

**Assets, Activities and Rural Income Generation:
Evidence from a Multicountry Analysis**

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Summary

This paper examines the links between the assets and the economic activities of rural households in developing countries to provide insight into how the promotion of certain key assets—particularly education, land and infrastructure—influences the economic choices of these households. Nationally representative data from 15 countries that form part of the rural income generating activities (RIGA) database are used in the analysis. The results indicate that improved land access is linked to agricultural production and thus will lead households to take, on average, this path for improving household welfare. Higher levels of education and greater access to infrastructure appear to be most closely linked to non-agricultural wage employment.

Key words: rural income generating activities, livelihood strategies, meta-regression analysis

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I. Introduction

Interventions designed to improve the well-being of rural households often focus on expanding asset ownership and access based on the view that it is the household's low asset position that limits its ability to take advantage of opportunities. Since assets determine the economic activities of a household in a given context, an intervention that improves a household's asset position is not likely to be path neutral; that is, such interventions are likely to promote participation in certain income generating activities and thus a particular path for improving household welfare.

Historically, farming has been considered the principal economic activity of rural households, particularly poor rural households, and the dominant view of development has been the small-farm first paradigm which emphasizes promoting agriculture among smallholders (Ellis and Biggs, 2001). As such, the main asset whose accumulation has been promoted has been land, based on the argument that land ownership and access is closely linked to agricultural production and, correspondingly, to food security and rural income generation. Additionally, by supplying land through land reform or by providing titles to owners to secure property rights, there are hopes of overall efficiency gains in agriculture through improved land utilization and allocation. The small-farm first perspective, therefore, emphasized land as the key asset to bring about gains in both equity and efficiency.

Recent evidence clearly shows, however, that rural households are involved in a range of economic activities and that agriculture, while remaining important, is not the sole, or in some cases, even the principal activity of the poor (FAO, 1998, Davis et al, 2008, Haggblade, Hazell

and Reardon, 2007). This realization has led to a greater emphasis within the rural development literature on what is referred to as the livelihoods approach. The livelihoods approach recognizes that households use a range of assets in a variety of activities, including agricultural and non-agricultural activities, as part of a livelihood strategy and accepts that there are multiple paths to improving well-being (Ellis, 2000). This observation has led some, such as Riggs (2006), to question the merit of a land-focused vision of rural development. This, of course, begs the question of which asset or set of assets is best promoted as part of a strategy to improving the welfare of rural households. Riggs answers this question by arguing that the best means of promoting pro-poor growth in the countryside is through endowing rural households with skills, presumably through increased education.

This shift in thinking by Riggs and others has been reflected in development practice. In the 1980s and 1990s as budgets were reduced as part of broader debt reduction programs, the state steadily decreased its support for all types of agricultural programs. Furthermore, in the last decade, there has been an increasing emphasis on alleviating rural poverty through the accumulation of human capital, at least for the children of the poor. In particular, the increasingly popular conditional cash transfer (CCT) programs provide cash to the poor if their children attend schools and they receive regular medical health check-ups. While the cash provided to rural households through CCT programs may alleviate short-run poverty and act as a social safety net, the long-run asset focus is squarely on human capital development and, in particular, promoting higher education levels.ⁱ As with land, which is fundamentally linked to agriculture, promoting education may be tied to certain economic activities. The evidence from a range of studies, as well as this paper, suggest a strong link between education and rural non-agricultural wage employment.ⁱⁱ

The objective of this paper is to examine the links between the assets and the economic activities of rural households and to compare those links across a range of developing countries. The relationship between certain assets and the capacity of rural households to generate income from different activities might be country specific and depend largely on the particular cultural and historical context of the country as well as its current policies. Alternatively, the asset-activities relationship may depend on the country's level of development—as countries develop and shift away from agriculture and towards manufacturing and services the magnitude of the returns to assets may shift from one activity to another or may change for a given asset. Most likely, the reality is somewhere in the middle, with the relationship between assets and livelihoods being influenced by both country-specific characteristics and general patterns of development. Through understanding the asset-activity relationship, the hope is to provide insight into how the promotion of certain key assets—particularly land, education and infrastructure—influences the path rural households are likely to take to improve their well-being.

Previous studies have examined the role of certain assets, but quite often with limited case study information in specific contexts. These studies have also tended to be partial analyses which only analyze certain income generating specific activities such as agricultural or rural non-agricultural employment. Some clear trends have emerged, but mixed conclusions as well which might be attributed to differences in the level of analysis, in the type of data collected or in the methods employed. To avoid these problems, in this paper, comparable data and methods are used to ensure comparability of result and to allow for cross-country comparisons. In particular, we use data from a series of Living Standard Measurement Surveys (LSMS) and similar surveys conducted in a number of developing countries. The data in all cases are national in scope and representative of the rural population and form part of the rural income generating activities

(RIGA) database.ⁱⁱⁱ The questions in the survey regarding income generating activities are similar and therefore, variables created from the survey data are comparable. The data thus allow the comparison of the relationship between assets and activities across a range of developing countries, something that is missing in previous analysis of rural income generating activities. The results also allow cross-country comparisons to determine whether results vary by region and level of development. The approach is akin to a meta-regression analysis where a similar set of dependent and independent variables are used across a range of data sets to draw general conclusions (Stanley, 2001).

The remainder of this paper is organized as follows. In the next section, the relationship between assets and activities are discussed and hypotheses formed about expected relationships. Section 3 provides a discussion of the multicountry data set and how it was constructed. Section 4 presents a profile of the rural income generating activities of rural households and an initial analysis of the relationship between key assets and household activities. Section 5 explains the methodological approach taken to analyze the link between assets and activity choice. Results of the econometric analysis of the data are presented in Section 6 and Section 7 provides conclusions and policy implications of the analysis.

2. Assets and rural income generating activities: A conceptual framework

Ellis (2000) defines a livelihood as comprising the assets, the activities and the access to these that together determine the living gained by an individual or household. Household assets are defined broadly to include natural, physical, human, financial, public and social capital as well as household valuables. These assets are stocks, which may depreciate over time or be expanded through investment. The value and use of an asset depends not only on the quantity owned but the ownership status and the fungibility of the asset. For example, land that has a clear and

transferable title may be sold while human capital, although clearly owned, cannot be transferred. Assets, such as literacy and numeracy of household members, can potentially be used in a number of productive activities while others, such as farm machinery, tend to be coupled with particular activities. In some cases, such coupling may be the product of specialization and can lead to higher returns to the asset. However, the lack of fungibility of coupled assets can dictate the economic path a household takes or can lead to an asset not being used to its full potential.

Based on access to a set of assets, households allocate labor to different activities to produce outcomes such as income, food security and investment spending. The allocation of labor to a particular activity may be a short-run response to make-up income deficits due to an economic shock or to obtain liquidity for investment, may be an active attempt to manage risk through diversification of activities, or may be part of a long-term strategy to improve household well-being. For these reasons, at a given point in time households may have a diverse portfolio of economic activities.

The decision to allocate labor to certain activities is conditioned on the context in which the household operates. The context includes natural forces, such as natural disasters, weather patterns and agricultural pests, and human forces such as markets, the state and civil society. Markets influence a household's labor allocation through prices as well as through the functioning of markets including whether market participation requires substantial transaction costs and thus pose a barrier to entry. The state influences activities through a variety of past and present actions such as the investment in infrastructure, provision of services, coordination and efficiency of activities, design of interventions, implementation and enforcement of laws, regulation as well as interaction with the private sector and NGOs. Finally, civil society shapes

activities because institutions determine the acceptability of and returns to activities, influence the use of assets, and establish the rules that govern the use of social capital.^{iv}

While the context in which a household operates varies both across and within countries, there are a few key assets which appear to be closely linked with labor allocation decisions and thus lead households to certain economic activities across a range of contexts. Land, education and infrastructure access appear in particular to be associated with certain economic activities. These three assets are often the focus of policies designed to promote rural development. While such policies are often intended to improve the efficiency of resource use, by design or by default, they also influence household labor allocation decisions and the pathways that households take to improve their capacity to generate income. Regardless of the context, they may be expected to be associated with certain labor allocation choices and it is this link we wish to explore here. Even if a similar association is found across countries between certain assets and economic activities, the relationship may vary in magnitude by region (Africa, Asia, Eastern Europe and Latin America) or by level of development of a country and this too is explored.

Land

Land ownership is expected to be closely linked to agricultural production, including both crop and livestock production. It is an asset that is not fungible across a range of activities and has a direct value only in agricultural production, although it can be used for different agricultural activities. It may have an indirect value in other economic activities, however, as collateral for credit and thus is potentially linked to these activities. In general, however, those without access to some land are expected, on average, to focus on other economic activities and limited land access is hypothesized to be linked to participation in off-farm (agricultural wage and non-agricultural income generating) activities.

The evidence generally supports these conclusions, particularly the result that land is negatively associated with non-agricultural activities. For Mexico, Yunez-Naude and Taylor (2001) find a positive relationship between land size and participation in crop and livestock activities although no relationship between crop income and land size. They do find a positive relationship for land size and livestock income. They also find a negative relationship between land size and participation in wage employment, as do Winters, Davis and Corral (2002) for Mexico. Corral and Reardon (2001) find a positive but diminishing effect of land on total farm income in Nicaragua, but also find a negative link to non-agricultural wage employment participation and income as well as farm wage income. For Egypt, Adams (2002) finds a positive relationship to agricultural and livestock income and a negative relationship to overall non-agricultural income. A number of other studies show a negative relationship between land size and non-agricultural employment participation or income for a range of countries including Chile (Berdegue et al, 2001), Ecuador (Elbers and Lanjouw, 2001), China (de Janvry, Sadoulet and Zhu, 2005; Zhu and Luo, 2005; Zhang and Li, 2001) and India (Lanjouw and Shariff, 2002).

Thus, land ownership seems to dictate whether households remain in agriculture or shifts to off-farm activities. The expectation is that this relationship is stronger in countries where land scarcity is a greater issue, such as in parts of Asia, and limited land ownership suggests limited options. The relationship, however, may get weaker as development occurs and agricultural becomes less important and non-agricultural activities increase in importance. Thus, for the relatively more developed countries, land may not play a substantial role in determining the household labor allocation.

Education

The human capital of a household, as measured by schooling, is expected to generally be linked to a shift to non-agricultural activities since this is where the returns to education are most likely to be highest (Taylor and Yunez-Naude, 2000). This does not necessarily imply there are no returns to education from agriculture, but rather that, on average, increased education appears to be likely to lead to a shift away from agricultural activities. A lack of education creates a barrier to entry in many non-agricultural activities and education is expected to be particularly important in participation in non-agricultural activities.

