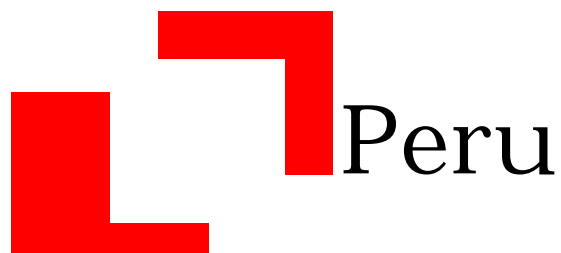


# **Economic Opportunities for Indigenous Peoples in Latin America**

---

February, 2007



**THE WORLD BANK**



CONFERENCE EDITION

**Economic Opportunities for Indigenous Peoples in Latin America in Peru**

Authors

Javier Escobar and Carmen Ponce

©2007 The International Bank for Reconstruction and Development / The World Bank  
1818 H Street NW  
Washington DC 200433  
Telephone: 202-473-1000  
Internet: [www.worldbank.org](http://www.worldbank.org)  
E-mail: [feedback@worldbank.org](mailto:feedback@worldbank.org)

All rights reserved

This volume is a product of the staff of the International Bank for Reconstruction and Development/ The World Bank. The findings, interpretations, and conclusions expressed in this volume do not necessarily reflect the views of the Executive Directors of The World Bank or the governments they represent.

#### Rights and Permissions

The material in this publication is copyrighted. Copying and/or transmitting portions or all of this work without permission may be a violation of applicable law. The International Bank for Reconstruction and Development / The World Bank encourages dissemination of its work and will normally grant permission to reproduce portions of the work promptly.

For permission to photocopy or reprint any part of this work or rights and licenses, please send a request with complete information to to the Office of the Publisher, The World Bank, 1818 H Street NW, Washington, DC 20433, USA; fax: 202-522-2422; email: [pubright@worldbank.org](mailto:pubright@worldbank.org).

**The manuscript for this conference edition disseminates the findings of work in progress to encourage the exchange of ideas about development issues.**

# **Economic Opportunities for Indigenous People in Rural and Urban Peru**

Javier Escobal

Carmen Ponce

The authors are grateful for the comments of Emmanuel Skoufias. This paper was financed by the World Bank. Any errors or omissions are responsibility of the authors.

## **Abstract**

This paper examines the factors that determine the income-generating activities of indigenous households in Peru and assesses how social networks affect these economic decisions.

## TABLE OF CONTENTS

<b>EXECUTIVE SUMMARY</b>	<b>I</b>
<b>I - INTRODUCTION</b>	<b>1</b>
<b>Ethnic Background and Income Opportunities - A Literature Review</b>	<b>2</b>
<b>Identifying Indigenous Populations</b>	<b>4</b>
Heterogeneity within the Indigenous Community	5
<b>II - CONTEXTUAL ETHNICITY EFFECTS</b>	<b>7</b>
<b>Description of Populations from Different Indigenous Backgrounds</b>	<b>9</b>
Access to Land Titling for Rural Dwellers	13
Access to Credit	14
Income Diversification and Employment Opportunities	16
Earnings Composition	16
Earning Differentials	17
Income Diversification	18
Occupational Decisions and Labor Returns	21
<b>III - PARTICIPATION IN THE FORMAL AND INFORMAL SECTORS</b>	<b>25</b>
<b>IV - HUMAN CAPITAL FORMATION</b>	<b>29</b>
Children's School Attendance	29
<b>V - USE OF MODERN HEALTH SERVICES</b>	<b>34</b>
<b>VI - ACCESS TO PUBLIC ASSISTANCE PROGRAMS</b>	<b>37</b>
<b>VII - POVERTY OUTCOMES</b>	<b>40</b>
Social Networks and Poverty Outcomes	42
<b>VIII - CONCLUSIONS</b>	<b>44</b>
<b>REFERENCES</b>	<b>46</b>

## TABLES

Table 1: Percentage of Households with Indigenous Background (Alternative Definitions)	4
Table 2: Ethnic Groups in Rural and Urban Areas (%)	5
Table 3: Distribution of Households across the Sample in Urban Areas (%)	8
Table 4: Distribution of Households across the Sample in Rural Areas (%)	8
Table 5: Distribution of Households across Regions in Urban Areas (%)	9
Table 6: Distribution of Households across Regions in Rural Areas (%)	9
Table 7: Household Demographics	10
Table 8: Sewerage Systems used by Households	12
Table 9: Water Provision Systems used by Households	12
Table 10: Household Lighting	13
Table 11: Access to Agricultural Land in Rural Areas	13
Table 12: Size of Plots held by the Indigenous and Non-indigenous	14
Table 13: Access to Credit for Indigenous and Non-indigenous Households	15

Table 14: Per Capita Income by Income Sources among Indigenous and Non-indigenous in Rural and Urban Areas with Small and Large shares of Indigenous Population	16
Table 15: Per Capita Income by Area and Indigenous Background	17
Table 16: Contribution of Independent Variables to Indigenous and Non-indigenous Earnings Differentials in Rural Peru	17
Table 17: Contribution of Independent Variables to Indigenous and Non-indigenous Earnings Differentials in Urban Peru	18
Table 18: Household Income Diversification/Specialization Patterns(Non-standardized Herfindahl Index)	19
Table 19: Household Income Diversification/Specialization Patterns (Standardized Herfindahl Index)	20
Table 20: Composition of Labor Force by Labor Conditions and Hourly Incomes (Indigenous/ Non-indigenous and Urban/ Rural)	22
Table 21: Employment Opportunities Available to Indigenous People	23
Table 22: Composition of Labor Force by Income-generating Activities and Sectors among Indigenous and Non-indigenous in Rural and Urban Areas with Small, Medium, and Large shares of Indigenous Population	24
Table 23: Waged Labor Force by Labor Conditions and Hourly Incomes among the Indigenous and Non-indigenous in Rural and Urban Areas (Main Occupation)	25
Table 24: Self-employed Labor Force by Labor Conditions and Hourly Incomes among the Indigenous and Non-indigenous in Rural and Urban Areas	25
Table 25: Employers by Labor Conditions and Hourly Incomes among the Indigenous and Non-indigenous in Rural and Urban Areas	26
Table 26: Households Receiving Modern Health Care	34
Table 27: Reasons why Households Did Not Receive Modern Health Care	35
Table 27: Participation of Indigenous and Non-indigenous Households in Welfare and Productive Enhancement Programs	37
Table 28: Participation of Indigenous and Non-indigenous Households in Welfare and Productive Enhancement Programs in Urban and Rural Areas with Small, Medium, and Large share of Indigenous Population	38
Table 29: Rates of Extreme Poverty and Poverty by Area and Size of the Local Indigenous Population	40
Table 30: Households in Extreme Poverty and Poverty by Ethnic Group	41
Table 31: Use of Social Networks in Rural Peru	42
Table 32: Percentage of Households using Social Networks in Rural Areas	43
Table 33: Summary of Regression Estimates	45

## **FIGURES**

Figure 1: Geographical Distribution of Indigenous Population	7
Figure 2: Diversification Patterns (Labor Sources Only)	21
Figure 3: Diversification Patterns (All Income Sources including Labor Sources, Remittances, and Property Income)	21

Figure 4: Probability that a Self-employed Person runs an Informal Business in Urban Peru after Controlling for Demographic Characteristics, Access to Public Services, and Region _____	27
Figure 5: Predicted Hourly Income for Individuals Running Microenterprises (Fewer than 10 workers) after Controlling for Demographic Characteristics, Access to Public Services, and Region _____	28
Figure 6: Probability of Attending School in Rural Peru for Children between 6 and 17 Years of Age after Controlling for Demographic Characteristics, Access to Public Services, and Region __	30
Figure 7: Probability of Attending School in Urban Peru for Children between 6 and 17 Years of Age after Controlling for Demographic Characteristics, Access to Public Services, and Region __	31
Figure 8: Probability of Attending School in Rural Peru for Children between 12 and 17 Years of Age after Controlling for Demographic Characteristics, Access to Public Services, and Region __	31
Figure 9: Probability of Attending School in Urban Peru for Children between 12 and 17 Years of Age after Controlling for Demographic Characteristics, Access to Public Services, and Region __	32
Figure 10: Probability of Not Accessing or Distrusting Formal Health Services in Urban Peru after Controlling for Demographic Characteristics, Access to Public Services, and Region _____	36
Figure 11: Probability of Not Accessing or Distrusting Formal Health Services in Rural Peru after Controlling for Demographic Characteristics, Access to Public Services, and Region _____	36
Figure 12: The Probability of Being a Beneficiary of a Health, Education, or Food Program in Urban Peru (after Controlling for Demographic Characteristics, Access to Public Services, and Region) _____	39
Figure 13: The Probability of Being a Beneficiary of a Health, Education, or Food Program in Rural Peru (after Controlling for Demographic Characteristics, Access to Public Services, and Region) _____	39
Figure 14: Probability of Being Poor in Urban Peru (after Controlling for Demographic Characteristics, Access to Public Services, and Region) _____	41
Figure 15: Probability of Being Poor in Rural Peru (after Controlling for Demographic Characteristics, Access to Public Services, and Region) _____	42

## EXECUTIVE SUMMARY

The percentage of Peruvian households with an indigenous background varies from as low as one-quarter to as high as one-half of the population depending on the operational definition of “indigenous.” If one considers the first language of both the head of the household and his or her spouse as the criterion to define a household’s ethnic background, then 26.5 percent of Peruvian households come from an indigenous background. This percentage increases to 33.5 percent if either the head of the household or his or her spouse reports that their first language is a native language.

The Peruvian indigenous population consists of a wide variety of native ethnic groups. However, two ethnic groups (Quechua and Aymara) predominate. Quechua speakers represent 88 percent of those speaking a native language and Aymara speakers represent 7 percent of those speaking a native language. The remaining 5 percent include speakers of a large number of native languages spoken mostly in remote areas of the Amazon region.

Although people with similar indigenous backgrounds tend to be clustered in specific areas of the country (for example, the Aymara population in the southern sierra and the Quechua population throughout the sierra region), indigenous people can also be found in areas with far smaller indigenous populations. Areas with only small indigenous populations are located in cities and towns in the northern Costa and Lima, while areas with large indigenous populations are located in the rural areas of the southern Sierra. However, sizable pockets of indigenous people can be found in districts in rural Peru (such as Selva and the northern Sierra regions) with small indigenous population. At the same time, Lima can be characterized as a place where indigenous people tend to live in areas with small or medium-sized indigenous populations.

This study presents the basic demographic characteristics of both indigenous and non-indigenous households living in small, medium, and large indigenous populations. Our results show that on average the size of indigenous and non-indigenous households tend to be the same in urban areas but in rural areas indigenous households tend to be smaller. This is a surprising result considering that family size correlates positively with poverty and poverty correlates positively with indigenous origin. However, the demographic picture may have changed in recent years. Many indigenous rural families who had migrated to cities during the years of conflict in Peru may have begun to return to their original communities. However, in the case of many of those families, part of the family stayed behind in the city. Therefore, the fact that indigenous rural households are smaller than non-indigenous households may be due more to migration behavior than to a lower birth rate. In terms of education, we found that the household heads of non-indigenous households have one to five more years of education than indigenous households. We also found that urban households were significantly more likely to have access to basic public services like access to piped water, sewerage or electricity than their rural peers in the same ethnic group.

These differences in asset endowments are of course related to welfare outcomes. While one-half of all Peruvian households are poor according to official statistics, the probability of an indigenous individual being poor is considerably higher (about 64 percent). Furthermore, the differences between the poverty rates of indigenous people living in areas with different-sized indigenous populations are striking. For example, 58.3 percent of indigenous people living in rural areas with large indigenous populations are extremely poor, while only 17.1 percent of indigenous people living in rural areas with small indigenous populations fall into that category. This pattern also prevails in urban areas - extreme poverty rates are considerably higher for indigenous people living in areas with large indigenous populations than for those living in areas with small indigenous

populations. It is interesting to note that the differences in non-extreme indigenous poverty rates between those living in areas with large indigenous populations and those living in areas with small indigenous populations are much lower than the differences that we observed in extreme poverty rates.

These differences in welfare outcomes may be the result of an uneven distribution of public assets across households within a particular area. On the other hand, they may be the result of more complex processes, such as social exclusion mechanisms that operate in society as a whole or in specific markets and the presence of network effects that may either strengthen or weaken these social exclusion mechanisms. Knowing what lies behind these individual outcomes would help policymakers to define a policy agenda to combat the mechanisms of social exclusion. This research task, however, is not straightforward. This study adapts the econometric methodology proposed by Bertrand et al (2000) to capture and disentangle the effects of indigenous population size, individual ethnic backgrounds, and social networks from the other characteristics that condition individual welfare outcomes.

We focused on several welfare dimensions that could be susceptible to social exclusion mechanisms. These dimensions include: (i) household strategies for diversifying their income; (ii) individual employment choices including the choice between being an entrepreneur in the informal or formal sectors; (iii) human capital formation outcomes such as children school attendance and households' use of modern health services; (iv) households' use of public assistance programs; and (v) households' poverty status. It is worth mentioning that, as has been pointed out in the literature, social exclusion mechanisms (against people with indigenous backgrounds) in rural areas may differ from those operating in urban ones, so we analyzed each welfare dimension separately for each of these two areas. This decision makes particular sense when we think of human capital formation outcomes and public assistance programs. However, this is less evident in the case of other welfare dimensions such as income diversification, employment choices, and poverty status because of the connection between rural and urban economic dynamics in some Peruvian towns. Nevertheless, we believe that the urban-rural separation in our analysis reduced most of the potential biases that we faced, and so we leave future researchers to explore the connection between rural areas and those towns where commercial activities are of primary importance.

We found sizable differences in outcomes for people living in areas with small, medium, and large indigenous populations after controlling for several covariates, with the indigenous consistently losing out irrespective of their relative population size. This is true for the probability of being poor in rural areas, the probability of being a welfare beneficiary in urban areas, and the probability of children attending school in rural areas. It is worth noting that, in the case of the probability of benefiting from public welfare programs in urban areas, the larger the indigenous population, the greater the number of households that benefit from welfare programs. This is probably because these tend to be the urban areas that receive the most assistance from the government because they are also the poorest. An important finding that applies in all three cases is that having an indigenous background has the opposite effect. For instance, although the probability of being a welfare beneficiary in urban areas (as well as the probability of children attending school in rural areas) is higher in areas with large indigenous populations, this positive effect vanishes if the household is indigenous (in other words, indigenous population size parameters are positive, whereas the social network effect is negative). A similar case can be stated for the probability of being poor in rural areas. As shown in our paper, most of the rural population of Peru lives in poverty, and, after we controlled for household characteristics and ethnicity, we found that areas with larger indigenous populations had a lower probability of being poor (in aggregate), but when looking at the "social network" parameter, we found that this positive effect of living in areas with larger indigenous populations vanishes for indigenous households. In these three cases, our regression analysis

captured the direct effects of exclusion mechanisms at work in the indigenous population size and social network variables.

However, this is not the rule. Our findings show that, for most of the dimensions of our analysis (in nine] out of the 12 regression analysis results), the most important exclusion mechanisms operate indirectly (accordingly, the parameters of indigenous population size and existence of social networks were not significant). It is worth noting that these results are consistent with the empirical literature. One way to characterize these results is to say that we found evidence of systematic discrimination that has led to significant differences among households in terms of the education level of its members and its access to public services. This is captured in our regressions by variables other than the social network and indigenous population size variables.

Supported by these findings, we have demonstrated the different dimensions through which social exclusion operates in Peruvian society. Our analysis may help policymakers find ways to minimize social exclusion mechanisms. In particular, we have raised the question of what direct and indirect exclusion mechanisms can explain the lack of economic opportunities available to indigenous individuals compared with those available to the rest of the Peruvian population, mechanisms that are usually analyzed in terms of differences in returns to particular sets of assets.

These mechanisms are very hard to counter through policy alone. Meeting this goal will require changing social norms through education and introducing legal bans on discrimination in the labor market. As we have shown in this report, most exclusion mechanisms manifest themselves as differences in household assets such as the level of education attained by household members and what basic infrastructure (e.g. running water and sewage) is available to poor households. The policy implications of our results are clear. The best way to reduce the exclusion mechanisms that prevail in Peru is by targeting the provision of public services to areas with large indigenous populations.



## I - INTRODUCTION

While half of Peruvian households are poor according to official statistics, the probability of an individual with an indigenous background of being poor is considerably higher than that for a non-indigenous person (about 64 percent). Indigenous people in Peru are less educated than the non-indigenous (2.3 fewer years of education) and have lower returns to their education. In addition, they have less access to basic public services like piped water, sewerage systems, and electricity.

Although the existing literature has considerably advanced our understanding of the magnitude of social exclusion that prevails in Peru (as well as in many other Latin American countries), we still have little information about the determinants of the economic and social behavior of indigenous people. The lack of such information makes it difficult for policymakers to devise effective policies to overcome social exclusion. For example, the existence of social networks is pointed out by policy makers as one of the mechanisms used by the poor to cope with their unfulfilled basic needs. Nonetheless, a closer look at this issue has unveiled the fact that some of these social networks may also generate the so-called “bridging capital” needed to overcome poverty rather than just surviving it. This type of social capital fosters social and economic mobility as opposed to the “bonding capital” associated with survival strategies. In this sense, understanding the difference between these two allows policy makers to focus better on the type of capital that corresponds to their particular objective, be it a short term one (surviving poverty) or a longer term one (overcoming poverty).

The purpose of this paper is to quantify and better understand how indigenous background contextual characteristics, besides individual’s family background, affect economic opportunities available to indigenous populations (as compared to non indigenous populations). This paper is part of a regional study that will: (i) identify the income sources and income-generating activities of rural and urban indigenous households in comparison with those of non-indigenous households; (ii) investigate what makes indigenous households choose particular income-generating activities in urban and rural areas with particular emphasis on the role played by contextual indigenous background and social networks; and (iii) suggest policies and programs that would increase the economic opportunities available to, and, ultimately, improve the welfare of indigenous people in Peru.

We studied three aspects of the economic opportunities available to indigenous people: (i) income diversification and employment opportunities; (ii) human capital formation; and (iii) access to social assistance programs. In addition, we explored how policies related to human capital formation and access to public goods and services affect the wellbeing (measured by consumption) of indigenous and non-indigenous populations differently. For each one of these aspects we explored whether the economic opportunities available to an individual with family indigenous background are affected by the indigenous background characteristics of his/her area of residence.

The main contribution of this study is the analysis of the contextual effects that a particular ethnic composition of the individual’s area of residence has on his/her socioeconomic outcomes. It is our belief that the contextual indigenous background an individual is immersed in affects differently an indigenous resident living in a district where he/she is an ethnic majority than it would had he lived in a district where he/she is an ethnic minority. We recognize that these contextual effects do not necessarily operate through contemporaneous mechanisms that can be captured in a static econometric analysis as the one performed here. Instead, we emphasize the importance of distinguishing two types of contextual effects. One type involves social exclusion processes operating contemporaneously in the labor markets, the provision of modern health services, and in other market spaces where current socioeconomic outcomes are determined; whereas the other type

involves processes that took place in the past and determined currently observed -contextual or individual- characteristics that may affect the outcome under analysis. The latter demands a more dynamic perspective of analysis if we want to capture the effects of contextual ethnicity; for example, important differences in indigenous' parents education due to past segregation may cause their children to have less economic opportunities in the present time even though there were no segregation processes operating in education coverage anymore, but the only thing we capture in a static econometric analysis is the effect of parent's education rather than parent's contextual indigenous background effect. Given our data limitations, we addressed the econometric analysis of contemporaneous contextual effects of ethnicity; while discussed intuitively the more structural/historical contextual effects that could be operating through some characteristics involved in the estimations.

The paper is divided into nine sections including this introduction. In Part II, we present a brief review of the existing literature on how indigenous background seems to affect key economic and social outcomes in urban and rural Peru. In Part III, we use data from the 2001 Peruvian Living Standard Measurement Survey (ENAH) to offer alternative definitions of "indigenous background" and show how these populations are distributed across Peru. In Part IV, we characterize Peruvian population following the definitions of family and contextual indigenous background established in Part III and show the differences in households' ownership of private assets and access to public services between indigenous and non-indigenous groups. In Parts V, VI and VII, we perform both descriptive and econometric analysis to identify potential differences in several socioeconomic outcomes between indigenous and non-indigenous populations depending on whether their area of residence is densely/vastly populated by indigenous residents or not (i.e. depending on the share of indigenous people living in their area of residence). The socioeconomic outcomes analyzed in Parts V, VI and VII are (i) employment opportunities and income diversification strategies, (ii) access to human capital formation services (like education and modern health facilities) and (iii) access to public assistance programs, respectively. In Part VIII, we look at the poverty profile of indigenous and non-indigenous people taking into consideration the proportion of indigenous population in the household's area of residence, and link these patterns to the existence of "bridging" and "bonding" types of social capital. Finally, in Part IX, we summarize our findings.

## **ETHNIC BACKGROUND AND INCOME OPPORTUNITIES - A LITERATURE REVIEW**

Ethnic identity is usually defined by certain characteristics – like language, religion, customs, dress code, geographical origin, history, and territory – which distinguish one ethnic group from the "others." The difficulties involved in defining "indigenous" in the context of Peru have been extensively reviewed in the literature. Valdivia (2002) stressed that, although native language is commonly used in the empirical literature as a criterion for identifying people with indigenous backgrounds, language must also be considered as one of the many dimensions associated to ethnic identity. Also, Torero et al (2004) found that the ethnic self-definition of a sample of people in urban Peru often differed from how others described them using alternative ethnic characteristics. Thus, we can say that not all people who consider themselves to be indigenous speak indigenous languages.

Many studies have accounted for the various forms of social exclusion that exist in Peru. Of those studies that analyzed discrimination against those with an indigenous background, most were based on case studies. Callirgos (1993) gave a global overview of the origins and particular characteristics of Peruvian racism. Oliart (1989), Pozzi (1989), Callirgos (1993), and Mendoza (1993) discussed ethnic and cultural discrimination. Oliart (1989) also discussed the effects of ethnic and cultural discrimination on educational enrollment and attainment. Sulmont (1995) and Chiswick et al (2000) documented some of the elements of social exclusion that exist in Peruvian labor markets.

Figueroa and Barrón (2005) discussed the relationship between ethnicity, discrimination, and social distress in Peru. They showed that, although the living standards of indigenous population has significantly improved in absolute terms in recent years (as their access to public services has increased), they have not experienced gains in relative terms. Because of this fact, inequities in Peru between people with different ethnic backgrounds continue to be significant and persistent and to contribute significantly to overall inequality. Interestingly, Figueroa and Barrón (2005) constructed an ethnicity variable based on region of birth although it cannot be compared with the ethnicity variable based on language since both variables came from different ENAHO surveys.

Although this brief literature review shows that racial, ethnic, and cultural discrimination has been the focus of numerous sociological and anthropological studies and debates, many unanswered questions remain, particularly regarding the economic effects of social exclusion. Within these areas, some analytical work has been done on what links ethnic background and labor market outcomes and on differential access to public goods and services.

Torero et al (2004) tried to approximate ethnic background for those living in urban Peru using not only an individual's mother tongue but also his or her parental background, race, and religion. Specifically, they approximated race by using indicators based on self-reported data as well as pollsters' data. They found that ethnic differences in access to education and income are sizeable. In the case of education, they confirmed that there is a significant negative correlation between educational attainment and ethnicity. and there is a clear negative monotonic relationship between racial intensity and private education attendance, The authors contend that these later effect may be related to differences in the possibilities of individuals to afford a private higher quality education when they were young. In spite of increases in overall educational attainment in Peru, the authors' results confirmed that educational investment is unevenly dispersed across the country in terms of both quality and quantity to the detriment of areas with large indigenous young adult populations. These findings were similar to those of Diaz et al (2002) who modeled educational attainment after controlling for gender, cohort effects, religion, first language, and race and found a negative relationship between areas with high indigenous population and number of years of education.

