

US Remittances to the Caribbean, Jamaica and Trinidad & Tobago

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ABSTRACT

A remittance is part of an employee's wages or salary that is sent back home. Remittances not only help the workers' family members, but also help the home countries to strengthen their balance of payments. Remittances are remuneration to employees from the economy in which they work, and thus they contribute to both the gross domestic product (GDP) and the gross national income (GNI) of that economy. Because of their stability and dependability, remittances have become a permanent fixture of governments' financial revenues. The primary objective of this research is to determine whether foreign nationals make a significant contribution to the level of remittances and what some of the determinants are. We utilize three models to test whether the categories of foreign nationals – immigrants admitted; persons naturalized; and non-immigrants admitted as temporary workers, exchange visitors and intra-company transferees – send significant amounts of remittances. In this work, we look at the flow of remittances during the 1982–2001 period from the United States to the Caribbean region, Jamaica, and Trinidad and Tobago. The results indicate that the number of “immigrants admitted”, “persons naturalized” and “non-immigrants admitted as temporary workers, exchange visitors and intra-company transferees”, together with the “exchange rate”, the “Hispanic unemployment rate” and the “median income of Hispanic families”, are significant determinants in the size of remittances. When the results are extrapolated, the number of “immigrants admitted” produces the maximum remittance flow to Jamaica. The number of persons naturalized is important to the total remittances for the overall Caribbean region. The non-immigrant temporary worker group is the largest single source of remittances. This group may potentially send US\$15 billion to Trinidad and Tobago.

INTRODUCTION

The study of remittances is important because of the magnitude of the funds (billions of US dollars per year), and the impact that they have on national economies. The remittance data comes from the *Balance of Payment Statistics Yearbook*, and the sharp rises and falls may be attributed to the different sizes of the groups of immigrants who send the remittances. The volume of immigrants in the United States (USA) is directly affected by the US immigration policies. After the Immigration Reform and Control Act (1986), the annual immigration ceiling was raised to 540,000. The Immigration Act of 1990 gave lawmakers the authority to further raise the immigration ceiling. The annual immigration ceiling was then raised to 700,000 for 1992, 1993 and 1994. Afterwards, the

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ceiling was reduced to 675,000 per year. Ten thousand permanent resident visas were offered to those immigrants agreeing to invest at least US\$1 million in US urban areas or US\$500,000 in US rural areas. So, the immigration policies and the political climate affected the volume of legal immigrants and may explain the variation in remittance levels.

The methods of transfer (channels) were also important because of the players involved. The formal channels, which included all the financial institutions, and the informal channels (person-to-person) directly affected the families and the economic systems of the local communities. Workers send part of their earnings back home to friends and families; therefore, the issue of remittances is closely linked to the phenomena of migration and immigration. Remittances not only help the workers' family members, who are often poor, but they also help the home countries to strengthen their balance of payments.

There are studies that link remittances to poverty reduction, sustainable Third World development, balance-of-payment improvements, indigenous knowledge and globalism. Ironically, the paradox of remittances is that the act of sending money back home is an individual decision that manifests itself globally, and impacts nations and global economies. Because of their stability, inelasticity to economic shocks, stability for the macroeconomy and dependability, remittances have become a permanent benefit fixture of governments' financial revenues.

LITERATURE REVIEW

According to Lucas and Stark (1985), early explanations regarding the motivation to remit primarily concerned an implicit contractual agreement between the migrant and the home community (family and friends). Early theoretical and empirical literature mentioned two sets of determinants. The first included the basic determinants of savings, the demographics of the migrant labour force and other family relations (Katseli and Glytsos, 1989; Rocha, 1989). The other set included relative prices and policies introduced in the labour-sending countries. On the lowest level, the determinant of remittances depended solely on the individual worker. The early literature suggested the following determinants of worker remittances: the composition of the family at home and abroad, the level of disposable income (wages), the income differentials and the anticipated length of stay. Elbadawi and Rocha (1992) summarized the concept of "desired" remittances as the basis of the portfolio approach. This approach focused on relative rates of return, relative prices and uncertainty as primary determinants in the decision to remit (Katseli and Glytsos, 1989; Miranda, 1988; Straubhaar, 1986; Swami, 1981).

The level of wages in the host country and the number of migrants were found to be among the major determinants of worker remittances (Birks and Sinclair, 1979; Swami, 1981). Lucas and Stark (1985) examined altruism and self-interest as factors in the remittance equation, and Chaney (1986) modelled remittances in cases where the migrant's socio-economic status played a major role. In his analysis of the flow of Greek remittances, from 1961 to 1991, Lianos (1997) examined migrants' income, migrants' family income, the rate of unemployment, the rate of interest, the exchange rate, and the rate of inflation as determinants.

Determinants of remittances

The contractual paradigm of remittances had the following as its primary determinants: the composition of the family at home; the migrant's wage level; the length of stay; and the income differentials (for example, the difference between the family's average income and the average income of the community). While adopting the portfolio approach, Swami (1981) found that 90 per cent of the variation in the level of remittances could be explained by the number of migrant workers and their earnings.

