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Migradollars and Meat:
Food Expenditures in Migrant-sending Mexican Households

Abstract
Using the 2002 Mexican Family Life Survey, a nationally representative survey of individuals, households, and communities, we examined the relationship between exposure to migration (i.e., having relatives who are migrants) and monthly household food expenditures in 2,638 households. Using a series of OLS regression, we found that exposure to migration is associated with greater household expenditures on food each month. Additionally, migrant-sending households spend more on Westernized foods like animal proteins and processed foods than other households in Mexico. Households with relatives in the US may be remitting money as well as dietary preferences or at least the purchasing power for changes in food behaviors. If the households that remained in Mexico eventually migrate to the US, they are likely to take their newly acquired food preferences with them to the US. As such, nutrition assimilation among Mexican immigrants may begin even prior to immigration to the US.

Introduction

Living in an economically developed country like the United States may expose immigrants to environments that place them at higher risk of overweight than if they had remained in their country of origin. Even though the U.S. is not the fattest country in the world, it ranks 13th among 148 countries in the percentage of obese women (with BMIs greater than or equal to 30) (Ono, Guthold, & Strong 2005). Exposure to the American environment (i.e. fast food industry and advertising, readily available cheap, pre-packaged foods, and reliance on cars) may lead to the "Americanization" of health behaviors involving diet and exercise, which in turn may lead to overweight and obesity (Blumenthal 2002; Carter 2002; Fried & Nestle 2002). Immigrant families in the United States may be particularly vulnerable to health risks involving diet and exercise because of their unfamiliarity with American food, language barriers, and inability to purchase ingredients to make foods from their countries of origin.

However, Mexican immigrants experience the "Americanization" of their diet prior to moving to the U.S. and the migration itself may not be the sole factor contributing to overweight. Obesity is not restricted to the United States or even to more developed countries (Popkin 2002). In 2005-2006, 33.3 percent of adult men and 35.3 percent of adult women in the U.S. were considered obese (BMI greater than or equal to 30) (Ogden et al. 2007). Comparably, in 2000, 18.6 percent of adult men and 28 percent of adult women in Mexico were considered obese (Olaiz et al. 2000). Although overweight and obesity is less prevalent in Mexico than the U.S., it is possible that Mexican immigrants originate from areas of Mexico where obesity is more prevalent, or that families who choose to emigrate already have lifestyles similar to those living in the U.S. Families and communities involved in a circular pattern of international labor migration may include people who have extensive experience and connections with the U.S. and who are already familiar with or perhaps attracted to U.S. lifestyles and dietary patterns.

Background

Mexican households likely include more than just the nuclear family; therefore, extended family living arrangements in Mexico increase the likelihood that households have one or many relatives in the United States and experience exposure to migration. Relatives in the United States serve as a proxy for monetary transfers remitted from the U.S. to Mexico. A household that has relatives in the United States has an additional potential source of income to contribute to the total household income. Massey and Parrado found that for many Mexican households, the money they receive from relatives in the United States can be more than the income earned in the Mexican household alone (1994). Migradollars that enhance a family's household income could potentially have large effects on household consumption patterns for those living in Mexico. The magnitude of remittances flowing into Mexico from the U.S. should not be underestimated—in

2003, remittances to Mexico exceeded US$13 billion and the average remittance was US$321 (Hernández-Coss 2005).

The remittances may allow families to alter their food expenditure patterns through increased resources and income that can be allocated towards more expensive or higher quality foods, greater quantities of foods they already purchase, or new types of foods. Not only do the remitting relatives provide increased income to their families in Mexico, they also expose the receiving families to American food and other consumption preferences (Leatherman and Goodman 2004). Changes in household food expenditures toward more high density foods (i.e. purchasing more animal protein products) have the potential to shift both eating behaviors and weight status among all household members in line with the nutrition transition.

The nutrition transition hypothesis posits that the diets of those in developing countries are shifting towards a more Westernized diet high in fat, artificial sweeteners, and animal sourced foods. Developing countries have also seen a rise in the consumption of vegetable based oils. Consumption of the aforementioned foods rises as income rises (Popkin & Gordon-Larsen 2004). Therefore, it seems entirely possible that exposure to migration speeds the nutrition transition process of moving from receding famine typified by a diet high in fruits and vegetables and animal protein (Stage 3) to degenerative diseases (Stage 4) characterized by a Westernized diet and increasing rates of obesity. Those households that have exposure to migration might be more likely to have internalized the nutrition transition and consume higher levels of fat or oils, caloric sweeteners, and animal sourced foods.

