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The Filters to Exit Rural Poverty: An Analysis of the Complementarities of Assets in Developing Countries

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ABSTRACT

This paper explores a 15-country household data base to evaluate the impact of three key assets (land, education and infrastructure) on rural poverty. Using both a descriptive analysis and a quadratic probit model, with the probability of being poor as a function of these three assets, the paper concludes that household access to education and infrastructure are positively associated with higher incomes, while the impact of land holdings varies across countries. Also, this paper shows the importance of the complementarities among assets in their poverty alleviating potential. The key policy implications revolve around long-term public investments in education and rural infrastructure, and asset-bundling, i.e. investing in assets simultaneously

JEL Keywords: Poverty alleviation, rural investment, education, infrastructure, land distribution.

1. Introduction

Access to assets is negatively correlated with poverty in agriculture. This an accepted proposition in the literature. From a policy perspective, an important question is, What combination of assets should be promoted? Which asset complementarities are most relevant for poverty reduction for farm households? Addressing this question requires identifying the characteristics of the rural poor. What characteristics distinguish the poor from the non-poor? This paper presents recent evidence regarding the characteristics of the rural poor, their activities and the connection between bundles of household assets and the probability of being poor. It makes use of information gleaned from household surveys for 15 (sometimes 16) countries in the FAO and World Bank's Rural Income Generating Activities (RIGA) database.[1] The main objective of this study is to understand the filters to exit poverty: What are the characteristics of small farmers specifically and rural households more generally (in terms of access to infrastructure, land and education) that determines the probability of remaining or exiting poverty.

The surveys are comparable in terms of the structure of household income, expenditures and characteristics and permit geographic coverage across Africa (Ghana, Madagascar, Malawi, and Nigeria), Asia (Bangladesh, Indonesia, Nepal, Pakistan and Vietnam), Eastern Europe and Central Asia (Albania, Bulgaria and in some cases Tajikistan) and Latin America and the Caribbean (Ecuador, Guatemala, Nicaragua and Panama). Although not statistically representative of the entire developing world, the surveys nevertheless provide considerable insight into the activities, incomes and characteristics of rural households and the rural poor. This present paper complements the work of Winters et al. (2010), Davis et al. (2009), and Zezza et al. (2009) by extending the analysis of the connections of principal activities and incomes of the rural poor with

[1] See Carletto, Covarrubias and Krausova (2007). A description of these data can be found at http://www.fao.org/es/ESA/riga/index_en.htm

family characteristics and assets, specifically education, land and infrastructure. We emphasize the relationship between combinations of family assets and the probability of being poor.

The income aggregates constructed from the data base of RIGA countries allow for seven principal income sources: crop; livestock; agricultural wages; non-agricultural wages; non-farm enterprises; transfers; other non-labor activities. These sources are grouped into four categories: *on-farm* activities (self-employed farming, crop and livestock production), *agricultural wage* activities; *non-farm* activities (non-agricultural wage employment and non-farm enterprises); and *transfers/other* (public and private transfer income and other non-labor sources). One can further aggregate income into *off-farm* activities (the sum of *agricultural wages*, *non-farm* income and *transfers/other*); *non-agricultural* activities (the sum of the *non-farm* and *transfers/other* category); and *agricultural* activities (the sum of *on-farm* and *agricultural wages*).

Based on the RIGA data and building on previous research, this paper first presents a discussion of the household characteristics and income-generating activities of the rural poor. The focus of the paper then turns to assessing the link between different bundles of assets and household characteristics, with an emphasis on those rural families without access to a minimum threshold of assets. This question of the link between bundles of assets as a filter to exit poverty then leads to an examination of the probability of being poor as a function of access to assets. How sensitive is the probability of being in poverty to changes in the access to certain assets of small farmers? It is true that limited access to the three assets of interest here (which are susceptible to government intervention in the medium and long term) might prevent moving a large number of small farmers out of poverty in the short term (even with government support programs in the forms of extension, credit, and marketing assistance). Nevertheless, the point is to help guide interventions affecting these assets that, in the medium and longer term, are more effective in reducing poverty. The paper develops an approach to estimate the magnitude of the complementarities between education, farm size and infrastructure; so that, for example, one can quantify the greater impact of infrastructure on reducing the probability of being poor when accompanied by higher levels of schooling. As another example, in some countries, only large increments of expanding farm size reduces significantly the probability of a household being poor, given education and infrastructure; in other countries, expanding farm sizes in smaller increments appears to have a larger impact.

Who are the rural poor?

The many uses of the term “poverty” leave the word’s definition ambiguous. Many authors look at income levels, while others prefer a measure based on current consumption.[2] In addition, there are other perceptions of the importance of non-monetary variables in determining whether or not persons perceive themselves poor. For example relative deprivation is a common determinant of perceived poverty, especially in rich countries. But social exclusion and vulnerability are non-monetary dimensions

[2] For discussions of issues related to the definition of poverty, see for example M. Ravallion (1996), ODI (February 1999) and A. Sen (1989).

associated with poverty in any country. Most economists would measure poverty in the monetary terms of the (perhaps transient) inability to meet a minimum consumption levels during some period. This narrowly quantifiable definition of poverty and destitution is certainly more easily measured and compared than other, non-monetary definitions. One can also trace the evolution of consumption and income over time, comparing one period to another, serving to evaluate policies, including in cross-country comparative analysis, which is the case in this study. Household assets are more obviously linked to these monetary measures of poverty. Households more generously endowed with assets have the ability to generate higher incomes and, in the case of shocks to income, households can make use of stored wealth to smooth consumption.

What characteristics distinguish the poor from the non-poor? The profiles of poor households across the 15 surveys in the RIGA database give similar pictures. A comparison of household demographic characteristics, assets and composition of income between poor and non-poor households can be found in Table 1a through Table 1d.[3] Basing the definition of poverty on household expenditures, poor households are larger, have a greater share of dependents (persons of non-working age), hold less land, and have less access to running water and electricity. They also tend to own fewer livestock (as measured in tropical livestock units - TLU[4]); and they have limited access to primary schools and health clinics. For all countries in the RIGA dataset, poor households have significantly fewer years of education whether one looks at the household-level average or at the years of schooling of household heads.

Some exceptions to these general tendencies are interesting, emphasizing that regional and country factors are important. For example, although the average livestock holdings are small for both poor and non-poor, the poor have on average slightly more farm animals than the non-poor in Ghana, Nepal, Vietnam, and Albania. In nine countries poor households have a significantly lower share of female-headed households; in only one country do poor households have a higher share of female-headed households. No clear patterns are discernable regarding the age of the household head. In four countries, poor household have on average older household heads then non-poor households, while in seven countries the reverse is true. In terms of the relative distance to health clinics and primary schools among poor and non poor households the results are more ambiguous; while in five countries poor households are significantly farther away from health clinics, only in three countries is the same true for schools, and in two cases schools are closer, on average, for the poor.

With respect to income portfolios, discussed in more detail below, participation in, and shares of income from, on-farm activities, and in particular agricultural wage employment, are in almost all countries significantly greater among poor households. Similarly, non poor households have a higher share of participation in, and share of income from, off-farm activities, including transfers. Important exceptions from these patterns include Bangladesh, Pakistan, Bulgaria, and to a lesser extent, Nepal. In Pakistan in particular, the non poor have a greater share of agricultural sources of income, and a significantly smaller share of income from non-farm sources of

[3] In order for poverty comparisons to be comparable across countries, we used as poverty lines the local currency equivalent of 2.16 PPP international dollars of 2000. These lines were inflated or deflated to the year of the survey using the corresponding national consumer price indices.

[4] Tropical livestock units aggregate livestock into one index using region-specific weights. Cattle, for example, have a value of around 0.7 compared to sheep and goats at 0.1 and chickens at 0.01.

employment. This might be due to the particularly strong unequal land access in Pakistan, and in particular the large number of landless among the poor, with the landless resorting to low return wage employment, both agricultural and non-agricultural (Anríquez and Valdés, 2006).

Household assets and income generation strategies

The activities of rural households, their degree of specialization or diversification – and most importantly the incomes that they can derive from their activities – depend on the assets available to them. In rural areas obviously farming has been and will continue to be in the developing world a major economic activity, particularly of rural households. It is not surprising, therefore, that much of the thinking about improving the welfare of the rural poor focused on access to land and enhancing the productivity of small-scale agriculture. But as the many studies and previous evidence demonstrate rural households are involved in a range of economic activities; agriculture, although important, is not the sole, or in some cases, even the principal activity of the poor. The rural development literature has developed a greater emphasis on a livelihoods approach, recognizing that households use a range of assets in a variety of activities, including farming and non-farming activities. Thinking in terms of assets and livelihoods suggests that there are multiple paths out of poverty (Ellis, 2000). This observation has led some to question the merit of a land-focused vision of rural poverty alleviation (e.g., Rigg, 2006). But, as a matter of policy, what combination of assets – of land, skills and education, access to technological improvements, and infrastructure – should be promoted?

Making use of its particular set of assets a household engages to greater or lesser degrees in the variety of economic activities discussed in the previous section. Certainly given the assets available, household decisions are influenced by external conditions, such as the nature of markets and government policy; and the final outcomes of these decisions depend on unknowns: family health, changing farm prices and wages, weather and pests, and other natural and market forces. Expectations of the working of markets influence the choice of activities through prices, and importantly through transaction costs, which when substantial – as is often the case in the developing world – raise barriers to entry into certain activities. Governments affect the choice of activities through a variety of past and present actions such as the investment in infrastructure, provision of services, the design and execution of interventions, the implementation and enforcement of laws, and regulations generally. Society more broadly speaking shapes activities, determining the acceptability of and returns to activities, and establishing the rules that govern the use of social capital (Winters, et al., 2010).

There are a few broadly-defined assets closely linked with certain economic activities across a range of contexts: land, education (human capital), and infrastructure. Land is closely linked to crop and livestock production, and is usually of direct value only in farming. It may, however, have an important indirect value to households for developing other activities through its use as collateral for credit. One expects that those without access to some land, on average, would focus on other non-farm economic activities, and in fact studies confirm that land ownership is negatively correlated with

non-farm work and income. Access to land access appears to determine whether households remain in agriculture or shift to other activities.[5]

Other types of assets are less likely to be linked to agriculture. A household's human capital, as measured by schooling, is linked to a shift to non-farm activities where returns to this asset are most likely to be highest (see for example Taylor and Yunez-Naude, 2000). While there are returns to investing in education for those in farming, on average increased education is likely to have greater returns elsewhere, and studies tend to confirm that education is linked to a shift away from agriculture.[6] Having access to infrastructure and to population centres increases opportunities in non-farm activities. Infrastructure, such as electricity, serves as a factor in non-farm production, even small-scale production in the home; and the proximity to markets enhances both the profitability of self employment and opportunities for non-agricultural wage labor. One problem in assessing the impact of access to infrastructure on household activities and income is that there are varying definitions of "access" related to differences in measuring "infrastructure," such as roads, travel time, electricity, piped water, and so on. Nevertheless, even with the differences in measures of access, the results of many studies point to a strong connection between the proximity to urban areas and having access to infrastructure, and a positive correlation between such access and rural non-farm employment, especially non-farm wage labor.[7]

Indeed, Winters et al. (2010) examine the relationships between rural household assets and activities using a meta-regression analysis combining comparable household data from the 15 RIGA countries. They find that the availability of certain assets strongly conditions participation in, and returns to, specific income generation activities. Further, characteristics of households participating in different income generating activities are surprisingly similar across these otherwise very dissimilar countries. Households participating in on-farm activities have land, lower levels of education, live further from infrastructure and the head of household tends to be an older male. Households engaging in non-farm wage labor have higher levels of education, and they tend to live closer to infrastructure, with a younger head of household. Households participating in farm wage labor own little or no land, are poorly educated, live further from infrastructure, and the head of household tends to be a younger male. Finally, they find that households relying more on transfers are more likely be headed by an older female.

