Strategies of Mexican Rural Communities to Entry in the Local and Global Markets

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This paper highlights the main features of the economy of rural households in Mexico and analyzes their strategies to entry in local and global markets. It built a model of household economies using ordinary least squares regression with data collected through a probabilistic survey in four communities. Especial care was taken to avoid multicollinearity problems. The study communities are situated in Oaxaca state, Mexico in two contrasting climatic environments that present different conditions to access the markets. The resulting model not only identifies the households' market strategies but also measures the impact of households' decision-making about allocation of resources on the household wellbeing. Contrary to the discourse on Mexico-US migration, this paper shows that the rural households' labor for international migration is shrinking. A process of diversification of income sources is already going on in rural areas, therefore, households rely increasingly on wages, family businesses, and government transfers; besides, they complement their income with subsistence production and transfers from other households. Finally, it was found that in some cases the simultaneous allocation of material and socio-demographic resources to economic activities and labor markets could restrict the increase in household wellbeing if the demographic structure is already altered.

Keywords: market strategies, impacts on household wellbeing, restrictions to allocation of resources

Introduction

This paper analyzes the participation of rural communities of Mexico in local and global markets and specifically in the state of Oaxaca where small-scale rural producers are the majority. Rural communities are integrated to the market economy in general through the sale of family labor, agricultural production surplus, and crafts. Rural households not only obtain wages in their communities and the nearby communities but also

remittances by exporting labor to other parts of Mexico and the United States. Exports of goods are less frequent, such as coffee beans, processed products (mezcal, Oaxacan cheese, chocolate, and tortillas), and crafts. Coffee is usually sold through the middlemen at low prices; mezcal is produced in a traditional way and sold in bulk, although some producers begin to register trademarks. The economy of most rural households is based on production of basic staples, wages, remittances, and transfers. Family businesses, small-scale commercial agriculture, and exportation are emerging sources of income. Thus, rural households are struggling to diversify their income sources; at the same time, they invest in human resources to increase their income and in social capital to secure an eventual source of income.

This paper analyzes the strategies of rural producers to entry into the markets and to improve their household economies situated in most cases in some point between peasants and emerging entrepreneurs. A theoretical model of the rural household economies was formulated and was tested in communities with different climatic conditions and market opportunities. Thus, households of Barda and Tepehuaje in the Central Valleys region are endowed mainly with seasonal agricultural land and are relatively close to regional markets. In the Sierra Norte region, the households of Otatitlán and Yatoni possess cloud forest and agricultural humid lands. Equations provide information of successful strategies of rural households, which are assessed through the direct contributions to household wellbeing. These contributions are the outcome of the households' allocation of their material and socio-demographic resources to family businesses, subsistence production, and labor markets. In addition, equations can identify restrictions to allocation of resources related to community demographic structure, income oriented to savings, investment, and unprofitable activities. The paper shows that the model of rural household economies is a useful tool to analyze rural economies considering multi-sectors and to identify household strategies to entry in the markets.

Resources of Rural Households

The resources of households include: labor, human capital, surplus production, government transfers, and social capital.

Household Labor

The household labor is grouped into two categories, i.e., labor force and other household members. The labor force obtains wages, income in kind from the family business and subsistence production. Children, single adult women, female heads of household, and elderly people participate part time in productive activities. In addition, women perform domestic activities and specifically the female head participates in the management of household resources and education of children. The main function of the household labor force is to earn income as breadwinners. The other household members misnamed by international economic organizations "not economically active" actually contribute partially to obtaining the household income and to maintaining the overall efficiency of the household. The sale of household labor in labor markets is the most common strategy of rural households to earn money and it reaches deeper into the market economy at national and international levels. Rural communities usually offer jobs, *LW* and meet partially the local demand of employment. Nearby communities also supply jobs, *RW* that supplement household income, *HI*. However, *LW* and *RW* often are not enough to cover the household goals of consumption (wellbeing). Another strategy of households to increase their income temporarily is to send members of their labor force to the national markets where there are more job opportunities and better wages. In this way, households can raise their level of

consumption and purchase inputs for agricultural production by means of internal remittances, *RN*. Unfortunately not always the national labor markets are a good option for rural migrants, as wages for low-skilled labor tend to be normally low. This is because the abundant supply of labor from rural areas depresses urban wages. In fact, job supply in Mexico cannot meet the demand of the growing labor force. Another alternative is migration to the United States and in some cases to Canada. In these countries, wages are considerably higher for low-skilled labor than in rural and urban areas of Mexico. Thus, Mexican migrants in these countries may be able to send international remittances, *IR*, to their households and meet the wellbeing goals and investment needs. However, the United States with the largest labor market on the planet but at the same time with hard anti-immigration policies is not the paradise. For undocumented Mexican migrants, to obtain income abroad can be hazardous and endangers their physical integrity.