Taylor and Mora find that migrant and non-migrant households have significantly different expenditure patterns and expenditure allocations (2006). Moreover, well-off households are spending more money on food and not investing the remittance income on traditional

productive investments like business ventures or savings (Koc & Onan 2004). Additionally, households that are financially better off garner greater benefits from remittances compared to those that are less financially sound (Conway & Cohen 1998). Even though the more financially sound households receive more benefits from remittance income, the households with comparatively lower income can now also afford more fat and sugar based foods with their increased income from family members in the U.S. (Popkin 2001).

Studies have shown that the relationship between a households' total income from remittances was negatively related to expenditures on traditional foods such as maize, beans, and chilies and positively related to expenditures on luxury food items like meat, milk and fruit. Migrant households also spend significantly more of their income on processed foods like bread, pasta, and snacks (Kaiser and Dewey 1991).

The focus of this study is the initial step of a larger project on the relation of household consumption, migration and body mass index. Much of the current work focuses on the weight status of Mexican American children who have an immigrant parent. The literature often points to family factors as a mechanism of obesity for the Mexican American children. So it may be that exposure to migration and remittances from a relative, opens a household (including children) to a diet that leads to higher weight status. Then the diet is carried to the United States after migration. This paper will test the hypothesis that a preliminary source of exposure to a more Americanized diet comes from a relative or multiple relatives of household members living in the United States, sending money to their relatives in Mexico, therefore increasing the receiving household's income and subsequently household expenditures especially on food. It is expected that as the numbers of relatives Mexican households have in the U.S. increases their

spending on Western type foods like animal proteins and industrialized foods (i.e. cooking oil, soda and other refined foods) will subsequently increase.

Data

This study used the 2002 wave of the Mexican Family Life Survey to test the hypotheses about exposure to migration and changes in household food consumption patterns. A household level sample was constructed to capture the multiple family structures within Mexico. There are 2,638 households in this sample.

Measures

Dependent Variable

The dependent variable is the log of monthly household food expenditures. This variable was constructed by first creating six monthly household food expenditure food categories: fruits, vegetables, animal protein (includes meat and dairy products), processed foods, cereals and grains, and meals away from the home. Each category was top coded to exclude households that had extreme expenditures in a certain food category. The food categories were then summed to create a monthly food expenditure variable. The log was taken of the sum of the food expenditures to provide a more normal distribution of the variable.

Independent Variable—Exposure to Migration

The primary independent variable is taken from the question asked to all adult household members aged 12 and above of whether or not they have a relative in the US. Then the individual level variable was collapsed to provide a household level count of how many relatives each household has in the US. The variable is top coded at ten relatives so as to not give undue weight

to those households with a large number of relative in the US. Almost 98 percent of the households have ten or less relatives in the United States.

Controls

Demographic and geographic controls were also created. The socioeconomic status (SES) indicator is essentially a wealth index including the presence of household appliances like a washing machine, stove, and a telephone, if a house has electricity, the type of plumbing, and the flooring material. Age category dummies were summed at the household level so taken together they reveal the age structure and size of a household. The monthly income variable computes the monthly earnings of a household from wage labor plus income from social programs. A dummy control was created for household participation in social programs. The rural dummy variable refers to an area that has less than 2,500 residents. Five regional dummies control for the relative wealth and industrialization of Mexican regions. The reference category is the central region of the country that includes Mexico City.

The final variable is an interaction term between monthly household income and the number of relatives a household has in the U.S. This will illustrate a relationship between household income and remittances—or the effect of remittances on household food expenditures by varying levels of household income.

Data Analysis

A series of ordinary linear regression were estimated regressing household food expenditures summed and for each food expenditure category (i.e. fruits, vegetables, etc.) on exposure to migration and the controls to determine if increased exposure increases expenditures. The first model regresses monthly household food expenditures on exposure to migration

(relatives in the United States) and includes the demographic and geographic control variables. The second model includes all of the variables from the first model and adds the interaction term between monthly household income and exposure to migration. The third model is a series of regression to determine which food expenditure category drives change in expenditures when a household is exposed to migration.

