NÚMERO 528

ALEJANDRO LÓPEZ

Environmental Dependence of Mexican Rural Households: Exploring the Role of Income, Shocks, Rules and Roads

MAYO 2012

CIDE

www.cide.edu

Carretera México Toluca 3655, Col. Lomas de Santa Fe, 01210,
Álvaro Obregón, México DF, México.
www.cide.edu

Dirección de Publicaciones
publicaciones@cide.edu
Tel. 5081 4003

Acknowledgements

I am indebted to the Ford Foundation, UC MEXUS and the William and Flora Hewlett Foundation for funding portions of this research and the data collection that preceded it.

Abstract

This paper examines the impact that household and village level characteristics have on environmental dependence and participation in resource extraction decisions. Contrary to previous studies that have used case studies or regional samples, I use a nationally representative sample of rural households. Econometric results show that participation in resource extraction follows an inverted U-shaped relationship with income and that environmental dependence decreases with income. Nevertheless, environmental income is very significant for the relatively rich households that do participate in extraction. Beyond income, results show that relatively wealthy households in rural Mexico are less likely to participate in resource extraction and have lower dependence than those with less wealth. There is also evidence that natural resources provide some sort of insurance for households that receive negative agricultural shocks. Finally, I also find evidence showing that natural resource management rules increase participation and environmental dependence while households in isolated villages are more dependent on environmental income.

Resumen

La pobreza en el mundo está concentrada en las zonas rurales, y los hogares rurales, sobre todo en los países en desarrollo, dependen del medio ambiente para obtener parte de su ingreso. Durante los últimos 15 años, la literatura ha demostrado la importancia del ingreso proveniente de fuentes ambientales para el bienestar de los hogares en zonas rurales. El énfasis hasta ahora ha sido en la relación entre el ingreso ambiental o la dependencia y el ingreso total; muy pocos estudios empíricos han explicado las diferencias que se presentan entre distintas comunidades y entre distintos grupos socioeconómicos. El presente trabajo contribuye a esta literatura al ahondar en las causas del comportamiento heterogéneo entre hogares mediante la inclusión de variables que capturan la riqueza del hogar y la ocurrencia de choques exógenos. Además, analiza las diferencias debidas a la heterogeneidad en términos de acceso a mercados y a la presencia de reglas de manejo de recursos ambientales a nivel localidad rural. El análisis también contribuye probando explícitamente la relación entre pobreza y dependencia, así como entre pobreza y participación en la extracción de recursos ambientales. Por último, este trabajo es uno de los pocos, sino es que el único, análisis de la dependencia de recursos ambientales que utiliza información de hogares rurales a nivel nacional.

Introduction

Poverty in the world is concentrated in rural areas, and rural households, particularly in developing countries, depend on the environment for at least some of their income (Angelsen *et al.*, 2011; Cavendish, 2000; World Bank, 2002; WRI, 2005). Nevertheless, the relationship between environment and poverty is complex as environmental goods and services can play different roles in rural households' livelihood strategies (WRI, 2005). In a detailed account of the links between poverty and forests, Angelsen and Wunder (2003) argue that forest resources can play different roles in a household's livelihood strategy; they can act as 'safety nets' or 'gap fillers', but they might just as easily become poverty traps. Furthermore, households' resource-use behavior can be quite diverse both within and across communities implying that while extraction from the environment can be the main source of income for some households others in the same village might not extract at all (Coomes and Barham, 1997; Fisher *et al*., 2005). In any case, environmental income can be of vital importance to people in rural areas even if its contribution to total income is relatively small (Sjaastad *et al*., 2005).

Jodha's (1986) seminal paper was one of the first to measure the importance of natural resources as an income generating activity using household level data. His results show that the Gini coefficient increases by as much as 36% in dry regions of India when income from common property resources is not considered.

During the last 15 years, many studies have followed this approach of estimating poverty and inequality with and without including income from environmental sources as a way to underscore the importance of this income source for the rural poor. Using a data set from Zimbabwe, Cavendish (1999) shows the relevance of including natural resources and environmental services when estimating poverty and inequality. By calculating these measures with and without considering the income derived from natural resources, he shows that rural poverty and inequality can be overstated using conventional household surveys. For India, Reddy and Chakravarty (1999) find that if income from forestry were set to zero (under the scenario of restricting access to common property areas), poverty would increase by as much as 28%; the reduction in inequality due to forest-related income was found to be negligible (-0.1%). Fisher (2004) shows that in southern Malawi forest income reduces income inequality. Mahapatra *et al*. (2005) use an Indian data set to estimate that sales of NTFPs can decrease income inequality. Babulo *et al*. (2009) show that poverty and inequality increase when forest income of rural households in Northern Ethiopia is not accounted for.

All these analyses were based on case studies or on samples representative at the regional level; López-Feldman *et al*. (2007) present one of the first efforts to estimate the impacts of natural resource income on poverty and inequality using a household data set that is representative for the rural population of a whole country (Mexico). They show that the number of poor individuals increases 4.2% and inequality increases 2.4% when natural resource income is not taken into consideration. A 10% increase in income from natural resources, other things being equal, reduces the Gini coefficient of total income inequality by 0.2% in rural Mexico and by 0.36% in the South-Southeast Region of the country.

These studies have contributed to establish the importance of including income from environmental sources when measuring rural poverty, inequality or livelihoods, although this has yet to be widely assimilated in rural development circles and poverty alleviations strategies (Angelsen *et al*., 2011; Sunderlin *et al*., 2005).[1] A related thread of the literature analyzes how this source of income as well as dependence on environmental resources, measured as the share of environmental income in overall income, vary with different socioeconomic characteristics (Narain *et al.*, 2008b). The results of a meta-study of 51 case studies, by Vedeld *et al*. (2007), show weak evidence of a negative relationship between forest income and total income and no statistically significant relation between dependence and income. So far the majority of the studies has been based on simple tabulations that fail to convey the complexity of the relationship (Narain *et al*., 2008a). A few exceptions employ an econometric approach.

One of these exceptions is Fisher (2004), who shows that asset-poor households in a region of Malawi are more dependent on natural resources than better off households. Similarly, Escobal and Aldana (2003) study a small sample of Brazil nut harvesters in Peru and conclude that the poor depend more heavily on natural resources than the wealthy. Contrary to the negative relationship that Cavendish (2000) finds for Zimbabwe, Narain *et al*. (2008a and 2008b) find that, for rural Indian households that participate in the collection of natural resources, dependence exhibits a U-shaped relationship with income. They also find that the poorest and the richest households are the least likely to collect. For households at the tails of the income distribution, dependence is either zero or relatively high. This is in line with other results showing that even when poor households exhibit greater dependence on natural resources the wealthy derive greater absolute values from the resources they exploit (Cavendish, 1998; Cavendish, 2000; Mamo *et al*., 2007). This could imply that rich households bear a greater responsibility for environmental degradation.

[1] One of the first economists in Latin America, if not the first, to underscore the importance of considering the environment as a key element of any development policy was Urquidi (1985).

The literature emphasis so far has been on the relationship between environmental income or dependence and total income, and relatively little empirical research has explained inter-village variations as well as differences across socio-economic groups (Mamo *et al*., 2007). This paper sheds light on the reasons behind households' heterogeneous behavior by incorporating variables that capture wealth as well as the occurrence of shocks (idiosyncratic and covariate). It also looks at differences due to village level heterogeneity in terms of access to markets and the existence of rules to access or manage environmental resources. Another contribution of this paper is that the relationship between poverty and dependence, as well as between poverty and participation is explicitly tested. Finally, the paper presents one of the few, if not the only, econometric analysis of environmental dependence that uses a national rural household survey.

The remainder of the paper is organized as follows. The next section discusses the data set and shows the importance of environmental income in the livelihoods of rural Mexican households using poverty and inequality measures. Section 3 presents the empirical strategy and results of the estimation of the factors that shape both the decision to participate in resource extraction and the degree of environmental dependence. Conclusions and final remarks are presented in section 4.

