Agrarian Structure and Labor Mobility in Rural Mexico

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This article examines the economic factors that affect labor allocation of rural landholding households in four areas of Mexico. The original research objective was considerably narrower, focusing on the "push factors" causing illegal migration to the United States. However, it soon became apparent that restricting the analysis to US migration would make it impossible to distinguish among factors that cause members of households to work off-farm in general, and those that condition this wage labor to take various forms, such as local labor, circular or permanent migration within Mexico, or migration to the United States.

At its broadest level, this is a study of the relationship between rural development and labor mobility. Yet, as tempting as it is to focus entirely upon the theoretical issues involved, especially those raised by the emerging literature on circulation and on peasant household decision-making, this study will keep the issue of undocumented migration plainly in sight. Its conclusions, which challenge the assumption of an inverse relationship between rural economic development and undocumented migration, have important implications for the effectiveness of development programs in slowing the long-term outflow of rural migrants and for the suitability of a guest-worker program as an "interim" solution to the current situation of insufficient job opportunities in Mexico and high levels of illegal migration to the United States.

Migration and rural development

Much of the literature on the relationship of economic development and migration in less-developed countries can trace its lineage to the dual-economy model of Lewis (1954). In his model the economy is composed of two sectors: rural agricultural and urban industrial. There is surplus labor in the agricultural sector, and the urban wage is set at a fixed premium above the level of rural

subsistence. Capital accumulation is the driving force of the model, providing increasing numbers of jobs that attract rural migrants. Rural-to-urban migration continues until there is no longer a labor surplus in the countryside, and rural and urban wages are equal.

These assumptions are echoed in numerous characterizations of the causes of Mexican migration to the United States. Thus, Reubens asserts that undocumented immigration is a result of "economic dualism, in which the expanding modern sectors exist side by side with lagging traditional sectors [and in which] surplus workers are accumulating in the hinterlands of agriculture, industry, and services" (1978:15). According to this widely held viewpoint, circular migration to the United States represents an interim strategy to cope with lagging job opportunities in rural and urban areas of Mexico. There is theoretical support for this role of circulation in the model of Zelinsky (1971), which posits a series of migration stages in which circulation is gradually replaced by permanent migration as urban opportunities expand.

Further development of the dual-economy model specified the rural conditions that define underdevelopment and cause migration: a lack of land and capital and the use of traditional techniques of production, resulting in low agricultural yields; rapid population growth resulting in a low marginal product of labor; resistance by economically insecure farmers to new agricultural technology and new crop varieties. An important implication of this theory is that if agriculture can be made more productive, the tide of migration to the cities will be slowed. Programs of rural agricultural development in the 1960s and 1970s, promoting the adoption of a mix of new grain varieties and the greater use of purchased inputs, often claimed the reduction of migration as one of the potential benefits. And, most significantly for the narrower subject of this study, the dual-economy model implies that the process of illegal migration from rural Mexico to the United States will not abate until Mexico develops its agricultural areas or provides jobs in the cities in numbers adequate to compensate for the lack of rural development (Cornelius, 1977).

Several recent studies have challenged the empirical validity of this theory for many less-developed countries. The identification of the rural population with agricultural labor has been found to provide an incomplete description of economic activity in the rural areas. A study of off-farm employment in rural areas of 15 developing countries found that 20–30 percent of the labor force was engaged primarily in nonfarm employment (Anderson and Leiserson, 1980). Beals, on the basis of his research on peasants in Oaxaca, a poor and predominantly rural state in Mexico, concluded that "farming is neither their primary occupation nor is it their main source of income. The ways of making a living are numerous and varied" (1975:15).

Employment off one's own land (called "off-farm employment" throughout this study) may involve agricultural wage labor or other types of work in the local area, commuting to nearby towns, or circular migration between regions. While patterns may differ greatly between countries and between regions within the same country, many rural areas exhibit what White (1976) has termed "extreme occupational multiplicity." Goldstein has ob-

served, "What evidently varies from country to country is not the variety of forms of movement relied upon, but rather the particular mix of alternatives and the exact conditions under which one or the other is relied upon more heavily" (1978:55).

Nor does agricultural "development" necessarily result in reduced migration or even reduced off-farm employment, as implied in the traditional theory. In many instances, new varieties of seeds and new techniques adopted in less-developed countries during the 1960s not only decreased labor requirements but also lowered incomes for certain strata of farmers and for landless laborers (Hewitt de Alcantara, 1976). The new technology requires a higher level of purchased inputs and gives the farmer less latitude with respect to the timing and amounts of labor and machinery inputs. A new cropping pattern or technology might have potential for increasing income and employment but, within a particular socioeconomic context, could cause greater concentration of land because of the inability of small farmers to afford the necessary level of purchased inputs and to assume higher levels of risk. Seasonal concentration of labor inputs for the new varieties might cause labor-supply bottlenecks and stimulate compensating changes in cropping patterns and increased mechanization.

These findings imply that circular migration does not necessarily represent a transitional phase between traditional agricultural employment and permanent migration from a region. In contrast to the portrayal of circular migration as corresponding to a period of declining agricultural production per worker, although a decline that is not severe enough to cause permanent migration from agriculture, it would appear that agricultural development may even stimulate circular migration. Circulation may provide a means to earn money to meet the higher level of cash requirements of agricultural production, to offset the risks accompanying decreased production of the subsistence crop, and to compensate for the decline in demand for local agricultural wage labor. Circular migration allows the peasant producer to maintain primary residence in the rural area and to obtain income from both farm and nonfarm sources. Circular migration may therefore provide higher income at less risk than either farm production or permanent migration (Fan and Stretton, 1980). This preliminary assessment of an expanded role for circular migration within less-developed countries is supported by recent research. Chapman and Prothero summarize this literature as follows: "Circulation, rather than being transitional or ephemeral, is a time-honored and enduring mode of behavior, deeply rooted in a great variety of cultures and found at all stages of socioeconomic change" (1977:5).

This article considers these challenges to the accepted theory of economic development and migration in greater detail, within the context of an analysis of patterns of farm and off-farm employment and permanent and circular migration in four rural areas of Mexico. The next section details the nature of agricultural production in each of the four survey areas, including the crops grown and marketed, the use of purchased inputs, improved techniques, household and hired labor, and the levels of farm income. The following sec-

tion examines the allocation of household labor to off-farm activities, including circular and permanent migration, and the role that the characteristics of the regional agrarian structure play in this allocation. The last section derives some general conclusions concerning the relationships observed in the four zones.