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Studies that examined the determinants of remittances fell into two categories. The first set was time series studies that used macro data. The other set was cross-sectional studies that used individual surveys to gather data. Three studies that utilized time series macro data were Katseli and Glytsos (1989), Glytsos (1988) and Swami (1981). They found that per capita income, and the rate of interest, had positive and significant effects on the level of remittances. According to Lianos (1997), of the many survey-type studies, only three – Lucas and Stark (1985), Johnson and White-law (1974) and Mohammad et al. (1973) – had reported regression results and test of hypotheses of possible factors that might determine the flow of remittances. From these studies, the variables with significant positive effects on the level of remittances were as follows: the level of income, and the number of children back home.

Lianos (1997) put forward the rational theory that migration was an individual decision in pursuit of economic gain. Although the amount to be remitted was determined by the migrant, the decision to remit had already been made by the family back home. In his model, to test the determinants of remittances, Lianos’ explanatory variables included the following: the migrant’s income in the host country; the family’s income in the country of origin; the rate of interest in the countries of origin and destination; the rate of inflation; the exchange rate; the rate of unemployment; and the number of migrants. The factors that showed statistically significant relationships with the level of remittances were as follows: the migrant’s income in the country of destination; the exchange rate; the rate of inflation; the rate of interest in the country of origin; and the number of migrants. There are numerous other theories relating to remittances that deserve to be mentioned here, and they include the following.

Derivation of hypotheses

Elbadawi and Rocha (1992) were the first to mention that there may be a relationship between immigrants and remittances. However, their focus was on migrant workers, and there was insufficient information to draw conclusions regarding other immigrants. There were other theories and hypotheses relating to remittances. They included the decision to remit, channels of remittances, uses of remittances and determinants of remittances. This research, which examined the determinants of remittances hypothesis, captured the idea put forward by Elbadawi and Rocha (1992) and posited the theory that other immigrants, separate from migrant workers, did send significant levels of remittances to their countries of birth.

The operating theory was that the number of immigrants residing in a country and the number of immigrants admitted into a country had positive and significant relationships with the amount of remittances sent to their countries of birth.

Data

The economic data included the following variables: US per-capita income (PCINC); the US unemployment rate (UNEMP); the Hispanic unemployment rate (HUNEMP); the country’s exchange rate in US dollars – annual average (XRATE); and the median income of Hispanic families in constant dollars (HisFam). The US Hispanic unemployment rate and the US median income of Hispanic

families were found to be better indicators for foreign workers' unemployment and income when compared to the unemployment rates and medium incomes of whites and blacks. The Balance of Payment Statistics Yearbook contained the annual amount of remittances (RAMT) received by each state. The immigration data came from The Yearbook of Immigration Statistics. These immigration variables included the following: "immigrants admitted by region and country of birth" (IMM-REG); "persons naturalized by region and country of birth" (NATREG); and "non-immigrants admitted as temporary workers, exchange visitors and intra-company transferees by region and country of citizenship" (NONIMM). The Caribbean area is normally distinguished into two groups: English-speaking states and Spanish-speaking states. This research looks only at the English-speaking states, of which Jamaica and Trinidad and Tobago constitute more than 90 per cent in the region. Reliable data exist for Jamaica and for Trinidad and Tobago, and they represent the overall English-speaking region of the Caribbean.

Remittances to the Caribbean

Up to 1996, the annual remittances to the Caribbean were below US\$2 billion. From 1982 to 1985, there had been a constant flow of US\$1.5 billion per year. After 1985, the rate of annual remittances began to increase. The amount of remittances went over the US\$2 billion mark in 1987 and then dipped back to US\$2 billion in 1988. Since 1988, the annual rate of remittance flow from the USA to the Caribbean has been increasing at an alarming rate. The size of remittances has increased exponentially: it went from US\$2 billion in 1988 to US\$8 billion in 1992. It stayed constant for a year and then resumed its upward trend, to US\$10.5 billion in 1995. There was a sharp decrease after 1995, when the level fell back to US\$10 billion US dollars, but it increased sharply, to US\$12.5 billion, in 2000.

Remittances to Jamaica

Remittances to Jamaica from the USA were just above the US\$200 million level in 1982. They dropped below the US\$200 million mark in 1983, but increased to US\$300 million in 1985. There was another huge jump in the flow of US remittances to Jamaica when US\$600 million was sent in 1988. Within 3 years, the rate of annual remittances had declined: it fell to US\$300 million in 1991. Since then, Jamaicans have been sending money home at an increasing rate. Remittances to Jamaica from the USA reached the US\$600 million mark in 1995, climbed above the US\$800 million mark in 1999 and then exceeded the US\$1 billion total in 2001. Overall, they went from US\$200 million in 1982 to US\$1.1 billion in 2001.