How are bundles of assets distributed? The number of families without access to a minimum threshold of assets.

[5] Most studies find a positive relationship between land size and participation in and/or level of agricultural income, and a negative relationship with non-farm employment and income. See Yunez-Naude and Taylor (2001) and Winters, Davis and Corral (2002) for Mexico; Corral and Reardon (2001) for Nicaragua; Adams (2002) for Egypt; Berdegue et al (2001) for Chile; Elbers and Lanjouw (2001) for Ecuador; de Janvry, Sadoulet and Zhu (2005), Zhu and Luo (2005) and Zhang and Li (2001) for China; and Lanjouw and Shariff (2002) for India.

[6] For example, 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).

[7] See, for example, Ferreira and Lanjouw (2001) for Brazil, Elbers and Lanjouw (2001) for Ecuador, Corral and Reardon (2001) for Nicaragua, De Janvry, Sadoulet and Zhu (2005) for China and Winters, Davis and Corral (2002) for Mexico.

To better understand the importance of households assets, consider the shares of the rural population and the shares of the rural poor (based on the $2/day expenditure poverty line) according to households sorted by their levels of land holdings, education levels of household heads and an index of access to infrastructure.[8] In Table , for each country we create twelve groups defined according to having different combinations of more or less than two hectares of land, more or less than primary education, and scoring more or less than the country's median level of access to rural infrastructure.[9] Across all 15 countries, there are relatively few households in the group with high levels of all three assets, and this group's population share is consistently higher than its share of the rural poor. The numerically larger group that is lacking in all three assets – low education, low land holdings and low infrastructure – consistently represents a greater share of the poor than its share of the rural population.

The patterns of asset bundling – although low in all countries by the standards of the developed world – vary considerably across the 15 countries, and each case has its own story. In Ghana, for example, the landless with little education and infrastructure represent 43 percent of the rural population and 50 percent of the rural poor. Nearly half of the rural population is made up of the poor with very little access to assets. In Panama, regardless of the amount of land, households with low levels of education and infrastructure make up 35 percent of the population, but 62 percent of the poor, while those with high levels of both education and infrastructure make up 33 of the rural population, but only 5 percent of the poor.

As a general rule, the data for poverty rates by asset bundle show that higher levels of education are associated with lower poverty rates, and with non-agricultural wage labor. But in some cases the relationship between poverty and education is not so clear. In Albania and Bulgaria, for example, where education levels exceed those in other countries, access to infrastructure appears to be important in determining poverty. In Albania, those with high education, low land but high infrastructure make up 38 percent of the rural population and only 17 percent of the rural poor, while those with high education, low land and low infrastructure make up 33 percent of the rural population and 45 percent of the rural poor. In Bulgaria, those without land make up almost 70 percent of the rural poor; within this group without land, those with low infrastructure

[8] The multi-dimensional concept of "access to infrastructure" is distilled to a single measure by creating country-specific indices based on principal components. The selection of factors follows the Kaiser criterion, and factors were scored following the regression method. The specific set of variables included in the principal components analysis is determined by the data available in each country survey. Nevertheless, three types of variables are always considered: household distance to infrastructure (school, health center, market, and/or transportation hub); household access to public utilities (electricity, telephone and cell phones, public water and sanitary connections, trash collection, and other); and housing characteristics (materials of floor, walls, and roofing). Distance incorporates travel time, when the individual country data are available; otherwise, distance is measured by simple kilometers. The household access to electricity, water and telephone refers to having the service in the home. The reader should note that the infrastructure index is not comparable across countries. One should not say, for example, the infrastructure elasticity is higher in Vietnam than in Bangladesh. In the following analysis, we explore correlations in the probit models country by country, and sort households within countries according to their country-specific indices. Although the indices derive from different underlying measures, nevertheless, for a given country, they can be used to sort or rank households qualitatively (not quantitatively) in the same way across countries.

[9] The asset "land" is measured in hectares, but of course the productivity of land varies within and across countries. Similarly the asset "education" is measured in terms of years of schooling, which also varies in quality within and across countries.

make up a much larger share of the rural poor than they do of the rural population, regardless of having high or low education.

Although in these RIGA countries education appears most obviously correlated with lower poverty rates, access to infrastructure is also linked clearly to poverty rates. For example, in Guatemala, the landless with little education but access to infrastructure make up 23 percent of the rural population, but only 16 percent of the rural poor. By contrast, the landless with little education and little access to infrastructure make up 19 percent of the rural population and 22 percent of the rural poor. In both Nepal and Vietnam, those with a little land and education but access to infrastructure make up nearly the same proportion of the rural poor as they do the rural population. But those with a little land and education and little access to infrastructure make up a notable larger share of the rural poor than they do the rural population. In Nepal this group makes up 38 percent of the rural poor and 44 percent of the rural poor; in Vietnam, the group makes up 27 percent of the population and 35 percent of the poor.

The probability of being poor as a function of access to assets.

To illustrate further the importance of education and the impact of infrastructure on the relationship between education and poverty, we model the probability of a household being poor (in terms of household expenditures: 2$/day) as a function of a series of household characteristics and assets.[10] Here we focus on the results regarding education and infrastructure. Consider first Figure 1a for Malawi and Figure 1b for Nicaragua. In the case of Malawi, the probability of being poor is very high for those with low levels of schooling, and falls rapidly for schooling beyond primary. But with low access to infrastructure, the probability of poverty increases notably compared to high access to infrastructure: for those with no schooling the probability of falling below the poverty line is estimated to be over 80 percent with low infrastructure access, but falls to 70 percent with high access.

In the case of Nicaragua, the probability of being poor is similar to that of Malawi at very low levels of schooling, but falls more rapidly as education increases. Again, access to infrastructure influences this schooling-poverty relationship. With five years of schooling and low infrastructure access, the probability of being poor is approximately 60 percent in Nicaragua, but it takes ten years of schooling in Malawi to decline to this probability. With high infrastructure access in Nicaragua, the probability of falling below the poverty line with five years of schooling falls relative to low infrastructure by 20 points to approximately 40 percent. A similar story can be found for Bangladesh (Figure 1c). In Panama (Figure d), households with no education on average have a relatively low probability of living in poverty (around 30 percent); with low infrastructure, however, the probability jumps to almost 70 percent, and with high infrastructure is falls to less then 10 percent.

Again for Malawi and Nicaragua Figure 2a and Figure 2b show the relationship between the size of land holding and the probability of being poor and the influence of

[10] The probability of being poor (in terms of consumption expenditures) as a function of household characteristics was estimated using a probit model for each country. The model was fit using a generalized quadratic specification for assets, demographic characteristics (gender and age of the household head, number of working age household members, and the proportion of females of working age in the household female), and district level fixed effects.

infrastructure on that relationship. To put these probability functions in context, note that the average holdings of the poorest income quintile in Malawi is about 1.2 hectares and for the highest 1.7. The average holding of the poorest quintile in Nicaragua is about 3.6 hectares and for the highest 7.5. Clearly for both countries the sensitivity with respect to land holdings of the probability of falling below the poverty line appears low.[11] The impact of moving from low to high access to infrastructure, however, is apparent at all levels of land holdings.

Across countries the probability of being poor responds most clearly to education levels and to infrastructure. The relationship between the probability of being poor and land holding is less clear. In most countries, controlling for education and infrastructure (and given the low levels of both), changing land size reduces the probability of being poor only marginally. There are exceptions, however. In Nepal (Figure 2c), on average the probability of poverty decreases with increasing size of landholdings, from almost 80 percent with no land to around 50 percent with 4 has; for Bangladesh (Figure 2d), the change is even greater. Further, for both countries across landholdings the association of infrastructure with a lower level of poverty is evident. However, the average size of landholdings in the wealthiest quintile of agricultural households in Bangladesh is only 0.84 has, and in Nepal 0.75 has. So, while the probability of being poor might be more sensitive to land holdings than other countries, a reasonable range over which land holdings might increase is quite restricted, with a decline in poverty rates small in absolute terms.

In most countries in the RIGA sample, the majority of the rural population simply lacks the assets necessary to exit poverty. Some countries, slightly richer, do tend to have greater access to infrastructure in rural areas, and higher levels of education, but in poorer countries the lack of access to assets is widespread. This raises the question, What is the scope for public policies that might have an impact over the medium-term horizon? For the adult population the level of schooling is almost given. Expanding the size of land holdings over a reasonable range appears only to offer a slight benefit in most of the RIGA countries, aside from the cost considerations. The evidence considered here points toward education for the young as a longer-term anti-poverty strategy – not only in terms of the quantity of schools and teachers, but incentives for attendance and improved quality of instruction. It also suggests that improving access to infrastructure could be a feasible, medium-term strategy, both by improving farmer access to markets, but also by improving employment opportunities in the non-farm sector, including wage labor.

Some concluding remarks on addressing the challenges to alleviating rural poverty

The magnitude of the problem of rural poverty in developing countries can seem overwhelming. According the Chen and Ravallion (2008), about 2.6 billion people live on less than two dollars a day, and 1.4 billion live on less than 1.25 dollars a day, a quarter of the developing world's population. As the World Development Report 2008

[11] A similar insensitivity of income with respect to farmland size was found in rural areas of six Latin American countries (see Lopez and Valdes, 2000). The contribution of land to total household per capita income was estimated to be small in Chile, Colombia, Peru and Honduras, reaching the highest income-to-land elasticity in El Salvador and Paraguay, but all elasticities less than 0.5 (and three less than 0.15). The elasticity of output to land is generally higher, fluctuating between 0.36 and 0.46.

notes, in Sub-Saharan Africa, agricultural-based countries are poor in terms of per capita GDP and face a rural poverty rate of about 50 percent on average. Transforming economies – not yet urbanized but dependent on agriculture and mainly in Asia – have a lower rural poverty rate of 28 percent, but represent 77 percent of the developing world's rural population – and 74 percent of the rural poor. Developing urbanized economies have a much lower rate of rural poverty – 13 percent – but only represent 9 percent of the developing world's rural population and 4 percent of the rural poor.