Production, income, and employment in agriculture

This study is based on farm survey data collected in the Mixteca Baja, Oaxaca; Las Huastecas, San Luis Potosí; Valsequillo, Puebla, and the Bajío, Guanajuato (see map). The four surveys were conducted in 1974, covering the year

Location of the four survey areas

1973, the first three by the Centro de Investigaciones Agrarias and the last by the author in collaboration with several Mexican agencies. The emphasis of each survey was on farm structure as it affected farm and off-farm labor, with the topic of migration treated secondarily in the context of off-farm labor. The unit of analysis was the farm household, including all members who live with the household head, work on the family farm, or contribute money to the farm household. The total sample consisted of 482 farm households.[1]

Table 1 summarizes the major agricultural characteristics of the four survey areas. Together, they span the major forms of agriculture found in Mexico (the major omission being any example of the highly mechanized agriculture of the irrigated areas of the Northwest). By almost any measure of development, the Mixteca Baja, located in the mountainous coastal region of the state of Oaxaca, occupies the lower end of the socioeconomic spectrum. The area has no large towns, and transportation within the region and to other regions is severely limited by poor roads. There are few local opportunities for nonagricultural labor, and farm techniques remain substantially as they were in the pre-Conquest period. The Bajío occupies the other end of the spectrum, having undergone significant agricultural modernization in the 1960s and rapid growth of the urban areas and infrastructure during the 1970s. A variety of commercial crops, relying heavily on fertilizer and other purchased inputs, now dominate agriculture in this region.

Any notion of a linear progression from traditional to commercial agriculture that may be implied in the contrast between the Mixteca Baja and the Bajío breaks down when the characteristics of the other two regions are examined. Las Huastecas exhibits many aspects of traditional agriculture, with reliance on family labor and traditional inputs, but subsistence crops are mixed with commercial crops, and farm incomes are relatively high. Valsequillo, by contrast, is closely linked with the commercial and semiurban economy of the Puebla area, and agriculture is partially mechanized. However, farm incomes are low for most households, and corn, the primary subsistence crop in Mexico, dominates the cropping pattern.

The Mixteca Baja, Oaxaca

The Mixteca Baja is representative of agricultural patterns in the poorest and most isolated regions of Mexico. The only two towns in the survey area, Jamiltepec and Pinotepa Nacional, are on the coastal highway, and transportation even short distances into the mountainous interior is extremely limited. The Centro de Investigaciones Agrarias has estimated that 23 percent of the population in the survey area is not linked to the major population centers by a road of any kind (Barbosa-Ramírez, 1976). There are three distinct population groups in the region—Blacks and Mestizos are found in the narrow coastal region, while indigenous groups predominate in the interior. Forty-one percent of the population of the region speaks an Indian language.

Agriculture is practiced in small mountain valleys and on the hillsides. Most of the farming is under the *ejido* system, in which land belongs collectively to the members of the *ejidal* community and cannot (with certain excep-

TABLE 1 Major agricultural characteristics of the four survey areas

Item	Mixteca Baja (67 households)	Las Huastecas (98 households)	Valsequillo (99 households)	The Bajío (198 households)[a]
Population[b]				
Density (persons per square kilometer)	26	39	560	100
Total	91,383	98,804	49,908	276,570
Labor force in agriculture (percent)	79	81	56	64
Population speaking Indian language (percent)	41	50	0	0
Dwellings with running water (percent)	10	25	52	n.a.
Agricultural production				
Average farm size (hectares)	2.8	7.1	6.1	10.4
Cultivated land in subsistence crops (percent)	76	66	87	46
Corn production sold (percent)	10	14	37	88
Value of agricultural capital per hectare (pesos)	$907	$285	$1,798	$4,070
Value of farm production per hectare (pesos)	$1,234	$3,273	$2,218	$4,250
Farm income (pesos)	$2,639	$16,816	$21,487	$22,306
Farms with income less than $5,000 pesos (percent)	79	20	64	23
Agricultural labor				
Household farm labor (person-days)	172	275	78	86
Hired farm labor (person-days)	68	52	87	85
Total farm labor (person-days)	240	327	165	171
Total farm labor per hectare cultivated (person-days)	118	75	37	22
Household farm labor in corn production (person-days)	127	105	58	30

[a]Excludes households possessing large irrigated farms.

[b]The population data are from the 1970 censo de Poblacion, Mexico, for the *municipios* of the survey area. All other data are from the household surveys.

tions) be sold or rented. In most *ejidos* in Mexico, the land is divided into individual plots that are farmed year after year by the same household. In this tropical region, however, the slash-and-burn technique and heavy rainfall quickly exhaust the thin mountain soils, and land must be left fallow for up to ten years after only one or two years' harvest. Therefore, each *ejidatario* is assigned a new plot of land to work each year, with plot size varying from 1.5 to 3 hectares, depending on the family labor available to undertake the arduous task of preparing the land for planting.

The average farm in the sample of 67 consisted of 2.8 hectares, of which 2.2 hectares were planted in corn, 0.4 in beans, 0.8 in sesame, and 0.3 in other crops (the sum exceeding 2.8 hectares due to intercropping). The average farm marketed only 16 percent of its produce.

The agricultural technology employed in the Mixteca Baja is primitive. Households in the zone spent only 75 pesos per hectare per year (US $1.00 = 12.5 pesos at the exchange rate prevailing at the time) on fertilizer, seeds, and machinery rental. The total value of agricultural capital per hectare, consisting primarily of draft animals and implements such as hoes, amounted to 907 pesos.

The use of primitive techniques on poor land is reflected in the value of production per hectare in the survey—1,234 pesos for all crops and only 958 pesos for corn. For comparison, Las Huastecas produced 1,849 pesos per hectare in corn, and Valsequillo 2,332 pesos. While it might be expected that the low value of corn production per hectare in the Mixteca Baja would be accompanied by low monetary expenses, in fact an average of 560 pesos per hectare was spent on wages for hired labor and 75 pesos on other purchased inputs, yielding a net return of only 323 pesos per hectare in the production of corn. Low values of net production combined with the small size of the average plot to produce annual farm incomes averaging just 2,639 pesos (or $211).

