WORKING PAPER SERIES

2006/01

On the Use of Remittance Income in Mexico
Jim Airola

Immigration affects sending countries through receipt of remittance income. These cash transfers impact households and communities in a variety of ways and have attracted the attention of remittances as a development mechanism. This study attempts to understand to what degree consumption patterns are affected by the receipt of remittances, thus the ways in which the broader communities may be impacted. Using household income and expenditure data for Mexico, expenditure patterns of remittance receiving households are analyzed. Regression analysis indicates that remittance-receiving households spend a greater share of total income on durable goods, healthcare, and housing.

Defense Resources Management Institute
School of International Graduate Studies
Naval Postgraduate School
Building 234
699 Dyer Road
Monterey, CA 93943-5138
831-656-2306
www.nps.navy.mil/drmi

Defense Resources Management Institute
Naval Postgraduate School

The Defense Resources Management Institute (DRMI) is an educational institution sponsored and supervised by the Secretary of Defense and located at the Naval Postgraduate School in Monterey, California. Since 1965 the Institute has conducted professional education programs in analytical decision making and resources management for military officers of all services and for senior civilian officials of the United States and 149 other countries.

The mission of the Defense Resources Management Institute is to educate civilian and military government officials in the principles and concepts of defense resources management.

The unique course offerings create an interdisciplinary, interactive learning environment that facilitates the exchange of ideas among U.S. and international participants in Monterey, California, and locations worldwide. These programs are presented on a regularly scheduled basis at DRMI in Monterey and by specific arrangement at other locations in the United States and in other countries.

The success of DRMI reflects the breadth and depth of the in-house technical expertise that DRMI can draw upon. The DRMI Faculty, a community of scholars and practitioners, are experts in defense resources management and has published in major academic and technical journals. The faculty has extensive experience in providing technical assistance and educational programs worldwide over the past 40 years. Our educational strategy is one of collaboration, tailored to the specific environment of the participant.

The Defense Resources Management Institute specializes in four broad educational areas:

- Economic analysis of the public sector
- Operations research of public sector decision problems
- Public budgeting and fiscal management
- Defense organizations and management methods

For more information about our educational and technical assistance activities, please visit our website at **http://www.nps.navy.mil/drmi** or email us at drmiadmin@nps.edu.

On the Use of Remittance Income in Mexico

Jim Airola
Naval Postgraduate School
699 Dyer Road, Room M-5
Monterey CA. 93943
jsairola@nps.edu

This Version: February 2005

Abstract

Abstract: Immigration affects sending countries through receipt of remittance income. These cash transfers impact households and communities in a variety of ways and have attracted the attention of remittances as a development mechanism. This study attempts to understand to what degree consumption patterns are affected by the receipt of remittances, thus the ways in which the broader communities may be impacted. Using household income and expenditure data for Mexico, expenditure patterns of remittance receiving households are analyzed. Regression analysis indicates that remittance-receiving households spend a greater share of total income on durable goods, healthcare, and housing.

On the Use of Remittance Income in Mexico

Introduction

The effect of immigration on host countries has been very well studied, particularly with regards to labor market outcomes. Much research has also investigated to what extent the loss of workers in a country from which many workers emigrate affects economic outcomes in the sending country. However, one factor of seeming consequence within the debate over immigration is the effect of funds that are sent by immigrants to friends or family members in their home countries. These funds, or remittances, have become very large in recent years, and represent a potentially important part of the debate surrounding the topic of immigration.

Although difficult to measure, recent studies estimate that official international remittances exceed US$100 billion per year, approximately twice the amount of official aid-related income to developing countries[1]. Remittance income represents a transfer often from developed countries to less developed countries. These transfers are highly efficient; they require no bureaucracies, contain very low transaction costs, and typically go to those households with the greatest need. Although cash transfers may be a poor proxy for the services that would be provided to the household were the emigrant present, it seems possible to assume that households that receive remittance income are made better off. In any case, clearly the remittance receiving households would be party to large welfare effects from any changes in immigration policy under consideration.