Progress toward alleviating poverty has been elusive in many countries, notably in South Asia and Sub-Saharan Africa, where poverty rates have remained stagnant. But there has been progress elsewhere, with a fall in the absolute number of the world's poor, mainly due to economic growth in East Asia, especially China. And in Latin America the number of poor has been falling in number and percentages since the year 2000. These differences in the trends in poverty across regions highlight the importance of economic growth generally to poverty reduction and the importance of public policies that foster pro-poor growth.

This paper has focussed on household-level attributes and decisions – activities and assets – which underline the practical links between public policies and the enhancement of opportunities of households to exit poverty. We have emphasized the bundling of three key assets in our discussion of the filters to exiting rural poverty: education, farm land and public infrastructure. Households' access to these assets can be influenced by government policies and have impacts on poverty reduction in the medium and long term. The paper has developed an approach to estimate the magnitude of the complementarities between education, farm size and infrastructure, which can assist in addressing the question of which combination of assets should be promoted. Effective policy depends on understanding better which complementarities between assets are most relevant for poverty reduction for farm households, and how these complementarities might differ across countries.

A number of key messages emerge from the literature and our results: First, across countries, with economic development overall there is an increase in the share of non-farm income in rural areas. Second, the relative importance of the three basic assets, bundled or by themselves, varies by country and context. Nevertheless, in most cases the poor are those with low levels of all three assets. Third, in only a few of the countries under study did a significant share of rural households have high levels of all three assets, or even two of the three; in most cases the proportion of rural households with access to sufficient assets to exit poverty is small. And those with the least likelihood to have such access are small farmers. Most importantly, higher levels of education are almost without exception associated with higher household incomes, especially when families have access to other assets, in particular infrastructure and the opportunities and the ability to engage in multiple activities. Moreover, higher levels of education permit mobility within and between rural and urban areas, and are associated with higher individual returns to labor.

The scope is limited, however, for public policies with an impact on rural poverty in the short run. For adults the level of schooling is difficult to improve significantly beyond some initiatives for training. For younger rural residents, investment in education is the principle avenue for escaping poverty as they reach working age. The evidence considered here points toward education for the young as a longer-term anti-poverty

strategy – not only in terms of the quantity of schools and teachers, but incentives for attendance and improved quality of instruction. Beyond a general education policy for rural areas, special attention should be given to marginalized groups, which often have higher rates of poverty, less access to infrastructure, and lower levels of schooling.

In contrast, it is less clear whether it is possible to expand the size of land holdings to such a degree that it might significantly raise incomes. Expanding land holdings over a feasible range might increase agricultural production but raise family income only slightly. Moreover, there are other policy considerations. Surplus land might not be available because of population density, and the costs of land transfers are large and many times ineffective without further, expensive support to beneficiaries for working capital and longer-term investments. Further, involuntary land transfers generate strong political tensions and undermine the credibility of property rights. The encouragement of land markets, however, especially rental markets, might offer an attractive option for farm-income-based families with the opportunity to expand. Again, in the case of marginalized groups, specific policies should be considered in the light of the legal and institutional obstacles they face in making better use of land resources. Similar institutional improvements could be applied to water markets.

In the medium term improving access to infrastructure appears to be among the most feasible and effective strategies. Rural infrastructure both improves farmer access to markets and expands employment opportunities in the non-farm sector. As discussed in previous sections, and supported by data from the RIGA countries, investments in infrastructure – most notably rural roads – tend to have a large impact on poverty reduction, and there is evidence that they also enhance agricultural productivity. The literature on the complementarities of policy instruments shows that with telephones and roads, for example, households can diversify income sources. A policy of providing better rural infrastructure could also influence the accumulation of human capital, improving both access to schooling and healthcare. Indeed, improved road networks, and the consequent improvement in local transportation and safety, leads to improved school attendance. The wider accessibility of electricity in rural areas produces a range of benefits; one in particular – more time for school study – in turn improves school performance. Investments in water and sanitation reduce infant, child, and maternal mortality, and increase school attainment. The mix of public expenditures can take advantage of these synergies.

For many farming areas agriculture will remain for the foreseeable future not only the mainstay of economic activity but the main income source of the bulk of rural families, and particularly the poor. While infrastructure investments would enhance access to markets, and reduce the costs of all transactions for agriculture generally, in order to improve the wellbeing of most smallholders policy makers should also consider the merits of specific institutional innovations. In the longer run many countries would benefit – rural areas especially – by the improvement the security of property rights, including the facilitation land transfers and rentals. In terms of having a shorter-term, program-oriented focus on farm families, development efforts can encourage farmer organizations, such as cooperatives, that might better be able to take advantage of scale economies, both for input purchases, technological transfers, and in accessing markets.

The paper has developed an approach to estimate the magnitude of the complementarities between education, farm size and infrastructure, showing the relative importance for improving rural family incomes of the access to the assets. Without

minimum levels of these assets households cannot take advantage of available opportunities, and thus programs for credit and extension are unlikely to have significant impacts on income. One can extract from the results of previous studies, and the evidence presented here for a sample of countries, that, in order to reduce rural poverty, policies should concentrate both on improving household activities already available – most prominently farming – and on expanding the range of potential activities of family members. The lesson from experience and much of the rural development literature is that the income generating potential – the ability to access and take advantage of activities – depends crucially on access to assets, such as education, land, and infrastructure.

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Table 1a. Household characteristics by poverty status, African countries

	Ghana 1998		Madagascar 1993		Malawi 2004		Nigeria 2004	
	Poor	Non-poor	Poor	Non-poor	Poor	Non-poor	Poor	Non-poor
	73.6%	26.4%	89.4%	10.6%	78.0%	22.0%	92.6%	7.4%
Demographic characteristics								
Share female headed households (%)	28.0	33.1	18.3	15.3	25.1	21.4	12.3	27.3
Age of household head	46.56	43.98	43.08	40.75	43.88	41.26	47.61	49.28
Household Size	5.37	3.15	5.14	3.48	5.05	3.26	5.20	2.67
Number HH members working age	2.38	1.71	2.41	2.14	2.23	1.86	3.01	1.78
Share of dependents in the HH (%)	54.6	40.2	49.5	32.2	54.1	37.3	40.0	30.8
Assets								
Agricultural assets								
Land ownership (ha)	1.05	1.29	1.09	1.48	1.43	1.66	...	...
Livestock holdings (TLU)†	0.83	0.41	1.51	1.84	0.28	0.41	0.79	0.23
Human Capital								
Years of education of household head	3.65	5.09	2.69	3.42	3.63	5.50	2.40	3.71
Highest years education in the HH	5.43	6.22	4.07	4.45	5.65	6.70	4.48	5.24
Infrastructure								
Distance nearest primary school (km)	0.81	0.38	0.33	0.26	2.01	5.24	...	...
Distance nearest health clinic/hospital (km)	6.04	6.41	1.85	2.30	0.67	0.66	...	...
Share households with running water (%)	2.95	15.49	0.05	1.92	0.98	5.08	23.85	30.61
Share households with electricity (%)	9.58	30.11	1.35	7.17	0.54	5.20	16.72	33.02
Income profile								
Participation share (% by Activity)§								
Farm	94.63	79.09	96.19	90.86	96.15	92.32	87.79	73.29
Agricultural Wage	2.95	5.02	27.62	16.86	60.40	42.34	3.76	3.13
Non-Agricultural Wage	13.32	24.84	17.54	21.98	14.67	19.37	8.16	13.35
Self-Employment	36.90	45.36	21.09	22.55	28.23	33.57	16.93	27.55
Transfers and Others	47.37	50.38	50.90	41.94	90.01	88.62	8.37	15.32
Income share (% by Activity)								
Farm	67.86	45.54	71.06	67.61	56.06	53.17	80.38	60.95
Agricultural Wage	0.97	2.19	6.97	3.71	16.91	10.62	1.99	1.82
Non-Agricultural Wage	6.27	15.11	5.47	9.70	6.58	12.48	6.34	12.10
Self-Employment	16.89	26.48	7.87	12.08	9.67	13.60	9.38	19.85
Transfers and Others	8.02	10.68	8.64	6.90	10.78	10.12	1.91	5.28

Source: Authors' calculations using the RIGA database. Notes: † Livestock measured in tropical livestock units. *§* Participation shares do not add to 100, as households may participate in more than one activity.

Table 1b. Household characteristics by poverty status, Asian countries

	Bangladesh 2000		Indonesia 2000		Nepal 1996		Pakistan 2001		Vietnam 1998	
	Poor	Non-poor	Poor	Non-poor	Poor	Non-poor	Poor	Non-poor	Non-poor	Non-poor
	70.0%	*30.0%*	*56.7%*	*43.3%*	*73.5%*	*26.5%*	*79.0%*	*21.0%*	*60.6%*	*39.4%*
Demographic characteristics										
Share female headed households (%)	7.61	11.01	15.49	18.38	11.80	14.86	7.68	11.54	19.55	24.22
Age of household head	43.52	47.00	46.68	45.34	43.93	46.36	45.02	46.93	45.40	49.47
Household Size	5.30	4.95	5.64	4.64	6.05	4.80	7.64	5.30	5.17	4.23
Number HH members working age	2.65	2.88	3.25	3.00	2.94	2.70	3.48	3.06	2.70	2.56
Share of dependents in the HH (%)	0.48	0.40	0.44	0.36	0.50	0.41	0.53	0.39	0.48	0.41
Assets										
Agricultural assets										
Land ownership (ha)	0.22	0.65	0.96	0.68	0.50	0.80	0.69	1.44	0.18	0.23
Livestock holdings (TLU)†	0.46	0.68	...	...	1.74	1.70	0.46	0.51	1.16	1.00
Human Capital										
Yrs. of education of household head	1.82	4.42	4.92	7.64	1.35	3.10	2.50	4.32	6.10	6.67
Highest years education in the HH	3.96	7.08	9.97	12.04	3.95	6.24	5.51	7.34	7.98	8.94
Infrastructure										
Dist. nearest primary school (km)	0.17	0.17	0.27	0.24	...	...	0.73	0.51	1.66	1.31
Distance nearest health clinic/hospital (km)	29.26	29.57	0.30	0.24	...	...	53.23	65.07	2.32	2.00
Share households with running water (%)	0.21	0.72	10.92	14.71	3.49	9.44	10.87	12.23	1.17	2.54
Share households with electricity (%)	10.21	37.30	81.50	86.75	4.41	16.45	66.31	77.72	40.20	62.84
Income profile										
Participation share (% by Activ.)§										
Farm	77.80	81.51	59.12	49.30	95.02	93.36	68.68	72.44	98.77	98.11
Agricultural Wage	43.99	16.66	25.05	13.17	50.01	23.18	22.49	13.45	23.64	15.67
Non-Agricultural Wage	31.03	33.74	30.41	33.28	36.81	32.27	51.75	39.92	30.70	33.32
Self-Employment	23.49	30.44	28.43	37.32	18.61	23.26	17.85	17.58	33.83	44.01
Transfers and Others	71.02	82.23	87.61	86.38	27.72	42.64	37.39	51.17	45.97	51.36
Income share (% by Activity)										
Farm	16.72	19.41	29.63	21.72	43.51	44.48	34.57	38.78	62.22	48.89
Agricultural Wage	25.82	7.36	12.00	7.14	22.09	10.00	9.70	4.66	7.53	3.90
Non-Agricultural Wage	20.18	18.68	18.75	22.00	17.75	17.03	29.29	22.48	8.52	10.10
Self-Employment	14.85	19.63	14.82	20.71	7.71	12.94	10.61	9.37	16.11	27.70
Transfers and Others	22.44	34.92	24.81	28.43	8.94	15.55	15.83	24.71	5.62	9.40

Source: Authors' calculations using the RIGA database. Notes: † Livestock measured in tropical livestock units. *§* Participation shares do not add to 100, as households may participate in more than one activity.