The average household in the sample worked 172 person-days per year on their land, representing two-thirds of total household labor input on and off the farm. In addition to household labor, 67 percent of the farms hired *jornaleros* (day laborers), adding an average of 68 person-days, to bring total farm labor input to 240 person-days. When these data are viewed in light of the fact that the average farm size is only 2.8 hectares, the labor-intensive nature of agricultural production in the zone is evident. The average household applied 84 person-days of its own labor and 37 person-days of hired labor, resulting in a total labor input of 118 person-days per hectare cultivated. As can be seen in Table 1, labor intensity of cultivation in Mixteca Baja far exceeds that in the other zones.

In summary, the Mixteca Baja conforms closely to the common perception of underdeveloped, traditional agriculture: subsistence crops produced using traditional inputs and techniques are dominant; farm incomes are extremely low; and local employment opportunities are limited. The population of the region is impoverished: the 1970 census shows that most of the region's rural population live in one-room dwellings with dirt floors, and, despite the

presence of two towns of over 10,000 people, only 10 percent of the households have running water (Barbosa-Ramírez, 1976).

Yet the significant amount of hired labor these farms employ does not fit the commonly held image of traditional agriculture; two-thirds of the farms used hired labor, and for these farms, hired labor represented 39 percent of their total farm labor input. Examination of monthly labor data reveals that even in the slack months a relatively constant proportion of farm labor input was hired. By contrast, household farm labor input varied significantly by season, and in July it exceeded total farm labor input for all other months. Thus, it would not appear that farm labor demand exceeded the capacity of the household labor force to provide these inputs internally. Examination of data for the other areas, and particularly wage labor data for the Mixteca Baja, will demonstrate the pivotal role that hired farm labor plays in the allocation of household labor between farm and off-farm activities.

Las Huastecas, San Luis Potosí

Las Huastecas, situated on the slopes of Mexico's eastern range of mountains, is a semitropical region that receives adequate rainfall in the winter months, permitting crops to be grown year-round without the need for irrigation. Corn, usually a summer crop, coffee, and sugarcane are grown throughout the year. Together, these crops are planted on 80 percent of the cultivated land. Livestock is also an important agricultural activity in the zone, but it is confined principally to the large private holdings. The Centro de Investigaciones Agrarias limited its survey to *ejidal* farms in the area, because it was mainly concerned with the labor allocation of peasant producers. As with most *ejidal* farming in Mexico, each plot is farmed year after year by the same household, and as long as it is cultivated regularly the land can be passed down to children, though not sold or legally divided into smaller plots.

Despite its location along the old Pan American highway, only 350 miles from the Texas border, Las Huastecas is as removed from the Mexican mainstream as is the Mixteca Baja. There are no sizable towns in the region, and the 1970 census showed that 50 percent of the population spoke an Indian language and 81 percent of the labor force was in agriculture (Barbosa-Ramírez, 1979).

Most farms in the sample were between 2 and 10 hectares. If a composite *ejidal* farm were to be created from the data, its 7.1 hectares would have 2.4 hectares in corn, 0.8 hectares in sugarcane, and 1 hectare evenly divided between coffee and all other crops. About 3 hectares would be left uncultivated, some of which would be in pasture. Thus subsistence crops occupy two-thirds of the cultivated land for the average household.[2] Ninety percent of the households grew corn, and only 14 percent of the average household's production of the crop was sold.

Because of the much higher value of sugarcane and coffee, the statistics on land use understate the importance of commercial crops to households in Las Huastecas. Corn, with production per hectare valued at 1,849 pesos, contributed only one-third of the value of agricultural production on the average

farm. Sugarcane produced 9,680 pesos and coffee 6,609 pesos per hectare. The higher value for the commercial crops raised the average value of production per hectare to 3,273 pesos, far exceeding that obtained by farmers of the Mixteca Baja. Farm incomes were correspondingly higher in Las Huastecas, averaging 16,816 pesos per farm per year, and only 20 percent of the farms generated annual incomes below 5,000 pesos.[3]

Both household and total farm labor inputs in Las Huastecas were the highest of the four zones. The average household worked 275 person-days on its parcel and hired workers for an additional 52 person-days. A significant percentage of this high household labor input was contributed by household members other than the principal farmer, and, due to the year-round cropping pattern, labor inputs were spread more evenly over the year than in the other zones.

Las Huastecas is a more prosperous agricultural zone than the Mixteca Baja despite the fact that agriculture as practiced in both zones would be classified as traditional, employing few purchased inputs and devoting a relatively large percentage of cultivated land to production for home consumption. Households in Las Huastecas were able to increase farm income by devoting a large amount of household labor to high-value, labor-intensive crops. Sugarcane required 149 person-days per hectare, while corn employed only 45 person-days per hectare. The former provided a source of cash income without requiring much monetary outlay, while the latter provided much of the subsistence consumption of the household. The fact that the value of agricultural output was relatively high without reliance on the market for hired labor, purchased inputs, or food will prove especially significant in explaining the differences between off-farm household labor allocation in Las Huastecas and the other zones.

Valsequillo, Puebla

Valsequillo, located in the southern part of the state of Puebla, is characteristic of many of the densely populated rural areas of the Central Plateau. Table 1 shows there were 560 persons per square kilometer in 1970, as compared with 39 in Las Huastecas and 26 in the Mixteca Baja. The zone, some 100 kilometers from the city of Puebla, is crossed by highways from Mexico City to the major coastal city of Veracruz, and contains two medium-sized towns, Tecamachalco and Tehuacan, which provide important links with the national economy and a nonagricultural source of employment for local inhabitants. The population is primarily *Mestizo*, and the culture reflects early Spanish domination.

Agriculture is the predominant economic activity in the zone, employing 56 percent of the labor force. The land is partially irrigated, but the majority of farms have only enough water to supplement seasonal rainfall for the summer corn crop and cannot engage in multiple cropping.

The average farm in the sample of 99 farm units had 6.1 hectares; however, seven farms of over 20 hectares controlled 37 percent of the land and 56

percent of the value of agricultural machinery and implements. These large farms were privately owned; the small farms were both privately owned and *ejidal*.

Corn is the major crop: 87 of the 99 households grew corn, and the average farm devoted 87 percent of its land to the two subsistence crops, corn and beans. While only one-third of the corn grown on the average farm was sold (Table 1), the high percentage marketed from the larger farms meant that almost three-fourths of all corn production was marketed. Thus agriculture in the zone was much less subsistence oriented than in the two indigenous zones considered earlier; each farm sold a larger proportion of its production, and a few large farms put the bulk of their production on the market.

