THE IMPACT OF OVERSEAS WORKERS' REMITTANCES ON INDIGENOUS INDUSTRIES: EVIDENCE FROM BANGLADESH

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I. INTRODUCTION

ONE of the most important factors impacting upon the trade position of a number of South and Southeast Asia economies since the mid-1970s has been the export of labor services to the oil-exporting countries of the Middle East and North Africa (MENA). By the early 1980s, more than 2.5 million Asian workers were employed in the oil-exporting countries of MENA [10, p. 27]. By 1983, official remittances from migrant workers abroad (which are significantly less than actual remittances for a variety of reasons) amounted to 84 per cent of merchandise exports for Bangladesh, 26 per cent for India, 98 per cent for Pakistan, 19 per cent for the Philippines, 28 per cent for Sri Lanka, and 11 per cent for Thailand [23, p. 903]. For several years after 1983 there was a decline in demand for Asian labor in MENA as a result of falling OPEC revenues. However, the last two years have witnessed a significant reversal of this trend with manpower exports from Bangladesh, Thailand, and the Philippines, and the corresponding inflow of workers remittances, currently exceeding their peak of the early 1980s. Demand for workers from other Asian countries is also experiencing a resurgence.

Although it seems apparent that the remittances of overseas workers has been of considerable benefit to the balance of payments position of the countries involved, there has been a continuing debate concerning the overall developmental impact of manpower export. In particular, there have been a number of studies of expenditure patterns out of remittances which indicate that they are directed principally into immediate consumption of both necessary and discretionary items, the latter often being imported; house construction or home improvement; the purchase of land; and debt repayment, to name the major uses.[1] Without exception, these studies provide abundant evidence that only a very small portion of remittances are directed into productive investment. Their conclusion, explicit in some studies and implicit in others, is that since "...the use of remittances is the litmus test of emigration's

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[1] Stahl and Arnold [24] provide a comprehensive review of studies within the Asian context which have looked at remittance expenditures.

benefits" [13, p. 13], it is questionable whether a policy of labor emigration is actually conducive to development.[2]

It is our position that the almost universal finding that only a very small proportion of remittance income is used for productive investment does not warrant the pessimistic conclusion regarding its potential developmental value. First, there is no reason to expect remittance recipients to directly invest their savings. It is the purpose of financial intermediaries to channel the savings and/or the collective credit balances (in bank deposits) of remittance recipients to investors. Second, remittances constitute an addition to real income. Although empirical evidence demonstrates that remittances are primarily destined to serve consumption needs, the theoretical anticipation is that this expansion of consumption will expand aggregate demand. If this induced demand for consumption goods is met through existing productive capacity the overall impact of remittances on output should be favorable, both in the quantitative sense and also because of more complete use of capacity. If in some cases output expansion is constrained by capacity limitations, this may precipitate an expansion of investment, now less constrained by foreign exchange availability and also facilitated by the expanded credit availability which is likely to follow in the wake of substantial remittance inflows.[3]

Thus the use of remittances for consumption has the potential of inducing an increase in output, employment, and investment demand. Yet with the exception of a few theoretical works which recognize the possibility of such a "multiplier effect" originating from remittance expenditure,[4] available literature seems to have

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[2] In a study published by the United Nations [27] it has been claimed, with regard to remittances, that "...such transfers generally have failed to contribute to development in the sending countries and have actually had a number of negative side effects.... Typically, little or none of the migrants' savings has been invested in capital-generating activities" (p. 42). Castles and Kosack [9] also take a pessimistic view of the potential contribution of remittances to development, considering them to be an unlikely source of developmental capital since they will most likely be used for consumption and only marginally productive enterprises. Kindleberger [15] is less than sanguine about the developmental importance of remittances which are usually "...invested in ways which contribute very little to economic growth" (p. 94). Bohning [7] also questions the usefulness of remittances as a promoter of development, arguing that remittance receivers and returnees are more likely to be consumers than innovating producers. Swanson [25] argues that "empirical evidence generally supports this assessment [of a pessimistic view of remittances as a stimulus to economic growth]. It appears that while some repatriated earnings find their way into productive enterprises the bulk of the revenues contribute little if anything to the countries' productive capacity" (p. 14). Referring to the experience of the European labor exporters, Macmillen [17] concludes that "remittances may have done little to improve the longer term economic development of the LDCs" (p. 267).

[3] Bangladesh follows a controlled exchange rate regime under which it periodically adjusts the value of its currency relative to other currencies. Such a foreign exchange regime implies that the inflow of foreign exchange remittances will add to bank reserves, expanding the supply of money and credit, unless countered by measures aimed at neutralizing the impact of foreign exchange inflows on the money supply.

[4] See, for example, [8, pp. 207–8] [11, pp. 36–37] [23, pp. 873–74] [22, p. 34]. This issue appears to be finally catching up with researchers, as the following excerpts from some relatively recent works would suggest: "one must ask how the seller uses his capital gains

TABLE I

ANNUAL OUTFLOW OF BANGLADESHI MIGRANT WORKERS AND REMITTANCES OF
MIGRANT WORKERS, 1976–88

	Annual Outflow	Remittances* (U.S.$ Million)
1976	6,092	23.2
1977	16,225	81.0
1978	22,809	110.3
1979	24,465	171.5
1980	33,275	338.9
1981	55,787	381.6
1982	62,805	530.9
1983	59,216	669.9
1984	56,754	500.8
1985	77,694	502.0
1986	68,658	752.2
1987	68,750	747.6
1988	68,121	750.0

Sources: Annual outflow figures unpublished information from International Labour
Organisation/Asian Regional Project for Labour Administration, Bangkok. Remittances
are from the Central Bank of Bangladesh.
* Remittances are in current dollars.

largely ignored the implications of this increased expenditure for development. In
the absence of any systematic empirical analysis, the impact of remittance expenditure on domestic industries remains in doubt.