1. Data description and empirical evidence on the relevance of environmental income

Data for this research are from rounds I and II of the Mexico National Rural Household Survey (Encuesta Nacional a Hogares Rurales de México, or ENHRUM). The survey consists of two parts, a village and a household questionnaire. The first part was applied to key informants and provides information on basic characteristics of the village (infrastructure, access to markets, etc.); the second one was applied to a random sample of 22 households in each of 80 communities located in 14 states. INEGI, Mexico's national information and census office, designed the sampling frame to provide a statistically reliable characterization of Mexico's population living in rural areas, or communities with fewer than 2,500 inhabitants. For reasons of cost and tractability, individuals in hamlets or disperse populations with fewer than 500 inhabitants were not included in the survey. The result is a sample that is representative of more than 80% of the population that the Mexican government considers rural. The first round was applied in 2003 (the information collected is for 2002) to more than 1,700 households. Almost 1,600 of these households were interviewed again in 2008.

Both rounds of ENHRUM provide detailed data on assets, socio-demographic characteristics, production, labor allocation and income (cash and in-kind) from all sources. Therefore, it is possible to quantify environmental income (firewood, wild fruits, wild animals, wild plants, etc.) as well as total income at the household level.[2] For the purposes of this paper total income is defined as the sum of value added from five sources: family production (crops, livestock, nonagricultural goods and services, and rent of land); environmental income; wage labor (agricultural and nonagricultural); migrant remittances (both internal and international); and public transfers.

Value added from household production activities was estimated as the gross value of production minus purchased inputs.[3] Production includes not only commercial production but also output consumed at home and given to other households as gifts. In order to obtain the gross value of commercial production, households were asked the price at which they sold their product. For output consumed at home or given as gifts, households were asked the price they would have received by selling the product. Firewood and other goods produced for home consumption were valued by asking what price they would have had to pay to purchase these goods. Salary and wage income were aggregated across all household members and jobs. Migrant remittances were aggregated across all remitters and government transfers were aggregated across all household members that received them. All the results in this paper refer to per capita income.

Prior to the application of the second round of ENHRUM the household questionnaire was modified to better capture all the potential sources of environmental income, especially that derived from the use of medicinal plants. Questions about the occurrence of agricultural and non-agricultural shocks (both idiosyncratic and covariate) were also included.[4] Questions about the existence of village level rules for the management of natural resources were included in the version of the village survey applied during the second round. Therefore, I decided to concentrate on the analysis of environmental income and environmental dependence using the second round of ENHRUM (the information collected is for 2007).

The first column of Table 1 shows that environmental income represents 6% of total income (if only the households that participate in resource extraction are considered this number increases to 12%). Wage income is the most important income source followed by family income. There is high inequality in the distribution of every one of the income sources; wage

[2] I follow Sjaastad *et al.* (2005) definition of environmental income as income earned from wild or uncultivated natural resources.

[3] Consistent with the methodology suggested by Angelsen and Friis (2011), the cost of family labor was not deducted to obtain value added. For livestock I added sales but did not subtract purchases because it resulted in many households having negative income which was not convenient for the measurement of environmental dependence.

[4] The first round only included agricultural shocks and it was not feasible to distinguish between covariate and idiosyncratic shocks.

income is the least unequally distributed.[5] Inequality of total income is also relatively high as shown by a Gini coefficient of 0.563.

Following Cavendish (1999) and Reddy and Chakravarty (1999), among others, I estimate again inequality (and poverty as discussed below) without taking into account environmental income. The result is a Gini coefficient of 0.577, which implies a moderate increase in inequality when environmental income is left out of the equation. The marginal impact of a small change in every one of the income sources is illustrated in Column 4 of Table 1. The results are obtained following the methodology proposed by Lerman and Yitzhaki (1985). They show that the Gini coefficient for total income inequality, G, can be represented as:

$$G = \sum_{k=1}^{K} S_k G_k R_k \qquad (1)$$

Where S_k represents the share of component k in total income, G_k is the source Gini, corresponding to the distribution of income from source k, and R_k is the Gini correlation between income from source k and the distribution of total income.[6] Given Equation (1), it can be shown (see Stark *et al*., 1986) that the percentage effect on the Gini coefficient (that is, the Gini elasticity) given a percentage change in income from source k equal to e_k is equal to:

$$\frac{\partial G / \partial e_k}{G} = \frac{S_k R_k G_k}{G} - S_k \qquad (2)$$

Consistent to what is shown above, environmental income has a very moderate, although not statistically significant, equalizing effect in total income; a 10% increase in environmental income reduces inequality in 0.08%. The highest equalizing effect comes from wage income, while a 10% increase in family production income increases inequality in 1.5%.

In order to calculate the impact of environmental income in poverty I use the three main variants of the poverty index proposed by Foster *et al*. (1984),

---

[5] In Table 1, the income-source Gini coefficient for family production is higher than 1.0. This does not imply perfect income inequality, but rather reflects the presence of some negative income values. Income-source Gini coefficients greater than 1.0 have been reported elsewhere in the literature (e.g., Lerman and Yitzhaki, 1985). The Gini coefficient is a measure of dispersion, similar to a coefficient of variation; it is equal to the expected difference between two randomly drawn observations divided by the mean. One can view the mean as the expected difference between each observation and zero. If all observations are positive, zero is outside the range of observations, so the ratio is lower than one. However, if some observations are negative, zero is not outside the range of the group, and the ratio depends on the location of zero in the range. Wodon and Yitzhaki (2002) argue that the ability to handle negative incomes is an advantage of the Gini coefficient over other inequality measures.

[6] For more details on the interpretation of each one of the components see Lerman and Yitzhaki (1985) and López-Feldman *et al.* (2007).

the FGT. Results in Table 2 show that 43% of the households in the sample are below the poverty line established by the Mexican government.[7] If environmental income is not included the number of households below the poverty line increases to 46%. The other two measures of poverty also show statistically significant increases when environmental income is not considered. These results are smaller than other reported in the literature but one needs to bear in consideration that they apply to a random sample of the Mexican rural population and not to a sample chosen by its proximity or abundance of natural resources, like most of the results in the literature. In any case, these results show that environmental income is an important source of income for many rural households and without it many households could see their ability to satisfy basic needs compromised.

TABLE 1. GINI DECOMPOSITION BY INCOME SOURCE

INCOME SOURCE	(1) SHARE IN TOTAL INCOME (S_K)	(2) INCOME SOURCE GINI (G_K)	(3) GINI CORRELATION WITH TOTAL INCOME RANKINGS (R_K)	(4) % CHANGE IN GINI FROM A 10% CHANGE IN INCOME SOURCE
FAMILY PRODUCTION	0.251	1.149	0.779	1.48***
ENVIRONMENT	0.062	0.880	0.559	-0.08
WAGES	0.384	0.676	0.595	-1.10*
REMITTANCES	0.191	0.900	0.690	0.20***
PUBLIC TRANSFERS	0.112	0.745	0.415	-0.51***
TOTAL INCOME		0.563		

* and *** denote significance at the 10% and 1% level, respectively using bootstrapped confidence intervals.
Note: Gini decomposition and bootstrapping was done using the Stata command descogini, which is described in López-Feldman (2006).

Once the relevance of environmental income for rural Mexican households has been established the next step, and the most relevant of this paper, is to empirically identify the effects of household and village characteristics on the decision to participate on natural resource extraction and on the level of environmental dependence. However, before going to the econometric estimation let's look at how participation in resource extraction and environmental dependence (share of environmental income in a household's total income) vary by total income quintiles.[8] Figure 1 shows what resembles

[7] The poverty line corresponds to the monthly per capita income necessary to purchase a basic basket of food in rural areas. The annual value used in this analysis is 6,312 Mexican pesos. The exchange rate at the time was 10.8 pesos per dollar.
[8] The measure of dependence that uses "permanent" income instead of total income suggested by Narain *et al.* (2008a and 2008b) is an attractive alternative to the traditional measure used here but unfortunately I do not have information on the monetary value of most of the productive assets so it is not feasible to estimate "permanent" income as they do.

an inverted U-shape for participation in resource extraction. For households in the first income quintile the participation rate is 57% and it increases to 68% for those in the second quintile and then starts to go down until it reaches 52% for the richest households in the sample. Dependence on environmental income, for households that participate in extraction, shows a tendency to decrease as total income increases, except at the fifth quintile where there is a small increase. For the poorest quintile of the rural population income from natural resources represents almost 25% of total income, while it represents only 8% for those in the fourth quintile, and 12% for the richest households. These tendencies suggest that in rural Mexico natural resource extraction is more common among the poor, although more than half of those that are relatively rich participate in extraction. On the other hand, it is clear that the poor depend more on the environment as a source of income.