Surplus of Agricultural Production

Rural production is predominantly primary and self-consumption oriented. To a lesser extent, there are small-scale commercial businesses, *NIC*. Of course, there are few large farmers oriented domestic and international markets, representing the rural power structure. When there is availability of irrigation, green vegetables, winter beans, fruit trees, flowers, and forage are grown. In the mountains, coffee and sugar cane are other examples of cash crops on a small scale, *NIA*. The Achilles heel of small rural producers is market access. Small production volumes often minimize the profits of producers due to transportation costs and the difficulty in accessing markets. However, production income represents a source of cash, food, and supplies for the rural households so this resource could be more important than wages.

Government Transfers

Households receive government transfers, *GT*, to compensate the imperfections of the market economy that in Mexico maintain around half of population in poverty and to control social movements. Thus, poor households can receive transfers to complement their budget and to afford school expenses of their children, care of elderly people, and food staple production. Besides, they secure nutrition of school children, among others. Most government transfers are given in cash and some government programs also include food.

Social Capital

In Mexico, the social capital, *SC*, is linked to cronyism (*compadrazgo*), the Catholic church, relatives, friends, and the community. The Catholic religion, *Catrel*, and compadrazgo are two inseparable pieces of the cauldron where the social practices of reciprocal gifts, normally linked with religious rites, are carried out between households. Thus, a household can receive gifts from migrant relatives and friends, which reduces the burden of the costs of family parties, death of a member, and Christmas celebrations, among other family events. At the individual level, a godchild can receive cash gifts and soft loans from his godfather to migrate to the United States. The community can also receive remittances from organizations of migrants situated in Mexican or foreign cities for construction and maintenance of public works and to defray expenses of the saint festivities. Therefore, the material social capital of households can be measured as the sum of the gifts received from other households, *TOH*. Sometimes Protestant churches, *Protrel*, play an important role in the communities, so social capital appears to be related to these churches.

Human Capital

Annual expenses of children attending school in the long run are the major single indicator of human

capital of households, *HC*. However, in the short term these are considered as expenses and become part of the household wellbeing. In addition, in the household labor section, it was discussed the contribution of the other household members to the household income and, in turn, such contribution can impact positively household wellbeing. Therefore, other household members can be considered as a part of human capital because the members of this category may contribute with part-time productive labor and also receive government transfers, which raise household income and the overall efficiency of the household. Indicators of human capital are: average age of household, *Avage*; average schooling of household, *Avsch*; household size, *HS*; number of men, *Nmen*, or number of women, *Nwom*; number of international migrants, *NIMig*; and number of internal migrants, *NNM*, among other socio-demographic characteristics.

The Theoretical Model of Rural Household Economies

The Economic Framework of Rural Areas

Rural development refers to the desirable welfare condition of the inhabitants of a territory considered rural and aims to improve the standard of living of the people through local participation processes and by taking advantage of their own resources (Guzmán, González de Molina, & Sevilla de Guzmán, 1999; Herrera, 2013). In this sense, this paper is centered on the household economics and the household strategies to entry in the markets.

The classic economic development proposes moving towards an ideal future based on the paths of rich industrialized countries, which exclude traditional or backward forms of production; in this manner, "social practices in rural areas tend to be replaced by others which underlies the idea of change" (Herrera, 2013, p. 132). As rural development implies different variables involved in production, it is necessary to consider holistically socio-economic, technical, production, training, and organization aspects (Cabello Palacios, 1991). Weitz (1981) synthesized this idea through integral rural development, which makes emphasis on eradication of poverty by meeting basic needs of the population. This can be achieved by means of an increase in productivity, but also it should be considered if it was necessary redistribution of the means of production. This view should be taken into account in Latin America and the Caribbean regions where the problems of poverty and rural production lags are present. However, economic development could contribute to increasing social inequality if compensatory public policies are not considered. This situation constitutes an incentive for migration covering mainly rural population of working age; as a result, it is an evident aging population in rural areas. Dirven (1995) referred the beginning of this trend in the 90s when the number of rural youth used to decline both in absolute and relative terms; this makes hard to achieve the expectations of development in rural areas. However, the relationship between poverty and labor market at the household level has several implications. The work reflects the dynamics of the population because most of the money income of poor households originates at work (70%) and also affects the evolution and decrease of income in households and the consequent process of change in the relation between population and development (Lagos & Arriagada, 1998). Labor markets in rural areas in the 70s and 80s were referred to agricultural activities, which provided financial support for rural people as posed by Chayanov (1985) at the end of the first quarter of the twentieth century. In the 90s, agriculture began to lose its position as the main economic activity because the secondary and tertiary activities were incorporated; thus, it was possible to diversify the occupation of the more literate labor force, which had access to technology and media (Arias, 1992).

In the context of global changes, rural labor markets are changing. Rural areas have a different labor force to that it prevailed in previous decades. Now there is more female participation, higher level of education, and

access to telecommunications and mobility among regional, national, and international markets. Consequently, there is an increase in economic activities, although there is an increase in income of rural households, the working conditions are lacking of benefits and full time work (Chong, Herrera, Chávez, & Sánchez, 2015).

