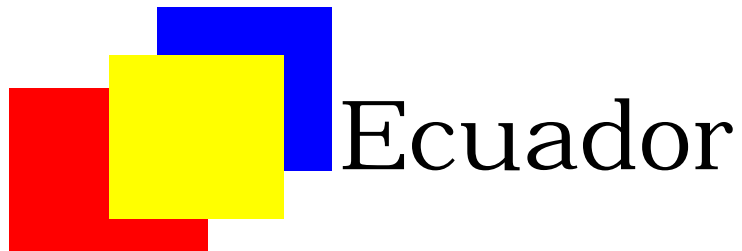


# **Economic Opportunities for Indigenous Peoples in Latin America**

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

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**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 Ecuador**

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## **Abstract**

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

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## EXECUTIVE SUMMARY

Indigenous groups in Ecuador have shown a great capacity to mobilize and negotiate with the national government – and to achieve their goals democratically. Yet, despite this increased political influence, Larrea and Montenegro (2006) find that the indigenous population continues to suffer from poverty and exclusion – and remain the poorest groups in a multicultural Ecuadorian society. In addition, the authors also find that indigenous households have lower human capital endowments (health and education) - even after controlling for per capita consumption. In other words, indigenous individuals have lower education and schooling attendance and worse nutritional conditions than non-indigenous individuals within the same consumption quintiles. The authors also show that the probability of being poor is higher for indigenous individuals and households, even after controlling for education, health and other factors.

In an effort to better understand why this continues to be the case, this paper looked at ethnic differences in economic opportunity, that is, differences in the access and ability to engage in income generating activities, as well as differences in the returns to these. In doing so we have looked at: (i) participation and the determinants of participation in occupations and sectors of economic activity; (ii) the concentration or diversification of economic activity; (iii) self-employment and the assets on which entrepreneurship is built, in particular credit; and; (iv) the role of social networks in determining economic outcomes. All of these aspects of economic opportunity were examined separately for rural and urban areas.

An overview of **labor market participation** in Chapter 2 shows that indigenous are more likely to engage in unskilled labor, to work in agriculture and to work without pay, than are the non-indigenous. These findings hold true for both rural and urban areas. In addition, 87 percent of indigenous in rural areas report having a second occupation or activity, while only 22 percent of rural non-indigenous do, indicating a common need among rural indigenous to complement primary activities – mostly unwaged agricultural work. In terms of unskilled employment, we find that while indigenous and non-indigenous have similar participation rates in waged employment, indigenous are more likely to work in the agricultural sector when engaging in waged labor than the non-indigenous. If we look at skilled employment, participation in waged labor is higher for non-indigenous than indigenous, in particular in urban areas where 42 percent of the non-indigenous work force engage in skilled waged labor compared to only 26 percent of the indigenous.

Chapter 2 also looks at **determinants of labor and occupational outcomes**. The analysis shows that the indigenous are more likely to be engaged in agriculture than any other ethnic group, above all in activities where returns are intuitively lower such as small scale farming and subsistence farming. In urban areas, findings suggest a change in traditional occupation patterns of indigenous in urban areas as current generations are more likely to work in informal commerce than previous ones. Human capital endowment – measured in years of schooling – was also found to impact occupational outcomes. As years of schooling increases, the probability of working in manufacturing increases compared to other unskilled work (agricultural, commerce and construction). The indigenous have lower human capital endowments than other ethnicities irrespective of occupation and geographic area. Estimates from probit models show that the probability of working in formal and waged sectors increases with years of schooling and the literacy rate of then household, and that the effect of human capital is stronger in rural areas and for the indigenous. Finally, predicted probabilities of waged work and self-employment were calculated for ages 19-35. In both rural and urban areas, the indigenous have a lower probability

of waged employment than the non-indigenous across all age groups; however in urban areas the ethnic gap increases with age. The probability of self employment is generally higher for indigenous than non-indigenous; in urban areas the gap increases with age while it falls in rural areas.

Following an overview of economic sectors and employment, Herfindahl indices is calculated to estimate the **concentration and diversification of economic activity**. International evidence show that the ability to diversify activities is particularly important among poorer rural households as it provides a means to mitigate risks and income volatility, as well as a response to liquidity constraints. In terms of unskilled employment, the economic activities of individuals engaged in informal commerce are the most concentrated while waged agricultural employment is associated with a more diversified activity. Overall, the activities of indigenous engaged in any form of agricultural activity are more concentrated than similarly engaged non-indigenous. Looking at individuals engaged in skilled employment we see that the indigenous have on average a much higher diversification of activities than non-indigenous. The most striking difference between indigenous and non-indigenous is the very concentrated activities of non-indigenous engaged in non-agricultural waged employment, and the highly diversified activities of indigenous employed in the same.

The analysis then turns to looks at **entrepreneurial activities and self-employment** more in-depth by focusing on the physical, human and financial assets these activities build on, in particular human capital and access to formal and informal credit. Comparing key characteristics of indigenous and non-indigenous self-employed told us that: (i) the indigenous have lower levels of education, (ii) the indigenous employ more family members in their businesses/activities; (iii) the use of machinery and equipment is more widespread among the non-indigenous; and that (iv) the indigenous rely more on farm animals. Comparing indigenous and non-indigenous agricultural farms/businesses, we also found stark ethnic differences in access to credit. Both formal and informal credit is much more common among non-indigenous than indigenous businesses, irrespective of their size. The indigenous also seem to be paying higher interest rates. When looking at factors that deter business owners from seeking credit, we found that high interest rates was a more commonly viewed as an obstacle by rural indigenous than rural non-indigenous. A study by the World Bank (2004) found that access to credit is the single most important policy intervention to raise productivity among small-scale poor farmers. Farm productivity measures show that non-indigenous small-scale farmers harvest between two and three times more a month than non-indigenous. In addition, the value of per kilo of production is also higher.

Finally, ethnic differences in **public program participation** are also assessed in chapter 2. A comparison across four different types of interventions found that when the household is headed by women, the probability of receiving a cash transfer increases, however this positive effect is stronger among indigenous than non-indigenous. Participation in labor training falls when the household is headed by a woman, while the probability of participating in school breakfasts in urban areas increases for non-indigenous and falls for indigenous female-headed households. As education increases, participation falls for most public programs. The probability of participating in training programs falls with education for the non-indigenous but increases with levels of schooling for the indigenous. Finally owning an agricultural business increases the probability of receiving training for indigenous and lowers it for non-indigenous.

Chapter 3 looked at **social capital and social networks effects on labor market outcomes**. Results show that bonding social capital – family and other strong ties - is slightly higher among speakers of an indigenous language. Non-indigenous are on the other hand much more endowed

in bridging social capital, that is, weaker ties with distant friends, acquaintances and colleagues. In rural indigenous communities where the majority of indigenous live, both types of social capital is higher among the bilingual indigenous population when compared to those who only speak an indigenous language. A formal analysis of social networks showed that for indigenous males in rural areas, networks have a positive and significant effect on participation in agricultural related activities indicating that networks in this sector are strong and well-functioning. This is the only positive network effect identified for indigenous males. In urban areas, social networks negatively affect participation in unskilled labor, services and commerce. Social networks also positively affect indigenous females' participation in agriculture – both in rural and urban areas, which is not the case for women at large.

Chapter 3 also examined the effects of **social networks on school attendance and child labor**. Social networks positively affect school attendance of children and youth ages 10-17, irrespective of geographic area and ethnicity. These effects are however stronger for males than females and stronger for the population at large when compared to the indigenous. Consequently, the effects are the weakest for indigenous females. While this also holds for rural areas, this consistency breaks down when we look at urban areas separately, where there are no significant effect of social networks on the school attendance of indigenous children and youth. There is less evidence of the positive effects of social networks on child labor, and is only shown to reduce child labor for males in urban areas.

Finally, Chapter 3 looked at the interaction between access to basic infrastructure and social networks, in an attempt to look more closely at potential asset complementarity. Complementarity between these two assets – i.e. infrastructure and social networks - is of interest, because access to public infrastructure varies across regions, communities and socio-economic strata. The results of the analysis are inconclusive for some outcomes, yet for certain employment outcomes as well as for decisions to migrate, the findings strengthened the hypothesis of asset complementarity. For instance, access to basic infrastructure, such as water, sanitation and electricity, strengthens social network effects that motivate entrepreneurial activities among indigenous in rural areas.

While the scope for policy implications is limited, the findings in this paper suggest a few key areas of intervention. These include: (i) Building on the complementarities of assets by facilitating both the acquisition of human capital (formal schooling and training) and access to credit; and (ii) look for ways in which social networks can work not only as aids to get by, but also as catapults for moving indigenous households ahead. An area not investigated in this report is land which would be a key area for further research. The distribution of land in Ecuador is highly unequal and has remained unchanged in the last twenty-five years (World Bank 2004). Clearly, differences in the size and quality of land, as well as land ownership structures crucially affect income generating strategies in rural areas where most indigenous live. Another area of investigation is recent cases of successful indigenous community development that have been documented in the literature (see for instance Carrasco et al. 2003). In addition, there are recent projects such as Ecuador's Indigenous and Afro-Ecuadorian Peoples Development (PRODEPINE) that have developed experience in local community planning, community subproject implementation and credit programs for indigenous communities. A closer review and evaluation of these experiences could help build a better understanding of what works and what doesn't, and under which contextual circumstances (rural/urban, high/ low density of indigenous populations etc.).



## I - INTRODUCTION AND BACKGROUND

The way in which the indigenous movement has shaped national debate and policymaking since the indigenous uprising in 1990, sets Ecuador apart from many other Latin American countries. Indigenous groups have shown a great capacity to mobilize and negotiate with the national government – and to achieve their goals democratically. Despite this increased political influence, the indigenous population continues to suffer from poverty and exclusion – and remain the poorest groups in a multicultural Ecuadorian society (Larrea and Montenegro, 2006).

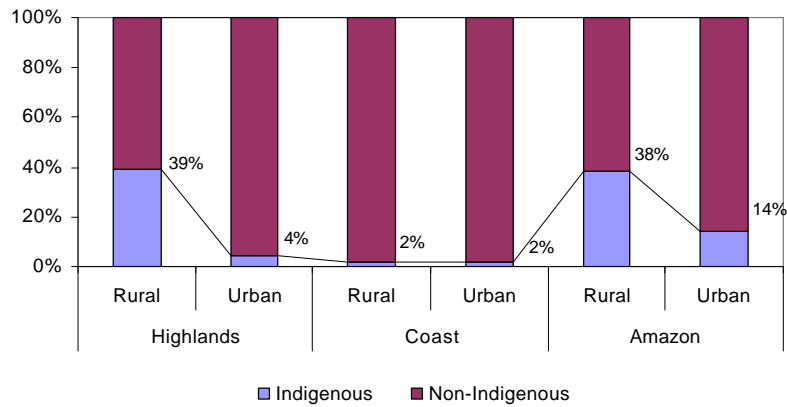
In addition to being among the poorest groups in Ecuador, indigenous households also have lower human capital endowments (health and education) - even after controlling for per capita consumption (Larrea and Montenegro, 2006). In other words, indigenous individuals have lower education and schooling attendance and worse nutritional conditions than non-indigenous individuals within the same consumption quintiles. The authors also show that the probability of being poor is higher for indigenous individuals and households, even after controlling for education, health and other factors.

This paper looks at how ethnic differences in economic opportunity contribute to the continued marginalization of the indigenous in Ecuador – despite increased political inclusion and weight. On the one hand we look at whether the indigenous face a different set of binding constraints to income generating activities. These constraints can occur in the form of: (i) deficient market access due to location, language barriers, lacking information and networks etc; (ii) lower quantities and quality of productive assets (human and physical); or (iii) other factors that lowers returns to economic activity such as wage discrimination. On the other hand, the analysis also looks at how avenues for getting ahead – i.e. social networks that help people find jobs or formal and informal credit– work for the indigenous when compared to the population at large.

**There are today by official records, 13 non-Hispanic ethnic groups or nationalities in Ecuador. The highland Quichua-speakers – culturally a highly diverse group - constitute more than 90 percent of the country's indigenous peoples (Uquillas and Van Nieuwkoop, 2003). Due to differences in the definition of the indigenous population in Ecuador, estimates of its size vary from 7 percent to as high as 40 percent. Larrea and Montenegro (2006) estimates the indigenous population at 7 percent, defining households as indigenous if at least one member (excluding domestic employees) speaks an indigenous language, and 9.2 percent if a member speaks an indigenous language or identifies as indigenous. This is much lower than the estimates provided by indigenous organizations (CONAIE 2005). These organizations think that neither language nor self-identification identify the true indigenous population correctly, and according to their estimates a third of Ecuador's population is indigenous (World Bank, 2004).**

In this study, we used indigenous language spoken at home by people aged 5 years or above to define the indigenous population. Fig. 1 shows that the population is concentrated in the rural highlands and the Amazon basin where the indigenous make up 39 and 38 percent of the population, respectively. As noted by Larrea and Montenegro (2006), linguistic erosion has taken place in the past decades as more than one third of those who self-identify as indigenous no longer speak a native language. Language erosion typically takes place faster in urban settings, which means that using language as the indigenous identifies may result in a rural bias in population estimates.

**Figure1: Concentration of indigenous population by geographic areas**



Note: Population that speaks an indigenous language  
 Source: Authors calculations, CENSUS 2001

Naturally, economic opportunity is also influenced by geographical location. Studies have for instance shown that urban poverty in Ecuador is associated with low educational achievement, employment in the informal sector, and low rates of participation in the labor force by women, while rural poverty is associated with lack of education, little access to land, a low degree of market integration, and lack of employment in the vibrant non-farm rural sector (World Bank 1998). Along the same lines, coastal regions offer more varied economic opportunity and better access to markets than do rural areas in the highlands (Anand 2002). Other studies (Lanjouw 1997 and Anand 2002) have analyzed the role of particular types of agricultural activities in providing income for the indigenous and non-indigenous and how these occupations tend to affect the incidence and persistence of poverty. These studies used geographical location as an exogenous factor to explain differences in wealth and consumption and found that geographical location strongly determines why the indigenous are excluded from markets, public infrastructure, and public programs. **As economic opportunity varies considerably both across and within regions and areas, the paper looks at rural and urban areas separately, and when feasible – differences between the coast and highland regions.**

Table 1 shows that poverty is - as expected – more widespread in rural areas than in urban areas. It also shows that poverty rates are in general higher in the highlands than in the coastal regions and national averages<sup>1</sup>. As shown earlier, the highlands is also the region with the highest indigenous population. Across all regions and areas, the indigenous are poorer than non-indigenous – a finding which confirms a string of earlier studies (Larrea and Montenegro 2006 and World Bank 2004). These studies have also shown how outcomes on other social indicators – such as access to basic services – are poorer in the highlands than other regions.

<sup>1</sup>ECOVII 1999 did not sample regions in the Amazon which is why estimates for this region is not given

**Table 1: Poverty by Geographic Location**

	<b>Non-Indigenous</b>		<b>Indigenous</b>	
	<i>Rural</i>	<i>Urban</i>	<i>Rural</i>	<i>Urban</i>
<b>Extreme Poverty (head count)</b>				
National	<b>48.6%</b>	<b>21.2%</b>	<b>82.7%</b>	<b>38.5%</b>
Coast	42.2%	23.9%	72.7%	31.5%
Highlands	55.8%	17.5%	86.2%	64.3%
<b>Poverty (Head Count)</b>				
National	<b>84.3%</b>	<b>58.1%</b>	<b>96.4%</b>	<b>74.3%</b>
Coast	82.5%	63.0%	89.4%	72.0%
Highlands	86.3%	51.1%	98.1%	81.4%

Note: Poverty lines based on the Methodology of Consumption and Caloric Ingestion of Brborich, 2000  
Source: Author's calculations, ECOVI 1999

In their study of indigenous people, poverty and human development in Ecuador, Larrea and Montenegro (2006) conclude that off-farm employment is the most important source of income in indigenous households, however, average labor earnings of indigenous workers are only 53 percent of what non-indigenous workers earn. The authors estimate that about one quarter of the earnings differential is caused by labor market discrimination, based on models that allow for the decomposition of intra-group earnings differentials<sup>2</sup>. Larrea and Montenegro (2006) also show how the indigenous/non-indigenous gaps in returns to education increase with levels of schooling, which may discourage investment in secondary and higher education for indigenous households. The expected earning ratio between non-indigenous and indigenous workers rises from 1.6 for completed primary education to 2.4 for upper levels of higher education. An earlier study by Garcia and Winkler (2001) also suggest that lower endowments of and returns to human capital explain why the indigenous receive lower wages and have more limited access to labor markets than the non-indigenous after controlling for other socio-demographic characteristics. They found that on average, the indigenous earn 21 percent less than non-indigenous and that the difference is bigger in rural areas where access to markets and public infrastructure is limited.

