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Labor Markets in Central America: Informal versus Formal Sectors

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LABOR MARKETS IN CENTRAL AMERICA Informal versus Formal Sectors

Ana Corbacho

Abstract

This paper estimates labor force participation equations and informal versus formal sector participation equations in the Central American countries of Honduras, Costa Rica, El Salvador and Nicaragua, using the most recent Household Surveys available for each country. Results from labor force participation equations show that differences across countries are not very significant. The composition of the informal sector, however, has a more heterogeneous character. The two most popular definitions of the informal sector have been applied, data permitting. Under the size definition, the three common features for all four countries are the higher participation of women, the least educated and the young in the informal sector. When the remainder of the characteristics are taken into account, each country has distinguishing results. Under the social security coverage definition, applied to Nicaragua and El Salvador only, most of the results coincide with those that fall under the alternative definition. However, in this last set of estimations people older than 50 years of age have lower chances of participating in the informal labor markets than people younger than 50 years, though this does not seem to matter under the size definition.

Keywords: Central America, informal sector, labor markets

JEL codes: J00, J21, J29, J40, J49

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I. INTRODUCTION

There have been important changes in the economic, political and social systems of Central America throughout the 1990s. One result of these changes has been an increased concern on how labor markets, and particularly the informal sector, have reacted to recent policies. This paper estimates labor force participation equations and informal versus formal sector participation equations in the Central American countries of Honduras, Costa Rica, El Salvador and Nicaragua.¹ The main goal is to establish patterns of labor force participation and formal versus informal sector participation to establish key differences and policy implications.

Why is the study of the composition of the labor market between the formal and informal sectors important? To answer this question it is first necessary to define what the informal sector is. There are at least two competing views. Some emphasize the small-scale characteristic of the informal sector, being composed of those workers who perform non-technical or non-professional activities in firms of five employees or less (size view). Others emphasize the unregulated characteristic of the informal sector, composed of those workers who do not have social security insurance (social coverage view).

Under the size view, the informal sector is seen as a segmented part of the labor market, without links to the formal sector. The restricted modern (or formal) sector is considered incapable of generating sufficient employment. Given the obstacles to inter-sector mobility, excluded workers find second-best opportunities in the easily entered and competitive small firms of the informal sector. Although empirical evidence is not conclusive, some authors have found evidence of segmentation in the labor markets of Central American countries, i.e. that the labor market is composed of two distinct, unrelated sectors.² This is a concern, for if there is a dual labor market and workers in the informal sector consistently receive lower wages, no returns to schooling or on the job training and encounter non-economic barriers in finding better jobs in the formal sector, there is definitely scope to improve the position of these workers. The informal sector

¹ Guatemala has not been included in the econometric analysis due to data restrictions. However a brief description of main characteristics of the labor market is given in the first sections.

² See section II.2 on Empirical Findings for a review of these studies.

would be a source of residual employment, not offering the same human capital investment opportunities and returns as the formal sector. This is of concern not only in issues of equality, but it may also have an impact on the overall quality of the labor force. Although this paper does not provide evidence for or against segmentation in labor markets, it does show that wages and human capital investment (as measured in years of schooling) are lower in the informal sector defined under the size view. The estimation of participation equations identifies what groups in the society are more likely to be employed in the informal sector, thus giving evidence as to who are the less advantaged in the labor force.

Under the social coverage view, the informal sector is the unregulated part of the economy, in an environment in which similar activities are regulated. Researchers have especially looked at whether workers are covered by the social security system. The fact that a large proportion of the labor force does not enjoy the benefits of social security is of special concern. There are negative externalities at the social level arising from having an uninsured work force. At the individual level, informal sector workers have a disadvantage over formal sector workers not only at retirement age but also in the event of accidents in the place of work. The analysis of participation decisions in the informal sector can therefore establish who composes the majority of workers in this part of the labor market, and can serve to better target policies to those that have no social insurance.

The estimation of labor force participation equations and sector of employment participation is a first step in understanding how labor markets are composed. Further research is necessary to establish what originates the existence of an informal sector and how focusing in these causes can improve labor market opportunities for a wider working population.

The structure of the paper is as follows. Section 1 describes very briefly the historical background of the region and gives aggregate labor market statistics and motivation for the analysis. Section II discusses some of the most important ideas in the topic and a short literature review of recent findings. Section III explains the contents of the data and definitions, and analyzes summary statistics. Section IV describes the model and estimation methodology. Results are reported in Section V. Section VI concludes.

A. Historical Background of the Region

With the exception of Costa Rica, Central America has had very a turbulent history. Internal wars, economic and political instability, and authoritarian governments have plagued most nations. With the 1990s peace, there has been a promotion of economic growth and development. A very brief description of main economic events follows.³

Guatemala

Guatemala, like other Central American countries, was severely affected by external crises in the 1980s. Combined with internal political conflicts, civil war, and import substitution policies, these crises accentuated Guatemala's lack of external competitiveness. GDP per capita fell by 20% in the first five years of the 1980s. By 1990 the macroeconomic situation was very poor, with no GDP per capita growth, fiscal deficits around 5% of GDP,⁴ and inflation above 60%.

The first comprehensive stabilization program was implemented in 1991, with the goal of reducing public expenditure and increasing the tributary base. In 1992, there was a surplus of 1% of GDP, inflation decreased to 10%, and GDP grew at almost 5%.

In 1993 President Serrano Elías was forced to resign by the Legislature after trying to close the Congress, amend the Constitution and rule by decree. The new government tried again to implement a stabilization program, but with little success.

From 1996-98, President Arzú implemented a series of structural reforms including:

- a) modernization of the state through privatization, tax, judicial and, legislative reforms;
- b) approval of the banking, pension funds, and stock markets laws;
- c) customs and export tax reforms;
- d) new law for foreign investments;
- e) approval of labor, education, health and social security reforms;
- f) intellectual and property rights laws.

³ This section summarizes ideas from "Estudio sobre aspectos salientes del mercado laboral centroamericano". Mimeo prepared by INCAE.

⁴ Includes quasi-fiscal deficit from the Central Bank.

The success of these reforms is yet to be seen, but peace agreements between the government and guerrilla groups have greatly improved political stability. Civil rights and internal security, however, remain a serious concern in Guatemala.

El Salvador

After a decade of civil war, El Salvador stabilized in the early 1990s. Peace was finally achieved in 1992. Prior to the peace, President Cristiani's administration started a series of reforms guided by market oriented policies in 1989. After the peace, these were continued. Central Bank independence and fiscal discipline have further helped to stabilize prices and to spur growth. Import taxes have been reduced and made more uniform. There's been improvement in national infrastructure and reduction of business costs in order to promote investment. El Salvador has maintained a fixed parity policy contributing to economic stability and low inflation. In 1996, the Heritage Foundation characterized El Salvador as one of the most open countries in Latin America, after Panama. Still, great concern exists over the development of a solid banking system⁵ and a private pension system.

Honduras

During the 1980s, Honduras was characterized by import substitution policies. Economic activity declined and fiscal deficits reached 10% of GDP. In turn, this made external financing hard to obtain.

The government implemented the first comprehensive program of economic reforms in 1990, achieving growth rates of 6% in 1993. By the end of 1993, many policies were reversed after the national elections, especially those intended to eliminate private sector subsidies and to maintain the real value of tariffs on public services. In that year fiscal deficits grew to almost 9% of GDP, inflation doubled and international reserves declined to less than US\$ 100 million.

Economic activity restarted in 1995, especially export-led growth. Fiscal measures helped to control expenditure and to increase taxes. International reserve levels were reestablished. Inflation, however, remained high at 29%.

⁵ Almost all banks have been privatized except for the Banco Hipotecario.

Nicaragua

Nicaragua, under the Sandinista government of the 1980s, adopted a “populist” model that actively involved the state in the economy. Public expenditure was very unproductive, directed towards financing the war. International monetary reserves were run down and external credit use reached \$12.000 million. With negative GDP growth and money creation to finance government expenditure, Nicaragua experienced hyperinflation.

A stabilization and structural adjustment plan followed the end of the Sandinista regime and the beginning of democracy. The main goals were price stabilization, balance of payments strengthening, reinsertion in the international financial market, and the promotion of the country’s competitiveness. Since 1994, there has been sustained growth, around 2%, and annual inflation has been stable at 12%. However, the employment situation is critical, with an unemployment rate of 9%, an underemployment rate over 50% and poverty levels at 50% in 1996. Land property rights have not been settled yet and there is strong parliamentary dissent with respect to the deepness and speed of the reforms.

Costa Rica

Costa Rica also suffered the ill consequences of the import substitution model during the 1980s. GDP fell by 7% in 1992, and inflation reached 90%. It has been the worst recession suffered in the past 30 years. Since 1992, several stabilization and structural adjustment plans have been implemented. Growth was positive at 7.7%, promoted mainly by exports and private investment. Inflation declined to 17%. Fiscal stance improved due to higher tax revenue and lower interest payments on debt. After a prosperous 1993, macroeconomic conditions deteriorated again in 1994. GDP growth was only 0.7% in 1996. Policy measures have been slow due to lack of political and social consensus with respect to privatization programs for public services and the financial system. The new government of 1998 has a pending agenda for deepening reforms and liberalization of the economy.

B. Labor Market Statistics for Central America

When analyzing aggregate labor market statistics for the region, several aspects stand out (See Table 1):⁶

1. Labor force participation rates are low by international standards. In Central America, labor force participation barely reaches 50%. Participation in other Latin American countries exceeds this rate by ten points. For example, in 1996 Bolivia had a labor force participation rate of 56.8%, Uruguay of 58.1%, Brasil of 59.6%, Colombia of 59.8% and Venezuela of 62.9%. The United States has even higher rates (67.7% in 1997), as do other developed countries.⁷
2. Low unemployment rates prevail. With the exception of Nicaragua, these rates do not surpass 8%.
3. Equivalent unemployment rates are very high. Equivalent unemployment equals the sum of open unemployment, visible subemployment (employment below normal working hours), and invisible subemployment (employment below minimum wages).

⁶ For a detailed description of statistics see also: "Labor Markets in Central America", prepared for the Central America Project, summer 1997.

⁷ Source: CEPAL, based on Household Surveys.

Table 1: Aggregate Labor Statistics⁸

| | Labor Force Participation | Unemployment Rate | Equivalent Unemployment |
|--------------------|----------------------------------|--------------------------|--------------------------------|
| Guatemala | | | |
| 1992 | 45.0 | 1.5 | 47.4 |
| 1993 | 45.1 | 2.5 | 46.2 |
| 1994 | 45.3 | 3.3 | 45.0 |
| 1995 | 45.5 | 3.7 | 43.9 |
| 1996 | 45.7 | 4.9 | 42.7 |
| Costa Rica | | | |
| 1992 | 51.5 | 4.1 | 20.8 |
| 1993 | 52.5 | 4.1 | 15.8 |
| 1994 | 53.1 | 4.2 | 17.3 |
| 1995 | 53.9 | 5.2 | 19.9 |
| 1996 | 52.2 | 6.2 | 22.6 |
| El Salvador | | | |
| 1994 | 53.4 | 7.7 | |
| 1995 | 52.4 | 7.6 | |
| 1996 | 51.3 | 7.7 | |
| Honduras | | | |
| 1992 | 48.9 | 3.1 | 33.9 |
| 1993 | 49.7 | 4.7 | 35.3 |
| 1994 | 49.2 | 2.8 | 31.8 |
| 1995 | 49.5 | 3.2 | 29.1 |
| 1996 | 51.6 | 4.6 | 34.0 |
| Nicaragua | | | |
| 1985 | 49.8 | 3.2 | |
| 1993 | 46.9 | 13.4 | |
| 1996 | 49.4 | 9.4 | 56.6 |

All numbers are percentages.