The Model

Therefore, it is possible to state a general equation of the household economy that includes the variables already discussed. Household income, *HI*, is defined as sum of all incomes obtained by household members from labor markets, financial markets, family businesses, subsistence production activities, transfers from government, *GT*, and transfers from other households, *TOH*. Household incomes associated to financial markets are mainly such as savings, *Sav*, and loans, *Lo*. There are various types of family businesses producing net incomes, such as small-scale manufacture businesses, which also include crafts, *NIM*; commercial businesses, *NIC*; services businesses, *NIS*; and businesses of production from animal origin food, *INBAF*. Agriculture can be either small-scale commercial or subsistence orientated, so net income of agriculture, *NIA*, refers to both activities. Other subsistence production activities that must be considered are backyard livestock, *NIL*, and collection activities, *NICA*. Incomes from labor markets were already discussed in section "household labor".

$$HI = LW + RW + IR + NR + NIM + NIC + NIS + INBAF +$$
$$NIA + NIL + NICA + a_1 Sav + Lo + GT + TOH \qquad (1)$$

In addition, being *HI* the household budget, this can be allocated to consumption (*C*), investment (*Inv*), and Savings (*Sav*):

$$HI = C + Inv + Sav \qquad (2)$$

Because savings, *Sav*, are not always available for consumption or investment, it must multiply this variable by a real scalar a_1 to be considered in the household income equation (1). To define household wellbeing, *HWB*, it is necessary that *Sav* and investment (*Inv*), allocations must be discounted from *HI*. In addition, variables of human capital and social capital from sections "Social Capital" and "Human Capital" are added to equation (1) to provide a further explanation about the sources of income that determine *HWB* through the socio-demographic characteristics of household. The following equation of *HWB* was defined in a previous paper (Gijón-Cruz & Reyes-Morales, 2016) and this was obtained from equations (1) and (2) after equalizing *C* = *HWB* and carrying out various simplifications:

$$HWB = \propto_0 + \propto_1 LW + \propto_2 RW + \propto_3 IR + \propto_4 NR + \propto_5 NIC + \propto_6 NIA + \propto_7 NIL + \propto_8 NICA +$$
$$\propto_9 NIM + \propto_{10} NIS + \propto_{11} INBAF + \propto_{12} Sav + \propto_{13} Lo + \propto_{14} GT + \propto_{15} TOH + \propto_{16} Avsch +$$
$$\propto_{17} Avage + \propto_{18} HS + \propto_{19} Nmen + \propto_{20} Nwom + \propto_{21} NIMig +$$
$$\propto_{22} NNM + \propto_{23} Catrel + \propto_{24} Protrel \qquad (3)$$

In this equation, coefficients $\propto_i$, where $i = 0, 1, 2, \ldots, 24$, allow the sum of independent variables with different scales and also determine the useful proportion of each one in the equation.

Strategies to Entry in the Market Economy to Obtain Cash and Raise Household Income

Besides selling household labor and buying goods and services, rural households enter in the market economy selling their production surpluses and using the financial services. In addition, investment in family businesses allows obtaining cash and the investment in subsistence activities provides food. Finally, investment in children's education will increase household income through better wages.

Allocation of Household Labor to the Market

Wages and remittances obtained from the labor markets sustain households' current level of consumption and may provide extra liquidity for savings and investment.

Investment in Subsistence Production

The vast majority of rural households in Mexico invest in subsistence production including basic crops, backyard livestock, and collection activities. These activities produce profits in kind and its value is estimated at the retail market prices. When there are small surpluses for the market, the monetary income appears. In fact, subsistence production is a priority strategy as it secures food for the household.

Investment in Family Businesses

After satisfying priorities, household income surplus can be used partly to raise the level of household wellbeing (consumption) and partly for savings and investment. Thus, when household income covers the basic consumption requirements and also there is available liquidity, then it is possible to invest in a business, which is a source of monetary income additional to wages, remittances, government transfers, and transfers from other households.

Investment in Human Capital

Rural households usually invest less in their children's education than urban households. However, rural households may invest more in education when it becomes a strategy to increase the household income and social mobility. Even an increase in household size will allow the availability of more household members who can also produce income through the household production, labor markets, or government transfers. Thus, human capital is not only associated to education but also associated to household size, if this is, at the same time, part of a strategy to entry in the market economy to obtain better wages.