Finally, economic decisions, particularly regarding labor and economic activities, tend to be highly influenced by their social context and there is a growing body of literature regarding how social capital and social networks influence people's economic choices. Coleman (1996) studied the role of networks in influencing education outcomes, while Montgomery (1991) demonstrated the effects of networks on job searches and employment opportunities. A segment of this work has focused on the role of social networks in explaining ethnic differences in economic outcomes. For instance, Bertrand et al (2000) did a detailed analysis of the endogenous conditions that allow social networks to influence individuals in participating in welfare programs in the United States. Thus, on the one hand economic decisions and outcomes may be driven by local context (e.g. economy and geographic location) and individual characteristics (e.g. human capital endowments). At the same time, social factors, such as networks and social bonds, may also explain economic outcomes.

<sup>2</sup> The authors used the Oaxaca-Blinder decomposition method to show that 74 percent of the earning gap is due to differences in endowments, above all education, leaving 26 percent unexplained.

This paper is organized as follows: A first part focuses on economic activity and ethnic differences in sector of activity as well as in the types of occupation and employment status. This part also looks at the concentration and diversification of economic activities, and provides a more in-depth look at entrepreneurial activities. Finally, ethnic differences in public program participation are examined. A second part (Chapter 3) looks at the role of bridging and bonding social capital, followed by a formal analysis of how social networks affects employment outcomes, public program participation and child labor. Chapter 4 summarizes findings and outlines implications for policy.

## II - INCOME GENERATING ACTIVITIES AND THE LABOR MARKET

This chapter looks at the participation of indigenous and non-indigenous in income generating activities. More specifically, it looks at: (i) participation rates in different sectors and occupations; (ii) determinants of employment outcomes; (iii) concentration and diversification of income generating activities; and (iv) entrepreneurial activity and self-employment. In addition to looking at labor related sources of income, a last section examines the role of public transfers and participation in public programs.

### Occupations and Sectors

The indigenous make up nearly 14 percent of the work force in Ecuador (table 2). However, the economically active indigenous are predominantly located in rural areas (94 percent) while this is not the case for non-indigenous (52 percent). In other words, the vast majority of indigenous engage in income generating activities in areas where economic opportunities are less diversified and where markets are limited, hard to access and at times absent. As this is not true for the non-indigenous, the following analysis separates urban from rural areas when analyzing ethnic differences in economic activity.

**Table 2: Economically Active Population by Ethnicity**

	Indigenous		Non-indigenous		All	
	Count	%	Count	%	Count	%
Rural	960,420	93.5%	3,125,987	48.4%	4,086,408	54.6%
Urban	67,183	6.5%	3,326,304	51.6%	3,393,487	45.4%
Total	1,027,603	100.0%	6,452,291	100.0%	7,479,895	100.0%
Share of total labor force		13.7%		86.3%		100.0%

Note: Includes individuals above 18 years of age and economically active  
Source: Author's calculations, ECOVI 1999

Table 3 shows that indigenous are more likely to engage in unskilled labor, to work in agriculture and to work without payment, than are the non-indigenous irrespective of whether they live in urban or rural areas. In general then, we see that indigenous tend to engage in lower-productivity, low-pay activities. While 63 percent of the indigenous in rural areas work in agriculture, only 52 percent of non-indigenous do. In urban areas, 71 percent of indigenous work as unskilled laborers, while the same is true for only 57 percent of urban non-indigenous. Similarly, 58 percent of indigenous engage in waged labor, compared to 70 percent of non-indigenous. The biggest ethnic difference is found in that while 87 percent of indigenous in rural areas report having a second occupation or activity, only 22 percent of rural non-indigenous do. In urban areas the opposite is true in that a higher share of non-indigenous (17 percent) work two jobs while only 5 percent of indigenous do. This indicates a higher need to supplement the primary activity among rural indigenous – not a surprising finding given that their primary activity tends to be un-waged agricultural work. It might also indicate lower productivity of the types of agricultural activities indigenous engage in and or differences in productive capital (land quality and human capital) which also affects agricultural returns. Poverty in the rural off-farm sector is significantly lower than in the on-farm sector in Ecuador (World Bank 2004).

**Table 3: Composition of Economically Active Population by Ethnicity**

	Indigenous		Non-indigenous	
	Rural	Urban	Rural	Urban
Skilled	24.5%	29.2%	35.1%	43.4%
Unskilled	75.5%	70.8%	64.9%	56.6%
Agriculture	62.6%	15.0%	51.8%	10.1%
Non-agriculture	37.4%	85.0%	48.2%	89.9%
Waged	35.0%	57.7%	42.5%	70.1%
Non-waged	65.0%	42.3%	57.5%	29.9%
One activity	13.4%	94.7%	78.5%	82.6%
Two activities	86.6%	5.3%	21.5%	17.4%
Informal	81.0%	72.0%	64.1%	48.8%
Formal	19.0%	28.0%	35.9%	51.2%

Note: Includes individuals above 18 years of age and economically active  
Source: Author's calculations, ECOVI 1999

The table above also shows that informality is higher among the indigenous when compared to the non-indigenous. In rural areas, 81 percent of indigenous work informally compared to 64 percent of non-indigenous. In urban areas, informality is also more widespread among the indigenous than the non-indigenous – 72 percent and 49 percent respectively. This finding is in line with studies that show that poor households are more likely to be headed by an informally employed individual (World Bank 2004). This and other studies (ILO 2005) also note that informality grew due to the crisis in the late 1990s - a trend has not been completely reversed since - and that labor incomes are 30 percent less in the informal sector when compared to the formal sector after controlling for demographic differences and employment composition.

In terms of unskilled employment, we find that indigenous and non-indigenous have similar participation rates in waged employment when looking at rural and urban areas separately (Table 4). However, indigenous are more likely to work in the agricultural sector when engaging in waged labor than are the non-indigenous. In rural areas, 16 percent of the indigenous work force work in waged agriculture compared 12 percent of non-indigenous. Furthermore, indigenous are more likely to be full-time employed in waged agricultural labor (10 percent) than non-indigenous (2 percent) who are more likely to take on seasonal farm work. Looking at the non-agricultural sector, the indigenous are less likely to participate in waged unskilled labor in rural areas while participation rates in urban areas do not change much with ethnicity. However, the indigenous are more likely to engage in non-waged labor in urban areas (37 percent) when compared to non-indigenous (25 percent). Earlier studies point to the existence of labor market discrimination, in particular against indigenous women migrating to urban areas, which may in part explain for this difference (Garcia and Winkler 2001). For both groups, informal commerce dominates non-waged activities in urban areas.

**Table 4: Participation in Unskilled Employment by Ethnicity**

	Indigenous				Non-indigenous			
	Rural		Urban		Rural		Urban	
	% of indigenous low skill work force	% of rural indigenous work force	% of indigenous low skill work force	% of urban indigenous work force	% of non-indigenous low skill work force	% of rural non-indigenous work force	% of non-indigenous low skill work force	% of urban non-indigenous work force
<b>Waged Employment</b>	<b>25.6%</b>	<b>19.3%</b>	<b>45.1%</b>	<b>31.9%</b>	<b>30.1%</b>	<b>19.6%</b>	<b>50.0%</b>	<b>28.3%</b>
<b>Agriculture (farm worker)</b>	<b>21.9%</b>	<b>16.5%</b>	<b>9.5%</b>	<b>6.7%</b>	<b>18.4%</b>	<b>12.0%</b>	<b>7.5%</b>	<b>4.3%</b>
Farm worker (full-time)	12.7%	9.6%	4.9%	3.5%	3.5%	2.2%	5.0%	2.8%
Farm worker (seasonal)	9.2%	6.9%	4.6%	3.2%	15.0%	9.7%	2.5%	1.4%
<b>Non-agriculture</b>	<b>3.7%</b>	<b>2.8%</b>	<b>35.8%</b>	<b>25.2%</b>	<b>11.7%</b>	<b>7.6%</b>	<b>42.5%</b>	<b>24.0%</b>
Construction	1.6%	1.2%	7.0%	4.9%	2.9%	1.9%	15.0%	8.5%
Formal Commerce (worker)	2.1%	1.6%	28.6%	20.2%	8.8%	5.7%	27.5%	15.6%
<b>Non-waged Employment</b>	<b>74.4%</b>	<b>56.2%</b>	<b>54.9%</b>	<b>38.9%</b>	<b>69.9%</b>	<b>45.3%</b>	<b>50.0%</b>	<b>28.3%</b>
<b>Agriculture</b>	<b>55.6%</b>	<b>42.0%</b>	<b>7.7%</b>	<b>5.5%</b>	<b>48.4%</b>	<b>31.4%</b>	<b>8.2%</b>	<b>4.7%</b>
Subsistence farming	10.5%	8.0%	0.3%	0.2%	7.0%	4.6%	0.9%	0.5%
Unpaid agricultural work	35.9%	27.1%	2.8%	2.0%	26.3%	17.1%	4.8%	2.7%
<b>Non-agriculture</b>	<b>28.0%</b>	<b>21.2%</b>	<b>51.8%</b>	<b>36.7%</b>	<b>36.5%</b>	<b>23.7%</b>	<b>44.3%</b>	<b>25.1%</b>
Informal Commerce	1.9%	1.5%	35.6%	25.2%	5.6%	3.6%	32.7%	18.5%
Un-paid work in family business	24.5%	18.5%	3.0%	2.1%	27.8%	18.0%	1.9%	1.1%
Un-paid work in non-family business	0.8%	0.6%	1.7%	1.2%	1.4%	0.9%	0.4%	0.2%
Domestic services	0.8%	0.6%	11.5%	8.1%	1.7%	1.1%	9.3%	5.3%

Note: Includes individuals above 18 years of age and economically active  
Source: Authors calculations, ECOVI 1999

If we look at skilled employment, participation is waged labor higher for non-indigenous than indigenous (table 5). Of the rural indigenous work force, 16 percent engage in waged high skilled labor compared to 23 percent of non-indigenous. The difference is higher still in urban areas, where 26 percent of the indigenous work force engage in skilled waged labor, compared to 42 percent of non-indigenous. Furthermore, 20 percent of the urban indigenous engage in high-skilled non-agricultural work compared to 39 percent of urban non-indigenous.

**Table 5: Participation in Skilled Employment by Ethnicity**

	Indigenous				Non-indigenous			
	Rural		Urban		Rural		Urban	
	% of indigenous high skill work force	% of rural indigenous work force	% of indigenous high skill work force	% of urban indigenous work force	% of non-indigenous high skill work force	% of rural non-indigenous work force	% of non-indigenous high skill work force	% of urban non-indigenous work force
<b>Waged Employment</b>	<b>64.2%</b>	<b>15.7%</b>	<b>88.3%</b>	<b>25.8%</b>	<b>65.3%</b>	<b>22.9%</b>	<b>96.3%</b>	<b>41.8%</b>
<b>Agriculture (skilled work)</b>	<b>44.9%</b>	<b>11.0%</b>	<b>20.8%</b>	<b>6.1%</b>	<b>41.6%</b>	<b>14.6%</b>	<b>6.0%</b>	<b>2.6%</b>
<b>Non-agriculture</b>	<b>19.2%</b>	<b>4.7%</b>	<b>67.5%</b>	<b>19.7%</b>	<b>23.7%</b>	<b>8.3%</b>	<b>90.3%</b>	<b>39.2%</b>
Worker or employer (industrial)	15.9%	3.9%	40.0%	11.7%	15.9%	5.6%	42.9%	18.6%
Office Workers	2.5%	0.6%	16.5%	4.8%	6.5%	2.3%	37.3%	16.2%
Clerks	0.8%	0.2%	11.0%	3.2%	1.3%	0.4%	10.1%	4.4%
<b>Non-waged Employment</b>	<b>35.8%</b>	<b>8.8%</b>	<b>11.7%</b>	<b>3.4%</b>	<b>34.7%</b>	<b>12.2%</b>	<b>3.7%</b>	<b>1.6%</b>
<b>Non-agriculture</b>	<b>35.8%</b>	<b>8.8%</b>	<b>11.7%</b>	<b>3.4%</b>	<b>34.7%</b>	<b>12.2%</b>	<b>3.7%</b>	<b>1.6%</b>
Owner	2.3%	0.6%	2.0%	0.6%	10.1%	3.5%	1.6%	0.7%
Self-employed	33.5%	8.2%	9.7%	2.8%	24.6%	8.6%	2.1%	0.9%

Note: Includes individuals above 18 years of age and economically active  
Source: Author's calculations, ECOVI 1999

## Determinants of Employment

The above section showed how the indigenous have a higher tendency to work in what is intuitively less remunerative jobs, i.e. in the informal and agricultural sectors, and as unskilled

laborers. This section examines the determinants of employment outcomes across ethnic groups and geographic areas in order to suggest some reasons for this.

Table 6 reports findings from an analysis using a Multinomial-Logit model. The dependent variable is a categorical variable of different sectors of activity constructed with manufacturing as the baseline comparison group. Dummies for different ethnic groups were included, leaving Mestizo (mixed) as the comparison group. The findings suggests that, after controlling for socio-demographic characteristics, indigenous are more likely to be engaged in occupations such as small unskilled agriculture and subsistence farming than any other ethnic groups. Other ethnic groups are less likely to work in agricultural activities and have a higher propensity to work in manufacturing and/or construction, e.g. categories more prominent in urban areas. As the majority of indigenous live in rural areas it is expected that they depend more on agricultural activities. However Table 6 also suggests that indigenous are more likely to work in agricultural activities where returns are intuitively lower, such as unskilled labor on small farms and as subsistence farmers.