Source: For Nicaragua 1985 and 1993: "Informe General de la Encuesta de Medicion de Nivel de Vida, 1993", prepared by Insituto Nacional de Estadisticas y Censos (INEC). For Honduras, El Salvador, Costa Rica, Guatemala, and Nicaragua 1996: "Estudio sobre aspectos salientes del mercado laboral centroamericano" prepared by INCAE, based on Household Surveys. Data includes "people in working age": older than 10 years for El Salvador, Honduras, Guatemala and Nicaragua; older than 12 years for Costa Rica.

* Estimate from Yearbook of Labor Statistics, 1995 edition.

Although in less-developed countries women typically participate less in the labor market than in developed countries, labor force participation rates for women are particularly low in Central America. Table 2 clearly shows that, in most countries, participation by women is less than half the rate for men. Their significant lack of participation drives down the overall participation and employment averages. In comparison, in Bolivia, Uruguay, Brasil, Colombia, and Venezuela the corresponding

⁸ The reader should be advised that source and methodology differ across countries and years.

figures are: 49%, 46.5%, 44.9%, 48% and 43.3% for 1996.⁹ Moreover, women suffer higher unemployment rates than men except in El Salvador and Nicaragua.

Table 2.: Females versus Males Basic Labor Statistics

| | Labor Force Participation | | | Unemployment Rates | | |
|--------------------|---------------------------|---------|-------|--------------------|---------|-------|
| | Males | Females | Total | Males | Females | Total |
| Guatemala | 76.91 | 24.47 | 49.71 | 2.00 | 3.15 | 1.60 |
| Costa Rica | 77.57 | 33.41 | 55.29 | 5.74 | 7.45 | 4.98 |
| El Salvador | 70.30 | 36.68 | 52.36 | 7.67 | 6.26 | 8.51 |
| Honduras | 71.61 | 29.98 | 50.06 | 3.52 | 3.97 | 3.31 |
| Nicaragua | 64.6 | 32.1 | 46.9 | 13.4 | 12.2 | 13.4 |

All numbers are percentages.

Data is average 1994-1996 for Costa Rica, Honduras and El Salvador, year 1989 for Guatemala and year 1993 for Nicaragua.

Source: For Nicaragua 1993: "Informe General de la Encuesta de Medicion de Nivel de Vida, 1993", prepared by Instituto Nacional de Estadisticas y Censos (INEC). For Honduras, El Salvador, Costa Rica and Guatemala: "Estudio sobre aspectos salientes del mercado laboral centroamericano" prepared by INCAE. Based on Household Surveys. Data includes "people in working age": older than 10 years for El Salvador, Honduras, Guatemala and Nicaragua; older than 12 years for Costa Rica.

Although it is not possible to find a homogeneous series of the size of the informal sector in all countries, the following table provides some basic figures.¹⁰ Three stylized facts should be emphasized:

1. The informal sector in Central America is *very* big, exceeding 40% of total employment.¹¹
2. The informal sector is even more significant for the employment of women in all countries except Costa Rica.¹²
3. The informal sector has grown during the 1990s in almost all countries.

⁹ Source: CEPAL, based on Household Surveys.

¹⁰ The reader should be advised that definition and methodology differ across countries and years. This is clearly evident for Costa Rica before and after 1992. The source of this data is different as the note below the table describes. The sample includes only urban employment.

¹¹ Except for the case of Costa Rica in the beginning of the 80's.

¹² For instance the size of the informal sector in Mexico is 30.8%, composed of 33.4% of males and 24.8% of females. (Source: Marcouiller et al, 1997).

Table 3: Labor Market Composition in Urban Areas: Formal versus Informal Sectors

| | Males | | Females | | Total | |
|--------------------|--------|----------|---------|----------|--------|----------|
| | Formal | Informal | Formal | Informal | Formal | Informal |
| Guatemala | | | | | | |
| 1986 | 69.2 | 30.8 | 45.4 | 54.6 | 58.6 | 41.4 |
| 1989 | 53.2 | 46.8 | 37.0 | 63.0 | 47.0 | 53.0 |
| Costa Rica | | | | | | |
| 1980 | 71.8 | 28.2 | 50.9 | 49.1 | 63.5 | 36.5 |
| 1983 | 67.2 | 32.8 | 63.1 | 36.9 | 65.8 | 34.2 |
| 1985 | 65.2 | 34.8 | 65.4 | 34.6 | 65.3 | 34.7 |
| 1988 | 68.4 | 31.6 | 65.5 | 34.5 | 67.4 | 32.6 |
| 1991 | 68.9 | 31.1 | 60.1 | 39.9 | 65.6 | 34.4 |
| 1992* | | | | | 58.6 | 41.4 |
| 1993* | | | | | 56.3 | 43.7 |
| 1994* | | | | | 53.8 | 46.2 |
| 1995* | | | | | 55.4 | 44.6 |
| El Salvador | | | | | | |
| 1985 | 47.0 | 53.0 | 25.8 | 74.2 | 37.7 | 62.3 |
| 1988 | 64.1 | 35.9 | 39.4 | 60.6 | 53.5 | 46.5 |
| 1990 | 55.3 | 44.7 | 32.1 | 67.9 | 44.7 | 55.3 |
| 1992 | 61.3 | 38.7 | 38.0 | 62.0 | 50.3 | 49.7 |
| Honduras | | | | | | |
| 1989 | 58.8 | 41.2 | 40.2 | 59.8 | 51.1 | 48.9 |
| 1990 | 54.9 | 45.1 | 37.0 | 63.0 | 47.7 | 52.3 |
| 1991 | 56.7 | 43.3 | 42.9 | 57.1 | 51.1 | 48.9 |
| Nicaragua | | | | | | |
| 1985 | 61.5 | 38.5 | 43.5 | 56.5 | 54.1 | 45.9 |
| 1993 | 39.6 | 60.4 | 31.7 | 68.3 | 36.2 | 63.8 |
| 1995 | 46.1 | 53.9 | 34.8 | 65.2 | 41.1 | 40.8 |
| 1996 | 45.2 | 54.8 | 35.2 | 64.8 | 58.9 | 49.2 |

*Please note the different source from 1992 onwards.

All numbers are percentages.

Source: Funkhouser (1996.b). Proportion over total urban employment. Sample consists of all persons working in the survey week. Informal sector consists of domestic workers, family workers, wage and salary workers in firms of four or fewer persons, except professionals and technical occupations, and all self employed.

Based on Household Surveys.

For Costa Rica 1992-1995: OIT estimates based on Household Surveys and other official figures.

For Nicaragua 1993-1996: MITRAB, Managua based on a survey of 17 cities.

The following table provides estimates of the informal sector in terms of GDP. Costa Rica stands out as an exception in the rest of the Central American countries for which data is available. In Guatemala and Honduras the informal sector represents a bigger proportion of GDP than in South America.

Table 4: The Informal Sector in Terms of GDP

| Central America | |
|------------------------|------|
| Costa Rica | 23.3 |
| Guatemala | 50.4 |
| Honduras | 46.7 |
| Panama | 62.1 |
| South America | |
| Argentina | 21.8 |
| Brazil | 37.8 |
| Chile | 18.2 |
| Colombia | 35.1 |
| Ecuador | 31.2 |
| Mexico | 27.1 |
| Uruguay | 35.2 |
| Venezuela | 30.8 |

Source: Loayza (1997).

Data is from early 90's. Informal sector consists of workers with no social security coverage.

Although at first glance unemployment rates do not appear to be critically high, labor markets in Central America, as a whole, are very precarious. A closer consideration of labor force under-utilization increases the unemployment rates to largely 50%. Moreover, half of the employed labor force works in the informal sector, which is largely composed of women and generally represents a larger share of GDP compared to many Latin-American countries.

II. THE INFORMAL SECTOR IN CENTRAL AMERICA

There has been an increased concern about labor informality in Central America. Even during the economic dynamism of the 1970s, informal employment decreased very little, and even grew in some cases (Tokman, 1989). Formal employment also declined after the crises in the 1980s, bringing greater open unemployment and sub-employment, while decreasing workers' protections. Finally, concern about poverty in the region, that has always been linked to informal employment, has been growing.¹³

¹³ See Funkhouser and Perez Sainz (1998) for an exhaustive analysis on poverty and labor markets.

A. Theoretical Debates

In the debate over how to define the informal sector, different approaches have been proposed. Supporters of the classical theory of competition see the informal sector as an example of the market economy, perfect and pure but segmented, without links to the modern sector. The restricted modern sector is considered incapable of generating sufficient employment. Given the obstacles to inter-sector mobility, excluded workers find second-best opportunities in the easily entered and competitive small firms of the informal sector. The classical view usually credits the process of technological change as partly responsible for the origin of the informal sector. They argue that since underdeveloped countries use imported technology not appropriate for their needs, this alters the profile of labor demand. Given the more capital-intensive technology in the formal sector, this results in an excluded labor force. With few physical or human resources, the excluded force resorts to small-scale productive activities.

In a competing theory, the functional definitions emphasize the key links between the two sectors. The informal sector is the unregulated part of the economy, in an environment in which similar activities are regulated. Economic activity freely moves from the protected or covered sector to the uncovered informal sector. The way the informal sector functions makes it almost impossible to enforce legal and institutional regulations. It is then the legal apparatus that explains the origin of the uncovered sector.

Based on the available data, two different operational definitions have been typically applied to the informal sector. Analysts who emphasize the generation of employment view use firm size as the defining criteria, usually five employees or less, with the exclusion of some occupational categories such as professionals or technicians. Supporters of the social regulation view focus on coverage by the social security system and the legal registration status.

Previous empirical findings have emphasized “common” characteristics of the informal sector in the region, especially regarding what demographic groups and which industries account for its composition. All the empirical evidence, however, corresponds primarily to the period before 1993. The process of restructuring and deregulation calls for a new analysis of the different scenarios that have emerged. Some are beginning to

recognize changes in the patterns of employment. “A significant subgroup of the informal sector has a dynamic entrepreneurial character that contrasts with the traditional view of the informal sector as source of refuge employment.”¹⁴ They argue that informal workers are the true capitalist entrepreneurs, somewhat stunted in their growth by excessive regulation by the state (Tokman, 1989).

Perez Sainz (1996) proposes three hypotheses to explain recent changes in informal labor markets in Central America. The first one deals with the growth of a new tradable sector:

- a) multinational companies of “the second generation“, that is, capital inflows of the 1970’s that do not correspond to traditional international businesses;
- b) investment from Asian countries, especially in “maquila,” such as by Korean firms in Guatemala;
- c) old firms that succeeded in redirecting production towards exporting instead of the sub-regional markets; and
- d) new businesses.

The second hypothesis addresses the decline of the formal sector that suffered the greatest impact with the crisis of the 1980s and the consequent generation of unemployment from private enterprises. The opening of an economy challenges the companies in a previously protected sector. These companies are forced to adapt to the tradable sector (exporting or competing with imported goods), to go into the informal sector or simply to disappear. Public employment also undergoes a drastic readjustment. This phenomenon tends to dilute the differences between the formal and informal sector, making the occupational category and size of the firm criteria less relevant. The same criticism applies to the regulation view, given the growing tendency towards deregulation. Firms in the informal sector may be well connected to larger firms through subcontracting and networking, making the distinction across sectors less well defined.

The third hypothesis concerns changes within the informal sector, especially in its origination, dynamics and insertion into the national economy. Perez Sainz (1996) applies the term “neoinformality”, and defines it as such urban activities characterized by

¹⁴ Funkhouser (1996.b)

a simple division of labor, where the owner is directly involved in the production of goods and services, in the process of capitalist modernization.

Informality in recent periods may be linked to three different settings then, from more traditional to more dynamic:

First, the persistence of subsistence activities, with entry barriers to the formal sectors such as ex public employees in Managua, Nicaragua. Two main differences with informality from previous periods are:

- a) the generation of excess labor supply does not occur as a consequence of import substitution industrialization, but rather due to the production of new tradable goods with no implied technological bias;
- b) the incorporation into this sector of the so-called “new poor”.

Second, subordinated activities that provided inputs to the tradable sector or to companies that were forced to rely on outside production of factors. An example would be domestic workers in Puente Alto, Honduras. Finally, dynamic agglomerations of micro-enterprises that share social capital, such as Sarchi handicraft in Costa Rica (Perez Sainz; 1996).