A number of studies on rural non-agricultural wage employment support this conclusion for a range of countries including Tanzania (Lanjouw, Quizon and Sparrow, 2001), Chile (Berdegue et al, 2001), Ecuador (Elbers and Lanjouw, 2001), Brazil (Fereira and Lanjouw, 2001), Mexico (Taylor and Yunez-Naude, 2000; Winters, Davis and Corral, 2002), Honduras (Isgut, 2004, Ruben and Van den Berg, 2001) and China (de Janvry, Sadoulet and Zhu, 2005). Evidence for rural non-agricultural self employment is mixed: a few studies—Tanzania (Lanjouw, Quizon and Sparrow, 2001), Chile (Berdegue et al, 2001), Ecuador (Elbers and Lanjouw, 2001), Mexico (Taylor and Yunez-Naude, 2000), China (de Janvry, Sadoulet and Zhu, 2005)—show a positive relationship between education and participation in rural non non-agricultural self employment while others find no influence.

Overall, education is hypothesized to be linked to a shift away from agricultural toward non-agricultural activities and to higher returns from these non-agricultural activities. The strength of these results is expected to increase as development occurs and the opportunities in the non-agricultural economy expand.

Infrastructure and urban proximity

Access to infrastructure and population centers is likely to increase opportunities in non-agricultural activities. Infrastructure such as electricity is a useful input for certain self-employment activities. In addition, proximity to markets provides opportunities to sell output, and purchase inputs, from self-employment activities as well as opportunities for non-agricultural wage employment. Of course, access to markets may also provide higher returns to certain agricultural activities through better input supply and greater opportunities for high-value crops. On average, while it is unlikely that those with infrastructure access and within proximity to urban centers will be more likely to participate in agricultural activities, those that do participate may obtain more money from those activities.

Results on the importance of infrastructure and proximity vary across previous studies possibly because of different definitions of infrastructure and market access. For example, in Brazil Ferreira and Lanjouw (2001) find that being near an urban region increases the probability of participating in non-agricultural wage employment while Elbers and Lanjouw (2001) find in Ecuador that households near larger urban areas and remote rural areas participate less in non-agricultural activities relative to those near smaller urban centers. For Nicaragua, Corral and Reardon (2001) find that having access to electricity and an improved road both increase the probability of being involved in rural non-agricultural wage employment and the amount of income earned from that activity. De Janvry, Sadoulet and Zhu (2005) find that proximity to the county capital influences participation in rural non-agricultural activities in China. Winters, Davis and Corral (2002) find that in Mexico those in proximity to urban centers are less likely to participate in agricultural wage activities while those in semi-urban environments are more likely to participate in non-agricultural wage employment.

Even with the differences in measures, the results point to a strong influence of access to infrastructure and proximity to urban areas, as well as a positive correlation between access and rural non-agricultural wage employment. Greater access to infrastructure is therefore hypothesized to be positively linked to non-agricultural activities and negatively related to participation in agricultural activities. As the non-agricultural activities expand with development, the expectation is that this effect will be even stronger.

Demographics, wealth, social capital and other factors

Beyond these key assets, a number of other variables of course are also likely to influence activity choice. Demographic characteristics, particularly the amount of labor available, could lead to an expanded range of activities, particularly in contexts in which land is limited. Other demographic factors such as the age of the household, which reflects the stage of life of the head, and the gender of the household head, which may influence available opportunities, are also expected to play a role in activity choice. The amount of investment the household has previously made in agricultural and non-agricultural assets also matters as does the level of social capital of the household. Finally, the local context including the functioning of markets, availability of common property resources and local government policy, are all likely to influence household decision-making with respect to activity choice. Although these and other factors are included in the analysis and discussed, or at least controlled for via locality fixed effects, the focus of the paper is on the three key assets noted above.

Assets, activities and the level of development

The above discussion points to a few key hypotheses regarding the relationship between key assets and income generating activities—namely, i) land ownership is positively associated with participation in and income earned from agricultural activities and negatively associated with

non-agricultural activities and agricultural wage participation; ii) education is positively associated with participation in and income earned from non-agricultural activities and negatively associated with agricultural activities, and iii) infrastructure and proximity to urban centers is positively associated with participation in and income earned from non-agricultural activities and negatively associated with agricultural activities. While, as noted above, these hypotheses have been previously tested, there remains some ambiguity in the results across studies and the findings come principally from case studies where there is some question of national validity. In this paper, we seek to test these hypotheses using nationally-representative data from a number of countries.

Beyond testing these hypotheses for individual countries, a key strength of available data is in the fact it represents a range of countries at different levels of development. As such, it is possible to test hypotheses regarding how the relationships between assets and activities vary by level of development. In particular, the expectation is that with development the aforementioned relationships strengthen. This is expected given that with development, agriculture tends to become less important to the economy as a whole and non-agricultural sectors tend to become more important (Chenery and Syrquin, 1975). This transformation of the economy is likely to provide more opportunities in the non-agricultural economy and thus greater options for those with education and access to infrastructure and urban centers.

3. The multicountry RIGA database

The data used in this analysis come from household surveys covering 15 different countries, which form part of the RIGA database created as part of a joint FAO-World Bank project to develop comparable income aggregates and corresponding data for a series of developing countries.^v The range of countries selected for inclusion in RIGA is based on an attempt to get

widespread geographic coverage across the four regions of interest—Africa, Asia, Eastern Europe as well as Latin American and the Caribbean—while ensuring the comparability of the data. For each of the included countries, multitopic household surveys were used that had similar survey instruments with detailed questions on all household income generating activities to ensure that income aggregates could be created in a comparable manner. Additional information on household characteristics, including demographic structure, education, asset ownership, infrastructure access and location, was also available in each survey. While clearly not representative of all developing countries, the list does represent a significant range of countries and is useful in providing insight into the income generating activities of rural households in the developing world.

Details of the manner in which comparable income aggregates were created for this study can be found in Carletto et al. (2006). Here, a few key choices regarding the organization of the data are discussed. The first choice relates to the definition of rural and, correspondingly, which households are considered rural households for the analysis. Countries generally have their own mechanisms for determining what constitutes rural and urban. Analysis of rural households may vary just by virtue of the fact the definitions of rural vary. In exploring this issue, de Ferranti et al (2005) show there is significant variability across countries in Latin America and the Caribbean in the government's definition of the rural population, which generally underestimate the size of the rural population. The bias in government definitions seems to be towards excluding rural towns from the definition of rural even though their economies are strongly linked to the natural resource base and the surrounding rural economic activity. Furthermore, commuters may live in urban areas and work in rural ones and vice versa. In general, this bias is likely to understate the relative importance of rural non-agricultural activities to the rural

economy as a whole. While this potential problem is recognized, the available information in the data sets does not allow for an alternative definition of rural. Furthermore, it may make sense to use government definitions of rural since presumably this definition reflects local information and is also the definition used to administer government programs.

A second choice is to determine how to disaggregate income data in a manner that is consistent across countries. One common initial division is between agricultural and non-agricultural activities. A second common division of income, for both agriculture and non-agricultural activities, is between wage employment and self-employment. In addition, transfer payments, either from public or private sources may be included. Of course, the manner of dividing income aggregates varies by study as does the level of disaggregation. For example, income from agricultural production can be divided between livestock and crop income and crop income further into cash crops and staple products. Rural non-agricultural wage employment may be divided by sector or skill level. The choices often depend on data availability or the purpose of the study.

For this study, seven basic categories of income have been identified for analysis: 1) crop production income; 2) livestock production income; 3) agricultural wage employment income, 4) non-agricultural wage employment income; 5) non-agricultural self employment income; 6) transfer income; and 7) other income. The creation of wage employment and transfer income is relatively straightforward since the income is directly reported or can be calculated from wages and time worked. Self employment income from agriculture or non-agricultural activities is more complicated since revenues must be calculated and costs subtracted from those revenues to obtain income. Again, details can be found in Carletto et al. (2006). For each survey, these income aggregates are created following the same procedure and, since the survey instruments

themselves were chosen for their similarity, the differences in the variables across data sets should reflect cross-country variation rather than differences in variable definition, variable construction method or data collection.

Note that by lumping all of the activities by sector together, there is no distinction between activities within a sector that may be high productivity or low productivity. For example, one might expect certain crop production activities to be high productivity while others are not. Exploring this possibility is beyond the scope of this paper and here the focus is on looking at broad sectoral differences. The results should be viewed as average relationships for a given activities and not necessarily reflect all activities in that sector.

A third choice relates to the unit of analysis. While it is most common to evaluate income generating activities at the household level, some analysis is conducted at the individual level. The value of looking at the individual level is that it gives a clear idea of how individual characteristics are related to participation and returns to activities. However, it may be difficult to establish if income accrues solely to one particular individual since some activities are joint activities, particularly self employment activities. Additionally, the activities of one member of a household are likely to be simultaneously determined as part of an overall household income generation and diversification strategy.^{vi} The appropriate approach depends on the questions being asked in the research. For this paper, the household was deemed the appropriate level of analysis both based on the view of the importance of the household as a social institution in which decisions are made and the availability of data at the household level.

4. Rural income generating activities in developing countries

Table 1 presents data on participation rates in rural income generating activities for the countries included in this analysis ordered by the level of development from poorest to richest.^{vii} The

definition of participation used here is the receipt of any household income by any household member from that income generating activity. Table 2 shows the household income from the different income generating activities as a share of total household income. Income is calculated using local currency units so reporting shares rather than income levels facilitates comparison. Note that the data come from national surveys that are designed to be representative of the population although in most cases the poor have been over sampled. Therefore, the calculated participation rates and income shares have been weighted to provide accurate estimates of the true values for the rural population.

[Table 1]

The results indicate the continued importance of agricultural activities for rural households. As can be seen in Table 1, crop and livestock production still remain key activities with participation rates in the analyzed data sets indicating that 54 to 98 percent of rural households participate in crop production while 10 to 91 percent of rural households participate in livestock production. In many countries, including Malawi, Bangladesh, Nepal, Tajikistan, Nicaragua, Guatemala, Ecuador and Panama, more than one in three rural households participates in agricultural wage markets. Rural households across all of these countries are actively engaged in agricultural activities. Although participation rates in agricultural activities are high, as can be seen in Table 2, the share of total income from agricultural activities is substantially lower than the participation rates and is often lower than non-agricultural activities. Taken together, agricultural activities still represent between 25 and 77 percent of income generated by rural households and make up, on average, 56 percent of all generated income. Of the agricultural activities, in terms of share of income generated, crop production appears most important in all of the countries

except for Albania and Bulgaria where livestock income is more important and Bangladesh and Nicaragua where income from agricultural wage employment is more important.