**Table 6: Determinants of Occupation Outcomes**

	<i>Commerce (Informal- Unskilled)</i>	<i>Small Unskilled Agriculture</i>	<i>Formal Skilled Agriculture</i>	<i>Subsistence Agriculture</i>	<i>Construction</i>
<i>Characteristics</i>					
<b>Comparison Group Manufacturing</b>					
Head Female (=1 if female)	-1.609 ***	-1.166 ***	0.426 ***	-0.370 *	-2.734 ***
Number of Rooms	-0.039 *	-0.068 **	-0.054 **	-0.130 **	-0.033
Electrification	0.111	-1.587 ***	-1.713 ***	-2.067 ***	0.304
Age	-0.053 *	-0.025	0.015	-0.085	0.028
AgeSquared	0.000	0.000	0.000	0.001	-0.001
Main Source of Labor (=1)	0.372 ***	0.341 ***	-0.161	-1.024 ***	-0.087
Head Years of Education	-0.119 ***	-0.331 ***	-0.235 ***	-0.253 ***	-0.125 ***
Bono Solidario	0.421 ***	0.160	0.172	0.168	-1.026
Previous generation Indigenous	-0.107 *	0.305 *	0.439 ***	0.769 **	0.496 ***
Public Insurance <sup>1</sup>	0.233 **	0.207 **	-0.057	-0.128	-0.836 **
Remittances reception <sup>2</sup>	0.078	-0.870 **	-0.214	-1.192	-1.150 **
Rural Strata	-0.291 *	0.001	0.326 *	-0.944	0.582 **
<i>Ethnicity:</i>					
<i>(Comparison Group Mestizo)</i>					
White	0.098	-0.079	-0.163	-0.219	-0.207
<b>Indigenous<sup>3</sup></b>	<b>0.102 *</b>	<b>0.503 ***</b>	<b>0.538 ***</b>	<b>0.424 *</b>	<b>-0.393 **</b>
Afro-Ecuadorians					
Black	0.815 ***	-0.460	-0.457	0.724 **	1.057 *
Mixed	0.253	-0.163	-0.290	-1.370 *	0.499 **
Constant	2.476 ***	4.880 ***	2.368 ***	4.398 ***	-3.272 ***
Controls for Province Fixed Effects <sup>4</sup>	<b>YES</b>	<b>YES</b>	<b>YES</b>	<b>YES</b>	<b>YES</b>
Number of obs	7384				
LR chi2(170)	4603.82				
Log of Likelihood	-9766.2084				
Prob > LR	0.000				
Pseudo R	0.1907				

\*Significant at 10%, \*\* significant at 5%, \*\*\*significant at 1%

<sup>1</sup> Public insurance includes IESSS and ISSPOL, and Seguro Campesino

<sup>2</sup> Remittances includes any monetary or non-monetary transfer from relatives in the last month

<sup>3</sup> Indigenous are defined as those who reported speaking an indigenous language in the household

<sup>4</sup> Dummies for 19 out of the 20 provinces in the sample were included

Source: Own calculations based on ENEDSUR, 2001

Interestingly, indigenous have a higher propensity to work in informal commerce than do the mestizo majority and other ethnicities. This might be a reflection of indigenous migration to urban areas resulting in a change in traditional occupation patterns. We also see that the previous generation of indigenous is less likely to work in informal commerce which indicates a shift towards more urban-like economic activities. The opposite was found for construction where

previous generations of indigenous were more likely to participate and today's generation is less likely to participate than the mestizo (and in comparison to participation in manufacturing).

The above table also shows that as years of education increases, participation in the manufacturing sector is more likely than participation in agriculture, informal commerce and construction. Table 7 shows years of schooling by type and sector of employment. Overall, indigenous have the least years of education, irrespective of occupation and geographical area when compared to both the white/mestizo and Afro-Ecuadorian populations. In rural areas, the biggest gap between indigenous and non-indigenous is found in unskilled agricultural work where indigenous have on average 3 years of education while non-indigenous have nearly 6 years. Overall, the lowest education level is found among subsistence farmers. In urban areas, the largest gap between indigenous and white/mestizo is in informal commerce where the indigenous have on average 5.7 years of education compared to 7.9 for white/mestizo.

**Table 7: Years of Schooling by Type/Sector of Employment**

	Commerce Formal	Commercial Informal	Small Unskilled Agriculture	Formal Skilled Agriculture	Subsistence Agriculture	Construction	Manufacturing
<b>White/Mestizo</b>							
Rural	7.4	6.9	5.9	5.9	4.2	5.6	5.7
Urban	9.0	7.9	6.2	6.4	4.4	8.0	8.8
<b>Indigenous</b>							
Rural	4.2	3.7	3.0	3.4	2.6	3.6	5.2
Urban	7.1	5.7	4.6	5.2	3.9	6.0	7.4
<b>Afro-Ecuadorian</b>							
Rural	5.9	5.2	4.6	5.1	2.3	4.3	5.6
Urban	7.3	7.0	4.8	5.7	6.0	6.3	5.8
<b>Gap Indigenous to white/mestizo</b>							
Rural	0.57	0.54	0.51	0.57	0.63	0.64	0.91
Urban	0.79	0.72	0.74	0.82	0.90	0.75	0.84

Source: Authors calculations based on ENEDSUR, 2001

Tables 8 a, b and c show probit estimates of the probability of working in the formal and waged sectors, and as self-employed, respectively. As an individual's endowment of human capital increases (literacy rates and years of schooling) the probability of working in the formal sector and of working in the waged sector increases while the probability of being self-employed falls. One extra year of schooling however has a greater effect on the probability of formal and waged employment in rural areas than in urban ones. The association between years of schooling and formal, paid work is higher for indigenous in all cases except for the probability of waged employment in urban areas.

Being a beneficiary of the government's cash transfer program Bono Solidario has the opposite effect of human capital: the probability of being employed in waged work and working in the formal sectors falls while the probability of being self-employed increases. This was to be expected as the program is targeted at poorer households, i.e. those where labor incomes are lower and more volatile. As the number of jobs increases, the probability of paid and/or formal work also falls. Again this is to be expected as lower or less stable incomes in the self-employed/informal sector pushes individuals to look for a second or third job or activity. This effect is higher for urban indigenous which reflects both the higher propensities of indigenous being informally employed and the greater diversity of job opportunities.

**Table 8a: Probability of Working in the Formal Sector**

	Indigenous				Non-Indigenous			
	Rural		Urban		Rural		Urban	
	Coefficient	Z	Coefficient	Z	Coefficient	Z	Coefficient	Z
Sex	-0.184	-2.43	-0.246	-1.67	-0.473	-9.61	-0.419	-10.05
Number of Rooms	0.055	1.93	-0.001	-0.01	0.012	0.68	-0.008	-0.56
House equipment: Fridge	-0.120	-1.00	-0.572	-3.54	-0.112	-2.07	0.029	0.63
Age	0.009	4.48	0.002	0.51	0.006	4.68	0.006	5.87
Literacy Rate of Members	0.204	1.77	0.112	0.54	0.273	2.99	0.066	0.85
Years of schooling, Head of HH	0.092	3.89	0.081	1.99	0.083	5.60	0.055	4.2
Bono Solidario (Public Program)	-0.072	-0.6	-0.297	-1.61	-0.366	-5.11	-0.039	-0.57
Number of Jobs	-0.101	-1.04	-0.755	-4.92	-1.046	-23.23	-0.992	-29.54
No Electricity	-0.148	-1.57	0.072	0.39	-0.276	-4.13	-0.020	-0.32
_cons	0.290	1.12	2.340	5.11	1.832	10.32	2.021	13.15
Observations	1862		1047		6027		7690	
LR chi2(9)	51.59		58.75		886.86		1167.34	
Prob > chi2	0.000		0.000		0.000		0.000	
Pseudo R2	0.1315		0.1278		0.1977		0.192	

**Table 8b: Probability of Working in Waged Sector**

	Indigenous				Non-Indigenous			
	Rural		Urban		Rural		Urban	
	Coefficient	Z	Coefficient	Z	Coefficient	Z	Coefficient	Z
Sex	-0.70	-8.66	-0.76	-8.99	-0.88	-11.92	-0.92	-20.84
Number of rooms	0.03	0.95	0.02	0.46	-0.02	-0.89	-0.01	-0.53
House equipment: Fridge	0.32	2.93	0.26	2.16	0.18	2.38	0.10	1.99
Age	0.01	9.81	0.00	-0.44	-0.01	-4.88	-0.01	-4.34
Literacy rate of members	0.06	0.32	0.01	0.04	0.20	3.60	0.23	4.02
Years of schooling, Head of HH	0.09	4.19	0.04	1.21	0.05	3.00	0.10	9.26
Bono Solidario (Public Program)	0.09	0.67	-0.48	-4.52	-0.09	-1.71	-0.03	-1.00
Number of jobs	-0.74	-7.90	-0.68	-6.13	-0.57	-14.67	-0.53	-16.92
No electricity	0.05	0.18	-0.48	-2.02	-0.28	-3.12	-0.32	-3.26
_cons	-2.34	-6.03	-1.12	-3.91	-0.57	-3.04	-0.89	-6.39
Observations	1592		1000		5537		6988	
Wald chi2(9)	4684.37		7084.98		13438.37		2482.65	
Prob > chi2	0.000		0.000		0.000		0.000	
Pseudo R2	0.1443		0.1327		0.1023		0.1212	

**Table 8c: Probability of Working as Self-Employed**

	Indigenous				Non-Indigenous			
	Rural		Urban		Rural		Urban	
	Coefficient	Z	Coefficient	Z	Coefficient	Z	Coefficient	Z
Sex	0.700	8.18	0.765	7.91	0.954	14.97	0.974	18.14
Number of rooms	-0.040	-1.17	-0.024	-0.53	0.015	0.73	0.011	0.65
House equipment: Fridge	-0.259	-2.76	-0.198	-2.06	-0.152	-2.23	-0.086	-2.28
Age	-0.012	-9.59	0.000	0.16	0.005	4.91	0.003	2.67
Literacy rate of members	-0.093	-0.48	-0.004	-0.02	-0.236	-3.82	-0.226	-3.64
Years of schooling, Head of HH	-0.106	-4.95	-0.051	-1.48	-0.063	-3.91	-0.103	-10.29
Bono Solidario (Public Program)	0.005	0.06	0.548	4.64	0.197	3.37	0.085	1.84
Number of jobs	-0.671	-7.22	-0.305	-3.16	0.145	2.18	0.134	1.84
No electricity	-0.046	-0.21	0.480	2.11	0.299	3.29	0.276	3.23
_cons	2.491	6.26	0.795	1.96	0.090	0.42	0.399	2.31
Observations	1841		1036		5806		7388	
Wald chi2(9)	1038.79		9905.81		3044.46		5959.26	
Prob > chi2	0		0		0		0	
Pseudo R2	0.1418		0.1247		0.1083		0.1174	

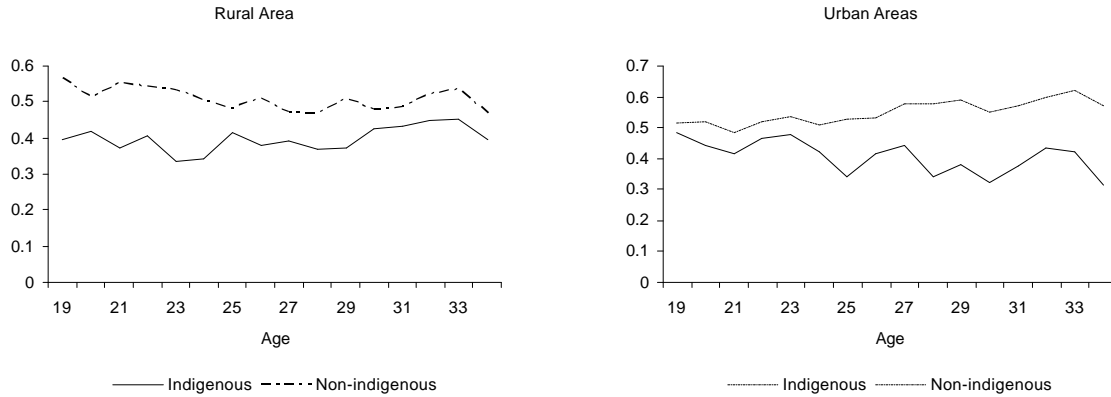
Note that results are statistically significant at 10 percent when the z-score between 1.64 and 1.94, at 5 percent when the z-score is between 1.95 and 2.57 and at 1 percent when the z score is larger then or equal to 2.58

Source: Own calculations based on ENEDSUR, 2001

Predicted probabilities of different employment outcomes are estimated from the above probit models and reported by age (18-35) in figures 2a and b which show probabilities for rural and urban populations respectively. In rural areas we see that the indigenous start out with a considerably lower probability of waged employment at age 18 (39 percent) compared to non-indigenous (56 percent). At age 35, the likelihood of non-indigenous to work in waged labor falls to 47 percent while indigenous remain at around 40 percent. In urban areas, indigenous and non-indigenous both have about a 50 percent probability of waged employment at age 18, yet by the

age of 35, the probability rises to 57 percent for non-indigenous and falls to 31 percent for indigenous.

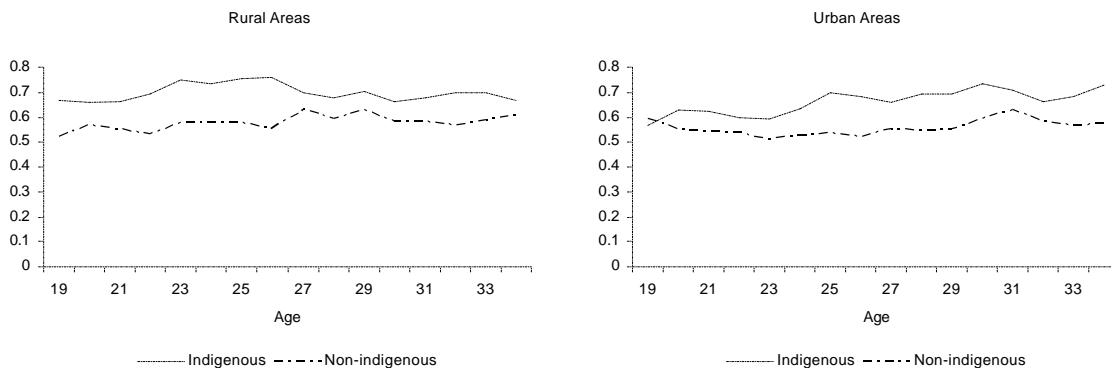
**Figure 2a and b: Probability of Participating in Waged Employment, Rural and Urban**



Source: Own calculations from above tables

Predicted probabilities of being self-employed are shown in a similar way in figures 3a and b. In rural areas, indigenous 18 year old have a higher probability of being self-employed (67 percent) compared to non-indigenous (52 percent), however the gap narrows as non-indigenous become more likely to be self-employed as they grow older: non-indigenous have a 60 percent probability of self-employment by age 35 compared to 67 percent for indigenous. In urban areas, the indigenous start out at age 18 with slightly lower probability of being self-employed, however by age 35 their probability raises to 72 percent compared to 57 percent for non-indigenous.

**Figure 3a and b: Probability of Being Self-employed, Rural and Urban**



Source: Own calculations from above tables

The importance of human capital for employment outcomes is illustrated in Table 9 which shows predicted probabilities from Table 8. According to these, rural indigenous a much lower likelihood of formal employment than non-indigenous. Even with more than 6 years of education, the likelihood of an indigenous getting a formal job is only 25 percent compared to 46 percent for non-indigenous. For urban areas, the indigenous/non-indigenous gap evens out with more education. At 6 years of schooling and above, the probability of an indigenous being formally

employed is 59 percent compared to 63 percent for non-indigenous. For waged employment it is interesting to see that even with only primary school or less, non-indigenous have a much higher probability of paid work than indigenous – 45 percent compared to 30 percent, in rural areas. Furthermore, the probability of being self-employed falls with education for both ethnic groups yet remains higher for the indigenous in both rural and urban areas. In rural areas, indigenous with no education have an 84 percent probability of being self-employed while non-indigenous with no education have only a 48 percent probability for self-employment. Equally, with more than 6 years of education in urban areas, the probability that a non-indigenous is self employed is 18 percent compared to 38 percent for an indigenous.

**Table 9: Education and Predicted Probabilities of Employment Outcomes**

	Indigenous		Non-Indigenous	
	Rural	Urban	Rural	Urban
Predicted probability of formal employment				
<i>Head without Education</i>	9.5%	17.4%	16.5%	27.0%
<i>Primary or Less</i>	16.4%	23.0%	32.8%	31.2%
<i>More than 6 years of Education</i>	25.4%	59.3%	46.4%	63.2%
Predicted probability of waged employment				
<i>Head without Education</i>	18.9%	23.7%	27.4%	34.2%
<i>Primary or Less</i>	29.7%	37.0%	45.0%	46.6%
<i>More than 6 years of Education</i>	74.4%	78.3%	84.3%	90.1%
Predicted probability of being self employed				
<i>Head without Education</i>	84.2%	79.2%	47.6%	52.3%
<i>Primary or Less</i>	43.6%	55.6%	25.9%	39.6%
<i>More than 6 years of Education</i>	26.2%	38.2%	13.9%	18.3%

Source: Author’s own calculations based on tables 8a, 8b and 8c

## Concentration and Diversification of Economic Activities

While the sectors and types of economic activity a person engage in matter for socioeconomic outcomes, so does the level of diversification of economic activity. As noted by Barrett and Reardon (2000), people choose to engage in more than just one activity as a means to mitigate risks or in response to a crisis or liquidity constraints and diversified as opposed to specialized (concentrated) economic activity is the norm. Economies of scope might also be achieved through diversification of activities, i.e. by adding the processing of crops to traditional farm activity. A review of employment and income patterns among rural households in Latin America found that diversification tends to increase with income and concluded that “*Those households poor in land and education, often located far from roads and electricity hookups, are forced to specialize, often in low-productivity farming and low-pay farm wage labor [...] When the lower income strata undertake multiactivity it is to survive, since they cannot prosper from these low-productivity dead end jobs*” (Reardon et al. 2001, pp 401). In order to look at the diversification of economic opportunity across ethnic groups and geographic areas, we use the Herfindahl index - a measure that summarizes the concentration/ diversification of economic activity in a single number ranging from zero to one. The index is increasing in concentration such that an index value of one equals perfect concentration (specialization).

