquired a skill through employment in the host country. In view of this, it is unlikely that unskilled migrant workers acquire skills through their employment in Japan.

(iv) Brain Drain

Economists have long pointed out that emigration causes "brain drain" from sending LDCs. Since good skilled labor emigrates in the hope of receiving higher pay in the receiving developed country, sending LDCs often suffer from the lack of essential professional workers, such as doctors and nurses. It should be noted that even unskilled migrant workers in Japan often have very high level of education. Since the wage rate for an unskilled worker like a construction

worker in Japan is often much higher than the wage rate for a skilled worker like doctor or nurse in LDCs, people of higher education also come to Japan to take an unskilled job. Table 11 shows the Latin-American migrant workers of Japanese origin by levels of education¹². After the revision of the Japanese Immigration Law in 1990, the person whose parent or grandparent is Japanese is allowed to come to Japan to do whatever activities in Japan, including unskilled work. Since then more than one million migrant workers from Latin America flow to Japan, and are doing unskilled work. In some sense, these people are substitutes for the illegal migrants. It would be surprising to see that more than 90 percent of these unskilled migrants have high school education (42 percent have college education!), although they are doing unskilled work in Japan for higher pay than that of a skilled job in their home country.

6. CONCLUDING REMARKS

After presenting some basic facts on migrant workers in Japan, I have analyzed the impact of these workers on the Japanese economy and on sending Asian developing countries. Partly because the problem of migrant workers is relatively new to Japan, there are no major studies which rigorously analyze the problem, and therefore, the discussion on the issue often goes emotional. Through the emotional argument without rigorous analysis, more and more people in Japan came to believe that, when foreign unskilled workers are legally admitted, she would enjoy economic gains, although she may suffer social losses (e.g., an increase in crimes etc.).

However, the above simulation results suggest that, if Japan is to benefit from admitting

¹² Since the data on education for illegal migrant are unavailable, the data for the legal migrant from Latin America are used here.

foreign labor, the scale of admission should be very large (more than 5 percent of the Japanese labor force). When the scale of admission is relatively small (e.g., one percent of the Japanese labor force, as often proposed in Japan), our study suggests that, under a realistic framework, Japan would incur fairly large economic loss from the admission of guest workers.

One might argue that Japan could benefit from even a small-scale admission of migrant workers if it is accompanied by wage discrimination against foreign workers. But, the wage discrimination is not allowed (by law as well as by humanitarian reasons), once foreign workers are legally admitted. One might also argue that, instead of wage discrimination, the Japanese government could impose an immigration tax on migrant workers. Ramaswami (1968) analyzed an optimal tax on the inflow of foreign factors a long time ago. While it seems relatively easy for developing countries to impose a tax on the capital inflow, it does not seem to be politically feasible for Japan, which is one of the most affluent countries in the world, to impose an immigration tax on migrant workers coming from very poor neighboring Asian countries. Therefore, if Japan is to gain from the admission of foreign workers, it seems reasonable to achieve this goal by a large-scale admission and/or trade liberalization rather than by wage discrimination or an immigration tax.

Moreover, as discussed in section 5, the alleged benefits of emigration for sending Asian LDCs often bring about negative side-effects like instability of the national economy and aggravation of urban unemployment. Further, the pressure of emigration from labor abundant countries tends to be stronger (and negative impact of immigration on the host country is more serious), when imports of labor intensive goods are severely restricted. As well known, imports of textiles and clothing, which are typical labor intensive products imported from developing

countries, are severely protected by higher tariffs and nontariff barriers. When such restrictions are lessened, the increase in imports of labor intensive products from LDCs will be able to substitute, at least to some extent, for imports of labor. In other words, the trade liberalization by Japan can create income and employment (probably at a smaller cost than by migration) in the sending Asian LDCs.

The present research can be extended in various directions. First, the simulation result can be sharpened by abandoning various simplifying assumptions, e.g., a small country assumption for the Japanese economy. Then the economic impact of the inflow of migrant workers can be evaluated more accurately. Second, the social impact which migrant workers might have on Japan can be investigated. Although the analysis in the present paper is limited to the economic impact, the admission of a large number of migrant workers would certainly have various social effects on Japanese society, e.g., a possible change in the crime rate and effects of a more diverse culture. Then we can contribute more to the policy debate on migrant workers in Japan and in other countries.