TABLE 2. FGT INDEX WITH AND WITHOUT ENVIRONMENTAL INCOME (EI)

	FGT (0) HEADCOUNT	FGT (1) POVERTY GAP	FGT (2) POVERTY SEVERITY
WITH EI	0.429	0.233	0.185
WITHOUT EI	0.464***	0.262***	0.211***

*** denotes that the difference between the measure with and without environmental income is statistically significant at the 1% level using bootstrapped confidence intervals.

2. Empirical strategy and econometric results

The estimation strategy is based on the assumption of an underlying process of household utility maximization. As a result of this process, some households decide to allocate some of their members' labor to natural resource extraction, while the optimal choice for other households is a corner solution in which nobody works in this activity. For the econometric analysis the latter implies that environmental income from resource extraction, and therefore environmental dependence, can take on a value of zero with positive probability and thus is censored.

In the construction of the econometric model it is important to take into account that rural households in developing countries are frequently exposed to market failures or even to the absence of some markets; households might need to incur in high transaction costs if they want to participate in a given market or they might face constraints in the quantity (quality) of the good or service that they want to exchange (de Janvry and Sadoulet, 2006). Because village level characteristics (e.g., distance to urban center) can be correlated with transaction costs and with the existence of markets it is natural to include them in the econometric estimation. Household characteristics are also relevant determinants of households' behavior when there are market distortions; for example, if there are no credit markets households need to self finance all their production activities, therefore, the level of household wealth can be a determinant of their production decisions. Furthermore, as de Janvry *et al*. (1991) explain, in rural areas market failure instead of being commodity specific can be household specific in the sense that transaction costs (or other factors that affect access to markets) depend on household characteristics (e.g., household size and composition); it is possible to have households with and without access to a given market in the same village. Overall, it has been shown that when there are multiple market failures the production decisions of a given household depend on its preferences and endowments; therefore, the amount of land and other assets owned can have an effect on both production and consumption decisions (Bardhan and Udry, 1999). Considering all these, households' decision to participate in resource extraction is represented according to the following probit model:

$$\begin{aligned} P_i &= 1\left[P_i^* > 0\right] \\ P_i^* &= \delta + \boldsymbol{x}_i^{'}\boldsymbol{\beta} + u_i \end{aligned} \qquad (3)$$

Where P_i is an indicator variable that takes the value of one when the household i participates in resource extraction. P_i^* is a latent variable, $\boldsymbol{x}_i$ is a vector of household and village level characteristics, and u_i is an error term assumed to be normally distributed.

To deal with the corner solution that leads to censoring when analyzing environmental dependence I follow Wooldridge (2002) and estimate a tobit model:

$$\begin{aligned} ED_i &= \max\left(0, ED_i^*\right) \\ ED_i^* &= \alpha + \boldsymbol{x}_i^{'}\gamma + \varepsilon_i \end{aligned} \qquad (4)$$

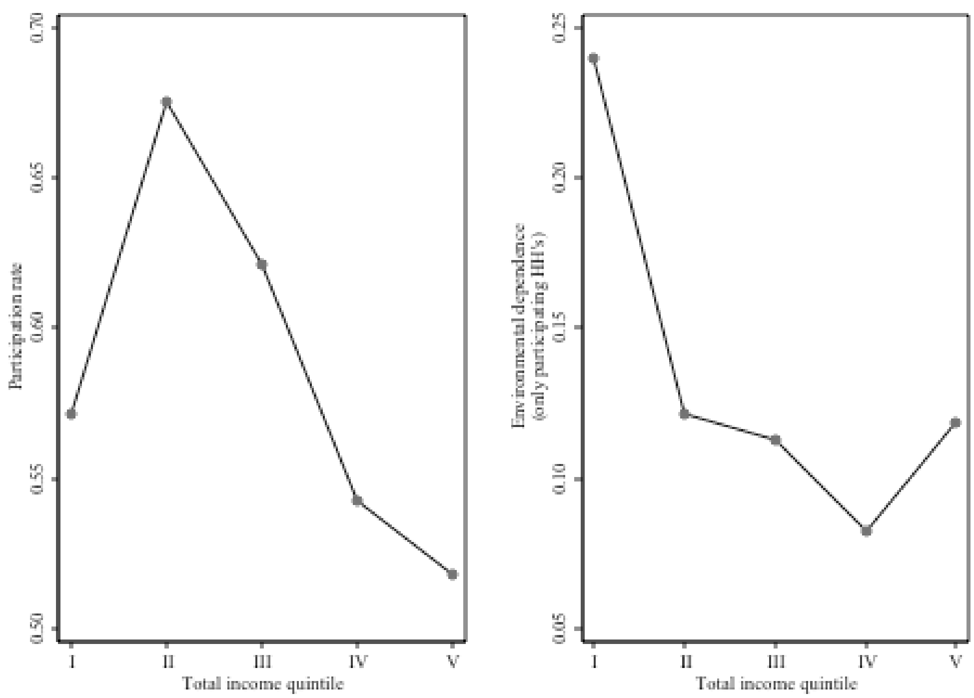
Where ED_i measures environmental dependence of household i. ED_i^* is a latent variable, $\boldsymbol{x}_i$ is a vector of household and village level characteristics, and ε_i is a normally distributed error term.

The first approach of the empirical strategy to analyze participation in resource extraction and the determinants of environmental income is to formally test the correlations revealed in Figure 1. To estimate the relationship between income and participation in resource extraction as an income generating activity in rural Mexico I begin by running a simple version of the probit model corresponding to Equation (3), where the only explanatory variables included are the natural logarithm of income and its square.[9] With

[9] Both variables are statistically significant at the 1% level.

the estimated coefficients I calculate the expected probability of participation as a function of income. Figure 2 shows the results of this exercise. A clear inverted U-shaped pattern emerges. Nevertheless, it is important to stress that the maximum expected probability of participation (68%) is reached at 1,665 pesos, well below the poverty line of 6,312 pesos. That is, the results show that probability of participation increases only at very low levels of income. At the average income of the top quintile, the probability of participation decreases to 47%. The correlations between total income and environmental dependence are tested using the results of a simple version of the tobit model corresponding to Equation (4).[10] The second panel of Figure 2 shows that expected environmental dependence has a clear negative relationship with total income; poor households depend more on environmental income than relatively rich households.