Table 1c. Household characteristics by poverty status, Latin American countries

	Ecuador 1995		Guatemala 2000		Nicaragua 2001		Panama 2003	
	Poor	Non-poor	Poor	Non-poor	Poor	Non-poor	Poor	Non-poor
	43.5%	*56.5%*	*45.3%*	*54.7%*	*66.1%*	*33.9%*	*35.3%*	*64.7%*
Demographic characteristics								
Share female headed households (%)	14.05	14.13	10.41	17.02	18.17	19.70	16.16	20.15
Age of household head	48.12	47.14	43.07	44.57	45.72	46.79	47.29	49.40
Household Size	6.37	4.34	7.02	4.81	6.64	4.62	6.96	3.75
Number HH members working age	2.87	2.36	2.89	2.45	3.17	2.51	3.10	2.15
Share of dependents in the HH (%)	55.20	44.65	58.23	47.53	50.85	42.87	53.95	42.21
Assets								
Agricultural assets								
Land ownership (ha)	3.83	6.65	1.84	1.94	5.43	6.36	5.42	6.47
Livestock holdings (TLU)†	2.33	3.06	0.56	1.14	1.33	3.24	0.70	2.26
Human Capital								
Years of education of household head	3.26	5.05	1.41	2.76	1.92	3.27	3.43	6.46
Highest years education in the HH	6.52	7.95	3.31	5.08	4.78	6.56	6.78	9.45
Infrastructure								
Distance nearest primary school (km)	10.73	10.70	4.30	3.08	1.55	1.40	0.64	0.50
Distance nearest health clinic/hospital (km)	2.64	2.58	...	...	6.22	5.60	4.95	3.66
Share households with running water (%)	0.48	0.49	0.49	0.56	0.19	0.37	0.61	0.85
Share households with electricity (%)	65.55	78.18	33.86	58.94	14.83	31.28	17.71	73.60
Income profile								
Participation share (% by Activity)§								
Farm	91.94	86.32	94.86	87.02	92.83	90.01	91.13	79.72
Agricultural Wage	49.60	33.56	59.27	33.23	48.14	27.63	46.23	25.73
Non-Agricultural Wage	32.86	35.27	24.15	40.60	33.17	38.27	23.89	47.38
Self-Employment	30.70	43.10	24.58	34.17	19.98	34.47	23.06	29.81
Transfers and Others	59.32	62.85	70.17	64.53	39.46	47.44	52.75	71.75
Income share (% by Activity)								
Farm	32.42	29.73	31.74	22.12	37.56	31.71	41.92	19.06
Agricultural Wage	29.47	17.52	30.44	17.07	27.43	13.33	26.48	14.27
Non-Agricultural Wage	17.63	19.04	11.56	26.20	18.39	25.06	11.40	32.46
Self-Employment	9.13	19.12	8.73	15.13	7.13	17.37	10.83	15.02
Transfers and Others	11.36	14.59	17.54	19.48	9.49	12.53	9.37	19.19

Source: Authors' calculations using the RIGA database. Notes: † Livestock measured in tropical livestock units. *§* Participation shares do not add to 100, as households may participate in more than one activity.

Table 1d. Household characteristics by poverty status, Eastern European countries

	Albania 2005		Bulgaria 2001	
	Poor	Non-poor	Poor	Non-poor
	7.6%	*92.4%*	*8.9%*	*91.1%*
Demographic characteristics				
Share female headed households (%)	3.33	7.66	13.64	22.21
Age of household head	47.75	52.32	50.09	57.03
Household Size	5.93	4.35	5.55	3.00
Number HH members working age	3.18	2.60	3.61	1.60
Share of dependents in the HH (%)	46.19	41.32	40.70	53.42
Assets				
Agricultural assets				
Land ownership (ha)	0.65	0.82	0.17	0.70
Livestock holdings (TLU)†	1.65	1.52	0.18	0.53
Human Capital				
Years of education of household head	6.60	7.95	5.61	7.90
Highest years education in the HH	8.68	9.79	7.30	9.30
Infrastructure				
Distance nearest primary school (km)	0.37	0.37	1.43	2.31
Distance nearest health clinic/hospital (km)	0.82	0.46	5.27	6.09
Share households with running water (%)	11.88	28.06	100.00	98.28
Share households with electricity (%)	92.66	89.61	63.64	88.36
Income profile				
Participation share (% by Activity)§				
Farm	88.20	95.66	40.91	78.75
Agricultural Wage	9.05	5.08	11.36	16.81
Non-Agricultural Wage	14.39	30.96	6.82	20.89
Self-Employment	2.64	11.44	2.27	2.40
Transfers and Others	86.00	75.21	88.64	90.76
Income share (% by Activity)				
Farm	49.73	39.95	6.89	16.00
Agricultural Wage	5.72	2.59	8.24	9.73
Non-Agricultural Wage	7.94	18.76	5.94	11.72
Self-Employment	1.76	7.71	0.73	1.39
Transfers and Others	34.85	30.99	78.21	61.16

Source: Authors' calculations using the RIGA database.

Notes: † Livestock measured in tropical livestock units. *§* Participation shares do not add to 100, as households may participate in more than one activity.

Table 2a. Household asset status and selected group characteristics

			Household by Asset Position	Share of HH members younger	Group's Share in Rural Population	Share of Group Poor (%)	Group's share in overall rural	% of Income						
								Agriculture	Agricultural Wage	Non-Agricultural Wage	Self-Employ-ment	Remit-tances	Public Transfers	Other
ALBANIA 2005	WITH LAND	1	E, L, I	5.66	2.20	0.00	0.00	41.18	5.07	15.89	12.24	9.95	12.85	2.82
		2	NE, L, I	0.00	0.24	0.00	0.00	31.83	0.00	0.00	0.00	42.55	25.63	0.00
		3	E, NL, I	2.50	38.73	3.01	16.67	36.48	1.75	22.96	11.38	11.43	13.03	2.98
		4	E, NL, NI	4.70	33.84	10.00	45.24	52.29	4.17	13.82	3.41	9.14	13.88	3.30
		5	E, L, NI	2.81	1.89	2.96	1.19	54.83	5.38	9.31	2.43	11.87	14.71	1.47
		6	NE, NL, I	3.90	5.93	9.40	5.95	33.59	1.95	6.97	1.51	21.55	30.66	3.76
		7	NE, L, NI	0.00	0.37	39.31	1.19	57.69	0.00	0.00	12.23	5.85	24.23	0.00
		8	NE, NL, NI	2.36	10.81	17.81	20.24	41.87	2.73	7.09	0.85	15.86	30.22	1.38
	NO LAND	9	E,I	9.72	3.30	6.59	2.38	5.96	2.77	54.03	14.76	4.54	14.12	3.82
		10	NE, I	0.00	0.55	0.00	0.00	2.42	0.00	16.33	7.57	37.94	33.16	2.58
		11	E, NI	2.54	0.98	7.62	1.19	15.27	2.23	59.65	16.15	1.73	3.22	1.74
		12	NE, NI	14.51	1.16	50.77	5.95	5.21	0.00	15.42	23.16	7.53	23.40	25.28
BULGARIA 2001	WITH LAND	1	E, L, I	0.00	5.25	3.64	2.27	22.50	7.20	11.50	2.37	2.32	51.88	2.24
		2	NE, L, I	0.00	0.34	0.00	0.00	10.16	0.00	0.00	0.00	18.80	70.63	0.40
		3	E, NL, I	1.29	26.57	0.28	2.27	18.16	11.21	17.89	1.79	2.71	46.78	1.46
		4	E, NL, NI	4.65	19.61	4.92	13.64	20.76	7.27	8.63	0.75	1.98	59.87	0.74
		5	E, L, NI	0.00	4.22	0.00	0.00	16.73	5.74	12.12	1.13	4.13	54.65	5.50
		6	NE, NL, I	7.69	2.96	0.00	0.00	28.55	6.71	3.45	0.00	2.75	56.58	1.97
		7	NE, L, NI	0.00	0.68	18.18	2.27	7.02	0.00	3.88	0.00	5.09	74.11	9.90
		8	NE, NL, NI	8.16	5.59	24.48	9.09	21.89	1.43	4.83	0.00	2.07	68.56	1.21
	NO LAND	9	E,I	11.70	10.72	0.00	0.00	6.28	17.24	20.53	3.72	7.10	44.06	1.07
		10	NE, I	15.63	3.65	22.73	9.09	5.15	14.42	3.80	0.00	7.65	68.98	0.00
		11	E, NI	12.24	11.17	18.18	25.00	10.96	13.16	5.89	0.00	5.98	63.77	0.25
		12	NE, NI	22.22	9.24	29.50	36.36	5.00	5.64	4.68	1.70	6.42	76.56	0.00
GHANA 1998	WITH LAND	1	E, L, I	6.51	0.80	31.53	0.46	55.31	1.85	34.79	-5.88	9.18	3.87	0.87
		2	NE, L, I	3.79	1.90	47.04	1.13	56.17	1.50	8.03	18.04	14.80	0.27	1.19
		3	E, NL, I	5.02	0.64	41.63	0.50	42.97	2.41	26.49	16.87	7.22	3.84	0.20
		4	E, NL, NI	29.54	1.69	63.91	1.05	68.41	1.57	8.08	16.42	2.95	2.29	0.28
		5	E, L, NI	13.77	2.41	54.42	1.51	72.67	0.00	13.21	7.32	4.22	2.03	0.55
		6	NE, NL, I	9.25	1.98	60.32	1.59	38.28	3.15	18.50	27.62	7.35	5.01	0.09
		7	NE, L, NI	11.57	14.64	80.06	15.75	82.85	0.75	1.73	8.82	4.86	0.46	0.53
		8	NE, NL, NI	11.49	11.37	76.50	12.78	71.57	0.95	2.69	16.94	7.32	0.48	0.06
	NO LAND	9	E,I	34.84	4.92	39.04	2.60	12.47	1.69	33.82	39.96	8.86	2.07	1.13
		10	NE, I	15.61	8.11	53.00	6.41	25.86	1.93	18.98	41.85	10.54	0.21	0.64
		11	E, NI	35.19	8.40	61.71	5.87	51.12	2.30	21.05	17.85	6.86	0.15	0.67
		12	NE, NI	16.54	43.14	83.96	50.36	64.81	1.39	4.91	19.61	8.63	0.16	0.49

Source: Authors' calculations using the RIGA database. Note: E, L and I refer to high levels of education, land and infrastructure, while NE, NL and NI refer to low levels of these three assets.