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TABLE 1
FOREIGN WORKERS IN JAPAN
(1991)

legal foreign workers	266,369
skilled workers	(67,983)
Latin Americans of Japanese origin	(147,800)
working students	(50,586)
illegal foreign workers	216,399
Total	482,768
<hr/>	
Total labor force in Japan	65,050,000

Source : Japanese Ministry of Labor

TABLE 2
ILLEGAL FOREIGN WORKERS APPREHENDED

	total	male	female
1983	2,339	200	2,139
1984	4,783	350	4,433
1985	5,629	687	4,942
1986	8,131	2,186	5,945
1987	11,307	4,289	7,018
1988	14,314	8,929	5,385
1989	16,608	11,791	4,817
1990	29,884	24,176	5,708
1991	32,908	25,350	7,558
1992	62,161	47,571	14,640
1993	64,341	45,144	19,197
1994	59,352	40,029	19,323

(Source) Japanese Ministry of Justice

TABLE 3
 ILLEGAL FOREIGN WORKERS BY COUNTRY OF ORIGIN
 (1994)

	Number			Share (%)		
	Total	Male	Female	Total	Male	Female
Total	59,352	40,029	19,323	100.00	100.00	100.00
Korea	10,730	6,694	4,036	18.08	16.72	20.89
Thailand	10,654	4,600	6,054	17.95	11.49	31.33
Malaysia	8,576	6,308	2,268	14.45	15.76	11.74
China ¹	8,000	6,025	1,975	13.48	15.05	10.22
Iran	5,628	5,530	98	9.48	13.81	0.51
Philippines	5,260	2,414	2,846	8.86	6.03	14.73
Peru	2,623	1,798	825	4.42	4.49	4.27
Pakistan	1,531	1,526	5	2.58	3.81	0.03
Bangladesh	918	908	10	1.55	2.27	0.05
Myanmar	899	688	211	1.51	1.72	1.09
Other	4,533	3,538	995	7.64	8.84	5.15

(Note) ¹ Including Taiwan and Hong Kong.

(Source) Japanese Ministry of Justice

TABLE 4
 ILLEGAL FOREIGN WORKERS BY ACTIVITIES
 (1994)

	number	share(%)
MALE		
Total	40,029	100.0
Construction worker*	15,691	39.2
Factory worker	10,654	26.6
Unskilled help*	3,656	9.1
Bartender*	1,865	4.7
Cook*	1,787	4.5
Dish washer*	1,407	3.5
Other service*	1,051	2.6
Mover*	480	1.2
Other	3,438	8.6
(Non-traded) ¹	25,938	64.8
FEMALE		
Total	19,323	100.0
Bar hostess*	7,413	38.4
Factory worker	3,139	16.2
Waitress*	2,242	11.6
Dish washer*	1,530	7.9
Prostitute*	1,176	6.1
Unskilled help*	800	4.1
Other service*	687	3.6
Cook*	626	3.2
Other	1,710	8.8
(Non Traded) ¹	14,474	74.9

(Note) ¹ summation of items with asterisk.

(Source) Japanese Ministry of Justice

TABLE 5
CLASSIFICATION OF INDUSTRIES

	export share ¹	import share ²
(Exportables)		
textiles & clothing	7.6	7.2
chemical	8.7	6.9
ceramic, stone & clay	6.3	2.2
iron & steel	11.1	1.6
metal product	8.3	1.2
general machinery	18.8	2.2
electric machinery	24.3	3.2
transportation equipment	29.4	2.0
precision instrument	30.0	7.6
other manufacturing ³	5.9	3.6
transportation & communication	8.7	3.9
(Importables)		
agriculture & fishery	0.4	17.3
mining	0.1	84.0
food product	0.7	5.3
paper & pulp	1.9	5.4
petroleum & coal product	2.0	12.2
Nonferrous metal	6.7	23.3
(Non-tradables)		
construction	0	0
wholesale & retail trade	4.7	1.1
banking & insurance	1.1	1.6
real estate	0	0
utilities	0.1	0
service	0.2	0.9

(Note) ¹ export share = exports / total supply

² import share = imports / total demand

³ "other manufacturing" in the industry classification

(Source) Prime Minister's Office, "Input-Output Table"

TABLE 6
ECONOMIC IMPACT OF FOREIGN WORKERS
(650,000 Workers)

	before	after	difference
social utility ¹	31,508	31,408	-100
national income ² (¥ bil.)	275,122	272,970	-2,152
capital income (¥ bil.)	82,078	82,756	678
labor income ³ (¥ bil.)	189,295	186,578	-2,712
labor income per capita (¥ thous.)	4,855	4,786	-69
labor share ⁴ (%)	69.75	69.27	-0.48

(Note) ¹ ordinal utility
² Tariff revenue is included.
³ The income of foreign workers is excluded.
⁴ = labor income / (capital income + labor income)
 (Source) Author's estimate. See main text for details.