Results

Table 1 presents the results for the first regression model. Exposure to migration is significantly related to increases in monthly household food expenditures controlling for the demographic and regional variables. For every one additional relative a household has in the U.S. (up to ten), household food expenditures rise by 2.9 percent. Indeed greater exposure to migration serves to raise food expenditures. The wealth index or SES measure is also significantly related to increases in household food expenditures. As SES increases, food expenditures rise by over 14 percent. The age structure and size of a household are significantly related to modest boosts in food expenditures with households that have the youngest children spending more on food. Most regions when compared to the central region spend significantly less per month on food except for the Northwest region. This region is one of the wealthiest regions in Mexico due to a strong industrial economy. Household participation in social programs has a negative and significant effect on food expenditures. Monthly income is not significantly related to household food expenditures.

Table 2 reveals the results for the regression that includes the interaction term. The interaction term is significant but the coefficient is negative. SES continues to be a positive and significant predictor of household food expenditures. The age structure and the size of the household remain significant for all age groups in the interactive model. Households who have

the youngest children increase food expenditures the most. The Northwest region is the only area in Mexico that significantly increased food expenditures compared to the Central region. The West Central region spends significantly less on food expenditures than those in the Central region. Those living in rural regions have significant lower food expenditures than urban dwellers. Participation by the household in social programs has a significant and negative effect on food expenditures. Monthly income has a tiny but significantly positive effect on food expenditures.

Figure 1illustrates the interaction between the log of household food expenditures and exposure to migration by two different income levels, the 50^{th} percentile for household monthly income and the 90^{th} percentile for household monthly income. When exposure to migration is at its lowest, those with a higher level of income spend more each month on food. Yet as exposure to migration increases, those with lower monthly incomes begin to have greater household food expenditures than households with higher incomes. Of households with the greatest exposure to migration, those with lower monthly incomes spend drastically more on food.

Finally, Model 3 attempts to determine which particular type of food expenditure drives the increase in household food expenditures. The log was taken of each food expenditure category to enhance interpretability and comparison. Six separate regressions were run to capture the strength of exposure to migration on each food category. The regressions suggest that households with relatives in the US are spending significantly more of their household income (possibly income from remittances) on vegetables, grains and cereals, animal sourced foods and processed foods but not on fruits and meals out. However, animal protein appears to be the driving force for the increase in food expenditures. For every one unit increase in exposure to migration (or each additional relative a household has in the U.S.), households spend 2.8 percent

more on animal sourced foods. Moreover, with increased exposure to migration, households also spend 2.5 percent more each month on processed food which includes vegetable oils and other types of processed foods. These types of expenditures indicate increased spending on more energy dense, high fat foods. Interestingly, with increased exposure to migration households are also spending more on grains and cereals, 2.4 percent more each month as exposure to migration increases.

Discussion

The results indicate that as the number of relatives a household in Mexico has in the U.S. increases, so do household monthly expenditures on food. Additionally, those households with higher SES and those living in the Northwest region of Mexico also expend more each month on food products, which one might expect. However, participation in social programs and monthly income seem to offer no explanation for increased food expenditures leading one to believe that it is the remittances from relatives living in the U.S. that lead to changes in food expenditures among Mexican households. Remittance income is not included in the measure of monthly household income but is captured in the measure of exposure to migration.

Moreover, exposure to migration shapes consumption preferences of the Mexican households towards more Americanized, high fat, energy dense foods. Mexican households with greater migration exposure are buying increasing amounts of animal sourced foods and processed foods. Therefore, exposure to migration appears to speed the nutrition transition process towards a Westernized diet by encouraging and enabling Mexican households to alter their food expenditure patterns. The Americanize dietary preferences (which have negative health implications given the enormous rise in obesity prevalence rates) are adopted by both the wealthy and the less wealthy in Mexico. Yet, the burden of the negative consequences of the Americanized dietary preferences falls on the less wealthy in Mexico as evidenced by Figure 1.

Both groups increase their expenditures on food, but the less wealthy do so at a much steeper rate. Increased consumption of fat or oils, processed foods, and animal sourced foods has the potential to negatively affect the weight status of Mexicans.

Conclusion

Exposure to migration leads to greater household expenditures on food each month. Additionally, these households are purchasing an increasing amount of Westernized foods like animal proteins and processed foods. Animal sourced foods are high in fat and are more expensive than other types of foods. Households with relatives in the US seem to be remitting money as well as dietary preferences or at least the purchasing power for a changes in food behaviors. If the households that remained in Mexico eventually migrate to the US, they will take their newly acquired food preferences with them to the US. The logical result of increased consumption of energy dense foods over time is weight gain and changes in weight status. The relationship between increased food expenditures, relatives in the US and obesity is a topic requiring further analysis.