B. Empirical Findings

Previous empirical findings can be classified in two main groups: those that concentrate in estimating wage differentials and participation equations across sectors and those that provide tests for segmentation and dual labor markets hypotheses.

In the first group, the recent work by Marcouiller et al. (1997) provides measures of the informal wage gap in El Salvador, Mexico and Peru and compares results based on two definitions of the informal sector, size of the firm and social security coverage. The social security coverage definition suggests a larger size of the informal sector in all three countries. Estimations for El Salvador show that women, the young, the old, and the least educated compose the majority of the informal sector work force. Controlling for

human capital variables and job characteristics, formal sector wages show a considerable premium over the informal wages. Five industries account for roughly two-thirds of informal sector employment: retail trade, construction, clothing and footwear manufacturing, transportation, and personal services.

Funkhouser (1996b) uses household data up to 1993 from Costa Rica, Nicaragua, El Salvador, Honduras and Guatemala. Contrary to Marcouiller et al., he concentrates on the size definition. Funkhouser finds four main patterns of employment common to all markets. First, the informal sector is a significant part of the labor force (using the size definition). Second, the informal sector is composed of the youngest, the oldest and the least educated. This is consistent with the results from Marcouiller et al. (1997). Third, returns to schooling, though significant, are smaller in the uncovered sector. On the other side, returns to experience are usually higher. Finally, female-male wage differentials are bigger in the informal than in the formal sector.

With respect to the second group of empirical findings, those who propose tests of dual or segmented labor markets naturally follow the employment generation view of informality.¹⁵ The two main claims of the dual markets hypothesis are:

- a) “that there is a distinct low-wage (secondary) labor market in which there are no returns to schooling and workers do not receive on the job training;” and,
- b) “that there are non-economic barriers that prevent at least some secondary workers from obtaining better (primary) jobs.”¹⁶

Some of the explanations given to the dual labor markets hypothesis include industry differentials, efficiency wages, unions and government hiring policies. Gindling (1991) provides evidence for labor market segmentation between the public and private-formal sectors in San Jose, Costa Rica. Funkhouser (1996.a) gives a detailed analysis of demand-side and supply-side explanations for barriers to labor mobility in Guatemala. According to Funkhouser, demand side rigidities (minimum wages and industry

¹⁵ See Dickens and Lang (1985) and Magnac (1991) for theoretical and empirical tests applied to the US, and Heckman and Hotz (1986) for evidence in Panama.

¹⁶ Dickens and Lang (1985).

differentials) explain some of the formal-sector wage gap, but there are also supply-side factors affecting mobility across sectors. Although traditional tests seem to support the idea of two different labor markets in Central America, the formal and the informal, none of the tests is completely conclusive. For instance, the hypothesis of dual markets across genders or across different industries is usually not rejected either.¹⁷

Using newly available data from household surveys, the study presented below analyzes how different patterns of development and modernization have shaped the composition of the informal sector in these countries of Central America. The study first describes the main characteristics of the labor market in recent years, then estimates equations to determine which groups are more likely to participate in the labor market. It then determines who of those likely to participate would choose the informal over the formal sector. This analysis aims not only to utilize the newest data available, but also to employ a more complete model of labor force participation at the extensive margin and sector of employment choice. Previous work has concentrated on estimating informal sector participation determinants without considering decisions that come before, namely, whether to participate in the labor market in the first place. This study attempts to give a more integral perspective on how labor markets are composed in Central America. Additionally, it will provide some evidence on competing views about different definitions given to the informal sector. The informal sector is both complex and multidimensional with no simple prescriptions.

¹⁷ See Krueger and Summers (1988); Brown, Charles and J. Medoff (1989) and Bils, Mark and K., McLaughlin (1997) for evidence based in the US.

III. DATA ANALYSIS

A. Data Description

The data corresponds to the latest compiled Household Survey in each Central American country under study. For Nicaragua this is the *Encuesta de Medición de Nivel de Vida de 1993*, conducted nationally by Instituto Nacional de Estadísticas y Censos (INEC). For El Salvador, data corresponds to the *Encuesta de Hogares de Propósitos Múltiples 1996*, conducted by Dirección General de Estadísticas y Censos. For Costa Rica the source is *Encuesta de Hogares de Propósitos Múltiples, Módulo Empleo, Julio 1997*, conducted by Ministerio de Economía, Industria y Comercio, Area de Estadísticas y Censos, and for Honduras, the data comes from the *Encuesta Permanente de Hogares de Propósitos Múltiples 1997*, conducted by Dirección General de Estadísticas y Censos.¹⁸

Household Surveys typically include information on:

- Demographic variables: household composition, age, sex, education, migration, civil status, and others.¹⁹
- Employment variables: labor force participation, unemployment spells, number of hours worked, income, social security coverage status, occupational category, sector of employment, etc.

Many Surveys also include a section on housing and/or health. The analysis does not consider this information.

The definition of the informal sector to be used depends on the type of data and special regulations available for each country. To make results comparable, however, definitions are as homogenous as possible. As data permits, size and social security coverage criteria are used in the analysis. Table 5 explains these criteria in each country.

¹⁸ A more detailed description of each survey is included in Appendix I.

¹⁹ For instance, the Survey for Nicaragua is very complete and includes information on tuition, types of school attended, special courses, book and materials expenditure and more.

Table 5: Informal Sector Criteria by Country

| Country | Criteria |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------|
| Costa Rica | Size: workers in firms of five people or less, with the exception of professionals and technicians, and all self-employed workers. |
| El Salvador | SS: workers not covered by Instituto Salvadoreño de Seguridad Social (ISSS). |
| | Size: workers in firms of five people or less, with the exception of professionals and technicians, and all self-employed workers. |
| Honduras | Size: workers in firms of five people or less, with the exception of professionals and technicians, and all self-employed workers. |
| Nicaragua | SS: workers not covered by Instituto Nacional de Seguridad Social (INSS) or any other institution. |
| | Size: workers in firms of five people or less, with the exception of professionals and technicians, and all self-employed workers. |

Note: Sample includes population in working age (10 years and older, except for Costa Rica -12 years and older-).

B. Summary Statistics

This section provides summary statistics that describe patterns of labor force participation by age group and sex; characteristics of the informal sector using the size definition; and characteristics of the informal sector using the social security coverage definition.²⁰

Patterns of Labor Force Participation

In general, labor force participation rates in Central America fall below other Latin American and developed countries and include low proportions of women. Table 7 presents the composition of the labor force by age groups and sex. In Honduras and Nicaragua total labor force participation rates are below 50%. In both countries, the labor force contains twice as many men as women. Men participate at a rate of 64% in Honduras in 1997 and 62% in Nicaragua in 1993. The corresponding figure for women is roughly 33%. Costa Rica and El Salvador have higher labor force participation rates,

²⁰ Appendix II gives general summary statistics on all available observations for people in working age.

above 50%, but still below other Latin American and developed countries. As in Honduras and Nicaragua, females' rates, around 30%, are not even half of males'.

This indicates that although there have been important macroeconomic and political changes in recent years, women are still very poorly represented in the labor market. While male rates are comparable to other Latin American and developed countries, female rates are clearly below standard.²¹

Participation in the labor market by different age groups shows common patterns across the countries and genders. Participation rates are consistently low for people younger than 20 years old, increase to a maximum for the group aged 40-50 and then decline again for the older two age groups. The group of 70 years and older has a higher participation rate in the labor market than the young, except in Costa Rica.

²¹ See the Introduction; section 2, for international figures.

Table 6: Labor Force Participation by Age Group and Gender (percent of total)

| Country | Age Groups | | | | | |
|-----------------------------|-----------------|-------|-------|-------|---------|-------|
| | Younger than 20 | 30-40 | 40-50 | 50-60 | More 70 | Total |
| Costa Rica 1997 | | | | | | |
| Male | 47.89 | 95.03 | 95.13 | 84.93 | 41.94 | 70.85 |
| Female | 18.89 | 43.36 | 41.43 | 25.87 | 8.93 | 33.51 |
| Total | 33.71 | 68.79 | 68.08 | 55.85 | 25.63 | 53.91 |
| El Salvador 1996 | | | | | | |
| Male | 36.43 | 89.09 | 91.42 | 83.84 | 51.38 | 69.20 |
| Female | 12.85 | 50.01 | 48.96 | 36.99 | 19.17 | 35.61 |
| Total | 24.78 | 67.57 | 68.15 | 57.69 | 33.43 | 51.30 |
| Honduras 1997 | | | | | | |
| Male | 30.59 | 86.68 | 89.55 | 86.94 | 63.44 | 63.92 |
| Female | 14.00 | 46.62 | 50.12 | 40.10 | 20.51 | 33.30 |
| Total | 22.45 | 65.22 | 68.41 | 61.40 | 40.24 | 47.97 |
| Nicaragua 1993 | | | | | | |
| Male | 30.05 | 83.87 | 87.98 | 86.05 | 48.00 | 64.52 |
| Female | 11.54 | 48.09 | 52.29 | 39.52 | 19.77 | 30.51 |
| Total | 20.81 | 65.18 | 68.74 | 60.87 | 32.60 | 47.01 |

All numbers are percentages.

Sample includes people in working age (10 years and older, except for Costa Rica, 12 years and older).

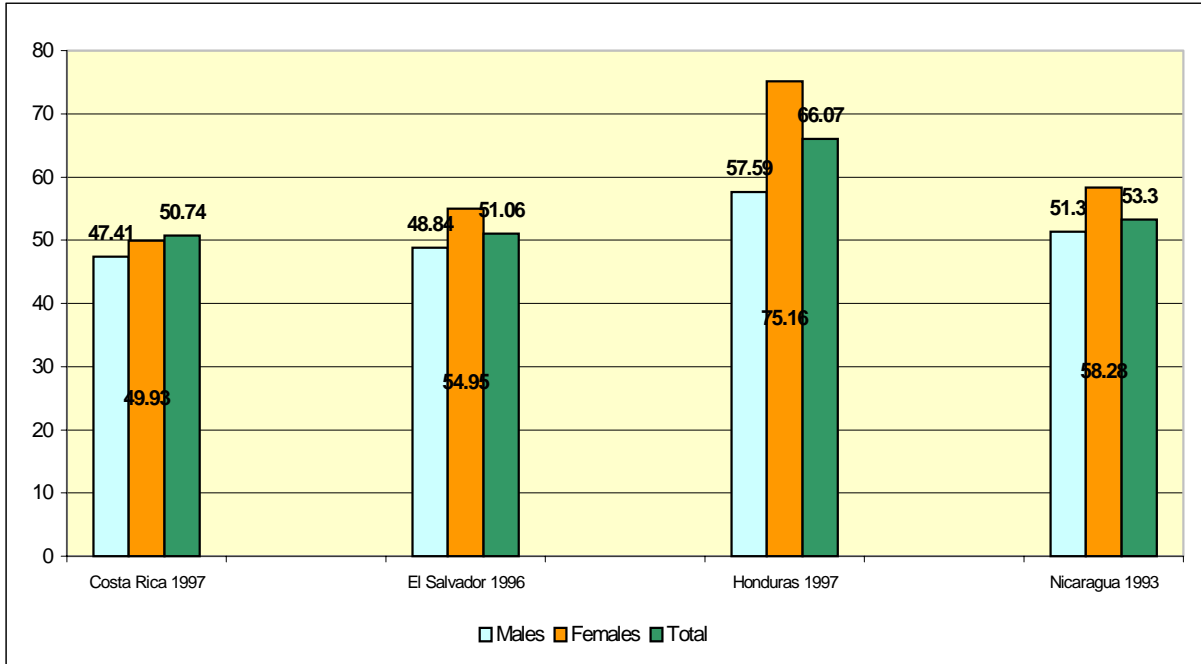
Source: Own calculations based on Household Surveys.