The Empirical Model of Rural Household Economies

Equations of the Model

The equations of the model of rural household economies (MRHE) were constructed with a database obtained through a probabilistic survey in four rural communities of Oaxaca state. The sample size of households in each site was 25. Households were selected by random sampling in three steps. Otatitlán de Morelos and San Bartolomé Yatoni are located in a rainy mountainous area of Sierra Norte region; these communities will be named just Otatitlán and Yatoni henceforth. Tepehuaje and Barda Paso de Piedras—last community will be named Barda—lie in Central Valleys region, which has an irregular summer rainy season. While Otatitlán and Yatoni are relatively isolated, Tepehuaje and Barda are rather close to regional markets. The four communities allow us to analyze various characteristics of rural households economies in Mexico that can be advantages or restrictions to entry in the local and global markets. The MRHE involves five community equations, which are significant for ANOVA (analysis of variance) and t tests ($p < 0.05$); multicollinearity diagnosis showed that the variance inflation factor (VIF) is less than 7.538, so problems of multicollinearity are not significant (Norusis, 1990; Fornaroli, Cbrini, Zaupa, Bettinetti, Ciampitiello, & Boggero, 2016). The equations of Tepehuaje and Barda are non-linear and those of Otatitlán and Yatoni are linear. The values of R^2 of the five equations are in the interval (0.912, 0.971) and values of $R^2_{adjusted}$ in the interval (0.895, 0.960), so the degree of explanation of these equations is high. The regression equations follow the notation of algebraic equations; therefore, products of variables by scalars are not indicated. Significance values appear below each term of regression equations within parenthesis and further down the beta values are within brackets.

Tepehuaje Equation

$$HWB = 64{,}181.894 NIM + 32{,}689.153(1.000285)^{NIL} + 2.442 x 10^{-12}(1.000561)^{GT}$$
$$(0.000) \qquad\qquad (0.000) \qquad\qquad (0.000)$$
$$[0.683] \qquad\qquad [0.644] \qquad\qquad [0.332]$$

$$-0.391 IR - 0.002(71.705)^{Nmen} - 0.001(1.000944)^{NICA}$$
$$(0.046) \qquad (0.001) \qquad\qquad (0.000)$$
$$[-0.179] \quad [-0.252] \qquad\qquad [-0.334]$$
\hfill (4)

$$R^2 = 0.946, R^2{}_{\text{adjusted}} = 0.928 \text{ and } F = 52.812 \ (p < 0.000)$$ \hfill (4a)

Barda Equations

$$HWB = 0.876 NR^2 + 1.06 x 10^{-13}(1.000577)^{GT} + 1{,}986.331 Avsch + 0.00031(1.00025)^{NIL}$$
$$(0.000) \qquad\qquad (0.000) \qquad\qquad (0.001) \qquad\qquad (0.008)$$
$$[0.820] \qquad\qquad [0.537] \qquad\qquad [0.365] \qquad\qquad [0.195]$$

$$- 0.381 W - 0.5971 NIL - 4.228 TOH$$
$$(0.040) \qquad (0.000) \qquad (0.000)$$
$$[-0.146] \qquad [-0.354] \qquad [-0.447]$$
\hfill (5)

$$R^2 = 0.971, R^2{}_{\text{adjusted}} = 0.960 \text{ and } F = 85.659 \ (p < 0.000)$$ \hfill (5a)

$$HWB = 52{,}278.345 Catrel + 31{,}941.871 NNM - 58.045 Lo - 581.078 Avage$$
$$(0.000) \qquad\qquad (0.001) \qquad\qquad (0.055) \qquad\qquad (0.000)$$
$$[1.460] \qquad\qquad [0.309] \qquad\qquad [-0.162] \qquad\qquad [-0.723]$$
\hfill (6)

$$R^2 = 0.912, R^2{}_{\text{adjusted}} = 0.895 \text{ and } F = 54.152 \ (p < 0.000)$$ \hfill (6a)

Otatitlán Equation

$$HWB = 2{,}874.504 Avsch + 4.558 NIC + 1.216 INA + 1.839 Sav + 8.245 INL - 95.307 NICA$$
$$(0.000) \qquad (0.000) \qquad (0.003) \qquad (0.000) \qquad (0.005) \qquad (0.000)$$
$$[0.406] \qquad [0.392] \qquad [0.248] \qquad [0.246] \qquad [0.164] \qquad [-0.227]$$
\hfill (7)

$$R^2 = 0.967, R^2{}_{\text{adjusted}} = 0.956 \text{ and } F = 92.265 \ (p < 0.000)$$ \hfill (7a)

Yatoni Equation

$$HWB = 4348.741 Avsch + 437.121 Avage - 2537.399 Protrel + 0.248 Sav$$ \hfill (8)
$$(0.000) \qquad\qquad (0.005) \qquad\qquad (0.062) \qquad\qquad (0.020)$$
$$[0.600] \qquad\qquad [0.384] \qquad\qquad [-0.141] \qquad\qquad [0.1660]$$

$$R^2 = 0.934, R^2{}_{\text{adjusted}} = 0.922 \text{ and } F = 74.395 \ (p < 0.000)$$ \hfill (8a)

Findings About Strategies to Entry in the Markets

Barda and Tepehuaje. In Barda and Tehuaje, most household income corresponds to endogenous sources obtained through activities, such as backyard livestock (*NIL*), local wages (*W*)[1], and family businesses (*NIC* and *NIS*). Exogenous income represents less than 40%; out of these, government transfers (*GT*) make the greatest contribution. Rural households can also supplement their *HI* by relying on internal remittances (*NR*) and international remittances (*IR*) (see Figure 1). In addition, subsistence activities contribute with less than 10% (subsistence agriculture, *INA*, and firewood, *NICA*) and social capital, *TOH*, competes with financial services

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[1] *W* contains both local wages and regional wages.