The efficacy of remittance transfers are not without critics, however. Much of the criticism is concerned with problems of moral hazard or suboptimal consumption

---

[1] IMF World Economic Outlook, Globalization and External Imbalances(2005)

patterns, for example increased consumption of alcohol or increased leisure. It is possible to theorize that households are worse off due to these cash transfers through some sort of dependency or reduced incentives to work or invest. It then becomes largely an empirical question as to whether or not this form of direct aid increases, or decreases, welfare. One way to examine the effects of remittance transfers is to observe the economy in aggregate and infer any changes in measures such as output per capita as a result of changes in aggregate receipt of remittance income. This may indicate whether the average household spends remittance income on productive, such as investment, or non-productive, such as leisure, activities. The main problem with this approach is the relatively small number of observations (country/year) compared to the large number of confounding country-specific variables. There are potentially hundreds of other factors that affect output growth such as foreign direct investment, domestic policies, natural disasters,etc. Controlling for all of these factors is difficult even with the largest datasets. Other studies used to evaluate the expenditures of remittances have relied upon recipients' explicit reporting of how remittance income was spent. To the extent that income received in the form of remittances is fungible, offsetting increases or decreases in expenditures of other funds could bias expenditure levels reported by family members. The difficulty of determining the effect of remittance income on expenditures lies in the fungibility of income at the household level. While households may have records of both incomes and expenditures, the direct observation of the allocation of marginal income is impossible.

Possibly a better approach is to utilize household data to infer differences in consumption behavior across households as a result of the receipt of remittance income. While

household data may seem ideal for investigating effects of remittance income on the welfare of households, it is fraught with difficulties. First, even though remittance flows are large, it remains that very few households actually receive remittances, even in the largest of household datasets. Second, within the small sample of households that receive remittances, it is not possible to observe how the actual remittance receipts are expended separately from other forms of income, nor is it possible to observe the household's counterfactual consumption patterns, or how they would have spent their income in the case that they did not receive remittances. Finally, and most problematic, we cannot think of the household as being randomly selected to receive remittances. The receipt of remittances to the household is the outcome of some agreement or negotiation between the remitter and the household and is therefore endogenous to the household's consumption decisions.

Nevertheless, household expenditure data can be used to make at least some inferences regarding the ways in which remittance receiving households allocate remittance income. In this article, I utilize household expenditure data from Mexico. While the survey is not large enough to find households which are identical in every respect except for the receipt of remittances, I utilize regression analysis to statistically control for variations across households. I find that households receiving remittance income differ from their counterparts in important ways. In particular, these households are more likely to spend money on durable goods, healthcare, and education than are households that do not receive remittance income. These results appear to question theories of dependency or induced moral hazard since they indicate that remittance income is used in productive ways.

The paper proceeds as follows. I begin with a discussion of the evidence presented within the literature regarding possible effects, both at the aggregate and household levels, of remittances on economic outcomes. Next, I describe the data and the empirical method utilized. The final section summarizes the results.

Previous literature

Much of the early literature regarding remittance flows was notably pessimistic concerning the effects these types of cash receipts have on the household. In particular, ethnographic studies in Mexico often claimed that remittances were disproportionately used for conspicuous consumption and increased leisure. In fact. Durand and Massey(1992) review thirty-seven community studies finding that investigators were "remarkably unanimous in condemning international migration as a palliative that improves the well-being of particular families but does not lead to sustained economic growth within sending communities." Broader studies relating to Mexico at the community level by Dinerman(1982), Lopez(1986) and others find the vast majority of remittance income spent on consumption. To the extent that households use remittance income only for consumption, the growth in remittances could lead to a culture of dependency and possibly idleness (Kapur, 2003). This has led many investigators to conclude that migration perpetuates a culture of economic dependency that undermines the prospects for development.

An opposing argument is that remittance income is used by households to insure against negative income shocks, particularly at the macro level, or as a mechanism to mitigate credit constraints at home. Thus, remittances may play an important role in gaining access to capital, especially among lower-income households. It remains an empirical

question whether or not the remittance income is spent in ways that increase the productive capacity of remittance-receiving communities.