Remittances to Trinidad and Tobago

At their lowest point, in 1986, the total amount of remittances to Trinidad and Tobago was less than US\$1 million. They reached their highest point in 1991, when the total amount of US remittances received by Trinidad and Tobago was almost US\$70 million. In 1982, Trinidad and Tobago received US\$1 million in remittances, and the figure increased to US\$13 million in 1984. The annual amounts of remittances then started to decline and the total did not exceed the US\$10 million mark until 1991. It reached US\$15 million in 1991, but dropped to US\$11 million a year later. Since then, there have been impressive increases in the amount of US remittances received by Trinidad and Tobago. In 1994, the total was almost US\$30 million; it exceeded US\$40 million in 1997; and it reached US\$60 million in 1998. In 1999, Trinidad and Tobago received approximately US\$70 million in remittances from the USA. The rapid rise cooled off 2 years later, as the amount of remittances fell to US\$64 million in 2001.

Descriptive statistics for the Caribbean

The Caribbean region has received an annual minimum of US\$1.2 billion of remittances from the USA. The maximum that it has received in any particular year is US\$12.6 billion. This figure is expected to continually increase during the years beyond 2001. The number of “immigrants admitted by region and country of birth” from the Caribbean into the USA had a standard deviation of approximately 600. Its minimum value was 67.7 million, and its maximum value was 1.9 billion persons. With a standard deviation of 333.1, the number of “persons naturalized by region and country of birth” ranged from 23,600 to 1.066 million. Its mean value was 414,520. The mean calculated currency exchange rate for the Caribbean was 9.68. The minimum value was 1.13 and the maximum value was 19.63.

Descriptive statistics for Jamaica

Jamaica received a maximum of US\$1 billion in remittances from the USA. The minimum value was US\$174 million, with a mean of US\$497.78 million. In Jamaica, there were three immigration variables that exceeded the 200,000 plateau. These were “non-immigrants admitted as temporary workers, exchange visitors and intra-company transferees by region and country of citizenship” (523,400), “immigrants admitted by region and country of birth” (379,200) and “persons naturalized by region and country of birth” (220,300). Their minimum values were 136,100, 18,700 and 4,600, respectively. The number of Jamaican immigrants grew from a minimum of 3,600 to a maximum of 144,000. It had a mean value of 56,550 and a standard deviation of 44.18. The lowest exchange rate for the Jamaican dollar (the highest international monetary value) was 1.78 to 1 US dollar. It was devalued to a maximum rate of 46 Jamaican dollars to 1 US dollar.

Descriptive statistics for Trinidad and Tobago

The maximum amount of US remittances sent to Trinidad and Tobago was US\$68.9 million, while the lowest amount recorded was US\$8 million. The mean value of the remittances was US\$24.7 million, with a standard deviation of 22.96. The number of “immigrants admitted by region and country of birth” reached a maximum of 104,900 from a recorded minimum of 3,500 persons. The mean value for this variable was 48,750 persons. The other three immigration variables never exceeded 75,000 persons. The maximum number of “persons naturalized by region and country of birth” was 72,200. Its minimum value was 1,100; the mean was 26,770. The Trinidad and Tobago exchange rate saw its dollar increase from its lowest exchange of TT\$2.4:US\$1 to a maximum of TT\$6.3:US\$1. The mean value of the Trinidad and Tobago dollar stood at 4.61 TT\$4.6:US\$1.

RESULTS

Modelling strategy

To test the theory that foreign nationals contribute a significant amount of remittances, the research utilizes immigration data that classify the foreign nationals into several categories. Three immigration categories are used: (1) “immigrants admitted by region and country of birth” (IMMREG); (2) “persons naturalized by region and country of birth” (NATREG); and (3) “non-immigrants admitted as temporary workers, exchange visitors and intra-company transferees by region and country of citizenship” (NONIMM). In addition to these immigration variables, there are economic variables to support the theory. The economic variables included are: (1) the exchange rate of the country’s foreign currency relative to the US dollar (XRATE); (2) the median income of Hispanic families

TABLE 1
 REMITTANCES FROM IMMIGRANTS ADMITTED BY REGION AND COUNTRY OF BIRTH; TIME SERIES,
 1982–2001

Variable	β	S.E.	<i>T</i>	<i>P</i>
Model 1a: Caribbean				
Immigrants admitted by region and country of birth	0.963	2.048	3.469	0.003
Country's exchange rate against the US dollar	0.109	170.169	0.428	0.675
Hispanic unemployment rate	0.186	131.260	3.053	0.008
Median income of Hispanic families	0.069	0.048	1.469	0.162
Constant	-6,159.911	1,986.336	-3.101	0.007
Model 1b: Jamaica				
Immigrants admitted by region and country of birth	-0.207	0.879	-0.557	0.586
Country's exchange rate against the US dollar	0.648	5.703	1.905	0.076
Hispanic unemployment rate	-0.428	19.836	-2.843	0.012
Median income of Hispanic families	0.213	0.008	1.592	0.132
Constant	503.856	341.067	1.477	0.160
Model 1c: Trinidad and Tobago				
Immigrants admitted by region and country of birth	0.946	0.263	2.454	0.027
Country's exchange rate against the US dollar	-0.344	4.850	-1.093	0.292
Hispanic unemployment rate	-0.112	1.145	-1.091	0.293
Median income of Hispanic families	0.292	0.001	1.995	0.064
Constant	-11.518	29.955	-0.385	0.706

living in the USA (HisFam); and (3) the unemployment rate of Hispanic families living in the USA (HUNEMP).