[Table 2]

Tables 1 and 2 confirm previous findings that the rural non-agricultural economy plays a critical role in the income generation of rural households. For the countries analyzed, between 16 and 36 percent of households are involved in non-agricultural wage employment with an average participation rate of 29 percent. Two to 39 percent of households are involved in non-agricultural self employment with an average of 24 percent. Transfers, which include both public and private transfers, are received by 26 to 89 percent of rural households and numerous households receive other forms of income, such as income from rental property. On average, 44 percent of rural household income is from non-agricultural activities. This ranges from a low of 23 percent in Madagascar and Malawi to a high of 75 percent in Bulgaria. The importance of each of the different types of rural non-agricultural activities varies by country. For Albania, Bulgaria, and Tajikistan, where there are large government pension programs, and particularly in the case of Albania, where remittances are a considerable source of income, transfers are the most important source of rural non-agricultural activity. For Malawi, Madagascar, Ghana, Vietnam and Pakistan self-employment activities are the most important non-agricultural activity. For the remaining majority of countries, non-agricultural wage employment is the most important non-agricultural activity.

Compared to previous results a number of conclusions should be noted. Recent analysis of census data indicates that the share of workers primarily employed in rural non-agricultural activities is 11 percent for Africa, 25 percent for Asia, 36 percent for Latin America, 22 percent for West Asia and North Africa (Haggblade, Hazell and Reardon, 2002) and 47 percent for

Eastern Europe (Davis, 2004). Our results suggest that the participation rates are generally higher than previously reported—78 percent for Africa, 83 percent for Asia, 82 percent for Latin America and 92 percent for Eastern Europe. This could be due to the fact census data used in previous studies often only includes primary occupation which is likely to underestimate participation. Also found, which is less frequently highlighted in the rural non-agricultural literature, is the widespread receipt of transfers from public and private sources. In all of the data sets, over one in four households receive some form of transfer and in six cases participation rates exceed 50 percent. However, only in a two cases—Albania and Bulgaria—do these participation rates translate into more than 20 percent of household income.

In terms of overall income shares, surveys of the literature indicate that rural non-agricultural income represents on average 42 percent of rural income in Africa, 32 percent in Asia, 40 percent in Latin America and 44 percent in Eastern Europe and the CIS (FAO, 1998; Davis, 2004). Again, our results show that these activities are even more important than previously noted, except in Africa, and represent 44 percent the income generated by rural households. Furthermore, we find a greater range of importance across region than previously reported. For our sample countries, on average 23 percent of rural income in Africa, 41 percent in Asia, 52 percent in Latin America and 66 percent in Eastern Europe come from rural non-agricultural activities. In all the countries included except the African countries and Tajikistan, income from rural non-agricultural activities exceeds one-third of total income and for the six most developed countries non-agricultural income is equal to or exceeds agricultural income in importance.

[Figure 1]

Looking across the level of development, few patterns emerge with respect to participation rates except for a slight increase in participation in non-agricultural wage employment and transfers.

For shares of income, Figure 1 presents the agricultural and non-agricultural shares by level of development. The figure shows that non-agricultural income becomes more important as an income source as development occurs.

To examine the relationship between key assets and income generating activities, the next step is to see how activities vary by asset ownership. Table 3 presents the asset variables used in the analysis. The first set of variables—schooling, age of household head, family labor size and the gender of the household head—represent the human capital and demographic composition of the household. Schooling is measured by the years of education of the head of household since it gives a good indication of household education and is the measure of schooling that is least likely to be simultaneously determined with current household activities. As seen in the table, there is a range of average schooling levels across the data sets ranging from a low in Guatemala of 2.3 years to a high in Tajikistan of 9.5 years. In general, the former communist countries (Albania, Bulgaria, Tajikistan and Vietnam) have on average higher levels of schooling. Age of the head of household is included to reflect changes that occur in the life cycle of a household as well as a measure of experience. Average ages range from 43 to 57 with the higher ages of household heads found in Eastern Europe. The availability of family labor is likely to influence the range and type of activities in which a household is involved. Family labor is defined in all countries as the total number of household members that are between 15 and 60 years of age and ranges from an average of 3.7 members in Tajikistan down to 1.7 members in Bulgaria. Finally, we distinguish whether a household head is female, which generally indicates the head is a widow or the husband is not in the household for reasons such as migration. Female-headed households are most prevalent in Ghana where they account for 29.9 percent of households and least common in Albania where only 7.4 percent of households are headed by a female.

The next set of variables measures household access to natural capital, physical capital, and household wealth. Natural capital is measured by the hectares of arable land owned, which ranges from 0.1 in Tajikistan to 6.1 in Panama. For both agricultural productive assets and household nonproductive assets, developing comparable measures was challenging given the range of assets used for production in the countries being analyzed and the differences in the way in which wealth is stored. Comparable measures are desirable in conducting a cross-country analysis to ensure that differences in results across country are not driven by differences in variables used. In both cases, the choice was made to create indices of wealth that would facilitate comparison across countries provided that in each case the index is positively associated with wealth. Following Filmer and Pritchett (2001), a principal components approach is used in which indices are based on a range of assets owned by households. The choice of assets incorporated depended on the country in question but for agricultural wealth included items such as number of livestock owned and agricultural assets owned (tractor, thresher, harvester, etc.) for agricultural wealth and for non-agricultural wealth household durables (tv, vcr, stove, refrigerator, etc) as well as household infrastructure (running water, brick walls, etc). By definition, the mean of these indices is at or near zero.^{viii} While the measures are not quantitatively the same across country, they are comparable in the sense that they measure assets with a higher value indicating a higher asset position.

[Table 3]

To test the hypothesis regarding the relationships between economic activity and access to infrastructure and proximity to urban centers, we need a measure of access to this type of public capital. The difficulty in doing so is that while most surveys included questions on infrastructure and distances to urban areas of key services, few of the variables are comparable. To address this

issue, an infrastructure access index, including both public goods (electricity, telephone, etc.) and distance to infrastructure (schools, health centers, towns, etc.) was created using principal components in a manner similar to the wealth indices. As with the wealth indices, the variables included in the creation of the index varied by country and are by definition at or near mean zero.

Finally, in each survey some measures of social capital are available including migrant networks and information on participation in associations and organizations. While these are included in the analysis, the link between social capital and activity choice depends on the type of social capital and the country under study. For example, in some countries where migration is prevalent migrant networks may play an important role in activity choice, but it is unclear what role that might be and whether it would be the same for all countries. Because of this, unlike other variables a single index was not created and while these variables are included in the econometric analysis as controls, their relationship to activity choice is not presented.

Prior to investigating the connection between assets and activities in the data, it is also important to document the relationships between household welfare and the three key assets examined in this paper: land, education and infrastructure.^{ix} Given the conventional thinking regarding rural development, strong and positive links are expected between the three key assets and welfare. Table 4 provides a snapshot of these relationships and, with limited exceptions^x, confirms these links and suggests their potential to play an instrumental role in the well-being of rural households. In other words, higher per capita expenditure levels are consistently associated with more land ownership, additional education, and more access to infrastructure in these surveys; however, it should be noted that causation cannot be interpreted from this preliminary analysis.

[Table 4]

As an initial examination of the relationship between assets and activities, Table 5 presents the share of income from agricultural and non-agricultural activities by land, education and infrastructure categories. With rare exception, clear patterns emerge. For land, households are divided by the landless and then land quintile from smallest to largest. In general, an increasing quantity of land leads to greater share of agricultural income. This pattern is most pronounced going from landless to the lowest land quintile. The positive relationship seems to diminish at higher quintiles (going from the third to fifth quintile) and in a number of cases the relationship becomes slightly negative suggesting that those with largest land holdings may not be most involved in agriculture. The positive relationship between land and agriculture is driven by increases in both crop and livestock income shares across land category (not shown).

For education, households are divided by the level of education attained by the household head with the lowest being no education, followed by some primary education (1-5 years), primary plus some secondary education (6-10) and completion of secondary or more (>10). With the exception of Tajikistan, Albania and Bulgaria, the evidence from across the countries suggests that education is associated with a higher share of income from non-agricultural sources. For Albania and Bulgaria, those with no education receive more income from non-agricultural sources and the pattern is consistent for the other categories. The relationship between education and non-agricultural income appears to be the case in particular for those with the highest education (>10). Breakdowns of non-agricultural activities (not shown) indicate that this relationship is primarily driven by rural non-agricultural wage activities, which show a clear positive correlation with education, although in some cases this relationship holds for non-agricultural self-employment activities as well.

[Table 5]

Finally, the last set of columns show the relationship between the infrastructure index and income shares. Recall that the indices were defined in such a way that the higher the index the greater the access. With the exception of Bulgaria, the results show that infrastructure access is positively associated with non-agricultural activities and negatively associated with agricultural income. Further breakdowns by income category (not shown), point to rural non-agricultural wage employment as the primary reason suggesting access and thus proximity to urban centers and infrastructure availability is likely associated with greater wage employment opportunities. The findings conform to the above hypotheses and suggest a clear connection between particular assets and household activities across a range of countries.

5. Methodological approach

The approach taken to analyze the data from the RIGA database is similar to a meta-regression analysis. Meta-regression analysis is a systematic approach to examining study-to-study variation in empirical research. The idea is to explain how the choice of methods, design and data affect a certain type of analysis and thus lead to variation in results. To do this, the following steps are taken: (i) data from relevant studies are collected into a standard database, (ii) a single summary statistic for the analysis is identified and put into a common metric, (iii) a set of explanatory variables to include in a regression analysis are determined, and (iv) the particular regression model for the analysis is chosen (Stanley, 2001; Stanley and Jarrell, 2005). The meta-regression analysis is then the application of this consistent approach to data analysis for different data sets. The objective of conducting such an analysis is to compare the results obtained through the meta-regression analysis with those found through previous studies using the same data. An example of meta-regression analysis is the evaluation of economic research on

gender wage discrimination, which generally finds there is wage discrimination by gender but that it varies in magnitude (Stanley and Jarrell, 1998).

In our case, there is concern over the accuracy of the results of previous studies of income generating activities because they have tended to use case study information or, if national, census information only on participation in primary activities. Given this is the case, rather than collecting data from previous research, we have embarked on creating nationally-representative and comparable data. From the outset, we have sought to avoid the problems of having different results driven by differences in data. However, our approach mirrors meta-regression analysis in that (i) for each of the countries analyzed common metrics (participation and income from seven income generating activities) are used, (ii) explanatory variables for each country have been created in a uniform manner, and (iii) a standard regression model is employed in each case (which is described below). This approach then minimizes the possibility that differences in results are driven by differences in the variables used or in the empirical approach, and facilitates our ability to compare results across country.

The next step is to describe the specific econometric methods used to analyze the relationship between certain assets and activities for each of the data sets. As discussed in the conceptual framework (Section 2), barriers to entry, such as a lack of land or education, may limit the ability of a household to allocate labor to a certain activity. As such, the decision to participate in a given activity should be viewed as independent of the decision on the level of participation in an activity. Given this is the case, a common approach to conducting this type of analysis is to examine participation in individual activities using a discrete dependent variable model and then separately consider the level of income from that activity (Taylor and Yunez-Naude, 2000; Winters, Davis and Corral, 2002).