Torero et al (2004) also found no conclusive evidence of discrimination in terms of access to credit. Although the study found some indication of a non-linear effect between density of indigenous population and credit access that could be related to a self-exclusion mechanism in both extremes of the race scale (the less indigenous may not need to enter the credit market as they may have other ways to finance their activities, while the most indigenous not even try to demand credit), this evidence was not very robust when they controlled for other household characteristics. Furthermore, when looking at credit applications, they found no clear difference between white population density and indigenous population density in explaining the decision by individuals to apply or not to apply for credit from a formal institution.

Ñopo et al (2002), analyzing raw averages for the self-employed and private wage earners, showed that the log hourly wage is positively correlated with communities with few indigenous residents as measured by a "white intensity" racial indicator and is negatively correlated with communities with many indigenous residents. In both cases, average earnings are lower for the self-employed than for private wage earners. When analyzing earning differentials among wage earners after controlling for personal, labor market (occupation, sector and firm size) and ethnic characteristics different from race, Ñopo et al (2002) found that white workers made significantly more money than indigenous workers. They found that for wage earners, the results were robust even when one controls for differences in individual characteristics. However in the case of the self-employed the authors did not observed an earning gap that can be attributed to ethnic characteristics, once one controls for differences in individual characteristics, suggesting that exclusion mechanisms operate at the moment individuals are acquiring skills and also in the labor market.

Regarding access to public services MacIsaac (1994) found that more than 80 percent of non-indigenous people - defined as those whose first language is Spanish - have access to public water supply or access to electricity while fewer than 45 percent of indigenous people - defined as those whose first language is Quechua or Aymara - have access to those public services. The author also found that the average number of years of schooling for non-indigenous people is 8.1 whereas for indigenous people it is only 5.5.

It is important to note that most if not all of these studies have distinguished between urban and rural regions, and many of them have found that ethnicity plays a different role in these two kinds of areas. We will also make this distinction between rural and urban areas, but we will go in to greater depth by differentiating between indigenous people who live in districts where there is a large indigenous population and those who live districts where there is only a small indigenous population.

## IDENTIFYING INDIGENOUS POPULATIONS

Clearly, a person’s native language is one criterion that can be used to identify people with indigenous background, but it is only one of the many dimensions of a person’s ethnic identity. Unfortunately, surveys in Peru that are representative at the national, urban, and rural levels collect limited information on ethnicity, and the only objective indicator that can be used in a quantitative analysis is language. Whenever possible we will complement these survey data with other variables (such as the existence of social capital) as well as with relevant case studies done by other researchers.<sup>1</sup>

According to the Peruvian Living Standard Survey (ENAHO) 2001, 26 percent of the heads of household and spouses answering the relevant module<sup>2</sup> defined themselves as “indigenous” (subjective indicator of ethnicity). However, 27 percent did not answer the question. According to Figueroa and Barrón (2005), it is very likely that many of these non-respondents might have been indigenous people who were unwilling to state their actual race.

Using the same database that we will use in this study, Trivelli (2005) showed that the percentage of Peruvian households with an indigenous background may vary from as low as 25.4 percent to as high as 47.7 percent depending on the definition of indigenous (see Table 1).<sup>3</sup>

**Table 1: Percentage of Households with Indigenous Background (Alternative Definitions)**

Percentage of Households with Indigenous Background  
(According to alternative definitions)

Alternative Definitions	Lima	Rest of Urban Peru	Rural Peru	Total Peru
Mother tongue is not Spanish or a foreign language	3.1	11.4	19.2	33.7
Self reported (ethnicity background)	5.0	16.3	21.3	42.6
Either self reported or mother tongue	5.4	17.3	22.5	45.2
Most common language used is not Spanish or foreign language	2.0	7.1	16.3	25.4
Parents' or Grandparents' mother tongue was not Spanish or a foreign language	6.7	17.8	23.2	47.7

Source: Trivelli (2005). Table 1. Based on ENAHO 2001 IV

<sup>1</sup> All the tables in this section and throughout the paper have being adjusted by using ENAHO 2001’s household sample weights. Probit estimations have been done with robust errors to account for the clustered nature of the data.

<sup>2</sup> In Annex 1, we briefly describe the characteristics of this survey.

<sup>3</sup> In all of these alternative definitions, a household is considered to be “indigenous” if the head of household and/or its spouse is considered indigenous. The ENAHO asked questions about indigenous background only to the head of household and spouse.

## Heterogeneity within the Indigenous Community

The Peruvian indigenous population comprises a wide variety of ethnic groups. Using census data, Grimes (1996) compiled a list of 18 language families and 84 local languages. Of these, two language families are the most prevalent - Quechua and Aymara. According to this data source, Quechua native speakers represent 88 percent and Aymara native speakers represent 7 percent of all those who speak a native language. The remaining 5 percent include people who speak one of a large number of native languages that are mostly used in remote areas of the Amazon region. Although Quechua is a language family, its regional variants are similar enough to make those who speak them part of the same ethnic community. Although Quechua native speakers are spread all over Peru, most people with this indigenous background are located in the Andean region (the northern, central, and southern sierra). Although the number of Aymara native speakers is small compared with Quechua native speakers, they are heavily concentrated in the southern sierra in the region of Puno near the border with Bolivia.

Table 2 shows the distribution of ethnic groups in urban and rural areas in the sample of households we will be using throughout this paper. The descriptive statistics showed in the table were obtained from the reports that the surveyed head of household and spouse gave in reference to the language they first learned in their childhood (mother tongue). As can be seen, the mother tongue reported by the majority of those with an indigenous background is Quechua. Only 3 percent of the households' sample has both Aymaran head of household and Aymaran spouse. With such a small sample, we must be careful when making inferences about this ethnic group. Because of this, we will limit our analysis to a definition of "indigenous" that includes households with both parents reporting a native background (i.e. native mother tongue), either Quechua, Aymara or any other native language.

We had several substantive reasons for counting Aymara and Quechua populations together. First, it is important to note that, even if the different regional varieties of Quechua form a separate language family, some scholars believe Quechua belongs with Aymara to an even larger language family called Quechumaran (Comrie, 1990). Second, it has been well documented that the pattern of discrimination that prevails in Peru does not differentiate between Quechua and Aymara populations. Thus, we did not expect there to be any important differences between the Quechua and Aymara populations in at least two of our three areas of enquiry (human capital formation and access to social assistance programs). For the third type of outcome under analysis, income diversification and employment opportunities, however, we expect contextual effects to differ between these two ethnic groups in districts where they coexist. It is worth mentioning, however, that districts where Quechua and Aymara live together, constitute a small part of the sample (4.6% of the Peruvian population lives in these 42 districts and is Quechua and Aymara). We hypothesize that within the districts where Aymara and Quechua populations live together, the networks these populations are engaged in differ from each other and social exclusion processes might differ between these two ethnicities. For example, Aymara population is well known as to be typically engaged in commercial activities and their social networks work differently from those of Quechua population, connecting rural and urban towns and engaging only Aymara individuals (excluding Quechuas). Although we expect to explore these differences between native ethnic groups in future research, this study will not explore them any further and will treat these two groups as an ethnic-wise homogeneous group of people with indigenous background (for the most part we do not expect bias, since the districts where these two groups coexist are a minority within the Peruvian urban and rural spaces).

**Table 2: Ethnic Groups in Rural and Urban Areas (%)**

<b>Region</b>	<b>Rural</b>	<b>Urban</b>	<b>Total</b>
Quechua	13.1	9.0	22.2
Aymara	1.9	1.1	3.0
Other Native (households headed by individuals from the same ethnic group)	0.6	0.0	0.7
Castellano	17.4	49.2	66.6
Mix Native-Native (households headed by individuals from different native groups)	0.3	0.4	0.6
Mix Native-Castellano (households by one individual from a native and from the Castellano ethnic group)	1.8	5.2	7.0
<b>Total</b>	<b>35.1</b>	<b>64.9</b>	<b>100.0</b>

Source: Own estimates based on ENAHO

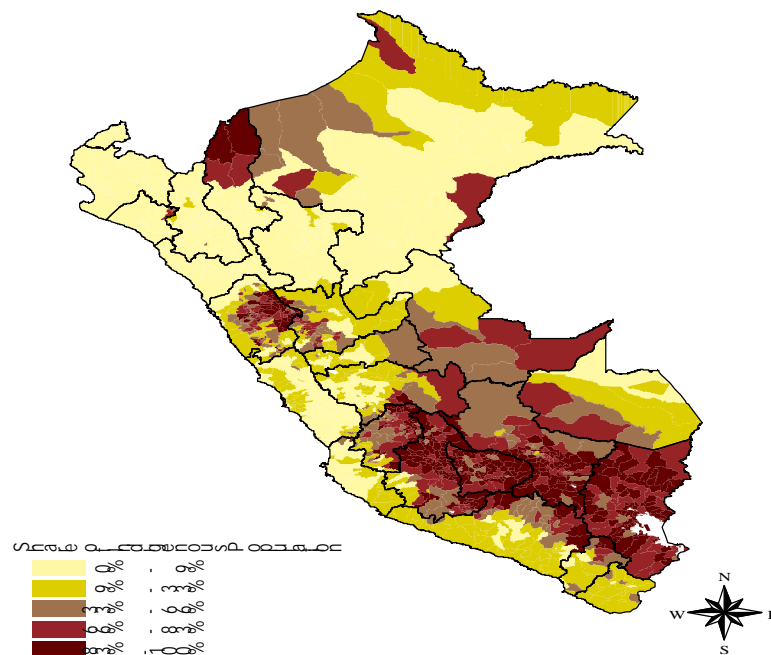
In the following pages we define an individual as having an indigenous background if within his/her family both the head of household and spouse (in case there was a spouse) reported to have a native language as their mother tongue. Correspondingly, those households with either the head of household or the spouse having spanish as mother tongue were defined as non-indigenous background households. In this sense, the individual's ethnicity is defined according to his/her family ethnic background instead of being defined as his/her own mother tongue.

## II - CONTEXTUAL ETHNICITY EFFECTS

We were interested in understanding how the economic opportunities available to indigenous people differ in different ethnicity contexts. To do so, we looked at the indigenous composition of the population in various districts in Peru. As Brass (1991) pointed out, ethnic communities in countries like Peru can be characterized only to a small degree by cultural distinctiveness, social exclusivity, and internal homogeneity. As the author points out, “As economic forces and other influences of the outer society take their toll on the ethnic community, a new category of ‘ethnicity’ enters the stage - that of the *urban* person with an ethnic past, who has left his community and parted with its core values – while still being emotionally tied to them - due to, say, out-migration or by rising in the society” (Brass (1991): 12).

The map depicted in Figure 1 shows how the indigenous population (as defined by their native languages) is spatially distributed by district. We constructed this map using population census data for 1993, which was the last census information available. It is worth noting that if the map were drawn up today it might be somewhat different as some of those people who were forced to emigrate to urban areas during the 1980s -because of the terrorism attacks and the resulting counterinsurgency performed by the state- have moved back to their rural communities of origin<sup>4</sup>. A striking figure that shows some of this massive migration flows directed to urban areas is the population growth rates that Lima city experienced between 1981 and 1993, which amounted to an average annual rate of nearly 2.5 percent, while the population of the rest of the country grew at a rate of 1.9 percent. Although data from the most recent census in 2005 showed that these rates have slowed down, the population of Lima is still growing at a faster pace than the population of the rest of the country.

**Figure 1: Geographical Distribution of Indigenous Population**



<sup>4</sup> As it is widely known (see the Report by the Commission for the Truth and Reconciliation), most of the victims were residents of rural communities where indigenous people were a majority.

Source: Own Calculations Based on 1993 Census Data. Map Groupings are optimally determined. See Annex 2

This map shows that there are some districts, especially in the southern and central sierra, that have a very high percentage of indigenous inhabitants. On the contrary in the costa and selva regions, districts with smaller proportion of indigenous populations tend to predominate.

Tables 3 and 4 show how the household sample is distributed between those with an indigenous and a non-indigenous background. From here and on we will refer to the ethnic composition of the population in the rural/urban portion of the district where the household lives as “share of indigenous population” or “contextual indigenous background”, this latter term emphasizes on the contextual dimension of ethnicity as opposed to the individual one that we refer to as “individual/household indigenous background”. The tables split the sample into three groups of contextual ethnicity: less than 33%, between 33% and 66%, and more than 66% of the population in the district has a family indigenous background.<sup>5</sup>

**Table 3: Distribution of Households across the Sample in Urban Areas (%)**

Household Indigenous Background (HIB)	Share of Indigenous Population			Total
	<33%	33%-66%	>66%	
Household with both head of household and spouse reporting native mother tongue	8.79	3.34	3.94	16.07
Household with either head of household or spouse, or both, reporting spanish as mother tongue	79.54	3.45	0.95	83.94
Total	88.33	6.79	4.89	100

Source: Own estimates based on ENAHO (2001)

**Table 4: Distribution of Households across the Sample in Rural Areas (%)**

Household Indigenous Background (HIB)	Share of Indigenous Population			Total
	<33%	33%-66%	>66%	
Household with both head of household and spouse reporting native mother tongue	1.52	4.21	39.58	45.31
Household with either head of household or spouse, or both, reporting spanish as mother tongue	46.76	4.68	3.25	54.69
Total	48.28	8.89	42.83	100

Source: Own estimates based on ENAHO (2001)

<sup>5</sup> It is worth emphasizing that this study is performed separately for urban and rural areas, so these proportions are constructed for the rural/urban portion of the district where the rural/urban household lives. We leave for future research the analysis of the interaction between rural and urban areas, where the variable of contextual indigenous background would be constructed in terms of the total population of the district (instead of its rural/urban portion).

Tables 5 and 6 show the geographic distribution of our sample, which can be compared with what we already have shown in Figure 1. It is clear from these tables that households living in contexts with a small proportion of indigenous population tend to be concentrated in cities and towns in Lima and in the Northern Costa, while households living in contexts with large proportion of indigenous population (more than 66% of the total population) are concentrated in the rural areas of the southern sierra.

**Table 5: Distribution of Households across Regions in Urban Areas (%)**

Region	Share of Indigenous Population			Total
	<33%	33%-66%	>66%	
Northern Costa	16.44	0	0	16.44
Central Costa	7.2	0.38	0.14	7.72
Southern Costa	2.01	0.48	0.3	2.79
Northern Sierra	1.86	0	0	1.86
Central Sierra	4.4	1.76	1.36	7.52
Southern Sierra	3.87	3.97	2.97	10.81
Selva	9	0.04	0.12	9.16
Metropolitan Lima	43.55	0.15	0	43.7
Total	88.33	6.78	4.89	100

Source: Own estimates based on ENAHO (2001)

**Table 6: Distribution of Households across Regions in Rural Areas (%)**

Region	Share of Indigenous Population			Total
	<33%	33%-66%	>66%	
Northern Costa	8.12	0	0	8.12
Central Costa	2.49	1.87	0	4.36
Southern Costa	0.16	0.63	0.47	1.26
Northern Sierra	16.62	0	0.27	16.89
Central Sierra	6.27	3.1	16.73	26.1
Southern Sierra	0.72	0.41	22.77	23.9
Selva	13.91	2.87	2.59	19.37
Metropolitan Lima				
Total	48.29	8.88	42.83	100

Source: Own estimates based on ENAHO (2001)

## DESCRIPTION OF POPULATIONS FROM DIFFERENT INDIGENOUS BACKGROUNDS

In this section, we provide a first glimpse of the main characteristics that affect the economic and social outcomes of households with different family and contextual ethnic backgrounds. It is worth mentioning that the number of households with no indigenous background living in rural-districts with low contextual indigenous background is very small (see Table 4), so the corresponding numbers should be read with caution. The same case can be made for urban indigenous households in districts with large proportion of indigenous households.

Table 7 shows the basic demographic households characteristics. On average household size tends to be the same in urban-districts with small proportion of indigenous population whereas it is higher

for indigenous households living in urban-districts with medium proportion of indigenous population. In rural districts with large proportion of indigenous population, however, family size tends to be significantly lower for indigenous than for non-indigenous households. At first look, this was a surprising result considering that family size correlates positively with poverty (in other words, the larger the family, the greater the poverty) and poverty correlates positively with indigenous origin. However, two factors that may have changes the demographic picture should be taken into account when reading those figures, (i) the high migration rates that have prevailed in rural Peru, and (ii) the fact that the crude violence during the terrorism period affected proportionately more Peruvians with indigenous family background living in rural isolated areas of the country, especially in the Andean region –sierra- (see the Report by the Commission for the Truth and Reconciliation). As we mentioned in the previous section, families who were forced to migrate may have moved back to their original communities by now. However, in many of those families, part of the family stayed behind. This may suggest that our finding of smaller family size among indigenous households in rural areas could be associated with migration behavior and higher mortality due to the internal war rather than with lower birth rate.

**Table 7: Household Demographics**

Household Indigenous Background (HIB)	RURAL			URBAN		
	Share of Indigenous Population			Share of Indigenous Population		
	LOW <33%	33% - 66%	HIGH 66% - 100%	LOW <33%	33% - 66%	HIGH 66% - 100%
<b>Household Size</b>						
Non Indig Backgr	4.7	4.3	4.7	4.5	4.2	3.8
Indig Background	3.6	4.2	4.3	4.5	4.5	4.4
<b>Number of household members whose age ranges between 3 - 5 years old</b>						
Non Indig Backgr	0.4	0.4	0.4	0.3	0.3	0.2
Indig Background	0.2	0.4	0.4	0.2	0.3	0.4
<b>Household members whose age</b>						
Non Indig Backgr	1.9	1.7	1.7	2.1	2.0	1.7
Indig Background	1.5	1.7	1.6	2.0	2.0	1.7
<b>Years of education achieved by the most qualified household member</b>						
Non Indig Backgr	7.5	8.9	9.2	11.6	12.6	12.2
Indig Background	5.9	7.1	6.2	10.2	10.4	8.8
<b>Years of education achieved by the head of household</b>						
Non Indig Backgr	4.7	6.9	7.7	9.4	10.8	11.4
Indig Background	2.7	4.2	3.9	6.1	6.5	6.6

Source: Own estimates based on ENAHO (2001)

In terms of education, which is important dimension of household human capital, we found that non-indigenous households are on average headed by more educated members than indigenous background households are, not only in urban but also in rural areas. This difference ranges from 1 to 5 years of difference between households with different ethnic background. The number of years of formal education of the most educated member of the family is also significantly higher in non-indigenous households than it is in indigenous households. These differences are particularly important because they affect welfare outcomes as we will see in the following sections.

Another striking finding was that urban household members had significantly higher levels of education than did their ethnically similar rural peers. In some cases, this amounted to as much as twice the number of years of education. These educational gaps between ethnically similar rural and urban households apply not only to the head of household but also to the most educated member, and they showed to be important for households across the three categories of contextual indigenous backgrounds. In Parts V and VIII below, we will be analyzing three economic outcomes for which education is a key determinant – employment opportunities, ability to diversify income sources and poverty. In Part VI, we will analyze this educational gap within young generations. It is worth mentioning that, although our discussion in Part VI focuses on children and we acknowledge the increasing enrollment rates in preschool, we do not analyze thoroughly children’s attendance to levels under primary school (i.e. children under 6).

The most important factors in any household’s quality of life - access to clean water, sewerage, and electricity - are summarized in Tables 8, 9, and 10. , Tables 8 and 9 point out the environmental risk factors that many households in Peru face. For instance, fewer than 10 percent of rural households have sewerage system connection within the house as opposed to about 50 percent of urban households. This table does not include data on those households that have connections from outside the house to the public sewerage network (a safe alternative to having a connection within the house). However, the other two options included in the table (use of latrines and rivers) may involve health risks for all household members, especially the younger ones. One of the most important differences we show in Table 8 is the higher proportion of indigenous households with no access to a safe sewerage system as compared to the proportion of non-indigenous households with the same problem, when looking at both rural and urban portions of districts with large proportion of indigenous population. This difference rises up to almost three times higher in urban areas. Similar observations can be drawn from Table 9, when looking at the lack of access to safe water provision systems available to indigenous households. The lack of access to both safe drinking water and safe sewerage systems is particularly important as the main health risks for children in Peru come from the water they consume as well as from the dirt they have contact with when playing, which can be severely polluted due to the problems referred to in Table 8.

Finally, besides its importance for daily life purposes, household access to electricity is a key factor in fostering income generating activities, especially self employment activities that are important not only in urban areas but also (and increasingly) in rural areas. Table 10 shows significant differences between urban households and their ethnically similar rural counterparts in terms of access to electricity. Wrapping up, it is worth emphasizing that extending access to public services such as electricity, clean water, and sewerage systems would help to strengthen human capital formation.

**Table 8: Sewerage Systems used by Households**

Household Indigenous Background (HIB)	RURAL			URBAN		
	Share of Indigenous Population			Share of Indigenous Population		
	LOW <33%	33% - 66%	HIGH 66% - 100%	LOW <33%	33% - 66%	HIGH 66% - 100%
Sewerage within the house , connected to the public network						
Non Indigenous Background	5.5	6.9	8.6	70.4	59.4	47.9
Indigenous Background	3.8	3.6	2.0	62.0	53.3	30.1
Non sewerage system, use of latrines and the like (low safety)						
Non Indigenous Background	41.7	32.5	25.1	11.3	8.0	10.2
Indigenous Background	20.6	27.0	28.8	13.1	9.8	16.8
No sewerage system at all (use of rivers, open field..) (no safety)						
Non Indigenous Background	40.8	40.9	43.5	8.9	11.6	16.1
Indigenous Background	61.1	53.8	60.5	13.4	16.4	38.0

Source: Own estimates based on ENAHO (2001)

**Table 9: Water Provision Systems used by Households**

Household Indigenous Background (HIB)	RURAL			URBAN		
	Share of Indigenous Population			Share of Indigenous Population		
	LOW <33%	33% - 66%	HIGH 66% - 100%	LOW <33%	33% - 66%	HIGH 66% - 100%
Water within the house, connection to the public network						
Non Indigenous Background	34.4	29.7	44.2	76.5	68.7	66.5
Indigenous Background	29.2	26.2	37.4	65.4	63.4	67.7
Water connection outside the house, or buy to cistern trucks						
Non Indigenous Background	7.3	17.1	4.4	13.0	22.3	23.4
Indigenous Background	13.2	19.4	5.4	26.0	23.2	13.8
Water from natural sources (such as the river, spring...)						
Non Indigenous Background	58.4	53.2	51.4	10.5	9.1	10.1
Indigenous Background	57.6	54.4	57.2	8.5	13.4	18.5

Source: Own estimates based on ENAHO (2001)

**Table 10: Household Lighting**

Household Indigenous Background (HIB)	RURAL			URBAN		
	Share of Indigenous Population			Share of Indigenous Population		
	LOW <33%	HIGH 33% - 66%	HIGH 66% - 100%	LOW <33%	HIGH 33% - 66%	HIGH 66% - 100%
House lighting: electricity						
Non Indigenous Background	20.1	34.0	23.9	89.7	89.7	80.4
Indigenous Background	23.7	32.2	24.6	92.0	86.8	71.0
House lighting: petroleum or kerosen lamps, other						
Non Indigenous Background	56.7	31.6	34.2	5.6	0.8	3.6
Indigenous Background	45.2	29.9	35.5	1.8	2.1	5.4
House lighting: None						
Non Indigenous Background	22.8	33.9	41.3	4.6	9.5	16.0
Indigenous Background	31.2	37.3	39.4	6.3	11.1	23.4

Source: Own estimates based on ENAHO (2001)

### Access to Land Titling for Rural Dwellers

Access to public assets is just one of the ways in which indigenous and non-indigenous populations differ. Access to key private assets may also differ. One of the key assets that are typically owned by indigenous people is agricultural land. The ENAHO household survey does not provide detailed information about the characteristics of the land that rural household own. Specifically, there is no information about land size, but there is some information about land tenure. Table 11 shows that indigenous people who live in areas with large proportion of indigenous population are less likely to own private land and are more likely to be working on community-owned land than both their non-indigenous neighbors and indigenous people who live in areas with smaller proportion of indigenous population.