Agricultural technology in Valsequillo is also more capital-intensive than in the other two zones. Tractors are commonly used in preparing the land for planting, with the smaller farms renting tractor services from the larger farms. In the study year the average farm used 1,185 pesos of purchased inputs (including hired labor) per hectare and had agricultural capital valued at 1,798 pesos per hectare. The average value of production per hectare in Valsequillo, however, was only 2,218 pesos—less than in Las Huastecas because of the low value of corn, the principal crop in the region.

Farm income in Valsequillo averaged 21,487 pesos, higher than in the other two zones, but this figure is heavily influenced by the high incomes generated on a few large farms. Sixty-four percent of the farms produced incomes of less than 5,000 pesos, and a sizable number reported expenses exceeding the gross value of output. This is especially significant because only monetary expenese were used in this calculation, excluding the imputed value of household labor, land rent, and depreciation.

Despite the larger farm size, total farm labor inputs on the average farm in Valsequillo were only 165 person-days: 78 person-days of household labor and 87 person-days of hired labor. While the large farms account for much of the high proportion of hired labor, hired labor was very important to the majority of agricultural production units; 83 percent of the farms surveyed used wage labor, and for those farms, the proportion of hired to total farm labor averaged 53 percent.

If labor inputs are calculated per hectare, the differences between Valsequillo and the other survey areas become even more evident. Total farm labor input per hectare in Valsequillo was 37 person-days, less than half that in Las Huastecas and one-third that in the Mixteca Baja. Nevertheless, 55 percent of the labor input in corn was hired labor in Valsequillo, while households in Las Huastecas hired only 15 percent of the labor in corn production. Mechanization, primarily in land preparation, appears to have substituted for household labor rather than for hired labor.

The higher level of integration of Valsequillo into the market system, requiring heavier use of purchased inputs and of hired labor, does not appear to have increased agricultural incomes for the majority of households. Most had farm incomes well below those in Las Huastecas, a zone of traditional agriculture. What agricultural modernization accomplished was a significant decrease

in household farm labor inputs, thus freeing labor at the disposal of the household for alternative uses.

The Bajío, Guanajuato

The Bajío is by far the most urban and commercially developed zone of the four surveyed in this study. Most widely known for its silver mines, the Bajío has long been one of the most important agricultural areas of Mexico. Throughout the Spanish occupation, deep, fertile valley soils irrigated by the Lerma river provided good yields for both summer and winter grain crops, and the men and mules that labored in the mines offered a nearby market. Later, the Bajío became known as the "breadbasket of Mexico" and was the most important wheat region of the country until displaced during the 1950s by the irrigated areas of the coastal northwest. Like that of Valsequillo, the population retains few traces of Indian background.

Most economic activity in the zone is in agriculture, but the area also contains strong industrial, commercial, and service sectors. The city of Salamanca is the site of an important refinery and chemical complex, while Celaya is the major town serving the agricultural industry of the region. Transportation is excellent, and the survey area is traversed by the major highway linking Mexico City and Guadalajara. In addition, the cities of Queretaro and Leon in adjacent *municipios* are undergoing very rapid growth.

Prosperity has not benefited the population equally. Indeed, the marked and growing social and economic heterogeneity of the region has been commented on in several studies.[4] A high degree of rural stratification, manifested in wide disparities in farm size, capitalization, and farm income, makes averages over all farms meaningless. While both privately owned and *ejidal* farms are included in the study, when farm size is controlled no significant differences emerge between these two forms of land tenure. The data show that the main differences among farms are between the unirrigated and the irrigated farms and, within the latter category, between the small to medium farms and the large farms. Therefore, data on the 218 farms in this survey are grouped into four categories of farm type and size: farms with less than 25 percent of their land irrigated (72 farms); and three size categories of irrigated farms, 4.0 hectares or less (42 farms); 4.1 to 12.0 hectares (84 farms); and over 12 hectares (20 farms). While these proportions may not correspond exactly to current patterns of land use found in the seven *municipios* comprising the study zone, they are representative of the major types of agriculture practiced in the Bajío.

Table 2 presents data on the basic characteristics of farms in the four categories. The large irrigated farms are essentially capitalist enterprises, with an average value of agricultural capital per farm of 357,827 pesos. Seventy percent of these farms possess a tractor, in contrast to 26 percent of the medium farms and very few of the small or unirrigated farms. Cropping patterns also differ by farm size. A smaller portion of the land of the large farms is devoted to corn and more to wheat and sorghum, two highly mechanized crops. Yet, as shown for sorghum, the value of purchased inputs per hectare in each crop does

not differ significantly between irrigated farms of different sizes, an indication of the similarity of the technology employed on irrigated land. Tractors, owned or rented, are used in many phases of agriculture, and hybrid seeds, chemical fertilizer, fungicides, and pesticides are used regularly on small and large farms alike. If an *ejidatario* lacks the resources necessary to properly use this technology, he rents his land out, usually to a large private farmer. The portion of the total value of production taken by the renter varies from 30 to 80 percent, depending on the inputs that he provides. The prevalence of land rental makes the effective degree of land concentration in the zone even higher than suggested by the statistics on land ownership.

Incomes derived from large and medium-sized irrigated farms in the Bajío were high, but even on the small irrigated farms they exceeded those in the next most prosperous zone, Las Huastecas. All but 23 percent of the farms in the Bajío produced incomes greater than 5,000 pesos. However, the form that this income takes and the methods used to produce it are far different from those in Las Huastecas. Besides commercial crops, most corn produced in the Bajío is sold, even by farms in the unirrigated and small irrigated categories. Farms in Las Huastecas manage to generate relatively high levels of income by growing high-value crops without spending much money on labor and other purchased inputs; farms in the Bajío employ a capital-intensive technology and have to produce good crop yields just to break even on cash expenses. The farmer growing sorghum or wheat is dependent on the market for fertilizer, machinery, and labor; for the sale of crops; and for purchase of most necessities of household consumption. The year of the interviews was one of adequate rainfall, no early frosts, and few losses due to insects or crop diseases. But conditions are not always so favorable (crops in 1976–79 suffered from adverse weather and other factors), and even a partial crop loss can mean a large loss when the money costs of production are high. It is reasonable to assume that the high farm incomes in the Bajío during good years are realized at the expense of a larger year-to-year variability, although the survey data do not permit examination of this issue.