Table 10 looks at the concentration of economic activity for categories of unskilled employment and reports Herfindahl indices (HI) separately for areas with high and low density of indigenous population. High density is defined as parroquias with more than 50 percent indigenous. The HIs show that across all areas and both ethnic groups, economic activity is most concentrated for those engaged in informal commerce. Indigenous in high-density areas engaged in non-waged

agricultural work also shows a high concentration of activity, while waged agricultural employment is associated with a more diversified economic activity. Overall, the activities of indigenous engaged in any form of agricultural activity are more concentrated than similarly engaged non-indigenous.

**Table 10: Herfindahl Indices by Categories of Unskilled Employment**

	Indigenous		Non-indigenous		Gap indigenous/ non-indigenous <sup>3</sup>	
	High Density	Low Density	High Density	Low Density	High Density	Low Density
<b>WAGED EMPLOYMENT</b>						
<b>Agriculture</b>						
Farm worker (full-time)	31.4	47.3	39.7	45.4	0.8	1.0
Farm worker <sup>1</sup> (seasonal)	40.3	23.8	36.7	15.0	1.1	1.6
<b>Non-agriculture</b>						
Construction	31.3	37.0	37.7	29.8	0.8	1.2
Formal commerce (worker)	26.8	45.1	39.0	61.9	0.7	0.7
<b>NON-WAGED EMPLOYMENT</b>						
<b>Agriculture</b>						
Subsistence farming	53.1	32.5	28.8	30.5	1.8	1.1
Unpaid agricultural work <sup>2</sup>	61.0	40.3	35.6	34.0	1.7	1.2
<b>Non-agriculture</b>						
Informal Commerce	77.3	49.1	59.2	47.4	1.3	1.0
Family Helper	49.4	10.1	23.7	11.8	2.1	0.9
Non-Family Helper	43.6	37.9	26.5	18.4	1.6	2.1
Domestic Labor	21.1	41.3	40.2	50.2	0.5	0.8

Note: Low density < 50 percent indigenous at the *parroquia* level, high density > 50 percent. For urban areas where the highest concentration of indigenous does not surpass 50 percent, the high densities correspond to the areas above the median urban indigenous density.

<sup>1</sup>Seasonal farm workers (*jornaleros*) are classified as unpaid in the ECOVI, however since they receive a daily wage when working we include here in waged employment

<sup>2</sup>Unpaid agricultural work includes unpaid work on family farm, unpaid work provided as part of a land rental agreement and work paid in-kind

<sup>3</sup>If >1, indigenous have more concentrated activities; if <1, indigenous have more diversified activity

Source: Own calculations based on ECOVI 1999

Table 11 shows how concentrated or diversified activities are by categories of skilled employment. Ethnic differences follow more of a pattern here than in the above analysis of unskilled occupations: indigenous with skilled employment have on average a much higher diversification of activities than non-indigenous. The most striking difference between indigenous and non-indigenous is the very concentrated activities of non-indigenous engaged in non-agricultural waged employment, and the highly diversified activities of indigenous employed in the same. Contrary to this, the activities of self-employed indigenous in non-agricultural sectors are more concentrated than non-indigenous self-employed.

**Table 11: Herfindahl Indices by Categories of Skilled Employment**

	Indigenous		Non-indigenous		Gap indigenous/ non-indigenous <sup>1</sup>	
	High Density	Low Density	High Density	Low Density	High Density	Low Density
<b>WAGED EMPLOYMENT</b>						
<b>Agriculture</b>						
Formal Skilled agricultural worker	26.3	28.5	45.1	34.2	0.6	0.8
<b>Non-agriculture</b>						
Worker or employer (industrial)	14.3	41.8	36.7	67.9	0.4	0.6
Office Workers	9.2	23.2	48.8	71.2	0.2	0.3
Clerks	24.6	62.8	40.0	70.9	0.6	0.9
<b>NON-WAGED EMPLOYMENT</b>						
<b>Non-agriculture</b>						
Owner	16.8	19.9	37.7	34.1	0.4	0.6
Self-employed	50.3	31.5	26.1	55.1	1.9	0.6

Note: Low density < 50 percent indigenous at the *parroquia* level, high density > 50 percent. For urban areas where the highest concentration of indigenous does not surpass 50 percent, the high densities correspond to the areas above the median urban indigenous density.

<sup>3</sup>If >1, indigenous have more concentrated activities; if <1, indigenous have more diversified activity

Source: Own calculations based on ECOVI 1999

In terms of geographic differences, table 12 shows that diversification of economic activities is generally lower in rural areas than urban areas. This runs contrary to general theory and empirical evidence that shows how rural households in Latin America tend to have more diversified employment and income patterns (Barrett and Reardon 2000, Reardon et al. 2001). This tendency of rural households to diversify is linked to higher risk of agricultural economic activity, and higher transactions costs which push households towards self-provision of certain goods and services. Also, if landholdings are too small, diversification might be an outcome of population pressures, i.e. the inability to utilize all of the household's labor supply.

Table 12 also shows the concentration and diversification of economic activity by geographic areas with a high and low density of indigenous population. In rural areas with a high density of indigenous, the economic activity is more concentrated among the indigenous (34.5) than the non-indigenous (29.4) which reflects the dominance of agricultural incomes. Incomes of the indigenous are however even more concentrated in rural areas with a low density of indigenous population and the gap between indigenous and non-indigenous is greater. The most striking difference is however found in urban areas with a high density of indigenous where the incomes of the indigenous are the least diversified (45.5) while the incomes of the non-indigenous are very much so (20.6). Diversification is the highest for both ethnic groups in urban areas with few indigenous.

**Table 12: Herfindahl Indices by Geographical Area**

	Rural				Urban			
	Herfindahl	Standard Error	Adjusted Confidence Interval		Herfindahl	Standard Error	Adjusted Confidence Interval	
			95%				95%	
High Indigenous Density	<b>30.7</b>	0.6	28.9	34.5	<b>22.3</b>	0.3	21.7	22.9
Non-Indigenous	<b>29.4</b>	0.5	28.4	30.5	<b>20.6</b>	0.2	18.4	24.9
Indigenous	<b>34.5</b>	0.9	32.7	36.3	<b>45.5</b>	3.8	42.5	53.6
Low Indigenous Density	<b>29.8</b>	0.6	27.2	30.7	<b>16.3</b>	0.7	13.0	18.8
Non-Indigenous	<b>28.0</b>	0.4	27.2	28.7	<b>13.8</b>	0.5	11.7	15.0
Indigenous	<b>38.6</b>	1.8	25.0	42.1	<b>20.1</b>	2.2	15.8	24.4

Note: Low density < 50 percent indigenous at the *parroquia* level, high density > 50 percent. For urban areas where the highest concentration of indigenous does not surpass 50 percent, the high densities correspond to the areas above the median urban indigenous density.

Standard errors and confidence intervals calculated using expansion weights

Source: Own calculations based on ECOVI 1999

## Entrepreneurial Activities

The earlier review of sectors of economic activity and occupations showed that self employment is more widespread among the indigenous in both rural and urban areas. Self-employment or entrepreneurial activities builds on asset ownership (land, house or machinery) and access to credit. In other words, households with entrepreneurial activities related to agriculture would be likely to own a piece of land while households involved in non-agricultural activities would use their property to host the micro-businesses. Human capital – formal education, skills and experience - can also be seen as impacting the returns to entrepreneurial activity via its impact on returns to assets or an increased ability of the more educated to access credit.

Table 13 shows characteristics of indigenous and non-indigenous who report owning or being part of the running of a business.<sup>3</sup> It is important to note that agricultural self-employment in rural areas also refer to subsistence farming, which differ substantially from other, more purely entrepreneurial activities in both rural and urban areas. In terms of human capital endowments, the self-employed indigenous have consistently lower human capital endowments than their non-indigenous peers. The biggest gap is found in rural agricultural self-employment where non-indigenous have nearly three times as many years of education as the indigenous, however the gap is large across all typed of self-employment. For instance, urban indigenous engaged in non-agricultural entrepreneurial activities have only 2.7 years of schooling compared to 5.5 years of schooling for non-indigenous peers. The average number of family members involved in entrepreneurial activities is higher among the indigenous, reflecting in part the on average more numerous indigenous family. The use of machinery –trucks and equipment– is more widespread among non-indigenous, in particular in agricultural self-employment be it in rural and urban areas. For instance, in rural areas 27 percent of non-indigenous self employed uses machinery compared to only 19 percent of indigenous. Indigenous self-employed tend to, however, rely

<sup>3</sup> The LSMS 1999 has a separate section of Agricultural and Non-agricultural businesses. For the people that responded to be self-employed or owner of business, this section was applied to them. The section covers multifaceted areas including business activity, operation and available resources to operate, as well as access to public programs, credit and asset accumulation.

more on the use of animals. Furthermore, the value per kilo produced is on average higher for non-indigenous than indigenous, in particular for agricultural activities in urban areas.

In terms of food expenditure, the greatest ethnic gap is found between indigenous and non-indigenous engaged in non-agricultural self employment in rural areas. Across all sectors and areas, indigenous spend less on food than do the non-indigenous. Similarly, poverty rates are also higher for the indigenous regardless of sectors and regions, while poverty is more widespread in rural areas for both ethnic groups. This simply mirrors overall poverty trends. Interestingly, in rural areas the poverty rate among self-employed indigenous engaged in agricultural activities is 6 percent higher than among indigenous engaged in non-agricultural activities. The opposite is true for self-employed non-indigenous in rural areas: poverty is 2 percent higher among those engaging in non-agricultural activities. Similar differences are found in the urban sector.

**Table 13: Endowments and Other Characteristics of Self-employed**

	URBAN			RURAL		
	Agricultural			Agricultural		
	Indigenous A	Non-indigenous B	Non-indigenous/ indigenous gap (B/A)	Indigenous A	Non-indigenous B	Non-indigenous/ indigenous gap (B/A)
Years of education, head of HH	3.2	5.7	<b>1.8</b>	1.3	3.7	<b>2.9</b>
Number of businesses	1.5	1.7	<b>1.1</b>	1.3	1.7	<b>1.3</b>
Average number of family workers	1.9	1.1	<b>0.6</b>	3.0	1.2	<b>0.4</b>
Proportion that uses machinery <sup>1</sup>	0.05	0.23	<b>4.60</b>	0.19	0.27	<b>1.38</b>
Proportion that uses animals <sup>2</sup>	0.19	0.16	<b>0.85</b>	0.19	0.13	<b>0.66</b>
Average surface (land/business) <sup>3</sup>	1.1	8.4	<b>7.5</b>	1.2	4.4	<b>3.6</b>
Value of production per kilo <sup>4</sup>	0.99	6.24	<b>6.33</b>	4.85	7.75	<b>1.60</b>
Per capita self-consumption <sup>5</sup>	1.98	5.09	<b>2.56</b>	4.45	6.58	<b>1.48</b>
Per capita food expenditure	22.31	30.42	<b>1.36</b>	13.41	23.74	<b>1.77</b>
Per capita non-food expenditure	57.18	78.02	<b>1.36</b>	12.65	22.84	<b>1.81</b>
Proportion in poverty	0.69	0.44	<b>0.64</b>	0.95	0.70	<b>0.74</b>
	Non-agricultural			Non-agricultural		
	Indigenous A	Non-indigenous B	Non-indigenous/ indigenous gap (B/A)	Indigenous A	Non-indigenous B	Non-indigenous/ indigenous gap (B/A)
Years of education, head of HH	2.6	5.5	<b>2.1</b>	2.4	3.3	<b>1.4</b>
Number of businesses	1.1	1.6	<b>1.4</b>	1.3	1.7	<b>1.3</b>
Average number of family workers	1.9	1.3	<b>0.7</b>	3.0	1.1	<b>0.4</b>
Used machinery (%)	0.14	0.16	<b>1.20</b>	0.22	0.30	<b>1.36</b>
Used animals (%)	0.15	0.09	<b>0.58</b>	0.28	0.18	<b>0.65</b>
Average surface (land/business)	0.67	7.39	<b>11.02</b>	0.89	3.57	<b>4.03</b>
Value of production per kilo	0.18	0.43	<b>2.39</b>	2.43	2.88	<b>1.19</b>
Per capita self-consumption	3.56	4.66	<b>1.31</b>	3.49	6.27	<b>1.79</b>
Per capita food expenditure	24.01	30.05	<b>1.25</b>	15.33	27.91	<b>1.82</b>
Per capita non-food expenditure	43.51	64.74	<b>1.49</b>	18.71	34.58	<b>1.85</b>
Proportion in poverty	0.67	0.49	<b>0.74</b>	0.89	0.72	<b>0.80</b>

<sup>1</sup>Machinery includes all machinery used in business operations such as trucks and equipment

<sup>2</sup>Includes all animals used in production

<sup>3</sup>In total squared acres

<sup>4</sup>Value measured in USD deflated 1999

<sup>5</sup>Includes the value of non-purchased or donated food, and non-food products to the household. Figures in monthly per capita USD, deflated 1999.

Source: Own calculations based on ECOVI 1999

Access to credit is also fundamental in many entrepreneurial activities. Table 14 shows the perceptions among indigenous and non-indigenous business owners about the availability of credit. In both sectors, it is primarily the lack of interest and high interest rates that prevents individuals from seeking business credit. In rural areas, more indigenous business owners are deterred from seeking a loan due to high interest rates than non-indigenous - 36 percent and 23 percent respectively - while lack of interest was more commonly listed as a reason not to apply for credit among the non-indigenous. In urban areas, lack of interest is more widespread among

the indigenous, while there is little difference in the number of respondents that felt interest rates were preventively high.

**Table 14: Qualitative factors affecting business credit**

	Rural		Urban	
	Indigenous	Non-indigenous	Indigenous	Non-indigenous
<i>Reasons for not applying for business credit (%)</i>				
Not Interested	49.2	57.3	63.0	59.3
High Interest rate	35.5	24.5	22.5	24.4
Difficult Bureaucracy	1.1	4.7	4.2	3.8
Does not know where to ask	4.2	6.0	0.1	2.5
Does not own property to ask for credit	3.3	3.3	6.9	3.9
Other	6.9	4.2	3.2	6.2

Source: Author's estimates, ECOVI 1999

**Table 14 shows some main characteristics of rural agricultural household businesses. We see again that education levels are higher among non-indigenous households when compared to indigenous. In terms of access to credit the ethnic differences are also stark. Only between 2 and 4 percent of small to medium indigenous businesses have access to formal credit, while credit seems to be less linked to size for non-indigenous businesses where between 9 to 15 percent has access to credit, irrespective size. Use of informal credit is also a lot more widespread among non-indigenous when compared to indigenous: while 17 and 26 percent of small and very small indigenous businesses depend on informal credit, about 60 percent of small and very small non-indigenous businesses do. For all types of businesses except medium sized ones, interest rates are higher for the indigenous. These differences have serious implications for the returns to entrepreneurial activities: the World Bank (2004) found that access to credit is the single most important policy intervention to raise productivity among small-scale, poor farmers.**

Table 15 also point to other key differences between agricultural entrepreneurial activities among the indigenous and non-indigenous. The use of animals to harvest is more prevalent among indigenous than non-indigenous while access to a water pump is higher among non-indigenous, indicating differences in access to equipment, machinery and other services that affect productivity. Indicators of farm productivity seem to confirm this. Monthly harvests are nearly twice as large among non-indigenous very small businesses and nearly three times as large for small businesses. Furthermore, the value of per kilo of production is higher for non-indigenous than indigenous for all types of businesses except the medium sized. For very small businesses it is nearly three times as high, for small businesses it is one and a half times as high.