**Table 11: Access to Agricultural Land in Rural Areas**

	INDIGENOUS BACKGROUND 29.32%			NON INDIGENOUS BACKGROUND 70.68%		
	Share of Indigenous Population			Share of Indigenous Population		
	LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH
<b>Land for agricultural activities</b>						
<b>Property Status</b>						
Own land (100% of the land)	86.21	83.21	74.37	79.91	76.24	86.64
Own land (50% of the land)	1.43	2.4	4.27	2.06	7.55	0.88
Rented land (100%)	4.59	3.34	2.18	5.14	5.8	1.56
Communal	3.93	6.07	15.67	3.45	4.54	5.16
Other	3.83	4.99	3.52	9.44	5.87	5.76

Source: Own estimates based on ENAHO (2001)

It is interesting to note that, in the evaluation of the Peruvian rural land titling program, GRADE (2005) found no segregation against indigenous farmers –among all beneficiary farmers- when analyzing their probability of having a registered title of their land plots, after controlling for

education, gender, and plot size. This may not be surprising given the methodology of the program, which consisted in registering all plots within the program’s chosen areas without discriminating plots for any particular reason. In fact, the figures reported in GRADE (2005) show that the proportion of indigenous people with registered titles in rural areas of the southern Sierra is not significantly different from the proportion of indigenous people with registered titles in rural areas of the northern Costa. Having said that, however, it is worth to emphasize that within the areas that were benefited by this titling program only 15% of all farmers are indigenous (following the definition used here). This figure contrasted sharply with the percentage of the rural population with indigenous background (45.3 percent as reported in Table 4). This difference may indicate that the areas that were chosen to be benefited by the program do not include areas with large proportion of indigenous population. If this is the case, it becomes clear that, although the project’s titling methodology does not discriminate *per se*, it is biased against areas with higher concentration of indigenous people. The program may have targeted valley floors and medium-sized urban centers in the Sierra region, which are the areas with the best connections to markets and where fewer proportion of indigenous residents.

GRADE (2005) also showed that the average size of plots owned by indigenous farmers (2.7 hectares including agricultural land and pastures) is considerably smaller than the size of plots owned by non-indigenous farmers (6 hectares). This difference is much larger in the Southern Sierra areas (see Table 12).<sup>6</sup>

**Table 12: Size of Plots held by the Indigenous and Non-indigenous**

	Indigenous Background	Non-indigenous Background
Northern Costa	4.94	4.49
Central and Southern	5.92	6.59
Northern Sierra	8.28	3.25
Central Sierra	2.11	2.39
Southern	2.51	5.56

Source: Linea de Base PETT.

### Access to Credit

As known, credit restrictions are typically considered one of the most important problems for households and firms to optimize their economic behavior, preventing them from allocating their resources in an intertemporal horizon. Table 13 shows some statistics on access to credit focusing on three types of users, farmers (agricultural activities), urban micro and small entrepreneurs (it excludes self-employed individuals providing professional services), and households (credit for consumption).<sup>7</sup>

<sup>6</sup> Since Northern Sierra is predominantly non-indigenous, the difference observed in Table 12 is not significant.

<sup>7</sup> It is worth noting that individuals tend to self-exclude from this market when they know they have no chances of getting a loan; this is clear when looking at the survey statistics where we can find that most of those who asked for a loan got it. This is why it is not possible to perform a reliable analysis on the role of individual and contextual ethnicity on this market (we do not really know who needed the credit and could have afforded it but still decided not to ask for it because he/she thought would not get it anyway, and who did not need it or could not afford getting one and decided not to ask for it).

The first striking result in Table 13 is the low proportion of individuals accessing credit in each group of potential users. Credit for household consumption is the only category that shows significant differences between indigenous and non-indigenous households. It is worth noting that this type of credit has increased considerably in the last years especially for urban areas, so we can expect that these differences are concentrated in urban areas.

**Table 13: Access to Credit for Indigenous and Non-indigenous Households**

	INDIGENOUS BACKGROUND 29.32%			NON INDIGENOUS BACKGROUND 70.68%		
	Share of Indigenous Population			Share of Indigenous Population		
	LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH
<b>Agriculture</b> Credit (at least one indiv. In the household asked for it)	9.80	6.93	2.87	6.49	4.70	4.94
<b>Micro firm</b> Credit (at least one indiv. In the household asked for it)	12.45	14.12	18.56	11.46	16.21	12.01
<b>For consumption</b> Credit (at least one indiv. In the household asked for it)	11.88	9.56	7.56	13.60	13.71	14.46

Source: Own estimates based on ENAHO (2001)

The findings in Table 13 for urban dwellers are –to a certain extent- consistent with the evidence found by Torero et al. (2004) for racial differences. It is worth highlighting that the operational definition of ethnicity in this study is different from the one used in Torero et al.’s; however, it may be relevant to bring this previous study up when we speculate about potential discrimination issues in credit markets access. As referred in Section II, these authors found some indication of a non-linear effect between race intensity and access to credit, but they recognized as well that this evidence is not very robust when controlling for other household characteristics. Moreover, they emphasize that these racial differentials might be capturing differences in individual’s earnings stability, and thus they might be working merely as a proxy for earnings stability instead of having an effect themselves. In consequence, if analysts control for direct variables of earnings stability, racial characteristics might no longer be significant. Following to Torero et al. argument, if anything, the apparent limited evidence of systematic discrimination in credit markets might be explained by differences in lenders’ attitude towards risk, with ethnicity working as a “cheap” signal for other available but costly individual information.

In the case of rural dwellers trying to access credit to finance their agricultural activities, we find a higher proportion of indigenous farmers accessing credit in districts with small or medium proportion of indigenous people, whereas we find a lower access among indigenous farmers as compared to non-indigenous farmers in districts with large proportion of indigenous residents. We may think of information networks operating among members of a minority ethnic group that could facilitate access to credit markets. However, the statistics showed here do not give much information on these processes so we do not develop any further this argument.

## INCOME DIVERSIFICATION AND EMPLOYMENT OPPORTUNITIES

To explore employment and income diversification patterns in our sample, we classified household income as follows:

- Labor income
  - Self-employment agricultural income
  - Wage agricultural income
  - Self-employment non-agricultural income
  - Wage non-agricultural income
- Private transfers (mostly remittances)
- Property income

In exploring employment and income diversification patterns, we looked at both total income and labor income. In the case of total income, we looked not only at decisions about agricultural and non-agricultural employment in either wage or self-employment activities but also at remittances as a way of diversifying income sources.

### Earnings Composition

The earnings sources of urban and rural dwellers differ. Table 14 shows that rural dwellers engage significantly more in agricultural activities while 14 a significantly larger share of the income of urban income-earners come from wage sources.

**Table 14: Per Capita Income by Income Sources among Indigenous and Non-indigenous in Rural and Urban Areas with Small and Large shares of Indigenous Population**

Components of per capita income	INDIGENOUS BACKGROUND		NON-INDIGENOUS BACKGROUND	
	RURAL	URBAN	RURAL	URBAN
<b>LABOR INCOME</b>	<b>91.0%</b>	<b>90.5%</b>	<b>91.0%</b>	<b>86.0%</b>
Agricultural Waged	16.5%		18.9%	
Agricultural Non-waged	44.8%		40.8%	
Non-agricultural Waged	21.7%		21.6%	
Non-agricultural Non-waged	17.1%		18.6%	
Waged income	38.2%	50.6%	40.5%	59.3%
Non-waged income	61.8%	49.4%	59.5%	40.7%
<b>NON-LABOR INCOME</b>				
<b>Property Rents</b>	<b>0.6%</b>	<b>0.5%</b>	<b>0.7%</b>	<b>1.1%</b>
<b>Remittances</b>	<b>8.4%</b>	<b>9.0%</b>	<b>8.3%</b>	<b>12.9%</b>
<b>Total</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

Source: Own estimates based on ENAHO (2001)

When we split the urban and rural sample to distinguish between indigenous and non-indigenous populations, we found that non-indigenous households were more likely than indigenous households to be engaged in wage employment.

## Earning Differentials

The per capita income of the non-indigenous population is almost double that of the indigenous population. At least part of this differential may be due to differences in endowments (education, private assets, access to public services, etc.). Although the differential is much larger in urban areas, even within rural areas the per capita income of the non-indigenous is on average 40 percent higher than that of the indigenous population (see Table 15).

**Table 15: Per Capita Income by Area and Indigenous Background**

	Total		INDIGENOUS		NON-INDIGENOUS	
	Labor Per Capita Income	Total Per Capita Income	Labor Per Capita Income	Total Per Capita Income	Labor Per Capita Income	Total Per Capita Income
<b>National</b>	73.2	86.8	41.6	47.2	84.5	101.0
<b>Rural</b>	30.5	34.6	24.7	28.1	35.4	40.0
<b>Urban</b>	96.1	114.9	67.1	76.3	101.9	122.5

Source: Own estimates based on ENAHO (2001)

\* Per Capita Monthly Income in Soles of November 2001

Tables 16 and 17 show the results of an income decomposition exercise based on the so-called Blinder-Oaxaca decomposition of the mean per capita income differential between the indigenous and non-indigenous in both rural and urban areas (Patrinos and Hall, 2005). The results show that for both rural and urban Peru about 40 percent of the income differential can be attributed to differences in endowments. However, the decomposition exercise revealed that only in rural areas a sizable share of the income differential (51 percent) can be attributed to differences in returns to different assets. The decomposition exercise was unable to disentangle both effects for the urban population but it found that both endowment and return differences account for almost 52 percent of the income differential between indigenous and non-indigenous population in urban areas.

**Table 16: Contribution of Independent Variables to Indigenous and Non-indigenous Earnings Differentials in Rural Peru**

Variable	Decomposition			Contribution as % of total differential		
	Endowments $b_n(X_n - X_i)$	Pay structure $X_i(b_n - b_i)$	Interaction	Endowments	Pay structure	Interaction
Years of schooling	35.3	43.9	17.1	36.8%	45.7%	17.8%
Log(hours worked)	-2.5	152.1	-2.4	-2.60%	158.5%	-2.5%
Experience	-28.5	65.0	-7.0	-29.7%	67.8%	-7.3%
Experience-squared	24.6	-20.5	3.7	25.6%	-21.3%	3.8%
Self employed	-0.3	-18.6	-0.1	-0.3%	-19.4%	-0.1%
Formal	8.6	6.3	-1.0	9.0%	6.6%	-1.1%
Married	0.02	-24.6	-1.0	0.02%	-25.6%	-1.1%
Constant		-154.3			-160.8%	
Total	37.3	49.3	9.3	38.9%	51.4%	9.7%

Source: Own calculations based on ENAHO (2001)

It is interesting to note that, in rural areas, returns to schooling, additional work hours, and **work** experience are all greater for the non-indigenous population than for the indigenous population, which accounts for an important share of the income differential. These factors are also important

in urban areas, but returns to being self-employed and being married and to non-observables (captured by the constant) are all negative and significantly reduce the difference in income that can be attributed to differences in returns between the indigenous and non-indigenous population.

**Table 17: Contribution of Independent Variables to Indigenous and Non-indigenous Earnings Differentials in Urban Peru**

Variable	Decomposition			Contribution as % of total differential		
	Endowments bn(Xn-Xi)	Pay structure Xi(bn- bi)	Interaction	Endowments	Pay structure	Interaction
Years of schooling	84.0	247.7	108.9	42.8%	126.2%	55.5%
Log(hours worked)	-4.9	81.7	-0.7	-2.49%	41.6%	-0.4%
Experience	-86.9	11.3	-1.8	-44.3%	5.7%	-0.9%
Experience-squared	81.0	80.5	-21.2	41.2%	41.0%	-10.8%
Self employed	-2.0	-67.8	10.4	-1.0%	-34.5%	5.3%
Formal	3.8	49.5	7.4	1.9%	25.2%	3.7%
Married	0.58	-95.7	-1.0	0.3%	-48.8%	-0.5%
Constant		-288.1			-146.7%	
Total	75.4	19.1	101.9	38.4%	9.7%	51.9%

Source: Own calculations based on ENAHO (2001)

## Income Diversification

To measure income diversification patterns, we used the Herfindahl index (H index), which considers the relative importance of income sources. It is constructed as follows:

$$H = 1 - \sum_{i=1}^N S_i^2$$

where  $S_i$  is the portion of income coming from source  $i$ . The value of  $H$  ranges from 0 if all income is concentrated in a single source to  $1-1/N$  if the income is divided equally between all income sources. To construct a Herfindahl concentration index for rural households, we included agricultural and non-agricultural wage income activities and agricultural and non-agricultural self-employment activities in the list of income sources. Income from “all sources” also included income from remittances (from private sources) and from property income. In the case of urban areas, labor income included income from both wage and self-employment activities. Income from “all sources” included all of these sources plus income from remittances (from private sources) and from property income.

Table 18 shows the Herfindahl concentration index for urban and rural Peru for all income sources and then just for labor income sources. To make it possible to make comparisons between different ways of categorizing income and between urban and rural diversification patterns, we had to use a standardized H index, which ranges between 0 and 1 with 0 denoting full concentration and 1 denoting full diversification:

$$H^* = \frac{1 - \sum_i S_i^2}{1 - 1/N}$$

Here  $N$  denotes the total number of categories into which income is divided. For example,  $N$  is 4 in for rural labor income sources and 6 for rural total income.<sup>8</sup>

<sup>8</sup>  $N$  cannot have a value of 0 since it does not change from household to household.

**Table 18: Household Income Diversification/Specialization Patterns(Non-standardized Herfindahl Index)**

	INDIGENOUS BACKGROUND		NON-INDIGENOUS BACKGROUND		INDIGENOUS POOR		NON-INDIGENOUS POOR	
	RURAL	URBAN	RURAL	URBAN	RURAL	URBAN	RURAL	URBAN
<b>I. LABOR INCOME SOURCES ONLY</b>								
Share of Indigenous Population	Herfindahl index							
Small	13.5%	13.4%	17.7%	12.4%	10.4%	14.5%	18.2%	12.8%
Medium	13.2%	14.0%	15.5%	12.6%	14.2%	16.4%	13.8%	14.6%
Large	16.2%	13.0%	17.6%	13.1%	16.0%	12.2%	17.3%	13.0%
<b>II. ALL INCOME SOURCES (LABOR, PROPERTY RENTS, REMITTANCES)</b>								
Share of Indigenous Population	Herfindahl index							
Small	25.4%	20.5%	26.5%	21.7%	18.7%	20.7%	26.1%	20.7%
Medium	23.3%	24.1%	22.3%	21.6%	22.1%	24.8%	21.7%	24.0%
Large	26.8%	21.6%	26.7%	19.9%	26.2%	20.9%	25.8%	21.0%

Note: Rural includes four sources of labor income and six sources of total income (including rents and remittances)  
 Urban includes two sources of labor income and four sources of total income (including rents and remittances)  
 Source: Own estimates based on ENAHO (2001)

Income diversification can be both a risk-coping strategy and a way of exploring new income-generating opportunities. As Barrett et al (2000) put it, "diversification patterns reflect individuals' voluntary exchange of assets and their allocation of assets across various activities so as to achieve an optimal balance between expected returns and risk exposure conditional on the constraints they face" (p. 2). Because of this, under risky conditions, the link between income diversification and total income is theoretically and empirically ambiguous.

Since income diversification depends on a household's asset base and the restrictions that it faces, it is no surprise that income diversification patterns may differ between rural and urban settings. In rural areas, the availability of natural resources (including agricultural and grazing land) will bias income diversification towards agricultural sources, while in urban areas industrial and service sectors will be more predominant sources of income, either as waged or self-employment employment sources.

Table 19 shows the standardized Herfindahl index. First it is important to note that, as we expected, diversification is higher on average in rural areas than in urban areas. This may reflect a greater need to diversify income in rural areas because these sources are intrinsically more risky than those in urban areas.

Diversification is higher on average among the non-indigenous than among the indigenous. In urban areas, no visible pattern emerges as indigenous households exhibit similar diversification patterns than those with no indigenous background in areas with both large and small share of indigenous population. However, in rural areas, indigenous households located in districts with small share of indigenous population diversify less than non-indigenous households in the same areas (18 percent versus 24 percent). Similarly, indigenous households located in districts with small share of indigenous population diversify less than indigenous households located in areas with large proportion of indigenous population.

**Table 19: Household Income Diversification/Specialization Patterns (Standardized Herfindahl Index)**

	INDIGENOUS BACKGROUND		NON-INDIGENOUS BACKGROUND		INDIGENOUS POOR		NON-INDIGENOUS POOR	
	RURAL	URBAN	RURAL	URBAN	RURAL	URBAN	RURAL	URBAN
<b>I. LABOR INCOME SOURCES ONLY</b>								
Share of Indigenous Population	Herfindahl index							
Small	18.0%	24.8%	23.6%	26.8%	15.6%	22.6%	21.6%	25.9%
Medium	17.6%	25.2%	20.6%	27.9%	17.9%	37.5%	16.5%	22.9%
Large	21.6%	26.2%	23.5%	25.9%	20.3%	22.7%	23.6%	30.7%
<b>II. ALL INCOME SOURCES (LABOR, PROPERTY RENTS, REMITTANCES)</b>								
Share of Indigenous Population	Herfindahl index							
Small	30.5%	27.4%	31.8%	29.0%	27.6%	23.4%	28.7%	27.5%
Medium	28.0%	32.1%	26.8%	28.7%	25.2%	35.1%	23.6%	24.3%
Large	32.1%	28.8%	32.1%	26.6%	30.6%	28.7%	31.9%	34.3%

Note: Rural includes four sources of labor income and six sources of total income (including rents and remittances)

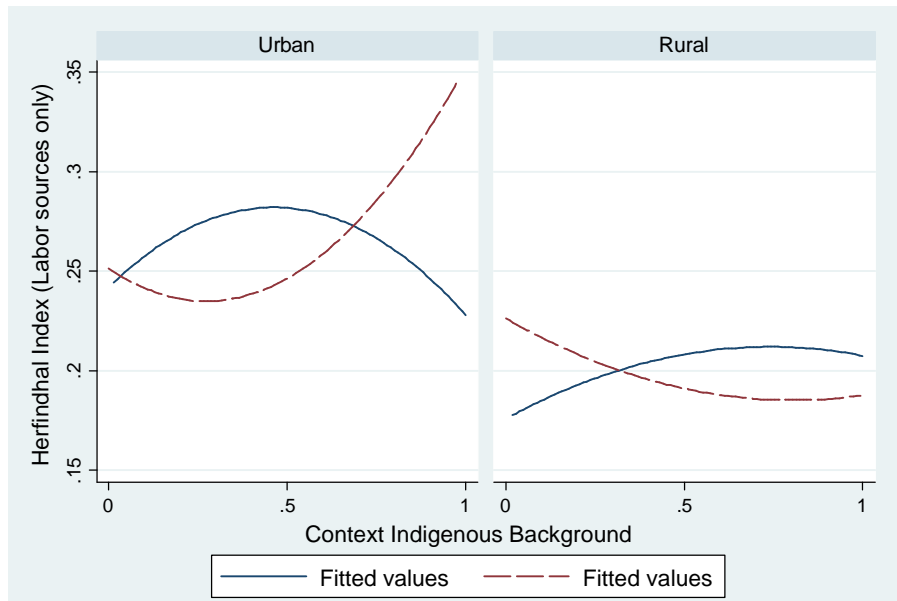
Urban includes two sources of labor income and four sources of total income (including rents and remittances)

Source: Own estimates based on ENAHO (2001)

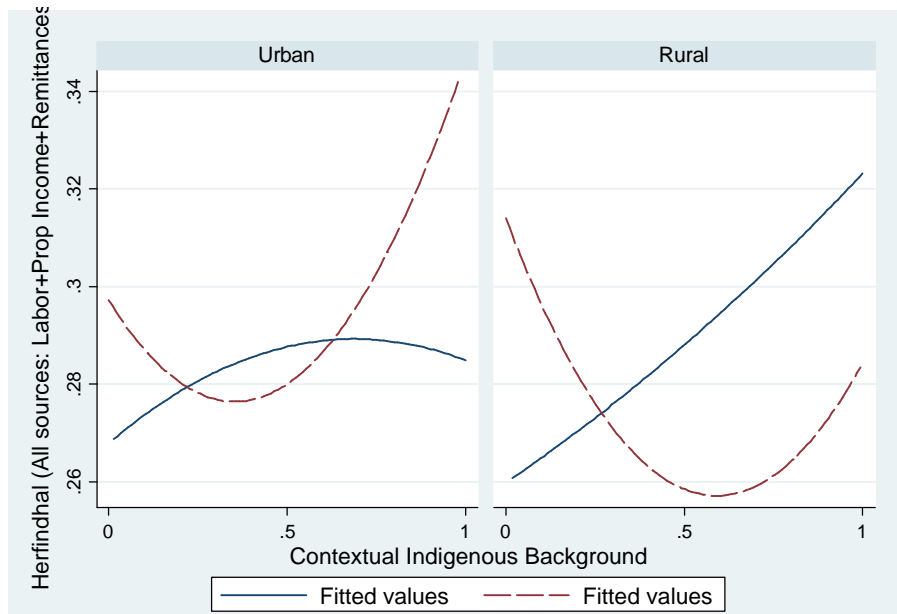
Further, it is interesting to note that when one focuses on total income sources (including remittances and other non-labor income sources) as opposed to labor income sources, the degree of diversification by all groups increases but more for indigenous households located in areas with small share of indigenous population. Thus, indigenous people living in areas with small share of indigenous population may have relatively less diversified labor income but at the same time greater diversification of non-income sources, especially remittances. This result is consistent with the work of Tamagno (2005), who highlighted the increasing articulation of migrants with their communities of origin and shown that increasingly transfer are an important income source for those having members who have migrated. This has come about through, among other things, the expansion of the telecommunications network and improvements in the rehabilitation and maintenance of rural roads that have occurred in the last 15 years.

Figures 2 and present a prediction of diversification patterns by the survey households. The solid line represents indigenous households while the long-dashed line represents non-indigenous households. The U-shaped pattern observed in Figure 3 for non-indigenous households reflects two distinct diversification profiles. While households with few assets may be pushed into diversification as a risk-coping strategy, those with more assets can take advantage of new labor market opportunities thanks to these assets. For example, households with access to key public services (such as electricity) can engage in non-salaried employment (such as small-scale industry or handicrafts), as well as in higher skilled (and therefore higher paid) jobs that require higher-level skills that are the result of education.

**Figure 2: Diversification Patterns (Labor Sources Only)**



**Figure 3: Diversification Patterns (All Income Sources including Labor Sources, Remittances, and Property Income)**



### Occupational Decisions and Labor Returns

Indigenous and non-indigenous populations may differ in terms of their occupations not only because of their sector of employment (agriculture/non-agriculture) but also because of other employment characteristics like their employment status (waged/self-employed), their legal relationship with their employer (formal/informal), the nature of the labor engagement (through a

single activity or more than one; full time/part time), or the skill level of the activity. Table 20 shows the main occupational characteristics of indigenous and non-indigenous populations and the average hourly income associated with type of labor relationship.

Table 20 shows that indigenous populations living in rural areas are more likely to be devoted full-time to self-employed agricultural activities than non-indigenous populations living in the same areas. Non-indigenous rural households are more likely to have diverse sources of income and to be engaged in waged and self-employment non-agricultural activities. In terms of average hourly income associated with each type of employment, we found that labor returns are higher for non-indigenous than for indigenous populations. The differences in hourly income is much higher for medium- and low-skilled jobs than for high-skilled jobs, which may be an indication that education can reduce the wage gap between indigenous and non-indigenous populations.