FIGURE 1 Seasonal pattern of household and hired labor on medium-sized irrigated farms in the Bajío

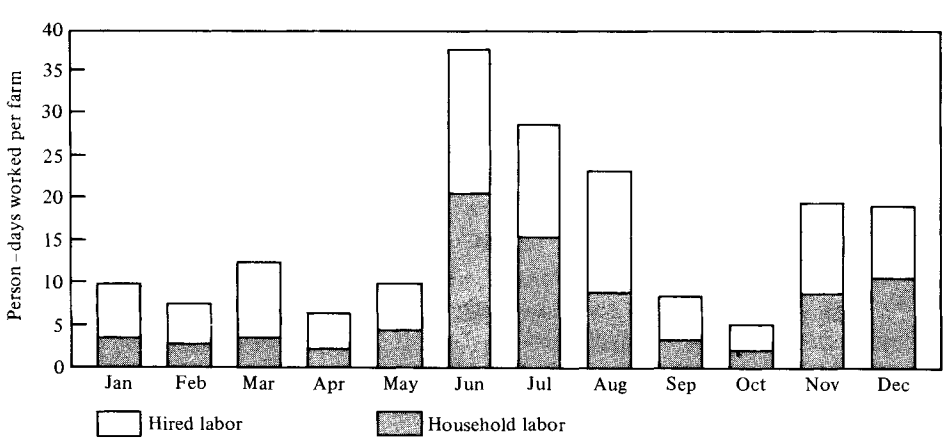


TABLE 2 Basic farm characteristics: the Bajío

Characteristics	Farm category			
	Unirrigated (72 farms)	Small irrigated (42 farms)	Medium irrigated (84 farms)	Large irrigated (20 farms)
Farm size (hectares)	17.4	3.4	7.8	55.8
Ejidal farms (percent)	44	74	93	10
Value of agricultural capital[a] (pesos)	$34,542	$21,004	$59,266	$357,827
Value of purchased inputs per hectare in sorghum (pesos)[b]	$862	$1,762	$2,104	$1,115
Land in subsistence crops (percent)	74	30	29	22
Share of corn marketed (percent)	84	95	87	98
Farm income (pesos)	$6,830	$21,282	$36,682	$319,059

[a]Agricultural capital includes the total value of fixed capital (pumps, etc.) and the value of animals.
[b]Purchased inputs include actual expenditures for fertilizer, herbicides, seeds, etc., but excludes machinery rental and hired labor.

TABLE 3 Farm labor: the Bajío

Item	Farm category			
	Unirrigated (72 farms)	Small irrigated (42 farms)	Medium irrigated (84 farms)	Large irrigated (20 farms)
Household farm labor	116	38	85	33
Hired farm labor	91	43	102	726
Total farm labor	207	81	187	759
Total labor per hectare	22	26	25	15

Complementing the information in Table 1, Table 3 presents data on labor use by farm categories in the Bajío. Labor inputs per hectare averaged 22 person-days per year, by far the lowest of all the zones studied. Per hectare labor input is lowest on the largest farms, which, of course, are the heaviest users of hired labor. These farms use less labor per hectare than the smaller farms because they grow less of the labor-intensive crop, corn. On the average, sorghum required 21 days of labor per hectare, wheat only 10 days, and corn 38 days. In addition, household farm labor inputs are relatively low in all farm strata, but particularly on the small and large irrigated farms.

Hired labor plays a pivotal role in the labor-allocation decisions of households in the Bajío. Figure 1 shows the seasonal pattern of household and hired labor use on the medium-sized irrigated farms, the largest and most representative category in the zone. These farms employ wage labor in all months, despite the fact that household labor inputs in June exceed total labor inputs in all but two other months. There are two complementary reasons why the

household may prefer to use hired labor even though it could provide these inputs internally. First, high household labor inputs in June and July correspond to the period of weeding, an activity in which women and children may contribute equally with men; second, household labor may be regularly employed in off-farm activities throughout the year, a proposition that will be examined in the next section. However, it is clear that hired labor does not play a purely compensating role in household labor allocation, making up the difference between seasonal farm labor demand and household labor supply.

This brief survey of the agricultural situation of four areas in Mexico emphasizes the importance of separating two potential effects of agricultural modernization. Agriculture almost inevitably becomes more commercialized; hybrid seeds, fertilizer, and machinery are substituted for more traditional inputs and a greater percentage of crop production is sold, linking the farm household much more closely to the market economy. Farm incomes may also rise, but only in regions where access to the improved inputs and infrastructure such as irrigation is not restricted to the large farms.

The separation of these concepts is important because they have had different effects on the allocation of household labor in the survey areas. The relatively high commercialization of farm production in Valsequillo and, especially, in the Bajío appears to have caused a reduction in farm labor inputs and a substitution of hired for household labor. Reliance on purchased inputs and marketed production probably also increased the year-to-year variability in farm income, in effect forcing households to seek additional forms of income to offset this risk.

At the same time, higher levels of farm income in the Bajío and Las Huastecas substantially reduced the risk that the household would fail to produce a subsistence level of income. Households in these zones could engage in types of off-farm economic activity that would not be undertaken with more limited resources, for the consequences of failure for household survival would not be as great. These two components of risk—income variability and the risk of falling below the subsistence level—will be seen to play a central role in determining the relationship between agricultural development and household labor allocation.

Off-farm employment, income, and migration

Table 4 compares farm and off-farm income and labor in the four zones.

The Mixteca Baja, Oaxaca

Out of the 259 person-days worked by the average household in the Mixteca Baja, 88 person-days, or 34 percent, were applied in off-farm income-producing activities. This off-farm labor produced an income of 2,329 pesos, bringing

TABLE 4 Off-farm income and labor in the four survey areas

Item	Mixteca Baja (67 households)	Las Huastecas (98 households)	Valsequillo (99 households)	The Bajío (198 households)[a]
Income (pesos)				
Farm	2,639	16,816	21,487	22,306
Off-farm	2,329	4,211	12,293	12,257
Total	4,968	21,027	33,780	34,563
Labor (person-days)				
Farm	171	275	78	86
Off-farm	88	139	253	101
Total	259	414	331	187
Off-farm labor days as *jornalero* (percent)	72	100	63	23
Average number of adults per-household (over age 16)	3.1	3.3	3.7	5.4

[a]Excludes 20 households possessing large irrigated farms.

total household income to the (still very low) figure of 4,968 pesos. Most households in the sample were poor and earned close to the average level of household income for the zone. Thus wage income formed a critical supplement to farm income for most households; 69 percent of all households engaged some of the labor at their disposal in a gainful activity other than farming their own parcel of land. Most off-farm labor was local agricultural wage labor, paying 15 to 20 pesos per day. Seventy-seven percent of the off-farm labor days were employed within the same *municipio*, a reflection of the difficulty of transportation in the region and the uniformity of wages throughout the zone.