A number of studies have analyzed the use of remittance income and the impact of remittances on national income. One example is Adams and Page(2005), which uses aggregate income and remittance data for 71 countries, finding evidence that remittance income reduces poverty in developing countries. However, aggregate data used by Chami, et al(2003) finds that remittances are negatively associated with economic growth, an artifact they claim is created by the disincentives to work caused by the remittance income.

Using firm level data is a study by Woodruff and Zenteno(2001). In looking for evidence that remittances are used for productive uses, the authors analyze whether remittances are relied on for small firms to access capital. They find that remittances are responsible for almost 20% of the capital invested in microenterprises in urban Mexico. However, Amuedo-Durantes and Pozo(2004), in the case of the Dominican Republic, where remittance income accounts for an even larger share of GDP than in Mexico, find no evidence that remittances promote small business ownership.

Few analyses have investigated the use of remittances using household expenditure data. One exception is Cox-Edwards and Ureta(2003) who examine the effect of remittance income on schooling choices. Assuming remittances to be exogenous to the household, the authors argue that remittances, playing the role of a randomly assigned transfer, provide a clean estimate of the impact of income on school retention rates. They find that children of remittance receiving households are more likely to stay in school. While more

a study of the effect of additional income on schooling decisions, the study does shed some light on the expenditure patterns of households receiving remittance income. While studied less frequently than other forms of capital flows such as foreign direct investment or foreign aid, remittance income provides an important role of social insurance and has a significant impact on both poverty and equity. While the sum of the effects of remittances on household decisions is not well understood, the growth in remittance flows appears to have large long-term implications for development.

The Data

In this paper I use a large household expenditure survey and relate expenditure on various goods to household characteristics and then test whether there exists differences in expenditure patterns depending on the receipt of remittances as a type of income I use data from the Household Income and Expenditure Survey (ENIGH) of Mexico. The ENIGH is a nationally representative household survey based on a stratified random sample and conducted by the Instituto Nacional de Estadistica, Geografica e Informática(INEGI) in Mexico. While there exist alternative data sources to analyze income, the ENIGH is the only nationally representative survey and contains observations across a relatively long time span. The income and demographics supplements of ENIGH contain individual level information on demographic characteristics, employment, and earnings. The expenditure supplement contains detailed expenditure data for the household for the three months prior to the survey date. All income and expenditure data are self-reported. The ENIGH is the only household level nationally representative expenditure survey in Mexico, and surveys have been conducted approximately biannually going back to 1984. Depending on the year, the survey details

as many as thirty-six various categories of income for the individual including regular earnings, overtime, bonus, transfers, sale of durables goods, etc. Included in income is money received from abroad in the form of remittances.

Table 1 presents remittance income as a share of household income for the years 1984 through 2000. The first column indicates that the incidence of remittance income at the household level has risen dramatically, from 1.34% of households reporting the receipt of some remittance income in 1984 to 4.27% of households in 2000. The largest change occurred in response to the macroeconomic crisis, between survey years 1994 and 1996, when the number of households receiving remittance income increased by almost 50%. However, as the second column illustrates, the importance of remittances within those households receiving remittances has remained relatively stable from 1994 through the end of the decade. In Mexico, as in most countries, remittances are typically reported by the national bank estimated from the balance of payments accounts. The final two columns of Table 1 compare the estimated level of remittances, measured in current U.S. dollars, with the total remittances claimed by the households in the ENIGH survey, using the sample weights to represent the entire nation. In each year, the Bank of Mexico's estimate is larger than that calculated using the ENIGH survey, suggesting that the Bank's estimates may slightly overstate the actual amount of remittances received by households.

Table 2 combines years 1992 to 2000 to demonstrate the differences in observable characteristics between households that receive remittance income and households that do not. All years combine to include observations on 58,440 households, 2,377 of which report positive remittance income. As can be seen from the table, the average monthly

income in 1994 pesos is 2,198 pesos for all households and only 881 pesos for households that receive some remittance income during the month. However, including the remittance income increases the total mean household income to 1,912 pesos, or 87% of the average income for all households. Households receiving remittances are also somewhat more likely to have young children. Table 2 also highlights the differences in characteristics of the household head between all households and only those households that report positive remittance income in the month of the survey. The typical head of a household receiving remittance income is more likely to be female, older, less educated, works fewer hours, and has a lower average wage than the typical household head within Mexico as a whole. It remains the case however, that the majority of remittance-receiving households are headed by working-age males, suggesting that remitters are likely to be adult children or relatives of the head rather than the household head himself.