When looking at levels of income from each activity, there is some concern about the endogeneity of activity choice and thus selectivity bias as well as efficiency in parameter estimates due to the simultaneous nature of activity choice. The approach taken here to deal with bias and inefficiency in parameter estimates is to follow Taylor and Yunez-Naude (2000) who use Lee's generalization of Amemiya's two-step estimator in a simultaneous-equation model. In this approach, the resulting estimators are asymptotically more efficient than other two-stage estimators, such as the commonly used Heckman procedure.

For the econometric analysis, therefore, as a first step a probit of participation in each activity category (seven equations) is estimated using the complete set of explanatory variables noted in Table 3 along with additional country-specific controls for social capital and regional fixed effects. The estimated coefficients on the explanatory variables test the aforementioned hypotheses regarding the relationship between key assets (land, education and infrastructure) and participation in each activity. In the second step, the level of income obtained for each activity is estimated using a simultaneous equation system (with seven equations) that includes the complete set of explanatory variables noted previously as explanatory variables, except for the agricultural wealth variable for non-agricultural activities and the non-agricultural wealth variable for agricultural activities, as well as an inverse Mill's ratio to control for selectivity bias. The estimated coefficients in this case, test the hypotheses regarding the relationship between the key assets and the level of income earned from each activity.

6. Assets, participation and income generation: Results of the analysis

For each country included in the analysis, the probit regressions of participation (seven equations per country) and the simultaneous equation system for the level of income (seven equations per country) described in Section 5 are estimated. Given the large volume of data analysis conducted

for this study, it is necessary to organize the data in a manner that makes it easier to present. Since our interest is in understanding the role assets play in income generating activities, the organizing principle used here is to examine results for key assets and present them in individual tables. This is done below. Complete results of the analysis are presented in the appendix. The results are presented separately for the probits, where marginal effects calculate at the sample mean are reported, and the level of income. Note that in the interest of space, results for the “other” category of income are not reported in any tables.

Before proceeding, it is worth noting that in analyzing the relationship between assets and activities it is very difficult to ensure a causal relationship is established. All the available data are cross-sectional and thus collected for a single 12-month period. For any given asset, determining whether it is possession of the asset itself that leads to participation in an activity is problematic. Consider land, for example. Even if land is quasi-fixed in the short-run, greater land ownership may be the result of previous investment in agriculture and reflect something about a household that makes them more likely to invest in agricultural assets. It then becomes difficult to identify if it is land that leads to greater agricultural involvement or unobservable characteristics of the household. For some assets, such as schooling, the schooling of the head of household is used since it is less likely to be problematic than a variable such as highest level of schooling in the household or mean schooling. Even so, there is the potential for problems. For this reason, in the analysis below we remain cautious about inferring causality. However, given the strength of the results, there does appear to be clear evidence of strong correlations between certain assets and activities and we do believe these have implications for policy.

Land

Land ownership is hypothesized to be closely linked to crop and livestock production and expected to positively influence the participation in and generation of income from those activities. The marginal impact of land ownership on participation in individual activities and on the level of income earned from those activities are presented in Tables 6 and 7, respectively. In general, the results for the probit regressions on participation indicate that the more hectares of land a household owns the more likely it is to participate in self-employment agricultural activities (crop and livestock). This relationship is significant in most cases, although not all (12 of 15 cases for crops and 10 of 15 cases for livestock). In most cases, land ownership is negatively related to participation in both agricultural wage (10 of 15 cases) and non-agricultural wage (7 of 15 cases) suggesting that a lack of land pushes households into wage employment. The marginal effects of land on the probability of participation show no clear pattern across level of development, although some regional differences emerge. In particular, in Asia (Bangladesh, Nepal, Pakistan and Vietnam) the probability of participating in wage employment (agricultural and non-agricultural) appears to have a strong negative association with land ownership indicating in these Asian countries a lack of land is driving individuals to participate off-farm.

[Table 6]

Moving to income levels, the results generally indicate that greater quantities of land owned are linked to greater income from crops in most cases (8 of 15 countries). The exception, where more land is significantly linked to lower crop income, are Pakistan and Panama. This may be because in many cases land may be farmed more intensively in small farms, particularly in peri-urban areas, and income earned from these activities may be high. Thus, land size becomes less important for income earned. Similarly for livestock, in five cases land is positively and

significantly linked to livestock income. In no cases is a significant negative relationship between land and livestock income found. Nonetheless, the possibility remains that land size in itself matter less than whether the land is located near urban centers. In a number of cases, greater land ownership limits income from other activities, particularly wage earning activities, indicating those that have access to land tend to use labor on the farm rather than off the farm.

[Table 7]

The results found here are consistent with findings elsewhere noted above. Taken together, the results of the analysis and literature suggest that not only does larger land size appear to be linked to agricultural production, but is negatively associated with agricultural and non-agricultural wage employment, particularly in Asia. The results, however, do not support the hypothesis that this relationship becomes weaker with development. Overall the results suggest that policies that tend to focus on land access support an agricultural path of improving the welfare of rural households.

Schooling

Investment in schooling, by increasing human capital levels, is hypothesized to shift households towards non-agricultural activities and away from agriculture. Table 8 presents the marginal impacts of schooling from the probits on participation in income generating activities. For every data set, schooling is positively and significantly associated with participation in rural non-agricultural wage employment. Marginal effects, evaluated at the sample mean, range from 0.7 percent to 3.9 percent for each additional year of schooling. Interestingly there is little indication of a uniform impact of schooling on participation in non-agricultural self employment. For transfers, the results are mixed and are likely to depend on the country-specific context. For agricultural activities, schooling is negatively associated with participation in both crop and

livestock production in many, although not all, cases. However, schooling is positively related to participation in livestock production in Malawi, Bangladesh and Indonesia, and to crop production in Bangladesh, Tajikistan and Bulgaria. In all cases, however, the marginal impacts are not large. In most cases (11 of 15), participation in agricultural wage activities tends to be negatively related to schooling. The one exception where a positive relationship is found is in Albania. These results reflect those consistently found elsewhere that schooling is linked to a shift to non-agricultural wage employment, and that agricultural wage employment is the refuge of the poor and relatively poorly educated.^{xi}

[Figure 2]

Looking across the level of development of the countries, the results suggest that the education effect on non-agricultural wage employment is even stronger at higher levels of development. This can be seen in Figure 2 which plots the marginal effect of each additional year of education on the probability of non-agricultural wage employment. The marginal effects are generally higher for more developed countries. The figure also shows the marginal effects for agricultural wage and while consistently negative no clear pattern emerges based on the level of development.

[Table 8]

Looking at Table 9, the income level associated with higher schooling levels appear to be greatest for rural non-agricultural wage employment with positive significant results in nearly all cases (except Madagascar, Tajikistan, and Bulgaria) and marginal effects that are generally higher than all other categories. In contrast, schooling is not positively and significantly related to returns to non-agricultural self employment in most cases. The results suggest that education leads not just to a shift toward participation in rural non-agricultural wage activities, but also to

greater income from those activities. For agricultural wage income, the results indicate schooling has either no impact on returns from this activity or a negative significant impact. Finally, schooling has a mixed effect on agricultural production activities with positive, negative and no relationship in a variety of cases. The results indicate that as hypothesized households with a head with a higher level of schooling tend to shift towards non-agricultural wage employment and the effect is stronger with the level of development. Contrary to expectations, however, this hypothesis with respect to non-agricultural self employment cannot be confirmed. Thus, policies that tend to focus on promoting rural education are supporting non-agricultural wage employment as the main path towards improving the welfare of rural households.

[Table 9]

Access to infrastructure

The expectation is that households with greater access to electricity, water, communication, roads and other forms of infrastructure have a broader range of opportunities in non-agricultural activities in comparison to those with less access, who may be limited to agricultural activities. Recall that the higher the index the greater the access to infrastructure and, correspondingly, the closer the distance of the household to towns and markets. Tables 10 and 11 present the relationship between the infrastructure index and rural income generating activities. With some exceptions, access to infrastructure appears positively and significantly associated with participation in rural non-agricultural wage employment (12 of 15 cases). It also appears to be positively and significantly associated with the level of non-agricultural wage employment in most cases (11 of 15 cases). Not surprisingly, when a significant relationship exists, infrastructure tends to be negatively associated with participation in a range of agricultural activities, including crop and livestock production as well as agricultural wage. There is only one

positive relationship between participation in agricultural wage employment and infrastructure access (Tajikistan). The results for agricultural income levels are somewhat more varied.

Finally, note that the results for participation in rural non-agricultural self employment are positive and significant in most cases (although negative in the case of Malawi and Panama). This is also the situation for non-agricultural self employment income for half of the surveys and for all the Asian countries except Pakistan. This provides a clear indication that access to markets and infrastructure increase the probability of participation in non-agricultural activities.

[Table 10]

[Table 11]

These results are consistent with a number of studies showing the positive link between infrastructure access and rural non-agricultural wage and self employment supporting the hypothesis that this relationship is positive. Overall the results suggest that policies that tend to focus on promoting infrastructure are supporting non-agricultural wage and self employment as the main path towards improving the welfare of rural households.

Other factors

A number of other factors are included in the analysis but in the interest of space the results are not presented. Rural households with greater labor endowments are expected to be pushed towards off-farm activities since on average they are likely to have higher labor-to-land ratios. The results are as expected across in nearly all countries. The more labor available to households the more likely households are to participate in a diversity of activities, with the exception of transfers. This is probably because transfers are often provided to the elderly by the government and via remittances to parents, both of which tend to have smaller households. Looking at the

magnitude of marginal effects, the results seem to suggest that greater family labor size is a strong factor in pushing households towards participation in wage activities, in general, as well as into non-agricultural self-employment in some cases. For the level of income from activities, more labor tends to bring about greater income gains for most activities, but much larger gains (as measured by marginal effects of an additional laborer) from non-agricultural wage employment, agricultural wage employment and in some cases non-agricultural self employment. Taken together, the results indicate a larger labor endowment pushes rural households into activities that are alternatives to agriculture.

Another component of household demographic characteristics that is of interest is the gender of the head of household. In most cases, a male member of the family is identified as the head of the household, but in each country there is a significant proportion (on average just over one-sixth) in which the household head is female. The expectation is that in the majority of these cases this is because the household is a single parent household due to the death of a spouse, separation or migration of the spouse. Interestingly, the results indicate that without exception female headed households tend to be more likely to get transfers and in most cases to get greater amounts of transfers. This is most likely because spouses who migrate are likely to remit back to households and both private and public transfers are more likely to be given to single-headed households out of concerns for the well-being of such households.