Table 2b. Household asset status and selected group characteristics

			Household by Asset Position	Share of HH members younger	Group's Share in Rural Population	Share of Group Poor (%)	Group's share in overall rural	% of Income						
								Agriculture	Agricultural Wage	Non-Agricultural Wage	Self-Employ-ment	Remit-tances	Public Transfers	Other
MADAGASCAR 1993	WITH LAND	1	E, L, I	0.00	0.19	81.86	0.18	92.54	0.00	2.95	-0.25	0.81	0.00	3.95
		2	NE, L, I	7.64	2.96	81.86	2.58	69.70	6.81	4.69	14.33	2.39	0.91	1.16
		3	E, NL, I	29.28	1.22	68.71	0.93	36.86	5.61	11.13	35.00	8.04	0.00	3.37
		4	E, NL, NI	24.21	1.33	72.59	1.16	71.67	3.78	7.36	12.31	3.52	0.00	1.36
		5	E, L, NI	38.14	0.42	76.35	0.36	90.79	0.00	0.67	0.53	7.37	0.00	0.65
		6	NE, NL, I	24.29	10.33	89.97	10.81	67.52	6.70	7.72	9.88	5.85	0.00	2.31
		7	NE, L, NI	17.24	14.25	84.55	13.04	83.76	2.71	1.77	5.76	3.03	0.00	2.96
		8	NE, NL, NI	24.69	45.36	93.33	47.57	79.44	5.56	2.00	6.27	4.61	0.07	2.04
	NO LAND	9	E,I	23.13	1.14	50.06	0.53	3.88	8.10	54.70	9.63	19.14	2.64	1.92
		10	NE, I	34.78	6.16	84.59	5.87	32.53	10.55	28.05	14.31	12.64	0.16	1.76
		11	E, NI	39.41	0.76	64.18	0.53	32.18	19.14	23.76	18.86	6.03	0.00	0.02
		12	NE, NI	32.49	15.88	93.08	16.42	61.97	10.08	5.84	10.01	9.65	0.00	2.45
MALAWI 2004	WITH LAND	1	E, L, I	22.16	2.88	52.29	2.03	66.95	5.82	11.37	7.20	4.62	1.68	2.36
		2	NE, L, I	10.02	5.40	72.12	5.13	68.35	8.98	4.05	10.28	4.55	3.15	0.64
		3	E, NL, I	40.45	8.58	59.10	6.38	45.67	10.79	19.83	15.75	4.83	1.91	1.22
		4	E, NL, NI	56.04	6.88	66.70	5.50	58.93	14.33	7.24	9.97	6.43	2.93	0.17
		5	E, L, NI	44.75	2.56	61.01	1.87	74.37	5.93	4.23	6.53	6.08	2.34	0.54
		6	NE, NL, I	21.88	21.57	85.54	24.33	52.30	17.40	6.81	12.70	6.25	4.23	0.31
		7	NE, L, NI	17.67	9.42	83.95	10.29	73.23	9.63	3.44	5.46	4.58	3.11	0.55
		8	NE, NL, NI	27.08	33.77	87.33	38.41	57.35	17.81	3.81	8.77	7.55	4.47	0.24
	NO LAND	9	E,I	41.83	3.23	27.65	1.16	12.27	9.08	54.43	16.22	6.22	0.78	1.00
		10	NE, I	26.89	2.07	76.94	1.95	21.20	15.53	27.15	23.04	10.70	2.25	0.13
		11	E, NI	64.48	1.16	50.49	0.68	33.87	20.15	13.50	21.44	9.57	1.23	0.25
		12	NE, NI	36.52	2.47	77.06	2.26	32.87	26.90	6.14	19.32	11.80	2.75	0.21
NIGERIA 2004	ALL RURAL	1	E,I	14.91	6.67	82.33	5.69	43.24	1.92	30.58	19.57	2.73	1.44	0.52
		2	NE, I	11.53	32.60	90.64	31.59	70.19	2.31	8.67	15.53	2.24	0.29	0.78
		3	E, NI	18.05	3.98	86.66	3.60	69.72	1.35	13.86	12.44	1.32	0.55	0.76
		4	NE, NI	13.84	56.75	95.66	59.12	87.44	1.80	2.52	6.68	0.91	0.11	0.54

Source: Authors' calculations using the RIGA database.

Table 2c. Household asset status and selected group characteristics

			Household by Asset Position	Share of HH members younger	Group's Share in Rural Population	Share of Group Poor (%)	Group's share in overall rural	% of Income						
								Agriculture	Agricultural Wage	Non-Agricultural Wage	Self-Employ-ment	Remit-tances	Public Transfers	Other
ECUADOR 1995	WITH LAND	1	E, L, I	3.91	5.25	24.99	2.69	30.03	7.87	21.87	15.59	3.41	1.21	20.03
		2	NE, L, I	3.93	6.13	43.59	6.23	49.36	9.48	5.59	13.70	3.15	0.55	18.17
		3	E, NL, I	14.62	4.97	39.28	5.37	21.26	10.22	29.38	23.80	4.35	0.31	10.68
		4	E, NL, NI	38.48	2.81	43.43	2.69	39.53	6.46	31.13	11.09	5.52	0.44	5.83
		5	E, L, NI	8.71	4.69	33.45	3.05	45.95	14.08	9.27	10.09	2.49	0.14	18.00
		6	NE, NL, I	10.02	8.14	61.41	12.58	38.65	20.55	15.75	9.49	5.42	0.74	9.41
		7	NE, L, NI	8.18	13.79	47.89	15.02	58.50	14.35	5.24	3.71	1.36	0.12	16.71
		8	NE, NL, NI	11.55	11.50	63.70	17.95	42.81	22.05	14.61	7.96	6.37	0.25	5.96
	NO LAND	9	E,I	25.64	13.19	13.78	4.52	8.35	17.26	32.55	34.10	4.70	1.27	1.78
		10	NE, I	14.82	10.18	45.12	10.38	11.23	37.76	19.18	19.73	9.43	1.21	1.45
		11	E, NI	36.02	6.29	20.71	2.44	12.06	25.23	33.74	23.66	3.95	0.20	1.15
		12	NE, NI	16.10	13.07	59.65	17.09	19.36	40.53	17.37	14.95	6.78	0.06	0.94
GUATEMALA 2000	WITH LAND	1	E, L, I	20.12	1.04	21.38	0.29	23.35	1.61	40.60	23.46	3.67	5.53	1.78
		2	NE, L, I	5.20	8.17	44.50	7.95	41.72	13.14	8.60	15.04	4.78	14.99	1.72
		3	E, NL, I	36.12	1.77	7.72	0.36	18.27	5.80	50.51	12.68	2.24	9.49	1.00
		4	E, NL, NI	82.17	0.21	10.61	0.07	18.69	12.90	57.78	0.00	0.16	10.48	0.00
		5	E, L, NI	18.99	0.29	10.74	0.14	65.73	9.08	9.66	2.37	4.19	8.71	0.26
		6	NE, NL, I	15.67	21.68	47.90	24.66	26.08	17.12	17.70	17.86	6.49	14.52	0.23
		7	NE, L, NI	11.30	6.73	63.30	9.91	58.69	14.25	4.47	8.32	2.79	10.81	0.67
		8	NE, NL, NI	25.09	11.06	70.58	18.37	37.36	27.16	9.75	7.89	6.30	11.48	0.06
	NO LAND	9	E,I	31.82	5.77	4.78	0.58	2.68	5.44	56.04	19.65	4.71	9.99	1.49
		10	NE, I	23.38	22.65	29.44	15.69	12.65	22.45	30.49	13.61	5.81	14.36	0.63
		11	E, NI	59.57	1.43	3.26	0.22	11.41	15.55	44.22	15.41	6.63	6.77	0.00
		12	NE, NI	29.31	19.20	53.88	21.76	23.61	37.57	15.36	7.06	4.66	11.51	0.23
NICARAGUA 2001	WITH LAND	1	E, L, I	4.70	1.64	16.78	0.37	40.31	4.69	25.76	12.71	7.52	0.04	8.97
		2	NE, L, I	6.39	9.90	64.91	9.11	57.03	10.75	13.09	8.47	5.11	0.03	5.51
		3	E, NL, I	0.00	0.93	35.41	0.55	13.38	11.19	36.17	25.98	5.53	0.00	7.75
		4	E, NL, NI	23.59	0.33	26.39	0.18	26.39	40.49	17.73	7.04	2.65	0.00	5.69
		5	E, L, NI	40.60	0.77	44.09	0.37	72.18	3.89	7.65	8.86	2.64	0.00	4.78
		6	NE, NL, I	5.39	3.83	69.78	4.23	37.23	20.76	22.86	10.67	4.39	0.00	4.10
		7	NE, L, NI	15.02	23.36	74.43	26.86	72.38	10.72	4.72	3.92	3.77	0.52	3.97
		8	NE, NL, NI	20.65	5.58	85.22	7.27	50.65	23.10	12.75	5.02	4.35	0.77	3.35
	NO LAND	9	E,I	22.22	6.51	21.96	2.02	7.70	7.91	51.25	20.24	6.07	1.65	5.19
		10	NE, I	15.51	17.51	63.03	15.92	13.83	24.74	26.68	22.04	6.15	1.12	5.43
		11	E, NI	38.20	2.74	48.28	1.66	12.03	20.57	42.92	11.36	7.23	0.42	5.48
		12	NE, NI	29.95	26.91	78.03	31.46	24.35	36.92	20.62	7.54	6.01	0.47	4.09

Source: Authors' calculations using the RIGA database.