**Table 20: Composition of Labor Force by Labor Conditions and Hourly Incomes (Indigenous/ Non-indigenous and Urban/ Rural)**

Characteristics	INDIGENOUS BACKGROUND 32.95%				NON-INDIGENOUS BACKGROUND 67.05%			
	RURAL 61.29%		URBAN 38.71%		RURAL 30.70%		URBAN 69.30%	
	%	Average Hourly income *	%	Average Hourly income *	%	Average Hourly income *	%	Average Hourly income *
One activity	75.63	0.41	81.63	0.92	72.76	0.92	83.65	1.48
Two activities	24.37	0.61	18.37	1.09	27.24	0.47	16.35	1.40
Full time	48.29	0.34	63.00	0.74	43.19	0.47	62.79	1.06
Part time	51.71	0.62	37.00	1.35	53.81	0.92	37.21	2.11
Low-skilled	38.42	0.52	37.71	0.86	32.00	0.69	28.35	1.14
Mid-skilled	60.14	0.43	57.46	0.93	65.04	0.63	60.49	1.42
High-skilled	1.45	1.54	4.82	1.79	2.95	1.59	11.16	2.48
<b>Agricultural</b>	<b>82.53</b>	<b>0.38</b>	<b>19.94</b>	<b>0.50</b>	<b>74.98</b>	<b>0.59</b>	<b>9.24</b>	<b>1.19</b>
Waged agricultural	9.19	0.51	22.56	0.66	14.20	0.62	35.60	0.82
Self-employed agricultural	53.19	0.33	45.62	0.37	52.14	0.52	42.84	1.08
Employer agricultural	5.79	0.69	12.48	0.78	10.69	0.95	12.87	2.19
Unpaid agricultural	31.82	0.00	19.34	0.00	22.97	0.00	8.69	0.00
<b>Non agricultural</b>	<b>17.47</b>	<b>0.78</b>	<b>80.06</b>	<b>1.08</b>	<b>25.02</b>	<b>0.90</b>	<b>90.76</b>	<b>1.50</b>
Waged Non-agricultural	30.52	0.97	36.22	1.18	31.58	1.17	47.55	1.45
Self-employed Non-agricultural	63.57	0.62	51.21	0.92	61.13	0.69	42.66	1.26
Employer Non-agricultural	3.36	1.39	6.75	1.83	2.64	1.42	5.99	3.66
Unpaid Non-agricultural	2.55		5.82		4.65		3.80	

\* Mean values In US\$ using exchange rate of Nov - 2001  
Source: Own estimates based on ENAHO (2001)

This pattern is also evident in urban areas where indigenous people are more likely to be engaged in low-skilled jobs, to have to take on more than one job at the time to earn their living, and to have lower returns to their labor than non-indigenous people living in the same area. This is especially true in highly skilled occupations where the earning premium against indigenous people is more than 50 percent.

Table 21 shows the likely employment opportunities (only the primary occupation) available to people of indigenous and non-indigenous backgrounds taking into account the size of the indigenous population in their particular area. We found that in urban areas not only does having an indigenous background reduce the likelihood of being employed in the waged-labor sector but also there is a significant difference between areas with small and large share of indigenous population,

being waged opportunities more likely for indigenous populations living in non-indigenous backgrounds than the same population living in areas where the share of the indigenous population is larger. This may reflect the fact that urban areas with small indigenous background coincide with cities with larger populations where labor markets are more dynamic.

**Table 21: Employment Opportunities Available to Indigenous People**

	INDIGENOUS BACKGROUND			NON INDIGENOUS BACKGROUND		
	Share of Indigenous Population			Share of Indigenous Population		
	Low	Medium	High	Low	Medium	High
<b>RURAL</b>						
Agricultural Waged	11.40	22.88	8.76	12.29	23.84	9.98
Agricultural Self-Employed	9.37	8.17	7.02	8.48	14.81	22.65
Non Agricultural Waged	62.14	58.09	67.64	59.52	42.66	49.25
Non Agricultural Self-Employed	17.02	10.57	16.55	19.71	18.68	18.12
<b>URBAN</b>						
Waged income	38.57	36.73	31.53	48.16	53.55	59.17
Self-Employed income	61.42	63.27	68.47	51.83	46.45	40.84

Source: Own estimates based on ENAHO (2001)

In rural Peru, the non-indigenous are more likely than the indigenous to be engaged in waged activities (both agricultural and non-agricultural) and self-employment non-agricultural activities. In the case of waged activities, some labor market discrimination may be involved (as we will discuss below), while differences in participation in self-employment non-agricultural activities may arise because of differences in asset ownership and in access to public goods and services. Living in areas with large share of indigenous population does increase the likelihood of indigenous people engaging in agriculture and reduces the likelihood of them engaging in waged activities. However, for non-indigenous people, the likelihood of engaging in non-agriculture waged activities increases, the larger the indigenous population in the area in which they live. Again, this may reflect non-indigenous people displacing indigenous people in the labor market.

**Table 22: Composition of Labor Force by Income-generating Activities and Sectors among Indigenous and Non-indigenous in Rural and Urban Areas with Small, Medium, and Large shares of Indigenous Population**

Category	INDIGENOUS BACKGROUND 29.32%						NON INDIGENOUS BACKGROUND 70.68%					
	RURAL 56.91%			URBAN 43.09%			RURAL 27.01%			URBAN 72.99%		
	Share of Indigenous Populat			Share of Indigenous Populat			Share of Indigenous Populat			Share of Indigenous Populat		
	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
<b>Waged worker</b>	<b>16.26</b>	<b>25.00</b>	<b>11.42</b>	<b>35.81</b>	<b>33.27</b>	<b>28.05</b>	<b>16.98</b>	<b>30.36</b>	<b>27.32</b>	<b>46.12</b>	<b>50.72</b>	<b>57.95</b>
Agricultural	54.88	73.03	55.51	7.10	22.78	23.64	59.17	61.68	30.59	7.02	9.85	3.17
Non Agricultural	45.12	26.07	44.49	92.90	77.22	76.36	40.83	38.32	69.41	92.98	90.15	96.83
<b>Self employed</b>	<b>47.91</b>	<b>45.88</b>	<b>56.35</b>	<b>48.62</b>	<b>50.28</b>	<b>53.53</b>	<b>56.29</b>	<b>39.18</b>	<b>45.24</b>	<b>43.14</b>	<b>34.75</b>	<b>32.61</b>
Agricultural	73.44	84.15	79.67	5.93	20.02	43.64	72.29	66.21	70.72	9.20	10.63	12.73
Non Agricultural	26.46	15.85	20.33	94.07	79.98	56.36	27.71	33.79	29.28	90.80	89.37	87.27
<b>Employer</b>	<b>14.11</b>	<b>8.90</b>	<b>4.56</b>	<b>8.40</b>	<b>7.04</b>	<b>7.37</b>	<b>8.50</b>	<b>9.00</b>	<b>11.17</b>	<b>6.50</b>	<b>9.24</b>	<b>7.39</b>
Agricultural	95.42	86.94	88.60	20.81	35.09	58.31	93.90	84.08	82.73	16.69	37.70	22.11
Non Agricultural	4.58	13.06	11.40	79.19	64.91	41.69	6.10	15.92	17.27	83.31	62.30	77.89
<b>Unpaid worker</b>	<b>21.71</b>	<b>20.22</b>	<b>27.66</b>	<b>7.16</b>	<b>9.41</b>	<b>11.05</b>	<b>18.23</b>	<b>21.46</b>	<b>16.27</b>	<b>4.23</b>	<b>5.29</b>	<b>2.06</b>
Agricultural	96.86	99.29	98.31	20.57	48.61	81.79	93.65	98.60	83.92	18.49	26.88	17.80
Non Agricultural	3.14	0.71	1.69	79.43	51.39	18.21	6.35	1.40	16.08	81.51	73.12	82.20

Source: Own estimates based on ENAHO (2001)

### III - PARTICIPATION IN THE FORMAL AND INFORMAL SECTORS

Tables 23, 24, and 25 show the main characteristics and average returns for different labor conditions divided by type of employment. Table 23 focuses on waged labor, Table 24 focuses on the self-employed, and Table 25 focuses on those who run their own business or activity as employers.

**Table 23: Waged Labor Force by Labor Conditions and Hourly Incomes among the Indigenous and Non-indigenous in Rural and Urban Areas (Main Occupation)**

	INDIGENOUS BACKGROUND 29.32%				NON-INDIGENOUS BACKGROUND 70.68%			
	RURAL		URBAN		RURAL		URBAN	
	56.91%		43.09%		27.01%		72.99%	
	%	Average Hourly income	%	Average Hourly income	%	Average Hourly income	%	Average Hourly income
<b>Waged</b>		<b>0.74</b>		<b>1.11</b>		<b>0.91</b>		<b>1.39</b>
Formal **	19.63	1.25	37.71	1.42	29.52	1.32	48.04	1.74
Informal	80.37	0.59	62.29	0.88	70.48	0.70	51.96	1.05
One activity	45.05	0.80	78.89	1.08	56.78	0.97	81.88	1.39
Two activities	54.95	0.70	21.11	1.22	43.22	0.83	18.12	1.44
Part time	44.19	0.92	31.51	1.60	38.02	1.23	29.79	1.86
Full time	55.81	0.60	68.49	0.88	61.98	0.69	70.21	1.18
Low skilled	72.54	0.52	43.58	0.77	65.67	0.64	27.22	0.88
Mid skilled	16.25	0.82	43.41	1.17	18.51	0.94	52.91	1.35
High skilled	11.21	1.54	13.02	1.81	15.82	1.59	19.87	2.17
Agricultural	58.71	0.51	13.43	0.66	57.40	0.62	7.09	0.82
Non-agricultural	41.29	0.97	86.57	1.18	42.60	1.17	92.91	1.45

\* Mean values In US\$ using exchange rate of Nov - 2001

\*\* Their employers pay the corresponding labor taxes.

Source: Own estimates based on ENAHO (2001)

**Table 24: Self-employed Labor Force by Labor Conditions and Hourly Incomes among the Indigenous and Non-indigenous in Rural and Urban Areas (Main Occupation)**

	INDIGENOUS BACKGROUND				NON-INDIGENOUS BACKGROUND			
	RURAL		URBAN		RURAL		URBAN	
	Average Hourly income		Average Hourly income		Average Hourly income		Average Hourly income	
	%	Average Hourly income	%	Average Hourly income	%	Average Hourly income	%	Average Hourly income
<b>Self employed</b>								
Formal **			13.5	1.10			14.2	1.22
Informal			86.5	0.89			85.8	1.20
One activity	71.98	0.34	80.38	0.77	69.92	0.51	84.19	1.25
Two activities	28.02	0.52	19.62	0.91	30.08	0.70	15.81	1.15
Part time	50.70	0.51	39.93	1.16	52.39	0.77	45.95	1.79
Full time	49.30	0.27	60.07	0.57	47.61	0.34	54.05	0.76
Low skilled	4.95	0.48	34.11	0.88	4.25	0.94	31.41	1.37
Mid skilled	95.05	0.38	65.41	0.76	95.72	0.55	65.54	1.09
High skilled	-	-	0.48	1.38	0.02	0.72	3.05	3.70
Agricultural	79.81	0.33	18.16	0.37	71.87	0.52	9.28	1.08
Non-agricultural	20.19	0.62	81.84	0.92	28.13	0.69	90.72	1.25

\* Mean values In US\$ using exchange rate of Nov - 2001

\*\* Information on formal/informal status of the enterprise is only provided for a sub-sample of the self-employed, it excludes self-employed individuals that provide professional services.

Source: Own estimates based on ENAHO (2001)

As can be seen in Table 23, indigenous people in rural areas engaged in waged activities are more likely to be working in the informal sector than non-indigenous people living in the same area. They also have lower returns on average than the non-indigenous to both informal and formal jobs, to both agricultural and non-agricultural waged jobs, and to both medium and high-skilled jobs. A similar pattern exists in urban areas.

The ENAHO data did not allow us to differentiate between formal and informal status for self-employed workers in rural areas. In urban areas, although indigenous and non-indigenous individuals are equally likely to work in the formal sector, average hourly incomes are considerably lower for those people with an indigenous background.

**Table 25: Employers by Labor Conditions and Hourly Incomes among the Indigenous and Non-indigenous in Rural and Urban Areas**

(Main Occupation)

	INDIGENOUS BACKGROUND				NON-INDIGENOUS BACKGROUND			
	RURAL		URBAN		RURAL		URBAN	
	%	Average Hourly income	%	Average Hourly income	%	Average Hourly income	%	Average Hourly income
Formal **			42.0	2.05			41.4	3.97
Informal			58.0	1.63			58.6	1.82
One activity	76.66	0.68	83.03	1.35	77.89	0.96	83.24	3.40
Two activities	23.34	1.08	16.97	1.90	22.11	1.15	16.76	2.72
Part time	41.24	1.26	31.30	1.97	48.17	1.35	27.07	6.75
Full time	58.76	0.45	68.70	121.16	51.83	0.70	72.93	1.81
Low skilled	0.60	2.38	3.12	3.54	0.34	0.91	4.04	1.82
Mid skilled	99.40	0.77	94.08	1.34	99.66	1.01	86.97	3.17
High skilled	-	-	2.80	1.94		0.00	8.99	5.95
Agricultural	89.07	0.69	31.53	0.78	92.38	0.95	17.95	2.19
Non-agricultural	10.93	1.39	68.47	1.83	7.62	1.42	82.05	3.66

\* Mean values In US\$ using exchange rate of Nov -

Source: Own estimates based on ENAHO

\*\* Information on formal/informal status of the enterprise is only provided for a sub-sample of the employers, it excludes employers running a firm that provides professional services, and it also excludes firms with more than 10 employees.

In general, there are no significant differences in the legal status of the establishments run by indigenous and non-indigenous self-employed individuals in urban areas regardless of the size of the indigenous population in their districts. However, again, non-indigenous business owners have higher average hourly incomes than business owners with an indigenous background. In order to check the robustness of this result, we controlled for differences in private assets (like education) and in access to public services. In doing so, we followed Bertrand et al (2000) and estimated the following model:

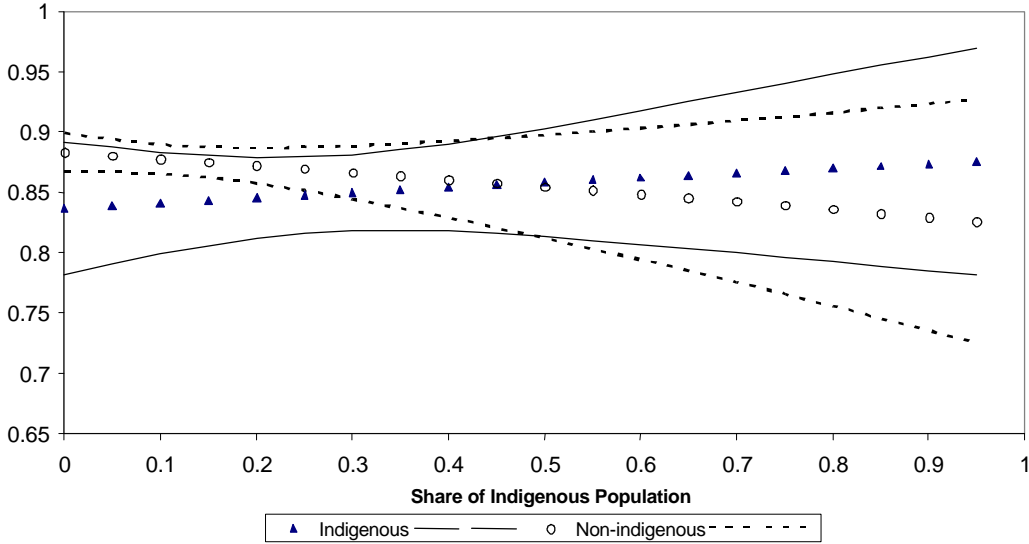
$$\Pr(Y_{ijk}) = \alpha CIB_{jk} + \bar{Y}_k \mathbf{b} + (CIB_{jk} * \bar{Y}_k) \mathbf{g} + X_i \mathbf{d} + Z_j \mathbf{q} + \mathbf{e}_{ijk} \quad (1)$$

where Y represents the variable of interest (in this case 1 if the person runs an informal business, 0 otherwise).  $CIB_{jk}$  represents the percentage of people of ethnic group k living in neighborhood j;  $\bar{Y}_k$  represents the average value for Y at the aggregate level (urban or rural);  $X_i$  are the individual characteristics, and  $Z_k$  are observed neighborhood characteristics.

In this case, we were trying to capture the importance of the size of the particular indigenous community as well as a measure of the existence of social networks while controlling for the ethnic background and the particular characteristics of the household and for observed characteristics of the neighborhood.

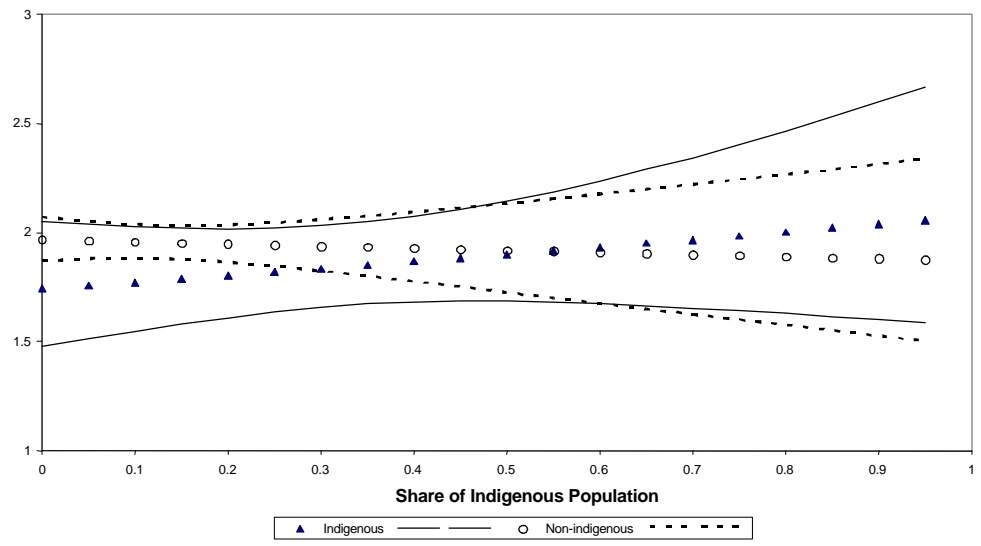
Our probit estimation can be found in Annex 3. Figure 4 shows a simulation based on this result, which depicts the predicted probability of running an informal business for both indigenous and non-indigenous populations who live in districts with different shares of indigenous population. When we controlled for human capital, access to public assets, and region of residence, we found that the importance of the size of the indigenous population remained about the same in areas with both small and large share of indigenous population. This showed that there is no significant difference between individuals with an indigenous background and individuals with a non-indigenous background in this respect.

**Figure 4: Probability that a Self-employed Person runs an Informal Business in Urban Peru after Controlling for Demographic Characteristics, Access to Public Services, and Region**



We also estimated the hourly income of individuals running self-employed activities while controlling for observable characteristics related to human capital, access to public assets, and region of residence. In this case, we again estimated equation (1) but this time with an indicator for the size of the indigenous population and a measure of social networks and after controlling for individual and neighborhood characteristics. Figure 5 presents the simulation for indigenous and non-indigenous populations in areas with different share of indigenous population. In this case it is interesting to note that the proportion of the indigenous population does not seem to explain the differences in hourly incomes. In other words, after controlling for individual and neighborhood characteristics, the differences that we observed between areas with large share of indigenous population and those with small share of indigenous population vanishes.

**Figure 5: Predicted Hourly Income for Individuals Running Microenterprises (Fewer than 10 workers) after Controlling for Demographic Characteristics, Access to Public Services, and Region**



## IV - HUMAN CAPITAL FORMATION

In this Section we analyze two main features of human capital formation, education and health. First, we seek to establish whether a child's ethnicity background, in any of its two dimensions individual or contextual, has important effects on the probability that he/she attends school. The second part of this Section focuses on the effects of individual and contextual ethnicity background on the probability that an individual receives medical attention from modern health services.

### Children's School Attendance

As we mentioned in Part IV, there are important differences in adults' education levels between indigenous and non-indigenous households. The heads of non-indigenous households had significantly higher levels of education than those of indigenous households, as did the member with the highest number of years of education within the family. While in rural areas this difference was around two years of education, in urban areas the difference ranges between one and five years depending on the proportion of indigenous population in the households' area of residence. The differences in adult members' education may be a result of ethnicity-related exclusion processes that took place in the past and may or may not have consequences in their children's current educational outcomes. It is worth noting that past exclusion processes may not exclusively affect younger generation educational outcomes; instead they may have consequences on other socio economic outcomes and current household's poverty status as well. Even though this is an interesting matter itself, establishing whether there is a historical contextual ethnicity effect is not the objective of this study. In the present subsection, we focus our attention on exploring contemporaneous contextual ethnicity effects on children school attendance, and take into account past exclusion processes only to a partial extent by including as covariates past generation educational outcomes like the number of years of education of the head of household. (Differences in the quality of education received by different ethnic groups is of course a key issue, but the statistical information available to us did not allow us to tackle this topic.)

According to the Peruvian education system, children whose age ranges between 6 and 11 should attend primary school, and children between 12 and 17 should attend secondary school. It is worth noting that children around 12 face greater risk of dropping out of school because they are old enough to help in generating household income and thus the opportunity cost of sending them to school rises to their families (especially if they are extremely poor). In this context, we performed two econometric analysis separately, one including the complete sample of children in school age (6 to 17 years old), and the other including only the cohort of children whose age ranges between 12 and 17 years.

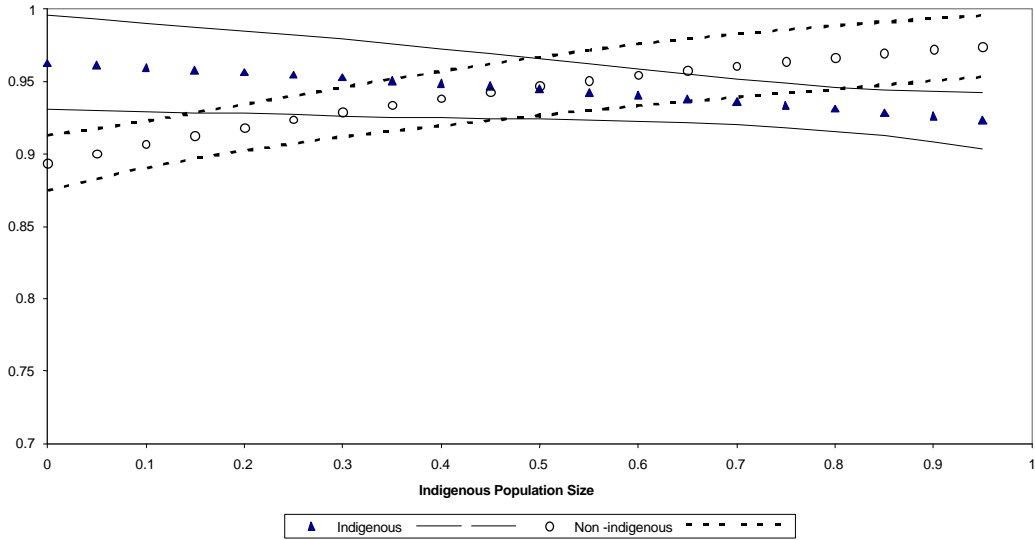
The probability of school attendance was modeled with similar specification as the one described in the previous section. In other words, we tried to capture the importance of contextual ethnicity represented by the proportion of indigenous population in the child's district and a measure of social networks, while controlling for the child's family ethnic background, other characteristics of the child and his family, and observed neighborhood characteristics. (All models can be found in Annex3. As in the other estimations in this study, the standard errors were adjusted to allow for intra-conglomerate correlations.)