General linear models

Model 1 consists of: “immigrants admitted by region and country of birth” (IMMREG); the country's currency exchange rate (XRATE) relative to the US dollar; the Hispanic unemployment rate (HUNEMP); and the median income of Hispanic families (HisFam). These are placed as independent variables in a linear regression relationship, with remittances (RAMT) as the dependent variable.

Model 2 consists of: “persons naturalized by region and country of birth” (NATREG); the country's currency exchange rate (XRATE) relative to the US dollar; the Hispanic unemployment rate (HUNEMP); and the median income of Hispanic families (HisFam). Similar to model 1, the variables are placed in a linear regression relationship, with remittances (RAMT) as the dependent variable.

Model 3 consists of: “non-immigrants admitted as temporary workers, exchange visitors and intra-company transferees by region and country of citizenship” (NONIMM); the country's currency exchange rate (XRATE) relative to the US dollar; the Hispanic unemployment rate (HUNEMP); and the median income of Hispanic families (HisFam). These are also placed as independent variables in a linear regression relationship, with remittances (RAMT) as the dependent variable.

Model 1a: the Caribbean. From the overall Caribbean region, the “number of immigrants admitted into the USA” (IMMREG) makes a significant contribution ($P = 0.003$) to the level of remittances. The other statistically significant factor is the Hispanic unemployment rate (HUNEMP) ($P = 0.008$). The number of immigrants admitted by region and country of birth from the Caribbean does matter in this model. The *t*-statistics for the three items also indicate that their values are significant.

TABLE 2
 REMITTANCES FROM PERSONS NATURALIZED BY REGION AND COUNTRY OF BIRTH; TIME
 SERIES, 1982–2001

Variable	β	S.E.	<i>T</i>	<i>P</i>
Model 2a: Caribbean				
Persons naturalized by region and country of birth	-0.355	3.975	-1.188	0.253
Country's exchange rate against the US dollar	1.174	122.820	6.404	0.000
Hispanic unemployment rate	-0.049	183.122	-0.575	0.574
Median income of Hispanic families	0.157	0.113	1.425	0.175
Constant	2,198.196	1,961.863	-1.120	0.280
Model 2b: Jamaica				
Persons naturalized by region and country of birth	0.229	2.441	0.376	0.712
Country's exchange rate against the US dollar	0.359	5.671	1.062	0.305
Hispanic unemployment rate	-0.308	26.245	-1.546	0.143
Median income of Hispanic families	0.151	0.015	0.614	0.548
Constant	394.675	254.853	1.549	0.142
Model 2c: Trinidad and Tobago				
Persons naturalized by region and country of birth	0.990	0.331	2.965	0.010
Country's exchange rate against the US dollar	-0.124	3.069	-0.622	0.543
Hispanic unemployment rate	0.008	1.173	0.080	0.937
Median income of Hispanic families	0.105	0.001	0.582	0.569
Constant	-7.689	27.137	-0.283	0.781

TABLE 3
 REMITTANCES FROM NON-IMMIGRANTS ADMITTED AS TEMPORARY WORKERS, EXCHANGE
 VISITORS AND INTRA-COMPANY TRANSFEREES BY REGION AND COUNTRY OF BIRTH; TIME
 SERIES, 1982–2001

Variable	β	S.E.	<i>T</i>	<i>P</i>
Model 3a: Caribbean				
Non-immigrants admitted as temporary workers, exchange visitors and intra-company transferees by region and country of birth	0.404	1.144	0.631	0.538
Country's exchange rate against the US dollar	0.945	54.223	11.671	0.000
Hispanic unemployment rate	0.050	134.657	0.791	0.441
Median income of Hispanic families	0.065	0.070	0.957	0.354
Constant	-3,251.669	3,506.980	-0.927	0.369
Model 3b: Jamaica				
Non-immigrants admitted as temporary workers, exchange visitors and intra-company transferees by region and country of birth	-0.165	0.659	-0.762	0.458
Country's exchange rate against the US dollar	0.605	3.667	2.765	0.014
Hispanic unemployment rate	-0.442	18.918	-3.079	0.008
Median income of Hispanic families	0.185	0.009	1.302	0.213
Constant	676.050	467.281	1.447	0.169
Model 3c: Trinidad and Tobago				
Non-immigrants admitted as temporary workers, exchange visitors and intra-company transferees by region and country of birth	0.087	0.084	0.821	0.425
Country's exchange rate against the US dollar	0.347	2.074	2.577	0.021
Hispanic unemployment rate	-0.071	1.455	-0.547	0.593
Median income of Hispanic families	0.600	0.001	5.321	0.000
Constant	-90.006	33.897	-2.655	0.018

The adjusted *R*-squared value for the Caribbean regression model is 0.982. This means that the regression function is an excellent fit for the data and it almost perfectly predicts the observed data.