Table 2d. Household asset status and selected group characteristics

			Household by Asset Position	Share of HH members younger	Group's Share in Rural Population	Share of Group Poor (%)	Group's share in overall rural	% of Income						
								Agriculture	Agricultural Wage	Non-Agricultural Wage	Self-Employ-ment	Remit-tances	Public Transfers	Other
PANAMA 2003	WITH LAND	1	E, L, I	2.81	5.36	9.34	0.85	21.17	7.81	37.58	17.59	4.18	8.88	2.78
		2	NE, L, I	1.46	3.07	0.00	0.00	34.45	11.23	11.34	18.18	11.25	5.24	8.30
		3	E, NL, I	4.33	5.50	7.88	0.85	15.40	11.68	37.47	18.83	5.18	9.51	1.93
		4	E, NL, NI	9.73	4.58	47.66	6.94	32.56	27.14	18.48	11.55	5.66	4.26	0.34
		5	E, L, NI	11.85	5.05	32.97	5.24	42.15	11.71	19.63	13.92	6.04	5.31	1.25
		6	NE, NL, I	7.97	3.21	6.14	0.99	19.94	9.39	21.16	8.68	20.74	18.52	1.58
		7	NE, L, NI	6.42	14.21	74.68	32.29	55.30	16.72	6.24	9.71	7.29	3.33	1.42
		8	NE, NL, NI	8.58	8.98	68.22	19.83	41.54	23.06	14.93	9.36	8.76	2.26	0.09
	NO LAND	9	E,I	17.94	22.61	5.36	3.40	5.73	11.03	50.67	17.34	5.82	8.42	1.00
		10	NE, I	10.61	6.76	23.45	3.68	9.30	21.11	19.96	14.52	14.31	18.72	2.08
		11	E, NI	38.54	8.44	27.39	6.37	13.24	24.36	33.78	13.71	11.14	3.61	0.15
		12	NE, NI	17.12	12.23	55.42	19.55	28.27	28.57	13.93	12.59	12.92	3.53	0.20
BANGLADESH 2000	WITH LAND	1	E, L, I	8.24	1.25	19.77	0.32	27.12	0.37	22.62	20.23	6.42	1.99	21.26
		2	NE, L, I	6.14	0.95	23.35	0.29	40.55	0.83	5.00	13.66	9.00	1.35	29.60
		3	E, NL, I	11.23	6.22	27.06	2.15	25.55	2.13	25.07	18.30	13.72	1.97	13.25
		4	E, NL, NI	13.95	3.42	51.30	2.39	31.68	3.74	24.13	12.43	10.68	3.82	13.51
		5	E, L, NI	4.31	0.46	21.83	0.12	36.24	2.97	11.79	23.44	4.92	1.19	19.46
		6	NE, NL, I	9.27	12.58	60.08	10.45	29.13	10.06	14.91	14.63	13.64	2.35	15.26
		7	NE, L, NI	0.00	0.70	51.28	0.47	47.29	4.14	3.15	3.73	8.10	1.89	31.70
		8	NE, NL, NI	12.82	23.61	81.09	26.94	33.34	18.59	9.72	12.48	8.40	2.33	15.15
	NO LAND	9	E,I	16.24	3.08	21.74	0.90	2.44	6.60	32.49	26.36	13.14	4.27	14.69
		10	NE, I	19.88	12.94	69.46	12.71	3.96	18.72	25.52	24.35	13.33	3.01	11.10
		11	E, NI	14.58	1.39	61.53	1.19	2.03	7.03	34.14	28.63	10.72	2.39	15.07
		12	NE, NI	20.56	33.39	89.53	42.07	4.58	33.70	23.93	15.38	7.40	4.80	10.21
INDONESIA 2000	WITH LAND	1	E, L, I	1.94	2.10	54.59	1.50	50.61	2.98	15.10	11.37	14.67	0.52	4.75
		2	NE, L, I	6.27	0.49	56.60	0.49	43.70	4.91	9.15	19.86	18.09	0.03	4.26
		3	E, NL, I	6.28	13.31	48.24	10.39	42.46	3.91	19.96	16.20	13.38	1.51	2.58
		4	E, NL, NI	7.42	8.67	63.42	9.25	48.79	6.67	14.85	10.38	16.41	1.73	1.18
		5	E, L, NI	7.43	1.45	46.82	1.10	45.75	6.07	7.14	16.83	17.96	0.54	5.71
		6	NE, NL, I	7.33	6.81	71.93	8.01	42.13	6.29	12.18	19.01	16.94	1.58	1.87
		7	NE, L, NI	8.69	1.21	72.71	1.54	65.36	1.72	2.35	9.10	18.53	0.07	2.87
		8	NE, NL, NI	10.26	12.61	76.38	16.32	51.77	7.38	8.93	10.79	18.13	0.87	2.12
	NO LAND	9	E,I	16.13	19.97	42.76	13.14	4.41	6.52	38.25	24.19	19.48	2.33	4.82
		10	NE, I	13.65	10.98	67.96	12.66	9.15	15.27	21.54	26.25	22.78	1.08	3.92
		11	E, NI	19.27	8.27	52.13	7.00	9.25	14.25	24.92	17.41	26.10	2.96	5.11
		12	NE, NI	14.76	14.12	79.18	18.60	13.92	19.30	22.59	16.64	23.18	1.13	3.22

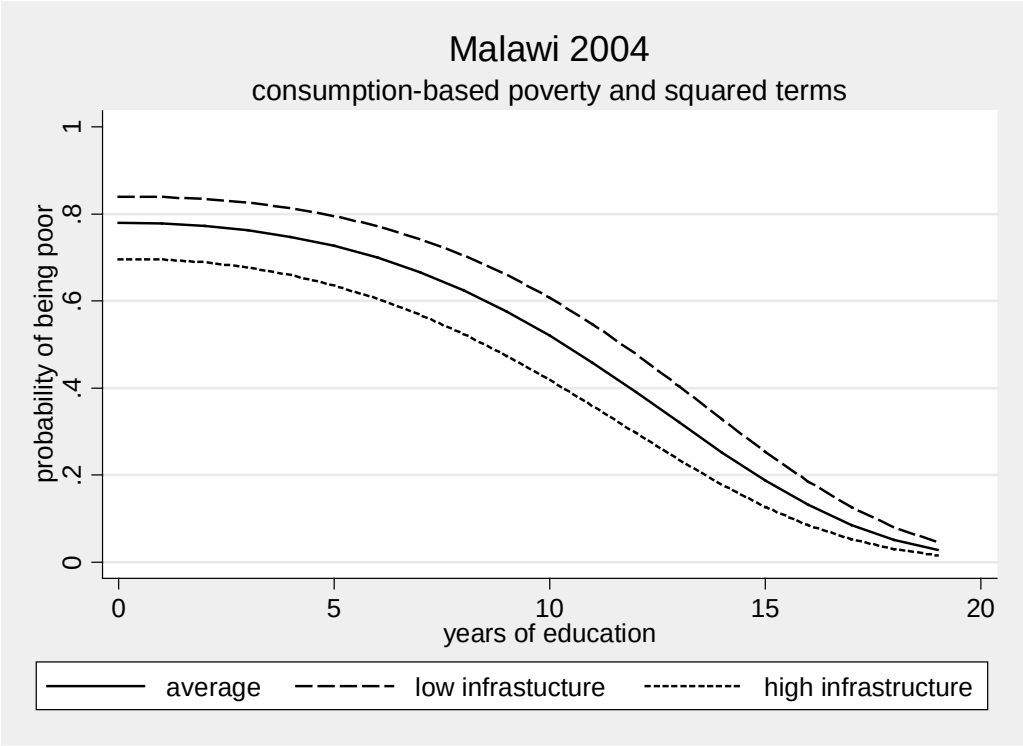
Source: Authors' calculations using the RIGA database.

Table 2e. Household asset status and selected group characteristics

			Household by Asset Position	Share of HH members younger	Group's Share in Rural Population	Share of Group Poor (%)	Group's share in overall rural	% of Income						
								Agriculture	Agricultural Wage	Non-Agricultural Wage	Self-Employ-ment	Remit-tances	Public Transfers	Other
NEPAL 1996	WITH LAND	1	E, L, I	10.45	0.77	11.14	0.11	68.65	0.00	4.48	16.25	0.64	9.32	0.66
		2	NE, L, I	6.08	2.04	58.50	1.44	68.34	2.00	11.54	6.81	6.15	2.02	3.14
		3	E, NL, I	16.42	4.88	20.63	1.33	44.09	1.22	24.63	14.11	8.18	4.59	3.18
		4	E, NL, NI	41.22	1.00	63.65	0.72	50.69	2.01	19.41	8.82	14.40	3.06	1.60
		5	E, L, NI	28.81	0.35	20.73	0.17	77.28	0.00	9.45	0.00	6.69	0.71	5.86
		6	NE, NL, I	15.79	30.30	70.66	29.19	49.84	14.76	17.01	7.17	7.53	2.61	1.08
		7	NE, L, NI	19.67	3.00	68.05	3.11	73.12	6.16	6.29	9.36	3.34	0.75	0.98
		8	NE, NL, NI	17.36	37.72	84.11	43.90	49.20	16.68	16.55	7.15	8.09	1.49	0.85
	NO LAND	9	E,I	25.20	1.15	21.06	0.28	12.25	0.34	28.93	51.21	3.92	1.58	1.76
		10	NE, I	19.67	8.92	70.00	7.94	19.40	28.46	24.21	17.08	9.28	0.27	1.30
		11	E, NI	62.79	0.19	64.60	0.17	27.00	3.81	41.05	24.57	3.56	0.00	0.00
		12	NE, NI	24.73	9.69	90.61	11.65	16.50	44.68	17.38	9.73	10.08	0.76	0.88
PAKISTAN 2001	WITH LAND	1	E, L, I	5.92	1.04	24.05	0.26	64.32	1.91	11.80	3.72	4.90	1.77	11.59
		2	NE, L, I	12.72	4.96	63.46	4.05	73.46	1.94	7.34	3.43	5.42	0.46	7.95
		3	E, NL, I	16.73	0.93	44.92	0.56	48.60	2.60	19.72	12.33	5.70	3.88	7.18
		4	E, NL, NI	11.08	0.61	59.99	0.43	43.72	3.36	12.97	5.30	23.78	8.56	2.30
		5	E, L, NI	14.86	0.28	42.85	0.16	62.44	2.04	9.75	5.87	10.03	3.59	6.27
		6	NE, NL, I	12.38	8.15	76.36	7.98	58.42	3.45	14.25	6.37	11.40	1.67	4.45
		7	NE, L, NI	14.02	7.46	73.63	7.28	79.25	2.26	7.08	2.33	3.73	0.42	4.92
		8	NE, NL, NI	13.97	9.13	85.07	9.80	63.98	3.84	11.75	4.48	13.13	1.06	1.74
	NO LAND	9	E,I	9.80	4.87	42.92	2.46	6.32	1.62	46.12	14.64	14.97	6.40	9.92
		10	NE, I	19.45	28.39	83.03	29.02	17.95	6.64	37.59	15.73	14.86	2.95	4.29
		11	E, NI	21.93	1.05	55.30	0.73	10.82	3.38	40.34	16.02	15.05	4.95	9.43
		12	NE, NI	22.07	33.12	89.79	37.27	26.00	16.95	31.41	10.04	9.71	2.60	3.27
VIETNAM 1998	WITH LAND	1	E, L, I	0.00	0.17	43.88	0.04	55.14	0.00	15.89	25.72	2.19	0.00	1.06
		2	NE, L, I	7.83	0.19	41.33	0.04	61.25	0.00	9.97	28.77	0.00	0.00	0.00
		3	E, NL, I	4.00	31.62	47.16	23.60	55.96	1.97	10.81	23.92	2.51	4.74	0.09
		4	E, NL, NI	7.17	11.06	64.70	11.65	66.47	4.03	8.50	15.94	2.20	2.64	0.22
		5	E, L, NI	0.00	0.05	0.00	0.00	52.60	12.99	13.50	0.00	0.00	20.90	0.00
		6	NE, NL, I	13.04	19.57	65.53	20.47	60.77	2.80	7.22	21.01	4.51	3.16	0.53
		7	NE, L, NI	35.58	0.07	100.00	0.13	71.01	0.00	0.00	28.99	0.00	0.00	0.00
		8	NE, NL, NI	13.69	26.46	76.47	34.85	63.84	10.54	6.18	14.05	3.10	1.79	0.50
	NO LAND	9	E,I	0.66	2.52	18.64	0.71	7.15	2.59	27.95	50.58	8.42	3.21	0.11
		10	NE, I	8.77	2.36	35.33	1.54	10.39	9.50	8.23	46.14	19.86	4.92	0.96
		11	E, NI	4.46	0.71	56.00	0.62	16.12	12.99	29.07	33.22	4.14	4.17	0.29
		12	NE, NI	13.60	5.23	70.27	6.35	26.31	27.37	12.14	25.71	5.76	2.42	0.28