We performed separate Probit estimations of the probability of attending school for the urban and rural samples. This separation was necessary because we expected that the dynamics of social exclusion in rural areas would be different from those in urban areas. Among other reasons, this may be due to the acculturation process that migrants tend to go through when arriving to urban areas and perhaps because the interaction of local community and household variables that affect school attendance might differ in nature between rural and urban areas.

Based on the Probit estimates, we performed several simulations of the contextual ethnicity effect among urban and rural children with indigenous and non-indigenous family background. The simulations fixed covariates to the average values within urban or rural areas for all variables except household ethnic background, social network indicator and proportion of the indigenous population in the child's area of residence.

Figures 6 and 7 show the simulations of the contextual ethnicity effect for the cohort of children from 6 to 17 years of age in rural and urban areas. It is worth noting that primary school enrollment is massive (almost universal) in Peru, a fact that might strongly induce the absence of differentiated patterns in contextual effects among children with indigenous family background and children with no indigenous family background. The question to rise here is whether this absence of differentiated patterns holds when looking at the cohort of older children from 12 to 17.

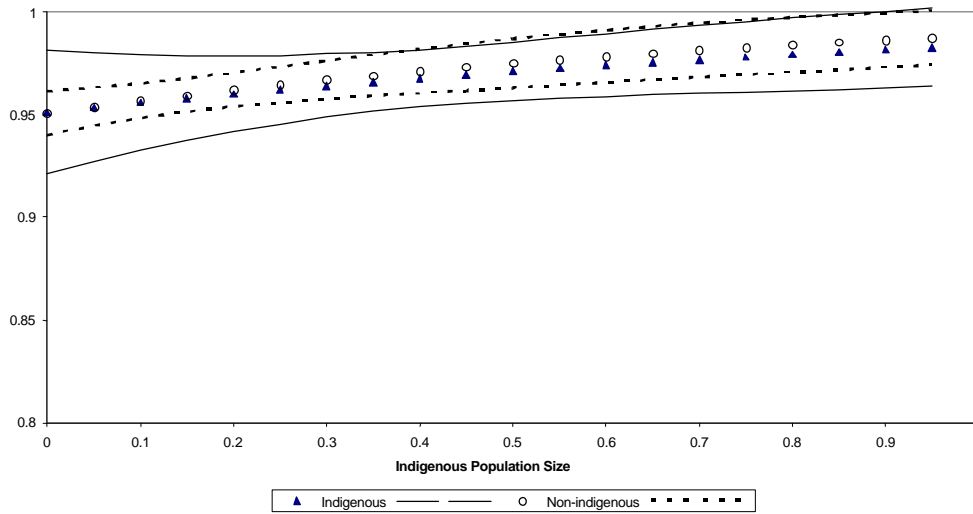
**Figure 6: Probability of Attending School in Rural Peru for Children between 6 and 17 Years of Age after Controlling for Demographic Characteristics, Access to Public Services, and Region**



As mentioned before, the pertinence of performing an analysis of school attendance by children between 12 and 17 years of age rests on our intuition that the opportunity cost to households of sending their children to school becomes much higher when children reach around 12 years old. Although this is the ideal age for starting secondary school, according to our sample, only 25 percent of rural children of age 12 had already finished primary school whereas 57 percent of urban children of this age had done so. These figures rise as we look at older cohorts. For 13-year-olds, 52 percent reported having finished primary school in rural areas and 82 percent in urban areas. For 14-year-olds, these figures rise to 68.4 percent and 88 percent respectively. (In this sense, this partition of the sample may capture only partially parents' and children's preference for secondary education, explained by their particular expectations on returns to secondary school education.)

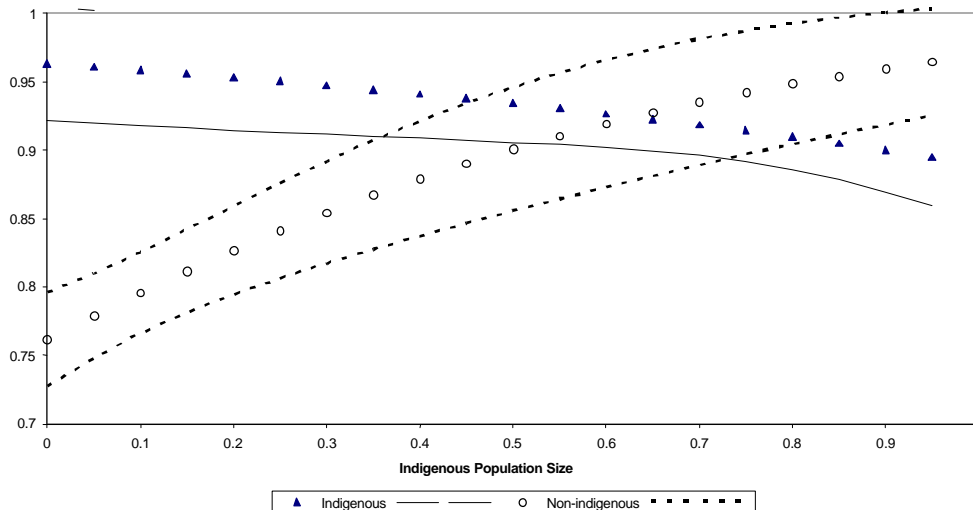
Some general notes on this cohort's school attendance are warranted. In urban areas, approximately 86 percent of non-indigenous individuals attend school whereas among the indigenous this figure is higher - 88.5 percent. In rural areas, these percentages are 73.5 percent versus almost 86 percent. Even though this seems to show that indigenous children have better educational opportunities than their non-indigenous rural neighbors, when we control for differences in household ownership of private and public assets, individual and contextual ethnicity effects show to differ.

**Figure 7: Probability of Attending School in Urban Peru for Children between 6 and 17 Years of Age after Controlling for Demographic Characteristics, Access to Public Services, and Region**



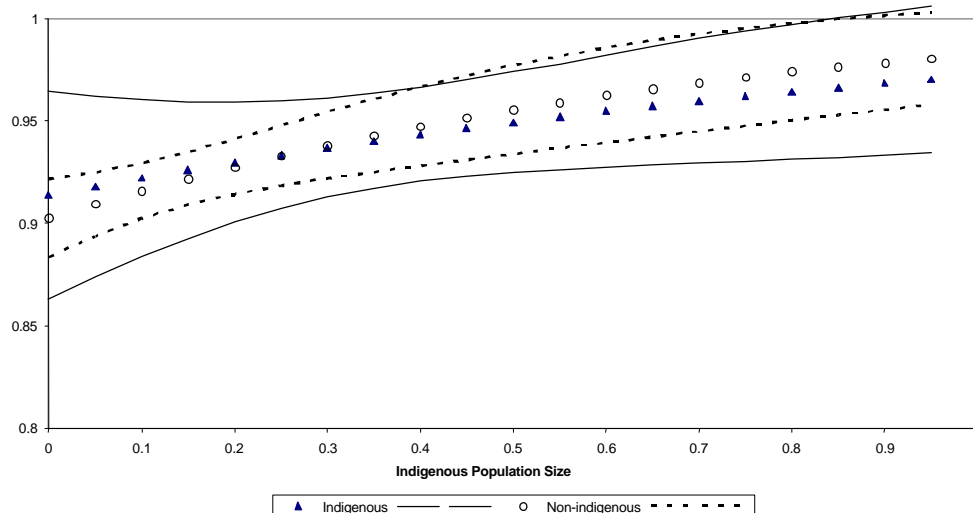
Even though the aggregate contextual ethnicity effect was positive and significant in the Probit estimation for rural areas, the simulation in Figure 8 shows significantly different contextual ethnicity effects for indigenous and non-indigenous children. According to this simulation, school attendance by children from non-indigenous households increases as the context becomes more predominantly indigenous, whereas school attendance by children from indigenous households -if anything- decreases as we move towards areas where they are an ethnic majority. Why would children with no-indigenous background face positive contextual indigenous background effects? In areas where they are an ethnic majority, and probably their social and economic networks are thicker and wider, their opportunity cost of attending school is higher and thus it is less likely that they attend school. But in contexts where they are a minority and it is harder for them to engage in market jobs, they are more likely to attend school.

**Figure 8: Probability of Attending School in Rural Peru for Children between 12 and 17 Years of Age after Controlling for Demographic Characteristics, Access to Public Services, and Region**



In urban areas, although the probability of attending school (after controlling for individual and contextual neighborhood characteristics) slightly increases with the proportion of indigenous population in the district of residence, there seems to be no difference between children from indigenous and non-indigenous backgrounds (see Figure 9).

**Figure 9: Probability of Attending School in Urban Peru for Children between 12 and 17 Years of Age after Controlling for Demographic Characteristics, Access to Public Services, and Region**



We also made a number of other findings in the estimates of school attendance among children between 12 and 17 years of age that are worth highlighting. First of all, we found a gender bias against girls in rural areas, this bias seemed to be stronger among children with family indigenous background. This contrasts not only with the results found for urban areas, but also with the findings for the complete cohort 6-17, in all three estimations no gender bias was found. This difference might be explained by at least two reasons. First, primary school facilities are available within “short” distance for most rural dwellers, but this is not usually the case for secondary school

facilities; in this context, parents may perceive it as dangerous to send their daughters to secondary school facilities in distant towns especially when roads are not safe. Second, parents' expectations on the returns to secondary education of their daughters might be lower than their expectations on their sons' in rural areas. This may be considered a cultural issue but it could also be just a market fact in certain areas!

As children grow older, their probability of attending school decreases in both urban and rural areas, after controlling for all the other variables that we listed above. Together with the decreasing probability of a child attending school as the number of his or her siblings below the age of 5 years old rises, this suggests that many older children have to take care of their younger siblings to release an adult member of the household to earn income for the household. The existence of preschool facilities in the area where the adolescent lives is also a very important factor in whether he or she attends school in both urban and rural areas and among both indigenous and non-indigenous households. Another important factor is that, as the proportion of household members between the ages of 23 and 65 years (in other words, potential income earners) increases, the probability of children of 12 and above from the same household attending school increases. However, this result is significant at a less conservative 85 percent level of significance.

These findings highlight the key issue that the opportunity cost to households of their children attending school rises as they get older because they become increasingly important for the household's strategy for generating income, not only through their work at the market directly generating income but also through their work in domestic tasks that allows other household members to engage in market jobs. The expected returns to the children's education are the natural counter-argument to their parents' decision to take them out of school, but these are long-term gains as opposed to the short-term goal of increasing the family income. In this context, it is worth emphasizing that one way in which policymakers may be able to reduce dropout rates among children above the age of 12 would be to widen the network of preschool facilities so that older children would not have to stay home to take care of their younger siblings.<sup>9</sup>

Finally, we found important regional differences. In rural costa it is more likely that children attend school than it is in sierra or selva, probably because costa dwellers have significantly easier access to secondary school facilities. We found no differences in regional effects between children with and without family indigenous background. In urban areas, where the distance to secondary school facilities is not a problem (as it is in rural areas), children living in sierra and selva are more likely to attend school than children in costa towns (including Lima city). This result may be explained by the higher cost of opportunity of sending children to school in costa towns where markets are more dynamic and job opportunities are greater for adolescents. It is worth noting that none of the regional effects found in these estimations differ for indigenous and non-indigenous children.

---

<sup>9</sup> When we take into account the proportion of local indigenous population (small, medium and large), we found that a higher proportion of children from urban households attending preschool facilities than from rural households. This is probably because there are more preschool facilities in urban areas than in rural areas (even though Peru has succeeded in opening more preschool facilities in rural areas in recent years).

## V - USE OF MODERN HEALTH SERVICES

Another key dimension in human capital formation is the use of modern health services. There are several ways to analyze this dimension and we cannot cover all of them. In this section, we will focus on studying whether there are differences in usage of modern health services between households with different ethnic background. The actual use of modern health services depends on two factors in this study, (i) the individual must trust in formal health services so he actively seeks medical when he/she is sick, and (ii) the individual must have access to health services when he/she needs them (i.e., the individual has health insurance or can afford to pay for the medical attention, there is a health facility available in his area of residence, etc.)

Table 26 shows the percentage of households with at least one member who, having been ill in the past three months before the survey was conducted, did not use modern health services. By modern services, we mean services provided by medicine professionals (such as physicians, nurses, and obstetricians) as opposed to shamans, folk healers, herb doctors, friends or relatives with no qualifications in mainstream medicine science. Table 26 categorizes the descriptive statistics according to the household indigenous background and the proportion of indigenous population in the household's district of residence. Our most important finding here is the high proportion of households that reported having at least one member who was ill and was not assisted by medical professionals. The statistics are significant not only in rural areas, where insufficient supply and cultural differences and communication issues make the interaction between doctors and patients difficult, but also in urban areas. Indeed, when we do not divide the sample by the district's proportion of indigenous population, we find that the proportion of non-indigenous households that did not received professional medical care in rural areas is almost twice the proportion in urban areas. Among indigenous households, this difference is also major.

**Table 26: Households Receiving Modern Health Care**

Household Indigenous Background (HIB)	RURAL			URBAN		
	Share of Indigenous Population			Share of Indigenous Population		
	LOW <33%	HIGH 33% - 66%	HIGH 66% - 100%	LOW <33%	HIGH 33% - 66%	HIGH 66% - 100%
<b>At least one member of the household got sick in the last three months but DID NOT receive formal health services (either because she did not want to or had no access to formal services)</b>						
Non Indigineous Background	27.2%	24.5%	37.0%	11.0%	18.8%	20.4%
Indigenous Background	35.0%	25.8%	40.3%	15.1%	25.5%	35.9%

Source: Own estimates based on ENAHO (2001)

Interpretation: 27.2% of the non indigenous households living in low concentration rural areas do not receive formal health attention

Another important finding was that a systematically higher proportion of rural households were not assisted by modern health services than their urban counterparts. This is true for both indigenous and non-indigenous households, so a first question we needed to address was whether this is because fewer modern services exist in rural areas than in urban ones, the evidence indicates that this may be an important factor. Table 27 shows the proportion of households that did not receive medical assistance because they lacked money or health insurance or because there were no health facilities nor professionals near their town of residence. The data show that rural households had less access to medical care than their urban peers regardless of whether they were located in areas with small, medium, or large proportion of indigenous population.

Nevertheless, the reasons why people do not receive modern health care are not exclusively related to lack of access (such as lack of money or insurance or insufficient supply of services). In some

cases, people do not choose to avail themselves of modern health services because they do not trust them due to bad past experiences or because of their cultural beliefs. Table 27 shows the percentage of households that have at least one member with this attitude. According to our results, the proportion of rural households in districts with small proportion of indigenous population with family members that distrust modern medical services is twice the proportion in urban areas. This may be because the quality of health services varies from area to area or because of the acculturation process that typically takes place when rural migrants move to urban areas and adopt new habits, including being open to modern health care.

**Table 27: Reasons why Households Did Not Receive Modern Health Care**

**Reasons why Households Did Not Receive Attention from Modern Health Services \***

Household Indigenous Background (HIB)	RURAL			URBAN		
	Share of Indigenous Population			Share of Indigenous Population		
	LOW <33%	33% - 66%	HIGH 66% - 100%	LOW <33%	33% - 66%	HIGH 66% - 100%
<b>At least one member of the household got sick in the last three months but DID NOT look for formal attention because she HAS NO ACCESS to these services (lack of money, has no insurance, there is no health center near her residence location)</b>						
Non Indigineous Background	47.5%	39.5%	54.1%	34.1%	34.1%	15.9%
Indigenous Background	68.5%	53.1%	54.2%	40.4%	46.6%	39.6%
<b>At least one member of the household got sick in the last three months but did not look for formal attention because she DOES NOT TRUST in formal health services</b>						
Non Indigineous Background	52.7%	56.1%	66.0%	27.6%	39.2%	51.8%
Indigenous Background	80.0%	54.5%	65.3%	30.5%	48.1%	67.7%

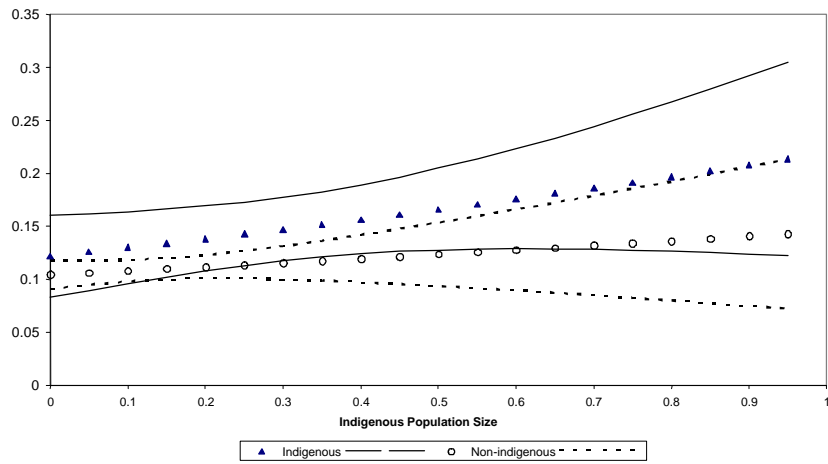
Source: Own estimates based on ENAHO (2001)

\* The other reasons listed in the survey are:

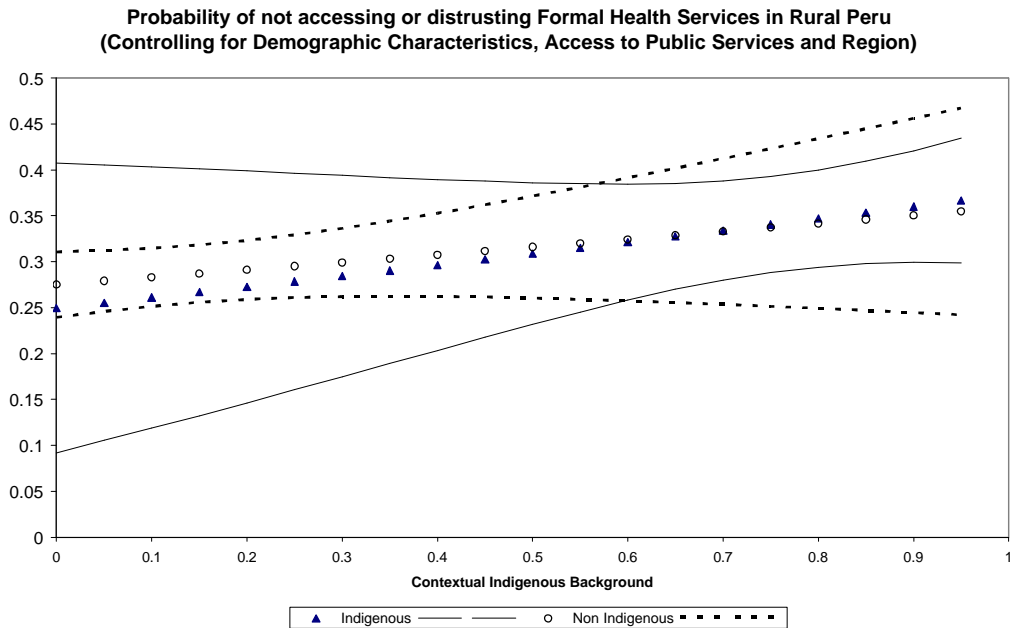
It was not considered necessary; other reason

When we controlled for individual and neighborhood characteristics (see the Probit model in Annex 3), we found no contextual ethnicity effects in either rural or urban areas. This is clearly seen in the simulation in Figures 10 and 11. Other interesting findings from the Probit estimation are associated with regional differences, in rural areas sierra dwellers are the most vulnerable because of the lesser use of modern health services, whereas in urban areas both sierra and selva dwellers are the most vulnerable ones. It is worth noting that in urban areas, vulnerability increases among indigenous households in costa and sierra areas. The latter is clearly an incremental effect that is not related to the availability of health centers, however, it could be related to effective access through the lack of insurance or the poverty status of indigenous households (of course, it could be related to cultural issues as well.) Finally, it is worth mentioning that, in both rural and urban areas, the more educated the household the more probable use of medical services by its members. This is true for all rural households, without difference due to household ethnicity. However, among urban households, this positive effect of education vanishes for indigenous households.

**Figure 10: Probability of Not Accessing or Distrusting Formal Health Services in Urban Peru after Controlling for Demographic Characteristics, Access to Public Services, and Region**



**Figure 11: Probability of Not Accessing or Distrusting Formal Health Services in Rural Peru after Controlling for Demographic Characteristics, Access to Public Services, and Region**



## VI - ACCESS TO PUBLIC ASSISTANCE PROGRAMS

In this section, we explore the question of whether there are any differences between indigenous and non-indigenous households in terms of whether and how they benefit from various public assistance programs. This is an area of enquiry where we expected to find some indication of social networks as individuals of the same indigenous background may share information with each other about what assistance programs are available. In Table 27, we present data on the participation of Peruvian households in three different kinds of public programs: (i) assistance programs including food, health, and education programs; (ii) public infrastructure programs (This includes programs implemented in the locality where the household is located and usually related to building, repairing or equipping educational or health facilities or public services such as sewerage, latrines or electricity connections); and (iii) public employment programs. Interestingly, as can be seen in Table 27, we found that indigenous and non-indigenous households had almost the same amount of access to all three kinds of programs in both urban and rural areas.

**Table 27: Participation of Indigenous and Non-indigenous Households in Welfare and Productive Enhancement Programs**

**Participation of Households with Indigenous and Non Indigenous Background in Welfare Programs and in Productive enhancement Programs**

Household Indigenous Background	RURAL	URBAN
<u>Indigenous Background</u>		
Participation in Welfare Assistencial Programs *	67.4%	57.1%
Infrastructure - Public Services Infrastructure **	27.1%	23.1%
Programs oriented to enhance income generating activities ***	21.1%	10.9%
<u>Non Indigenous Background</u>		
Participation in Welfare Assistencial Programs *	70.3%	49.3%
Infrastructure - Public Services Infrastructure **	30.1%	23.8%
Programs oriented to enhance income generating activities ***	21.0%	8.4%

\* It includes welfare programs (health, education or food) that benefitted at least one household member.

\*\* It includes programs implemented in the locality where the household lives, oriented to building/repairing/equipping educational or health facilities, and public services such as drinking water, sewerage, latrines or electricity connections.

\*\*\* It includes programs implemented in the locality where the household lives, oriented to building/repairing roads, bridges, cultivation terraces, irrigation works. It also includes programs providing technical assistance for agricultural and non agricultural activities, microcredit programs, and the like.

Source: Own estimates based on ENAHO (2001)

However, as Table 28 shows, indigenous people living in areas with large share of indigenous population are more likely than those living in areas with small share of indigenous population to benefit from assistance programs in both urban and rural areas.