Model 1b: Jamaica. In Jamaica, only the Hispanic unemployment rate (HUNEMP) makes a statistically significant ($P = 0.012$) contribution to the level of remittances. The number of immigrants admitted by region and country of birth from Jamaica into the USA does not matter in this model. The adjusted *R*-squared value for Jamaica's regression model is 0.864.

Model 1c: Trinidad and Tobago. In Trinidad and Tobago, only the "immigrants admitted" (IMMREG) make a statistically significant ($P = 0.027$) contribution to the level of remittances. The number of immigrants admitted by region and country of birth from Trinidad and Tobago into the USA does matter in this model. The adjusted *R*-squared value for the Trinidad and Tobago model is 0.907.

Model 2a: the Caribbean. In this second model for the Caribbean, there is only one statistically significant variable, which is the exchange rate (XRATE) ($P = 0.000$). The number of "persons naturalized by region and country of birth" (NATREG) does not matter in this model. The adjusted *R*-squared value for the second model in the Caribbean is 0.971.

Model 2b: Jamaica. In model 2b for Jamaica, there are no statistically significant variables. The adjusted *R*-squared value for the second model in the Jamaica is 0.863.

Model 2c: Trinidad and Tobago. Model 2c for Trinidad and Tobago produces only one significant relationship, which occurs with the "number of persons naturalized by region and country of birth" (NATREG) ($P = 0.010$). The adjusted *R*-squared value for the second model in Trinidad and Tobago is 0.918.

Model 3a: the Caribbean. In model 3a for the Caribbean, there is only one statistically significant variable, XRATE ($P = 0.000$). The adjusted *R*-squared value is 0.969.

Model 3b: Jamaica. In model 3b for Jamaica, there are two statistically significant variables, XRATE ($P = 0.014$) and HUNEMP ($P = 0.008$). The adjusted *R*-squared is 0.867.

Model 3c: Trinidad and Tobago. There are two statistically significant items in model 3c for Trinidad and Tobago, the XRATE of the Trinidad and Tobago dollar ($P = 0.021$) and HisFam ($P = 0.000$). The adjusted *R*-squared is 0.876.

Predicted remittances

Using the three linear regression models, the major determinant independent variables are set to their mean, minimum and maximum values, while the other independent variables are held at their mean values and the changes in the size of remittances are observed. The following remittance values were obtained for each location within the three models. The first variable used to predict remittances was IMMREG. For each of the three regions, this variable was changed to its mean, minimum and then maximum value, while the other variables were kept at their mean values. Each time the predictor variable was changed, the size and relative changes in the amount of remittances were recorded. The second variable used to predict remittances was NATREG. We followed the same procedure of varying the predictor variable while holding the other independent variables constant at their means and observing the changes in the size of

remittances. The third variable used to predict remittances within the Caribbean, Jamaica, and Trinidad and Tobago was NONIMM. Again, we followed the same variation/observation procedure.

Predicted remittances for the Caribbean from IMMREG

From the linear regression, we now begin to estimate Caribbean remittances, using IMMREG as the predictor variable. When we vary the value of the predictor variable while keeping the other independent variables constant at their means, we thus predict the amount of remittances. For every 1,000 Caribbean IMMREG admitted into the USA, the amount of remittances increases by US \$963,000 annually. When all the determinants are set at their mean values, the size of remittances associated with the mean value of IMMREG admitted from the Caribbean is –US\$3,452.38 million. However, when IMMREG is set to its minimum value, and all the other determinants are set at their mean values, the size of remittances associated with the minimum value of Caribbean IMMREG is –US\$4,337.34 million. When IMMREG is set to its maximum value, and all the other determinants are kept at their mean values, the size of remittances associated with the maximum value of Caribbean IMMREG is –US\$2,554.19 million.

Generally, when the number of Caribbean immigrants decreases, the amount of remittances to the Caribbean also decrease. And as the volume of Caribbean immigrants increases, the size of remittances flowing to the Caribbean from the USA also increases. When the size of the predictor variable is decreased, from its mean value to its minimum value, then the size of remittances decreases by 25.63 per cent. When the size of the predictor variable is increased, from its mean value to its maximum value, then the size of remittances increases by 26.02 per cent.

Predicted remittances for Jamaica from IMMREG

For every 1,000 Jamaican IMMREG, the amount of remittances increases by US\$207,000 annually. When all the determinants are set at their mean values, the size of remittances associated with the mean value of Jamaican IMMREG is US\$5,887.20 million. However, when IMMREG is set to its minimum value, and all the other determinants are held constant at their mean values, then the size of remittances associated with the minimum value of Jamaican IMMREG increases to US\$5,926.68 million. When immigrants admitted is set to its maximum value, and all the other determinants are kept at their mean values, the size of remittances associated with the maximum value of Jamaican IMMREG is US\$5,852.06 million.