**Table 15: Main Characteristics of Rural Agricultural Household Businesses**

	Very Small	Small	Medium	Large	Very Large	Total
<b>Indigenous</b>						
Number of households (HH)	41,964	34,448	35,485	21,258	14,100	147,255
Years of education, head of HH	2.5	2.8	3.2	3.2	3.4	2.9
<i>Credit</i>						
HHs with formal credit	2.3%	3.6%	2.7%	8.7%	17.7%	6.0%
HHs that rely informal credit	16.8%	25.5%	73.7%	23.5%	10.3%	29.9%
Average interest rate of rural credit <sup>1</sup>	23.3%	43.0%	6.1%	15.0%	34.6%	22.6%
<i>Other complements</i>						
HHs that used animals to harvest	52.1%	23.1%	23.3%	57.9%	55.2%	40.4%
HHs with waterpump	1.0%	1.6%	2.1%	2.3%	4.1%	2.2%
Coefficient of variation in land surface ownership	1.879	2.488	1.184	1.843	1.023	1.683
<i>Farm productivity</i>						
Monthly agricultural harvest in kilo per HH	277	221	429	656	277	409
Agricultural yield for self-consumption <sup>2</sup>	20.1%	19.0%	9.3%	13.5%	47.7%	16.0%
Value of production per kilo <sup>3</sup>	23,611	40,685	43,915	63,383	73,963	46,595
<b>Non-indigenous</b>						
Number of households (HH)	128,142	112,586	111,810	130,285	119,337	602,160
Years of education, head of HH	4.4	4.9	4.9	4.6	5.3	4.8
<i>Credit</i>						
HHs with formal credit	14.1%	10.6%	9.3%	13.8%	14.7%	12.6%
HHs that rely informal credit	58.8%	58.3%	84.6%	78.0%	61.0%	67.3%
Average interest rate of rural credit	17.2%	25.5%	20.0%	8.8%	24.7%	18.4%
<i>Other Complements</i>						
HHs that used animals to harvest	18.3%	13.3%	8.7%	10.2%	8.9%	12.0%
Proportion of HHs with waterpump	7.6%	6.4%	2.4%	4.7%	9.4%	6.2%
Coefficient of variation in land surface ownership	1.794	2.272	1.235	1.784	0.636	1.544
<i>Farm productivity</i>						
Monthly agricultural harvest in kilo per HH	503	618	527	490	786	582
Agricultural yield for self-consumption	14.3%	19.0%	12.4%	40.6%	18.5%	20.8%
Value of production per kilo	69,147	62,675	31,172	89,167	115,683	74,373

Source: ECOVI 1999

<sup>1</sup>The interest rate refers to formal credit

<sup>2</sup> Corresponds to the proportion between the value of the agricultural yield allocated to household consumption in relation to the total value of the agricultural yield produced by the household.

<sup>3</sup>Reported in 1999 Suces (local currency)

## Public Program Participation

From the beginning of the 1980s to the mid-1990s social spending dropped by 57 percent. From 1996 to 2000 social spending was reduced by 15 percent, from a per capita investment of US\$ 83 in the beginning of the 1980s to US\$ 48 in 2000 (UNICEF, 2001). According to the World Bank (2004), social expenditures in Ecuador tend to be pro-cyclical and have declined significantly over time, especially education and health expenditures. Overall, the report also found social spending to be progressive (i.e. benefits the poor relatively more than the rich), but that there is significant variation across different programs and services. The public programs/expenditures included in the following analysis of indigenous/non-indigenous differences in program participation are: (i) rural and urban social insurance; (ii) poverty targeted cash transfers; (iii) school breakfasts; and (iv) labor training. These four major programs cover the main social policy interventions developed by the Ecuadorian government.

Tables 16a and 16b show probit estimates of public program participation among indigenous and non-indigenous in rural and urban areas. We see that when households are headed by women the probability of receiving cash transfers rises, however this positive impact on participation is stronger among indigenous than non-indigenous. The probability of receiving training however falls when the households are headed by a woman and this effect is strongest for indigenous households in rural areas. For urban indigenous households the effect was small and positive but insignificant. The sex of the head of household does not affect participation in school breakfast in

rural areas, however in urban areas, the probability of participating increases for non-indigenous households headed by women and fall for indigenous households.

Education levels also affect participation in public programs. In both rural and urban areas, the probability of receiving a transfer falls with years of schooling of the head of household. In urban areas, the likelihood to be in school breakfast programs also falls with education, while the probability of receiving training increases with years of schooling for indigenous and falls for non-indigenous.

Business ownership is another factor that affects participation. In rural areas, owning an agricultural business increases the probability of having social insurance for non-indigenous and lowers it for indigenous. At the same time, owning an agricultural business increases the probability of receiving training among indigenous and lowers it for non-indigenous. In urban areas, owning a non-agricultural business lowers both the probability of being insured, and of receiving training, for both indigenous and non-indigenous.

The association between consumption estimates and program participation show that for both ethnicities and in both rural and urban areas, as consumption increases, the chance of participating in public programs falls. This is true for all programs except training, which is more probable as consumption, and by inference income, increases.

**Table 16a: Determinants of Public Program Participation, Indigenous**

	Indigenous Rural				Indigenous Urban			
	Insurance <sup>1</sup>	Public Transfer <sup>2</sup>	School breakfast	Training <sup>3</sup>	Insurance	Public Transfer	School Breakfast	Labor Training
Sex, head of HH (=1 female)	-0.184	0.032 **	0.037	-0.544 **	0.187	0.026 **	-0.524 **	0.004
Years of schooling, head of HH <sup>4</sup>	0.030	-0.110 ***	0.049 **	-0.036	-0.051 **	-0.092	-0.746 ***	0.099 **
Non-agricultural business (=1 if household owns)	0.244 *	0.116 **	-0.130 **	0.163	-0.527 *	-0.199 **	-0.258 ***	-0.532 *
Agricultural business (=1 if household owns)	-0.268 ***	-0.125	0.179 **	0.770 **	0.184	-0.280 *	0.247	-0.424
Log of monthly PC consumption	-0.241 ***	-0.075 **	-0.206	0.143 ***	-0.090 ***	-0.349 **	-0.909	0.641 **
Region	1.502 ***	0.176 **	0.061 *	0.620	-0.503	-0.451	0.761	0.005
Constant	0.395	-0.079	-0.206	-9.618 ***	-12.160 ***	3.537	-9.992	-9.402
F(K, K-k)	8.55	1.92	4.9	4.11	35.09	7.09	10.6	13.39
N sample	1,699	1,206	260	1,216	174	127	38	130
Prob> F	0.000	0.063	0.014	0.000	0.000	0.019	0.016	0.012

<sup>1</sup>Insurance includes IESSS and ISSPOL

<sup>2</sup>Public Transfers include the Program Bono Solidario and complementary local transfer programs

<sup>3</sup>Training reported in survey as part of a temporary training provided by government

<sup>4</sup>Control for squared function included

\*\*\* significance at 1% ; \*\* significance at 5% ; \* significance at 10%.

Source: Own calculations based on ECOVI 1999

**Table 16b: Determinants of Public Program Participation, Non-indigenous**

	Non-Indigenous Rural				Non-Indigenous Urban			
	Insurance <sup>1</sup>	Public Transfer <sup>2</sup>	School breakfast	Training <sup>3</sup>	Insurance	Public Transfer	School Breakfast	Labor Training
Sex, head of HH (=1 female)	-0.034	0.399 ***	-0.133	-0.278 **	-0.125 ***	0.372 ***	0.338 ***	-0.109 **
Years of schooling, head of HH <sup>4</sup>	0.051 ***	-0.042 **	0.007	-0.047 *	-0.116 ***	-0.024 *	-0.091 ***	-0.063 ***
Non-agricultural business (=1 if household owns)	0.1485 ***	-0.012	0.106	0.158 *	-0.354 ***	-0.024	0.069	-0.008
Agricultural business (=1 if household owns)	0.388 ***	-0.077	0.379 ***	-0.203 ***	0.005 ***	-0.167 *	0.093	-0.289 ***
Log of monthly PC consumption	-0.093 **	-0.193 ***	-0.219 ***	0.250 **	0.604 ***	-0.554 ***	-0.068	0.330 ***
Region	0.335 ***	0.209 ***	-0.455 **	-0.201 ***	-0.251 ***	0.108 **	0.167 **	-0.185 **
Constant	-0.398	1.269 **	2.358 **	-4.595 ***	-7.629 ***	5.746 ***	-0.870	-5.068 ***
F(K, K-k)	18.91	12.11	6.42	12.81	59.65	65.1	5.38	50.8
N sample	8,977	6,626	1,484	6,817	13,033	10,195	1,856	10,428
Prob> F	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

<sup>1</sup>Insurance includes IESSS and ISSPOL

<sup>2</sup>Public Transfers include the Program Bono Solidario and complementary local transfer programs

<sup>3</sup>Training reported in survey as part of a temporary training provided by government

<sup>4</sup>Control for squared function included

\*\*\* significance at 1% ; \*\* significance at 5% ; \* significance at 10%.

Source: Own calculations based on ECOVI 1999

This section showed differences in economic activity and participation in public programs between the indigenous and the rest of the population. While part of the ethnic differences in labor market and public program participation may be explained by discrimination and exclusion, other forces may be at play, including peer pressure or information about jobs and programs transmitted through social networks. The next section provides a formal analysis of the strength and type of social capital as well as the effects of social networks on labor market outcomes and school attendance.

### III - SOCIAL NETWORKS

Indigenous peoples or groups are often characterized as having stronger network ties, as well as a stronger sense of solidarity than non-indigenous populations (Reingold, 1999) and that these cultural and social aspects facilitate the effect of social networks on economic outcomes. This section looks at how social contexts and networks impact individual behavior with respect to tapping into economic resources and opportunities. Conventional wisdom and empirical evidence shows that the matching of individuals to jobs or other economic opportunity is widely influenced by networks of friends, family or acquaintances. Fazio (2006) analyses job search strategies in Guatemala and finds that 37 percent of workers used social contacts (friends and relatives) to find their current job, and while this did not differ much across ethnic groups, the indigenous tend to rely on relatives while non-indigenous take more use of friends, acquaintances and political contacts.

While social ties and social capital can be leveraged for material gain – i.e. by helping individuals access secure jobs or take advantage of other economic opportunities – it can also be a liability. *“...there are also costs in that those same ties can place considerable non-economic claims on members’ sense of obligation and commitment, with negative economic consequences. Group loyalties may be so strong that they isolate members from information about employment opportunities, foster a climate of ridicule toward efforts to study and work hard, or siphon off hard-won assets”* (Woolcock, 2001).

Indigenous peoples in Ecuador are well endowed in social capital, a result of strong internal organization and solidarity, as well as shared social and cultural values (Uquillas and Van Nieuwkoop 2003). Indigenous organizations act and function not only at the grassroots level, but also at regional and national levels. The organizations themselves are highly diverse, as some are politically motivated, while others align along ethnic or religious lines. Even so, they all contributed to the vibrant social movement of the 1990s that reaffirmed indigenous rights and identity in Ecuadorian society. While the past decades have shown the ability of indigenous organizations and networks to impact regional and national politics, Uquillas and Van Nieuwkoop (2003) also recognize that the bulk of social capital remain locally or village based, and that its main function is to provide safety for the community’s members: *“Much of this type of social capital is manifest at the level of the traditional community through informal networks of reciprocity and is strongly survival oriented”* (p. 5).

#### **Bridging and Bonding Social Capital**

Social capital has been defined and named in a myriad of ways; ranging from *“social energy, community spirit, social bonds, civic virtue, community networks, social ozone, extended friendships, community life, social resources, informal and formal networks, good neighbourliness and social glue”* (ONS 2001). Woolcock and Narayan (2000) sums up our conventional wisdom of social capital using the aphorism *“It’s not what you know, it’s who you know,”* before giving a more formal definition of social capital as *the norms and networks that enable people to act collectively.*

Today, the most commonly used definitions distinguish between bridging and bonding social capital. Putnam (2000) suggests that bonding social capital is good for “getting by” and bridging is crucial for “getting ahead”. Bonding (exclusive) social capital refers to relations amongst

relatively homogenous groups such as family members and close friends and is similar to the notion of strong ties. Examples of bonding social capital include ethnic fraternal organizations and church based women's reading groups. Bridging (inclusive) social capital refers to relations with distant friends, associates and colleagues and examples include civil rights movements and ecumenical religious organizations. Woolcock and Narayan (2000) refer to bridging social capital as supra-communal linkages among social organizations.

This section focuses on bridging and bonding social capital only, however it should be noted that a third distinction – linking social capital - is increasingly used in studies and estimations of social capital. Linking social capital refers to relations between individuals and groups in different social strata (i.e. that have differential access to power, social status and wealth). The key function of linking social capital is to leverage resources, ideas and information from formal institutions beyond the community (Woolcock 2001).

Table 17 shows bridging and bonding social capital estimates measured by looking at individuals' membership in different types of associations. Bonding capital is measured by membership in public programs such as school breakfasts where there is a need for community-level, collective support, while bridging capital is measured by membership in producer organizations, unions or labor organizations etc. The results show that bonding social capital is slightly higher among speakers of an indigenous language (monolingual and bilingual) than Spanish speakers, while bridging social capital is much higher among the speakers of an indigenous language. In terms of geographic areas, the highest bonding capital is found among the bilingual population in rural indigenous communities. Bridging social capital is highest among monolingual indigenous in metropolitan highlands and bilingual in rural indigenous communities. Within rural indigenous communities where the large majority of the indigenous live, both bonding and bridging social capital is higher among the bilingual population when compared to those who only speak and indigenous language

**Table 17: Bridging and Bonding Social Capital by Geographic Area**

	Bonding Capital <sup>1</sup>			Bridging Capital <sup>2</sup>		
	Monolingual		Bilingual <sup>3</sup>	Monolingual		Bilingual
	Spanish Speakers (Only)	Quichua (Only)		Spanish Speakers (Only)	Quichua (Only)	
Metropolitan Highlands	6.0	12.7	7.4	7.8	19.0	4.7
Rural Indigenous Communities <sup>4</sup>	12.5	11.2	14.1	6.6	12.3	18.5
Rural Non-Indigenous Communities	10.5	0.0	0.0	14.6	0.0	2.6
Metropolitan Coastal	6.6	8.7	9.0	8.5	9.6	8.6
Highlands Total	6.4	8.2	2.6	8.9	8.7	12.6
Coastal Total	6.9	1.2	11.5	6.3	12.6	13.6
<b>TOTAL</b>	<b>6.6</b>	<b>7.0</b>	<b>7.4</b>	<b>7.7</b>	<b>12.3</b>	<b>13.5</b>

<sup>1</sup>Beneficiaries of school breakfasts and membership in nutrition programs of the government

<sup>2</sup>Members of farmers' safety net and social security, unions or other labor association or other similar organizations

<sup>3</sup>Spanish and any other indigenous language

<sup>4</sup>Rural Indigenous communities are defined by the National Institute of Statistics, 2001

Source: Own calculations based on ENCOVI 1999, INEC

Table 18 shows social capital – bonding and bridging – for self-employed, and shows how it differs depending on work location. It shows that in urban areas, bonding capital is high among indigenous self-employed who work in the street (e.g. street vendors) but not so for non-indigenous for whom bonding social capital is the highest among those who work in a business.

Bridging capital is highest among those who work their own land for both ethnic groups. This is also the case for rural areas.