**Table 28: Participation of Indigenous and Non-indigenous Households in Welfare and Productive Enhancement Programs in Urban and Rural Areas with Small, Medium, and Large share of Indigenous Population**

Household Indigenous Background	RURAL			URBAN		
	Share of Indigenous Population			Share of Indigenous Population		
	LOW < 33%	33% - 66%	HIGH 66% - 100	LOW < 33%	33% - 66%	HIGH 66% - 100
<u>Indigenous Background</u>						
Participation in Welfare Assistencial Programs *	51.7%	57.2%	69.1%	54.6%	56.8%	62.9%
Infrastructure - Public Services Infrastructure **	26.3%	18.4%	28.1%	21.2%	22.6%	27.9%
Programs oriented to enhance income generating activities ***	21.2%	10.4%	22.3%	5.3%	11.7%	22.6%
<u>Non Indigenous Background</u>						
Participation in Welfare Assistencial Programs *	71.0%	65.7%	67.2%	49.1%	54.2%	50.1%
Infrastructure - Public Services Infrastructure **	29.9%	27.1%	37.7%	23.7%	24.7%	28.7%
Programs oriented to enhance income generating activities ***	21.3%	18.9%	20.8%	7.9%	16.3%	27.4%

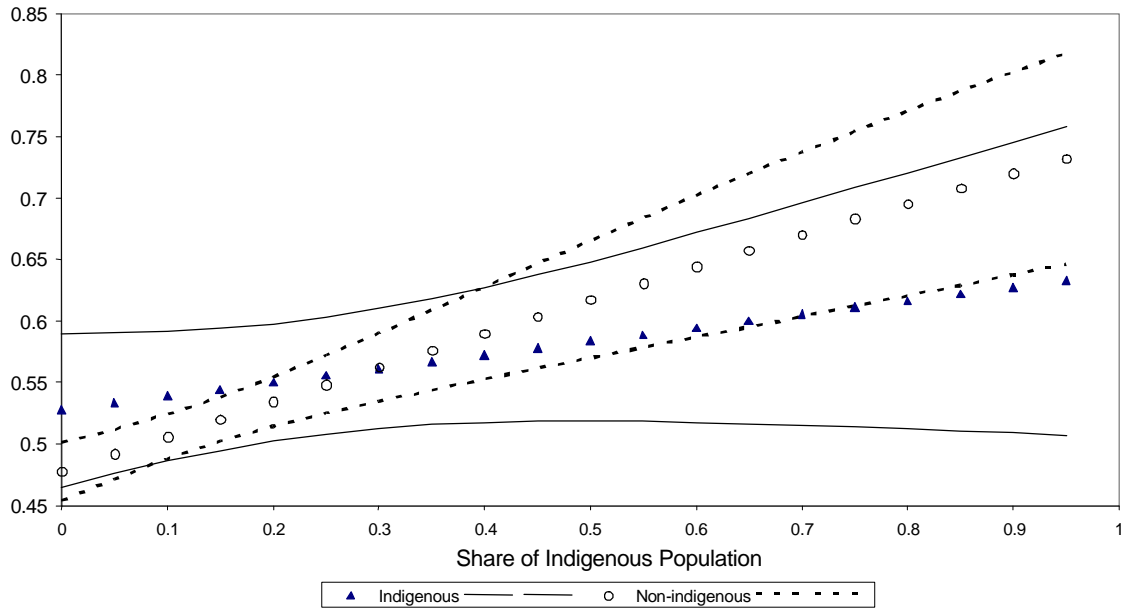
Source: Own estimates based on ENAHO (2001)

This difference may be due to individual characteristics or to differences in access to public infrastructure in areas with different share of indigenous population. To control for these characteristics and to try to isolate the effects of indigenous population size and of social networks, we estimated the probability of being a beneficiary of these programs following the procedure depicted in equation 1.

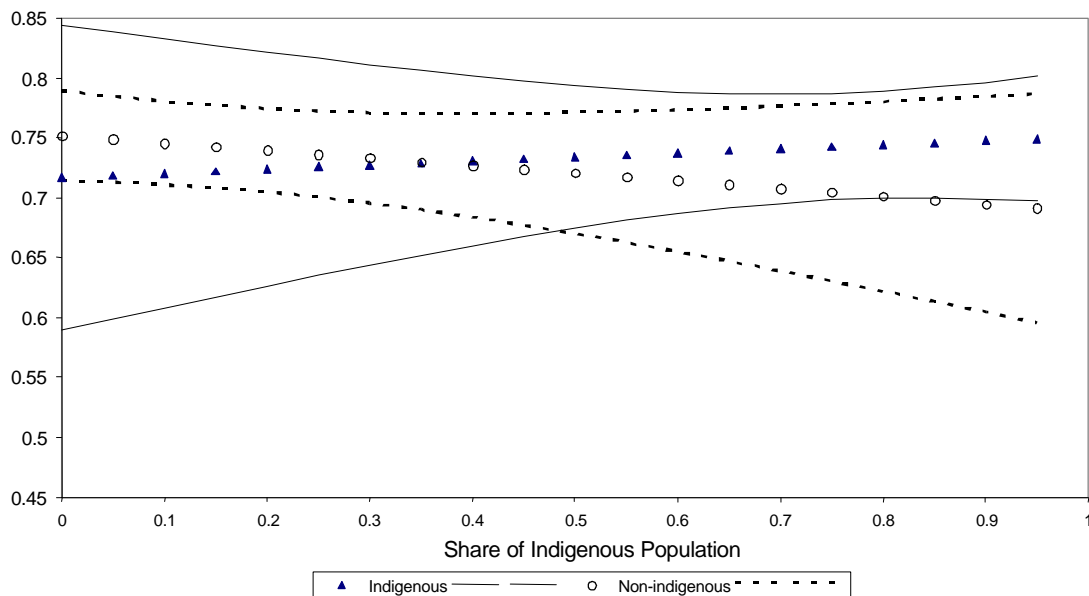
Figures 12 and 13 show the probability of being a beneficiary of a health, education, or food public program for different indigenous population sizes after controlling for observable individual and neighborhood characteristics. Our results indicate that, even after controlling for individual and neighborhood characteristics, the likelihood of being a beneficiary of such programs increases as the size of the local indigenous population increases.

In addition, our probit estimation (see Annex 3) shows that having an indigenous background may impact negatively on the likelihood of being a beneficiary of a health, education, or food public program, which may be an indication of an underlying exclusion process at work. Finally, the effect of social networks on the probability of being a beneficiary of these type of programs is negative and significant, which in our opinion may be another sign that exclusion processes may be operating within areas with large share of indigenous population. In other words, after controlling for everything else, it is less likely that a person with an indigenous background will receive welfare assistance if he or she lives in an area with a large indigenous population because in those areas there is more competition for scarce resources.

**Figure 12: The Probability of Being a Beneficiary of a Health, Education, or Food Program in Urban Peru (after Controlling for Demographic Characteristics, Access to Public Services, and Region)**



**Figure 13: The Probability of Being a Beneficiary of a Health, Education, or Food Program in Rural Peru (after Controlling for Demographic Characteristics, Access to Public Services, and Region)**



## VII - POVERTY OUTCOMES

Table 29 summarizes the poverty profile of both indigenous and non-indigenous households located in areas with small, medium, and large share of indigenous population. Here we can see the striking difference in the poverty rates of indigenous people living in different sized indigenous communities. For example, 58.3 percent of indigenous people living in rural areas with large share of indigenous population are extremely poor, while only 17.1 percent of indigenous people living in rural areas with small share of indigenous population are extremely poor. This finding also applies in urban areas. Extreme poverty rates are considerably higher for indigenous people living in areas with large share of indigenous population than for indigenous people living in areas with small share of indigenous population. These differences may be the result of an uneven distribution of public assets within urban and rural areas or the ultimate impact of some network effect related, for example, to the existence of bridging or bonding capital. To pursue this further, we would need to control for the characteristics of the households and of the areas in which they are located.

It is interesting to note that the differences in the non-extreme poverty rate between indigenous people living in areas with large share of indigenous population and indigenous people living in areas with small share of indigenous population much lower than the differences in extreme poverty rates.<sup>10</sup> In addition, as Table 30 shows, poverty rates are not significantly different between Quechua and Aymara indigenous groups in rural areas. However, although the sample is small, Aymara indigenous groups tend to have a lower probability of been poor in rural areas.

**Table 29: Rates of Extreme Poverty and Poverty by Area and Size of the Local Indigenous Population**

Share of Indigenous Population	TOTAL			INDIGENOUS BACKGROUND			NON INDIGENOUS BACKGROUND		
	Extreme poverty	Non Extreme Poverty	Average. Percapita consumption *	Extreme poverty	Non Extreme Poverty	Average. Percapita consumption *	Extreme poverty	Non Extreme Poverty	Average. Percapita consumption *
<b>National</b>	<b>20.1%</b>	<b>26.7%</b>	<b>95</b>	<b>38.6%</b>	<b>28.0%</b>		<b>13.6%</b>	<b>26.2%</b>	
Low				6.7%	31.9%	91	13.2%	26.3%	111
Medium				23.6%	31.9%	63	14.7%	23.9%	84
High				54.1%	25.6%	37	26.1%	24.8%	79
<b>Rural</b>	<b>44.1%</b>	<b>9.2%</b>	<b>41</b>	<b>54.5%</b>	<b>34.6%</b>		<b>35.6%</b>	<b>29.1%</b>	
Low				17.1%	22.4%	64	36.6%	29.8%	44
Medium				32.2%	23.8%	52	24.1%	24.5%	59
High				58.3%	23.7%	33	37.4%	25.5%	54
<b>Urban</b>	<b>7.2%</b>	<b>17.5%</b>	<b>123</b>	<b>14.4%</b>	<b>23.6%</b>		<b>5.9%</b>	<b>25.2%</b>	
Low				5.7%	32.8%	93	5.8%	25.3%	133
Medium				17.8%	37.4%	70	7.9%	23.5%	102
High				31.0%	36.2%	57	55.2%	23.6%	125

\* Mean values for total, indigenous and non indigenous households In US\$ using exchange rate of Nov - 2001

Note: The level of indigenous concentration is defined as the share of indigenous people at the rural and urban portions of the peruvian districts. Low is <33%, Medium is between 33% and 66% and High>66% (from the household survey data).

Source: Own estimates based on ENAHO (2001)

<sup>10</sup> The differences in non-extreme poverty rates are not significantly different from zero at a 95 percent confidence level.

**Table 30: Households in Extreme Poverty and Poverty by Ethnic Group**

Ethnic group	Number	%	Extreme Poverty		Non Extreme Poverty		Poverty	
			Contribution		Contribution		Contribution	
<b>Rural</b>								
Quechua *	762,599	37.4%	54.9%	46.4%	23.4%	32.8%	78.2%	41.3%
Aymara *	109,379	5.4%	53.3%	6.5%	25.6%	5.2%	78.9%	6.0%
Castellano (spanish) *	1,010,642	49.6%	36.0%	40.3%	28.5%	53.2%	64.5%	45.1%
Others **	156,764	7.7%	39.1%	6.8%	30.5%	8.8%	69.7%	7.6%
<b>Total</b>	<b>2,039,383</b>	<b>100.0%</b>		<b>100.0%</b>		<b>100.0%</b>		<b>100.0%</b>
<b>Urban</b>								
Quechua	523,771	13.9%	15.0%	28.7%	35.3%	18.3%	50.3%	20.6%
Aymara	63,898	1.7%	6.3%	1.5%	31.7%	2.0%	38.0%	1.9%
Castellano (spanish)	2,855,915	75.8%	6.0%	62.6%	24.3%	68.8%	30.3%	67.5%
Others	326,474	8.7%	6.0%	7.2%	33.6%	10.9%	39.6%	10.1%
<b>Total</b>	<b>3,770,059</b>	<b>10000.0%</b>		<b>100.0%</b>		<b>100.0%</b>		<b>100.0%</b>

Source: Own calculations based on ENAHO(2001)

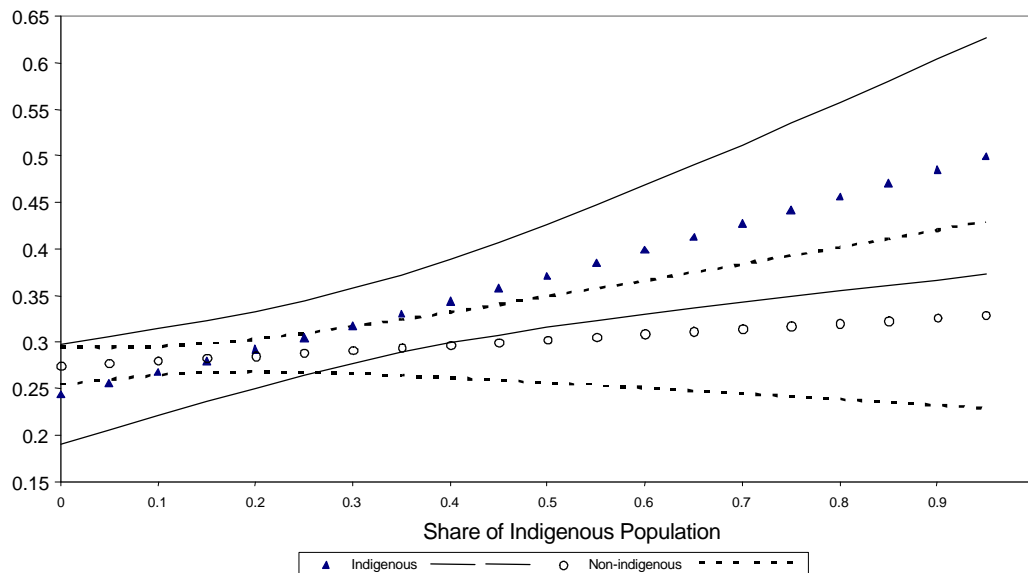
\* Both head of household and spouse belong to the same ethnic group

\*\* This group includes (i) mixed households (i.e. the head of household belongs to a ethnic group different from her spouse´s) and (ii) households with both, head and spouse, belonging to a native ethnic group different from quechua, aymara and castellano.

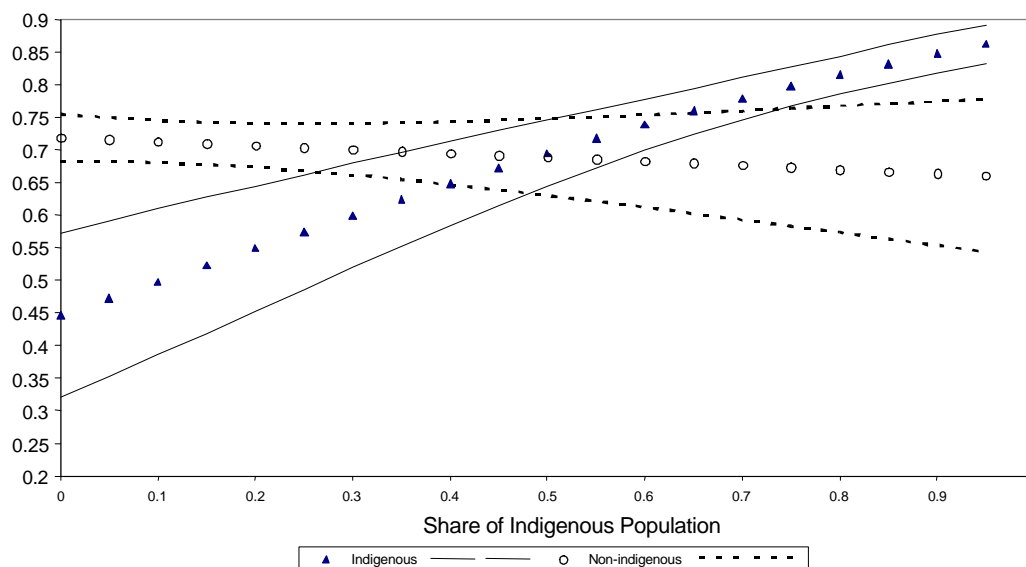
In Figures 14 and 15, we show how the probability of an individual (from either indigenous or non-indigenous backgrounds) being poor changes depending on the size of the local indigenous population after controlling for human capital and access to public goods and services. Our results show that indigenous people living in areas with large share of indigenous population are indeed more likely to be poor than indigenous people living in an area with a small share of indigenous population.

While the probability of non-indigenous people being poor is about the same regardless of the size of the surrounding indigenous community, this probability increases monotonically for those with an indigenous background.

**Figure 14: Probability of Being Poor in Urban Peru (after Controlling for Demographic Characteristics, Access to Public Services, and Region)**



**Figure 15: Probability of Being Poor in Rural Peru (after Controlling for Demographic Characteristics, Access to Public Services, and Region)**



### Social Networks and Poverty Outcomes

The ENAHO 2001 data include references to different organizations in which the sample household participated. The nature of these institutions and the reasons why households participate in them may vary greatly. Although the survey did not include the additional questions that would have made it possible for us to explore this issue, we thought it might be useful if we grouped the participation in these organizations into two categories according to their contributions to increasing an individual’s social capital. Social capital is usually defined as the ability of individuals to construct networks that they can use to exchange information and ideas, improve coordination **of actions** and cooperation **with other individuals**, and manage risk and cope with uncertainty.

Following Adler and Kwon (2002) we distinguished between “bonding” and “bridging” capital. “Bonding” capital is the kind involved in survival strategies, while “bridging” capital is the kind that increases social and economic mobility.

**Table 31: Use of Social Networks in Rural Peru**

Type of Social Capital Used	Extreme Poor	Poor	Non-Poor	Total
"Bonding"	64.6	53.6	38.8	54.1
"Bridging"	2.1	5.2	8.8	4.9
Both	10.9	10.2	5.9	9.2
None	22.4	31.0	46.6	31.8
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

Source: Tuesta (2002), based on ENAHO 2001

Tuesta (2002) defined “bonding” social capital as including participation in assistance programs (such as mothers’ associations, free milk programs, and soup kitchens, community associations, and

religious groups, while “bridging” social capital includes membership of, for example, savings and loan associations, producer associations, marketing associations, and irrigation associations.

**Table 32: Percentage of Households using Social Networks in Rural Areas**

Household Indigenous Background	Share of Indigenous Population		
	LOW	HIGH	
	<33%	33% - 66%	66% - 100%
<u>Non Indigenous Background</u>			
<i>Bonding</i> Social Capital	49%	56%	48%
<i>Bridging</i> Social Capital	7%	6%	5%
Both types	11%	5%	5%
None	32%	33%	42%
Total	100%	100%	100%
<u>Indigenous Background</u>			
<i>Bonding</i> Social Capital	45%	47%	60%
<i>Bridging</i> Social Capital	5%	6%	2%
Both types	8%	3%	9%
None	42%	44%	29%
Total	100%	100%	100%

Source: Own estimates based on ENAHO (2001)

## VIII - CONCLUSIONS

We set out this report to try to answer the following question: is there any evidence of direct and contemporaneous exclusion mechanisms that can explain the differences in economic opportunities available to individuals with indigenous background as opposed to the opportunities available to the rest of the Peruvian population?

We have shown that there are sizable differences in outcomes for people living in areas with small and large proportion of indigenous population after controlling for several covariates and individual ethnicity effects. This is true for the probability of being poor in rural areas, the probability that children attend school in rural areas, and the probability of being a welfare beneficiary in urban areas (in this case, as we move towards areas with larger proportion of indigenous population, welfare use increases for everybody, probably because these are usually the urban areas that receive the most government assistance since they are the poorest). In all of these cases, however, having a family indigenous background has a counteracting effect. For instance, the probability of welfare use in urban areas (as well as the probability of attending school in rural areas) is higher as we move towards areas with larger indigenous population, but this positive contextual effect vanishes for households with indigenous background (in the table: *share of indigenous population* parameters are positive, whereas *social network* effect is negative). A similar case can be stated for the probability of being poor in rural areas. As shown in this paper, most of rural population of Peru lives in poverty, and, after we controlled for household characteristics and ethnicity, we found that areas with larger share of indigenous population had a lower probability of being poor (in aggregate), but when looking at the “social network” parameter, we found that this positive effect of living in areas with larger share of indigenous population vanishes for indigenous households. In these three cases, we found some evidence that significant differences between the indigenous and non-indigenous populations within an area may be due to exclusion mechanisms operating at the *micro* level, and so a direct effect could be obtained from the regressions analysis (captured by *share of indigenous population* and *social network* variables).

However, this is not the rule. Our findings show that, for most of the dimensions of our analysis (the other nine of the 12 regression results), the most important exclusion mechanisms operate indirectly (accordingly, the parameters of share of indigenous population and social network showed no statistical significance). It is worth noting that these results are consistent with the empirical literature. One way to characterize these results is to say that we found some evidence of systematic exclusion that has itself resulted in significant differences in contextual or historical households’ characteristics, such as concentration of unequally educated people or differential access to public services, and that it is partially captured in our regressions by variables other than social network and district’s share of indigenous population.

Supported in these findings, we raise the issue of the different dimensions through which social exclusion operates in Peruvian society; this definition can help devise more suitable policies to get rid of some of the mechanisms that channel social exclusion. In particular, we raise the research and policy question of what are direct and contemporaneous exclusion mechanisms that can explain differences in economic opportunities available to individuals with indigenous background (as opposed to those opportunities available to the rest of the Peruvian population), mechanisms that are usually approached in the analysis through differences in returns to particular sets of assets. These mechanisms are very hard to address through policy and require efforts that cover areas such as education and social norms, legal bans to discrimination policies in labor market can help in this task, strengthening social networking across welfare dimensions might be helpful as well, but it is widely recognized that this type of problem requires longer periods of time to be solved. On the other hand, we advocate for a more concrete and effective space for policy intervention that can help cut important exclusion mechanisms; as we show in this document, most of the exclusion

mechanisms operate through differences in household assets such as older family members' education, public infrastructure available to poor households, and so on. These differences can be reduced by policy intervention and thus some exclusion mechanisms to be cut in a narrower period of time.

**Table 33: Summary of Regression Estimates**

Model (Dependent Variable)	Family Indigenous Background	Share of Indigenous Population	Social Network indicator	Education	Infrastructure
<b>URBAN</b>					
1 Probability of Being Poor	-0.065	-0.279	1.084 **	-0.044 ***	-0.179 ****
2 Probability of Being Beneficiary of Assistencial Programs (Health, Education, Food)	-0.242 ***	1.357 **	-2.178 *	-0.033 ***	-0.056 **
3 Probab of School Attendance among Children between 6 and 17 years of age	-0.026	0.545	-0.536	0.003 ***	0.024 ****
4 Probab of School Attendance among Children between 12 and 17 years of age	-0.086	0.857	-0.865	0.006 ***	0.044 ***
5 Probability of Rejecting or Not Having Access to Modern Health Services	-0.067 *	-0.002	0.360	-0.009 ***	0.026
6 Probability of Having an Informal Business (for selfemployed or employers with less than 10 employees; it does not include professional services selfemployed)	-0.197	12.560	-14.864	-0.015 ***	-0.124 ****
7 Av. Hourly Income - Micro-firm (individual)	-0.684 **	0.926	-0.233	0.033 ***	0.171 ***
<b>RURAL</b>					
1 Probability of Being Poor	-0.327 ****	-2.109 ****	3.183 ****	-0.030 ***	-0.172 ****
2 Probability of Being Beneficiary of Assistencial Programs (Health, Education, Food)	-0.039	2.135	-3.120	-0.007 **	-0.077 **
3 Probab of School Attendance among Children between 6 and 17 years of age	0.086	2.766 ****	-3.112 ****	0.012 ***	0.060 ****
4 Probab of School Attendance among Children between 12 and 17 years of age	0.431 ****	3.001 ****	-3.666 ****	0.019 ***	0.065 ***
5 Probability of Rejecting or Not Having Access to Modern Health Services	0.102	-0.015	0.360	-0.012 ***	0.049

Note: The Education variables captures: for (3) (4) and (6) years of education of head of household; for (1) (2) and (5) maximum education of a household member; for (7) years of education of the individual

The Infrastructure variable captures: for (1) electricity; (2) piped water; (3) and (4) Preschool education infrastructure; for (5), (6) and (7) Sewerage infrastructure

Source: Own estimates based on ENAHO (2001)

\*\*\*\* 99%, \*\*\* 95%, \*\* 90% \* 85%

## REFERENCES

- Adler, P. and S. Kwon, 2002. "Social capital: prospects for a new concept" *Academy of Management Review*, vol. 27 no. 1, pp. 17–40.
- Aldenderfer, M. and Roger Blashfield, 1984. Cluster Analysis. California: SAGE Publications.
- Ai, C., and E. C. Norton, 2003. "Interaction terms in logit and probit models." *Economics Letters*, 80, 123-129.
- Bertrand, M., E. F. P. Luttmer, and S. Mullainathan, 2000. "Network Effects and Welfare Cultures." *Quarterly Journal of Economics*, 115(3), 1019-1055.
- Callirgos, J. C., 1993. El racismo: la cuestión del otro (y de uno), DESCO, Lima.
- Chiswick, B., H. Patrinos, and M. Hurst, 2000. "Indigenous Language Skills and the Labor Market in a Development Economy: Bolivia." *Economic Development and Cultural Change*, January.
- Comisión de la Verdad y la Reconciliación, 2003. "Informe Final", Lima. <http://www.cverdad.org.pe/ifinal/index.php>
- Comrie, B., 1990. "Languages of the World" in Bernard Comrie (ed), The World's Major Languages. Oxford University Press: Oxford.
- Diaz, J. J., H. Ñopo, J. Saavedra, and M. Torero, 2002. "Ethnicity and Access to Education in Urban Peru." Mimeo. GRADE, Lima. <http://www.middlebury.edu/~hnopo/education.pdf>.
- Figueroa, A., and M. Barrón, 2005. "Inequality, Ethnicity and Social Disorder in Peru." CRISE Working Paper 8. Centre for Research on Inequality, Human Security and Ethnicity (CRISE). Queen Elizabeth House, University of Oxford.
- GRADE, 2005. "Informe Analítico sobre la Encuesta de Línea de Base del Estudio de Impactos Económico y Socio Ambientales del PETT." Report Prepared for PETT - Ministerio de Agricultura. GRADE, Lima.
- Grimes, B. F., 1996. "Ethnologue" 13th Edition, Summer Institute of Linguistic, Inc.
- Hall, Gillette, and H. A. Patrinos (eds.) (2005). Indigenous Peoples, Poverty and Human Development in Latin America Palgrave Macmillan, United Kingdom.
- Hardle, W., 1990. Applied Nonparametric Regression, Cambridge University Press; Cambridge, MA.
- MacIsaac, D., 1994. "Peru" in ", George Psacharopoulos and Harry Patrinos (eds), " Indigenous People and Poverty in Latin America: an Empirical Analysis The World Bank. Latin American and the Caribbean Technical Departments. Regional Studies Program. Report No. 30. pages 179 - 224.
- Mendoza, A., 1993. Cuestión de piel: testimonios de racismo en el Perú, Lima: ADEC-ATC, 1993. 132 p.
- Ñopo, Hugo, Jaime Saavedra and Maximo Torero (2002). "Ethnicity and Earnings in Urban Peru". Unpublished. GRADE.