Ironically, when the Jamaican IMMREG decreases, then the amount of remittances to Jamaica increases. Also, when the Jamaican IMMREG increases, then the size of remittances flowing to Jamaica decreases. When the size of the predictor variable is decreased, from its mean value to its minimum value, then the size of remittances decreases by 0.67 per cent. When the size of the predictor variable is increased, from its mean value to its maximum value, then the size of remittances decreases by 0.60 per cent.

Predicted remittances for Trinidad and Tobago from IMMREG

For every 1,000 Trinidad and Tobago IMMREG, the amount of remittances increases by US \$946,000 annually. When all the determinants are set at their mean values, the size of remittances associated with the mean value of IMMREG from Trinidad and Tobago is US\$7,458.23 million. However, when IMMREG is set to its minimum value, and all the other determinants are held constant at their mean values, the size of remittances associated with the minimum value of the Trinidad and Tobago IMMREG is US\$7,415.45 million. Also, when IMMREG is set to its maximum

value, and all the other determinants are held constant at their mean values, the size of remittances associated with the maximum value of the Trinidad and Tobago IMMREG increases to US \$7,511.31 million.

In general, when the number of IMMREG from Trinidad and Tobago decreases, the amount of remittances to Trinidad and Tobago also decreases. And when the volume of immigrants from Trinidad and Tobago increases, then the size of remittances flowing to Trinidad and Tobago from the USA also increases. When the size of the predictor variable is decreased, from its mean value to its minimum value, then the size of remittances decreases by 0.57 per cent. When the size of the predictor variable is increased, from its mean value to its maximum value, then the size of remittances increases by 0.71 per cent.

Predicted remittances for the Caribbean from NATREG

For every 1,000 Caribbean NATREG, the amount of remittances decreases by US\$355,000 each year. When the sizes of all variables are set at their mean values, the amount of remittances associated with the mean value of the Caribbean NATREG is US\$1,658.42 million. However, when the number of NATREG is set to its minimum value, and all the other determinants are set at their mean values, then the size of remittances, associated with the minimum value of the Caribbean NATREG, increases to US\$1,797.19 million. We observe that when the number of Caribbean NATREG decreases, then the size of remittances to the Caribbean increases. In this case, the remittances increased by 8.37 per cent.

When the number of persons naturalized is set to its maximum value, and all the other determinants are kept at their mean values, the size of remittances associated with the maximum value of persons naturalized from the Caribbean is US\$1,427.26 million. When the number of Caribbean naturalizations increases, then the size of remittances to the Caribbean decreases. At this point, the remittances decreased by 13.94 per cent. The maximum value of Caribbean remittances is obtained when the number of persons naturalized is set at its minimum value.

Predicted remittances for Jamaica from NATREG

For every 1,000 Jamaican NATREG, the amount of remittances increases by US\$229,000 each year. When the sizes of all variables are set at their mean values, then the size of remittances associated with the mean value of NATREG from Jamaica is US\$4,258.23 million. However, when the number of NATREG is set to its minimum value, and all the other determinants are set at their mean values, then the size of remittances, associated with the minimum value of Jamaican NATREG, is US\$4,240.73 million. We see that when the number of Jamaican naturalizations decreases, then the size of Jamaican remittances also decreases. And when the number of persons naturalized is set to its maximum value, and all the other determinants are kept at their mean values, then the size of remittances associated with the maximum value of persons naturalized from Jamaica is US \$4290.13 million. We also see that when the Jamaican naturalizations increased, then the Jamaican remittances also increased by only 0.75 per cent.

Predicted remittances for Trinidad and Tobago from NATREG

For every 1,000 NATREG from Trinidad and Tobago, the amount of remittances increases by US \$990,000 each year. When all the determinants are set at their mean values, the size of remittances associated with the mean value of NATREG from Trinidad and Tobago is US\$2,688.66 million. However, when the number of NATREG is set to its minimum value, and all the other determinants are set at their mean values, the size of remittances, associated with the minimum value of

NATREG from Trinidad and Tobago, is US\$2,663.27 million. We see when NATREG from Trinidad and Tobago decreases, then the size of remittances also decreased. Here, the decrease in remittances was 0.94 per cent. And when NATREG from Trinidad and Tobago is set to its maximum value, and all the other determinants are held constant at their mean values, then the size of remittances associated with the maximum value of the Trinidad and Tobago NATREG is US\$2,733.63 million. As expected, when the Trinidad and Tobago naturalizations increased, then the remittances also increased.