In view of these shortcoming of existing studies, it is the purpose of this paper
to investigate the implications of remittance expenditure for the expansion of
indigenous industries by employing empirical information from Bangladesh pertaining to remittance inflows, the pattern of remittance expenditures, and an input-output table for the economy.

II. TRENDS IN MANPOWER EXPORT FROM BANGLADESH

Table I provides information concerning the trends in manpower export from
Bangladesh and the foreign exchange remittances it has provided. In excess of
98 per cent of the annual placements are in the Middle East. As is evident from
Table I, labor emigration initially peaked in 1982 when 62,805 workers found
employment abroad. In that year, the stock of Bangladeshis in the oil-exporting

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rather than simply accusing the migrant of spending unproductively" [21, pp. 292–93];
"money paid for land by the migrant may in turn be invested by the former owner, the
problem then becomes one of tracing remittance inflows after they have changed hands
two or more times...the impact of remittance money [may] be felt in ways that go far
beyond immediate cash purchases" [2, pp. 590, 593]; and "there is now a considerable
amount of data on the first use of remittances, but no information on how the money is
eventually spent" [5, p. 301].

TABLE II
REMITTANCES AND BROAD MACRO AGGREGATES

	Remittances* (U.S.$ Million)	GDP	Exports	Imports	Debt Service
			(As a Percentage of Remittances)		
1976	23.2	0.3	5.6	2.4	36.4
1977	81.0	1.1	15.9	6.5	120.9
1978	110.3	1.3	20.0	7.2	117.1
1979	171.5	1.9	26.2	9.0	204.2
1980	338.9	3.2	47.0	13.7	445.3
1981	381.6	3.9	53.5	15.5	391.0
1982	530.9	4.8	75.0	23.5	428.8
1983	669.9	4.9	93.9	31.4	495.9
1984	500.8	3.7	55.1	18.2	289.5
1985	502.0	3.7	55.6	20.1	234.6
1986	752.2	5.0	86.6	28.2	—
1987	747.6	4.3	85.0	27.8	—

Sources: From the Central Bank of Bangladesh and International Monetary Fund, *International Financial Statistics* (Geneva), various issues.
* Remittances are in current dollars.

countries of MENA was estimated to be 200,000 [10, p. 27]. With the decline in oil revenues and the ensuing reduction in labor demand in MENA, the placement of Bangladeshi labor declined over the period 1983–84. However, 1985 witnessed a strong revival of demand for Bangladeshi labor in MENA, to such an extent that annual placements in 1985, numbering 77,694, substantially exceeded placements in 1982. Although annual placements declined between 1985 and 1988, with the latter year witnessing a placement figure of 68,121, annual placements have still remained substantially above their 1982 peak.

As can be discerned from Table I, the remittances of Bangladeshi workers abroad peaked in 1983, lagging the peak in annual placements by a year. The decline in annual placements over the period 1983–84 was manifest in a substantial reduction in remittances over the period 1984–85. However, the strong recover of annual placements resulted in a significant increase in remittances, growing from U.S.$500 million in 1984 to U.S.$750 million by 1988.

The importance of contract workers' remittances to Bangladesh is indicated by their value relative to the broad macro aggregates of the economy. As can be seen from Table II, remittances amount to a substantial percentage of exports, imports, and debt servicing. By 1987, remittances amounted to 4.3 per cent of GDP, 85 per cent of exports, and 28 per cent of imports. In 1985, the latest year for which estimates are available, remittances were 235 per cent of debt service.

III. MODELLING THE IMPACT OF REMITTANCES

There are several methods of modelling the economy-wide effects of an inflow of remittances. Ideally, one could employ a price endogenous computable general

equilibrium model (CGE) which is built around a country's social accounting matrix. To our knowledge, Bangladesh does not have statistical information of sufficient detail to construct a CGE capable of tracing out the economy-wide effects of an inflow of remittances. Although less sophisticated than the CGE models, input-output analysis is capable of tracing the path of remittances expenditures and predicting their consequences for indigenous industries, despite its well-known shortcomings.

As a first step in the modelling exercise, the distribution of remittance income among various categories of expenditure is established using survey data from the World Bank study [4] on the expenditure patterns of remittance receiving households and other relevant published materials. The expenditure categories of the World Bank survey are then matched as closely as possible to the forty-seven sectors comprising the input-output table for Bangladesh. This sectoral distribution of expenditures is imputed to total remittance inflow data for the years 1976 to 1988 to obtain corresponding sectorwise anticipated expenditures out of remittances. Assuming these expenditure figures to be autonomous additions to final demand attributable to remittances, they are used to construct the $|y|$-vector-equivalent in the model. Multiplying the output multiplier matrix $[I - A + m]^{-1}$ by the vector $|y|$, we obtain total output attributable to remittances, i.e., vector $|x|$.[5] On the basis of our results, we identify those sectors more favored by remittance expenditures. Moreover, we investigate the strength of forward and backward linkages of thoses sectors most affected by the expenditure of remittances.[6]

IV. THE ANALYTICAL FRAMEWORK

Our analysis uses the basic open Leontief framework which views equilibrium output $|x|$ to be determined by the amount of final demand $|y|$ under the relationship, $|x| = [I - A]^{-1}|y|$, where $[A]$ is the technical coefficient matrix of order $n \times n$ which describes the input-output structure of each sector in terms of a

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[5] The reader will note that the formation of the output multiprier matrix $[I-A+m]^{-1}$ is different from the basic Leontief inverse $[I-A]^{-1}$. The form we use represent the structural interdependence relationships net of imports (giving it the name net matrix, as opposed to gross matrix by which the ordinary Leontief inverse is normally referred to. This nomenclature has been adopted from [1, p. 108 esp.]). Matrix $[I-A+m]^{-1}$ has been interchangeably referred to as $[M]$ in subsequent references.