(savings, *Sav*, and loans, *Lo*) to support the household economy; of the latter, savings are more visible and decrease as distance to regional markets increases.
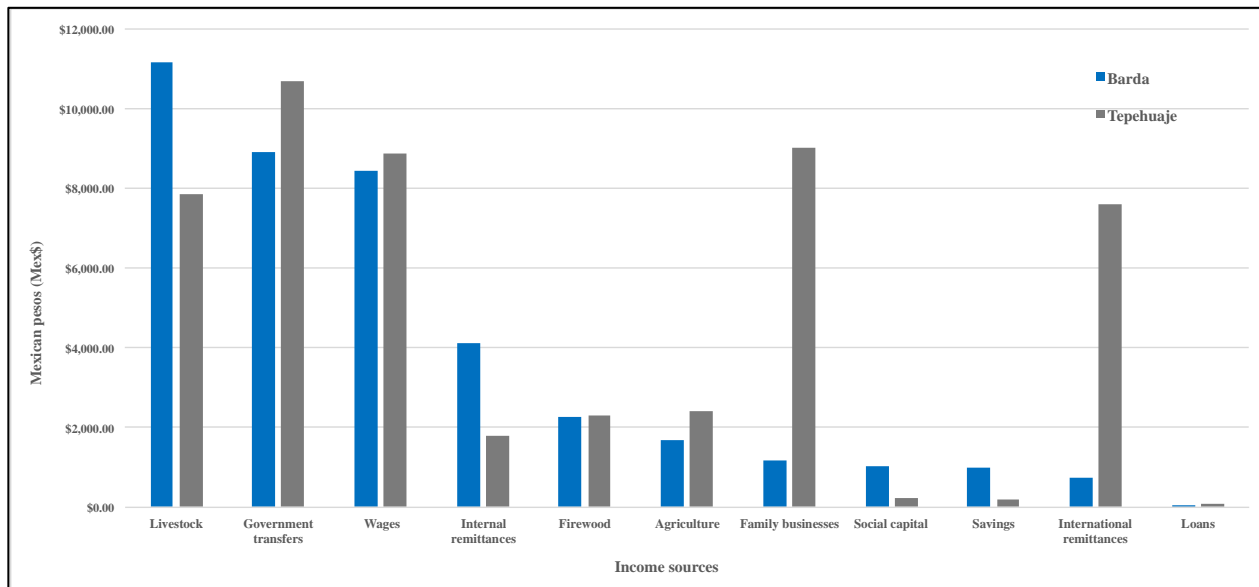

Figure 1. Main sources of avarage household income from a sample in Tepehuaje and Barda Paso de Piedras, Oaxaca state, 2013 (Constant prices, base year = 2013). Source: Probabilistic socioeconomic survey applied to a sample of households carried out during 2013 in Barda and 2014 in Tepehuaje, Oaxaca state.

According to Equation (4), Tepehuaje's household wellbeing depends on number of international migrants (*NIM*), *NIL*, and *GT*. These variables together made up the greatest contribution to the household wellbeing according to beta values. However, there is a delicate balance between the allocation of family labor to economic activities and international migration. In this sense, international remittances (*IR*), the number of men (*Nmen*), and net income from firewood (*NICA*) behave as restrictions, i.e., if the *Nmen* and the amount of *IR* simultaneously increase, household wellbeing contracts. The same happens when labor is allocated to firewood collection. Because both activities are labor intensive, the allocation of labor force could have been more profitable in terms of household wellbeing if it has been allocated other productive activities. In turn, women contribute more to the household wellbeing than men if both are involved in international migration, i.e., *NIM*. It seems that an increase in the average amount of *IR* pushes the average *NIM* beyond its critical value if more men (*Nmen*) are involved. At this point, the amount of remittances may not be sufficient to cover the costs of hired labor for subsistence activities and the production costs of the family businesses may considerably reduce the profitability. As a result, there will be a visible contraction in the level of household wellbeing. The explanation lies on the side of the shrinking male labor force at home closely tied to the household size. Finally, it can be stressed that income of backyard livestock together with *GT* contribute significantly to the household budget and also *NIM* as far as *IR* no reaches a certain critical value.

Barda's economy depends mainly on exogenous income, such as internal remittances (*NR*), *GT*, and also to a lesser extent *W*. Backyard livestock which represents an endogenous source of income is another important source of the household income (*HI*). Equation (5) indicates that *NR*, *GT*, and *NIL* contribute to sustaining *HWB*, while *W* represents a restriction. These variables appear as quadratic and compound exponential functions and can be represented by ascending curves. Specifically *NIL* is given by the following non-linear

function: $= 0.00031(1.00025)^{NIL} - 0.5971NIL$.