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Table 1. Exposure to Migration on Logged Monthly Household Food Expenditures (N=2,638)

	b		se
Exposure to Migration	0.029	**	0.009
Demographic Controls			
SES	0.143	***	0.011
Age less than 5	0.069	**	0.02
Ages 6 to 12	0.062	***	0.015
Ages 13 to 18	0.035	*	0.017
Ages 19 and over	0.043	**	0.013
Monthly Income	1.86e-09		8.63e-09
Household Participation in Social Program	-0.161	***	0.038
Regional Controls			
Rural	-0.274	***	0.034
Northeast Center	0.003		0.044
West Central	-0.182	***	0.043
Northwest	0.176	***	0.044
South Southwest	-0.017		0.051
Constant	5.796		

*= p< 0.05 **= p < 0.01 ***= p< 0.001

†= p< 0.10 two tailed test

Table 2. Interaction of Migration Exposure and Monthly HH Income on Logged Monthly Household Food Expenditures (N=2,638)

	b		se
Exposure to Migration	0.064	***	0.011
Demographic Controls			
SES	0.138	***	0.011
Age less than 5	0.067	**	0.02
Ages 6 to 12	0.06	***	0.015
Ages 13 to 18	0.031	†	0.017
Ages 19 and over	0.037	**	0.013
Monthly HH Income	0.00002	***	3.33e-06
Household Participation in Social Program	-0.162	***	0.038
Regional Controls			
Rural	-0.268	***	0.034
Northeast Center	0.004		0.044
West Central	-0.174	***	0.043
Northwest	0.181	***	0.044
South Southwest	-0.013		0.05
Exposure to Migration x Monthly HH Income	-6.43E-06	***	1.11e-06
Constant	5.796		