[6] This exercise allows us to trace through the economy-wide intersectoral impacts of the consumption and investment expenditures undertaken by remittance receiving households. However, households also save remittance income as financial deposits in financial institutions. These savings, when loaned out by financial institutions for investment (or consumption in the case of loans for that purpose), must also add to the demand for domestic output. It would be difficult indeed to determine the sectoral distribution of investment/consumption expenditures funded by financial institutions on the basis of the deposits of remittance income. We have not attempted to do so in this study. This implies that the estimates we arrive at regarding the potential output consequences of remittances must be considered conservative. However, evidence suggests that financial savings out of remittance income in Bangladesh is just over 6 per cent, a relatively small figure compared to the proportion of remittance income spent by households.

derived set of technical coefficients of production a_{ij}; $[I]$ is an $n \times n$ order identity matrix, $|x|$ and $|y|$ are the total output and final demand vectors, respectively, both being of order $n \times 1$. Investigations in the envisaged direction may start from the inverted Leontief matrix $[I - A]^{-1}$ which, in an input-output system, describes the structure of sectoral interdependencies in terms of output.[7] Once the inverted Leontief matrix is known, the output required to support a given amount of final demand may be calculated. In the context of our discussion, this analytical framework can provide an estimate of potential output generation that may be attributable to remittances.

The requisite information for any such exercise is the Leontief inverse matrix for Bangladesh and final demand originating from remittances. However, this analytical framework does not take into account the role that imports play in most sectors of LDCs. Imports constitute a leakage from the economy and reduce the strength of sectoral linkages. Thus any operation with a Leontief matrix unadjusted for imports may provide a misleading picture about the output generation potential of expanded final demand. Fortunately, using some well known procedures, the open Leontief model may be modified to capture expansionary effects net of imports. If the output-multiplier matrix $[I - A]^{-1}$ is thought to comprise gross relationships (including imports), then net (imports excluded) relationships will be given by $[I - A + m]^{-1}$, where m is the diagonalized matrix of the import coefficients.[8] The adjustment exercise is then simply a matter of subtracting the import coefficients of each sector from the corresponding element of the $[A]$-matrix prior to calculation of $[I - A]$ and the inversion thereof. Import coefficients are defined as the import demand of a sector corresponding to a unit of domestic production of that sector, specifically calculated by dividing the domestic production figure into the corresponding import figure. The Bangladesh Planning Commission [6, p. 29] provides estimates of sectoral import coefficients for 1976–77. It reveals that imports are quite important for many sectors of the economy. Indeed, in many sectors the import coefficient exceeds unity, implying that imports exceed domestic production in these sectors.[9] In some sectors, for example, transport equipment and machinery, the import coefficient is almost 5. In such a situation, an expanded demand of U.S.$5 is likely to result in only U.S.$1 of domestic output, and a corresponding decline in the output generation potential is to be anticipated. The question of import content is also important in the case of intermediate inputs. The anticipated output-generation potential may also be short-circuited if, because of high import content, the linkage between the expansion of the output of final goods and intermediate input producing industries is weakened. Lin and Yotopoulos [16, p. 3] observed specifically that it is therefore "...best to measure linkages by excluding the imported inputs of production" as this approach is likely to reflect the true potential for output generation and thus induced development. Bangladesh

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[7] See [26], chapter on "Development Planning: Theory and Practice."

[8] See [19, pp. 64–69] for the mathematics of introducing imports in input-output models.

[9] In Table V, to be discussed below, column 4 provides information concerning the relative importance of imports to each of the forty-seven sectors.

certainly meets the description of a highly import-dependent economy which strengthens the case for excluding imports from our analysis.[10]

V. THE DATA

This section will be devoted to descriptions of the output-multiplier matrix and the derivation of remittance induced final demand which together provide the basis for this work is the forty-seven sector Input-Output Coefficient Matrix for Bangladesh, Matrix A [6, pp. 47–54], which was used by the Planning Commission for the task of materials balancing and policy framing for the Second Five-Year-Plan (1980–85). The input-output table under reference refers to the year 1976–77, which is the latest available. Information on import content of final demand is available from the input-output table [6, p. 29] in which the imports of any sector are expressed as proportional to the domestic output of that sector, $M_i = m_i X_i$, where M_i and X_i are sectoral imports and domestic output at market prices and m_i is the import coefficient, i.e., import demand of sector i corresponding to one unit domestic production of sector i. The concept "local content of final demand" used in our analysis to determine the direct contribution of remittances to the output of a particular sector thus becomes $1/(1 + m)$.

The present study uses raw data from the World Bank survey on emigration from Bangladesh. A report on the survey was published by Ali et al. [4]. The data is comprised of monthly expenditures on various items by households. For the 277 remittance receiving households interviewed (201 rural and 76 urban), expenditure information is available separately for rural and urban households. These expenditures were assigned to the relevant sectoral categories used in the input-output table. As would be expected, the number of expenditure categories of the World Bank study was not as great as the number of sectors in the input-output table. Moreover, there was not always a one-to-one correspondence between expenditure categories in the World Bank survey and the sector categories of the input-output table. In some instances, certain expenditures which did not correspond specifically to an input-output sector were assigned to particular sectors on the basis of logical deduction.

An important assumption in calculating the distribution of remittance expenditures by sectors was to assume that the average propensity of households to spend on various categories of goods and services is equal to their marginal propensity. A margin-oriented formula was avoided as it could lead to a considerable downward bias in the derived consumption figures, given that the year to year increase in the total amount of remittances owes its origin to increasing number of remittance receiving households, rather than an increase in the amount of remittances received by existing beneficiaries.