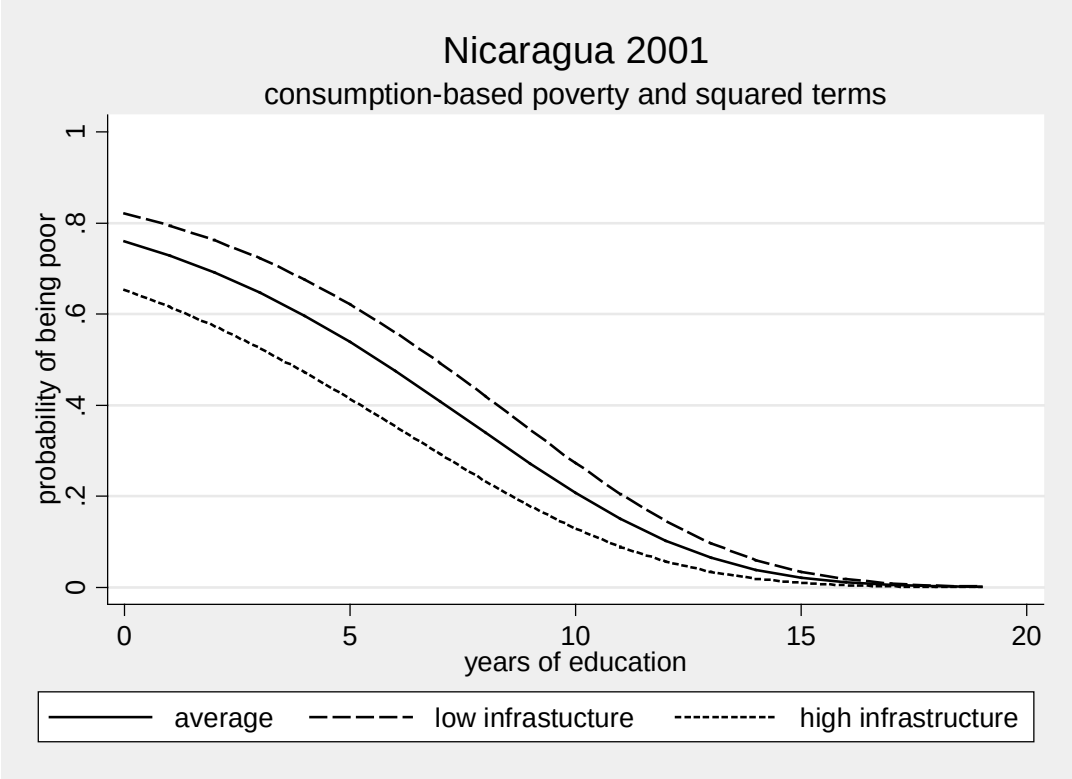
Source: Authors' calculations using the RIGA database.

Figure 1a. Estimated probabilities of being poor ($2/day) as a function of the schooling of a rural household head, simulated low and high values of infrastructure, Malawi.



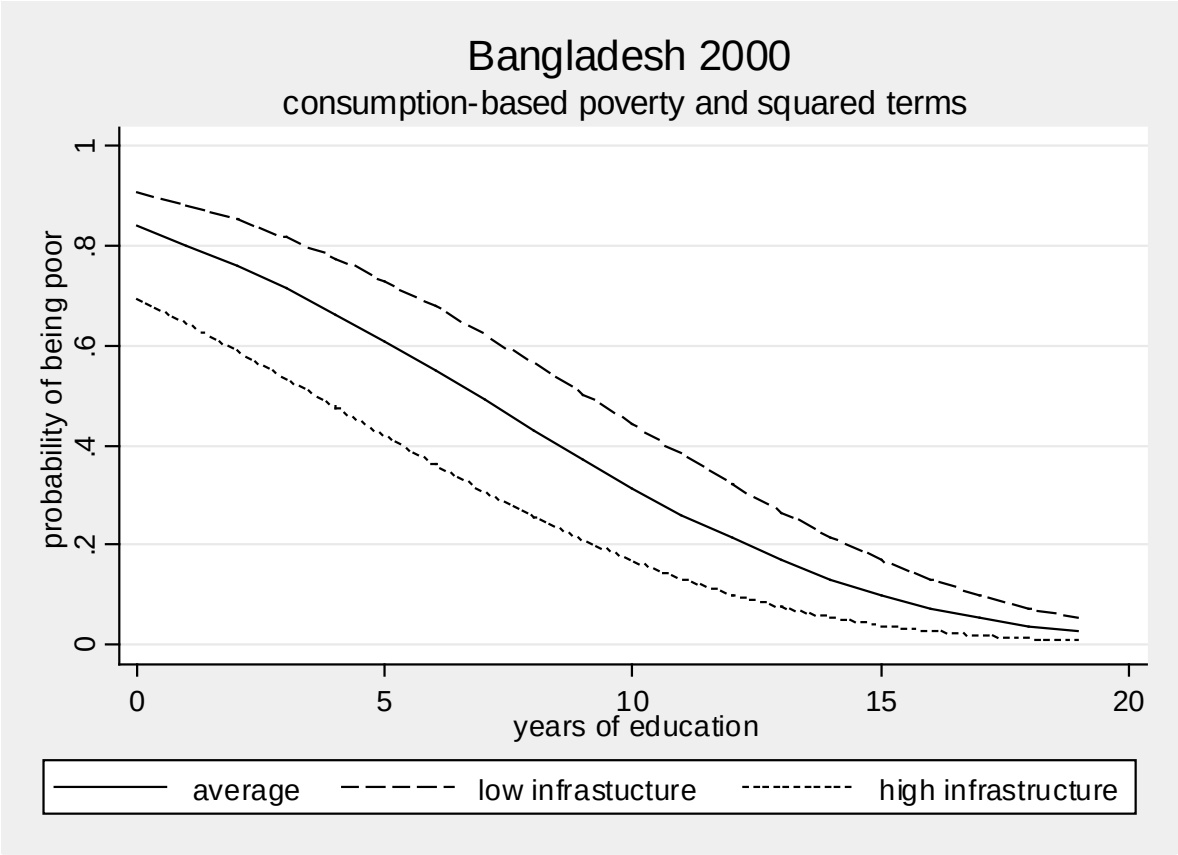
Source: Authors' calculations using the RIGA database

Figure 1b. Estimated probabilities of being poor ($2/day) as a function of the schooling of a rural household head, simulated low and high values of infrastructure, Nicaragua.



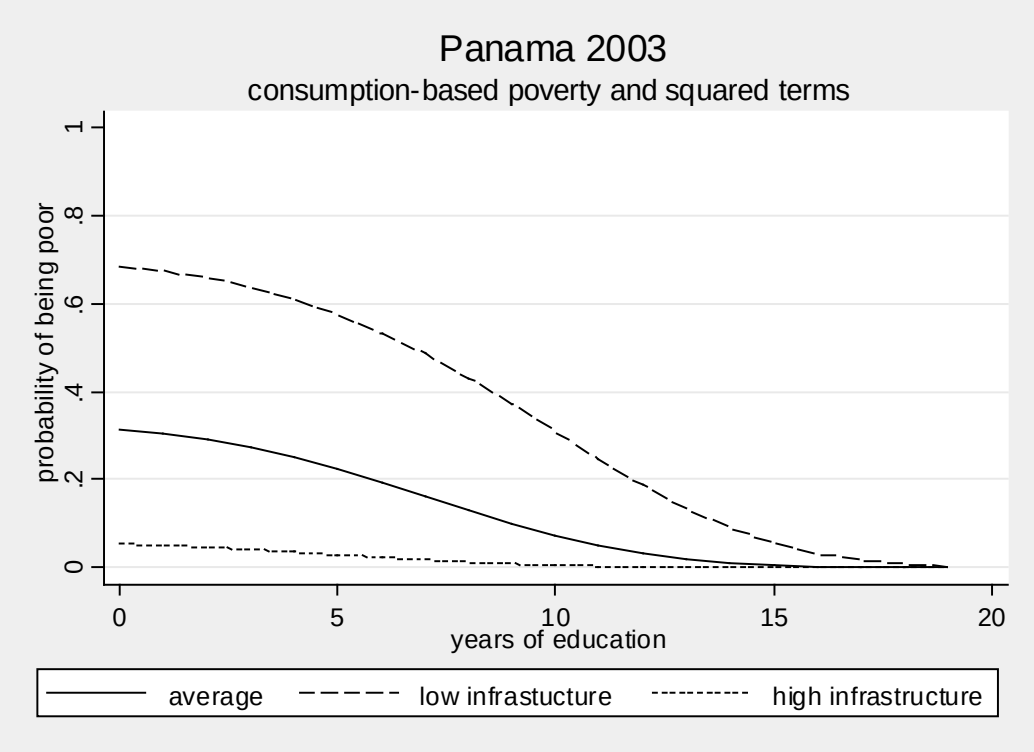
Source: Authors' calculations using the RIGA database

Figure 1c. Estimated probabilities of being poor ($2/day) as a function of the schooling of a rural household head, simulated low and high values of infrastructure, Bangladesh.