**Table 18: Social Capital by Types of Self-employment**

	Indigenous Urban					Indigenous Rural				
	%	Mean Consumption	Bridging Capital	Bonding Capital	Both	%	Mean Consumption	Bridging Capital	Bonding Capital	Both
<i>Self-employed who works...</i>										
...in a business	18.6	109.9	10.0	0.1	4.0	7.7	37.9	9.9	5.4	4.4
...in construction	4.4	25.7	9.0	5.4	7.9	5.2	22.4	15.9	0.6	2.6
...in an office	23.7	58.5	9.3	0.4	9.3	3.2	25.0	8.3	0.0	6.2
...in the street	13.7	61.2	9.7	11.1	1.4	1.0	46.7	16.6	0.0	0.8
...in parks or plazas	0.6	25.0	9.1	0.1	0.2	0.0	23.7	37.2	0.0	0.1
...in own establishment	7.2	42.0	9.4	0.0	1.7	0.8	33.5	6.8	0.0	1.1
...from home	9.2	70.3	0.8	0.0	1.2	1.4	25.5	10.5	5.9	1.1
...own land	5.0	62.0	22.4	0.8	9.4	64.5	20.4	31.0	9.9	21.1
...somboddy else's land	6.4	26.6	0.0	8.1	0.8	8.8	22.3	5.6	0.0	3.2
Correlation of mean consumption and social capital			<b>0.195</b>	<b>-0.288</b>	<b>0.140</b>			<b>-0.261</b>	<b>-0.203</b>	<b>-0.378</b>
	Non-Indigenous Urban					Non-Indigenous Rural				
	%	Mean Consumption	Bridging Capital	Bonding Capital	Both	%	Mean Consumption	Bridging Capital	Bonding Capital	Both
<i>Self-employed who works...</i>										
...in a business	36.4	100.3	3.4	22.3	0.1	11.2	63.2	11.3	1.2	6.6
...in construction	5.0	51.3	0.4	0.3	0.8	2.6	41.0	12.9	0.5	1.7
...in an office	16.0	81.3	10.9	0.9	2.2	6.9	54.3	23.1	4.0	8.9
...in the street	3.9	53.2	0.6	0.4	1.2	2.7	44.7	26.4	1.9	3.3
...in parks or plazas	0.6	67.2	2.7	1.1	0.1	0.3	50.8	3.7	0.0	0.1
...in own establishment	9.1	116.5	1.8	0.2	3.6	2.4	81.1	9.1	2.6	1.4
...from home	6.1	50.6	1.0	0.7	1.7	2.4	32.0	14.9	0.0	1.9
...own land	2.4	89.9	39.3	0.0	12.8	41.2	40.4	49.8	4.3	20.3
...somboddy else's land	2.8	50.8	4.2	0.4	6.4	20.9	36.2	13.7	2.0	14.6
Correlation of mean consumption and social capital			<b>0.3004551</b>	<b>0.395796</b>	<b>0.1931546</b>			<b>-0.324359</b>	<b>0.2048566</b>	<b>-0.299144</b>

Note: Mean consumption is defined as the monthly per capita value in USD, 1999.

Source: Own calculations based on ECOVI 1999

## Social Network Effects

Social networks are increasingly seen as a determinant of economic outcomes. On the one hand, some social scientists argue that a culture has developed in which poverty reinforces itself through social networks (Wilson, 1987). On the other hand, social networks influence individual decisions and opportunities in a range of areas tightly linked to economic outcomes including: job search and labor outcomes (Montgomery, 1990); education (Coleman et al. 1966; Putnam, 2000; Manski, 1993); consumption (Abel, 1990); and unemployment (Akerlof, 1980). Non-market and social mechanisms thus influence aggregate outcomes – both in positive and negative ways. In addition, networks contribute to the generation of “*feedback effects that can amplify shocks or lead to multiple equilibria*” (Bertrand et al., 2000).

A consistent way to analyze the effects of social networks on different economic outcomes is found in Bertrand et al (2000) which looks at the effect of social networks on participation in welfare among different minority groups based on language spoken. In this paper, we also look at the impact of social networks on participation in different sectors of employment and on child labor, in addition to participation in social programs. Language is used to identify the indigenous population and in terms of social network effects, language spoken can also be seen as a “*proxy for the social links between individuals within a neighborhood*” (Bertrand et al., 2000).

Table 19 show estimates of network effects by sectors of employment first only for indigenous and then for the population at large. For indigenous males living in rural areas, social networks have a positive and significant effect on participation in agricultural-related activities. The coefficient for all males is also positive and significant, but not as strong. Indigenous in rural

areas tend to be more involved in agricultural-related activities, thus the availability of networks is greater and employment channels better developed which would typically influence an individual's employment decisions. Social networks also positively affect indigenous females' participation in agriculture – both in rural and urban areas, which is not the case for women at large.

In areas such as commerce (formal) and services, however, fierce competition may be encouraging a negative effect of networks as reflected in the negative coefficients present for all groups in both areas. In terms of informal commerce of handicrafts network effects are positive and significant for both indigenous and the population at large in rural areas, in particularly for women.

Social networks affect employment in unskilled labor differently depending on area of residence and gender. Social networks have a positive and significant effect on the participation in unskilled labor for indigenous women in rural areas as well as for the population at large irrespective of gender. In urban areas, networks negatively affect participation in unskilled labor for all groups, but are not significant for indigenous women. These different outcomes may be due to the great variety of unskilled jobs. Furthermore, social ties that exist in rural areas may dissolve or even enlarge in urban areas, depending on the geographical and the labor market contexts.

**Table 19: Social Network Effects and Labor Market Outcomes**

	Rural		Urban		Total	
	Male	Female	Male	Female	Male	Female
<b>Indigenous</b>						
<i>Network Effects</i>						
Unskilled Labor	0.131	<b>0.439</b>	<b>-0.319</b>	-0.057	-0.062	<b>0.398</b>
Agriculture	<b>0.072</b>	<b>0.041</b>	0.024	<b>0.033</b>	<b>0.026</b>	0.016
Craftships	-0.006	<b>0.121</b>	0.065	0.111	<b>-0.082</b>	<b>0.236</b>
Services and Commerce	-0.009	<b>-0.083</b>	<b>-0.332</b>	0.064	<b>-0.220</b>	<b>-0.227</b>
<b>All Population</b>						
<i>Network Effects</i>						
Unskilled Labor	<b>0.081</b>	<b>0.250</b>	<b>-0.302</b>	<b>-0.739</b>	<b>-0.078</b>	<b>0.315</b>
Agriculture	<b>0.035</b>	0.020	-0.013	-0.010	0.009	0.006
Craftships and Artesanias	<b>0.094</b>	<b>0.308</b>	<b>0.499</b>	<b>1.198</b>	<b>0.392</b>	<b>0.462</b>
Services and Commerce	<b>-0.123</b>	<b>-0.130</b>	<b>-0.325</b>	0.092	<b>-0.534</b>	<b>-0.185</b>

Note: Controls for socio-demographic and economic characteristics were included but only networks effects shown here. Specific fixed effects for types of language and localities' characteristics were also included  
 Bold indicates significance at the 10% level

Source: Own calculations based on the Population and Housing CENSUS, Ecuador, INEC 2001

In addition to looking at social network effects of labor market outcomes, we also look at the effects of social networks on child labor and school attendance. Results by ethnicity, gender and rural-urban location are shown in Table 20. We see that social networks have a positive impact school attendance among children and youth ages 10-17, irrespective of gender and ethnicity. The effects are stronger for males than for females, and for the population at large when compared to the indigenous. Consequently, the effect is lowest for indigenous females, yet remains positive and significant. Looking at urban and rural areas separately, the results change. In urban areas, social networks only strengthen the school attendance of males in the population at large, and there are no significant effect of social networks on the school attendance of females or

indigenous children and youth. In rural areas, social networks positively affect school attendance for all groups, and are again stronger for the population at large when compared to the indigenous, and for males when compared to females.

In terms of child labor, we see from Table 20 that there is less evidence of positive social network effects. In fact, social networks were only found to positively affect (i.e. reduce) child labor among urban males, with no effect when looking at urban indigenous males separately. Social networks do not reduce child labor among female children and youth.

**Table 20: Social Network Effects, Child Labor and School Attendance**

	MALES						FEMALES					
	All			Indigenous			All			Indigenous		
	Coefficient	t-statistic	Model R sq.	Coefficient	t-statistic	Model R sq.	Coefficient	t-statistic	Model R sq.	Coefficient	t-statistic	Model R sq.
<b>All</b>												
School Attendance	<b>0.259</b>	3.99	0.62	<b>0.174</b>	3.27	0.62	<b>0.185</b>	2.79	0.64	<b>0.131</b>	2.37	0.64
Child Labor	0.088	0.83	0.12	-0.089	-0.9	0.12	0.141	1.08	0.11	-0.167	-1.32	0.11
<b>Urban</b>												
School Attendance	0.117	0.65	0.28	0.094	0.43	0.28	0.045	0.44	0.68	0.081	0.58	0.68
Child Labor	<b>0.417</b>	1.74	0.21	0.296	0.91	0.21	0.029	0.08	0.27	0.397	0.87	0.29
<b>Rural</b>												
School Attendance	<b>0.252</b>	3.46	0.64	<b>0.163</b>	2.68	0.64	<b>0.182</b>	1.89	0.65	<b>0.212</b>	2.47	0.65
Child Labor	0.114	0.97	0.11	-0.008	-0.07	0.11	0.018	0.12	0.10	-0.219	-1.46	0.10

<sup>1</sup>Includes children ages 10 to 17 who are reported as working as a secondary activity

Source: Own calculations based on the Population and Housing CENSUS, Ecuador, INEC 2001

In rural areas, child labor is often resorted to out of economic necessity and as a means to manage risks. In this setting any positive social influence from networks is undermined by the need for under-aged members to contribute to the economy of the household. In a study of child labor and school attendance in Ecuador, López-Acevedo (2002) finds that child labor increases when the head of the household works in the informal and agricultural sector. The author also shows that an increase in the wage of the head of the household results in a small, yet positive impact on the schooling of children in rural areas. Education also impacts school attendance and child labor, while moving from coastal areas to the highlands increases the probability of working and not going to school in rural communities. Along the same lines, Jacoby and Skoufias (1997, 1998) link incomplete financial markets to lower human capital accumulation in a study of agrarian households in rural India, and found that parents make significant use of child labor to self-insure.

## Social Networks and Basic Infrastructure

This section explores interactions between access to public infrastructure and the strength of social network effects. The objective is to test how different types of infrastructure endowments affect the strength of social networks in determining employment outcomes. This relationship is of interest, because access to public infrastructure varies across regions, communities and socio-economic strata.

Simple interactions between infrastructure indicator variables and social networks were used in the social networks regressions<sup>4</sup> to assess the complementarities that may exist between these two assets in determining employment and other economic outcomes. Positive and significant coefficients suggests that there are complementarities of infrastructure and networks, i.e. that

<sup>4</sup> See appendix for reference on the model.

access to public infrastructure strengthens or weakens social network effects. The analysis was conducted for male and females, for indigenous and non-indigenous groups, for urban and rural areas, and with regard to a range of occupational and other outcomes<sup>5</sup>.

The results of the analysis are inconclusive for some outcomes yet strengthened the hypothesis of asset complementarity for others. For the non-indigenous, many employment outcomes showed weak or insignificant interaction between assets and social networks. Intuitively, the fact that non-indigenous groups have more access to basic infrastructure makes it less likely that the interactions between infrastructure and network influence their decisions.

The main findings of infrastructure complementarities to social networks can be summarized as follow (see also Table 21):

- Social networks have a stronger impact on decisions to migrate when interacted with basic infrastructure (e.g. access to water) for non-indigenous males in both rural and urban areas and for indigenous males in rural areas. This interaction effects are not significant among women.
- A crucial asset is house or property ownership, which appears to lowers social network effects on migration decisions for indigenous males and females in urban areas.
- Access to basic infrastructure, e.g. water, sanitation and electricity, interacts positively and significantly with social networks networks in motivating decisions to work in entrepreneurial activities among indigenous in rural areas.
- While infrastructure interacts positively and significantly with social networks in motivating decisions to engage in unskilled work among indigenous males in urban areas only, the same effect is found among indigenous women in rural areas. This could be attributed to the specific employment structures found in urban and rural areas.
- Regarding agricultural activities, the interaction of infrastructure and networks is positive and significant for indigenous males and females in rural areas. The findings are, however, inconclusive for non-indigenous males and females in both rural and urban areas.
- For *mining and handicrafts* activities there is no clear evidence of interaction between infrastructure and social networks effects, for either areas or groups. This may be due to the fact that *mining and handicrafts* are site-specific occupations where other non-observable aspects play a more important role in peoples' decision to engage in such activities.
- Social networks interact positively and significantly with infrastructure in motivating indigenous males in rural areas to engage in waged employment. This may be explained by the large share of indigenous males engaged in *peasant or forestry* waged activities in rural areas. For women, the same is true but for urban areas where *domestic* labor represent a high share of waged activities.

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<sup>5</sup> Such include participation in social security, migration (international), waged and entrepreneurial activities, as well as agricultural, unskilled and *handicrafts* types of occupations.

- Finally, the results of the analysis were inconclusive for social security participation both across groups and areas

**Table 21: Infrastructure Complementarities with Social Networks for Different Outcomes**  
(Only Interaction coefficients Reported)

Access to...	Non-Indigenous		Indigenous	
	Urban	Rural	Urban	Rural
<i>Males</i>				
<b>Outcome: Migration</b>				
Water	<b>0.229</b> (1.87)*	<b>0.158</b> (3.50)***	0.063 (0.50)	<b>0.145</b> (3.25)***
<b>Urban Areas Only</b>				
<i>Males</i>				
<b>Outcome: Migration</b>				
House Ownership	0.066 (1.48)	<b>-0.294</b> (2.05)**	<b>-0.099</b> (2.34)**	<b>-0.032</b> (2.24)**
<i>Females</i>				
<b>Outcome: Migration</b>				
House Ownership	0.066 (1.48)	<b>-0.294</b> (2.05)**	<b>-0.099</b> (2.34)**	<b>-0.032</b> (2.24)**
<b>Outcome: Entrepreneurial Activities</b>				
Water	<b>0.017</b> (10.75)***		<b>0.096</b> (5.36)***	
Sanitary Services	<b>0.020</b> (4.03)***		<b>0.085</b> (4.47)***	
Electricity	0.122 (1.60)		<b>0.041</b> (2.21)**	
<b>Outcome: Unskilled Labor</b>				
Water	<b>0.045</b> (6.71)***	<b>0.161</b> (2.92)**	<b>0.131</b> (5.45)***	<b>0.183</b> (2.29)**
Electricity	0.223 (0.54)	0.013 (0.34)	<b>0.076</b> (6.48)***	<b>0.170</b> (3.07)**

Access to...	Non-indigenous		Indigenous	
	Males Rural Areas	Women Rural Areas	Males Rural Areas	Women Rural Areas
<b>Outcome: Agricultural Activities</b>				
Water	0.007 (1.18)	-0.024 (1.50)	<b>0.029</b> (3.35)***	<b>0.071</b> (5.60)***
Electricity	0.004 (0.48)	<b>0.052</b> (4.81)**	<b>0.021</b> (2.43)***	<b>0.073</b> (6.20)**
<b>Outcome: Mining and Artifacts</b>				
<i>Males</i>				
Water	0.010 (0.34)	<b>0.103</b> (5.36)**	<b>-0.040</b> (1.39)	<b>0.013</b> (2.39)**
Electricity	0.033 (2.89)	0.097 (5.04)	0.016 (0.82)	<b>0.066</b> (2.22)**
<i>Females</i>				
Water	-0.028 (1.44)	<b>0.015</b> (3.70)**	-0.021 (1.16)	-0.090 (1.05)
Electricity	<b>0.070</b> (3.05)***	0.005 (1.25)	0.080 (1.08)	0.120 (1.26)
<b>Outcome: Waged Employment</b>				
Water	<b>0.063</b> (8.35)***	-0.015 (0.85)	<b>0.031</b> (2.32)**	<b>0.191</b> (2.01)**
Electricity	<b>0.015</b> (1.91)*	-0.320 (1.26)	<b>0.024</b> (2.40)**	<b>0.027</b> (2.03)**

T-statistics in Parenthesis in absolute value. Regressions calculated with robust standard errors.