As might be expected in a region with limited income-earning opportunities, permanent outmigration is a fairly regular feature: 43 of the 75 *municipios* in the larger Mixteca region lost population between 1960 and 1970 (Aguilar, 1974; Butterworth, 1975), largely due to the migration of young people to Acapulco or Mexico City. About one-fourth of the households in the sample had members working outside the zone at the time of the interview. Perhaps because of this, household size in the Mixteca Baja was the smallest of the four zones, averaging about 5.3 persons, with 3.1 of these over 16 years old. There was no circular migration to the United States, which is not surprising given the geographic and cultural distance separating the two societies and the lack of resources to finance the journey, the border crossing, and the necessary job search.[5]

Las Huastecas, San Luis Potosí

Wage labor plays a less significant role in Las Huastecas than in the other three zones. This is not surprising since household farm labor input and farm incomes are relatively high. During the study period off-farm labor was 34 percent of total household labor, but much of this labor was in unpaid community service still common in some indigenous regions of Mexico. Few households worked off-farm to earn money, and the income contributed by off-farm labor is only about 20 percent of total household income. The share of off-farm labor to total labor tends to be higher for households with greater numbers of adult workers and for households with lower farm incomes. The number of days worked in off-farm labor is distributed evenly over the year, with monthly variations in total household labor due almost entirely to variations in farm labor input.

Most off-farm labor is agricultural, and 63 percent of this occurs in the *municipio* in which the household resides. None of the households in the sample had members who had worked in the United States during the study year, despite the proximity of the zone to the border. Agricultural wages in the surrounding region, at 64 pesos per day, exceeded local agricultural wages of 31 pesos per day for work in the *municipio*, and households whose members engaged in work outside the *municipio* tended to invest more days in this activity than did households whose members worked locally. This difference probably reflects the less casual nature of regional *jornalero* labor; the higher costs of travel and job search are presumably overcome by higher wages and longer periods of labor. In addition to this salaried labor by persons living with the household head at the time of the interview, 18 households had members working in another area who had sent remittances during the year, averaging 2,135 pesos per migrant household.

The pattern of labor allocation that emerges in Las Huastecas is thus heavily weighted toward intensive use of on-farm labor, with less permanent migration but more regional circular migration and commuting than in the Mixteca Baja. Earning off-farm income is less critical to most of the households in Las Huastecas, where farm incomes are relatively high and purchased inputs are kept to a minimum. Most households are able to earn sufficient cash to meet their minimal needs by growing sugarcane or coffee on a portion of their household land.

Valsequillo, Puebla

Valsequillo has been shown to be a more commercial agricultural zone than either Las Huastecas or the Mixteca Baja. But farm incomes are low for the majority of households, while levels of purchased inputs are higher than in either of the two indigenous zones. This creates the need for off-farm income, and much lower farm labor inputs and a higher proportion of hired labor allow households to devote the majority of their time to off-farm labor. Households in Valsequillo allocated 76 percent of their work time to wage labor during the survey period.

The large farms cause the averages to understate the importance of off-farm income to the majority of households in Valsequillo. For the 70 households with more than one-fourth of their total income earned off-farm, farm income averaged only 4,180 pesos, and four out of five households received income from wage labor.

Off-farm labor for the average household was divided between agricultural wage labor and a wide variety of unskilled employment, including construction and domestic labor. Of the average household's total of 253 person-days of off-farm labor, 63 percent was employed in agriculture. Workers in nonagricultural occupations worked more days per year and earned a higher average income, 48 pesos per day, as opposed to 37 pesos per day for agricultural laborers.

Only about 20 percent of off-farm labor occurred outside the *municipio*. Households whose members worked in other *municipios* did not tend to record more working days than those whose members worked entirely within the *municipio*, possibly reflecting the good transportation network, which makes local travel comparatively easy. In addition to earning wage income locally, ten households received remittances from temporary and permanent migrants, averaging 6,966 pesos per migrant. None of these migrants worked in the United States.

The Bajío, Guanajuato

Table 5 summarizes the off-farm income and labor for the 218 households surveyed in the Bajío. Wage income was a significant portion of total household income for all but the largest category of farms. Two-thirds of the households in the sample engaged in wage labor, and for these households wage

TABLE 5 Household income and labor: the Bajío

Item	Farm category			
	Unirrigated (72 farms)	Small irrigated (42 farms)	Medium irrigated (84 farms)	Large irrigated (20 farms)
Income (pesos)				
Farm	6,830	21,282	36,082	319,059
Off-farm	9,386	6,879	11,552	20,512
Remittances	1,299	2,136	1,705	—
Total	17,515	30,297	49,339	339,571
Labor (person-days)				
Farm	116	38	85	33
Off-farm	100	110	90	132
Total	216	148	175	165
Off-farm labor days as *jornalero* (percent)	29	25	15	—
Percent of *jornalero* labor worked in				
Municipio	64	72	60	—
Mexico, other *municipios*	16	—	7	—
United States	20	28	33	—

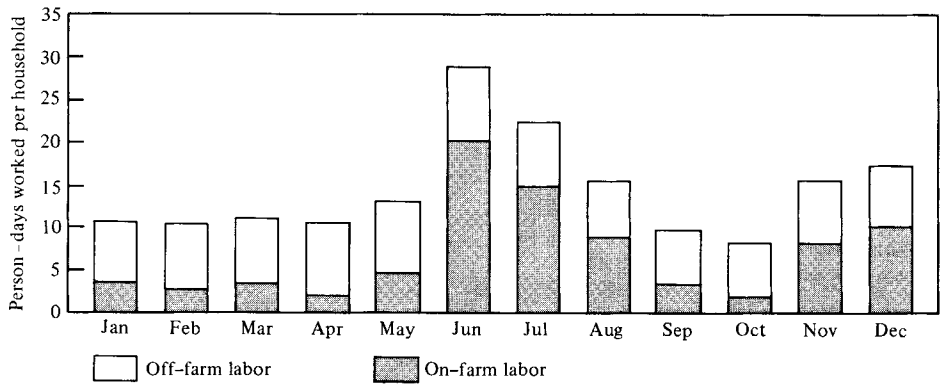
income was between 26 and 44 percent of total income. Remittances were also important to the three smaller categories of farm, with more than one-fourth of the households in these categories receiving remittances averaging 5,936 pesos.