The sectorwise monthly consumption expenditures for urban and rural households are presented in Table III. These may be thought to constitute the expendi-

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[10] Acharya and Hazari's [1, p. 112] research with the 1962–63 input-output table for erstwhile East Pakistan confirmed a significant divergence between gross and net linkages.

TABLE III
Sectoral Distribution of Household Expenditure from Remittances

	Sector Description	Code Used	Final Demand (Taka/Month)		Sectoral Distribution of Expenditure (%)	Sectoral Expenditure as a Percentage of Remittances
			Rural	Urban		
01	Rice growing and processing	Rice	553.04	385.64	16.8	9.7
02	Wheat growing and processing	Wheat	13.87	64.69	0.9	0.5
03	Jute growing and baling	Jute	0.00	0.00	0.0	0.0
04	Cotton growing and ginning	Cotton	0.00	0.00	0.0	0.0
05	Tea growing and processing	Tea	14.51	20.47	0.5	0.3
06	Other crops: growing & processing	Othrcrop	304.90	287.71	9.9	5.7
07	Livestock	Livstock	215.65	340.42	8.3	4.8
08	Fisheries	Fishries	124.92	193.40	4.8	2.7
09	Forestry	Forestry	49.71	0.00	1.2	0.7
10	Sugar refining and molasses making	Sugar	59.40	42.24	1.8	10.4
11	Edible oil and vegetable ghee	Edibloil	53.16	71.04	1.9	11.1
12	Salt: uncrushed and refined	Salt	0.00	0.00	0.0	0.0
13	Cigarettes & other tobacco products	Tobacco	29.17	50.86	1.2	0.7
14	Food & drink, n.e.c.	Othrfood	42.07	76.74	1.7	1.0
15	Cotton yarn	Cottnyrn	0.00	0.00	0.0	0.0
16	Cloth: mill made	Millclth	22.97	24.41	0.8	0.4
17	Cloth: handloom	Handclth	111.62	118.60	3.8	2.2
18	Jute textiles	Jutetxtl	0.00	0.00	0.0	0.0
19	Paper, board & other paper products	Paper	0.00	0.00	0.0	0.0
20	Leather and leather products	Leather	68.72	73.02	2.3	1.3
21	Fertilizer	Fertilzr	0.00	0.00	0.0	0.0
22	Pharmaceuticals	Phrmaceu	0.00	0.00	0.0	0.0
23	Other chemicals	Othrchem	0.00	0.00	0.0	0.0
24	Cement, limestone & clinker	Cement	0.00	0.00	0.0	0.0
25	Steel and basic metals	Bsicmetl	0.00	0.00	0.0	0.0
26	Metal products	Metlprod	0.00	0.00	0.0	0.0
27	Machinery incl. elect. equipments	Machinery	235.41	438.34	9.6	5.6
28	Transport equipments	Transeqp	0.00	0.00	0.0	0.0
29	Furniture and other wood products	Wood	29.83	38.59	1.1	0.6
30	Miscellaneous industries	Miscinds	45.48	8.95	1.2	0.7
31	Urban house building	Urbhouse	0.00	231.88	2.1	1.2

TABLE III (Continued)

	Sector Description	Code Used	Final Demand (Taka/Month)		Sectoral Distribution of Expenditure (%)	Sectoral Expenditure as a Percentage of Remittances
			Rural	Urban		
32	Rural house building	Rurhouse	457.80	0.00	11.0	6.3
33	Non-residential building	Nonresbl	0.00	0.00	0.0	0.0
34	Const.: power & gas plants	Conselgs	0.00	0.00	0.0	0.0
35	Const.: railways, roads, ports, etc.	Constran	0.00	0.00	0.0	0.0
36	Const.: canals, embankments, etc.	Othrcons	0.00	0.00	0.0	0.0
37	Petroleum products	Petrleum	48.81	0.00	1.2	0.7
38	Electricity generation	Elctrcty	0.00	85.35	0.8	0.4
39	Gas: extraction and distribution	Gas	0.00	9.77	0.1	0.1
40	Transport service	Transerv	43.02	220.72	3.1	1.8
41	Trade service	Tradserv	0.00	0.00	0.0	0.0
42	Housing service	Housserv	101.33	288.58	5.1	2.9
43	Health service	Health	18.68	95.87	1.3	0.8
44	Education service	Educatn	33.25	170.58	2.3	1.4
45	Public administration	Publicad	0.00	0.00	0.0	0.0
46	Banking and insurance	Bankinsr	14.68	75.34	1.0	0.6
47	Professional & other services	Othrserv	62.10	318.61	4.4	2.5

ture pattern of a "typical" remittance receiving household which can be generalized to obtain the sectorwise addition to final demand attributable to remittances. The sixth column of Table III provides information on the sectorwise distribution of expenditure as a percentage of total expenditure. It is obviously inappropriate to treat all remittance income as expenditure since a portion is saved. Thus in the last column of Table III we have provided an estimate of the percentage of remittance income which is actually spent within the various sectoral categories.[11] When multiplied by the amount of remittances for a particular year, the proportions indicated in the last column of Table III will provide estimates of the distribution of remittance expenditures by sector.

VI.   EMPIRICAL RESULTS

The remittance expenditure (final demand) vector implicit in the last column of Table III, when multiplied by the output multiplier matrix $[I - A + m]^{-1}$ (denoted by $|M|$ in subsequent references) yields, for respective years, the potential generation of output in the economy attributable to remittances. This has been done for years

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[11] Ali et al. [4, p. 96] report an average monthly income of Taka 5,201 for the rural sample, and Taka 5,354 for urban.