- Oliart, P., 1989. "El cristal con que se mira. Algo sobre género, raza y clase en el Perú." Lima: PUCP, 1989. Mimeo. 20 p.
- Pozzi, I. L., 1989. "La discriminación étnico-cultural en la escuela peruana" PUCP Facultad de Ciencias Sociales. Serie Materiales de Enseñanza. Sub-Serie Sociológica, Lima. 26 p.
- Racine, J., 2005. N© Users Manual. Nonparametric kernel software for applied analysis MPI-enabled for Beowulf clusters, Department of Economics, McMaster University, Ontario.
- Sulmont, D. (1995). "Exclusión social y empleo: notas para un debate" in G. Tello (ed) "Globalización y Empleo", Asociación Laboral para el Desarrollo, Lima.
- Tamagno, C., 2005. "Entre Celulinos y Cholulares: Prácticas comunicativas y la construcción de vidas transnacionales entre Perú e Italia." in U. D. Berg and K. Paerregaard (eds) "El Quinto Suyo: Transnacionalidad Y Formaciones Diaspóricas En La Migración Peruana" ., IEP, Lima.
- Torero, M., J. Saavedra, H. Ñopo, and J. Escobal, 2004. "The Economics of Social Exclusion in Peru: An Invisible Wall?" in Buvinic, M., J. Mazza, and R. Deutsch (eds) Social Inclusion and Economic Development in Latin America, Johns Hopkins University Press and Inter-American Development Bank, Washington, DC.
- Valdivia, N. (2002): "Etnicidad, pobreza y exclusión social: la situación de la población indígena urbana en Perú". Mimeo. Lima. GRADE

## **Annex 1: The ENAHO 2001 Survey**

The Encuesta Nacional de Hogares (ENAHO) is a general purpose household survey that is very similar in content to the typical Living Standard Measurement Study (LSMS) surveys sponsored by the World Bank. It collects information on consumption, income, health, education, access to public services, labor force participation, wages and salaries, and a variety of other social and economic variables. The 2001 survey had a systematic stratified sample based on 1993 census data (adjusted by the 2000 pre-census). The sample was representative at the urban and rural levels and included 16,515 households.

For the purpose of this project, we took advantage of the clustered nature of ENAHO. To capture peer effects, we worked at the district level distinguishing between rural and urban portions of the district. The ENAHO surveys typically survey an average of five households per cluster in urban areas and 11 per cluster in rural areas. This goes up to 27 households per district in urban areas and 16 per district in rural areas. Although we finally decided to focus on the district level for the final econometric estimations, it is worth saying that we performed intermediate estimations using alternative levels of aggregation such as conglomerate and Province as well for testing purposes.

In the survey interviews, all questions related to ethnicity were asked of both the head of household and her or his domestic partner/spouse. These questions included:

- Whether their first language was Spanish, Quechua, Aymara, another native language, English, Portuguese, or another foreign language.
- With whom they learned to speak this language as children (their father, mother, both parents, maternal grandparents, paternal grandparents, village elders, or with some other person they do not remember)
- What other languages they speak (Spanish, Quechua, Aymara, another native language, English, Portuguese, another foreign language, or none)
- Whether the language they speak most frequently is Spanish, Quechua, Aymara, another native language, English, Portuguese, or another foreign language.
- According to their ancestors and customs, the group they consider they belong to is Amazonian indigenous people, Quechua, Aymara, Black/Mulato (both black and white parentage)/Zambo (both indigenous and white parentage), Mestizo (both white and indigenous parentage), Caucasian/white, or some other group.
- What the first language of their mother, father, maternal grandparents, paternal grandparents, and village were (Spanish, Quechua, Aymara, another native language, English, Portuguese, or another foreign language).
- The level of education achieved by their parents.

## Annex 2: Mapping Indigenous Background – the Optimal Number of Groups

Variable name	Description	Measurement unit	Source
% pop. who speak a native language	% population who has a native language as their first language	%	1993 Census

	Obs.	Average	Std. Dev.	Min	Max
% of pop. who speaks a native language					
Peru	1828	34.3	37.2	0.0	99.5
Costa	263	5.7	6.6	0.0	44.8
Sierra	1257	45.2	38.4	0.0	99.5
Selva	308	14.2	24.3	0.0	93.2
Northern Sierra	194	1.8	7.6	0.0	79.5
Central Sierra	654	43.2	36.2	0.0	99.1
Southern Sierra	409	68.8	30.6	0.9	99.5

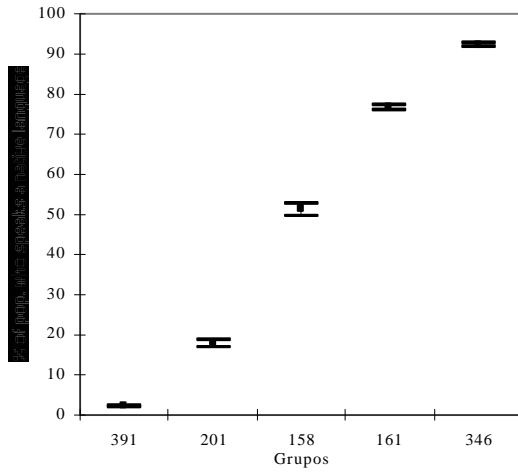
**Annex Table 2.1: Criteria to Establish the Optimal Number of Groups**

Number of groups	Calinski/H. pseudo-F	Duda/Hart	
		Je(2)/Je(1)	Seudo T2
2	7,869.5	0.25	1,978.7
3	11,416.7	0.26	1,695.5
4	11,623.0	0.29	1,237.5
5	15,361.1	0.28	395.4
6	17,256.3	0.32	422.6
7	18,612.5	0.25	1,048.6
8	21,605.5	0.23	533.6
9	23,812.5	0.27	227.8
10	26,481.2	0.22	377.8

Note: Statistics based on the methodology proposed by Aldenderfer and Blashfield (1984).

**Annex Table 2.2: Means and 95% Confidence Intervals, by groups:**

*5 Groups: % of pop. who speak a native language*



**Descriptive statistics, by groups:**

Group	# of Districts.	Mean	Min	Max
1	391	2.2	0.0	8.9
2	201	17.7	9.1	32.0
3	158	51.2	33.0	65.2
4	161	76.6	66.9	83.3
5	346	92.4	83.5	99.5

### Annex 3: Econometric Estimations

**Annex Table 3.1 Probability of Attending School in Urban Peru for Children between 6 and 17 years of age Probit Estimates**

Probability of Attending School in Urban Peru for Children between 6 and 17 years of age Probit Estimates						
Covariates	URBAN			RURAL		
	Marginal Effect dy/dx	z	P>z	Marginal Effect dy/dx	z	P>z
Child's Ethnicity (household contextual background: 1 for native mother tongue)	-0.026	-0.32	0.75	0.086	1.28	0.20
CIB (% of households with indigenous background in the district)	0.545	0.36	0.72	<b>2.766</b>	<b>3.48</b>	<b>0.00</b>
Social Network indicator **	-0.536	-0.33	0.74	<b>-3.112</b>	<b>-3.43</b>	<b>0.00</b>
Percentage of Households with no Sewerage in the conglomerate	-0.020	-1.27	0.20			
Interaction *	0.012	0.48	0.63			
Percentage of Households with no Piped Water in the conglomerate				0.001	0.02	0.98
Interaction *				<b>-0.062</b>	<b>-2.17</b>	<b>0.03</b>
Percentage of Households with Electricity in the conglomerate	0.011	0.88	0.38	<b>0.060</b>	<b>2.52</b>	<b>0.01</b>
Interaction *	0.006	0.24	0.81	-0.014	-0.46	0.65
Age of the Child	-0.024	<b>-15.19</b>	<b>0.00</b>	-0.017	-5.83	0.00
Interaction *	0.005	1.25	0.21	0.002	0.37	0.72
Preschool educational infrastructure in the conglomerate	0.024	<b>3.28</b>	<b>0.00</b>	<b>0.060</b>	<b>3.2</b>	<b>0.00</b>
Interaction *	-0.014	-0.92	0.36	0.011	0.42	0.67
Years of Education of the Head of Household	0.003	<b>4.86</b>	<b>0.00</b>	<b>0.012</b>	<b>7.77</b>	<b>0.00</b>
Interaction *	-0.002	-1.09	0.28	-0.003	-1.11	0.27
Household size	0.0002	0.13	0.90	0.002	0.5	0.62
Interaction *	0.001	0.23	0.82	-0.002	-0.34	0.74
Number of little children (0 to 5 year-olds) in the household	-0.014	<b>-4.45</b>	<b>0.00</b>	<b>-0.019</b>	<b>-2.95</b>	<b>0.00</b>
Interaction *	0.006	0.8	0.42	-0.0005	-0.05	0.96
Percentage of Members in Working Age within the household	0.034	<b>1.74</b>	<b>0.08</b>	0.066	1.22	0.22
Interaction *	-0.078	<b>-1.96</b>	<b>0.05</b>	-0.054	-0.7	0.48
Costa Region	0.011	<b>1.69</b>	<b>0.09</b>	0.022	1.18	0.24
Interaction *	0.010	0.59	0.56	-0.088	-1.34	0.18
Sierra Region	0.023	<b>3.45</b>	<b>0.00</b>			
Interaction *	-0.023	-0.9	0.37			
Selva Region	0.014	<b>2.32</b>	<b>0.02</b>	<b>-0.045</b>	<b>-2.03</b>	<b>0.04</b>
Interaction *	-0.014	-0.45	0.65	-0.001	-0.03	0.98
The child's age corresponds to Secondary school (12 to 17 years of age)	0.058	<b>6.52</b>	<b>0.00</b>	<b>-0.056</b>	<b>-3.2</b>	<b>0.00</b>
Interaction *	-0.011	-0.54	0.59	<b>0.042</b>	<b>2.3</b>	<b>0.02</b>
Gender of the Child	0.002	0.47	0.64	<b>0.022</b>	<b>2.58</b>	<b>0.01</b>
Interaction *	0.012	1.24	0.21	<b>0.035</b>	<b>2.94</b>	<b>0.00</b>
Gender of the Head of Household	-0.015	<b>-1.65</b>	<b>0.10</b>	0.009	0.36	0.72
Interaction *	0.027	<b>2.23</b>	<b>0.03</b>	<b>-0.068</b>	<b>-1.69</b>	<b>0.09</b>
Head of Household has a Spouse	0.014	1.12	0.26	-0.021	-1.03	0.30
Interaction *	-0.029	-1.04	0.30	<b>0.074</b>	<b>2.76</b>	<b>0.01</b>

**Annex Table 3.2 – Probability of Attending School in Urban Peru for Children between 12 and 17 years of age Probit Estimates**

Probability of Attending School in Urban Peru for Children between 12 and 17 years of age Probit Estimates						
Covariates	URBAN			RURAL		
	Marginal Effect dy/dx	z	P>z	Marginal Effect dy/dx	z	P>z
Child's Ethnicity (household contextual background: 1 for native mother tongue)	-0.086	-0.38	0.71	0.431	3.18	0.00
CIB (% of households with indigenous background in the district)	0.857	0.59	0.55	<b>3.001</b>	<b>3.91</b>	<b>0.00</b>
Social Network indicator **	-0.865	-0.52	0.60	<b>-3.666</b>	<b>-3.79</b>	<b>0.00</b>
Percentage of Households with no Sewerage in the conglomerate	-0.035	-1.01	0.31			
Interaction *	0.001	0.02	0.99			
Percentage of Households with no Piped Water in the conglomerate				0.002	0.04	0.97
Interaction *				<b>-0.147</b>	<b>-2.9</b>	<b>0.00</b>
Percentage of Households with Electricity in the conglomerate	0.014	0.57	0.57	<b>0.131</b>	<b>3.21</b>	<b>0.00</b>
Interaction *	0.028	0.5	0.62	-0.083	-1.52	0.13
Age of the Child	<b>-0.062</b>	<b>-18.34</b>	<b>0.00</b>	<b>-0.064</b>	<b>-9.98</b>	<b>0.00</b>
Interaction *	0.008	1.05	0.29	-0.013	-1.34	0.18
Preschool educational infrastructure in the conglomerate	<b>0.044</b>	<b>3.17</b>	<b>0.00</b>	<b>0.065</b>	<b>2.17</b>	<b>0.03</b>
Interaction *	-0.034	-1.12	0.26	-0.012	-0.25	0.81
Years of Education of the Head of Household	0.006	<b>4.9</b>	<b>0.00</b>	<b>0.019</b>	<b>6.54</b>	<b>0.00</b>
Interaction *	<b>-0.007</b>	<b>-2.47</b>	<b>0.01</b>	-0.001	-0.22	0.83
Household size	0.0009	0.4	0.69	0.010	1.48	0.14
Interaction *	0.007	1.08	0.28	0.002	0.21	0.83
Number of little children (0 to 5 year-olds) in the household	<b>-0.027</b>	<b>-4.13</b>	<b>0.00</b>	<b>-0.047</b>	<b>-3.71</b>	<b>0.00</b>
Interaction *	0.000	-0.01	0.99	0.0072	0.29	0.77
Percentage of Members in Working Age within the household	<b>0.081</b>	<b>2.18</b>	<b>0.03</b>	0.138	1.36	0.18
Interaction *	-0.137	-1.6	0.11	-0.079	-0.52	0.60
Costa Region	0.018	1.35	0.18	<b>0.074</b>	<b>2.67</b>	<b>0.01</b>
Interaction *	<b>0.037</b>	<b>1.85</b>	<b>0.06</b>	-0.214	-1.57	0.12
Sierra Region	<b>0.045</b>	<b>3.27</b>	<b>0.00</b>			
Interaction *	-0.025	-0.54	0.59			
Selva Region	<b>0.026</b>	<b>2.16</b>	<b>0.03</b>	<b>-0.050</b>	<b>-1.6</b>	<b>0.11</b>
Interaction *	0.002	0.05	0.96	-0.007	-0.14	0.89
Gender of the Child	0.000	-0.03	0.98	<b>0.057</b>	<b>3.01</b>	<b>0.00</b>
Interaction *	0.023	1.21	0.22	<b>0.086</b>	<b>3.45</b>	<b>0.00</b>
Gender of the Head of Household	0.001	0.06	0.95	0.021	0.4	0.69
Interaction *	<b>0.059</b>	<b>2.74</b>	<b>0.01</b>	-0.131	-1.48	0.14
Head of Household has a Spouse	-0.003	-0.16	0.87	-0.040	-0.94	0.35
Interaction *	-0.105	-1.49	0.14	<b>0.131</b>	<b>2.25</b>	<b>0.02</b>

\* Inter : interaction of the previous variable with *Child's Ethnicity*

\*\* Social Network Indicator: CIB \* (% of children with the child's same indigenous background attending school in Urban(Rural) Areas)

Source: Own estimates based on ENAHO (2001)

**Annex Table 3.3 – Probability of Not Using Modern Health Services (either because of Distrust or because of Lack of Access) Probit Estimates**

Probability of Not Using Modern Health Services (either because of Distrust or because of Lack of Access) Probit Estimates						
Covariates	URBAN			RURAL		
	Marginal Effect dy/dx	z	P>z	Marginal Effect dy/dx	z	P>z
Child's Ethnicity (household contextual background: 1 for native mother tongue)	<b>-0.067</b>	<b>-1.5</b>	<b>0.1</b>	0.102	0.7	0.5
CIB (% of households with indigenous background in the district)	-0.002	0.0	1.0	-0.015	0.0	1.0
Social Network indicator **	0.360	0.7	0.5	0.360	0.3	0.8
Percentage of Households benefitting from Health Welfare Programs in the conglomerate	0.009	0.8	0.4	-0.016	-0.4	0.7
Interaction *	0.007	0.3	0.8	-0.037	-0.6	0.6
Costa Region	<b>-0.030</b>	<b>-2.3</b>	<b>0.0</b>	<b>-0.227</b>	<b>-8.5</b>	<b>0.0</b>
Interaction *	<b>0.100</b>	<b>2.9</b>	<b>0.0</b>	0.072	0.4	0.7
Sierra Region	<b>0.087</b>	<b>5.8</b>	<b>0.0</b>			
Interaction *	<b>0.051</b>	<b>1.7</b>	<b>0.1</b>			
Selva Region	<b>0.051</b>	<b>3.1</b>	<b>0.0</b>	<b>-0.129</b>	<b>-3.6</b>	<b>0.0</b>
Interaction *	0.061	0.9	0.4	0.080	0.9	0.4
Gender of the Head of Household	0.014	1.2	0.2			
Interaction *	<b>-0.042</b>	<b>-2.4</b>	<b>0.0</b>			
Age of the Head of Household	-0.0002	-0.7	0.5	<b>0.002</b>	<b>2.7</b>	<b>0.0</b>
Interaction *	0.0002	0.4	0.7	-0.002	-1.8	0.1
Years of Education of the Most Qualified Household Member	<b>-0.009</b>	<b>-5.6</b>	<b>0.0</b>	<b>-0.012</b>	<b>-3.8</b>	<b>0.0</b>
Interaction *	<b>0.007</b>	<b>2.3</b>	<b>0.0</b>	0.006	1.3	0.2
Household size	<b>0.017</b>	<b>7.9</b>	<b>0.0</b>	<b>0.034</b>	<b>2.1</b>	<b>0.0</b>
Interaction *	0.0001	0.0	1.0	-0.008	-0.4	0.7
Percentage of Households with no Sewerage in the conglomerate	-0.026	-1.1	0.3			
Interaction *	-0.014	-0.4	0.7			
Number of Household Members of age 6 and above				0.003	0.2	0.9
Interaction *				0.011	0.5	0.7
Percentage of Households with Piped Water in the conglomerate				0.049	1.1	0.3
Interaction *				-0.173	-2.8	0.0

\* Inter : interaction of the previous variable with *Household's Ethnicity*

\*\* Social Network Indicator: CIB \* (% of children with the household's same indigenous background with at least one member not

Source: Own estimates based on ENAHO (2001)

**Annex Table 3.4 – Probability of Having an Informal Business (business with 10 or less employees, it does not include professional services self-employed) Probit Estimates**

Covariates	URBAN		
	Marginal Effect dy/dx	z	P>z
Child's Ethnicity (household contextual background: 1 for native mother tongue)	<b>-0.197</b>	<b>-1.1</b>	<b>0.3</b>
CIB (% of households with indigenous background in the district)	<b>12.560</b>	<b>1.1</b>	<b>0.3</b>
Social Network indicator **	<b>-14.864</b>	<b>-1.1</b>	<b>0.3</b>
Costa Region	-0.017	-1.1	0.3
Interaction *	0.0274	0.8	0.4
Sierra Region	<b>-0.052</b>	<b>-2.7</b>	<b>0.0</b>
Interaction *	-0.004	-0.1	0.9
Selva Region	<b>-0.062</b>	<b>-2.7</b>	<b>0.0</b>
Interaction *	0.017	0.4	0.7
Household size	<b>0.010</b>	<b>3.5</b>	<b>0.0</b>
Interaction *	<b>-0.012</b>	<b>-1.7</b>	<b>0.1</b>
Gender of the Head of Household	-0.027	-1.3	0.2
Interaction *	0.026	0.6	0.6
Age of the Head of Household	<b>-0.002</b>	<b>-4.6</b>	<b>0.0</b>
Interaction *	0.001	1.1	0.3
Years of Education of the Head of Household	<b>-0.015</b>	<b>-9.1</b>	<b>0.0</b>
Interaction *	<b>0.010</b>	<b>3.2</b>	<b>0.0</b>
Head of Household has a Spouse	-0.020	-1.0	0.3
Interaction *	-0.012	-0.3	0.8
Preschool educational infrastructure in the	0.000	0.0	1.0
Interaction *	<b>-0.059</b>	<b>-1.6</b>	<b>0.1</b>
Percentage of Households with Piped Water in	0.030	1.2	0.3
Interaction *	-0.052	-0.9	0.4
Percentage of Households with Sewerage in the conglomerate	<b>-0.124</b>	<b>-5.0</b>	<b>0.0</b>
Interaction *	0.028	0.5	0.6
Percentage of Households with Electricity in the conglomerate	<b>-0.098</b>	<b>-2.5</b>	<b>0.0</b>
Interaction *	<b>0.063</b>	<b>0.8</b>	<b>0.4</b>

\* Inter : interaction of the previous variable with *Household's Ethnicity*

\*\* Social Network Indicator: CIB \* (% of children with the household's same indigenous

Source: Own estimates based on ENAHO (2001)

**Annex Table 3.5 – Hourly Income of the Owner of a Micro-Enterprise (business with 10 or less employees, it does not include professional services self-employed) – OLS Estimates (logarithm of hourly income)**

Covariates	URBAN		
	Marginal Effect dy/dx	z	P>z
Child's Ethnicity (household contextual background: 1 for native mother tongue)	<b>-0.684</b>	<b>-1.7</b>	<b>0.1</b>
CIB (% of households with indigenous background in the district)	0.926	1.0	0.3
Social Network indicator **	-0.233	-1.0	0.3
Informal Business	<b>-0.205</b>	<b>-4.2</b>	<b>0.0</b>
Interaction *	-0.019	-0.2	0.9
Costa Region	-0.029	-0.6	0.6
Interaction *	0.1092	0.8	0.4
Sierra Region	-0.075	-1.3	0.2
Interaction *	0.060	0.4	0.7
Selva Region	<b>0.117</b>	<b>2.0</b>	<b>0.1</b>
Interaction *	0.085	0.5	0.6
Household size	0.012	1.4	0.2
Interaction *	0.028	1.4	0.2
Gender of the Head of Household	<b>-0.438</b>	<b>-11.8</b>	<b>0.0</b>
Interaction *	0.037	0.4	0.7
Age of the Head of Household	<b>-0.005</b>	<b>-3.4</b>	<b>0.0</b>
Interaction *	0.005	1.2	0.2
Years of Education of the owner of the business	<b>0.033</b>	<b>6.9</b>	<b>0.0</b>
Interaction *	-0.011	-0.9	0.4
Preschool educational infrastructure in the	-0.002	0.0	1.0
Interaction *	0.095	0.9	0.4
Percentage of Households with Piped Water in	-0.050	-0.7	0.5
Interaction *	<b>-0.265</b>	<b>-1.6</b>	<b>0.1</b>
Percentage of Households with Sewerage in the conglomerate	<b>0.171</b>	<b>2.5</b>	<b>0.0</b>
Interaction *	0.203	1.3	0.2
Percentage of Households with Electricity in the conglomerate	-0.128	-1.4	0.2
Interaction *	0.255	1.2	0.2