The age of the household head is included to reflect the experience of the household head as well as the effect of the life cycle. The results clearly suggest that older household heads are much less likely to participate in either agricultural or non-agricultural wage employment. With the exception of a few countries in Latin America, they are also less likely to participate in non-agricultural self employment activities. This may reflect that these households began their path

of economic activity prior to the availability of alternatives to agriculture. They then tend to have remained in agricultural production while younger heads have followed alternative routes to improve their household's well-being.

As noted previously, both the agricultural and household wealth variables are indices created using principal components. Wealth variables such as these partially reflect the household investment of income earned in previous periods. Households that have previously worked in agriculture are much more likely to invest in agricultural production while households that have not are more likely to invest in other forms of wealth. Given this case, the expectation is that households that have invested in agricultural wealth will continue to pursue those activities while those that have invested in non-agricultural wealth will be more likely to focus on non-agricultural sectors. In general, the results correspond to expectations. Households with greater agricultural wealth tend to participate in livestock and crop production and gain, on average, more income from those activities. Interestingly, in a few cases the results indicate that having more agricultural wealth is linked to rural non-agricultural self employment. This could be due to the fact some self-employment activities, such as agricultural processing, are linked to agriculture. The generally negative relationship between agricultural wealth and both agricultural and non-agricultural wage employment suggest, as expected, that those who have invested in agriculture are not likely to participate in these activities. The results for non-agricultural wealth also support the idea that households who have invested in non-agricultural wealth are more likely to be in non-agricultural activities. Participation in and returns to non-agricultural wage employment and non-agricultural self-employment are positively and significantly linked to non-agricultural wealth. Interestingly, in a number of cases agricultural wage employment is

negatively linked to both forms of wealth. This provides additional evidence that in those cases agricultural wage employment is a refuge sector where only the poorest households participate.

7. Conclusions and policy implications

The objective of this paper is to examine the links between key assets and the income generating activities of rural households in developing countries. The approach to identify these relationships is to use household data from a range of countries and comparable methods thereby conducting an analysis akin to meta-regression analysis. This approach minimizes the possibility that cross-country differences are due to differences in data, variable definition or method. The analysis confirms the importance of rural non-agricultural activities in the livelihood strategies of rural households and suggests that previous studies that rely on case study information or census data probably underestimate the importance of the rural non-agricultural economy. This could be due to the fact case study data are likely to be in more agriculturally-oriented rural regions and census data miss occupations other than the primary one.

The analysis also shows clear links between key assets and the activity choice and level of income from different economic activities. In particular, we find that land access is linked to greater agricultural production and less participation in agricultural wage and non-agricultural wage activities and thus lead households to take, on average, this path toward improving household well-being. Land is found to be a particularly strong indicator of activity choice in parts of Asia where land scarcity is an important factor in rural development. Higher levels of education appear to be most closely linked to non-agricultural wage employment. This relationship is found to strengthen as countries develop, presumably with the expanding importance of the rural non-agricultural economy. Education does not appear to be closely linked to non-agricultural self-employment as hypothesized suggesting the educated prefer the security

of wage employment. Education is negatively related in most cases to agricultural wage employment indicating a preference to non-agricultural wage employment among the educated. Like education, infrastructure is closely linked to non-agricultural wage employment, but also non-agricultural self employment, most likely since this provides access to markets and inputs for production.

Land, education and infrastructure are assets that can be accumulated and their usefulness and value can be greatly influenced by government policy. The accumulation of assets by households that is the result of state intervention is therefore likely to push households towards certain economic activities. Given this is the case, a key question to consider is which assets should a government promote given its limited resources. There are some who argue that a land-focused approach to improving the well-being of rural households may be outdated and not reflect current reality. Clearly, the results presented here support the idea that households are involved in a range of activity and a sole focus on land access, which necessarily promotes a focus on agricultural production, is misplaced. In fact, the sole focus on any single asset for promoting rural development, including education or infrastructure, is likely to be misplaced since such a focus promotes a certain pathway for rural households since these assets are linked to certain activities.

This suggests the need for a mix of investment in assets that critically depends on the level of development of the country as well as local conditions. Of course, for a central government to identify such conditions requires local information and participation and suggests the need for some form of decentralized approach to rural development, such as a territorial approach which has received recent notice. A territorial approach is described by de Janvry and Sadoulet (2004) as an approach that distinguishes between different areas, and that seeks to integrate rural and

urban activities in a territorial dimension centered on regional economic projects and the economic incorporation of the poor. Such an approach would allow policy makers to identify how key assets, such as land, education, and infrastructure, are likely to shape the decisions of the local rural population. Ignoring the path specific implications of individual or joint interventions will only leave policies vulnerable to being imbalanced and ineffective.

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Table 1: Household participation in rural income-generating activities

Country and year	Income-generating activity								Agricultural total	Non-Agricultural Total
	Agriculture-Crops	Agriculture-Livestock	Agricultural wage employment	Non-agric wage employment	Non-agric self-employment	Transfers	Other			
Malawi 2004	96.3%	65.3%	54.8%	16.0%	29.8%	88.9%	6.6%	97.0%	93.4%	
Madagascar 1993	93.4%	78.0%	26.0%	18.2%	21.3%	43.5%	11.4%	96.1%	67.0%	
Bangladesh 2000	90.9%	80.4%	41.6%	35.4%	20.1%	26.4%	8.5%	87.1%	90.5%	
Nepal 2003	93.4%	86.2%	38.2%	36.0%	21.3%	38.3%	27.4%	97.8%	82.2%	
Ghana 1998	93.4%	78.0%	3.7%	18.2%	21.3%	43.5%	11.4%	88.9%	74.7%	
Tajikistan 2003	88.5%	68.9%	49.4%	29.3%	2.9%	58.0%	0.9%	95.3%	72.7%	
Vietnam 1998	97.8%	90.8%	20.1%	31.9%	38.3%	36.4%	19.3%	99.0%	79.8%	
Pakistan 2001	97.8%	90.8%	20.1%	31.9%	38.4%	36.4%	19.4%	74.5%	78.1%	
Nicaragua 2001	84.8%	71.9%	39.4%	35.2%	26.2%	38.7%	19.5%	95.0%	72.8%	
Indonesia 2000	53.7%	10.2%	19.3%	31.8%	32.7%	85.4%	14.1%	64.3%	92.5%	
Guatemala 2000	87.8%	66.0%	42.6%	34.5%	30.7%	65.3%	3.7%	92.6%	84.1%	
Albania 2005	94.9%	85.4%	5.3%	30.0%	10.9%	74.4%	18.8%	95.6%	90.3%	
Ecuador 1995	73.5%	76.2%	39.1%	34.4%	38.8%	27.3%	48.4%	93.0%	85.3%	
Bulgaria 2001	68.3%	66.5%	16.5%	20.2%	2.4%	89.3%	12.5%	80.7%	94.3%	
Panama 2003	61.2%	56.9%	35.4%	31.9%	25.7%	48.5%	55.0%	86.6%	86.5%	
Simple mean	85.0%	71.4%	30.1%	29.0%	24.1%	53.4%	18.5%	89.6%	83.0%	
Minimum	53.7%	10.2%	3.7%	16.0%	2.4%	26.4%	0.9%	64.3%	67.0%	
Maximum	97.8%	90.8%	54.8%	36.0%	38.8%	89.3%	55.0%	99.0%	94.3%	

Table 2: Rural household share of income from different activities

Country and year	Income-generating activity							Agricultural total	Non-Agricultural Total
	Agriculture- Crops	Agriculture - Livestock	Agricultural wage employment	Non-agric wage employment	Non-agric self-employment	Transfers	Other		
Malawi 2004	56.1%	9.4%	11.4%	7.4%	8.7%	6.6%	0.3%	77.0%	23.0%
Madagascar 1993	57.3%	13.2%	6.5%	6.1%	8.5%	6.2%	2.2%	77.0%	23.0%
Bangladesh 2000	29.4%	14.4%	18.3%	17.5%	9.3%	9.8%	1.2%	62.1%	37.9%
Nepal 2003	20.3%	17.7%	12.6%	21.1%	9.2%	16.8%	2.4%	50.6%	49.4%
Ghana 1998	57.3%	13.2%	1.4%	6.1%	8.5%	6.2%	2.2%	77.0%	23.0%
Tajikistan 2003	37.3%	17.4%	16.9%	11.5%	1.1%	15.5%	0.3%	71.6%	28.4%
Vietnam 1998	41.5%	14.8%	5.9%	9.2%	21.2%	7.0%	0.3%	62.2%	37.8%
Pakistan 2001	38.1%	16.1%	6.3%	9.8%	22.0%	7.4%	0.3%	60.5%	39.5%
Nicaragua 2001	20.6%	14.5%	21.5%	21.3%	11.2%	6.2%	4.7%	56.6%	43.4%
Indonesia 2000	22.4%	13.7%	8.2%	27.3%	10.1%	13.9%	4.4%	44.3%	55.7%
Guatemala 2000	27.6%	2.6%	19.9%	20.2%	12.4%	16.9%	0.5%	50.1%	49.9%
Albania 2005	20.1%	22.1%	2.6%	17.8%	7.3%	27.1%	3.2%	43.3%	56.7%
Ecuador 1995	22.1%	3.5%	21.9%	20.9%	12.8%	18.2%	0.5%	47.5%	52.5%
Bulgaria 2001	4.1%	11.5%	9.7%	11.5%	1.4%	60.7%	1.2%	25.2%	74.8%
Panama 2003	15.3%	2.2%	20.0%	19.7%	16.3%	13.2%	13.1%	37.6%	62.4%
Simple mean	31.3%	12.4%	12.2%	15.2%	10.7%	15.4%	2.5%	56.2%	43.8%
Minimum	4.1%	2.2%	1.4%	6.1%	1.1%	6.2%	0.3%	25.2%	23.0%
Maximum	57.3%	22.1%	21.9%	27.3%	22.0%	60.7%	13.1%	77.0%	74.8%