TABLE IV

ESTIMATED ANNUAL FINAL DEMAND AND OUTPUT FROM REMITTANCES

(U.S.$ Million)

Year	Remittances	Final Demand	Direct Output	Indirect Output	Total Output
1976	23.2	13.4	11.6	4.9	16.5
1977	81.0	46.7	40.7	17.1	57.8
1978	110.3	63.6	55.4	23.3	78.7
1979	171.5	98.9	86.1	36.2	122.3
1980	338.9	195.4	170.1	71.6	241.7
1981	381.6	220.0	191.6	80.6	272.2
1982	530.9	306.1	266.5	112.1	378.6
1983	669.9	386.2	336.3	141.5	477.8
1984	500.8	288.7	251.4	105.8	357.2
1985	502.0	289.4	252.0	106.0	358.0
1986	752.2	433.6	377.6	158.9	536.5
1987	747.6	431.0	375.3	157.9	533.2
1988	750.0	432.4	376.5	158.4	534.7

Sources: Remittances are from the Central Bank of Bangladesh.

1976 to 1988 with the results summarized in Table IV. In this table, the amount of remittances corresponding to each year has been recorded in column 2. Column 3 shows expenditure out of remittances, i.e., the addition to final demand attributable to remittances. The portion of it that is likely to be locally supplied is presented in column 4, while column 5 shows the quantity of intermediate inputs that is required to support this expansion in the output of final goods and services. Column 6 is the sum of columns 4 and 5 and indicates the total potential change in output resulting from the inflow of remittances.

It is evident that expenditures out of remittances (column 3) are less than the amount of remittances (column 2). The difference is equal to the amount that is saved out of remittance income, where savings is broadly defined to include both financial savings as well as the purchase of assets.[12] The difference between expenditures from remittances (column 3) and induced indigenous output (column 4) is the amount of spillover into imports.[13]

The value of the remittance multiplier is equal to the ratio of column 6 and column 3. However, this is a "simple output multiplier." It is "simple" because

[12] It is an objective of the government to encourage a greater proportion of financial savings out of remittance income. To this end, the government has introduced a number of schemes. The "Wage Earners' Scheme" allows the foreign exchange remittances of overseas workers to be sold through daily auctions conducted by major national banks, assuring that remittance recipients will receive the best possible rate of exchange for their foreign currency. In addition, a number of other schemes have been introduced to provide incentives to migrant workers to save and invest their overseas earnings (see [14, pp. 37–38]).

[13] An often heard complaint concerning the use of remittances is that they are used for importing luxury goods. The data in Table IV, specifically column 3 less column 4, indicates that about 13 per cent of expenditures out of remittances are directed toward imported goods. This is arguably a relatively small proportion of expenditures in view of the general

it excludes household expenditures induced by increases in household income which result from the expansion of output to support the remittance induced increase in demand. Because of data limitations and the need to build in further assumptions, we have stopped short of closing the model with respect to the household sector, the step necessary to derive the full output multiplier. Hence our estimate of the impact of remittances on potential output should be viewed as being conservative.

Table IV clearly indicates that the expenditure of remittance income has the potential to provide a substantial stimulus to indigenous industries, even in a country as heavily reliant on imports as is Bangladesh. However, caution is required in interpreting these results since they are but estimates of the potential increase in output, fully realizable only under conditions of short-term under-utilization of productive capacity. This potential may not be realized under certain conditions. It is often believed that in many Third World countries a major bottleneck to higher output levels typically is not insufficient demand but structural and institutional constraints on the supply side. Shortages of capital, raw materials, intermediate products, and skilled and managerial human resources (which may be further eroded through emigration), combined with poorly functioning and inefficiently organized commodity and credit markets, and inadequate infrastructure constitute supply-side constraints which can effectively stifle the output response to expanding demand. This possibility notwithstanding, by taking account of overall production inter-dependencies our investigation provides useful insights into the potential economy-wide consequences of remittance use.

VII.   REMITTANCE USE IN THE CONTEXT OF INTER-INDUSTRY LINKAGES

Column 5 of Table IV reveals that remittances may indeed induce a considerable degree of indirect expansion in output. In some cases, sectors with little or no final demand (see Table III) and hence with little or no "direct" output stimulation can nonetheless be stimulated indirectly insofar as their output is required as inputs for those sectors experiencing direct demand. For example, as can be discerned from Table V, indirect output generation is relatively important in the sectors Trade services (41), Forestry (09), Livestock (07), and Other crops (06), despite the fact that these sectors receive little or no direct demand stimulus as a result of remittances. This implies that these sectors have strong linkages with those sectors receiving a direct stimulus to demand as a result of the expenditure of remittances. In what follows, we attempt to measure the strength of intersectoral linkages with the ultimate aim of discerning the extent to which remittance expenditures are addressed to sectors which have strong backward and/or forward linkages.

Mathematically derived linkage indices indicate the degree of structural inter-

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import dependence of the Bangladesh economy. It also should be noted that columns 3 less column 4 indicates only the proportion of expenditures allocated to imported consumption goods. The total change in import demand would also include imported intermediate inputs induced by the expansion of indigenous industries.