Agricultural wage labor is a much less important component of off-farm labor in the Bajío than in the other zones because of the diversified economy. Households with large irrigated farms recorded high wage incomes because their members often held full-time positions as professionals or in commercial enterprises.

Perhaps the most striking characteristic of household labor in the Bajío is its low absolute amount: household labor for all categories in the Bajío averaged only 183 person-days per household, compared with 331 days in Valsequillo, 414 days in Las Huastecas, and 259 days in the Mixteca Baja (see Table 4). Households in the two indigenous zones worked more on-farm than in the Bajío, while those in Valsequillo worked more off-farm. Certainly the higher incomes from farm production in the Bajío were instrumental in reducing the need for wage income, but the fact that two-thirds of the households in this zone engaged in off-farm labor indicates its importance in supplementing farm income.

The seasonality of on-farm and off-farm labor reveals the role played by off-farm labor in total household labor allocation. If off-farm labor were to vary inversely with farm labor, this would indicate that the household subordinated its off-farm labor to farm labor demands. Figure 2 shows that monthly off-farm labor did not vary much for the medium category of irrigated farms, most representative of the average farm in the sample. Thus off-farm labor played an independent role in total household labor allocation; households worked a rather constant amount of time off-farm each month, and during months of high farm labor inputs they hired labor to enable them to continue working in these activities (see Figure 1).

FIGURE 2 Seasonal allocation of household on-farm and off-farm labor for medium-sized irrigated farms in the Bajío



Circular migration in the Bajío was more common than in any of the other zones studied. Data on the location of household members indicate that about 40 percent of the 622 males of working age lived apart from the household head. Over half of these were in the same village, but a significant number were also found in the local cities of Celaya and Salamanca (7 percent), in Mexico City (3 percent), and in the United States (5 percent). These men could have been engaged in either circular or permanent migration, but the fact that they maintained a relationship with the household by either sending remittances or helping with farm work supports the thesis that they were probably absent only temporarily.

Survey respondents were asked to approximate the number of days worked by household members as agricultural laborers in different locations. Table 5 shows that the United States was the most frequent destination for *jornalero* labor outside of the *municipio* of residence.

Table 6 presents data on the differences between households that had members who had worked in the United States and those that did not, excluding the large irrigated farms, which sent no members to the United States. These two groups are not significantly different with respect to the major economic variables—farm size, farm income, purchased inputs per hectare, off-farm income, or off-farm labor; however, of great interest, households that sent migrants to the United States had an average labor force (males age 16 or more) that was 46 percent larger than those that did not, a difference that is statistically significant at the .001 level. The implication is that a larger household labor force permits a diversification of income sources that offsets the increased risk of migration to the United States.

This analysis indicates that circular migration to the United States would only be undertaken by households with multiple sources of income, which would not be too dependent on this risky income source alone. Moreover, households in the Bajío are larger than those in the other zones.

TABLE 6 Mean values of selected variables for households with and without members working in the United States: the Bajío

Variable	Households with US labor (N = 30)[a]	Households without US labor (N = 168)[a]	Level of significance of difference in mean values[b]
Farm size (hectares)	8.4	10.7	.586
Farm income (pesos)	$21,131	$22,515	.936
Value of purchased inputs per hectare (pesos)	$1,409	$923	.590
Off-farm income (pesos)	$10,138	$9,708	.935
Remittances (pesos)	$4,173	$1,198	.001
Off-farm wage labor (person-days)	75	52	.245
Education (years)	9.1	8.7	.810
Male labor force (persons)	4.1	2.8	.001

[a]Excludes the 20 large irrigated farms.
[b]T-test of pooled variance.

It may be postulated that households in the Bajío are larger *because* farm income is higher, permitting more members to share in the income from farm production.[6] The incorporation of adult members into the extended household, combined with low farm labor requirements, allows one or more household members to work almost entirely off-farm. Enjoying the security of the extended household and a share in farm production, household members can leave the community for long periods of time. Total household income is increased by their remittances, and the larger extended household permitted by higher farm income enables them to choose these relatively more risky off-farm alternatives. By contrast, in Valsequillo, farm incomes are lower and there are fewer adult members in each household, so that the failure to obtain a job in a more distant location could have serious consequences.

Discussion

The data presented in this study cast doubt on some of the distinctions often perceived between traditional and modern agriculture and on the common explanations for rural outmigration. Households in each of the four survey zones work a significant amount of the time off-farm and use hired labor to permit them to continue to engage in off-farm economic activities even in months of heavy farm labor inputs. Thus off-farm labor is not a residual that absorbs part of the difference between household labor supply and farm labor demand. Rather, the household makes simultaneous decisions concerning the allocation of farm labor between household and hired labor, and the allocation of household labor between on-farm and off-farm labor.

This conclusion has important implications for the validity of simpler theories relating agricultural development and migration. If off-farm employment does not vary inversely with household farm employment and farm income, this calls into question the assumption that a lack of agricultural development triggers increased circular migration, and that circular migration, in turn, leads to permanent migration as urban opportunities expand and rural opportunities decline relative to the size of the rapidly growing population.

Two potential consequences of the concept of agricultural development, increased commercialization and higher farm incomes, have been shown to be important factors in the determination of household labor allocation. Agricultural commercialization, loosely defined as the substitution of purchased inputs, commercial crops, and marketed production for traditional farming, unequivocably has caused a decline in total farm labor inputs in the Bajío and Valsequillo and in the portion of these inputs contributed by the household. However, only where local agricultural conditions are favorable, as in the Bajío, can small farms raise farm incomes by participating in this improved technology. Agricultural development is not invariably associated with higher farm income. In Valsequillo, modern technology fails to produce adequate levels of income for most farms and serves only to reduce household labor inputs. In contrast, farm incomes are relatively high in Las Huastecas because the soil

and climate permit high-value crops to be grown with minimal levels of purchased inputs.

Agricultural development, through its potential impact on farm income and the commercialization of agriculture, also has been shown to have different effects on the types of risk associated with total household income and therefore on the allocation of household labor to different off-farm activities. Higher levels of purchased inputs and the substitution of commercial for subsistence production link the household closely to the market economy, increasing the fixed monetary costs of production and the potential variability of farm income. Higher farm incomes, on the other hand, decrease the risk that the household will earn an income below subsistence level.