Table 3: Summary statistics of independent variables

Country and year	Household Head		Age of Head	Household labor size	Female Head	Land Ownership (Ha)	Agricultural		Infrastructure index
	Education (yrs)	Wealth Index					Wealth Index	Wealth Index	
Malawi 2004	4.2	43.1	2.1	24.0%	1.5	-0.005	-0.003	0.000	
Madagascar 1993	2.8	42.7	2.4	17.8%	1.1	-0.003	-0.004	-0.003	
Bangladesh 2000	2.6	44.6	2.7	8.7%	0.4	0.000	0.000	0.000	
Nepal 2003	2.4	47.1	2.8	19.5%	0.7	0.000	0.001	0.002	
Ghana 1998	4.2	45.6	2.1	29.9%	1.1	0.000	-0.003	-0.001	
Tajikistan 2003	9.5	49.3	3.7	14.4%	0.1	0.000	0.001	0.001	
Vietnam 1998	6.4	47.2	2.6	21.6%	0.2	0.000	-0.002	0.000	
Pakistan 2001	3.0	45.6	3.4	8.8%	0.9	-0.003	0.001	0.000	
Nicaragua 2001	2.5	46.2	2.9	18.8%	6.0	-0.001	0.000	-0.001	
Indonesia 2000	6.2	46.0	3.1	16.9%	0.8	0.000	-0.001	0.001	
Guatemala 2000	2.3	44.0	2.6	14.7%	1.4	0.000	0.001	0.000	
Albania 2005	7.9	52.1	2.6	7.4%	0.8	0.000	-0.003	0.001	
Ecuador 1995	4.4	47.5	2.5	14.1%	5.7	0.000	-0.001	-0.003	
Bulgaria 2001	7.8	56.7	1.7	21.8%	0.7	0.000	0.000	0.000	
Panama 2003	5.8	49.0	2.4	19.1%	6.1	-0.003	-0.002	-0.002	
Simple mean	4.8	47.1	2.6	17.2%	1.8	-0.001	-0.001	0.000	
Minimum	2.3	42.7	1.7	7.4%	0.1	-0.005	-0.004	-0.003	
Maximum	9.5	56.7	3.7	29.9%	6.1	0.000	0.001	0.002	

Table 4: Rural Household Land, Education, and Infrastructure Levels by Expenditure Quintiles

	Land Owned (ha)					Household Head Education (yrs)					Infrastructure Index							
	1	2	3	4	5	All	1	2	3	4	5	All	1	2	3	4	5	All
Malawi 2004	1.19	1.49	1.63	1.61	1.60	1.51	3.0	3.6	4.0	4.6	5.8	4.2	-0.18	-0.16	-0.11	0.01	0.45	0.00
Madagascar 1993	0.90	1.19	1.05	1.18	1.40	1.14	2.1	2.7	3.0	2.8	3.3	2.8	-0.20	-0.17	0.03	0.07	0.25	0.00
Bangladesh 2000	0.12	0.19	0.28	0.44	0.73	0.35	1.2	1.7	2.2	3.2	4.9	2.6	-0.40	-0.28	-0.10	0.08	0.70	0.00
Nepal 2003	0.35	0.55	0.63	0.82	0.94	0.72	0.9	1.7	2.2	3.0	4.1	2.4	-0.50	-0.34	-0.24	0.07	0.93	0.00
Ghana 1998	0.82	0.94	1.35	1.21	1.38	1.14	2.3	4.2	4.4	4.9	5.2	4.2	-0.58	-0.22	0.01	0.31	0.48	0.00
Tajikistan 2003	0.14	0.15	0.14	0.14	0.14	0.14	8.7	9.3	9.7	9.9	10.2	9.5	-0.14	-0.04	-0.01	0.01	0.17	0.00
Vietnam 1998	0.18	0.21	0.22	0.23	0.28	0.23	5.8	6.2	6.4	6.4	7.0	6.4	-0.42	-0.11	-0.05	0.18	0.41	0.00
Pakistan 2001	0.43	0.56	0.85	1.05	1.58	0.90	1.8	2.4	2.9	3.4	4.5	3.0	-0.25	-0.14	-0.04	0.08	0.34	0.00
Nicaragua 2001	3.70	4.86	8.08	5.46	7.79	5.97	1.4	2.0	2.4	2.8	4.0	2.5	-0.37	-0.11	-0.09	0.10	0.47	0.00
Indonesia 2000	1.09	0.85	0.71	0.80	0.68	0.83	4.4	5.0	5.9	7.0	8.8	6.2	-0.35	-0.14	0.01	0.10	0.38	0.00
Guatemala 2000	1.13	1.53	1.20	0.93	2.43	1.44	1.3	1.6	2.0	2.5	3.9	2.3	-0.40	-0.22	0.00	0.06	0.57	0.00
Albania 2005	0.66	0.73	0.79	0.88	0.98	0.81	6.8	7.4	8.3	8.0	8.9	7.9	-0.33	-0.10	0.01	0.06	0.36	0.00
Ecuador 1995	3.92	4.05	4.44	5.81	10.23	5.67	3.2	3.7	4.3	5.0	6.0	4.4	-0.22	-0.12	0.00	0.10	0.24	0.00
Bulgaria 2001	0.30	0.58	0.74	0.78	0.97	0.67	6.0	7.1	7.9	8.9	9.1	7.8	-0.59	-0.08	0.07	0.21	0.40	0.00
Panama 2003	5.54	4.43	5.22	6.71	8.74	6.13	3.3	4.9	5.7	6.6	8.3	5.8	-0.92	-0.43	0.09	0.33	0.92	0.00

Table 5: Sources of income by asset category

	Land Quintile	Share		Head Education Category	Share		Infrastructure Index Quintile	Share	
		Share Agric.	Share Non-Agric.		Share Agric.	Share Non-Agric.		Share Agric.	Share Non-Agric.
Malawi 2004	Landless	47%	53%	No Education	81%	19%	1st	84%	16%
	1st	72%	28%	Primary	80%	20%	3rd	78%	22%
	3rd	81%	19%	Middle School	76%	24%	5th	61%	39%
	5th	85%	15%	Higher: > 10 yrs	59%	41%			
Madagascar 1993	Landless	60%	40%	No Education	83%	17%	1st	86%	14%
	1st	79%	21%	Primary	78%	22%	3rd	79%	21%
	3rd	87%	13%	Middle School	64%	36%	5th	58%	42%
	5th	85%	15%	Higher: > 10 yrs					
Bangladesh 2000	Landless	32%	68%	No Education	41%	59%	1st	43%	57%
	1st	38%	62%	Primary	32%	68%	3rd	45%	55%
	3rd	43%	57%	Middle School	32%	68%	5th	25%	75%
	5th	42%	58%	Higher: > 10 yrs	22%	78%			
Nepal 2003	Landless	38%	62%	No Education	52%	48%	1st	60%	40%
	1st	44%	56%	Primary	48%	52%	3rd	48%	52%
	3rd	51%	49%	Middle School	47%	53%	5th	35%	65%
	5th	54%	46%	Higher: > 10 yrs	33%	67%			
Ghana 1998	Landless	55%	45%	No Education	70%	30%	1st	74%	26%
	1st	65%	35%	Primary	56%	44%	3rd	67%	33%
	3rd	77%	23%	Middle School	57%	43%	5th	32%	68%
	5th	82%	18%	Higher: > 10 yrs	33%	67%			
Tajikistan 2003	Landless	55%	45%	No Education	65%	35%	1st	77%	23%
	1st	61%	39%	Primary	69%	31%	3rd	73%	27%
	3rd	77%	23%	Middle School	70%	30%	5th	60%	40%
	5th	80%	20%	Higher: > 10 yrs	73%	27%			
Vietnam 1998	Landless	32%	68%	No Education	68%	32%	1st	76%	24%
	1st	55%	45%	Primary	64%	36%	3rd	64%	36%
	3rd	68%	32%	Middle School	63%	37%	5th	37%	63%
	5th	73%	27%	Higher: > 10 yrs	54%	46%			
Pakistan 2001	Landless	29%	71%	No Education	46%	54%	1st	52%	48%
	1st	70%	46%	Primary	39%	61%	3rd	46%	54%
	3rd	74%	31%	Middle School	37%	63%	5th	25%	75%
	5th	64%	24%	Higher: > 10 yrs	27%	73%			
Nicaragua 2001	Landless	46%	54%	No Education	63%	37%	1st	81%	19%
	1st	61%	39%	Primary	58%	42%	3rd	60%	40%
	3rd	75%	25%	Middle School	38%	62%	5th	33%	67%
	5th	77%	23%	Higher: > 10 yrs	17%	83%			
Indonesia 2000	Landless	21%	79%	No Education	38%	62%	1st	50%	50%
	1st	48%	52%	Primary	42%	58%	3rd	37%	63%
	3rd	57%	43%	Middle School	37%	63%	5th	22%	78%
	5th	54%	46%	Higher: > 10 yrs	22%	78%			
Guatemala 2000	Landless	44%	56%	No Education	59%	41%	1st	67%	33%
	1st	42%	58%	Primary	49%	51%	3rd	44%	56%
	3rd	58%	42%	Middle School	30%	70%	5th	11%	89%
	5th	66%	34%	Higher: > 10 yrs	8%	92%			
Albania 2005	Landless	8%	92%	No Education	33%	67%	1st	50%	50%
	1st	37%	63%	Primary	46%	54%	3rd	41%	59%
	3rd	46%	54%	Middle School	49%	51%	5th	28%	72%
	5th	50%	50%	Higher: > 10 yrs	36%	64%			
Ecuador 1995	Landless	44%	56%	No Education	63%	37%	1st	75%	25%
	1st	47%	53%	Primary	58%	42%	3rd	43%	57%
	3rd	63%	37%	Middle School	45%	55%	5th	36%	64%
	5th	59%	41%	Higher: > 10 yrs	31%	69%			
Bulgaria 2001	Landless	15%	85%	No Education	15%	85%	1st	20%	80%
	1st	19%	81%	Primary	22%	78%	3rd	21%	79%
	3rd	26%	74%	Middle School	23%	77%	5th	22%	78%
	5th	22%	78%	Higher: > 10 yrs	20%	80%			
Panama 2003	Landless	27%	73%	No Education	50%	50%	1st	60%	40%
	1st	39%	61%	Primary	42%	58%	3rd	35%	65%
	3rd	47%	53%	Middle School	33%	67%	5th	12%	88%
	5th	32%	68%	Higher: > 10 yrs	11%	89%			

Table 6: Relationship between land ownership and participation in income-generating activities