To find the function change points, the first derivative was calculated and its plot indicates that there are two kinds of relationships between *NIL* and *HWB*. A portion of the curve is ascending so it presents a direct relationship. The other portion is descending and indicates an inverse relationship. The first outcome confirms that *NIL* contributes to *HWB*. In fact, the second can be also explained through the quadratic regression equation whose independent variable is food expenses (*FE*):

$$NIL = \frac{1.752FE}{(0.010)} - \frac{0.000053FE^2}{(0.046)}$$

This equation has $R^2 = 0.336$ and $R^2_{\text{adjusted}} = 0.278$ and passes the ANOVA test, i.e., $F = 5.815$ ($p < 0.009$). The first derivative of this equation provides the path of its curve with change points and the resulting equation is linear: $1.752 - 0.000106FE$. This equation indicates that if *FE* increases, *NIL* diminishes, conversely, if *FE* tends to decrease, then *NIL* will increase. The first case refers to those households consuming most their backyard livestock production (*FE*), so the net income is either low or non-existent, while the second case includes households whose production is market orientated and their net income is relatively high, i.e., greater than the average.

Schooling (*Avsch*) which is a major attribute of human capital, in fact, is directly related to *HWB*, because it allows raising *HI* through *NR* and *W*. From Figure 1, it can be seen that *W* and transfers received from other households (social capital, *TOH*) contribute to *HI*. However, Equation (5) shows that these variables restrict the increase of *HWB*. This means that *W* may be allocated to savings or investment and this would have a negative effect on *HWB*. To probe this hypothetical statement, it was determined the correlation between *W* and savings (*Sav*) measured by Pearson's coefficient, which is significant: 0.524** ($p < 0.000$). Thus, it was found statistical evidence that *W* is mainly allocated to *Sav*. The negative sign of *TOH* has a different explanation which is related to the negative balance between *TOH* and transfers given by Barda's households to other households (*TGOH*), i.e., if it happens: *TGOH > TOH*, then *HWB* shrinks. However, *TOH* is not only a material measure of *HWB* but also a subjective measure of it. Thus, *TOH* can have sign either positive or negative and its effect on household's self-appraisal may always be socially positive. *TOH* is also an indicator of households' social prestige because the more transfers allocated by households to godfathers, godchildren, friends, and neighbors, the better prestige they won in the community.

In this community unlike Tepehuaje migration has not yet reached its critical level, thus, an increase in the average number of internal migrants in households (*NNM*) still produces a proportional increase in the household wellbeing (Equation (6)). In addition, social capital contributes to household wellbeing through social practices associated with the Catholic religion, *Catreg*, but not transfers from other households (*TOH*), which appear to be inversely correlated with household wellbeing (Equation (5)) like loans that are contracted timidly by household members. This result varies from year to year and in the year of reference no doubt the value of given gifts was greater than the value of received gifts. These practices of exchanging gifts among households throughout the year and the life cycle promote community cohesion and can be even reflected in household wellbeing. Catholic religion is the adhesive ingredient of these practices in most rural communities since the sixteenth century. Protestant churches appeared in Mexican society after the Mexican Revolution so they are still introducing their roots in the deep layers of the society. Equation (6) detected that the average age of household (*Avage*) is inversely correlated with household wellbeing and this means that the population tends to age associated to internal migration, which contributes to household budget through *NR*.

Yatoni and Otatitlán. In rural households of Mexico, agriculture has meant a medium to produce food since prehistoric times. Soil quality and climatic conditions are important resources for agricultural production for both self-consumption and market orientated. In this sense, the Sierra Norte region of Oaxaca is characterized by having a favorable climate for agriculture, in whose territory houses the district of Villa Alta an area suitable for growing coffee and sugar cane. The municipality of Villa Talea de Castro—located within this district—houses Otatitlán and Yatoni, whose economy is based on subsistence agriculture and small-scale commercial agriculture. In these communities, agricultural activities can sustain a network of trade and also represent an important source of employment. Besides, the producers are closely related to their natural environment and they take advantage of useful wild resources that are part of the collective ancestral knowledge. Agricultural land and forest provide the households with food and income from the sale of their cash crops and other products; of these, it highlights the coffee production. However, the sale of parchment coffee does not always generate sufficient income to meet the goals of households' wellbeing, because coffee is grown in small plots of land and the production is sold mainly through the middlemen; for this reason, some producers choose to migrate to other states of Mexico or to the United States. Other households are investing in family businesses and specifically households of Otatitlán invest in education, which is reflected in a substantial amount of regional wages (*RW*); most of these wages are obtained by household members graduated from universities and teachers colleges, who are employed in the nearby communities. In contrast, households of Yatoni retain family labor and still need to hire local labor for agriculture (*LW*). Out of this, it shines the demand of labor for harvesting coffee and the productive chain of sugar cane product *panela* (brown sugar loaf). Since these wages are relatively low, family members tend to seek new income sources. With regard to this, farm-household theory states that a decrease of household size affects the household structure and labor force. Thus, the population structures of Yatoni and Otatitlán present significant changes due to labor migration. These communities have the same economic dynamics, however, Yatoni has a deficit in its household economies because endogenous income cannot cover the household budget. On the contrary, Otatitlán has a surplus. This outcome is attributed to the fact that Otatitlán's households invest more in education to train professionals who are employed in the region or in other parts of Mexico, so they make important income contributions to their household budgets. Yatoni's households has a different approach, because their children represent labor available for agriculture, which represents savings; and people have an average schooling of 6.3 years compared to Otatitlán's, which is 8.9. The youth of the second community has more opportunities to get jobs with better remuneration than Yatoni's (see Figure 2). Summarizing, investment in education in Otatitlán is productive while in Yatoni household labor represents a valuable resource for productive activities. It is noteworthy that these communities supplement their income and livelihood resort to collection activities, such as gathering wild fruits and firewood, as well as crafts.