TABLE V

REMITTANCE INDUCED OUTPUT: BANGLADESH, 1988

(U.S.$ Million)

	Sector	Final Demand from Remitts.	% Produced Domestically	Direct Output	Indirect Output	Total Output
01	Rice	72.55	97.9	71.02	8.12	79.12
02	Wheat	12.87	3.0	1.20	0.31	1.51
03	Jute	—	100.0	—	0.55	0.55
04	Cotton	—	5.0	—	0.01	0.01
05	Tea	2.31	99.9	2.31	0.01	2.32
06	Othrcrop	42.95	93.1	39.96	11.87	51.81
07	Livstock	35.75	96.2	34.38	13.57	47.94
08	Fishries	20.56	100.0	20.55	0.01	20.56
09	Forestry	5.16	99.2	5.12	20.25	25.36
10	Sugar	7.83	100.0	7.82	0.41	8.23
11	Edibloil	8.31	61.5	5.11	0.28	5.38
12	Salt	—	97.9	—	0.44	0.44
13	Tobacco	5.03	97.7	4.91	0.00	4.91
14	Othrfood	7.38	67.5	4.98	0.03	5.01
15	Cottnyrn	—	83.7	—	5.24	5.24
16	Millclth	3.34	47.1	1.57	0.77	2.34
17	Handclth	16.24	100.0	16.24	0.13	16.37
18	Jutetxtl	—	100.0	—	0.88	0.88
19	Paper	—	56.1	—	0.85	0.85
20	Leather	10.00	99.9	9.98	1.78	11.76
21	Fertilzr	—	88.2	—	3.04	3.04
22	Phrmaceu	—	48.0	—	0.15	0.15
23	Othrchem	—	31.4	—	2.16	2.16
24	Cement	—	49.0	—	1.75	1.75
25	Bsicmetl	—	78.7	—	9.86	9.85
26	Metlprod	—	20.3	—	3.36	3.36
27	Machinry	41.65	16.4	6.83	0.54	7.38
28	Transeqp	—	15.9	—	0.14	0.14
29	Wood	4.61	95.6	4.41	2.61	7.02
30	Miscinds	5.07	65.6	3.33	10.21	13.52
31	Urbhouse	9.10	100.0	9.10	0.91	10.01
32	Rurhouse	47.53	100.0	47.52	1.93	49.43
33	Nonresbl	—	100.0	—	0.43	0.43
34	Conselgs	—	100.0	—	0.18	0.18
35	Constran	—	100.0	—	0.20	0.20
36	Othrcons	—	100.0	—	0.04	0.04
37	Petrleum	5.07	42.6	2.16	6.62	8.77
38	Elctrcty	3.35	100.0	3.35	1.40	4.75
39	Gas	0.38	100.0	0.38	0.69	1.07
40	Transerv	13.13	100.0	13.13	9.70	22.82
41	Tradserv	—	100.0	—	31.96	31.95
42	Housserv	21.85	100.0	21.85	—	21.84
43	Health	5.70	100.0	5.70	0.08	5.78
44	Educatn	10.15	100.0	10.15	—	10.14
45	Publicad	—	100.0	—	1.18	1.18
46	Bankinsr	4.48	100.0	4.48	1.64	6.12
47	Othrserv	18.95	100.0	18.95	2.12	21.06
	Total	432.40		376.50	158.40	534.70

dependence of one sector with other sectors of the economy, i.e., the extent to which growth in that sector can provide a stimulus to expansion in other sectors. The "linkages" of a sector have two components: backward linkages, which describe the impact upon the sectors that provide intermediate inputs to the specific sector; and forward linkages, which refer to the impact on the sectors that utilize the output of the specific sector [16, p. 2]. As in the framework used earlier, the sum of elements of a particular column of the inverse matrix [M] indicates the potential increase in direct and indirect output requirements per unit increase in final demand for the product of any sector. In an analogous manner, the sum of the elements of a particular row indicates the increase in output of that sector per unit increase in final demand of all sectors in the system. The average of the column sum, i.e., $\Sigma_i M_{ij}/n$, indicates the structural importance of a particular industry j, say $j = 1$, relative to other industries, i.e., $j = 2, \ldots, n$. A similar meaning may be imputed to the average of the row-sum, i.e., $\Sigma_j M_{ij}/n$.[14]

The linkage indices introduced up to this point are expressed in terms of per unit of output. The sectoral composition of total production has been ignored. A sector that has only weak linkages per unit of output may contribute a significant share to total production and thus must be assigned appropriate weights if the indices have to be used for intersectoral comparison. This may be achieved through normalization of the averages earlier arrived at using the overall averages (defined as $\Sigma_i \Sigma_j M_{ij}/n^2$) as a divisor. This provides the indices

$$U_{\cdot j} = n\Sigma_i M_{ij}/\Sigma_i\Sigma_j M_{ij}, \qquad\qquad (1)$$

$$U_{i\cdot} = n\Sigma_j M_{ij}/\Sigma_i\Sigma_j M_{ij}, \qquad\qquad (2)$$

designated by Rasmussen [20, p. 135] as the "index of the power of dispersion" and the "index of the sensitivity of dispersion," respectively, which are, in turn, parallel to Hirschman's concepts of backward and forward linkages [13, pp. 100–17]. Table VI presents values of these indices appropriate to the "net" output-interdependence matrix for Bangladesh economy, 1976–77. The sectorwise indices of backward linkage, $U_{\cdot j}$, are presented in column 5, while forward linkage indices, $U_{i\cdot}$, appear in column 8. The magnitude of the U's is convenient in interpreting the linkage coefficients since it measures the effects of increased output in one sector relative to those of all sectors.[15] If $U < 1$ that sector transmits relatively weak output stimuli to other sectors. Conversely, $U > 1$ indicates that the sector transmits relatively strong impulses to other sectors. The two different U-indices ($U_{\cdot j}$ and $U_{i\cdot}$) refer to the direction of the linkage. If this measurement is accepted then those sectors having above-unity values for either or both of the U-indices are to be construed having relatively strong linkages.

Table VII lists those sectors which have $U_{\cdot j}$ and $U_{i\cdot}$ values in excess of unity. Twenty-five sectors are estimated to have relatively strong backward linkages and fifteen have strong forward linkages. Of the total potential output generated by the inflow of remittances, some 67 per cent occurs in sectors with strong backward

[14] See [20, pp. 133–35].
[15] The identification of key productive sectors in the Bangladesh economy was undertaken by the authors in another context (see [12] and also [3]).