Country and year	Income-generating activity					Transfers
	Agriculture- Crops	Agriculture - Livestock	Agricultural wage employment	Non-agric wage employment	Non-agric self- employment	
Malawi 2004	0.0039	0.0078	-0.0027	-0.0035	-0.0028	0.0015
	18.41	2.05	1.41	1.60	1.50	1.11
Madagascar 1993	0.0008	0.0077	-0.0155	-0.0003	0.0030	0.0107
	2.10	1.40	2.50	0.07	0.59	1.60
Bangladesh 2000	0.2331	-0.0145	-0.0673	-0.0623	0.0044	-0.0104
	6.27	1.02	2.10	3.99	0.74	1.94
Nepal 2003	0.0000	0.0177	-0.1592	-0.0444	-0.0219	-0.0013
	4.22	1.72	4.87	3.52	2.44	0.14
Ghana 1998	0.0068	0.0080	-0.0008	-0.0071	-0.0068	-0.0012
	4.47	2.34	0.91	3.23	1.84	0.51
Tajikistan 2003	0.4147	-0.0866	0.2994	-0.1306	-0.0196	-0.1549
	4.34	-1.39	3.51	-2.01	-1.63	-2.07
Vietnam 1998	0.0000	0.0280	-0.0891	-0.1542	-0.1255	-0.1109
	2.46	3.45	3.94	5.05	4.29	3.96
Pakistan 2001	0.3572	0.0140	-0.0156	-0.0411	-0.0161	-0.0137
	13.67	5.94	5.05	9.45	4.91	4.85
Nicaragua 2001	0.0004	0.0042	-0.0037	-0.0001	-0.0008	-0.0005
	1.28	2.80	3.12	0.13	1.12	0.71
Indonesia 2000	0.0361	0.0007	-0.0329	-0.0001	-0.0011	0.0011
	31.70	1.58	2.56	0.08	1.03	1.65
Guatemala 2000	0.0219	0.0060	-0.0060	-0.0031	0.0002	0.0000
	2.57	1.78	2.92	1.43	0.21	0.18
Albania 2005	0.0000	0.0000	-0.0070	-0.0718	-0.0332	0.0423
	2.49	4.06	0.68	3.13	2.41	2.08
Ecuador 1995	0.0084	0.0033	0.0002	-0.0012	0.0007	0.0002
	2.42	2.42	0.29	1.23	1.78	0.62
Bulgaria 2001	0.0173	0.0049	-0.0100	0.0130	0.0016	0.0085
	0.92	0.51	1.71	1.25	1.25	1.35
Panama 2003	0.0017	0.0068	-0.0032	-0.0006	0.0015	-0.0011
	1.42	4.02	5.13	1.31	2.11	3.13

Notes: t-statistics presented below each coefficient. Bold indicates significance with at least 90 percent confidence. Marginal effects evaluated at the sample mean reported.

Table 7: Relationship between land ownership and income-generation by activity (in local currency)

Country and year	Income-generating activity					Transfers
	Agriculture- Crops	Agriculture - Livestock	Agricultural wage employment	Non-agric wage employment	Non-agric self- employment	
Malawi 2004	197.51	7.67	-107.01	81.08	-179.66	-13.19
	8.13	1.03	3.47	0.78	2.24	1.72
Madagascar 1993	48496.25	2083.67	-1011.78	-2654.80	-3788.78	-512.39
	9.86	0.97	0.79	2.21	0.52	0.74
Bangladesh 2000	-8.31	-17.43	279.37	2879.90	-2417.04	-294.85
	0.09	0.64	1.69	6.88	5.97	1.74
Nepal 2003	1932.64	509.38	-2260.99	-1010.06	-4.01	457.46
	14.27	2.55	7.94	0.93	0.01	1.34
Ghana 1998	36016.83	1460.66	284.88	-60957.53	6841.33	-367.29
	8.24	1.28	0.10	8.48	0.32	0.34
Tajikistan 2003	223.81	124.72	61.00	-75.46	-412.93	29.29
	3.68	2.80	1.59	-1.14	-3.76	1.37
Vietnam 1998	1162.48	5.15	-892.31	-4084.29	-8530.29	-569.75
	7.01	0.05	7.20	7.84	3.14	3.12
Pakistan 2001	-1265.52	53.26	-405.91	-1433.48	222.82	-162.83
	-13.10	1.34	-4.23	-7.82	0.47	-1.84
Nicaragua 2001	30.04	31.15	-94.69	-41.28	10.73	0.31
	3.76	4.52	5.06	2.75	0.69	0.10
Indonesia 2000	-1729.80	-443.07	-27965.86	-1719.78	-25675.03	-1756.69
	0.81	0.48	1.05	0.34	3.68	1.09
Guatemala 2000	5.65	3.40	-20.93	-63.73	5.73	0.55
	1.08	2.02	2.48	3.89	0.60	0.13
Albania 2005	66089.98	176316.04	92637.10	-333615.25	-1282900.00	67561.69
	2.25	6.19	2.18	2.24	4.04	1.44
Ecuador 1995	-1221.19	579.18	1194.88	-3092.68	-8.56	388.28
	-0.18	0.85	0.64	-1.13	0.00	0.73
Bulgaria 2001	20.38	1.54	11.02	-5.11	6.13	21.29
	1.43	0.14	0.62	0.16	0.28	1.24
Panama 2003	-1.09	0.96	-3.59	-6.88	1.73	-0.31
	3.08	2.87	2.09	3.22	1.06	0.44

Notes: t-statistics presented below each coefficient. Bold indicates significance with at least 90 percent confidence. Values of coefficients are in local currency units.

Table 8: Relationship between head schooling and participation in income-generating activities

Country and year	Income-generating activity					Transfers
	Agriculture- Crops	Agriculture - Livestock	Agricultural wage employment	Non-agric wage employment	Non-agric self- employment	
Malawi 2004	0.0000	0.0051	-0.0182	0.0129	-0.0031	0.0057
	0.14	3.34	10.69	11.67	2.18	6.69
Madagascar 1993	-0.0001	-0.0055	-0.0043	0.0164	0.0055	0.0059
	2.49	1.73	1.06	5.08	1.62	1.27
Bangladesh 2000	0.0035	0.0012	-0.0294	0.0154	-0.0001	0.0110
	2.62	0.54	13.12	7.72	0.08	5.24
Nepal 2003	0.0000	-0.0040	-0.0373	0.0070	0.0018	-0.0013
	0.27	3.80	11.90	2.74	0.87	0.48
Ghana 1998	-0.0001	-0.0041	-0.0019	0.0143	0.0064	0.0044
	1.59	1.70	2.68	9.90	2.88	1.92
Tajikistan 2003	0.0025	-0.0013	0.0016	0.0292	-0.0005	-0.0218
	1.70	-0.76	0.58	10.07	-1.52	-7.08
Vietnam 1998	0.0000	0.0006	-0.0040	0.0163	-0.0037	0.0078
	0.60	1.02	1.97	6.59	1.42	3.02
Pakistan 2001	-0.0006	-0.0004	-0.0092	0.0125	-0.0008	0.0100
	0.61	0.72	7.84	8.82	0.97	7.86
Nicaragua 2001	-0.0002	-0.0047	-0.0310	0.0272	0.0056	-0.0004
	1.99	1.50	6.43	6.28	1.52	0.08
Indonesia 2000	-0.0063	0.0013	-0.0112	0.0118	-0.0035	-0.0014
	4.36	1.67	10.55	9.21	2.68	1.42
Guatemala 2000	-0.0031	-0.0091	-0.0231	0.0315	0.0015	-0.0001
	6.34	2.90	5.88	9.14	0.48	0.37
Albania 2005	0.0000	0.0000	0.0032	0.0386	0.0024	-0.0186
	1.34	0.78	1.77	9.67	1.21	5.83
Ecuador 1995	-0.0051	-0.0040	-0.0265	0.0205	-0.0026	0.0049
	3.16	1.85	7.46	6.00	0.73	1.60
Bulgaria 2001	0.0094	0.0004	-0.0018	0.0112	0.0001	-0.0054
	1.67	0.10	0.74	2.17	0.12	2.20
Panama 2003	-0.0006	-0.0121	-0.0231	0.0226	-0.0049	-0.0076
	2.92	4.66	8.30	7.74	1.75	2.82

Notes: t-statistics presented below each coefficient. Bold indicates significance with at least 90 percent confidence. Marginal effects evaluated at the sample mean reported.

Table 9: Relationship between head schooling and income-generation by activity

Country and year	Income-generating activity					Transfers
	Agriculture- Crops	Agriculture - Livestock	Agricultural wage employment	Non-agric wage employment	Non-agric self- employment	
Malawi 2004	30.83	-4.75	-121.47	611.13	39.23	-35.51
	1.69	0.82	4.26	5.97	0.79	5.64
Madagascar 1993	-5590.18	-1006.23	2665.03	-854.93	6726.91	349.30
	1.69	0.70	3.17	0.78	1.24	0.71
Bangladesh 2000	170.42	-4.23	-444.18	193.94	-165.32	467.55
	5.30	0.52	7.34	2.12	1.02	4.28
Nepal 2003	129.52	138.83	-613.24	695.22	462.87	171.71
	3.49	2.49	9.48	3.79	4.18	1.68
Ghana 1998	-5459.28	-3718.54	-2689.14	137553.28	-9372.03	6945.40
	1.34	3.99	0.42	10.55	0.48	4.26
Tajikistan 2003	5.13	0.31	0.57	11.88	-11.15	-4.53
	2.47	0.18	0.49	1.06	-3.98	-4.50
Vietnam 1998	9.20	48.02	-32.10	398.47	-296.12	83.89
	0.63	5.35	2.83	7.63	2.42	6.07
Pakistan 2001	-188.19	40.73	-274.77	1190.33	33.63	42.27
	-3.95	1.81	-4.62	17.10	0.37	0.73
Nicaragua 2001	-24.45	108.79	-719.54	712.72	182.89	29.88
	0.52	2.75	5.10	6.04	1.60	1.52
Indonesia 2000	17190.60	334.56	-22460.00	85835.04	-66959.25	18528.01
	5.99	0.25	2.73	7.93	3.70	8.88
Guatemala 2000	99.55	-3.45	-147.19	612.48	-39.24	-5.61
	4.41	0.53	4.13	8.24	0.92	0.31
Albania 2005	-2105.78	-12443.92	-8960.21	179979.74	61346.64	-9116.48
	0.48	3.01	1.33	2.88	1.56	1.10
Ecuador 1995	150849.94	-111.02	-56496.31	126119.06	20624.80	22960.13
	2.61	-0.02	-2.02	5.39	0.64	2.58
Bulgaria 2001	-3.78	-9.38	-5.26	21.67	3.74	1.78
	0.48	1.61	0.63	1.18	0.32	0.19
Panama 2003	-6.08	4.73	-31.11	203.08	37.12	5.41
	3.06	2.64	2.66	10.02	4.52	1.23

Notes: t-statistics presented below each coefficient. Bold indicates significance with at least 90 percent confidence. Values of coefficients are in local currency units.