Equation (7) shows that Otatitlán's *HWB* depends on human capital measured by average schooling of household members (*Avsch*); on net income from commercial businesses (*NIC*), agriculture (*NIA*), and back-yard livestock (*NIL*); and it is supplemented by savings (*Sav*) associated to local wages, regional wages, and international remittances. Abundant rain sustains basic and small-scale commercial crops and sufficient fodder is produced for cattle raising. Collection activities (*NICA*) appear as a restriction to material wellbeing (*HWB*) but they link people to social practices, which provide supplies for the household and subjective wellbeing for household members.
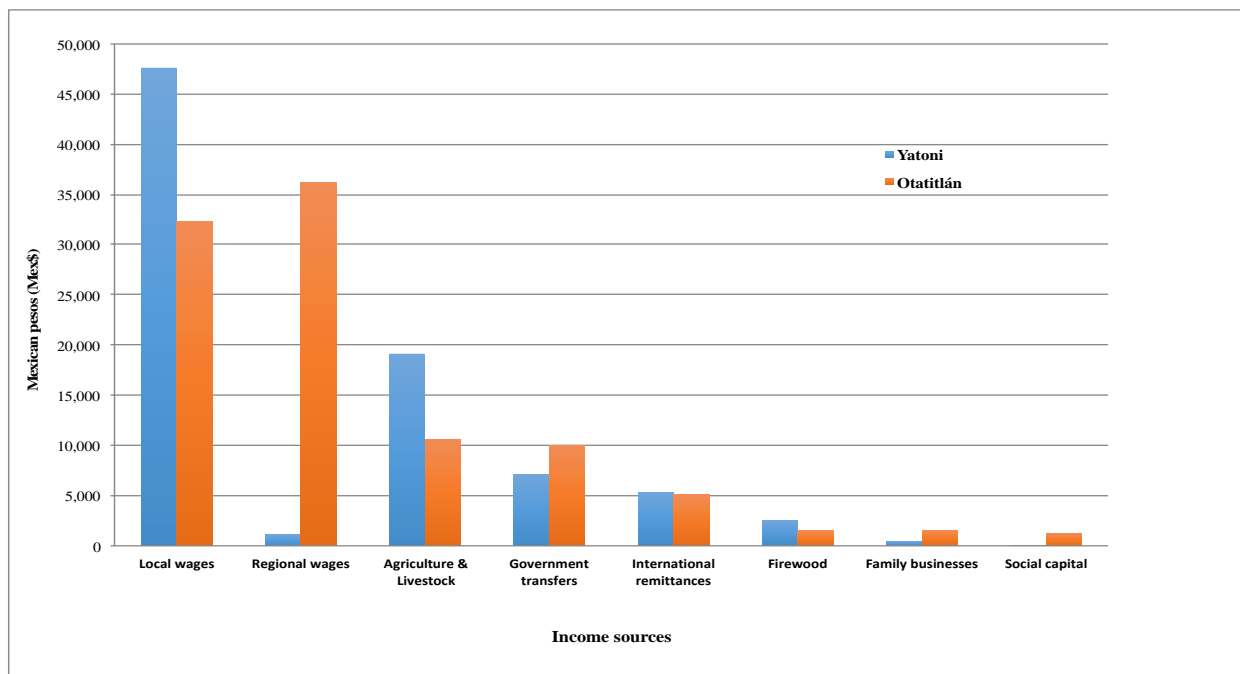
Figure 2. Main sources of average household income from a simple in Yatoni and Otatitlán, Oaxaca State, 2013 (Constant prices, base year = 2013). Source: Probabilistic socioeconomic survey applied to a sample of households carried out during 2013 and 2014 in Yatoni and Otatitlán, Oaxaca state.

In Yatoni, it is obvious that human capital (*Avsch* and average age of household members, *Avage*) is very important to support *HBW* through productive activities of the household (agriculture and back-yard livestock) and labor markets (local wages, *LW*, and international remittances, *IR*). Again *Sav* coming from *LW* and *IR* supplements *HWB*. Finally, social capital appears inversely related through protestant religion, *Protrel*, in Yatoni. Protestant churches do not contribute to household wellbeing as Catholic church does and equation (8) of Barda provides further evidence in this sense.