TABLE VI

REMITTANCE INDUCED ADDITIONS TO OUTPUT (1988) AND
MEASURES OF SECTORAL INTERDEPENDENCE

	Sector	Output		Backward Linkage		Forward Linkage	
		Value (U.S.$ Million)	Rank	$U_{.j}$	Rank	$U_{i.}$	Rank
01	Rice	79.12	1	1.0251	23	1.0306	14
06	Othrcrop	51.81	2	1.0294	22	1.7830	5
32	Rurhouse	49.43	3	1.4895	6	0.9062	20
07	Livstock	47.94	4	1.0215	24	1.5124	7
41	Tradserv	31.95	5	0.9237	31	4.0535	1
09	Forestry	25.36	6	0.9299	30	1.6811	6
40	Transerv	22.82	7	0.9975	26	1.8674	4
42	Housserv	21.84	8	1.0352	21	0.8328	34
47	Othrserv	21.06	9	0.8478	35	1.1658	10
08	Fishries	20.56	10	1.0553	20	0.8355	31
17	Handclth	16.37	11	1.3818	9	0.8595	25
30	Miscinds	13.52	12	0.8910	33	2.0612	3
20	Leather	11.76	13	1.6931	1	0.9847	18
44	Educatn	10.14	14	0.8846	34	0.8328	33
31	Urbhouse	10.01	15	1.6233	2	0.8685	24
25	Bsicmetl	9.85	16	1.1677	16	2.1246	2
37	Petrleum	8.77	17	0.6225	41	1.4282	8
10	Sugar	8.23	18	1.5148	5	0.8849	23
27	Machinry	7.38	19	0.2181	45	0.2320	45
29	Wood	7.02	20	1.3084	11	1.0159	15
46	Bankinsr	6.12	21	0.9917	28	1.0490	13
43	Health	5.78	22	1.1770	14	0.8471	30
11	Edibloil	5.38	23	0.9918	27	0.5516	39
15	Cottnyrn	5.24	24	0.7609	37	1.0960	12
14	Othrfood	5.01	25	0.9374	29	0.5663	38
13	Tobacco	4.91	26	1.2167	12	0.8141	35
38	Elctrcty	4.75	27	1.3802	10	1.1439	11
26	Metlprod	3.36	28	0.2695	44	0.3551	43
21	Fertilzr	3.04	29	1.2138	13	0.8504	27
16	Millclth	2.34	30	0.6741	39	0.4628	41
05	Tea	2.32	31	1.1296	18	0.8354	32
23	Othrchem	2.16	32	0.4464	42	0.5509	40
24	Cement	1.75	33	0.7339	38	0.7282	36
02	Wheat	1.51	34	0.3273	43	0.2853	44
45	Publicad	1.18	35	1.0801	19	0.9969	16
39	Gas	1.07	36	0.9179	32	0.9895	17
18	Jutetxtl	0.88	37	1.6173	3	0.9736	19
19	Paper	0.85	38	0.7635	36	0.6164	37
03	Jute	0.55	39	1.1378	17	1.3796	9
12	Salt	0.44	40	1.0121	25	0.8480	29
33	Nonresbl	0.43	41	1.6142	4	0.8974	22
35	Constran	0.20	42	1.4385	8	0.8485	28
34	Conselgs	0.18	43	1.4643	7	0.8982	21
22	Phrmaceu	0.15	44	0.6716	40	0.4372	42
28	Transeqp	0.14	45	0.2024	46	0.1564	46
36	Othrcons	0.04	46	1.1684	15	0.8594	26
04	Cotton	0.01	47	0.0014	47	0.0020	47

TABLE VII

KEY SECTORS MEASURED BY STRENGTH OF INTERDEPENDENCE

$(U._j$ and $U_i. > 1)$

Sector	Backward Linkage $(U._j)$	Rank	Sector	Forward Linkage $(U_i.)$	Rank
Leather	4.192	1	Tradserv	4.053	1
Urbhouse	1.623	2	Bsicmetl	2.125	2
Jutetxtl	1.617	3	Miscinds	2.061	3
Nonresbl	1.614	4	Transerv	1.867	4
Sugar	1.515	5	Othrcrop	1.783	5
Rurhouse	1.490	6	Forestry	1.681	6
Conselgs	1.464	7	Livstock	1.512	7
Constran	1.438	8	Petrleum	1.428	8
Handclth	1.382	9	Jute	1.380	9
Elctrcty	1.380	10	Othrserv	1.166	10
Wood	1.308	11	Elctrcty	1.144	11
Tobacco	1.217	12	Cottnyrn	1.096	12
Fertilzr	1.214	13	Bankinsr	1.094	13
Health	1.177	14	Rice	1.031	14
Othrcons	1.168	15	Wood	1.016	15
Bsicmetl	1.168	16			
Jute	1.138	17			
Tea	1.130	18			
Publicad	1.080	19			
Fishries	1.055	20			
Housserv	1.035	21			
Othrcrop	1.029	22			
Rice	1.025	23			
Livstock	1.022	24			
Salt	1.021	25			

linkages, while 63 per cent occurs in sectors with strong forward linkages.[16] Thus it can be concluded that remittance expenditures tend to favor those sectors with relatively strong linkages elsewhere in the economy and as such provide a potentially important stimulus to broader economic expansion.