Characteristics of the Informal Sector: Firm Size Definition

Informal Sector Participation Summary Statistics

New developments following structural adjustment plans have not changed the main patterns of participation in the informal labor market in terms of size or gender composition in Central American countries. In all countries, women compose the majority of the informal sector, under the firm size criteria. Moreover, there is a clear correlation between the level of development of the country and the size of the informal sector; the more developed nations having less informal labor participation. This coincides with previous trends of participation described in earlier sections. According to the size definition, Costa Rica has the smallest percentage of employed workers in the informal labor market, 50.7%. El Salvador follows closely with 51.1%, then Nicaragua with 53.3% and Honduras with the largest incidence of informality, 66.1%. (See graph 1)

Figure 1: The Informal Sector Defined by Size: Participation by Men, Woman and Total as a Percent of Participation of Each Category in the Labor Force.



All numbers are percentages.

Sample includes people in working age (10 years and older, except for Costa Rica, 12 years and older).

Source: Own calculations based on Household Surveys.

Hourly Wage and Level of Education

Hourly wages are on average 27% higher in the formal sector in Costa Rica, 35% in Nicaragua, 40% in Honduras and 50% in El Salvador. In all countries, these differences are even larger for women. Men make on average 15% more than women in Nicaragua, 25% in Honduras, and 17% in El Salvador both in the formal and informal sectors. In Costa Rica, however, women make 10% more than men.

Table 7: Hourly Wage in Dollars of the Survey Year by Sector and Gender

| Costa Rica 1997 | | | | El Salvador 1996 | | | |
|-----------------|--------|----------|-------|------------------|--------|----------|-------|
| | Formal | Informal | Total | | Formal | Informal | Total |
| Male | 1.79 | 1.37 | 1.60 | Male | 1.34 | 0.73 | 1.08 |
| Female | 2.10 | 1.44 | 1.77 | Female | 1.16 | 0.67 | 0.91 |
| Total | 1.87 | 1.39 | 1.65 | Total | 1.28 | 0.70 | 1.02 |
| Honduras 1997 | | | | Nicaragua 1993 | | | |
| | Formal | Informal | Total | | Formal | Informal | Total |
| Male | 1.07 | 0.77 | 0.88 | Male | 0.77 | 0.59 | 0.69 |
| Female | 0.92 | 0.51 | 0.68 | Female | 0.69 | 0.43 | 0.57 |
| Total | 1.01 | 0.68 | 0.81 | Total | 0.75 | 0.55 | 0.66 |

Note: Wage corresponds to payment from main and secondary occupation, and monetary value of compensation in kind, divided by total hours worked. For Nicaragua includes only payment from main occupation.

Sample includes people in working age.

Source: Own calculations based on Household Surveys.

A rigorous statement about wage discrimination by gender cannot be made without controlling for other variables that affect wages, such as work experience and tenure. For instance, the result for Costa Rica could be explained by differences in human capital endowments other than education. It may be the case that within specific levels of education the traditional wage premium for men exists in Costa Rica.²²

A simple look at averages of education levels indicates that workers in the informal sector are less educated than workers in the formal sector. It also indicates that women who work both in the formal and informal sector tend to have more average years of education than men (See Table 9).

²² A rigorous wage analysis escapes the scope of the present research.

Table 8: Years of Education by Sector and Gender

| Costa Rica 1997 | | | | El Salvador 1996 | | | |
|-----------------|--------|----------|-------|------------------|--------|----------|-------|
| | Formal | Informal | Total | | Formal | Informal | Total |
| Male | 7.58 | 5.90 | 6.78 | Male | 6.53 | 3.81 | 5.18 |
| Female | 10.16 | 6.75 | 8.18 | Female | 7.94 | 4.44 | 5.98 |
| Total | 8.27 | 6.21 | 7.22 | Total | 7.00 | 4.06 | 5.47 |
| Honduras 1997 | | | | Nicaragua 1993 | | | |
| | Formal | Informal | Total | | Formal | Informal | Total |
| Male | 7.75 | 4.21 | 5.37 | Male | 7.20 | 5.55 | 6.39 |
| Female | 9.66 | 4.74 | 6.55 | Female | 8.51 | 6.66 | 7.44 |
| Total | 8.49 | 4.40 | 5.79 | Total | 7.54 | 5.92 | 6.71 |

Sample includes people in working age.

Source: Own calculations based on Household Surveys.

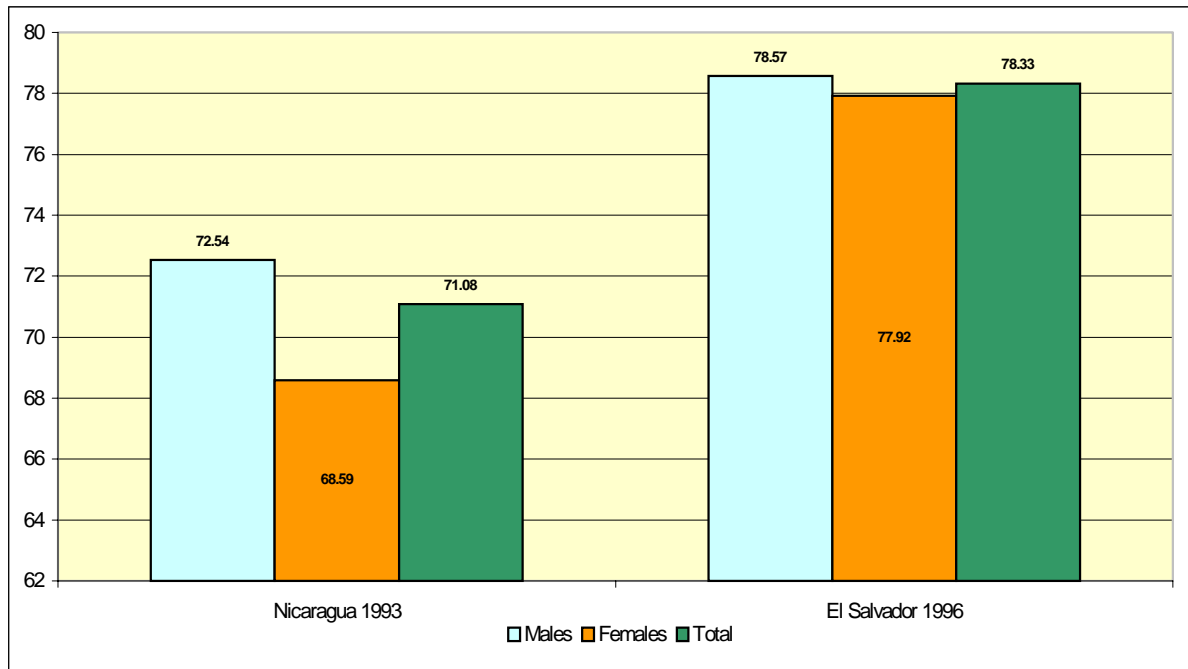
Characteristics of the Informal Sector: Social Security Coverage Definition

Informal Sector Participation Summary Statistics

Participation in the informal labor market is much larger when defined by social security coverage (See Graph 2). The size of the informal sector increases for both Nicaragua and El Salvador, 70% versus 53% and 78% versus 51% respectively.²³ The gender composition also shifts so that men and women are almost equally represented in the informal sector. These results, although not unexpected, make evident the importance of the applied definition: policy implications differ under the two views.

²³ This result coincides with that of Marcouiller et al. (1997) for El Salvador, Mexico and Peru. They also find that the informal sector size is bigger under the social security coverage definition.

Figure 2: The Informal Sector Defined by Social Security Coverage: Participation by Men, Women and Total as a Percent of Participation of Each Category in the Labor Force.



All numbers are percentages.
 Sample includes people in working age (10 years and older).
 Source: Own calculations based on Household Surveys.

Hourly Wage and Level of Education

Under the social security coverage definition, hourly wages and level of education summary statistics follow similar trends as when the informal labor is defined by firm size. Hourly wages are higher in the formal sector, and higher for men. Women who participate in the labor market, however, are more educated. Also, the informal sector is composed of a less educated pool of workers than the formal sector.

Table 9: Hourly Wage in Dollars of the Survey Year by Sector and Gender

| El Salvador 1996 | | | | Nicaragua 1993 | | | |
|------------------|--------|----------|-------|----------------|--------|----------|-------|
| | Formal | Informal | Total | | Formal | Informal | Total |
| Male | 1.34 | 0.73 | 1.08 | Male | 0.91 | 0.70 | 0.75 |
| | | | | | | | |
| Female | 1.16 | 0.67 | 0.91 | Female | 0.72 | 0.57 | 0.63 |
| | | | | | | | |
| Total | 1.28 | 0.70 | 1.02 | Total | 0.82 | 0.64 | 0.68 |
| | | | | | | | |

Note: For El Salvador wage corresponds to payment from main and secondary occupation, and monetary value of compensation in kind, divided by total hours worked. For Nicaragua includes only payment from main occupation.

Sample includes people in working age.

Source: Own calculations based on Household Surveys.

Table 10: Years of Education by Sector and Gender

| El Salvador 1996 | | | | Nicaragua 1993 | | | |
|------------------|--------|----------|-------|----------------|--------|----------|-------|
| | Formal | Informal | Total | | Formal | Informal | Total |
| Male | 6.53 | 3.81 | 5.18 | Male | 8.64 | 5.69 | 6.63 |
| | | | | | | | |
| Female | 7.94 | 4.44 | 5.98 | Female | 9.72 | 5.88 | 7.20 |
| | | | | | | | |
| Total | 7.00 | 4.06 | 5.47 | Total | 9.08 | 5.76 | 6.85 |
| | | | | | | | |

Sample includes people in working age.

Source: Own calculations based on Household Surveys.

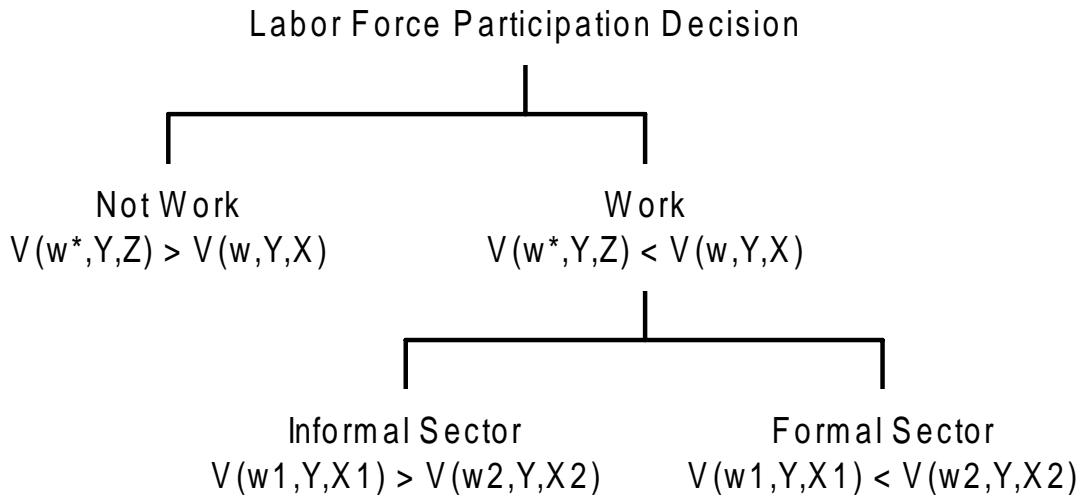
IV. METHODOLOGICAL FRAMEWORK

This section explains the model of labor force participation under consideration. The estimation of participation equations by country will provide statistical evidence as to what demographic groups are more likely to work, and would do so in the informal sector over the formal sector. These will further clarify the results discussed in the previous section.

A. Description of the Model

This model presents a very simple labor supply decision. It assumes that individuals are rational in that their choices maximize perceived utility subject to constraints on expenditure. Utility depends on consumption and leisure. Only the extensive margin decision is considered. Because of imperfect perception and optimization as well as the inability of the analyst to measure exactly all relevant variables, certain errors exist in the maximization process. Utility is therefore treated as a random variable.