FIGURE 1. PARTICIPATION AND ENVIRONMENTAL DEPENDENCE BY INCOME QUINTILES

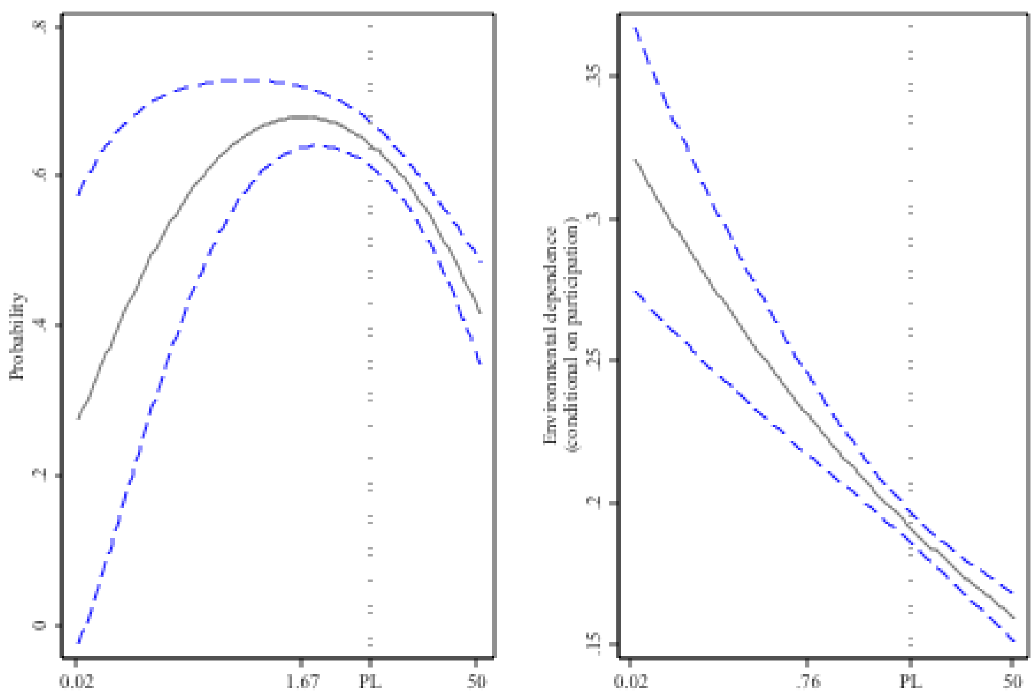


Even though the results illustrated in Figure 2 are informative they provide an incomplete picture because no household or village level characteristics are being included in the analysis. Furthermore, they might be subject to an endogeneity problem due to the fact that the simultaneity in the production

10 The income-squared term was not statistically significant and was dropped from the estimation; the remaining linear term was significant at a 1% level.

decisions that lead to total and environmental income (and therefore to the observed outcomes of participation and environmental dependence) is being overlooked. In order to deal with these issues I first include a set of household and village variables in the econometric estimations and then, taking advantage of the panel nature of the data set, I replace the natural logarithm of contemporaneous income with the natural logarithm of lagged income. In this way I am able to test the role that household and village level characteristics have on the outcomes of interest (participation and environmental dependence) while controlling, at least partially, for simultaneity in the production decisions.

FIGURE 2. EXPECTED PROBABILITY OF PARTICIPATION AND EXPECTED ENVIRONMENTAL DEPENDENCE AS A FUNCTION OF INCOME



Note: For each panel the solid line represents the expected level, dashed lines are 95% CI and the dotted line is the poverty line. The horizontal axis shows total income (in thousands of pesos) on a log scale

Before discussing the econometric results I present some basic descriptive statistics of the explanatory variables as well as the basic motivation to include them in the full econometric model (see Table 3). The second round of the ENHRUM survey collected information for 1543 of the households surveyed during the first round. Because of missing values or environmental dependence ratios out of the range [0,1], 143 households were dropped from the sample.[11] All the results presented in this paper, including the results that have been discussed so far, use the remaining sample (1400). On average the head of the household is 53 years old and has less than five years of formal education. Almost 90% of the households in the sample have a man as head.

TABLE 3. VARIABLE DEFINITIONS AND DESCRIPTIVE STATISTICS

VARIABLE NAME	DESCRIPTION	MEAN	STANDARD DEVIATION
	EXPLANATORY VARIABLES		
AGE	AGE OF HOUSEHOLD HEAD IN YEARS	53.53	15.16
EDUCATION	EDUCATION OF HOUSEHOLD HEAD IN YEARS	4.58	3.81
GENDER	GENDER OF HOUSEHOLD HEAD (1= MAN)	0.86	0.35
LAND	HECTARES OF LAND	5.20	27.99
WEALTH	INDEX OF HOUSEHOLD WEALTH USING 2002 DATA	0.55	0.23
AG_ID_S	AGRICULTURAL OR LIVESTOCK IDIOSYNCRATIC SHOCK (1= YES)	0.10	0.29
AG_CO_S	AGRICULTURAL OR LIVESTOCK COVARIATE SHOCK (1= YES)	0.30	0.46
OTHER_S	OTHER SHOCKS (1= YES)	0.27	0.45
AV_DIST	AVERAGE DISTANCE IN KILOMETERS FROM THE VILLAGE TO THE PLACES THAT HAVE MORE INTERACTIONS WITH THE LOCAL POPULATIONS	35.61	32.99
ALL_PAVED	ALL THE ROADS THAT CONNECT THE VILLAGE WITH THE PLACES THAT HAVE MORE INTERACTIONS WITH THE LOCAL POPULATION ARE PAVED (1= YES)	0.72	0.45
	ENDOGENOUS VARIABLE		
DRULE	THE VILLAGE HAD AT LEAST ONE RULE IN RELATION TO THE MANAGEMENT OF NATURAL RESOURCES (1= YES)	0.14	0.35
	INSTRUMENTAL VARIABLE		
INEQUALITY	VILLAGE LEVEL GINI COEFFICIENT OF THE DISTRIBUTION OF THE HOUSEHOLD WEALTH INDEX	0.17	0.08
N			1400

The effect of these three variables on participation and dependence is a priori indeterminate. Arguably, if the head of the household has more education it can have access to income generating activities that are more remunerative than resource extraction. On the other hand, better-educated household heads might be in a better position to access markets for high-value

[11] Of the households dropped from the sample 34 reported negative total income, 23 had total income equal to zero, 11 had environmental income higher than total income, and the remaining had missing values for one or more of the explanatory variables used in the econometric analysis.

natural resources. Age can be a proxy for experience and therefore can have similar effects to those of education; it is also possible that certain extraction activities are physically demanding and only people of certain age can participate. Households headed by a woman might be in disadvantage to participate in some income generating activities (e.g., women might not be allowed to work in agriculture) but they might also be restricted in their access to natural resources.

Under a setting of incomplete markets, land and wealth can have an effect on the portfolio of productive activities available for a given household. For example, if there are no land markets a household can only farm its' own land. Also, being landless (or not having certain assets) can become a constraint for investing in productive activities if access to credit is tied to having land (or other assets) as collateral. Asset ownership can also be a proxy for having the social connections that can be the key for getting access to credit as well as to other markets or networks (e.g., marketing cooperatives). As a proxy for wealth I constructed and index using variables that measure dwelling characteristics (number of rooms, availability of a separate room exclusive for cooking, quality of construction materials, and availability of electricity, bathroom and sewage) as well as dummy variables capturing ownership of durable goods (television set, refrigerator, car and agricultural equipment).[12] In order to have a predetermined variable and reduce the concern of endogeneity, the index uses household information available from the 2002 household survey. The index ranges from zero to one and had a mean equal to 0.55 with a relatively high standard deviation.

When insurance markets are inexistent or incomplete households rely on different strategies to cover themselves against idiosyncratic and covariate shocks. In this sense, it has been argued that environmental resources might provide households with a 'natural insurance' (Pattanayak and Sills, 2001; Takasaki *et al*., 2004). If this were the case there should be a positive correlation between the occurrence of a negative shock and participation (dependence) on resource extraction. To capture the presence of different shocks at the household level I include three dummy variables. The variable *ag_id_s* takes the value of one if the household received a negative shock related to agriculture or livestock production that was not common to all the households in the village (e.g., the household lost some tools or equipment used in the activity or they were stolen or the household suffered a localized fire). The variable *ag_co_s* takes the value of one if the household suffered a negative agricultural or livestock related shock that was also suffered by their neighbors (e.g., drought). The variable *other_ s* captures the occurence of other negative shocks either idiosyncratic or covariate (e.g., sickness of a

[12] This index was created using principal components analysis and it captures the largest amount of information common to all the dwelling and durable goods variables. The methodology is explained in Filmer and Pritchett (2001). The Stata command *pca* was used to estimate the index.

household member or damage to the dwelling due to rain).[13] Almost 10% of the households in the sample reported idiosyncratic shocks, 27% suffered covariate agricultural shocks, and almost 30% suffered other kind of negative shocks.