\* Significant at 10% level; \*\* significant at 5% level; \*\*\* significant at 1% level

Notes:

1. Infrastructure and asset access included the following: water and sanitation facilities, electricity, and house/property ownership. These indicator variables were built based on what head of households reported in the Census.
2. The regressions were specified with a set of education, demographic, and regional controls. Household characteristics were used also as controls. Language controls included 11 identified nationalities and 22 pueblos to control for ethnic fixed effects. Local level geographical fixed effect controls were also included.
3. The coefficients reported correspond to the interaction between the social network variable and the indicator for access to infrastructure.
4. Different specifications for each outcome were computed finding no substantial changes in the model fit, coefficients and significance of the variables of interest.
5. Sanitation services correspond to access to sewerage, or restrooms located inside the household.
6. The sample includes individuals with ages between 25 and 65 years old.
7. R-squares for all the models ranged from 0.17 to 0.56.

Source: Author's calculations based on Census, 2001 data, Ecuador.

## VI - CONCLUSIONS AND POLICY IMPLICATIONS

As noted in the introduction, recent studies show that despite their increased political influence, indigenous people in Ecuador continue to suffer disproportionate high levels of poverty and exclusion (World Bank 2004, Larrea and Torre 2006). Alongside higher, more persistent income poverty, the indigenous are also faced with lower human capital endowments (health and education) and consistently lower returns to labor and other economic activity.

In an effort to better understand why this continues to be the case, this paper looked at ethnic differences in economic opportunity, that is, differences in the access and ability to engage in income generating activities, as well as differences in the returns to these. In doing so we have looked at: (i) participation and the determinants of participation in occupations and sectors of economic activity; (ii) the concentration or diversification of economic activity; (iii) self-employment and the assets on which entrepreneurship is built, in particular credit; and; (iv) the role of social networks in determining economic outcomes. All of these aspects of economic opportunity were examined separately for rural and urban areas.

### Summary of findings

The overview given in Chapter 2 of **labor market participation** showed that indigenous are more likely to engage in unskilled labor, to work in agriculture and to work without pay, than are the non-indigenous. These findings hold true for both rural and urban areas. In addition, 87 percent of indigenous in rural areas report having a second occupation or activity, while only 22 percent of rural non-indigenous do, indicating a common need among rural indigenous to complement primary activities – mostly unwaged agricultural work. In terms of unskilled employment, we find that while indigenous and non-indigenous have similar participation rates in waged employment, indigenous are more likely to work in the agricultural sector when engaging in waged labor than the non-indigenous. If we look at skilled employment, participation in waged labor is higher for non-indigenous than indigenous, in particular in urban areas where 42 percent of the non-indigenous work force engage in skilled waged labor compared to only 26 percent of the indigenous.

Chapter 2 also looked at **determinants of labor and occupational outcomes**. The analysis showed that the indigenous are more likely to be engaged in agriculture than any other ethnic group, above all in activities where returns are intuitively lower such as small scale farming and subsistence farming. In urban areas, findings suggest a change in traditional occupation patterns of indigenous in urban areas as current generations are more likely to work in informal commerce than previous ones. Human capital endowment – measured in years of schooling – was also found to impact occupational outcomes. As years of schooling increases, the probability of working in manufacturing increases compared to other unskilled work (agricultural, commerce and construction). The indigenous have lower human capital endowments than other ethnicities irrespective of occupation and geographic area. Estimates from probit models show that the probability of working in formal and waged sectors increases with years of schooling and the literacy rate of then household, and that the effect of human capital is stronger in rural areas and for the indigenous. Finally, predicted probabilities of waged work and self-employment were calculated for ages 19-35. In both rural and urban areas, the indigenous have a lower probability of waged employment than the non-indigenous across all age groups; however in urban areas the ethnic gap increases with age. The probability of self employment is generally higher for indigenous than non-indigenous; in urban areas the gap increases with age while it falls in rural areas.

Herfindahl indices were calculated to estimate the **concentration and diversification of economic activity**. International evidence show that the ability to diversify activities is particularly important among poorer rural households as it provides a means to mitigate risks and income volatility, as well as a response to liquidity constraints. In terms of unskilled employment, the economic activities of individuals engaged in informal commerce are the most concentrated while waged agricultural employment is associated with a more diversified activity. Overall, the activities of indigenous engaged in any form of agricultural activity are more concentrated than similarly engaged non-indigenous. Looking at individuals engaged in skilled employment we see that the indigenous have on average a much higher diversification of activities than non-indigenous. The most striking difference between indigenous and non-indigenous is the very concentrated activities of non-indigenous engaged in non-agricultural waged employment, and the highly diversified activities of indigenous employed in the same.

Finally, Chapter 2 looked at **entrepreneurial activities and self-employment** more in-depth by focusing on physical and financial assets such activities builds on, in particular human capital endowments and access to formal and informal credit. Comparing key characteristics of indigenous and non-indigenous self-employed told us that: (i) indigenous have lower levels of education, (ii) indigenous employ more family members in their businesses/activities; (iii) the use of machinery and equipment is more widespread among the non-indigenous; and that (iv) indigenous rely more on animals. Comparing indigenous and non-indigenous agricultural farms/businesses, we also found stark ethnic differences in access to credit. Both formal and informal credit is much more common among non-indigenous than indigenous businesses, irrespective of their size. The indigenous also seem to be paying higher interest rates. When looking at factors that deter business owners from seeking credit, we found that high interest rates was a more commonly viewed as an obstacle by rural indigenous than rural non-indigenous. A study by the World Bank (2004) found that access to credit is the single most important policy intervention to raise productivity among small-scale poor farmers. Farm productivity measures show non-indigenous small-scale farmers harvest between two and three times more a month than non-indigenous. In addition, the value of per kilo of production is also higher.

Ethnic differences in **public program participation** are also assessed in chapter 2. A comparison across four different types of interventions found that when the household is headed by women, the probability of receiving a cash transfer increases, however this positive effect is stronger among indigenous than non-indigenous. Participation in labor training falls when the household is headed by a woman, while the probability of participating in school breakfasts in urban areas increases for non-indigenous and falls for indigenous female-headed households. As education increases, participation falls for most public programs. The probability of participating in training programs falls with education for the non-indigenous but increases with levels of schooling for the indigenous. Finally owning an agricultural business increases the probability of receiving training for indigenous and lowers it for non-indigenous.

Chapter 3 looked at **social capital and social networks effects on labor market outcomes**. Results show that bonding social capital – family and other strong ties - is slightly higher among speakers of an indigenous language. Non-indigenous are on the other hand much more endowed in bridging social capital, that is, weaker ties with distant friends, acquaintances and colleagues. In rural indigenous communities where the majority of indigenous live, both types of social capital is higher among the bilingual indigenous population when compared to those who only speak an indigenous language. A formal analysis of social networks showed that for indigenous males in rural areas, networks have a positive and significant effect on participation in agricultural related activities indicating that networks in this sector are strong and well-

functioning. This is the only positive network effect identified for indigenous males. In urban areas, social networks negatively affect participation in unskilled labor, services and commerce. Social networks also positively affect indigenous females' participation in agriculture – both in rural and urban areas, which is not the case for women at large.

Chapter 3 also examined the effects of **social networks on school attendance and child labor**. Social networks positively affect school attendance of children and youth ages 10-17, irrespective of geographic area and ethnicity. These effects are however stronger for males than females and stronger for the population at large when compared to the indigenous. Consequently, the effects are the weakest for indigenous females. While this also holds for rural areas, this consistency breaks down when we look at urban areas separately, where there are no significant effect of social networks on the school attendance of indigenous children and youth. There is less evidence of the positive effects of social networks on child labor, and is only shown to reduce child labor for males in urban areas. It finally analyzed how social networks may be propelled with the existence of basic infrastructure. Many times decisions have constraints that depend on physical endowments to engage in certain activities. In some cases, **social networks and infrastructure seem to be strongly complementary as they interact in motivating and facilitating** entry into certain occupations.

### **Policy implications**

While the scope for concrete policy recommendations is limited from the above analysis a few areas of intervention emerge as crucial. These include: (i) Building on the complementarities of assets by facilitating both the acquisition of human capital (formal schooling and training) and access to credit; and (ii) look for ways in which social networks can work not only as aids to get by, but also as catapults for moving indigenous households ahead.

An area not investigated in this report is land – probably a third area in which interventions may be centered. Clearly, differences in the size and quality of land, as well as land ownership structures crucially affect income generating strategies in rural areas where most indigenous live. The distribution of land in Ecuador is highly unequal and has remained unchanged in the last twenty-five years. As such, the poorest stand to gain from policies that facilitate access to land, as well as policies that improve tenure security and facilitate land transactions (World Bank 2004).

Over the past years, many cases of successful indigenous community development have been documented in the literature (see for instance Carrasco et al. 2003). In addition, there are recent experiences acquired by projects such as Ecuador's Indigenous and Afro-Ecuadorian Peoples Development (PRODEPINE), a project that has also compiled a set of tools and methodologies of local community planning, community subproject implementation and credit programs. A closer review and evaluation of these experiences could help build a better understanding of what works and what doesn't and in which context (rural/urban, high and low density of indigenous populations etc.).

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## **Annex 1: Data and Methodology**

### **A.1.1 Data**

#### 1.1.1 Encuesta Nacional de Condiciones de Vida 1999 Fourth Round (LSMS 1999, ECOVI)

The 1999 is the fourth round of surveys applied all through 1998 and 1999. The survey has a sample size of 5,824 households and 25,980 individuals. The survey contains 7.7 percent of indigenous people in the whole sample, defined with language spoken. Around 16.15 percent is distributed in rural areas, while only 1.5 percent is located in urban areas. This survey has three components for several dimensions of well being and life standards. The first component relates to the Households and Individual characteristics. The second with information related to the Community, and involves productive, economic and social relations. The third general component is related to price levels of products and services varying by sector and branch of activity and production.

Household and Individual Detailed Components: Section I of the ENCOVI 99 contains all detailed information of households pertaining such as physical conditions of floors, roofs, walls, access to potable, water and sewerage, hygiene conditions, fuels utilized, and electricity, garbage disposal, among others. Moreover, there are questions about the property status of the household (e.g. still being paid) as well as property ownership. One interesting feature of this section is that it also has questions regarding household repairs and constructions and the sources to finance such repairs. This is important since Ecuador has one important program called *Bono Para la Reconstrucción y el Mantenimiento*, focused primarily in providing income transfers to rural households. Also, this survey has reservation prices on rents of properties. It has questions that directly ask the respondent how much would he/she paid if he/she would have to rent the property where they live.

Characteristics of Individuals: The characteristics begin in section 3 (A-F) that contains the information of children below the age of 5 (A & B) and for all the members above 5 (C & D). Part A corresponds to child care, including immunizations, children's lactation, morbidity and place of medical visit. Part B explores deeply types of diseases affecting the children. Part C inspects in detail the conditions of access to hospitals, prevalence of disease, and time taken to transport to the clinic/hospital of all members above 5 years old. Part D contains health expenditures and health insurance information of the households. Detail information on ambulatory expenditures, hospitalized discharges, interventions and medicines, as well as doctor fees. Another section, E, exclusively for persons above 15 years old, contains information on tastes and habits, such as practice of sports, smoking and drinking habits. Subsection F, has anthropometric measures of children below 5 years old. With such anthropometric measures, child poverty/malnutrition can be estimated using body mass indices.

Section 4 contains socio-demographic characteristics of individuals such as education and job training. The subsections are very important for the purposes of the study, particularly the section on job training since it enhances human capital and is highly dependent on social networks. It would not be surprising that the indigenous populations in the 22 provinces suffer from exclusion from job training.

Section 5 contains information of migration for residents above 10 years old. Destinations, motives for migrating, and total years of migratory flow are the information available for this section.

Section 6 brings upfront all job related issues and economic activities of individuals. It includes types of labor activities and occupations, causes of inactivity, time spent on work, type and size of business, independent (entrepreneurial) income sources, wages, social and health benefits from labor, types of contracts and unionization. Subsection B contains detailed information of independent workers (self-employed) including monetary transfers and non-monetary in kind payments on housing, food, clothing and transportation. Part C of section 6 contains information on secondary jobs, like the type of occupation, activity, wage/income perceived, etc. Although this information of primary and secondary jobs is useful, still many jobs, particularly agricultural, highly depend on harvest seasonality. Sub-section E has information on jobs done during the last 12 months. In this way, we can capture better agricultural sources of income. Finally subsection F has all the information on Remittances and Income assistance to the household from family members, NGOs, and public institutions. These can be separated by national and international sources.

Section 7 has health information on pregnancy and birth control of women between 15 and 49 years old. Health care utilization is available for the main providers of services within the health care system including MSP, IESS, FFAA, ISSPOL, JBG, and PSJ<sup>6</sup>.

Section 8 has detailed information on household expenditures by item on food and beverages, agricultural and animal-derived products, home care, personal care, books, magazines and leisure, fuels and transportation, house services, insurance, clothing, furniture and electro-domestic devices, culture and vacations, financial and professional services, taxes and fees, and other expenditures. On the side of income and revenues, this section has income generated from non-labor activities such as, capital income, transfers and financial transactions, and other monetary benefits.

Finally, sections 9 and 10 have information regarding entrepreneurial activities and independent workers from non-agricultural and agricultural activities, respectively. There is rich information on agricultural production, property ownership, value and availability of inputs of production such as fertilizers, pesticides, seeds and grains, labor force available, machinery, technical assistance, credit, and equipment. The section of agricultural activity has the advantage of separating the production of vegetables, grains and fruits from the production of animal-derived products.

#### 1.1.2 VI Censo de Población y V de Vivienda 2001 (*Population and Housing Census, 2001*)

The Population and Housing Census of Ecuador contains around 12 million individuals and detailed information about households' conditions, infrastructure, and equipment. For individuals it includes demographic, economic and general characteristics. Such characteristics are: marital status, disability, language spoken, race, migration, education level, school attendance and literacy, labor conditions, types of activities and occupations, conditions of employment, and child mortality. The information is concentrated in 22 different provinces, 215 cantones, and 1,149 parroquias (361 urban and 788 rural). The CENSUS is divided in three sub-data sets: population, migration and households. The surveys of the census are applied in a rotative, polietapic (three stages) and stratified conglomerates with replacements, where the primary units of sampling (UPM) constitute the censal sectors selected with the proportional probability of the median strata size. The secondary sampling units (USM) constitute household gathered in the process of cartographic update.

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<sup>6</sup> Ministry of Public Health, Ecuadorian Institute of Social Security, Armed Forces Social Security, Institute of Social Security of Police, *Junta de Beneficiencia, Patronato San Jose* (Quito Area), respectively.

### 1.1.3 Encuesta Nacional de Empleo, Desempleo y Subempleo de Areas Urbanas y Rurales 2001 (ENEDSUR, 2001)

This Survey is part of a longitudinal survey applied periodically to measure the evolution of employment conditions and occupations in urban and rural areas. The survey contains 60,700 observations at the individual level, contained in 14,000 households. The survey is representative at the urban and rural levels. This survey contains not only the language spoken but the type of ethnicity of the individual. Likewise, the employment conditions have a higher level of specificity compared to the employment conditions reported in the LSMS surveys. Although this survey underreports income, several categories of sources of income (e.g. income from public programs) are reported well and are useful for identifying program transfers. The survey reports between 5 and 7 percent of indigenous population, being 2.7 percent monolingual.