The model proposes that individuals make choices according to the following scheme:



The function V denotes indirect “utility” perceived by the individual. It depends upon the wage rate w , non-labor income Y and other variables X , such as personal characteristics that may affect utility through channels other than the wage. The reservation wage, w^* , is defined as the wage rate that makes the individual indifferent between participating and not participating in the labor market. The average potential wage for the agent is w , while w_1 and w_2 correspond to wages in the informal and formal sectors respectively.

The process of decision making is sequential. Once the individual decides to leave the house and search for a job, she next decides what type of employment to accept - in the informal sector or in the formal sector. The unemployed are those who decide to search for a job, but cannot find one. The agent chooses not to work if utility derived from working, $V(w, Y, X)$, is less than utility derived from staying home, $V(w^*, Y, X)$ (those who choose not to search for work are not considered part of the labor market). The decision about which sector to work in also depends on utility. To allow a more general specification, though, variables affecting labor force participation, X , could be different from variables affecting sector choice, Z . The worker chooses the informal sector if utility from working in this sector, $V(w_1, Y, Z)$, is higher than utility in the formal sector and vice versa.

Definitions play a key role in this last stage. If the informal sector is defined by size criteria, the worker can decide by himself what sector to choose, since the distinction between formal and informal is determined by the characteristics of the firm, before the he starts working. If the informal sector is defined by social security coverage more complex factors of labor demand enter into the choice. The decision to avoid regulatory measures or payroll taxes (i.e. participate in the informal sector) is either agreed upon by the two involved parties (employer and employee) or imposed by the employer, regardless of the occupational category or size of the firm. In this sense, Z may be either labor supply factors, or a combination of supply and demand factors. This last possibility makes the scheme more complex. The criteria applied depend crucially on the type of data available.

B. Estimation Approach

The proposed estimation of the model is quite simple:

1. Estimation of a probit for labor force participation. The variable LFP (Labor Force Participation) takes the value of 1 if the person reports having worked in the week prior to the interview or having looked for a job in the prior four weeks. Then:

$$\text{LFP} = 1 \text{ if } V(w, Y, X) - V(w^*, Y, X) > 0$$

Assuming a simple linear form for the difference in utility:

$$\text{LFP} = 1 \text{ if } P \beta + \varepsilon > 0$$

where P includes all variables determining differences in utility through wages, non-labor income and the variables X . It is assumed that ε is a random variable distributed as Normal with mean 0 and standard deviation 1.

From the previous assumption we get:

$$\text{Prob}(\text{LFP} = 1) = \text{Prob}(\varepsilon > -P \beta) = 1 - F(-P \beta)$$

where $F(\cdot)$ denotes the cumulative Normal distribution.

From the estimation of this model it is possible to identify what demographic groups are more likely to participate in the labor market in the different countries. The estimated parameters β indicate how the probability of being employed is affected by the independent variables P .²⁴ In order to capture utility from working, the vector of variables P will include: age, age squared, years of education, years of education squared, dummies for young and old (less than 20 years old, older than 50), marital status (legal marriage, consensual marriage, single, divorced or widow), whether the person is head of household, a sex dummy, interaction of sex and head of household, interaction of sex and

years of education, and when data is available, place of residence and nationality dummies.

2. Estimation of a probit for sector choice. The variable I (Informal) takes the value of 1 if the worker is employed in the informal sector.

Then, following the same logic as before:

$$\text{Prob}(I = 1) = \text{Prob}(v > -Q\alpha) = 1 - F(-Q\alpha)$$

where v is assumed to be a random variable distributed as Normal with mean 0 and standard deviation 1, and F is again the cumulative Normal distribution.

Q denotes the variables that determine differences between utility across the two sectors, through wages, non-labor income and other variables. The estimated parameters α indicate how the probability of being employed in the informal sector is affected by the independent variables Q .²⁵ In this second stage, the vector of variables Q will include:

- Variables that directly affect a worker's utility: age, age squared, years of education, years of education squared, dummies for young and old (less than 20 years old, older than 50), marital status (legal marriage, consensual marriage, single, divorced or widow), whether the person is head of household, a sex dummy, interaction of sex and head of household, interaction of sex and years of education, whether the person has a working spouse, and when data is available, place of residence and nationality dummies.
- Variables that capture an employer's preferences: years of education, years of education squared (and interaction terms), age, age squared -these proxy for labor productivity-; a dummy for firms of five or less employees,²⁶ and when data is available, a dummy for temporary work, and economic sector dummies.

²⁴ This is so through marginal effects: $dF/dP = \phi(P\beta) * \beta$, where ϕ is the normal density function. It is standard to evaluate it at the sample mean.

²⁵ Idem. Given the proposed decision tree, these effects are changes in marginal probabilities conditional on employment.

²⁶ This variable is naturally excluded when using the size definition.

When using the size definition, a simple interpretation for the inclusion of this last set of variables may be that the quality of the match between employers' and employees' preferences has an indirect impact on workers' utility. Therefore these variables belong in the equation for informal sector participation and affect labor supply. When using the social security coverage definition, these variables are simply included to capture factors of labor demand that affect the type of contract. Therefore, the justification is either the indirect effect on workers' utility or the direct effect on employers' preferences.

V. RESULTS

A. Labor Force Participation Equations

Table 12 provides the results from the estimation of labor force participation equations. The results correspond to the variables described in the previous section, that include interaction and quadratic terms. Appendix III shows results from simpler specifications. All have lower R-squared values. Main conclusions are:

- The predictive value of the model is quite good. The Pseudo-R squared is high in all regressions, over 26%, which is standard for this type of model. The observed mean and the predicted mean of labor force participation differ by less than one point in the cases of El Salvador, Honduras and Nicaragua, and by less than three points in the case of Costa Rica.
- Surprisingly, the marginal effect of education on labor force participation is negative for the cases of El Salvador, Honduras and Nicaragua, including linear and quadratic terms. For Costa Rica, the coefficients are not statistically significant.²⁷
- The conclusions about the marginal effect of education on labor participation is quite different, however, when considered for women alone. Education seems to have an

²⁷ The total effect of a variable, linear plus quadratic, is: $dF/dP_i = \phi(P\beta) * \beta_{i1} + 2 * P_i * \phi(P\beta) * \beta_{i2}$, where ϕ is the normal density function and β_{i1} and β_{i2} are the coefficients on the variables P_i and P_i squared respectively. It is standard to evaluate P at the sample mean.

important role when women decide whether to participate in the labor force. In Costa Rica, years of education increase the chance of going into the labor market for a female by 3%. In El Salvador, Honduras and Nicaragua, the corresponding figure is around 2%.²⁸

Clearly, education has different effects on labor force participation patterns for men and women. This coincides with the conclusions reached from the summary statistics: it is the more educated women who participate in the labor market.

- People younger than 20 years old are less likely to participate in the labor market. The coefficient ranges from 15% to 26%.
- In Costa Rica, El Salvador and Honduras, people older than 50 years of age have between 10% and 16% less of a chance of entering the labor market. This coefficient is not significant for Nicaragua.
- The female dummy is statistically significant at 1%, indicating that women have a 40% or lower chance of participating in the labor market compared to men.
- The probability of going into the labor market for a head of household is between 21% and 37% higher than that of a non-head of household.
- For women who are heads of households, the corresponding total effects on labor force participation are negative, ranging from 29% to 39%.²⁹ This indicates that being the head of her household *increases* the chances of going into the labor market for a woman by more than ten points (-30% compared to -40%). The coefficient for the interactive term is not significant in the case of Nicaragua.
- People in rural areas have lower probabilities of participating in the labor force in El Salvador and Costa Rica. For Honduras the coefficient on the rural dummy is not significant.

²⁸ These numbers are calculated by computing the total effect of education on labor force participation (both linear and quadratic) and adding the effect of the interaction term of education and sex.

²⁹ These effects include the effect of the head of household dummy, the effect of the gender dummy, and the effect of the interactive term between gender and head of household.

Table 11: Dependent Variable: Labor Force Participation: **Specification 3**

| | Costa Rica | El Salvador | Honduras | Nicaragua |
|------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| Years of education | 0.00083 <i>0.26</i> | -0.01179 <i>-4.51</i> | -0.01085 <i>-3.59</i> | -0.01500 <i>-2.56</i> |
| Years of education sq. | -0.00023 <i>-1.21</i> | -0.00004 <i>-0.26</i> | 0.00020 <i>1.11</i> | 0.00085 <i>2.32</i> |
| Age | 0.03415 <i>24.23</i> | 0.03609 <i>26.35</i> | 0.04376 <i>26.47</i> | 0.04940 <i>16.56</i> |
| Age sq. | -0.00045 <i>-29.81</i> | -0.00045 <i>-29.60</i> | -0.00052 <i>-27.62</i> | -0.00061 <i>-16.19</i> |
| Age < 20* | -0.26745 <i>-19.29</i> | -0.24447 <i>-18.84</i> | -0.16985 <i>-10.99</i> | -0.15223 <i>-6.34</i> |
| Age > 50* | -0.16259 <i>-9.24</i> | -0.09718 <i>-5.64</i> | -0.06426 <i>-3.02</i> | -0.00404 <i>-0.10</i> |
| Head* | 0.37478 <i>28.72</i> | 0.21336 <i>16.43</i> | 0.30661 <i>20.48</i> | 0.23032 <i>9.56</i> |
| Female* | -0.58116 <i>-38.17</i> | -0.51719 <i>-42.39</i> | -0.44805 <i>-30.76</i> | -0.43347 <i>-16.98</i> |
| Consensual Marriage* | -0.09066 <i>-5.12</i> | | -0.13070 <i>-8.51</i> | -0.03875 <i>-1.62</i> |
| Married* | -0.15617 <i>-10.07</i> | -0.02651 <i>-1.27</i> | -0.13525 <i>-8.84</i> | -0.09464 <i>-3.93</i> |
| Single* | 0.05621 <i>3.53</i> | 0.03706 <i>1.83</i> | -0.03662 <i>-2.15</i> | -0.11488 <i>-4.52</i> |
| Female x head* | -0.18236 <i>-8.30</i> | 0.00262 <i>0.15</i> | -0.17081 <i>-7.67</i> | -0.05120 <i>-1.46</i> |
| Female x years of ed.* | 0.03289 <i>17.34</i> | 0.03156 <i>20.14</i> | 0.02612 <i>13.74</i> | 0.02112 <i>6.20</i> |
| Rural* | -0.03628 <i>-4.23</i> | -0.01420 <i>-1.80</i> | -0.01325 <i>-1.13</i> | |
| Regional dummies | yes | yes | yes | yes |
| Nationality dummies | yes | no | no | no |
| obs. P | 0.55 | 0.50 | 0.50 | 0.48 |
| Pred. P | 0.58 | 0.51 | 0.50 | 0.47 |
| N | 28942 | 28404 | 21683 | 8783 |
| Pseudo R sq. | 0.34 | 0.26 | 0.27 | 0.28 |

(*) dF/dx is for a discrete change of a dummy variable from 0 to 1.

T-statistics below the coefficients.

Excluded dummy=1 for divorced, separated or widow.

Differences across the four countries are not very significant in terms of labor force participation patterns. The least-educated women, non-heads of households, people

younger than 20 years and older than 50,³⁰ all have lower probabilities of participating in the labor market. While being in a rural area does not affect the probability of labor force participation in Honduras, it decreases it in Costa Rica and El Salvador.

B. Informal Sector Participation Equations: Size Definition

This section presents results on all the variables described in the section on methodological framework. Appendix III, contains tables with results from simpler model specifications. Main conclusions follow:

- The predictive value of the informal sector participation model is good. The Pseudo R squared ranges between 10% and 23%. Discrepancies between the observed means and the predicted means of the dependent variable –informal sector participation- do not exceed three points.
- The variable years of education has a negative effect on the participation of workers in the informal sector for all the countries, when considering both linear and quadratic terms.³¹ The negative coefficient verifies the analysis of the summary statistics: it is the least-educated who form the pool of workers in the informal labor market. When considering the interaction between female and years of education, results differ across countries. For Costa Rica and Honduras the effect is negative, meaning that education diminishes the chances of a woman being employed in the informal sector. For El Salvador, the opposite is true. This interaction term is not significant for Nicaragua.
- With the exception of Nicaragua, for which the coefficient was not significant, workers younger than 20 years of age have around a 10% higher probability of working in the informal sector than workers over 20 years of age.