\* Inter : interaction of the previous variable with *Household's Ethnicity*

\*\* Social Network Indicator: CIB \* (% of children with the household's same indigenous

Source: Own estimates based on ENAHO (2001)

**Annex Table 3.6 – Probability of Being Poor – Probit Estimates**

Covariates	URBAN			RURAL		
	Marginal Effect dy/dx	z	P>z	Marginal Effect dy/dx	z	P>z
Child's Ethnicity (household contextual background: 1 for native mother tongue)	-0.065	-0.6	0.5	<b>-0.327</b>	<b>-4.9</b>	<b>0.0</b>
CIB (% of households with indigenous background in the district)	-0.279	-1.4	0.2	<b>-2.109</b>	<b>-4.7</b>	<b>0.0</b>
Social Network indicator **	<b>1.084</b>	<b>2.0</b>	<b>0.0</b>	<b>3.183</b>	<b>5.0</b>	<b>0.0</b>
Costa Region	0.049	1.5	0.1	<b>-0.183</b>	<b>-3.9</b>	<b>0.0</b>
Interaction *	<b>-0.171</b>	<b>-2.2</b>	<b>0.0</b>	-0.042	-0.8	0.4
Sierra Region	<b>0.082</b>	<b>2.6</b>	<b>0.0</b>			
Interaction *	0.002	0.0	1.0			
Selva Region	<b>0.154</b>	<b>4.1</b>	<b>0.0</b>	<b>-0.104</b>	<b>-3.0</b>	<b>0.0</b>
Interaction *	-0.014	-0.1	0.9	-0.074	-1.2	0.2
Percentage of Households with Piped Water in the conglomerate	<b>-0.159</b>	<b>-6.3</b>	<b>0.0</b>	-0.052	-1.3	0.2
Interaction *	0.074	1.3	0.2	-0.056	-1.1	0.3
Percentage of Households with Electricity in the conglomerate	<b>-0.179</b>	<b>-5.1</b>	<b>0.0</b>	<b>-0.172</b>	<b>-4.3</b>	<b>0.0</b>
Interaction *	-0.051	-0.7	0.5	<b>0.108</b>	<b>2.0</b>	<b>0.0</b>
Household size	<b>0.092</b>	<b>21.3</b>	<b>0.0</b>	<b>0.088</b>	<b>14.0</b>	<b>0.0</b>
Interaction *	<b>0.024</b>	<b>2.6</b>	<b>0.0</b>	<b>0.023</b>	<b>2.0</b>	<b>0.0</b>
Percentage of Members in Working Age within the household	<b>-0.2030</b>	<b>-6.3</b>	<b>0.0</b>	<b>-0.116</b>	<b>-3.0</b>	<b>0.0</b>
Interaction *	-0.0292	-0.5	0.7	0.068	1.1	0.3
Years of Education of the Most Qualified Household Member	<b>-0.044</b>	<b>-19.7</b>	<b>0.0</b>	<b>-0.030</b>	<b>-9.2</b>	<b>0.0</b>
Interaction *	0.000	-0.1	0.9	-0.002	-0.3	0.7
Big city	-0.037	-1.2	0.2			
Interaction *	-0.0256	-0.4	0.7			

\* Inter : interaction of the previous variable with *Household's Ethnicity*

\*\* Social Network Indicator: CIB \* (% of children with the household's same indigenous background with at least one member not Source: Own estimates based on ENAHO (2001)

**Annex Table 3.7 – Probability of Being Beneficiary of Assistencial Programs (Health, Education, Food) – Probit Estimates**

Covariates	URBAN			RURAL		
	Marginal Effect dy/dx	z	P>z	Marginal Effect dy/dx	z	P>z
Child's Ethnicity (household contextual background: 1 for native mother tongue)	<b>-0.242</b>	<b>-2.0</b>	<b>0.0</b>	-0.039	-0.3	0.7
CIB (% of households with indigenous background in the district)	<b>1.357</b>	<b>1.9</b>	<b>0.1</b>	2.135	1.0	0.3
Social Network indicator **	<b>-2.178</b>	<b>-1.6</b>	<b>0.1</b>	-3.120	-1.0	0.3
Costa Region	0.030	0.9	0.4	-0.036	-1.0	0.3
Interaction *	0.0002	0.0	1.0	<b>-0.2276</b>	<b>-1.9</b>	<b>0.1</b>
Sierra Region	-0.036	-1.0	0.3			
Interaction *	-0.018	-0.3	0.8			
Selva Region	-0.029	-0.7	0.5	0.022	0.7	0.5
Interaction *	-0.004	0.0	1.0	<b>-0.143</b>	<b>-2.0</b>	<b>0.0</b>
Percentage of Households with Piped Water in the conglomerate	<b>-0.056</b>	<b>-1.8</b>	<b>0.1</b>	0.040	0.9	0.4
Interaction *	-0.022	-0.4	0.7	-0.068	-1.2	0.3
Percentage of Households with Electricity in the conglomerate	-0.062	-1.3	0.2	<b>-0.077</b>	<b>-1.9</b>	<b>0.1</b>
Interaction *	-0.020	-0.2	0.8	-0.025	-0.4	0.7
Household size	<b>0.090</b>	<b>18.8</b>	<b>0.0</b>	<b>0.088</b>	<b>12.8</b>	<b>0.0</b>
Interaction *	0.001	0.1	0.9	-0.001	-0.1	1.0
Number of little children (0 to 5 year-olds) in the household	<b>0.183</b>	<b>11.2</b>	<b>0.0</b>	<b>0.112</b>	<b>6.0</b>	<b>0.0</b>
Interaction *	-0.063	-1.5	0.1	-0.003	-0.1	0.9
Years of Education of the Most Qualified Household Member	<b>-0.033</b>	<b>12.8</b>	<b>0.0</b>	<b>-0.007</b>	<b>-2.6</b>	<b>0.0</b>
Interaction *	<b>0.021</b>	<b>3.9</b>	<b>0.0</b>	0.003	0.6	0.6
Big city	<b>-0.089</b>	<b>-2.9</b>	<b>0.0</b>			
Interaction *	0.019	0.3	0.8			
Gender of the Head of Household	-0.009	-0.5	0.6	-0.034	-1.2	0.2
Interaction *	-0.010	-0.2	0.8	0.028	0.6	0.6
Age of the Head of Household	<b>-0.007</b>	<b>12.2</b>	<b>0.0</b>	<b>-0.005</b>	<b>-7.4</b>	<b>0.0</b>
Interaction *	<b>0.003</b>	<b>2.0</b>	<b>0.0</b>	<b>0.001</b>	<b>1.0</b>	<b>0.3</b>

\* Inter : interaction of the previous variable with *Household's Ethnicity*

\*\* Social Network Indicator: CIB \* (% of children with the household's same indigenous

Source: Own estimates based on ENAHO (2001)

#### **Annex 4: Interaction Effects**

An important issue in trying to analyze differences between indigenous and non-indigenous households in Peru is how we can capture the interaction between households' indigenous backgrounds and the size of the indigenous populations among whom they live. If one adds interaction terms to a probit or any other non-linear model, the sign and significance of the interaction parameter will not shed light on the complementarity or substitutability issue if the functional form is not linear. The interaction effect is not equal to marginal effect reported by most statistical programs. As Ai and Norton (2003) have noted, there are several implications that can be derived from this result. First, the interaction effect could be non-zero, even if the interaction estimated parameter is zero. Second, the statistical significance of interaction effect – which is, in our case, a key parameter of interest – cannot be tested with a simple t test on the coefficient of the interaction term. Third, the interaction effect is conditional on the independent variables, unlike the interaction effect in linear models. Fourth, the interaction effect may have different signs for different values of covariates. If this is the case, then community-level variables may, for example, interact positively with the indigenous background of some households but for others, it may well interact negatively.

We have estimated a probit model for urban and rural areas including the interaction between households' indigenous background and the size of the surrounding indigenous population. We have included typical explanatory factors (human capital variables like highest education level achieved by a member of the household, household size, and age composition as well as access to key public services like piped water and electricity). To check the robustness of our results, we re-estimated the interaction effect using the methodology proposed by Ai and Norton (2003).

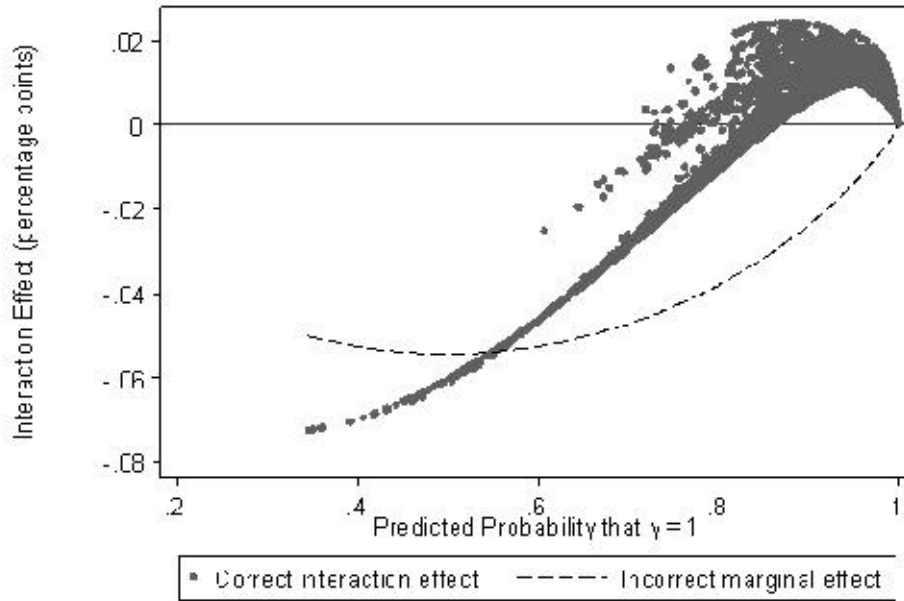
In the case of school attendance, Annex Figure 3.1 shows the correct marginal and typically reported interaction effect for different predicted probabilities for urban Peru, while Annex Figure 3.2 shows the significance of the interaction term. Annex Figures 3.3 and 3.4 show the interaction term and its significance, respectively, for rural Peru. In the case of the probability of being poor in urban areas, Annex Figures 3.5 and 3.6 show the correct interaction effect and its significance for different predicted probabilities. Finally Annex Figures 3.7 and 3.8 show the correct interaction effect and its significance for different predicted probabilities for urban and rural Peru respectively.<sup>11</sup>

These results, and the others related to the other Probit estimations done throughout the paper, show that the social network indicator has been robustly estimated.

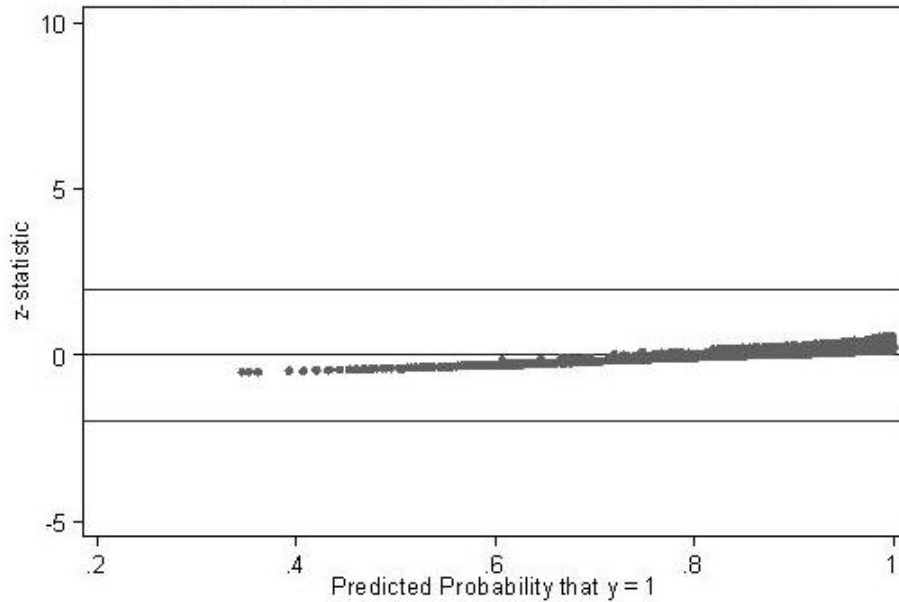
---

<sup>11</sup> The other Probit estimations related to access to assistance programs, access to modern health services, and probability of Having an Informal Business show similar results as the ones depicted here and are available from the authors upon request.

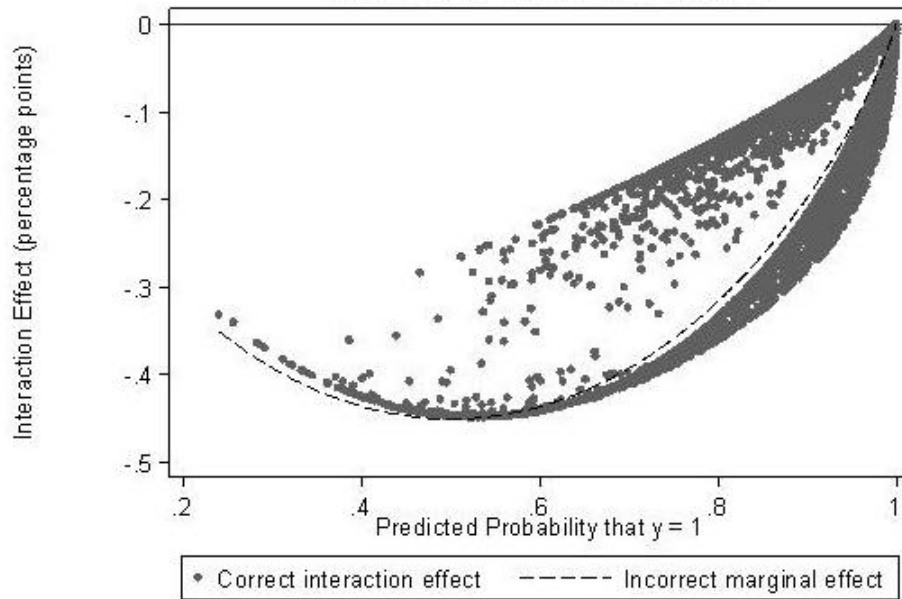
**Annex Figure 4.1: Interaction Effects between Indigenous Background and Indigenous Population Size  
(After Probit Estimation for School Attendance in Urban Peru)**



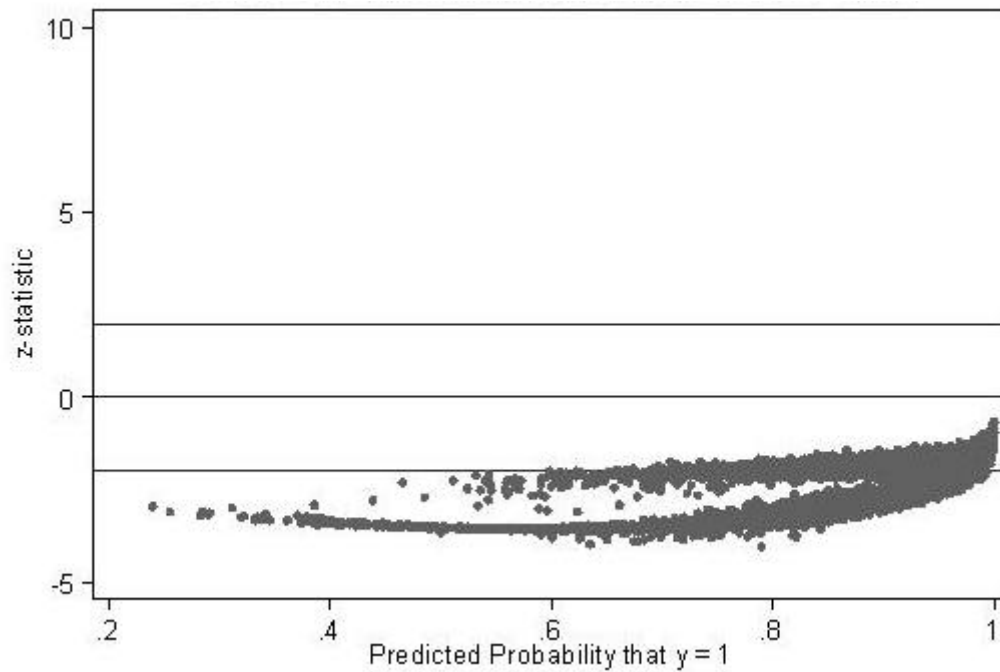
**Annex Figure 4.2: Significance of the Interaction Effect  
(After Probit Estimation for School Attendance in Urban Peru)**



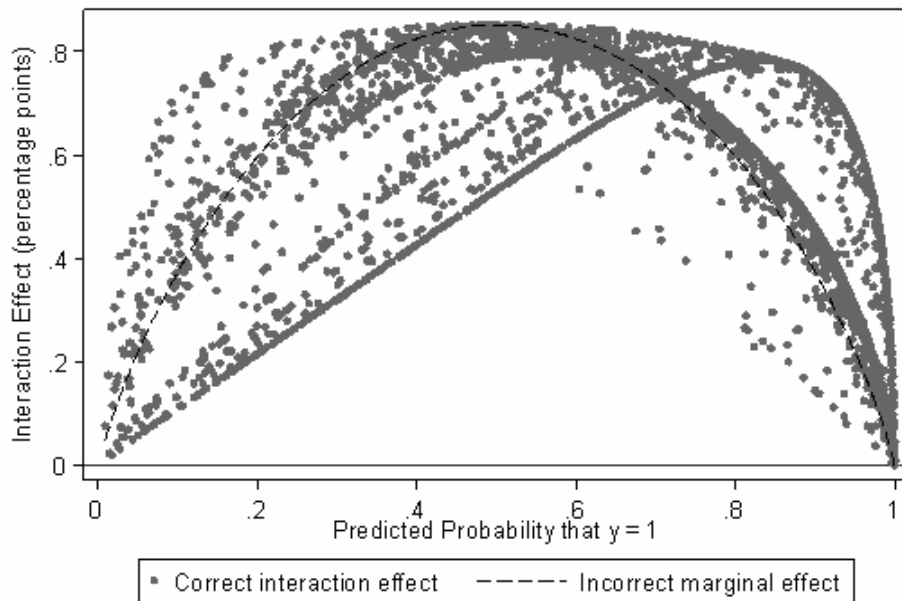
**Annex Figure 4.3: Interaction Effects between Indigenous Background and Indigenous Population Size  
(After Probit Estimation for School Attendance in Rural Peru)**



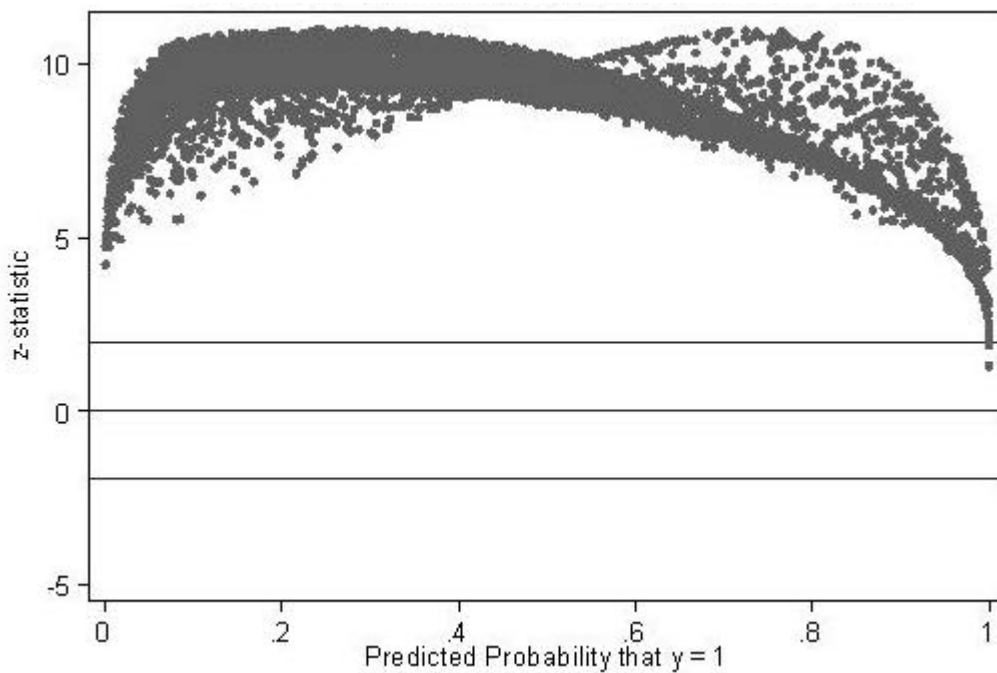
**Annex Figure 4.4: Significance of the Interaction Effect  
(After Probit Estimation for School Attendance in Rural Peru)**



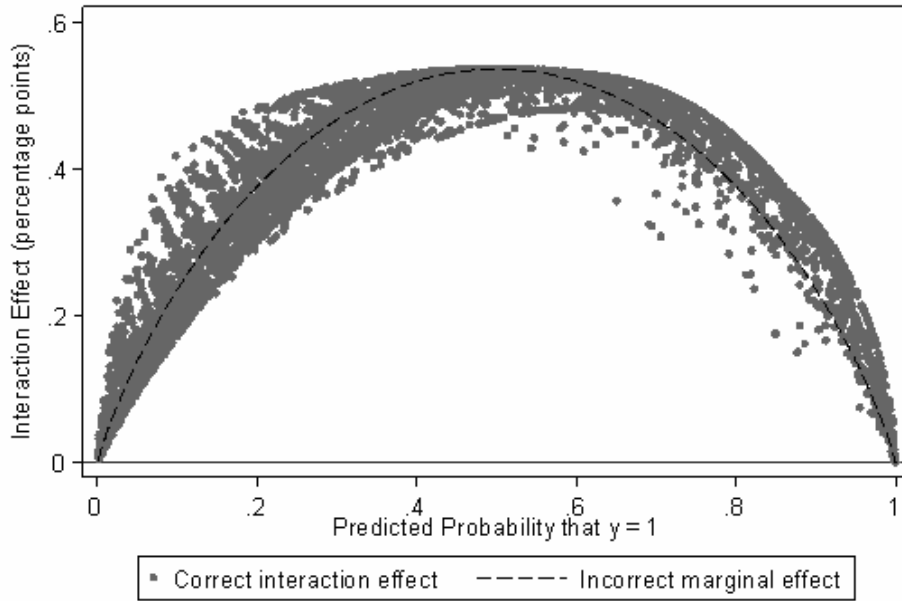
**Annex 4.5: Interaction Effects between Indigenous Background and Indigenous Population Size  
Size  
(After Probit Estimation for Urban Poverty)**



**Annex Figure 4.6: Significance of the Interaction Effect  
(After Probit Estimation for Urban Poverty)**



**Annex Figure 4.7: Interaction Effects between Indigenous Background and Indigenous Population Size (After Probit Estimation for Rural Poverty)**



**Annex Figure 4.8: Significance of the Interaction Effect (After Probit Estimation for Rural Poverty)**