*= p< 0.05 **= p < 0.01 ***= p< 0.001

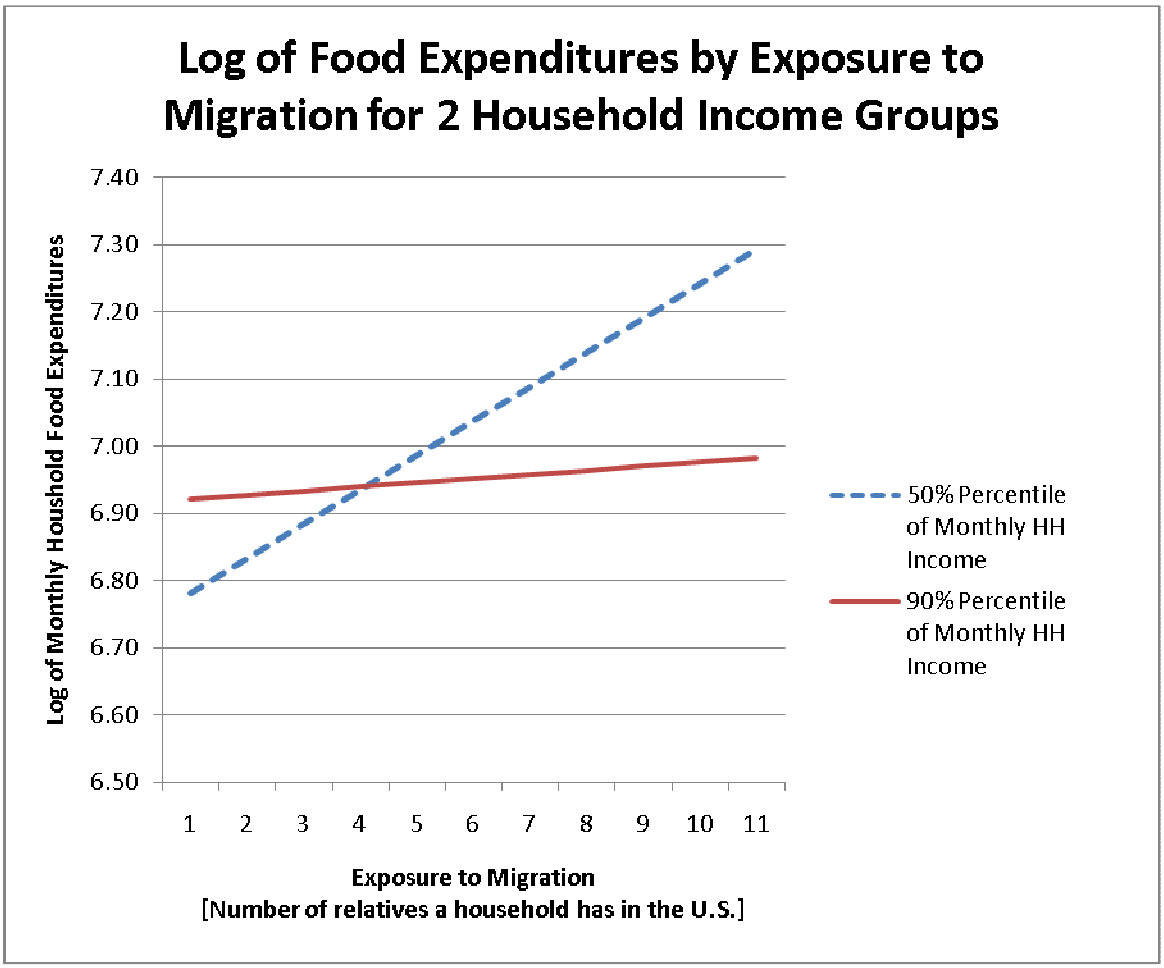
†= p< 0.10 two tailed test

Table 3. Exposure to Migration on The Log of Each Household Food Expenditure Category

	Vegetables		Fruits		Grains		Animal Sourced		Processed Foods		Meals Out	
	b	se b	b	se b	b	se b	b	se b	b	se b	b	se b
Exposure to Migration	0.022 *	0.01	0.015	0.011	0.024 *	0.011	0.028 *	0.006	0.025 *	0.011	-0.011	0.023
Demographic Controls												
SES	0.073 ***	0.011	0.162 ***	0.014	0.064 ***	0.013	0.159 ***	0.013	0.142 ***	0.013	0.148 ***	0.030
Age less than 5	0.026	0.021	0.04	0.025	0.055 *	0.023	0.097 ***	0.023	0.091 ***	0.023	-0.040	0.051
Ages 6 to 12	0.033 *	0.015	0.045 **	0.018	0.103 ***	0.017	0.058 ***	0.017	0.039 *	0.017	0.016	0.040
Ages 13 to 18	0.08 ***	0.018	0.026	0.021	0.055 **	0.02	0.056 *	0.020	0.030	0.020	-0.030	0.045
Ages 19 and over	0.084 ***	0.013	0.037 *	0.016	-0.012	0.015	0.053 ***	0.015	0.014	0.015	-0.045	0.033
Monthly Income	2.06e-09	8.29e-09	9.67e-09	1.02e-08	7.42e-06 **	2.39e-06	4.36e-09	9.83e-09	4.09e-09	0.00000	.00003 ***	4.19e-06
Household Participation in Social Program	-0.112 **	0.04	-0.094 *	0.048	-0.226 ***	0.045	-0.156 ***	0.045	-0.217 ***	0.044	-74.000	0.112
Regional Controls												
Rural	-0.119 ***	0.035	-0.211 ***	0.04	-0.136 ***	0.04	-0.259 ***	0.040	-0.195 ***	0.039	-0.246 *	0.023
Northeast Center	0.031	0.046	-0.236 ***	0.055	0.085	0.051	0.028	0.052	0.270 ***	0.051	-0.420 ***	0.114
West Central	-0.241 ***	0.050	-0.196 ***	0.053	-0.122 *	0.051	-0.124 *	0.050	-0.082	0.049	-0.282 **	0.109
Northwest	0.096 *	0.046	-0.037	0.054	0.255 ***	0.052	0.202 ***	0.051	0.405 ***	0.050	-0.232 *	0.103
South Southwest	-0.250 ***	0.053	-0.070	0.063	0.022	0.060	0.007	0.059	0.156 **	0.058	-0.242 *	0.121
Constant	4.12 ***	0.094	3.58 ***	0.11	4.11 ***	0.11	4.470 ***	0.106	4.083 ***	0.103	5.027 ***	0.236
N	2623		2462		2539		2544		2638		709	

*= p< 0.05 **= p < 0.01 ***= p< 0.001 †= p< 0.10 two tailed test

Figure 1.


Log of Food Expenditures by Exposure to Migration for 2 Household Income Groups
Log of Monthly Houshold Food Expenditures
7.40
7.30
7.20
7.10
7.00
6.90
6.80
6.70
6.60
6.50
1
2
3
4
5
6
7
8
9
10
11
Exposure to Migration
[Number of relatives a household has in the U.S.]
50% Percentile of Monthly HH Income
90% Percentile of Monthly HH Income