VIII. CONCLUSIONS

The analysis presented in this paper indicates that although it is true that only a small fraction of remittances are directly spent on investment goods, it cannot be concluded that their potential contribution toward economic development is minimal. We have seen that even when utilized for seemingly "non-productive" uses, remittances may expand the domestic production of consumption goods as well as the intermediate products necessary to support that increased consumption. Moreover, for Bangladesh we have seen that remittances tend to be spend within those sectors which have relatively strong linkages with the rest of the economy. Thus many sectors which do not benefit directly from remittance expenditure will none-

[16] The percentages are compiled from Tables V and VII.

theless experience a growth in demand for their output. It is also to be anticipated that such a broad expansion of output will enlarge employment opportunities and stimulate demand for investment goods. To reiterate, the often heard argument that the use of remittances for consumption is of little developmental benefit to an economy must be interpreted with considerable caution.

It merits pointing out that in comparison to Bangladesh other labor-exporting countries of Asia, e.g., Pakistan, India, Thailand, the Philippines, and Indonesia, are much more diversified in terms of economic structure (as measured by the proportion of GDP attributable to industrial and manufacturing output). In general, it would be reasonable to deduce that the more diversified and integrated is a country's productive structure, the more it stands to benefit from the external stimulus provided by the inflow of overseas workers' remittances.

REFERENCES

1. ACHARYA, S. N., and HAZARI, B. R. "Linkages and Impacts: A Comparative Study of India and Pakistan," *Journal of Development Studies,* Vol. 8, No. 1 (October 1971).
2. ADDLETON, J. "The Impact of International Migration on Economic Development in Pakistan," *Asian Survey,* Vol. 24, No. 5 (May 1984).
3. ALAUDDIN, M. "Identification of Key Sectors in the Bangladesh Economy: A Linkage Analysis Approach," *Applied Economics,* Vol. 18, No. 4 (April 1986).
4. ALI, S. A., et al. *Labour Migration from Bangladesh to the Middle East,* World Bank Staff Working Paper No. 454 (Washington, D.C.: World Bank, 1981).
5. ARNOLD, F., and SHAH, N. "Asian Labor Migration to the Middle East," *International Migration Review,* Vol. 18, No. 2 (Summer 1984).
6. Bangladesh, Bangladesh Planning Commission. "The Structure of the Bangladesh Economy: An Input-Output Analysis," background papers of the Second Five-Year Plan of Bangladesh, Volume I (Dhaka, 1980).
7. BOHNING, W. R. "Some Thoughts on Emigration from the Mediterranean Basin," *International Labour Review,* Vol. 111, No. 3 (March 1977).
8. BOURGUIGNON, F. "Foreign Investment, Emigration and Development," in *International Labour Migrations and Economic Choices: The European Case,* by F. Bourguignon, G. Gallais-Hamonno, and B. Fernet (Paris: OECD, 1977).
9. CASTLES, S., and KOSACK, G. *Immigrant Workers and Class Structure in Western Europe* (London: Oxford University Press, 1973).
10. DEMERY, L. "Asian Labour Migration: An Empirical Assessment," in *Asian Labor Migration: Pipeline to the Middle East* (Boulder, Colo.: Westview Press, 1986).
11. ECEVIT, Z. H., and ZACHARIAH, K. C. "International Labor Migration," *Finance & Development,* Vol. 15, No. 4 (December 1978).
12. HABIB, A.; STAHL, C.; and ALAUDDIN, M. "Inter-Industry Analysis of Employment Linkages in Bangladesh," *Economics of Planning,* Vol. 19, No. 1 (January 1985).
13. HIRSCHMAN, A. O. *The Strategy of Economic Development* (New Haven, Conn.: Yale University Press, 1958).
14. International Labour Office. *Agenda for Policy: Asian Migration Project* (Bangkok: ILO Regional Office for Asia and the Pacific, 1988).
15. KINDLEBERGER, C. P. *Europe's Postwar Growth: The Role of Labor Supply* (Cambridge, Mass.: Harvard University Press, 1967).
16. LIN, W.-L., and YOTOPOULOS, P. A. "The Utilization of Linkage Analysis in Development Planning," Curriculum and Teaching Materials No. 45, A/D/C Teaching Forum (New York: Agricultural Development Council, 1975).

17. MACMILLEN, M. J. "The Economic Effects of International Migration: A Survey," *Journal of Common Market Studies,* Vol. 20, No. 3 (March 1982).

18. MARTIN, P. L. "The Economic Effects of Temporary Worker Emigration," paper presented at the East-West Population Institute Conference on Asian Labor Migration to the Middle East, the East-West Center, Honolulu, September 19–23, 1983.

19. O'CONNOR, R., and HENRY, E. W. *Input-Output Analysis and Its Applications* (London: Charles Griffin and Co., 1975).

20. RASMUSSEN, P. N. *Studies in Inter-Sectoral Relations* (Amsterdam: North-Holland Publishing Co., 1956).

21. ROGERS, R. "Return Migration in Comparative Perspective," in *The Politics of Return: International Return Migration in Europe,* ed. D. Kubat (Rome: Centro Studi Emigrazione, 1984).

22. SERAGELDIN, I., and SOCKNAT, J. A. "Migration and Manpower Needs in the Middle East and North Africa, 1975–85," *Finance & Development,* Vol. 17, No. 4 (December 1980).

23. STAHL, C. W. "Labor Emigration and Economic Development," *International Migration Review,* Vol. 16, No. 4 (December 1982).

24. STAHL, C. W., and ARNOLD, F. "Overseas Workers' Remittances in Asian Development," *International Migration Review,* Special Issue: Remittance, Winter 1986.

25. SWANSON, J. C. *Emigration and Economic Development: The Case of Yemen Arab Republic* (Boulder, Colo.: Westview Press, 1979).

26. TODARO, M. P. *Economic Development in the Third World,* 3d ed. (New York: Longman, 1986).

27. United Nations, Department of International Economic and Social Affairs. *International Migration Policies and Programmes: A World Survey* (New York: United Nations, 1982).