Table 10: Relationship between infrastructure access and participation in income-generating activities

Country and year	Income-generating activity					
	Agriculture- Crops	Agriculture - Livestock	Agricultural wage employment	Non-agric wage employment	Non-agric self- employment	Transfers
Malawi 2004	-0.0013	-0.0493	-0.0203	0.0255	-0.0177	-0.0057
	6.04	5.99	1.89	5.01	2.68	1.82
Madagascar 1993	-0.0002	-0.0352	-0.0093	0.0291	0.0225	-0.0307
	3.47	3.86	0.89	3.20	2.42	2.30
Bangladesh 2000	-0.0067	0.0551	-0.0289	-0.0007	0.0051	0.0027
	0.73	4.96	1.69	0.08	0.68	0.29
Nepal 2003	0.0000	-0.0111	-0.0585	-0.0282	0.0052	0.0351
	4.06	2.75	3.73	2.08	0.49	2.63
Ghana 1998	-0.0014	-0.0553	0.0034	0.0169	0.0180	-0.0028
	6.66	4.27	0.95	2.38	1.49	0.23
Tajikistan 2003	-0.0163	-0.0222	0.0407	0.0210	0.0089	-0.0442
	-2.45	-2.38	3.63	2.04	5.08	-3.78
Vietnam 1998	0.0000	-0.0043	-0.0482	0.0393	0.0285	-0.0127
	1.17	1.73	5.59	3.91	2.63	1.19
Pakistan 2001	-0.0107	-0.0206	-0.0379	0.0047	0.0196	-0.0101
	2.39	8.91	8.34	0.79	4.93	1.70
Nicaragua 2001	0.0006	-0.0338	-0.0891	0.0690	0.0799	0.0048
	1.86	2.90	6.24	5.00	6.14	0.35
Indonesia 2000	-0.0783	-0.0163	-0.0156	0.0313	0.0562	-0.0009
	9.18	3.44	2.78	4.03	7.03	0.17
Guatemala 2000	-0.0015	-0.0162	-0.0840	0.0539	0.0575	0.0014
	0.89	1.66	7.80	5.11	6.06	1.85
Albania 2005	0.0000	0.0000	-0.0103	0.0417	0.0454	-0.0094
	2.43	3.52	1.84	2.99	5.11	0.83
Ecuador 1995	-0.0048	0.0019	-0.0267	0.0606	0.0358	0.0378
	0.75	0.23	2.18	4.86	2.81	3.50
Bulgaria 2001	0.0231	0.0138	-0.0138	0.0328	0.0047	-0.0081
	1.33	1.01	1.86	1.89	1.32	1.00
Panama 2003	-0.0088	-0.1784	-0.0228	0.0313	-0.0863	0.0277
	8.02	12.12	1.54	2.06	5.58	1.91

Notes: t-statistics presented below each coefficient. Bold indicates significance with at least 90 percent confidence. Marginal effects evaluated at the sample mean reported.

Table 11: Relationship between infrastructure access and participation in income-generating activities

Country and year	Income-generating activity					Transfers
	Agriculture- Crops	Agriculture - Livestock	Agricultural wage employment	Non-agric wage employment	Non-agric self- employment	
Malawi 2004	-158.74	19.52	-31.65	5776.35	-247.81	34.34
	2.30	0.88	0.27	18.26	1.01	1.29
Madagascar 1993	-13656.32	-5214.01	-1124.26	11176.49	-24825.32	3363.35
	1.34	1.18	0.49	4.43	1.54	2.40
Bangladesh 2000	670.27	194.46	-572.57	652.47	3601.80	1200.56
	5.52	2.98	2.78	2.15	5.08	3.95
Nepal 2003	255.19	855.92	-1631.48	1462.33	1680.30	1456.58
	1.65	3.65	7.11	1.88	3.01	2.23
Ghana 1998	-59919.54	-20497.61	16531.81	164348.28	-14364.69	25982.04
	2.49	2.68	1.17	7.58	0.20	4.72
Tajikistan 2003	-30.21	-5.48	12.12	14.12	188.28	-0.96
	-3.60	-0.79	2.23	1.34	3.66	-0.26
Vietnam 1998	311.92	136.24	-289.64	898.85	2528.86	-19.42
	5.78	3.98	4.49	6.46	3.28	0.55
Pakistan 2001	-324.30	257.53	-1341.17	1532.37	-672.95	173.96
	-1.64	2.65	-5.25	6.06	-1.02	1.17
Nicaragua 2001	-465.69	52.46	-1876.70	1334.54	233.41	146.39
	3.37	0.43	5.22	3.61	0.24	2.39
Indonesia 2000	123704.42	13224.29	-3014.43	1559.47	1440104.90	70958.50
	5.76	1.34	0.14	0.03	5.24	5.75
Guatemala 2000	-218.33	-21.41	-908.99	916.52	738.98	120.02
	3.78	1.19	8.44	5.00	3.13	2.18
Albania 2005	-11437.48	-11898.15	35075.93	294251.55	1297827.78	91404.65
	0.71	0.77	1.38	3.51	3.56	3.50
Ecuador 1995	-155721.72	-48698.39	-39196.82	52254.65	-170261.18	152591.68
	-0.80	-2.51	-0.60	0.61	-1.30	2.38
Bulgaria 2001	70.05	2.78	-21.99	155.87	-16.48	-1.36
	2.79	0.15	0.77	2.61	0.35	0.04
Panama 2003	-23.39	29.07	2.75	313.42	424.32	66.35
	2.36	2.50	0.07	4.21	6.73	3.00

Notes: t-statistics presented below each coefficient. Bold indicates significance with at least 90 percent confidence. Values of coefficients are in local currency units.

Figure 1: Share of income by level of development

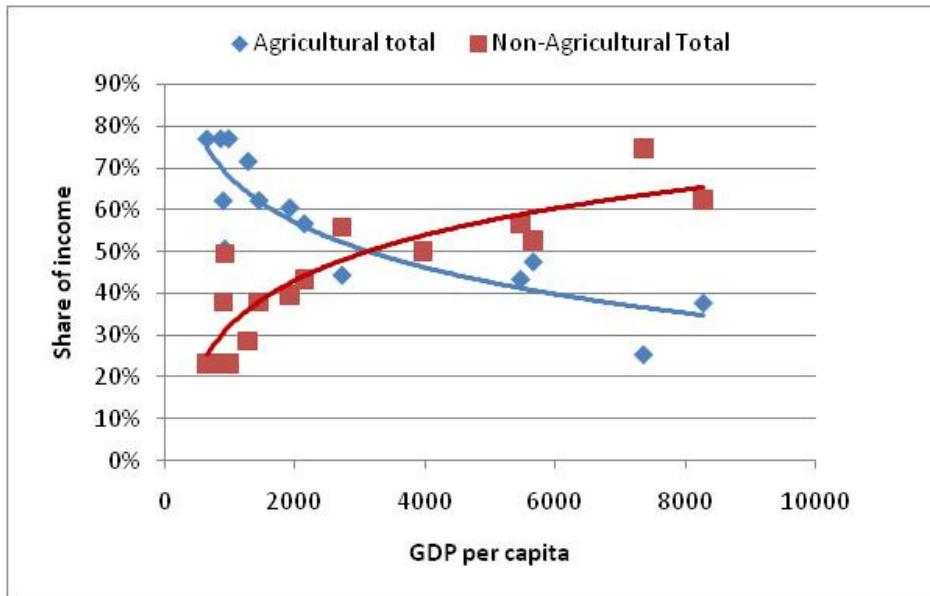
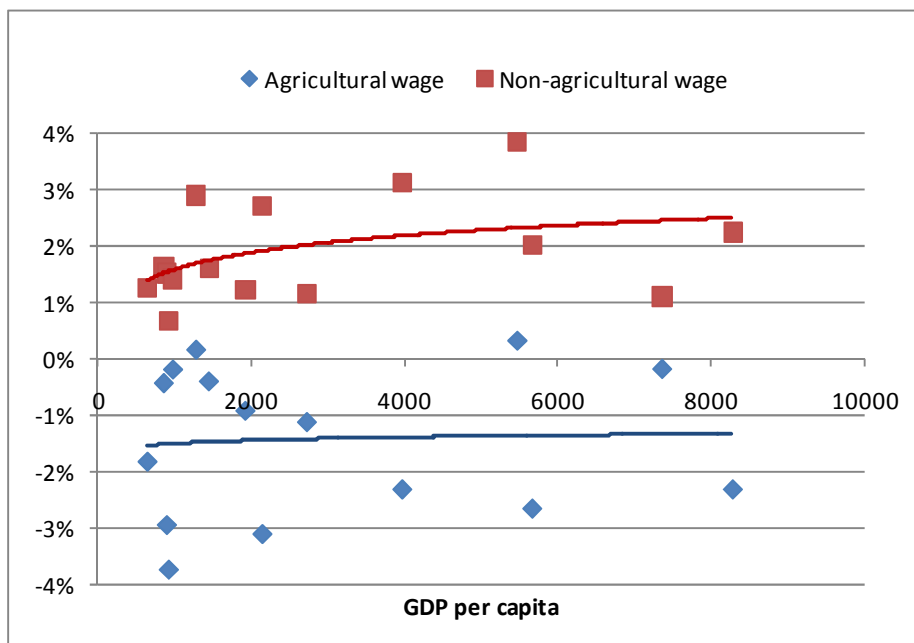


Figure 2: Education and participation in wage employment by level of development



ⁱ See Handa and Davis (2006) for a discussion of the development objectives of CCT programs.

ⁱⁱ For evidence showing a positive relationship between education and rural non-agricultural wage employment see Lanjouw, Quizon and Sparrow (2001), Berdegue et al (2001), Elbers and Lanjouw (2001), Ferreira and Lanjouw (2001), Yunez-Naude and Taylor (2001), Corral and Reardon (2001), Ruben and Van den Berg (2001), de Janvry, Sadoulet and Zhu (2005), Isgut (2004) and Winters, Davis and Corral (2002).

ⁱⁱⁱ For information on the RIGA project see http://www.fao.org/es/ESA/riga/index_en.htm.

^{iv} Institutions can be defined as a set of ordered relationships among people which define their rights, exposures to the rights of others, privileges and responsibilities (Schmid, 1972).

^v A description of these data can be found on the Food and Agriculture Organizations website at http://www.fao.org/es/ESA/riga/index_en.htm

^{vi} This does not necessarily imply a unitary household model. Even in alternative models such as a collective model, the decisions of one individual can be influenced by the relative bargaining power of other individuals in the household.

^{vii} The level of development is determined by (i) obtaining the GDP per capita for the year in which the survey was administered from the World Development Indicators, (ii) putting this into US dollar terms using the purchasing power parity exchange rate, and (iii) calculating the value in real 2005 terms using the US consumer price index.

^{viii} The values of the indices are not comparable across countries, though the method of construction is comparable and in all cases the values go in the same direction: more is better. Thus while for the econometric analysis the sign of the parameter is comparable across countries, the magnitude of the effect is not.

^{ix} Welfare is measured as per capita expenditures for each household.

^x The exceptions are for land where Indonesia shows a negative relationship between land ownership and welfare and for a few other countries where trends are not completely clear across all categories.

^{xi} See, for example, Lanjouw, Quizon and Sparrow (2001) for Tanzania, Berdegue et al, (2001) for Chile, Elbers and Lanjouw (2001) for Ecuador, Ferreira and Lanjouw (2001) for Brazil, Winters, Davis and Corral (2002) for Mexico, Corral and Reardon (2001) for Nicaragua, Ruben and Van den Berg (2001) and Isgut (2004) for Honduras, and de Janvry, Sadoulet and Zhu (2005) for China.