³⁰ However, the coefficient for older than 50 years was not significant for Nicaragua.

³¹ Nicaragua is the only country for which the linear and the quadratic terms have different signs, but the negative one on years of education squared dominates: $0.023 + 2 * 6.7 * (-0.0032) = - 0.019$. For the rest

- The dummy variable for older than 50 years of age was not significant in any of the countries.
- Heads of household have around a 10% lower probability of working in the informal sector than non-heads of households in Nicaragua and El Salvador. This variable is not significant for Costa Rica and Honduras.
- The sex dummy has the expected positive sign in all countries except El Salvador.³² This is compatible with what was described in the summary statistics (women compose the majority of the informal sector according to the size definition), when the interaction of female and head of household is considered. When interpreting these coefficients together, women who are head of their households in El Salvador are most likely to be in the informal sector. This estimate includes the effect of the female dummy (-0.4), the effect of the head of household dummy (-.11) and the effect of the interaction between female and head of household (.22).
- Having a working spouse increases the chances of being employed in the informal sector in El Salvador and Costa Rica by about 14%. It may be argued that once there is an employed person in the household, the other spouse can afford more easily to work in the informal sector. This variable is not significant for Honduras and was not used in the equation for Nicaragua.³³
- Finally, for the rural dummy, while the coefficient is positive in Honduras, it is negative in Costa Rica and not significant in El Salvador.

of the countries the effect is clearly negative. For Honduras, the linear term is significant, for Costa Rica only the quadratic term and for El Salvador, both terms matter.

³² For Nicaragua, this variable is significant only at 13% level.

³³ It was highly correlated with other variables.

Table 12: Dependent Variable: Informal Sector participation, size definition: **Specification 3**

| | Costa Rica | El Salvador | Honduras | Nicaragua |
|-------------------------|-------------------|--------------------|-------------------|-------------------|
| Years of education | -0.00464 -1.16 | -0.00712 -2.18 | -0.02539 -7.22 | 0.02331 1.98 |
| Years of education sq. | -0.00040 -1.67 | -0.00184 -7.98 | -0.00030 -1.41 | -0.00322 -4.25 |
| Age | 0.00997 5.03 | -0.00001 -0.01 | -0.00350 -1.42 | -0.02588 -3.16 |
| Age sq. | -0.00005 -2.21 | 0.00005 2.00 | 0.00009 2.80 | 0.00028 2.44 |
| Age < 20* | 0.13967 7.46 | 0.08814 4.73 | 0.06399 3.43 | -0.01710 -0.32 |
| Age > 50* | 0.02373 1.10 | 0.02353 1.06 | -0.00951 -0.36 | 0.09695 1.00 |
| Head* | 0.00528 0.28 | -0.11229 -7.51 | -0.01444 -0.81 | -0.10616 -2.66 |
| Female* | 0.22130 8.47 | -0.04104 -2.09 | 0.20195 9.30 | 0.09614 1.51 |
| Consensual marriage* | -0.03773 -1.64 | | 0.00884 0.44 | 0.04625 0.88 |
| Married* | -0.03801 -1.77 | 0.00781 0.26 | 0.03071 1.51 | 0.03608 0.65 |
| Single* | 0.05956 2.93 | -0.00117 -0.04 | 0.04065 2.02 | 0.03142 0.55 |
| Female x head* | 0.00039 0.01 | 0.22503 10.11 | 0.01568 0.58 | 0.01385 0.18 |
| Female x years of ed.* | -0.01599 -5.88 | 0.00223 1.03 | -0.02361 -9.58 | 0.00353 0.46 |
| Working spouse* | 0.13349 5.53 | 0.14739 8.35 | 0.00071 0.03 | |
| Rural* | -0.05274 -4.79 | -0.01414 -1.32 | 0.07949 5.48 | |
| Temporary job* | 0.14310 11.57 | | | |
| Regional dummies | yes | yes | yes | no |
| Nationality dummies | yes | no | no | no |
| Economic sector dummies | yes | no | yes | no |
| obs. P | 0.48 | 0.52 | 0.66 | 0.52 |
| pred. P | 0.45 | 0.52 | 0.69 | 0.51 |
| N | 14928 | 13677 | 11907 | 1565 |
| Pseudo R sq. | 0.15 | 0.11 | 0.23 | 0.09 |

(*) dF/dx is for a discrete change of a dummy variable from 0 to 1.

T-statistics below the coefficients.

Excluded dummy=1 for divorced, separated or widow.

In summary, in Costa Rica, El Salvador, Honduras and Nicaragua: the least educated, women, and workers younger than 20 years of age all have higher probabilities of participating in the informal labor market than other groups of workers. Main

differences across these countries are that while being a head of household decreases the probability of belonging to the informal sector in El Salvador and Nicaragua, it does not have an effect in Costa Rica and Honduras. While having a working spouse has positive effects in Costa Rica and El Salvador making participation more likely, it does not seem to matter in Honduras. Finally, living in a rural area has opposite effects. In Costa Rica, it decreases the probability of participating in the informal sector while in Honduras it increases it.

B. Informal Sector Participation Equations: Social Security Coverage Definition

In El Salvador and Nicaragua the Household Survey contains information on social security coverage of the worker. In this analysis, one conclusion repeats from the definition by size. The informal sector has more of a heterogeneous character in comparison to patterns of labor force participation. Other conclusions include:

- Both equations have better goodness of fit statistics than with the size definition, implying stronger predictive power. For Nicaragua, the pseudo R squared is 14% as opposed to 10%, and for El Salvador, 30% compared to 11%. Observed and predicted means of the dependent variable differ by 10 points in El Salvador, but only by 2 points in Nicaragua.
- In both El Salvador and Nicaragua an increase of one year of education decreases the chances of participating in the informal labor market by about 2%. In both cases the linear effect dominates. This result coincides with the one found under the size definition. The effect is even larger (more negative) for females.
- Age increases the chances of being employed in the informal sector for both countries. This result also coincides with the one found under the size definition.
- Workers younger than 20 years are 8% more likely to participate in the informal sector than workers older than 20. This coincides with results from the size definition.

- Workers older than 50 are less likely to participate in the informal sector than workers younger than 50.
- Women have a 4% greater probability of being employed in the informal sector than men in El Salvador and a 12% greater probability in Nicaragua.
- Being a head of household is significant and negative in El Salvador, as it was by the size definition section. Also, women who are heads of households are more likely to work in the informal sector than non-heads of households in El Salvador. This status had no impact on labor-sector choice in Nicaragua.
- In El Salvador, workers in firms of five people or less have a greater than 18% probability of participating in the informal sector, indicating that there is a positive relationship between small enterprises and lack of coverage by the social security system, and that the two competing views of informality are not unrelated. The model is inconclusive on the effect of firm size in Nicaragua.³⁴

³⁴This variable was highly correlated with others in the case of Nicaragua and could not be included in the regression.

Table 13: Dependent Variable: Informal Sector participation, social security coverage definition:
Specification 3

| | El Salvador | Nicaragua |
|-------------------------|---------------------------|--------------------------|
| Years of education | -0.03666 <i>-17.33</i> | -0.02898 <i>-3.70</i> |
| Years of education sq. | 0.00129 <i>10.31</i> | -0.00054 <i>-1.21</i> |
| Age | -0.00397 <i>-2.74</i> | -0.02315 <i>-4.83</i> |
| Age sq. | 0.00007 <i>3.70</i> | 0.00030 <i>4.66</i> |
| Age < 20* | 0.07596 <i>7.56</i> | 0.07874 <i>2.12</i> |
| Age > 50* | -0.03533 <i>-2.25</i> | -0.11599 <i>-2.21</i> |
| Head* | -0.03502 <i>-3.93</i> | -0.00328 <i>-0.13</i> |
| Female* | 0.04913 <i>3.76</i> | 0.12027 <i>2.98</i> |
| Consensual marriage* | | -0.00384 <i>-0.13</i> |
| Married* | 0.01652 <i>0.91</i> | -0.01436 <i>-0.48</i> |
| Single* | 0.03466 <i>1.85</i> | -0.00128 <i>-0.04</i> |
| Female x head* | 0.05916 <i>5.05</i> | -0.00753 <i>-0.18</i> |
| Female x years of ed.* | -0.00503 <i>-4.01</i> | -0.01430 <i>-3.29</i> |
| Working spouse* | 0.00971 <i>0.97</i> | |
| Rural* | 0.04988 <i>7.42</i> | |
| Firm size < 5 employees | 0.18450 <i>28.27</i> | |
| Regional dummies | yes | no |
| obs. P | 0.79 | 0.67 |
| pred. P | 0.89 | 0.70 |
| N | 13531 | 3618 |
| Pseudo R sq. | 0.31 | 0.14 |

(*) dF/dx is for a discrete change of a dummy variable from 0 to 1.

T-statistics below the coefficients.

Excluded dummy=1 for divorced, separated or widow.

In summary, trends in the composition of the labor force of the informal sector appear similar when either size or social security coverage is used to define the sector.³⁵

³⁵ With the exception of the dummy on older than 50 years that was not significant under the size definition of the informal sector.

In both El Salvador and Nicaragua women are more likely to participate in the informal sector than men. Workers younger than 20 have greater probabilities of working in the informal sector, while workers older than 50 have lower probabilities. The informal sector is composed of a less educated pool of workers.

VI. CONCLUSIONS

Central America is undergoing important and radical changes in its economic, political and social systems. Concern is increasing about how labor markets, and particularly the informal sector, have reacted to these changes of the 1990s and recent policies. Previous empirical evidence concentrated on labor markets before 1993. This paper extends that body of work. It examines the latest compiled household surveys in Costa Rica, El Salvador, Honduras and Nicaragua, and analyzes the informal sector in relation to patterns of overall labor force participation.

Results from labor force participation equations show that differences in labor markets in Costa Rica, El Salvador, Honduras and Nicaragua are not very significant. The least educated women, non-heads of households, and the young and the old, all have lower probabilities of participating in the labor market.

The policy implications of these findings are quite clear. Investment in human capital such as education, and the promotion of mechanisms to facilitate the greater inclusion of women in the labor market would both increase labor force participation rates in Central America. How to implement these policies is a challenging question for each national government. A first beneficial step would be to investigate further the causes of the poor representation of women in the labor market, including cultural and historical factors and institutional issues. A parallel investigation should closely analyze the education systems and private incentives to invest in schooling in each economy.

The analysis of choices between the informal and the formal sectors employs the two most popular definitions in the literature as data permits (social security data was not available for Costa Rica and Honduras). Viewed by size, Costa Rica, El Salvador, Honduras and Nicaragua share three common features. In the informal sector in all four countries:

- a) women participate more than men,
- b) the least educated participate more than the most-educated, and
- c) the young participate more than the old.

In other regards, the countries differ.

Viewed by social security coverage similar results arise on informal sector participation in El Salvador and Nicaragua. Women, the young and the poorly-educated compose the majority of workers in this sector. In this last set of estimations, however men and women older than 50 have lower probabilities of participating in the informal labor markets than people younger than 50. This age distinction does not seem to matter under the size definition.

When moving to the policy aspects of the informality phenomenon, the first thing to establish is what should concern policy makers: that around 50% of the workers are concentrated in small firms, performing non professional or technical jobs, or that more than 70% of workers do not have social security insurance. The second alternative appears to be the more important of the two. The need for mandatory social security systems and the negative externalities that may arise when there are uninsured people in the society have been established long ago. If, however, as has been proposed under the size criteria supporters, informality follows the dual labor market hypothesis, where workers in the informal sector receive consistently lower wages, no returns to schooling or on the job training and encounter non-economic barriers to find better jobs in the formal sector, there is definitely scope for policy to improve these workers' position.