TABLE 7
ECONOMIC IMPACT OF FOREIGN WORKERS
(A SENSITIVITY ANALYSIS)

	Number of Migrant Workers (Thousand)		
	325 (650÷2)	650	1300 (650*2)
social utility ¹	-62	-100	-153
national income ² (¥ billion)	-1,084	-2,152	-4,160
capital income (¥ billion)	335	678	1,357
labor income ³ (¥ billion)	-1,362	-2,717	-5,296
labor income per capita (¥ thous.)	-35	-70	-136
labor share ⁴ (%)	-0.24	-0.48	-0.95

(Note) ¹ ordinal utility
² Tariff revenue is included.
³ The income of foreign workers is excluded.
⁴ = labor income / (capital income + labor income)
 (Source) Author's estimate. See main text for detail.

TABLE 8
TRADE BARRIERS AND WELFARE EFFECT OF MIGRANT WORKERS

t (percent)	L_f^1 (thousand)	L_f^2 (thousand)
13.3 ¹	1,660	3,430
10.0	1,220	2,500
6.6 ²	790	1,610
4.4 ³	520	1,050

(Note) ¹ Base estimate

² One-half of the base value

³ One-third of the base value

(Source) Author's estimate. See main text for details.

TABLE 9
THE RATIO OF REMITTANCES TO EXPORTS EARNINGS
(%)

	1980	1983	1986	1988
Bangladesh	26.6	73.0	61.4	57.1
India	36.3	27.2	25.0	21.4
Pakistan	67.5	94.3	79.7	44.6
Philippines	3.6	3.6	3.4	5.5
Sri Lanka	14.6	27.9	28.0	24.1
Thailand	5.9	13.4	12.2	n.a.

(Source) The World Bank and the United Nations Statistics

TABLE 10
ACQUISITION OF SKILLS BY EMIGRANT WORKERS
(%)

Acquired through employment in the host country	13.6
Acquired through official training	13.3
No skill acquired	67.8
Acquired through books	4.4
Other	1.0
Total	100.0

(Source) The Government of the Philippines

TABLE 11
EDUCATION LEVEL OF LATIN AMERICAN MIGRANTS OF JAPANESE ORIGIN
(%)

College or above	42.1
Professional school	21.5
High school	29.4
Elementary school	7.1