Methodology

I begin with a general expression that relates household expenditure on good category i to the household's total expenditures

$$p_i q_i = f(x, n, z, u) \tag{1}$$

wher $p_i q_i$ is expenditure on good category i, x represents total household expenditure in household i, n is a vector of demographic characteristics taken to be a list of the number of people in the household within defined age and gender categories, z includes other household characteristics including whether or not the household received positive remittance income during the survey month. As usual, u represents unobservable taste variation of the household. In order to viably ignore price variation, I limit the analysis to

9

one year of data, the year 2000. This year is especially convenient because many of the

characteristics may be cross-checked using the Mexican decenniel census of 2000.

The question of concern in this analysis is whether households that receive remittances

exhibit expenditure patterns which are different from households that do not. In order to

evaluate the differential consumption patterns of remittance receiving households, the

procedure will be to make a list of goods, or goods categories, and test whether receiving

households exhibit consumption patterns different from their comparable non-remittance

receiving counterparts. The simplest way to do this is to estimate an Engel[2] curve of the

following form:

$$w_i = p_i q_i / x = \alpha_i + \beta_i \ln(x/n) + v_i \ln(n) + \mathbf{dz} + u_i \qquad (2)$$

where x is total household expenditures, p and q are price and quantity of good of type i,

n represents the household size, and z contains a number of dummy variables to allow

for possible effects of household characteristics and includes the dummy variable of

interest, whether or not the household received remittance income in the period of the

survey.

The econometric procedure used here is straightforward. Using the household survey

with households as the unit of observation, equation 2 is estimated using ordinary

(weighted) least squares, and all households are included. The test concerns whether or

not the estimated coefficient associated with the dummy variable contains statistical

content. We can use these coefficients to help understand the average effects of

---

[2] This type of Engel curve is an extension of the Leser-Working specification, see Deaton
and Muellbauer(1980)

remittances on spending patterns at the household level after controlling for numerous characteristics of the household.

Results are presented in Table 3. The estimated coefficients for the dummy variable are presented by type of good. Coefficients found to be statistically significant at the 95% level are shown in bold type and include expenditures on food, durables, healthcare and housing. The estimates indicate that households that receive remittances purchase more durables, healthcare and housing and spend a lower share of the household budget on food. These estimates may be interpreted as the expenditure of the remittance peso, or the marginal peso, on various types of goods. The results indicate that after controlling for the size, location, and demographic characteristics of the household, remittance income is associated with a 56% rise in the share of durables, a 44% rise in the share of healthcare, a 17% rise in the share of housing, and a 8% decline in the share of food. Since at the mean level of income, remittances play a large role in the household budget(close to half), the expenditure levels of all goods purchased rises. But this is evidence that the consumption patterns of remittance-receiving households is distinct from other households and favors goods which could be viewed as investments rather than consumption.

Summary

Remittances are one of the important ways in which immigrants affect the people and communities within their respective sending countries. Unlike foreign aid, remittance flows impose no burden on taxpayers. Remittances require no bureaucracy, simply going directly to households as cash transfers. As immigration, both legal and illegal, continues to be an important policy issue in the U.S., little is known about the effects of remittances

sent by those immigrants to households in their country of origin. Fundamental to our understanding of migration policies is our understanding of how sending communities are affected. This analysis presents evidence that households that receive remittances expend a higher share of their household budget on durable goods, healthcare, and housing, and less on food than their observationally equivalent counterparts that receive no remittance income. This suggests a number of things. First, that anecdotal evidence of remittance receiving households engaging in conspicuous consumption or non-productivity enhancing activities does not withstand the wider scrutiny of a large nationally representative dataset. Second, remittance income can be thought of as welfare improving to households in Mexico, on average, and these welfare effects accrue to lower than average income households. Finally, to the extent that remittances play an important role in the provision of healthcare, housing, or investment goods, it is possible that remittances may play a role in the development of the economy in aggregate, and may be growth enhancing.