The village level questionnaire included questions to elicit information about the villages or cities with which the surveyed village had most of their interactions. From this information I constructed two village level variables that proxy for access to markets and transaction costs. The average distance (in kilometers) from the village to the places that have more interaction with the local population is captured by the variable *av_dist*. The variable *all_paved* takes the value of one if all the roads that connect the village to those places are paved roads (including highways). Slightly more than 70% of the households in the sample live in villages that are connected to the outside only by paved roads. The average distance from the village to the main communities is 36 kilometers (the minimum is 2 and the maximum is 200). The endogenous and instrumental variables are discussed below along with an instrumental variables model.

The results of the probit model for participation in resource extraction that includes all these explanatory variables are shown in Table 4. The first column presents the results of the model that uses contemporaneous income and the second the ones of the model with lagged income.[14] The results of both are remarkably similar; all the variables have the same signs across models and the same variables are statistically significant in both models. Therefore, I concentrate on describing the results of the model with lagged income. Probability has an inverted U-shape relationship with lagged income but, similarly to what happens in Figure 2, the expected probability of participation starts to decrease at a very low level of income (less than 1,000 pesos). Households with more wealth are less likely to participate in resource extraction. Households located in villages that are communicated with the exterior by paved roads are less likely to participate. The farther away the village is from other communities the more likely a household is to participate. Finally, households that received a negative agricultural shock (either idiosyncratic or covariate) are more likely to participate in extraction.

Column 3 of Table 4 shows a model where lagged income is substituted by the poverty status that the household had in 2002. In this way I can explicitly test the relationship between poverty and participation in resource extraction. The results show that households that were considered poor in 2002 are more likely to participate in extraction than non-poor households;

[13] I separated the non-agricultural shocks in covariate and idiosyncratic but it made no difference for the econometric analysis.

[14] In the sample of 1400 households there are 43 that had environmental income equal to zero and total income negative for the year 2007, this is not a problem given the definition of environmental dependence but when the natural logarithm of contemporaneous income is used as an explanatory variable these observations are dropped.

the expected probability of participation of a poor household is 6.2 percentage points higher than that of a non-poor. None of the other results change when poverty is used instead of income.

A similar approach is followed to analyze environmental dependence. By looking at the first two columns of Table 5 the same pattern as that of Table 4 can be seen; the signs and significance of the results are the same and the magnitudes are very similar. Therefore, as I did for participation, I only discuss results in Column 2. Environmental dependence decreases with total income and households with more wealth depend less on the environment. Dependence in the environment increases with the presence of agricultural shocks (both idiosyncratic and covariate). Households located in villages farther away from other villages are more dependent on the environment for their income. Column 3 shows the results of the model with poverty status instead of income. Poverty increases environmental dependence; the expected dependence of households that participate in extraction and are poor is 0.014 higher than for those that participate and are not poor.

According to the results outlined above, what can be said about the determinants of participation and environmental dependence? It is clear that the poor are more likely to participate in extraction than the relatively rich and they are also more dependent on environmental income. Furthermore, the statistically significant results support the idea that resource extraction is a low-return activity mainly for households with few income generating opportunities. The results for the wealth index favor the hypothesis that when there are market failures wealthier households can access better opportunities. The results for distance and quality of the roads support the hypothesis that households in isolated villages have less productive alternatives and are more likely to take part in low return activities, like resource extraction, and to depend more on them as income generating activities. It is also more likely that these households will face market failures reinforcing the effect on both participation and dependence. Finally, there is evidence that environmental income plays a role as natural insurance for households that receive negative agricultural shocks.[15]

The final step of the empirical analysis is to analyze the role that the existence of management rules at the village level has on both the probability of extraction and environmental dependence. To do so I include in the estimations a dummy variable (*drule*) that takes the value of one if, according to the information obtained from the village level questionnaire, in 2007 there was at least one local rule in relation to the management of the

[15] The non-statistical significant results could very well mean that there is no effect, however, it might also be the case that there are opposing effects. For example, in the case of land, it is possible that on one hand access to land encourages on-farm work, which might be complemented with income from natural resource extraction. On the other hand, landed agricultural households might be able to use their land as collateral and therefore have a higher opportunity cost and a lower probability of extraction. In any case, the model is not able to tease out which effect dominates.

resource. The data available does not provide enough information about the characteristics of the rules so I do not attempt to analyze their determinants but simply to include them in the analysis of participation and dependence. Nevertheless, it is very natural to argue that the causality could go the other way as participation and dependence might affect the probability that a given village has a rule. For example, one could think that if in a village many people participate in resource extraction and many of them obtain environmental incomes that are relatively high compared to their total income then they are more likely to coordinate and implement a management rule.[16] Simply put, there is a potential endogeneity problem when the rule variable is included in the econometric analysis.

I follow an instrumental variables approach to overcome this problem. The instrumental variable that I use is economic inequality as measured by a Gini coefficient calculated for each village from the household wealth index. Inequality goes from 0.056 in the village with the highest level of equality to 0.463 in the village with more inequality. The intuition for using village level inequality as a good instrument for the existence of a management rule comes from the work of Baland and Platteau (1997, 1998 and 1999) who look at the role that wealth inequality has on management of local resources. They consider that the creation of rules generally requires effort both to mobilize the users concerned and to reach an agreement, and that different members of the community will bear different shares of the costs of this collective action. Given this, there are many ways in which inequality can affect the prospects for collective action; thus, the direction of this impact is ambiguous (Baland and Platteau, 1999). On one hand, the richest households might be willing to bear the costs of collective action, in which case inequality could facilitate collective action. On the other, greater inequality in wealth can be associated with diverging objectives and preferences, which could hinder collective action (Baland and Platteau, 1997).

For the objectives of this paper what is relevant, more than the direction of the impact, is that there is both theoretical and empirical evidence supporting the claim that village level inequality has an effect on the creation of management rules. This implies that the instrumental variable proposed is theoretically relevant, besides being in fact statistically correlated to the probability of existence of a management rule in a given community.[17] The other requisite of a good instrument, exogeneity, cannot be tested with the data available. I claim that the only impact that inequality in wealth distribution at the village level (measured with a lag of five years) has on both

[16] The effect could go in the other direction, more dependent households have more problems to coordinate and the result is a lower probability of enacting a local management rule. For the sake of this paper the direction of the effect does not matter, the point simply is to emphasize the potential endogeneity of the rule.

[17] The first stage of the instrumental variables estimation shows a highly significant positive correlation between inequality and the existence of a management rule. There is no evidence of a weak instrument problem as the F-statistic for the excluded instrument is 140.1.

participation and dependence is through the effect that it has on the creation of the management rule.

I follow an instrumental variables strategy to estimate again the probability of participation as well as dependence using lagged income as explanatory variable but now with the rule variable included.[18] Table 6 shows that for both models the results for the exogenous variables are very similar to what is reported in Column 2 of Tables 4 and 5.[19] On the other hand, the endogenous variable shows that if a household is located in a village where there exists a management rule then it has a higher expected probability of participation and higher expected environmental dependence than a household in a village with no management rules. One possible interpretation of these results is that rules are in fact effective in the management of the resource and therefore more people benefit from it and, while doing so, a bigger share of their total income comes from this source.

[18] Since the endogenous variable is binary the two-step traditional approach to account for endogeneity in probit and tobit models is not recommended. Therefore, I estimate linear models by two-stage least squares for both probability of participation and dependence. Wooldridge (2010) claims that in this case linear models properly estimated by instrumental variables are likely to be superior to two-step estimation of probit or tobit with instrumental variables.

[19] As a robustness check the models that include a poverty dummy instead of the income variables were also estimated using instrumental variables. The results are very similar to those presented in Table 6 and are omitted for the sake of concreteness.