(Source) Kaigai Nikkeijin Kyokai

FIGURE 1
CHEAPER FOREIGN LABOR EFFECT

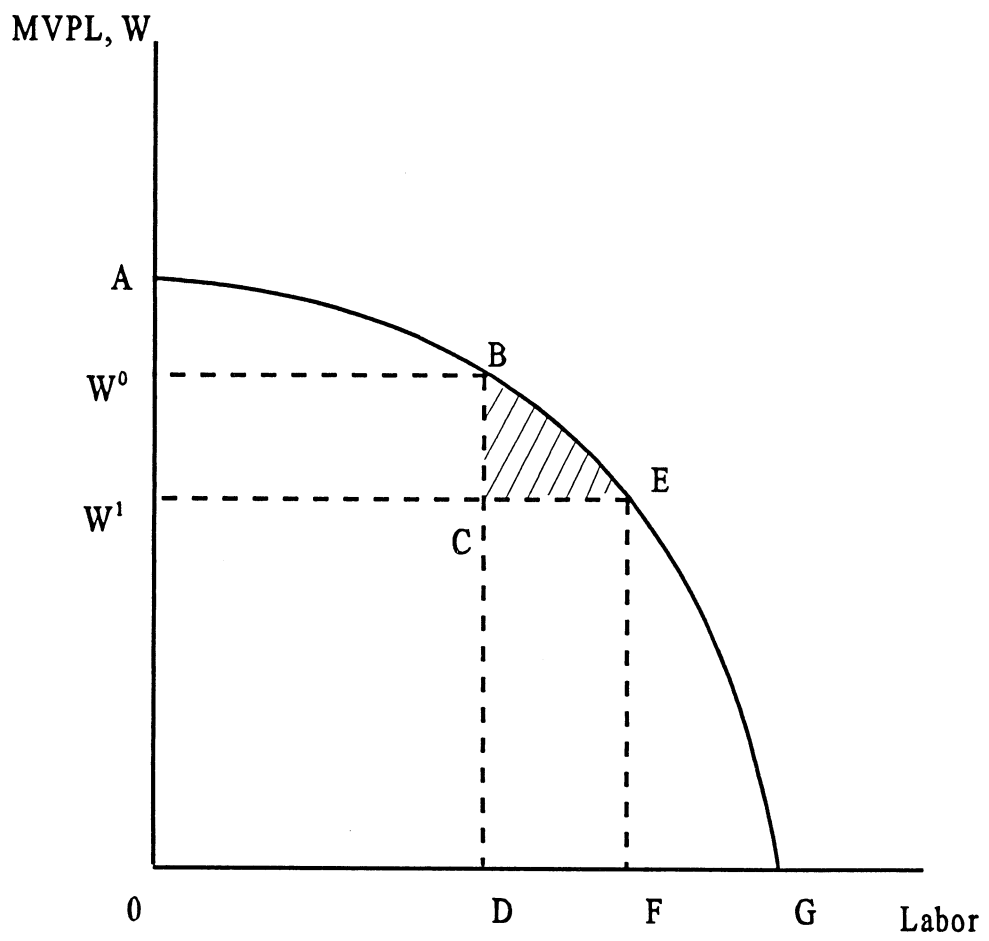
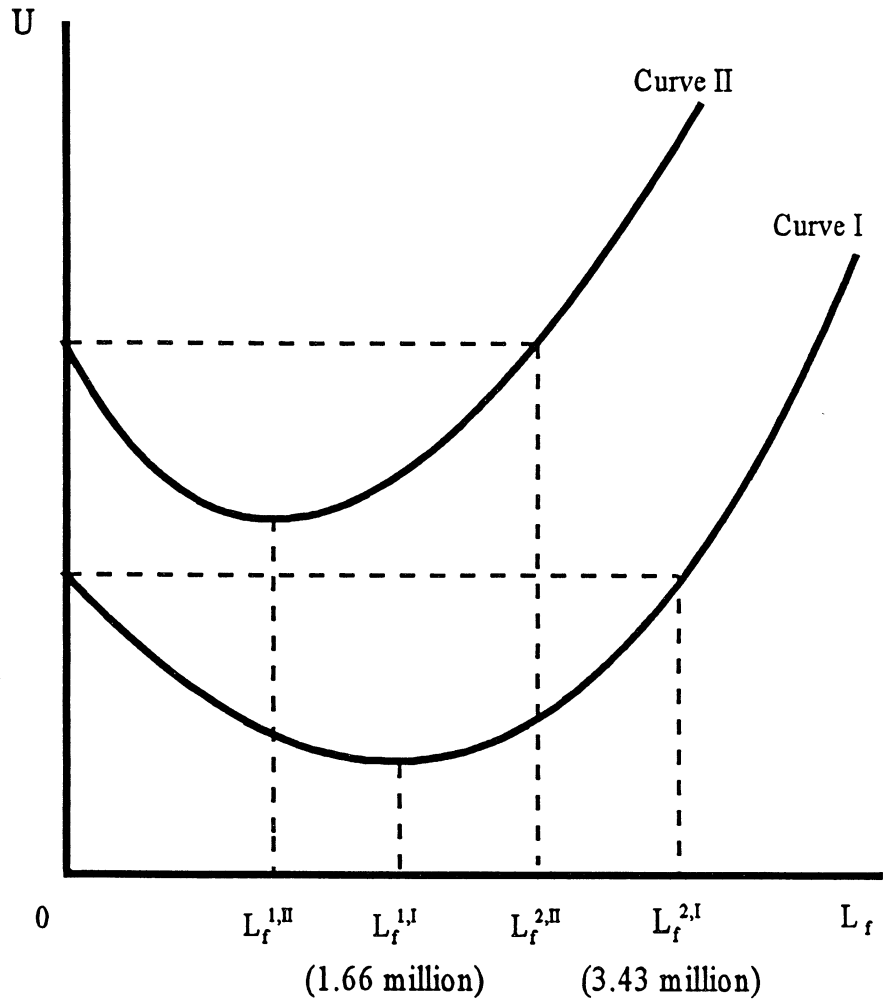


FIGURE 2
MIGRANT WORKERS AND HOST COUNTRY'S WELFARE



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