Predicted remittances for the Caribbean from NONIMM

For every 1,000 Caribbean NONIMM, the amount of remittances increases by US\$404,000. When all the determinants are set at their mean values, the size of remittances associated with the mean value of the Caribbean NONIMM is –US\$904.349 million. However, when NONIMM is set to its minimum value, and all the other determinants are kept at their mean values, then the size of remittances associated with the minimum value of the Caribbean NONIMM is –US\$1,296.12 million. When the size of NONIMM decreases, then the size of remittances also decreases. The change is also huge. When the predictor variable is moved from its mean value to its minimum value, then the remittances decline by 43.32 per cent. Then, when NONIMM is set to its maximum value, and all the other determinants are kept constant at their mean values, the size of remittances associated with the maximum value of NONIMM from the Caribbean is –US\$812.885 million. As NONIMM increases, then the size of remittances also increases. Here, the change in the size of remittances is not as dramatic when the predictor was reduced to its minimum value. When the size of NONIMM is moved from its mean value to its maximum value, then the remittances increase by 10.11 per cent.

Predicted remittances for Jamaica from NONIMM

For every 1,000 NONIMM from Jamaica, the amount of remittances decreases by US\$165,000. When all the determinants are set at their mean values, the size of remittances associated with the mean value of NONIMM from Jamaica is US\$5,324.16 million. However, when NONIMM is set to its minimum value, and all the other determinants are set at their mean values, then the size of remittances associated with the minimum value of NONIMM from Jamaica is US\$5,367.21 million. Here, when the number of Jamaican NONIMM is decreased, then the size of remittances increased. The increase is 0.81 per cent. However, when the Jamaican NONIMM is set to its maximum value while all the other determinants are held constant at their mean values, then the size of remittances associated with the maximum value of NONIMM decreases to US\$5,303.3 million. In the case of Jamaica, when the predictor variable increases, the dependent variable decreases. When the size of NONIMM is increased to its maximum value, then the amount of remittances decreases by 0.39 per cent.

Predicted remittances for Trinidad and Tobago from NONIMM

For every 1,000 Trinidad and Tobago NONIMM, the amount of remittances increases by US\$87,000. When all the determinants are set at their mean values, the size of remittances associated with the mean value of NONIMM from Trinidad and Tobago is US\$15,189.8 million. However, when NONIMM is set to its minimum value, and all the other determinants are held constant at their mean values, then the size of remittances associated with the minimum value of NONIMM from Trinidad and Tobago is US\$15,179.3 million. We see that when the number of NONIMM decreases, then the size of remittances also decreases. The decrease in remittances is only 0.07 per

cent. And when the number of NONIMM is set to its maximum value while all the other determinants remain at their mean values, then the size of remittances associated with the maximum value of NONIMM from Trinidad and Tobago is US\$15,191.4 million. We see that when the number of NONIMM increases, then the size of remittances also increases. However, the increase in the amount of remittances is only 0.01 per cent.

CONCLUSIONS

The volume of remittances cannot be solely attributed to the efforts of migrant workers. In the case of the Caribbean islands, where the ports of entry into the USA were strictly regulated, the flows of remittances to Jamaica, and to Trinidad and Tobago, were ever increasing despite the declining amounts of workers entering the USA from these countries.

The size of remittances is affected by the different variables in several ways. The overall Caribbean region is the only location where persons naturalized have an inverse relationship with the size of remittances. In the other independent states, when there is an increase in the number of persons naturalized, the size of remittances also increases.

In Trinidad and Tobago, when the number of IMMREG is reduced from its maximum value to its mean value, the size of remittances falls from US\$7,511 million to US\$7,458 million. This is a monetary loss of approximately US\$1 million. Overall, the reduction of IMMREG from Trinidad and Tobago from the maximum value to the minimum value causes a modest decrease of US\$1.1 billion.

There is an inverse relationship in Jamaica. When the size of IMMREG from Jamaica is reduced from its maximum to its minimum value, then the size of remittances increases from its minimum to its maximum. At the maximum level of 379,168 immigrants, the size of remittances to Jamaica is US\$5,852 million. When the number of Jamaican immigrants is reduced to its minimum level of 18.711 thousand, the remittances increase by approximately US\$1.1 billion. In the Caribbean region, the group IMMREG causes has a negative correlation to the size of remittances. At its maximum level, the number of immigrants is associated with –US\$2,554 million. This figure drops to –US\$4.337 when the size of Caribbean immigrants declines to its minimum.

The maximum size of NONIMM from Trinidad and Tobago produces the largest flow of remittances. This resembles the direct relationship that was observed with immigrants admitted. Also, in the case of Jamaica, the NONIMM have an inverse relationship with the size of remittances; while in the Caribbean region, the NONIMM causes a negative balance in the remittance equation.

For Trinidad and Tobago, when the number of NONIMM is set to its maximum value, the size of remittances reaches an extraordinary figure of US\$15,191 million. If the number of NONIMM was set at its minimum value, the size of remittances would experience a negligible decline. It drops slightly, to US\$15,179 million.