TABLE 4. PROBIT RESULTS FOR PROBABILITY OF PARTICIPATION IN RESOURCE EXTRACTION

	(1)	(2)	(3)
NATURAL LOG OF INCOME (2007)	0.8255***		
	[0.2996]		
NATURAL LOG OF INCOME SQUARED (2007)	-0.0485***		
	[0.0172]		
NATURAL LOG OF INCOME (2002)		0.4293*	
		[0.2330]	
NATURAL LOG OF INCOME SQUARED (2002)		-0.0312**	
		[0.0137]	
POVERTY STATUS (2002)			0.1869**
			[0.0795]
AGE	-0.0020	-0.0017	-0.0022
	[0.0029]	[0.0028]	[0.0028]
EDUCATION	0.0051	0.0057	0.0044
	[0.0115]	[0.0113]	[0.0112]
LAND	-0.0011	-0.0004	-0.0010
	[0.0013]	[0.0014]	[0.0013]
GENDER	0.0947	0.0618	0.0636
	[0.1074]	[0.1062]	[0.1057]
WEALTH	-1.8291***	-1.6847***	-1.7671***
	[0.1961]	[0.1961]	[0.1940]
OTHER_S	0.0802	0.1093	0.0997
	[0.0837]	[0.0824]	[0.0821]
AG_ID_S	0.5317***	0.4645***	0.4457***
	[0.1327]	[0.1284]	[0.1275]
AG_CO_S	0.6593***	0.5717***	0.5769***
	[0.0887]	[0.0857]	[0.0858]
ALL_PAVED	-0.1841**	-0.2283***	-0.2181**
	[0.0893]	[0.0883]	[0.0880]
AV_DIST	0.0041***	0.0042***	0.0042***
	[0.0012]	[0.0011]	[0.0011]
CONSTANT	-2.3925*	-0.3517	0.9710***
	[1.3384]	[1.0181]	[0.2381]
PSEUDO R^2	0.149	0.150	0.146
N	1357	1400	1400

*, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

TABLE 5. TOBIT RESULTS FOR ENVIRONMENTAL DEPENDENCE

	(1)	(2)	(3)
NATURAL LOG OF INCOME (2007)	-0.0251***		
	[0.0063]		
NATURAL LOG OF INCOME (2002)		-0.0154**	
		[0.0063]	
POVERTY STATUS (2002)			0.0373**
			[0.0148]
AGE	-0.0003	-0.0003	-0.0003
	[0.0005]	[0.0005]	[0.0005]
EDUCATION	0.0006	0.0007	0.0005
	[0.0022]	[0.0022]	[0.0022]
LAND	-0.0005	-0.0004	-0.0004
	[0.0003]	[0.0003]	[0.0003]
GENDER	0.0303	0.0310	0.0303
	[0.0195]	[0.0197]	[0.0197]
WEALTH	-0.2746***	-0.2972***	-0.2980***
	[0.0337]	[0.0347]	[0.0344]
OTHER_S	0.0083	0.0111	0.0110
	[0.0148]	[0.0150]	[0.0149]
AG_ID_S	0.0594***	0.0521**	0.0509**
	[0.0230]	[0.0230]	[0.0230]
AG_CO_S	0.0482***	0.0445***	0.0434***
	[0.0150]	[0.0151]	[0.0152]
ALL_PAVED	-0.0205	-0.0242	-0.0236
	[0.0154]	[0.0156]	[0.0156]
AV_DIST	0.0012***	0.0011***	0.0011***
	[0.0002]	[0.0002]	[0.0002]
CONSTANT	0.3180***	0.2364***	0.1051**
	[0.0629]	[0.0598]	[0.0418]
SIGMA	0.2221***	0.2255***	0.2251***
	[0.0057]	[0.0058]	[0.0058]
PSEUDO R^2	0.2927	0.2735	0.2709
N	1357	1400	1400

*, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

TABLE 6. PARTICIPATION AND ENVIRONMENTAL DEPENDENCE WITH INSTRUMENTAL VARIABLES

	(1) PARTICIPATION	(2) DEPENDENCE
DRULE	0.2972***	0.1286***
	[0.1119]	[0.0485]
NATURAL LOG OF INCOME (2002)	0.1809***	-0.0080*
	[0.0680]	[0.0041]
NATURAL LOG OF INCOME SQUARED (2002)	-0.0129***	
	[0.0041]	
AGE	-0.0008	-0.0003
	[0.0010]	[0.0004]
EDUCATION	-0.0005	-0.0007
	[0.0041]	[0.0014]
LAND	-0.0001	-0.0002**
	[0.0004]	[0.0001]
GENDER	0.0175	0.0202
	[0.0345]	[0.0123]
WEALTH	-0.4866***	-0.1263***
	[0.0694]	[0.0246]
OTHER_S	0.0434	0.0016
	[0.0273]	[0.0102]
AG_ID_S	0.1503***	0.0093
	[0.0425]	[0.0165]
AG_CO_S	0.1742***	-0.0015
	[0.0284]	[0.0097]
ALL_PAVED	-0.0498*	-0.0117
	[0.0282]	[0.0108]
AV_DIST	0.0006	0.0002
	[0.0005]	[0.0002]
CONSTANT	0.1999	0.2014***
	[0.2944]	[0.0425]
N	1400	1400

*, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Conclusions

Previous studies of environmental dependence of rural households have used case studies or regional samples to analyze the role that environmental income plays in rural households' livelihoods and to test the hypothesis that dependence decreases with income. In this paper I use a nationally representative sample to analyze those issues. My results show that in fact natural resource extraction is an important source of income for a large number of rural Mexican households. Participation in resource extraction is higher for the poor than for the relatively rich and the poor depend more on the environment as an income generating activity than the rich. Without it, many poor households' ability to satisfy their basic needs would be jeopardized. Nevertheless, even though participation in resource extraction follows an inverted U-shaped relationship with income the participation rates of non-poor households are not negligible; 52% of the households in the highest income quintile participate in the activity. Environmental dependence decreases with income but it is still very significant for the rich households that do participate in extraction; on average environmental income represent 12% of total income for households in the fifth income quintile. These results imply that it will be wrong to assume that only poor rural households are affected by resource declines (say due to adverse impacts of climate change or degradation). It is also possible that in many instances relatively rich rural households put more pressure on the environment than do the poor.

Income is not the only factor that shapes participation and environmental dependence. When there are market distortions, as is the case in many rural areas in developing countries, other household characteristics are also relevant determinants of households' behavior. Wealthier households in rural Mexico are less likely to participate in resource extraction and when they participate they have lower dependence than households with less wealth. This suggests that wealthier households are able to access other, more remunerative, income generating opportunities. There is also evidence that natural resources are providing a natural insurance for households that receive negative agricultural shocks.

Village level characteristics also shape households' extraction decisions in rural Mexico. Results for variables that proxy for access to markets and transaction costs (quality of the roads that connect the village with locally relevant places and distance to those places) support the hypothesis that households in isolated villages have less productive alternatives and are more likely to take part in low return activities like resource extraction and to depend more on them as income generating activities. I also find evidence showing that natural resource management rules increase participation and environmental dependence. Nevertheless, more research is needed to better understand both the implications and the emergence of different kind of rules.

The findings of this paper underscore the importance of taking into account natural resources when designing rural development policies. On one hand, it might be feasible to decrease the pressure over natural resources by correcting some market failures in rural areas (e.g., access to insurance). On the other, it is important to realize that reductions in the quality or availability of environmental resources (e.g., due to climate change, deforestation or creation of protected areas) can impact rural households' income stream but also their capacity to bounce back after negative shocks. Therefore, although more research is necessary on the determinants of the differences in resource extraction behavior between non-poor and poor households, policy makers should not forget about relatively rich rural households when designing public policies aimed at achieving both environmental sustainability and development in rural areas.

References

Angelsen, A. and Friis J., (2011), "Designing the household questionnaire", in A. Angelsen, H. Overgaard, J. Friis, C. Smith-Hall and S. Wunder (eds.), *Measuring Livelihoods and Environmental Dependence. Methods for Research and Fieldwork*, London: Earthscan.

______________, Overgaard H., Friis J., Smith-Hall C. and Wunder S., (2011), "Why Measure Rural Livelihoods and Environmental Dependence?", in A. Angelsen, H. Overgaard, J. Friis, C. Smith-Hall and S. Wunder (eds.), *Measuring Livelihoods and Environmental Dependence. Methods for Research and Fieldwork*, London: Earthscan.

______________ and Wunder S., (2003), "Exploring the Forest-Poverty Link: Key Concepts, Issues and Research Implications", CIFOR Occasional Paper 40.