Further research is needed on the causes of the origin and recent growth of the informal sector. It would be useful to policy makers to analyze why such a large percentage of the labor force is not insured, whether regulation, enforcement, culture, or a combination of all these factors is at fault. More conclusive ways to test segmentation hypotheses are also called for.

This paper provides a necessary first step in understanding informal labor markets by establishing who participates in the different sectors. The next challenging steps are to analyze why these demographic groups are more likely to belong in the informal sector,

when participation in the informal market constitutes a problem and calls for policy intervention, and how these problems may be more effectively solved.

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APPENDIX I:
DESCRIPTION OF THE DATA SETS BY COUNTRY

COSTA RICA: Encuesta de Hogares de Propósitos Múltiples, Módulo Empleo, 1997
Ministerio de Economía, Industria y Comercio
Area de Estadística y Censos

The sample corresponds to 719 segments of the National Population and Housing Census, of which 288 are urban and 431 are rural. Each segment is a delimited geographical area, with an average of 60 and 40 households in each urban and rural area respectively. The total number of households surveyed is 11,533.

This survey is collected in July of every year. The reference is the week prior to the interview for the information on employment, and the five weeks prior to the interview for the information on unemployment. The questionnaire consists of four sections: housing and services, sociodemographic characteristics, employment and characteristics of people older than 60 years (this section is not included every year).

For this study only the information on demographics and employment was used. These sections include the following data: a) for all the people in the household: age, gender, marital status, household composition, place of birth, nationality, place of residence, etc.; b) for people older than five years: highest grade completed, type of degree obtained, extracurricular education, etc.; c) for people older than twelve years: employment status, hours worked, sector of employment and occupational category, income from main and secondary occupation, number of people in the firm, etc.

EL SALVADOR: Encuesta de Hogares de Propósitos Múltiples 1996
Ministerio de Economía
Dirección de Información

The population under study resides in all *municipios* of the country, both urban and rural. El Salvador is divided in 14 political-administrative departments, and subdivided in 262 *municipios*. Each *municipio* is then divided in an urban and a rural area. The survey covers a total of 1,235,484 households.

The information is collected in four periods annually, each lasting 10 weeks approximately. The reference is the week prior to the interview. Each household is visited only once a year. The survey consists of eight parts, six continuous and two supplementary. The two supplementary sections correspond to those aspects that are

considered not to change very much over time and do not require frequent updating. These are health coverage, and birth/mortality rates. The six continuous parts are: demographic characteristics, employment (for older than 10 years), education (for older than four years), income/expenditure, housing and family income from abroad.

For this study, only the information from the first three continuous sections was used. The section on demographic characteristics includes information such as age, sex, marital status and relationship to the head of household. The section on education includes information such as ability to read and write, highest grade approved, highest degree obtained, type of education center, annual expenditure in tuition and school materials, reasons for not going to school, etc. The section on employment includes information such as employment status, number of hours and days worked, sector of employment, occupation category, number of employees in the firm, social security coverage, union status, income, reasons for not having looked for a job if not working, unemployment spell, etc.

HONDURAS: Encuesta Permanente de Hogares de Propósitos Múltiples 1996
Dirección General de Estadística y Censos

The population under consideration resides in private housing, excluding hospitals, hotels, prisons and other collective housing facilities. Coverage is national, both urban and rural, with the exception of the departments of Gracias a Dios and Islas de la Bahía, due to low density and uneasy access, and high operational costs, respectively. The survey covers a total of 7,200 households.

The reference is the week prior to the interview for the information on employment and the month prior to the interview for the information on income. The survey consists of five main parts: housing, household composition, demographic characteristics and education (for older than five years), and economic characteristics (for older than 10 years).

For this study all the information was used with the exception of the section on housing. This survey is very similar to the one described for Costa Rica, although data

on education is more limited (only highest school level attained and ability to read and write information is surveyed).

NICARAGUA: Encuesta de Medición de Nivel de Vida 1993

Instituto Nacional de Estadísticas y Censos

This survey is the first national one conducted during the 90's. Quality of the data significantly improved with respect to the previous survey conducted by INEC (in 1985). The sample includes private households, both urban and rural. The size was preestablished in 4,200 households, estimating a 15% rate of non-responses.

Both the week and the twelve months prior to the interview are used as references. The survey is very comprehensive in a number of topics. It consists of nine sections: housing, education, household composition, health, employment, migration, independent employment (non-agricultural), household expenditure and income. Compared to the rest of the surveys, this one is very complete and provides a vast amount of information. For instance, in the section on education there is detailed information on where the person learned to read and write, type of education center attended (public vs. private), reasons for not going to school, expenditure related to school (tuition, books, school associations, transportation, etc), how the books used were obtained, distance to school, means of transportation and commuting time, a subsection on special instruction courses, a subsection on kindergarten, etc., in addition to the typical information contained in the other surveys. Additionally, the section on employment includes data on coverage by the social security systems, as the one in El Salvador does.

For this study, only the information on household composition, education and employment was used. The reference was the week prior to the interview to be consistent with the data for the rest of the countries.

APPENDIX II:

SUMMARY STATISTICS FOR ALL AVAILABLE OBSERVATIONS

**People in working age: older than 10 years, except for Costa Rica (older than 12)
Hourly wage in dollars of the survey year**

COSTA RICA

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|-----------------------------|------------|-------------|------------------|------------|------------|
| Female | 29034 | 0.5011 | 0.5000 | 0 | 1 |
| Head | 29034 | 0.3418 | 0.4743 | 0 | 1 |
| Age | 29024 | 35.8064 | 17.6892 | 13 | 99 |
| Consensual marriage | 29005 | 0.1287 | 0.3349 | 0 | 1 |
| Legal marriage | 29005 | 0.3998 | 0.4899 | 0 | 1 |
| Widow | 29005 | 0.0343 | 0.1819 | 0 | 1 |
| Divorced | 29005 | 0.0163 | 0.1267 | 0 | 1 |
| Separated | 29005 | 0.0463 | 0.2101 | 0 | 1 |
| Single | 29005 | 0.3746 | 0.4840 | 0 | 1 |
| Years of education | 29006 | 6.7112 | 3.8366 | 0 | 19 |
| Labor force participation | 29034 | 0.5391 | 0.4976 | 0 | 1 |
| Informal sector, size def. | 16001 | 0.5074 | 0.5000 | 0 | 1 |
| Hourly wage | 12814 | 1.6485 | 2.5313 | 0.02 | 101.47 |
| Central public sector | 17253 | 0.0638 | 0.2444 | 0 | 1 |
| Services | 17253 | 0.0287 | 0.1671 | 0 | 1 |
| Financial sector | 17253 | 0.0091 | 0.0950 | 0 | 1 |
| Non financial sector | 17253 | 0.0181 | 0.1333 | 0 | 1 |
| Local public sector | 17253 | 0.0063 | 0.0792 | 0 | 1 |
| Private sector | 17253 | 0.8731 | 0.3328 | 0 | 1 |
| International organizations | 17253 | 0.0008 | 0.0285 | 0 | 1 |
| Chief | 17258 | 0.0649 | 0.2464 | 0 | 1 |
| Self employed | 17258 | 0.1843 | 0.3878 | 0 | 1 |
| Employee | 17258 | 0.6601 | 0.4737 | 0 | 1 |
| Domestic worker | 17258 | 0.0579 | 0.2335 | 0 | 1 |
| Family worker | 17258 | 0.0328 | 0.1781 | 0 | 1 |
| Size < 5 | 17002 | 0.5326 | 0.4989 | 0 | 1 |
| Size < 10 | 17002 | 0.0542 | 0.2265 | 0 | 1 |
| Size < 10plus | 17002 | 0.4131 | 0.4924 | 0 | 1 |
| Temporary work | 14986 | 0.1571 | 0.3639 | 0 | 1 |
| Payment in kind | 9892 | 0.0857 | 0.2800 | 0 | 1 |
| Metropolitan region | 29034 | 0.1900 | 0.3923 | 0 | 1 |
| Rest of central region | 29034 | 0.2310 | 0.4215 | 0 | 1 |
| Chorotega | 29034 | 0.1220 | 0.3273 | 0 | 1 |
| Central pacific | 29034 | 0.1204 | 0.3254 | 0 | 1 |
| Brunca | 29034 | 0.1056 | 0.3074 | 0 | 1 |
| Huetar atlántica | 29034 | 0.1374 | 0.3442 | 0 | 1 |
| Huetar norte | 29034 | 0.0936 | 0.2913 | 0 | 1 |
| Rural | 29034 | 0.3521 | 0.4776 | 0 | 1 |
| Costarrican | 29032 | 0.9629 | 0.1889 | 0 | 1 |
| Nicaraguan | 29032 | 0.0288 | 0.1673 | 0 | 1 |
| Rest of Central America | 29032 | 0.0045 | 0.0673 | 0 | 1 |
| Rest of America | 29032 | 0.0022 | 0.0473 | 0 | 1 |
| Rest of world | 29032 | 0.0014 | 0.0380 | 0 | 1 |

EL SALVADOR

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|-----------------------------------|------------|-------------|------------------|------------|------------|
| Female | 29698 | 0.5349 | 0.4988 | 0 | 1 |
| Head | 29698 | 0.2919 | 0.4547 | 0 | 1 |
| Age | 29698 | 33.3832 | 18.7204 | 11 | 99 |
| Legal marriage | 28762 | 0.2577 | 0.4374 | 0 | 1 |
| Widow | 28762 | 0.0325 | 0.1773 | 0 | 1 |
| Divorced | 28762 | 0.0056 | 0.0748 | 0 | 1 |
| Single | 28762 | 0.7042 | 0.4564 | 0 | 1 |
| Years of education | 29340 | 5.1352 | 4.4076 | 0 | 20 |
| Labor force participation | 29698 | 0.5118 | 0.5000 | 0 | 1 |
| Informal sector, size def. | 14057 | 0.5111 | 0.4999 | 0 | 1 |
| Informal sector, social sec. def. | 14037 | 0.7831 | 0.4120 | 0 | 1 |
| Hourly wage | 12505 | 1.0121 | 1.5868 | 0.00 | 46.22 |
| Public sector | 7284 | 0.1649 | 0.3711 | 0 | 1 |
| Private sector | 7284 | 0.8351 | 0.3711 | 0 | 1 |
| Chief | 14290 | 0.0523 | 0.2226 | 0 | 1 |
| Self employed | 14290 | 0.2884 | 0.4530 | 0 | 1 |
| Employee | 14290 | 0.5041 | 0.5000 | 0 | 1 |
| Domestic worker | 14290 | 0.0429 | 0.2026 | 0 | 1 |
| Family worker | 14290 | 0.1030 | 0.3040 | 0 | 1 |
| Other occup. | 14290 | 0.0010 | 0.0324 | 0 | 1 |
| Trainee | 14290 | 0.0046 | 0.0678 | 0 | 1 |
| Cooperative worker | 14290 | 0.0037 | 0.0608 | 0 | 1 |
| Size < 5 | 25546 | 0.3368 | 0.4726 | 0 | 1 |
| Size < 10 | 25546 | 0.0602 | 0.2379 | 0 | 1 |
| Size < 10plus | 25546 | 0.3817 | 0.4858 | 0 | 1 |
| Rural | 29698 | 0.4260 | 0.4945 | 0 | 1 |
| Union | 14290 | 0.0309 | 0.1731 | 0 | 1 |
| Occidental region | 29698 | 0.2068 | 0.4050 | 0 | 1 |
| Central 1 region | 29698 | 0.2034 | 0.4025 | 0 | 1 |
| Central 2 region | 29698 | 0.2085 | 0.4063 | 0 | 1 |
| Oriental region | 29698 | 0.2048 | 0.4036 | 0 | 1 |
| Amss | 29698 | 0.1765 | 0.3812 | 0 | 1 |