There are five categories encompassed by the questions addressed to head of households<sup>7</sup>:

- 1) Household composition, including full name of each member of the household and his/her demographic characteristics (including relationship to HH head, sex, age, formal education and technical/vocational training).
- (2) Economic characteristics of all members of the household aged five and above(10), including both "current" activity (during the last seven days or one week preceding the reference date of the survey) and "usual" activity (during the last 12 months preceding the survey reference date), and duration of the "usual" activity or employment.
- (3) Details of the current economic activity of all members of the household aged five and above: e.g whether full or part-time worker or underemployed, status in employment, occupation, earnings, hours of work and all other working conditions.
- (4) In case of self-employed, types of goods he/she produced or services rendered; if working as an employee, type of industry of the employer.
- (5) If not working, whether he/she is a job seeker and duration of the job search, etc.
- (6) Housing/dwelling conditions/particulars of the HH, migration status of HH and level of HH income and expenditures.

#### **A.1.2. Methodology for Poverty Lines based on Consumption**

Poverty measurement in Ecuador has been estimated using the LSMS surveys. For the 1999 survey the methodology of Wladimir Brborich (2000) involved the construction of consumption aggregates. The first reason to justify the use of consumption and non income as the main source for calculating poverty is that consumption fluctuates less than income, particularly in the context of economic crisis experienced by Ecuador in the end of the 1990s and 2000. The second reason is that consumption can indeed be used as a proxy of welfare or well-being of households. The advantage of using the ENCOVI 1999 is that the period of survey application was 4 times larger (1 year) than previous LSMS.

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<sup>7</sup> Source: Internacional Labor Organization. Available at:  
<http://www.ilo.org/public/english/standards/ipecc/simpoc/simpoc00/annexes.htm>

The formal methodology of Brborich includes a series of steps that include the calculation of poverty and extreme poverty thresholds based on minimum requirements of consumptions, as well as the calculation of Engel coefficients.

### 1.2.1. Steps for calculating Consumption Aggregates

- a. The selection of Items was based on common items included in 1995, 1998 and 1999 surveys. This added a degree of comparability and robustness.
- b. For each food item it is necessary to calculate the grams and milliliters consumed and the corresponding expenditure in Sucres. Such is attained through equivalence tables included in the survey for each food item.
- c. Each item belonging to the basic bundle of food available for minimum caloric requirement has to be included and calculated in terms of milligrams/milliliters per day per person. The caloric contribution of each item is added up to consolidate a general caloric requirement per person. The threshold of caloric requirement (net of any wasteful calories) is around 2236 kilocalories per day per individual.
- d. The cost of each kilocalorie is calculated per item and depending on the region and area of residence by utilizing the median of the cost per calorie reported in the section of prices of items.
- e. The caloric value of the bundle is multiplied by the cost in Sucres per calorie. Four different values are obtained for the cost of basic calories needed: Rural COSTA, Rural SIERRA, Urban COSTA, Urban SIERRA. However, it is necessary to adjust by population so that:

$$L = \sum_{\substack{i=0,1 \\ j=1,3}} w_{ij} * L_{ij}$$

where: i has the values of 0 rural y 1 urbano

j has the values of 1 costa, 2 sierra y 3 oriente ? is the factor of population adjustment (costa urbana for total population, etc.) L<sub>ij</sub> is the value of the bundle by combining area and region

L is the value of a national bundle (the value of this bundle can be expressed in per capita monthly terms).

### 1.2.2. Other issues

The consumption of households that correspond to non-food items are the following: a) durables; b) education; c) water, electricity, and cooking fuels; d) rents ; f) other expenditures from section 8, subsections B, C, D, E.

A similar methodology for Household extreme poverty can be applied to Census data with micro-geographical units. Although Census data has fewer consumption categories than survey data, Census data is useful when controlling for geographical units' size and spatial issues (see Table A.I.2). Therefore it can provide a more accurate estimation of extreme poverty.

<b>Table A.I.2 Extreme Poverty Rates Based on the Methodology of Unsatisfied Basic Needs (UBN) of Households Using Census Data, 2001</b>						
<b>Province</b>	<b>Indigenous</b>			<b>Non-Indigenous</b>		
	<b>Total</b>	<b>Rural</b>	<b>Urban</b>	<b>Total</b>	<b>Rural</b>	<b>Urban</b>
Azuay	62.1	72.7	18.2	26.7	47.2	6.8
Bolívar	80.9	83.5	31.8	32.9	43.0	10.2
Cañar	76.0	79.2	36.2	31.8	42.3	16.7
Carchi	60.2	80.7	14.9	30.8	50.4	9.4
Cotopaxi	79.7	81.6	26.5	35.9	47.3	11.2
Chimborazo	80.8	84.1	16.2	24.1	49.6	5.9
Imbabura	68.2	75.2	23.1	21.9	43.4	8.9
Loja	68.7	74.3	20.5	41.9	66.6	12.1
Pichincha	41.4	58.6	24.4	14.0	26.5	8.9
Tungurahua	72.4	76.5	19.8	23.8	38.6	6.4
El Oro	27.6	44.0	23.6	25.8	44.1	19.4
Esmeraldas	76.6	84.6	28.0	39.6	50.5	22.6
Guayas	33.1	59.0	28.9	32.0	59.0	24.8
Los Rios	50.2	63.6	30.5	42.9	57.3	27.1
Manabí	57.5	75.3	33.3	48.5	69.7	27.1
Morona Santiago	75.4	78.2	21.9	25.4	42.5	10.1
Napo	60.4	64.9	31.5	21.4	33.3	11.5
Pastaza	67.3	73.8	30.8	16.2	24.9	10.3
Zamora Chinchipe	66.4	69.6	20.7	37.6	52.7	14.2
Sucumbíos	67.5	72.4	29.2	37.3	44.1	26.4
Orellana	74.2	78.3	29.0	34.3	43.1	19.3
Galápagos	17.2	41.3	14.9	9.9	27.8	6.4
Undelimited Areas	52.7	52.7	0.0	49.6	49.6	0.0
<b>Total Extreme Poverty Rate</b>	<b>61.6</b>	<b>70.6</b>	<b>24.1</b>	<b>30.6</b>	<b>45.8</b>	<b>13.7</b>

Source: Own Estimation based on SIISE V.04 and CENSUS, 2001. Ecuador

### A.1.3 Technical Notes

#### A.2.3.1 Multinomial Logit Regression

When categories are unordered, Multinomial Logistic regression is one often-used strategy. Mlogit models are a straightforward extension of logistic models. Suppose a DV has M categories. One value (typically the first, the last, or the value with the highest frequency) of the DV is designated as the reference category. The probability of membership in other categories is compared to the probability of membership in the reference category. For a DV with M categories, this requires the calculation of M-1 equations, one for each category relative to the reference category, to describe the relationship between the DV and the IVs. Hence, if the first category is the reference, then, for  $m = 2, \dots, M$ ,

$$\ln \frac{P(Y_i = m)}{P(Y_i = 1)} = \alpha_m + \sum_{k=1}^K \beta_{mk} X_{ik} = Z_{mi}$$

Hence, for each case, there will be M-1 predicted log odds, one for each category relative to the reference category. (Note that when  $m = 1$  you get  $\ln(1) = 0 = Z_{11}$ , and  $\exp(0) = 1$ .) When there

are more than 2 groups, computing probabilities is a little more complicated than it was in logistic regression. For  $m = 2, \dots, M$ ,

$$P(Y_i = m) = \frac{\exp(Z_{mi})}{1 + \sum_{h=2}^M \exp(Z_{hi})}$$

For the reference category,

$$P(Y_i = 1) = \frac{1}{1 + \sum_{h=2}^M \exp(Z_{hi})}$$

In other words, you take each of the  $M-1$  log odds you computed and exponentiate it. Once you have done that the calculation of the probabilities is straightforward. Note that, when  $M = 2$ , the mlogit and logistic regression models (and for that matter the ordered logit model) become one and the same. This is adapted heavily from Menard's Applied Logistic Regression analysis; also, Borooah's Logit and Probit: Ordered and Multinomial Models;

### A.2.3.2 Herfindahl Index

A common measure of concentration is the Herfindahl index (H), which is defined as:

$$1) \quad H = \sum_{i=1}^N y_i^2$$

where  $y_i$  is the production share of region  $I$  and  $N$  stands for the number of regions.

The index lies between  $1/N$  (all activities have the same share, *i.e.* there is no concentration) and 1 (all activities are concentrated in specific occupation, *i.e.* maximum concentration). In general, however, activities have different shares within and across ethnic groups so that a correct measure of activity concentration has to compare the activity share of each group and area with its share in the national mainstream.

### A.1.4 Social Networks Methodology

The basic model for networks effects estimations has the following functional form:

$$\Pr(H = 1) = netw_{ijk} \mathbf{a}^* + X_i^* \mathbf{b}^* + Y_j^* \mathbf{g}^* + Z_k^* \mathbf{d}^* + \mathbf{e}_{ijk} \quad (A.1)$$

Yet this model presents specification problems that deploy biased estimates of the true impact of social networks (*netw*) on the outcome of interest (H). In our case the outcome of interest is related, mainly, to economic occupations in an effort to try to differentiate between the networks effects that are prevalent in specific activities and how that effect varies in magnitude among other activities. In the model (A.1)  $i$  indexes individuals,  $j$  indexes areas,  $k$  indexes language groups  $\mathbf{d}$  measures the unobserved language group characteristics, and  $\mathbf{e}$  is an error term.

With this simple model several issues emerge when trying to identify *netw* effects on H. First it generates endogeneity since we cannot fully identify the side of the effects, or what causes what. Other problem emerges from omitted variable biases. Many contextual characteristics of indigenous localities may play a role (e.g. networks are strong because isolated indigenous communities only enable them to interact among them).

In equation (A.1), one can include both the ethnic and geographic dimensions of networks. This deals with two biases mentioned above by including the omitted neighborhood and ethnic group characteristics. Also the definition of the variable of networks differs from other studies and it is close to the definition used by Bertrand et al. (2000), where the quantity and the quality of the networks are measured:

$$netw \approx R_{jk} \times G_k \quad (A.2)$$

where R and G are the density of language group k in area j and the employed in the same sector of the same language k in area j, respectively. The density of language group k living in area j measures contact availability, denoted by CA. The other term (G) is the difference between the mean employment rate in given sector that varies by ethnic group and geographical area, and the average employment<sup>8</sup>. This term can be identified as:

$$G_k \approx (\overline{EMP}_k - \overline{EMP}) \quad (A.3)$$

From A.1, A.2, and A.3. we have the following model to estimate networks effects after correcting endogeneity and omitted variable biases, incorporating a broader definition of networks based on the interaction between quantity and quality of networks. With this redefinition and rearrangement of the model we estimate,

$$\Pr(H = 1) = \mathbf{h} + (CA_{jk} * G_k) \mathbf{a}^* + X_i \mathbf{b}^* + \mathbf{g}_j^* + \mathbf{d}_k^* + CA_{jk} \mathbf{q} + \mathbf{e}_{ijk} \quad (A.4)$$

The estimations carried out to explore the networks effects consider the value and sign of the interaction term between CA and G. For a detailed description of the methodology as well as the strategy to conduct specification checks see Bertrand et al. (2000).

A final consideration of the methodology is related to inclusion of small indigenous groups as part of the ethnic diversity of Ecuador's indigenous population<sup>9</sup>. By including R we are

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<sup>8</sup> Incorporating these two terms circumvents many conventional estimation problems where the social network variable is plagued with omitted variable biases. Also, the simultaneity problem represents an estimation problem as well: we cannot with certainty know if the effect estimated on individual's behavior depends on the behavior or characteristics of the group (social effects) or if individuals in a group behave similarly because they are subject to the same shocks (correlated effects). Therefore, the use of CA and G allows controlling for local area fixed effects and deals with any unobserved differences between areas, such as variation in job availability. The language group fixed effects absorb omitted characteristics of language groups, such as different levels of discrimination, cultural endowments, and other ethnic specific attributes different than those related to the networks.

<sup>9</sup> The following groups of indigenous populations based on indigenous languages were grouped since some groups have a small number of individuals: Group I. Achuar and Shuar; Group II. Awa, Chachi, Epera; Group III. Cofan, Secoya, Siona; Group IV. Quichua; Group V. Huaorani; Group VI. Tsa'Chila; Zapara, Shiwar. Group VII. Kichwa. The rest of the groups are non-indigenous groups.

considering the proportion of k language groups in a given area j. Yet misleading estimates could emerge since the small groups would not be weighted properly. Therefore, the definition of CA in the estimated model was reconstructed as the log of the ratio, thus:

$$CA = R_{jk} = \left( \frac{C_{jk} / A_j}{L_k / T} \right) \quad (\text{A.5})$$

With the use of the log of the ratio in (A.5) it prevents us from underweighting small language groups. If simple proportions are used, small groups would appear to have parallel small contact availability regressions because even at full concentration they would never be a large fraction of any area. Therefore, this completes the specification to circumvent all possible shortcomings of estimations, leaving with unbiased estimators.

To evaluate the existence of interactions between basic infrastructure and social networks several indicator variables of infrastructure access were included to validate this hypothesis and as a way to make specification checks. Infrastructure and asset access included the following: water and sanitation facilities, electricity, and house/property ownership. These indicator variables were built based on what head of households reported in the Census. The complementarities between assets/infrastructure and social networks is identified by a positive coefficient<sup>10</sup> (see Bertrand, et. al. 2000), yet little interpretative and theoretical work exist on this topic. The regressions were specified with a set of education, demographic, and regional controls. Household characteristics were used also as controls. Language controls included 11 identified nationalities and 22 pueblos to control for ethnic fixed effects. Local level geographical fixed effect controls were also included.

#### A.1.4 Complementary Notes

Although the overall analysis considered language spoken to identify indigenous individuals and households, and the social networks methodology included regional groups aggregated by common indigenous dialects, there exists also a distinction within indigenous groups. The definition of indigenous “nationalities” (*Nacionalidades*) and “peoples” (*Pueblos*) considers self-identification of individuals to indigenous communities in the absence of speaking an indigenous language<sup>11</sup>. On the one hand, these self-perceived indigenous groups might be under- or over-represented within the Census and LSMS sample. That does not mean we omitted the fact that these indigenous populations represent a considerable amount of individuals that share attributes to language-speaking populations.

Recently, as of 1998, the notions of *Nacionalidades* and *Pueblos* became part of a Constitutional definition of indigenous, that emerged as a consequence of the recognition that many individuals may actually identify with indigenous traditions and customs, yet their indigenous language has been extinct. In order to gain consistency with the methodology of social networks, where networks can be only identified and estimated through knowing different language groups, we decided to omit self-perceived indigenous groups. This does not imply that we are not aware of

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<sup>10</sup> One may think conversely, that negative significant coefficient might show that infrastructure access and social networks act in opposite directions. In other words, infrastructure may hinder or discourage the influence of networks in individual decision-making.

<sup>11</sup> In Ecuador there are 14 different *Nacionalidades* and 32 *Pueblos* groups according to the 2001 National Population and Housing Census.

the regional differences, heterogeneity and cultural richness that exist in the distribution of self-perceived indigenous populations within Ecuador.

**Table VI CENSO DE POBLACION Y V DE VIVIENDA. 2001**  
**INDIGENOUS NACIONALIDADES AND PUEBLOS**

<b>NACIONALIDADES</b>	<b>PUEBLOS</b>
Name	Name
ACHUAR	SARAGURO
AWA	CAÑARI
COFAN	PURUHA
CHACHI	WARANKA
EPERA	PANZALEO
HUAORANI	CHIBULEO
QUICHUA	SALASACA
SECOYA	QUITU
SHUAR	CAYAMBI
SIONA	CARANQUI
TSA'CHILA	NATABUELA
ZAPARA	OTAVALO
SHIWIAR	QUICHUAS DE LA AMAZONIA
KICHWA	MANTA
	HUANCAVILCA
	QUISAPINCHA
	PILAHUIN
	AMBATILLO
	PASA
	GUARANGA
	CHIMBO
	CACHA
	COLTA
	GALTI
	CALPI
	LICTO
	SIBAMBI
	OCPOTE
	SICALPA
	GUANO
	QUIMIAG
	CHAMBO

Source: VI Population and Household Census, 2001, Ecuador.