Babulo, B., Muys B., Nega F., Tollens E., Nyssen J., Deckers J. and Mathijs E., (2009), "The economic contribution of forest resource use to rural livelihoods in Tigray, northern Ethiopia", *Forest Policy and Economics*, 11, 109-117.

Bardhan, P. and Udry C., (1999), *Development microeconomics*, New York: Oxford University Press.

Baland J. and Platteau J. P., (1997), "Wealth inequality and efficiency in the commons, Part I: The unregulated case", *Oxford Economic Papers*, 49(4), 451-482.

______________, (1998), "Wealth inequality and efficiency in the commons, Part II: The regulated case", *Oxford Economic Papers*, 50(1), 1-22.

__________________________, (1999), "The Ambiguous Impact of Inequality on Local Resource Management", *World Development*, 27(5), 773-788.

Cavendish, W., (1998), "The complexity of the commons: Environmental resource demands in rural Zimbabwe", Center for the Study of African Economies Working Paper Series 99-98.

______________, (1999), "Poverty, Inequality and Environmental Resources: Quantitative Analysis of Rural Households", Center for the Study of African Economies Working Paper Series 99-9.

______________, (2000), "Empirical regularities in the poverty-environment relationship of rural households: Evidence from Zimbabwe", *World Development*, 28(11), 1979-2003.

Coomes, O. and Barham B., (1997), "Rain forest extraction and conservation in Amazonia", *The Geographical Journal*, 163(2), 180-188.

de Janvry, A., Fafchamps M. and Sadoulet E., (1991), "Peasant household behaviour with missing markets: Some paradoxes explained", *The Economic Journal*, 101, 1400-1417.

______________ and Sadoulet E., (2006), "Progress in the modeling of rural households' behavior under market failures", in A. de Janvry and R. Kanbur (Eds.) *Poverty, Inequality and Development. Essays in Honor of Erik Thorbecke*, New York: Springer.

Escobal, J. and Aldana U., (2003), "Are Nontimber Forest Products the Antidote to Rainforest Degradation? Brazil Nut Extraction in Madre de Dios, Peru", *World Development*, 31(11), 1873-1887.

Fisher, M., (2004), “Household Welfare and Forest Dependence in Southern Malawi”, *Environment and Development Economics*, 9, 135-154.

_____________, Shively G. and Buccola S., (2005), “Activity choice, labor allocation, and forest use in Malawi”, *Land Economics*, 81(4), 503-517.

Foster, J., Greer J. and Thorbecke E., (1984), “A Class of Decomposable Poverty Measures”, *Econometrica*, 52, 761-766.

Jodha, N.S., (1986), “Common Property Resources and Rural Poor in Dry Regions of India”, *Economic and Political Weekly*, 11, 1169-1181.

Lerman,R. and Yitzhaki S., (1985), “Income Inequality Effects by Income Source: A New Approach and Applications to the United States”, *The Review of Economics and Statistics*, 67, 151-156.

López-Feldman, A., (2006), “Decomposing Inequality and Obtaining Marginal Effects”, *The Stata Journal*, 6, 106-111.

_____________, Mora J. and Taylor J. E., (2007), “Does Natural Resource Extraction Mitigate Poverty and Inequality? Evidence from Rural Mexico and a Lacandona Rainforest Community”, *Environment and Development Economics*, 12, 251-269.

Mahapatra, K. A., Albers H. and Robinson E., (2005), “The Impact of NTFP Sales on Rural Households’ Cash Income in India’s Dry Deciduous Forest”, *Environmental Management*, 35, 258-265.

Mamo, G., Sjaastad, E. and Vedeld P., (2007), “Economic dependence on forest resources: A case from Dendi District, Ethiopia”, *Forest Policy and Economics*, 9, 916-927.

Narain, U., Gupta S. and van’t Veld K., (2008a), “Poverty and resource dependence in rural India”, *Ecological Economics*, 66, 161-176.

_____________, (2008b), “Poverty and the environment: Exploring the relationship between household incomes, private assets, and natural assets”, *Land Economics*, 84(1), 148-167.

Pattanayak, S. and Sills E., (2001), “Do tropical forests provide natural insurance? The microeconomics of non-timber forest product collection in the Brazilian Amazon”, *Land Economics*, 77(4), 595-612.

Reddy, S. and Chakravarty S., (1999), “Forest Dependence and Income Distribution in a Subsistence Economy: Evidence from India”, *World Development*, 27, 1141-1149.

Sjaastad, E., Angelsen A., Vedeld P. and Bojö J., (2005), “What is environmental income?”, *Ecological Economics*, 55, 37-46.

Stark O., Taylor J. E. and Yitzhaki S., (1986), “Remittances and Inequality”, *The Economic Journal*, 383, 722-740.

Sunderlin, W., Angelsen A., Belcher B., Burgers P., Nasi R., Santoso L. and Wunder S., (2005), “Livelihoods, forests, and conservation in developing countries: An overview”, *World Development*, 33(9), 1383-1402.

Takasaki, Y., Barham B. and Coomes O., (2004), “Risk coping strategies in tropical forests: floods, illnesses, and resource extraction”, *Environment and Development Economics*, 9, 203-224.

Urquidi, V., (1985), “Reflexiones sobre medio ambiente y economía del desarrollo”, *Estudios Sociológicos*, 3(7), 9-24.

Vedeld, P., Angelsen A., Bojö J., Sjaastad E. and Kobugabe G., (2007), "Forest environmental incomes and the rural poor", *Forest Policy and Economics* 9, 869-879.

Wooldridge, J., (2002), *Econometric Analysis of Cross Section and Panel Data*, Cambridge: MIT Press.

Wodon, Q. and Yitzhaki S., (2002), "Inequality and Social Welfare", in J. Klugman, (Ed.), *Poverty Reduction Strategy Papers Sourcebook*, Washington, DC: The World Bank.

World Bank, (2002), *The environment and the Millennium Development Goals*, Washington, DC: World Bank.

WRI, (2005), *The wealth of the poor. Managing Ecosystems to fight poverty.* Washington, DC: World Resources Institute.

División de Administración Pública

Dolores Luna *et al.*, *Índice de Gobierno Electrónico Estatal: La medición 2010*, DTAP-264

Gabriel Purón Cid y J. Ramón Gil-García, *Los efectos de las características tecnológicas en los sitios web del gobierno*, DTAP-263

Ana Elena Fierro y J. Ramón Gil-García, *Más allá del acceso a la información*, DTAP-262

Gabriel Purón Cid, *Resultados del "Cuestionario sobre la reforma Presupuesto basado en Resultados…"*, DTAP-261

Guillermo Cejudo y Alejandra Ríos, *El acceso a la información gubernamental en América Central y México: Diagnóstico y propuestas*, DTAP-260

Rodolfo De la Torre and Patricia López-Rodríguez, *Closing the Gap: The Link between Social Capital and Microfinance Services*, DTAP-259

Ma. Amparo Casar, *Representation and Decision Making in the Mexican Congress*, DTAP-258

Guillermo Cejudo y Dirk Zavala, *Procesos y prácticas del acceso a la información: un ejercicio de usuario simulado*, DTAP-257

Ernesto Flores-Roux y Judith Mariscal, *The Development of Mobile Money Systems*, DTAP-256

David Arellano, Walter Lepore, Laura Zamudio e Israel Aguilar, Control de los conflictos de interés, DTAP-255

División de Economía

Brasil Acosta *et al.*, *Evaluación de los resultados de la Licitación del Espectro Radioeléctrico de la COFETEL*, DTE-525

Eva Arceo-Gómez and Raymundo M. Campos-Vázquez, *¿Quiénes son los NiNis en México?*, DTE-524

Juan Rosellón, Wolf-Peter Schill and Jonas Egerer, *Regulated Expansion of Electricity Transmission Networks*, DTE-523

Juan Rosellón and Erix Ruíz, *Transmission Investment in the Peruvian Electricity Market: Theory and Applications*, DTE-522

Sonia Di Giannatale *et al.*, *Risk Aversion and the Pareto Frontier of a Dynamic Principal-Agent Model: An Evolutionary Approximation*, DTE-521