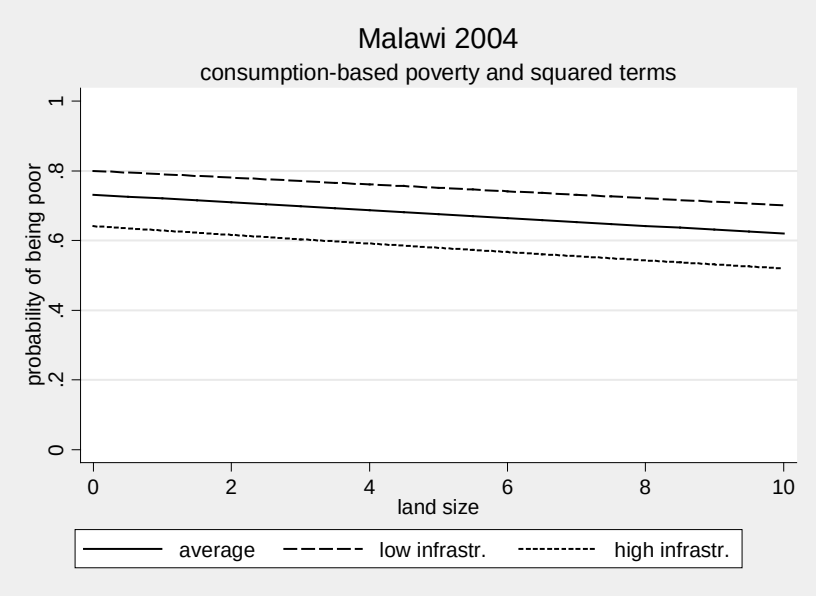
Source: Authors' calculations using the RIGA database

Figure 1d. Estimated probabilities of being poor ($2/day) as a function of the schooling of a rural household head, simulated low and high values of infrastructure, Panama.



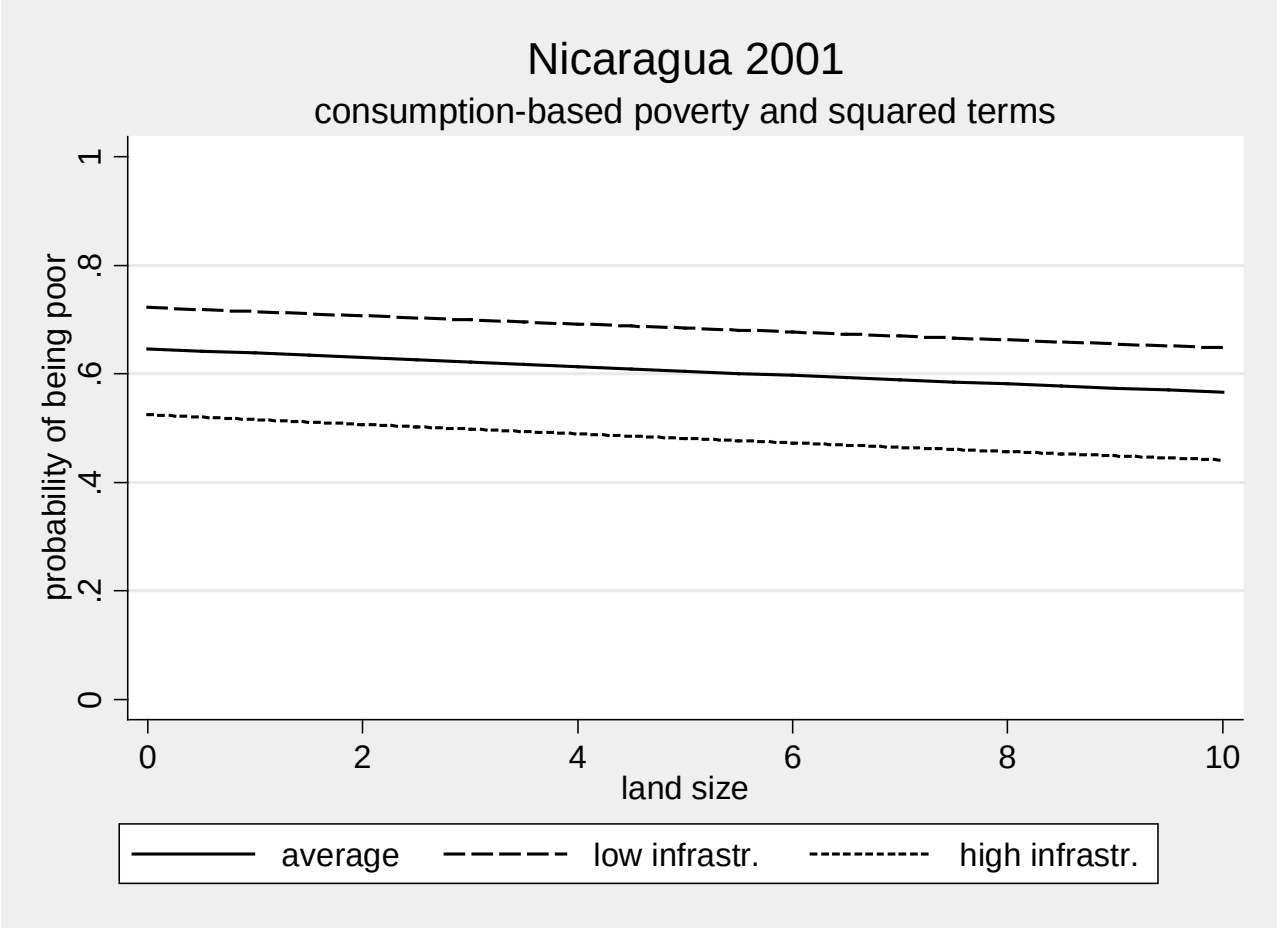
Source: Authors' calculations using the RIGA database

Figure 2a. Estimated probabilities of being poor ($2/day) as a function of the size of farm (ownership), simulated low and high values of infrastructure, Malawi



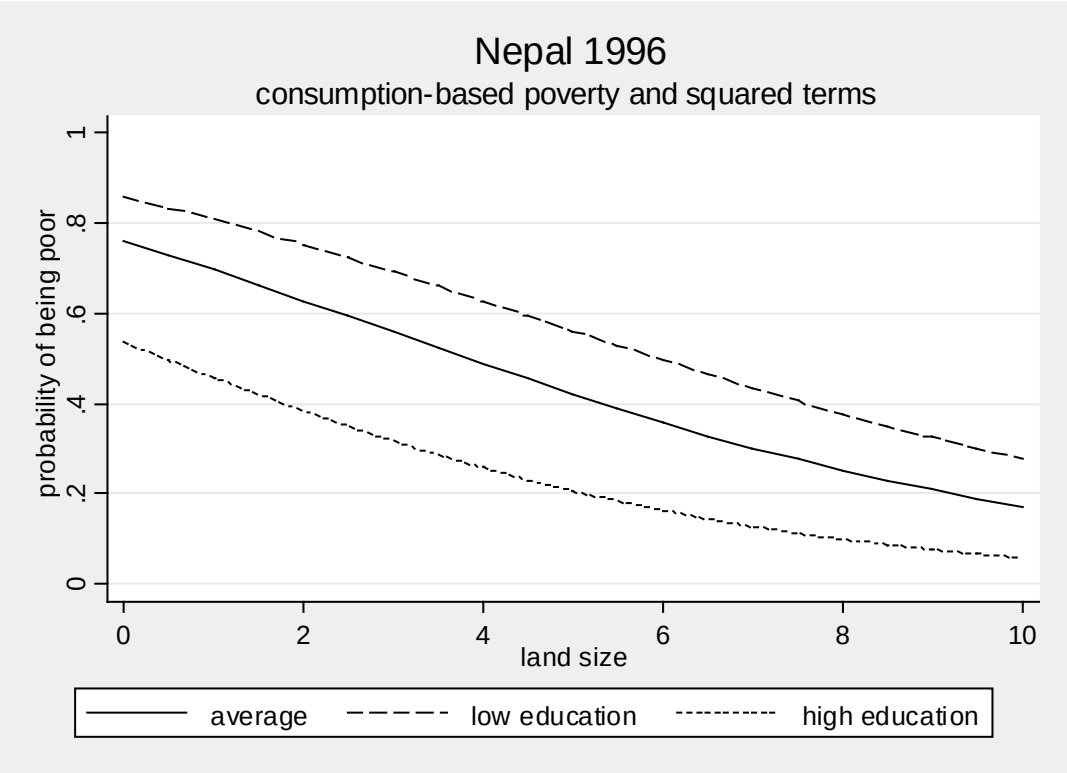
Source: Authors' calculations using the RIGA database

Figure 2b. Estimated probabilities of being poor ($2/day) as a function of the size of farm (ownership), simulated low and high values of infrastructure, Nicaragua.



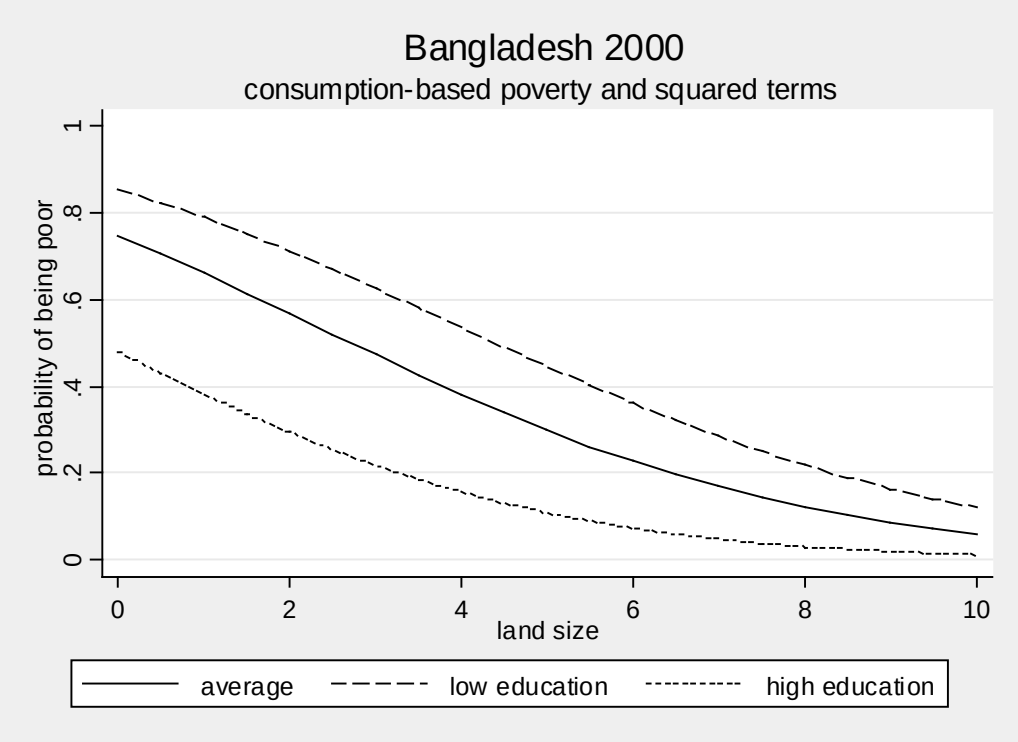
Source: Authors' calculations using the RIGA database

Figure 2c. Estimated probabilities of being poor ($2/day) as a function of the size of farm (ownership), simulated low and high values of infrastructure, Nepal.



Source: Authors' calculations using the RIGA database

Figure 2d. Estimated probabilities of being poor ($2/day) as a function of the size of farm (ownership), simulated low and high values of infrastructure, Bangladesh.



Source: Authors' calculations using the RIGA database