In these mountainous and rainy communities, human capital represents the main resource of household economies based on primary activities and supplemented with exogenous incomes, i.e., *LW*, *IR*, and *TG*. The presence of savings shows that household budget has a remainder to face contingencies and either increase consumption or investment. Social capital also contributes to *HWB* through the Catholic church by means of social practices of mutual assistance among community's households. However, investment in family businesses is not a good option in these communities because of its low profitability (see Figure 2). Households usually satisfy their needs of goods and services in the businesses of Talea de Castro the municipal seat located at 0.5-1 hour by a dirt road, and even they travel six hours by a paved road to Oaxaca city, the largest city in Oaxaca state. Thus, local businesses cannot compete with those larger businesses of Talea de Castro whose market exceeds the municipal area.

Conclusions on Strategies to Entry in Markets

The rural household economies of the Central Valleys region are based on backyard livestock, government transfers, and wages; especially those that depend on seasonal agriculture. Tepehuaje's households also obtain income from family businesses and international migration, while Barda's complement their budget with income from internal migration. In the mountainous rainy communities, the household income comes from

local and regional wages, agriculture, backyard livestock, and government transfers. The principal income source of Otatilán is regional wages because its educated labor can obtain attractive wages in the nearby communities; and Yatoni allocates its labor principally to household production.

The model of rural household economies (MRHE) shows a fresh picture of the rural household economies, because it measures the relationships between household wellbeing, income, and socio-demographic variables. The first strategy of the rural households is to invest in food production for self-consumption (agriculture and backyard livestock); i.e., households first ensure their survival before investing in a family business or allocating labor force to labor markets. In addition, they spend time gathering firewood and wild fruits although these activities are less profitable with respect to other economic activities. In fact, gathering produces savings in kind to household and the sale of the surplus becomes money, but such savings may not be reflected in the household wellbeing. Rural households also spend money on other social practices associated with religion; the expenses of Catholics are profitable in terms of wellbeing, while those of Protestants are not yet. When households have liquidity, they can invest in businesses as a means to incorporate an additional source of cash income and besides obtain social prestige in the community by exchanging gifts with other households. The profitability of a business in a rural community depends partly on the degree of isolation from regional markets and partly on the size of the local market. Households in relatively isolated communities in the mountains with long rainy seasons save money and rather invest in education and production. Thus, its current level of household wellbeing is maintained or improved. In Otatitlán, households save money and invest in profitable family business. Agriculture is also profitable in this community and particularly this can be said of coffee cultivation. In Yatoni, households also save money and invest in education but their main resource is the household labor. Because labor is retained, the average age of households has a directly proportional relationship with household wellbeing.

In the communities of the Central Valley region, the household economy depends on government transfers and labor force allocated to both internal and international migration. While backyard livestock is profitable, subsistence agriculture is not really due to the shortage of irrigation and the irregular rainy season. In Barda, investment in education and allocation of labor to internal migration produces important amounts of internal remittances. Seen from the wellbeing, households should not allocate labor at the local and regional labor markets, since wages as well as loans do not go to consumption. In fact, these incomes may be allocated to investment or savings. The allocation of household to these variables may be profitable with relation to household income but not to wellbeing. Migration has affected the demographic structure and in this respect this relationship was identified: if age and household size increase, household wellbeing shrinks. In Tepehuaje, an increase in the number of international migrants, *NIM*, is profitable as long as at the same time the number of women, *Nwomen*, increases. The male labor force is necessary locally for agriculture; therefore, it must be retained at home. It can be drawn from above that Tepehuaje and Yatoni utilize the same strategy of retaining family labor which responds to similar conditions.

Investing in human capital (education) is other good strategy to increase household income, in both the mountains and the valleys. Spending on social capital (Catholic religious practices) also contributes to the household wellbeing, although the net income from gifts received may not be always profitable. Therefore, the MRHE allows measuring the impact of household strategies for entry into the markets and generally allows the analysis of decision-making on the allocation of resources aimed at increasing household wellbeing.

Summarizing, after securing basic staples, rural households secure monetary sources of income, which

include small-scale commercial agriculture (coffee), family businesses, and labor markets. The principal strategy of rural households to enter in the markets is the sale of labor in the local, regional, and international markets, while family business role—in the community economies—is rather orientated to capture part of local economy liquidity through sale of goods and services. The only agricultural product that goes beyond the local market and the neighboring communities is parchment coffee, which generates most local demand of labor. Agriculture and backyard livestock constitute a productive chain whose production mainly provides food for the households and surpluses are scarce. Finally, it must be remarked that an independent variable, e.g., a source of income, with the negative sign means that either it was not allocated to consumption or it was an outcome of a bad decision. This can also occur with the socio-demographic resources of households, such as age, household size, and labor force. Another general conclusion is that rural communities have some opportunities to create a local market based on investments on profitable activities, such as coffee cultivation in the mountains and family businesses in the central valleys. In the mountainous communities, family businesses and small-scale commercial agriculture strengthen the local economy through generation wages and profits. In the Central Valleys region, rural households enter the national and international markets through the allocation of household labor. The performance of migration may be greater if households would invest in education. Conversely, in the mountainous communities investment in education avoids migration to certain extent, because regional wages for skilled labor are attractive.

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