Víctor Carreón and Jorge L. García, *Trivariate Probit with Double Sample Selection: Theory and Application*, DTE-520

Alejandro Castañeda y Pedro Ibarra, *Entrada de supermercados en México*, DTE-519

Julio César Leal, *Combate a la informalidad: ¿Más monitoreo fiscal o menos monopolios?*, DTE-518

Julio Leal and Jorge Alonso, Taxes, *Transfers and the Distribution of Employment in Mexico*, DTE-517

Eva Arceo and Raymundo M. Campos-Vázquez, *Teenage Pregnacy in Mexico: Evolution and Consequences*, DTE-516

DIVISIÓN DE ESTUDIOS INTERNACIONALES

Covadonga Meseguer and Gerardo Maldonado, *Kind Resistance: Attitudes toward Immigrants in Mexico and Brazil*, DTEI-227

Guadalupe González *et al., The Americas and the World 2010-2011. Public Opinion and Foreign Policy in Brazil, Colombia, Ecuador, Mexico and Peru*, DTEI-226

Guadalupe González *et al., Las Américas y el mundo 2010-2011: Opinión pública y política exterior en Brasil, Colombia, Ecuador, México y Perú,* DTEI-225

Álvaro Morcillo Laiz, *Un vocabulario para la modernidad. Economía y sociedad de Max Weber (1944) y la sociología en español*, DTEI-224

Álvaro Morcillo Laiz, *Aviso a los navegantes. La traducción al español de Economía y sociedad de Max Weber*, DTEI-223

Gerardo Maldonado, *Cambio electoral, anclaje del voto e intermediación política en sistemas de partidos de baja institucionalización*, DTEI-222

James Ron and Emilie Hafner-Burton, *The Latin Bias: Regions, the Western Media and Human Rights*, DTEI-221

Rafael Velázquez, *La política exterior de Estados Unidos hacia México bajo la administración de Barack Obama*, DTEI-220

Rafael Velázquez y Jorge Schiavon, *La cooperación internacional descentralizada para el desarrollo en México*, DTEI-219

Kimberly A. Nolan García, *Whose Preferences?: Latin American Trade Promotion Pacts as a Tool of US Foreign Policy*, DTEI-218

DIVISIÓN DE ESTUDIOS JURÍDICOS

Ana Laura Magaloni, *La Suprema Corte y el obsoleto sistema de jurisprudencia constitucional*, DTEJ-57

María Mercedes Albornoz , *Cooperación interamericana en materia de restitución de menores*, DTEJ-56

Marcelo Bergman, *Crimen y desempleo en México: ¿Una correlación espuria?*, DTEJ-55

Jimena Moreno, Xiao Recio y Cynthia Michel, *La conservación del acuario del mundo. Alternativas y recomendaciones para el Golfo de California*, DTEJ-54

María Solange Maqueo, *Mecanismos de tutela de los derechos de los beneficiarios*, DTEJ-53

Rodolfo Sarsfield, *The Mordida´s Game. How institutions incentive corruption*, DTEJ-52

Ángela Guerrero, Alejandro Madrazo, José Cruz y Tania Ramírez, *Identificación de las estrategias de la industria tabacalera en México*, DTEJ-51

Estefanía Vela, *Current Abortion Regulation in Mexico*, DTEJ-50

Adriana García and Alejandro Tello, *Salaries, Appelate Jurisdiction and Judges Performance*, DTEJ-49

Ana Elena Fierro and Adriana García, *Design Matters: The Case of Mexican Administrative Courts*, DTEJ-48

DIVISIÓN DE ESTUDIOS POLÍTICOS

Carlos Elizondo, *Stuck in the Mud: The Politics of Constitutional Reform in the Oil Sector in Mexico*, DTEP-235

Joy Langston and Francisco Javier Aparicio, *Gender Quotas are not Enough: How Background Experience and Campaigning Affect Electoral Outcomes*, DTEP-234

Gilles Serra, *How Could Pemex be Reformed? An Analytical Framework Based on Congressional Politics*, DTEP-233

Ana Carolina Garriga, *Regulatory Lags, Liberalization, and Vulnerability to Systemic Banking Crises*, DTEP-232

Rosario Aguilar, *The Tones of Democratic Challenges: Skin Color and Race in Mexico*, DTEP-231

Rosario Aguilar, *Social and Political Consequences of Stereotypes Related to Racial Phenotypes in Mexico*, DTEP-230

Raúl C. González and Caitlin Milazzo, *An Argument for the 'Best Loser' Principle in Mexico*, DTEP-229

Francisco Javier Aparicio and Covadonga Meseguer, *Supply or Demand? Politics and the 3x1 Program for Migrants*, DTEP-228

Ana Carolina Garriga and Brian J. Phillips, *Foreign Aid and Investment in Post-Conflict Countries*, DTEP-227

Allyson Benton, *The Origins of Mexico's Municipal Usos y Costumbres Regimes*, DTEP-226

DIVISIÓN DE HISTORIA

Adriana Luna, *La reforma a la legislación penal en el siglo XVIII: Notas sobre el aporte de Cesare Beccaria y Gaetano Filangieri*, DTH-76

Michael Sauter, *Human Space: The Rise of Euclidism and the Construction of an Early-Modern World, 1400-1800*, DTH-75

Michael Sauter, *Strangers to the World: Astronomy and the Birth of Anthropology in the Eighteenth Century*, DTH-74

Jean Meyer, *Una revista curial antisemita en el siglo XIX: Civiltá Cattolica*, DTH-73

Jean Meyer, *Dos siglos, dos naciones: México y Francia, 1810- 2010*, DTH-72

Adriana Luna, *La era legislativa en Nápoles: De soberanías y tradiciones*, DTH-71

Adriana Luna, *El surgimiento de la Escuela de Economía Política Napolitana*, DTH-70

Pablo Mijangos, *La historiografía jurídica mexicana durante los últimos veinte años*, DTH-69

Sergio Visacovsky, *"Hasta la próxima crisis". Historia cíclica, virtudes genealógicas y la identidad de clase media entre los afectados por la debacle financiera en la Argentina (2001-2002)*, DTH-68

Rafael Rojas, *El debate de la Independencia. Opinión pública y guerra civil en México (1808-1830)*, DTH-67

ESTUDIOS INTERDISCIPLINARIOS

Ugo Pipitone, México y América Latina en la tercera oleada (crecimiento, instituciones y desigualdad), DTEIN-02

Eugenio Anguiano, El estudio de China desde cuatro enfoques: histórico, político, internacionalista y económico, DTEIN-01

Ventas

El **CIDE** es una institución de educación superior especializada particularmente en las disciplinas de Economía, Administración Pública, Estudios Internacionales, Estudios Políticos, Historia y Estudios Jurídicos. El Centro publica, como producto del ejercicio intelectual de sus investigadores, **libros, documentos de trabajo,** y **cuatro revistas especializadas:** *Gestión y Política Pública*, *Política y Gobierno*, *Economía Mexicana Nueva Época* e *Istor*.

Para adquirir cualquiera de estas publicaciones, le ofrecemos las siguientes opciones:

VENTAS DIRECTAS:	VENTAS EN LÍNEA:
Tel. Directo: 5081-4003 Tel: 5727-9800 Ext. 6094 y 6091 Fax: 5727 9800 Ext. 6314 Av. Constituyentes 1046, 1er piso, Col. Lomas Altas, Del. Álvaro Obregón, 11950, México, D.F.	Librería virtual: **www.e-cide.com** Dudas y comentarios: **publicaciones@cide.edu**

¡¡Colecciones completas!!

Adquiere los **CDs de las colecciones completas** de los documentos de trabajo de todas las divisiones académicas del CIDE: **Economía**, **Administración Pública**, **Estudios Internacionales**, **Estudios Políticos**, **Historia** y **Estudios Jurídicos.**

¡Nuevo! ¡¡Arma tu CD!!

Visita nuestra Librería Virtual www.e-cide.com y selecciona entre 10 y 20 documentos de trabajo. A partir de tu lista te enviaremos un CD con los documentos que elegiste.