These concepts may be used to explain the patterns of household labor allocation observed in the four zones. In the Mixteca Baja, primitive techniques on poor soil yield insufficient farm incomes for the bare necessities of a small household; and with few local opportunities for wage labor, young people often migrate permanently to cities in which networks of migrants from the local area live. Farm incomes are too low to finance the riskier alternative of circular migration to other areas, especially to the United States. In Las Huastecas, farm production yields a relatively high income with few purchased inputs. The necessity for wage labor is reduced by minimal household cash requirements resulting from the low commercialization of agriculture, and heavy inputs of household labor leave little opportunity for extended stays away from the farm. Clearly, farm income plays an important role in determining migratory patterns in these two zones of traditional agriculture. Were the analysis to stop here, it might be concluded that rising farm incomes would decrease migration.

The patterns of household labor allocation observed in Valsequillo and the Bajío provide little support for this conclusion. Both of these zones are much more commercially developed than the two indigenous zones, yet farm incomes are low in the former and high in the latter. The monetization of production in these zones has increased both the relative importance of off-farm labor and its diversification. However, circular migration is not an important component of the off-farm labor mix in Valsequillo, while in the Bajío circular migration, especially to the United States, is quite common.

The function of farm income in reducing the risk of obtaining below-subsistence income is central to an explanation of the differences in patterns of labor allocation between these two zones. While households must work off-farm in Valsequillo to earn an adequate income, they cannot afford to undertake the substantial investment needed to support a circular migrant and the risk that he will not quickly obtain a job and send remittances. Therefore, they work locally for long periods in a variety of occupations. Households in the Bajío use higher levels of farm income to support circular migrants, generating more off-farm income and partially offsetting the risk associated with their greater dependence on monetary sources of income. The total portfolio of income-producing activities is the important consideration; higher farm incomes

permit the relatively risky alternative of United States migration, while this activity produces high cash income and may reduce the variability of the total income portfolio.[7]

These conclusions are of course tentative, for they are based on assumptions about the relative riskiness of farm income and particular types of off-farm employment in the four zones, and on incomplete data on labor migration. Yet the data on agrarian structure and patterns of off-farm labor allocation indicate clearly that the simple preconceptions that often guide policy do not apply. Circular migration has emerged in the Bajío as an integral part of a complex response to agricultural change, while other patterns of labor mobility in the other zones resulted from their particular circumstances. In order to understand this response, it was necessary to specify the impact of agricultural change upon purchased inputs, crop composition and seasonality, marketed production, hired labor, farm income, and household composition. While other explanations of the data may prove equally useful, it is clear that no general theory of a mobility transition can be applied to a region without an examination of its agrarian structure.

Notes

This paper is based on a report prepared for the US Department of State and the Employment and Training Administration, US Department of Labor, entitled *Agrarian Structure and Labor Migration in Rural Mexico: The Case of Circular Migration of Undocumented Workers to the U.S.* The research was a collaborative effort of the Institute of Latin American Studies, The University of Texas at Austin, and the Centro de Investigaciones Agrarias, Mexico City, and benefited greatly from the assistance of Gustavo Treviño Elizondo and discussion with Ina Dinerman.

1 The fieldwork in the Mixteca Baja, Oaxaca; Las Huastecas, San Luis Potosí; and Valsequillo, Puebla was conducted in 1974 as part of a project examining the conditions of employment in rural Mexico; the results were published in three volumes (Barbosa Ramírez, 1976, 1977, 1979). They were conducted by the Centro de Investigaciones Agrarias, a Mexican organization with a long history of independent research on Mexican agricultural problems. The data utilized in this study on these three areas are based on random samples, within farm size categories, of the original questionnaires of landholding households. Extensive data were collected on agricultural production and agricultural labor, distinguishing between household and hired labor and household off-farm employment. Migration emerges in this data as the location of off-farm employment during the year 1973, or through remittances sent by a household member from employment elsewhere, allowing circular migration to be explicitly examined.

I was the director of the Bajío fieldwork, which was a collaborative effort of the Centro de Investigaciones Agrarias, the Comisión Coordinadora del Sector Agropecuario, the Instituto Nacional de Investigaciones Agrícolas, and the Ford Foundation. A sample of 218 farms in the seven *municipios* (a geographic division of governmental authority similar to a county in the United States) of the survey area was selected and data collected on farm production, income, costs, and labor, and on household off-farm employment. The labor data were exhaustive: they included the number of days worked by each household member, as well as by hired labor, machinery, and animals on the household plot, broken down by crop, month, and type of labor activity (planting, weeding, etc.), and off-farm labor for each household member by occupation. The definition of the household encompassed all persons living with the household head who contributed income from off-farm sources to

the household or worked on the household's land. Thus migrants, circular or permanent, were captured if they either returned home and worked or sent remittances.

2 Subsistence crops are defined separately for each zone to account for regional differences in consumption habits, but the majority in each zone consists of corn and beans. The percent of cultivated land in subsistence crops that appears in Table 1 and the text is the proportion of cultivated land in these crops to total cultivated land for each household, averaged over all households. It may differ from that calculated from the data for the composite farm because the latter is influenced by farm size.

3 The value of production for each crop is derived consistently in the four survey areas by multiplying total production by the unit price of that portion which was sold, or if none was sold, by the unit price received by nearby farms in similar circumstances. Farm income includes the sum of these values for all crops less their direct cost of production, plus other sources of farm income such as sale of dairy products, eggs, or cattle. Imputed costs for items such as capital, household labor, and land are not included.

4 Barbosa-Ramírez (1973) characterized the Bajío as a polarized agricultural zone; Baring-Gould (1974) emphasized the growing gap between the *ejido* community and modern agriculture; and Díaz-Polanco and Montandon said it is a "zone where relatively modern agriculture and a dynamic modern commercial sector are combined with peasant communities at various levels of development" (1977:9).

5 Arizpe, in her study of migration from rural Mexico to the United States, wrote, "in Oaxaca, Young did find that the poorest migrated, first expelling children, then as whole households, but practically all went only so far as Mexico City or Oaxaca City" (1981:643).

6 Dinerman, in a study of US migration from two villages in Michoacán, Mexico, noted that "migration tends to maintain, if not create, a preference for a particular form of household organization, the extended household" (1981:76).

7 A relatively risky asset may reduce the risk of a portfolio of assets by having its returns uncorrelated with the returns of the other assets (Markowitz, 1959). In this sense, US migration might reduce the risk of the household income portfolio, although the returns from this activity alone might be expected to be quite variable.

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