Jamaica maintains its inverse relationship between NONIMM and remittances. When this variable is held constant at its maximum value, the size of remittances is US\$5,303 million. However, when the size of Jamaican NONIMM is reduced to its minimum value, then the amount of remittances sent to Jamaica increases slightly, to US\$3,367 million. In the overall Caribbean region, there is a negative balance of remittances, which is associated with the NONIMM from the Caribbean. At its maximum value, the non-immigrants are associated with –US\$812 million. When this variable is set to its minimum value, then the remittances are further reduced, to –US\$1,296 million.

The number of NATREG was the most volatile predictor of remittances within the study. It produced stable results in Trinidad and Tobago and also in the previously unconventional case of Jamaica. There were positive results that occurred for the first time in the Caribbean in relation to the naturalizations. In Trinidad and Tobago, the amount of remittances dropped from US\$2,733 million to US\$2,663 when the number of NATREG was reduced from its maximum level to its

minimum level. For the first time in Jamaica, there is a reduction in remittances when the predictor declines. In this instance, when there is a decline in the number of persons of previous Jamaican nationality who have now become naturalized US citizens, from the maximum to the minimum value, the remittances also decrease, from US\$4,290 million to US\$4,240 million.

The Caribbean now has a positive yet inverse relationship between the number of naturalizations and the size of remittances. When the number of Caribbean naturalizations decreases from its maximum to its minimum level, the size of its remittances increases substantially, from US\$1,427 million to US\$1,797 million. This is an increase of US\$370 million.

In this research, we added the unemployment rate as a significant determinant of remittances. Previous work identified the exchange rate and income as determinants, but they all used the migrant worker as the sole actor. In this work, we have shown that the legal “immigrants admitted”, the “persons naturalized” and the “non-immigrants admitted as temporary workers, exchange visitors and intra-company transferees” all send remittances back to their country of birth. The three models were used to predict the future remittance flows, and they demonstrate how determinants such as the exchange rate, family income and immigration policy may be manipulated to leverage the flow of millions of US dollars. From the models, “immigrants admitted” was a significant determinant in the Caribbean, and in Trinidad and Tobago. The number of “naturalizations” was only significant for Trinidad and Tobago. The policy implications are such that the exchange rates and the flow of immigrants can be manipulated to maximize the financial and political leverage for the sending and host countries. US foreign policy regulates the number of foreign workers, which in turn determines the amount of remittances that may leave the USA en route to the central banks of foreign nations.

REFERENCES

- Appleyard, R.T.
1989 “Migration and development: myths and reality”, *International Migration Review*, 23(3): 486–499.
- Birks, J.S., and C.A. Sinclair
1979 “Migration and development: the changing perspective of the poor Arab countries”, *Journal of International Affairs*, 33(2): 285–309.
- Chaney, R.
1986 *Regional Emigration and Remittances in Developing Countries: The Portuguese Experience*, Praeger, Westport, CT.
- Choucri, N.
1986 “Asians in the Arab world: labor migration and public policy”, *Middle Eastern Studies*, 22(2): 252–273.
- Elbadawi, I.A., and R. Rocha
1992 “Determinants of expatriate workers’ remittances in North Africa and Europe”, Working Paper 1038, The World Bank, Washington, DC.
- Glytsos, N.
1988 “Remittances in temporary migration: a theoretical model and its testing with the Greek–German experience”, *Weltwirtschaftliches Archiv*, 124: 524–549.
- Johnson, G.E., and W.E. Whitelaw
1974 “Urban–rural income transfers in Kenya: an estimated remittance function”, *Economic Development and Cultural Change*, 22(3): 473–479.
- Katseli, L., and N. Glytsos
1989 “Theoretical and empirical determinants of international labour mobility: a Greek–German perspective”, in I. Gordon and A.P. Thirlwall (Eds), *European Factor Mobility: Trends and Consequences*, Macmillan, London.

- Lianos, T.P.
1997 "Factors determining migrant remittances: the case of Greece", *International Migration Review*, 31 (1): 72.
- Lucas, R.E.B., and O. Stark
1985 "Motivation to remit: evidence from Botswana", *Journal of Political Economy*, 93: 901–918.
- Mohammad, A., W.A. Butcher, and C.H. Gotsch
1973 "Temporary migration of workers and return flow of remittances in Pakistan", Economic Development Reports No. 234, Center for International Affairs, Cambridge, MA.
- Miranda, K.
1988 *Workers' Remittances, Commodity Aid Utilization and Exchange Rate Unification*, IMF, Geneva.
- Rocha, R.
1989 *Workers' Remittances in the Maghreb Countries: A Preliminary Analysis*, EMTTF, The World Bank, Washington, DC.
- Russell, S.S.
1986 "Remittance and international migration: a review in perspective", *World Development*, 14: 677.
- Straubhaar, T.
1986 "The determinants of workers' remittances: the case of Turkey", *Weltwirtschaftliches Archiv*, 122: 728–739.
- Swami, G.
1981 "International migrant workers' remittances: issues and prospects", World Bank Staff Paper No. 481, The World Bank, Washington, DC.