Appendix

Adams, R. and Page,J.(20050"Do International Migration and Remittances Reduce Poverty in Developing countries?" *World Development, vol 33, no. 10*, pgs 1645-69.

Amuedo-Durantes, Catalina, and Pozo, Susan(2003) "Workers' Remittances and Business Ownership in the Dominican Republic" working paper.

Chami, R., Fullenkamp,C., and Jahjah,S.(2003) "Are Immigrant Remittance Flows a Source of Capital for Development?" IMF working paper.

Deaton, A and Muellbauer, J (1980) An Almost Ideal Demand System, The American Economic Review, Vol. 70, No.3, 312-326.

Dinerman, I.R.(1982) Migrants and Stay-at-Homes:A comparative study of rural migration from Michoacan, Mexico. Monographs in US_Mexican Studies, NO 5 U.C. San Diego.

Durand, Jorge; Massey, Douglas, and Parrado, Emilio(1996) "Migradollars and Development: A Reconsideration of the Mexican Case", International Migration Review 30(2) pg423-444.

Edwards, Alejandra Cox and Ureta, Manuelita(2003) "International Migration, Remittances, and Schooling: Evidence from El Salvador," Journal of Development Economics, 72(2)

Kapur, Devesh (2003) Mimeo, Center for Global Development

López, G.(1986) *La Casa Dividida: Un Estudio de Caso Sobre Migación a Estados Unidos en un Pueblo Michoacano*, Zamoro, Michoacán: El Colegio de Michoacán.

Woodruff Christopher and Zenteno, Rene(2001) "Remittances and Microenterprises in Mexico", working pape

Table 1

Remittances to Mexico, 1984-2000

year	Share of households receiving positive remittances	Remittances as a share of total household income conditional upon receiving positive remittances	Total estimated international remittances to Mexico(ENIGH) billions US dollars	Total estimated international remittances to Mexico(Banco de Mexico)billions US dollars
1984	1.34%	51.48%		na
1989	2.98%	60.66%		na
1992	2.81%	38.95%	1.67	2.43
1994	2.70%	59.63%	2.78	3.72
1996	4.01%	59.40%	3.65	4.22
1998	4.15%	56.59%	4.26	5.63
2000	4.27%	54.35%	5.85	6.57

Source: Author's calculations based on ENIGH(INEGI), Banco de Mexico

Table 2

Descriptive Statistics, 1992-2000

Characteristic, household	All Households mean(sd)	Households receiving positive remittances mean(sd)
total monthly household income excluding remittance(1994 pesos)	2198 (6824)	881 (1705)
total monthly household income including remittance(1994 pesos)	2198 (6824)	1912 (2328)
number of children under age of 5	0.61	0.67
children between ages of 6 and 10	0.56	0.57
Characteristic, head of household		
Age	45.1(15.4)	49.6(16.1)
% female	16.30%	24.50%
years of education	5.75(4.8)	2.4(3.4)
hourly wage(1994 pesos)	6.75(12.5)	2.92(4.6)
total hours worked per week	41.2(24.5)	20.1(26.1)
N	58,440	2,377

Source: Author's calculations based on ENIGH(INEGI)

Table 3

Estimates of Remittance Income on Consumption Share

Category of Expenditure	estimate	s.e.
Food	**-0.0334**	0.0082
Rent	-0.0067	0.0053
Durables	**0.0192**	0.0053
Health	**0.0221**	0.0066
Clothing	0.0009	0.0335
Recreation	-0.0012	0.0057
Transportation	-0.0012	0.0038
Personal	0.0046	0.0026
Housing	**0.0102**	0.0049

N   10,075

Notes: results from weighted ordinary least squares estimation of equation(2).Household characteristics include education of head, rural/ urban designation,age of head, and marital status. Estimated coefficients relate to dummy variable which assumes the value of 1 if the household recieved international remittance income in the survey month. Coefficents which are significant at the 95% level indicated in bold.

Source: ENIGH 2000(INEGI)