HONDURAS

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|----------------------------|------------|-------------|------------------|------------|------------|
| Female | 22377 | 0.5233 | 0.4995 | 0 | 1 |
| Head | 22377 | 0.2840 | 0.4509 | 0 | 1 |
| Age | 22377 | 31.4049 | 17.5685 | 11 | 99 |
| Consensual marriage | 22369 | 0.2135 | 0.4098 | 0 | 1 |
| Legal marriage | 22369 | 0.2300 | 0.4208 | 0 | 1 |
| Widow | 22369 | 0.0402 | 0.1965 | 0 | 1 |
| Divorced | 22369 | 0.0039 | 0.0626 | 0 | 1 |
| Separated | 22369 | 0.0919 | 0.2888 | 0 | 1 |
| Single | 22369 | 0.4205 | 0.4937 | 0 | 1 |
| Years of education | 21691 | 5.4376 | 4.1894 | 0 | 18 |
| Labor force participation | 22377 | 0.4801 | 0.4998 | 0 | 1 |
| Informal sector, size def. | 12029 | 0.6598 | 0.4746 | 0 | 1 |
| Hourly wage | 10482 | 0.8095 | 1.6400 | 0.00 | 97.47 |
| Professional | 12431 | 0.0204 | 0.1412 | 0 | 1 |
| Manager | 12431 | 0.0574 | 0.2325 | 0 | 1 |
| Employee | 12431 | 0.0700 | 0.2551 | 0 | 1 |
| Sales person | 12431 | 0.3630 | 0.4809 | 0 | 1 |
| Agricultural worker | 12431 | 0.1328 | 0.3394 | 0 | 1 |
| Transportation worker | 12431 | 0.1125 | 0.3159 | 0 | 1 |
| Textile worker | 12431 | 0.0434 | 0.2039 | 0 | 1 |
| Graphic worker | 12431 | 0.0127 | 0.1120 | 0 | 1 |
| Retail worker | 12431 | 0.0657 | 0.2478 | 0 | 1 |
| Services worker | 12431 | 0.1213 | 0.3265 | 0 | 1 |
| Blue collar worker | 12431 | 0.4712 | 0.4992 | 0 | 1 |
| Domestic worker | 12431 | 0.0389 | 0.1933 | 0 | 1 |
| Cooperative worker | 12431 | 0.0014 | 0.0370 | 0 | 1 |
| Self employed | 12431 | 0.3374 | 0.4728 | 0 | 1 |
| Chief | 12431 | 0.0471 | 0.2118 | 0 | 1 |
| Family worker | 12431 | 0.1033 | 0.3043 | 0 | 1 |
| Service sector | 12431 | 0.1213 | 0.3265 | 0 | 1 |
| Primary sector | 12431 | 0.0479 | 0.2135 | 0 | 1 |
| Mining sector | 12431 | 0.0945 | 0.2926 | 0 | 1 |
| Manufacturing sector | 12431 | 0.0188 | 0.1359 | 0 | 1 |
| Electricity and utilities | 12431 | 0.0139 | 0.1172 | 0 | 1 |
| Construction | 12431 | 0.0045 | 0.0670 | 0 | 1 |
| Commerce | 12431 | 0.2769 | 0.4475 | 0 | 1 |
| Transportation | 12431 | 0.0271 | 0.1624 | 0 | 1 |
| Other services | 12431 | 0.1009 | 0.3012 | 0 | 1 |
| Size < 5 | 8480 | 0.9448 | 0.2284 | 0 | 1 |
| Size < 10 | 8480 | 0.0538 | 0.2256 | 0 | 1 |
| Size < 10plus | 8480 | 0.0001 | 0.0109 | 0 | 1 |
| Distrito central | 22377 | 0.1900 | 0.3923 | 0 | 1 |
| San Pedro Sula | 22377 | 0.1453 | 0.3524 | 0 | 1 |
| Medium size cities | 22377 | 0.0589 | 0.2354 | 0 | 1 |
| Small size cities | 22377 | 0.1554 | 0.3623 | 0 | 1 |
| Rural | 22377 | 0.4504 | 0.4975 | 0 | 1 |

NICARAGUA

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|-----------------------------------|------------|-------------|----------------------|------------|------------|
| Female | 11114 | 0.5239 | 0.4994 | 0 | 1 |
| Head | 11114 | 0.2613 | 0.4394 | 0 | 1 |
| Age | 11114 | 30.6131 | 17.1688 | 11 | 101 |
| Consensual marriage | 11113 | 0.2279 | 0.4195 | 0 | 1 |
| Legal marriage | 11113 | 0.2153 | 0.4111 | 0 | 1 |
| Widow | 11113 | 0.0441 | 0.2053 | 0 | 1 |
| Divorced | 11113 | 0.0062 | 0.0786 | 0 | 1 |
| Separated | 11113 | 0.0878 | 0.2831 | 0 | 1 |
| Single | 11113 | 0.4185 | 0.4933 | 0 | 1 |
| Years of education | 8812 | 6.2231 | 3.6768 | 0 | 18 |
| Labor force participation | 10729 | 0.4665 | 0.4995 | 0 | 1 |
| Temporary work | 1339 | 0.4033 | 0.4907 | 0 | 1 |
| Hourly wage | 3555 | 0.6801 | 1.5589 | 0.00 | 52.91 |
| Payment in kind | 2460 | 0.3146 | 0.4645 | 0 | 1 |
| Blue collar worker | 4553 | 0.1768 | 0.3815 | 0 | 1 |
| Employee | 4553 | 0.3049 | 0.4604 | 0 | 1 |
| Domestic worker | 4553 | 0.0597 | 0.2370 | 0 | 1 |
| Self employed | 4553 | 0.3429 | 0.4747 | 0 | 1 |
| Professional | 4553 | 0.0046 | 0.0678 | 0 | 1 |
| Family worker | 4553 | 0.1052 | 0.3069 | 0 | 1 |
| Chief | 4553 | 0.0059 | 0.0768 | 0 | 1 |
| Private sector | 2468 | 0.5563 | 0.4969 | 0 | 1 |
| Public sector | 2468 | 0.2516 | 0.4340 | 0 | 1 |
| State companies sector | 2468 | 0.0482 | 0.2143 | 0 | 1 |
| Works at home | 2468 | 0.1438 | 0.3510 | 0 | 1 |
| Union | 1938 | 0.1218 | 0.3271 | 0 | 1 |
| Informal sector, size def. | 1857 | 0.5353 | 0.4989 | 0 | 1 |
| Informal sector, social sec. def. | 4441 | 0.7109 | 0.4534 | 0 | 1 |
| Size < 5 | 1919 | 0.5534 | 0.4973 | 0 | 1 |
| Size < 10 | 1919 | 0.1605 | 0.3672 | 0 | 1 |
| Size < 20 | 1919 | 0.0855 | 0.2796 | 0 | 1 |
| Size < 50 | 1919 | 0.0792 | 0.2701 | 0 | 1 |
| Size < 50plus | 1919 | 0.0599 | 0.2374 | 0 | 1 |
| Lives in a farm | 3324 | 0.0560 | 0.2299 | 0 | 1 |
| Lives in a community | 3324 | 0.1327 | 0.3393 | 0 | 1 |
| Lives in a town | 3324 | 0.3219 | 0.4673 | 0 | 1 |
| Lives in a city | 3324 | 0.4895 | 0.5000 | 0 | 1 |

APPENDIX III:

ECONOMETRIC RESULTS WITH SIMPLE MODEL SPECIFICATIONS

A. Labor Force Participation Equations

**Dependent Variable: Labor Force Participation
Specification 1**

| | COSTA RICA | EL SALVADOR | HONDURAS | NICARAGUA |
|----------------------|-------------------|-------------------|-------------------|-------------------|
| Years of education | 0.028 28.220 | 0.014 16.610 | 0.018 17.480 | 0.023 14.030 |
| Age | -0.006 -22.350 | -0.001 -3.000 | -0.001 -4.360 | 0.001 2.250 |
| Head | 0.355 38.840 | 0.320 37.220 | 0.272 24.840 | 0.245 13.950 |
| Female* | -0.374 -51.910 | -0.264 -39.860 | -0.324 -38.270 | -0.302 -23.760 |
| Consensual marriage* | 0.072 4.920 | | 0.008 0.600 | 0.048 2.200 |
| Married* | 0.016 1.350 | 0.226 13.040 | 0.004 0.330 | -0.017 -0.810 |
| Single* | -0.061 -4.310 | 0.169 9.520 | -0.240 -16.020 | -0.285 -12.540 |
| Rural* | -0.045 -5.550 | 0.003 0.350 | 0.000 -0.030 | |
| Regional dummies | yes | yes | yes | yes |
| Nationality dummies | yes | no | no | no |
| obs. P | 0.55 | 0.50 | 0.50 | 0.48 |
| pred. P (at x-bar) | 0.57 | 0.51 | 0.51 | 0.48 |
| N | 28942 | 28404 | 21683 | 8783 |
| Pseudo R sq. | 0.24 | 0.14 | 0.19 | 0.20 |

(*) dF/dx is for a discrete change of a dummy variable from 0 to 1.

T-statistics below the coefficients.

Excluded dummy=1 for divorced, separated or widow.

**Dependent Variable: Labor Force Participation
Specification 2**

| | COSTA RICA | EL SALVADOR | HONDURAS | NICARAGUA |
|------------------------|-------------------|-------------------|-------------------|-------------------|
| Years of education | 0.013 4.260 | 0.006 2.280 | 0.004 1.400 | -0.005 -0.870 |
| Years of education sq. | 0.000 1.030 | 0.000 0.500 | 0.000 1.330 | 0.001 2.590 |
| Age | 0.032 23.230 | 0.033 24.650 | 0.042 25.630 | 0.048 16.190 |
| Age sq. | 0.000 -28.660 | 0.000 -28.050 | 0.000 -26.920 | -0.001 -15.900 |
| Age < 20* | -0.270 -19.480 | -0.242 -18.700 | -0.177 -11.440 | -0.155 -6.480 |
| Age > 50* | -0.174 -9.970 | -0.097 -5.680 | -0.067 -3.190 | -0.003 -0.070 |
| Head* | 0.391 30.330 | 0.257 20.130 | 0.322 21.660 | 0.234 9.690 |
| Female* | -0.390 -42.030 | -0.353 -41.460 | -0.313 -30.570 | -0.313 -20.890 |
| Consensual Marriage* | -0.096 -5.510 | 0.000 | -0.133 -8.710 | -0.042 -1.760 |
| Married* | -0.154 -10.020 | -0.025 -1.230 | -0.132 -8.690 | -0.094 -3.900 |
| Single* | 0.059 3.770 | 0.035 1.740 | -0.033 -1.930 | -0.114 -4.500 |
| Female x head* | -0.223 -10.340 | -0.071 -4.100 | -0.197 -8.970 | -0.060 -1.720 |
| Rural* | -0.036 -4.250 | -0.012 -1.490 | -0.011 -0.980 | |
| Regional dummies | yes | yes | yes | yes |
| Nationality dummies | yes | no | no | no |
| obs. P | 0.55 | 0.50 | 0.50 | 0.48 |
| pred. P | 0.57 | 0.51 | 0.51 | 0.47 |
| N | 28942 | 28404 | 21683 | 8783 |
| Pseudo R sq. | 0.33 | 0.25 | 0.26 | 0.28 |

(*) dF/dx is for a discrete change of a dummy variable from 0 to 1.

T-statistics below the coefficients.

Excluded dummy=1 for divorced, separated or widow.

B. Informal Sector Participation Equations: Size Definition

**Dependent Variable: Informal Sector participation, size definition
Specification 1**

| | COSTA RICA | EL SALVADOR | HONDURAS | NICARAGUA |
|-------------------------|-------------------|-------------------|-------------------|------------------|
| Years of education | -0.017 -12.430 | -0.034 -29.000 | -0.040 -32.070 | -0.028 -7.820 |
| Age | 0.005 12.380 | 0.004 9.350 | 0.003 5.860 | -0.004 -2.970 |
| Head* | -0.054 -4.280 | -0.102 -8.880 | -0.014 -1.070 | -0.123 -3.580 |
| Female* | 0.134 11.780 | 0.064 6.200 | 0.051 4.270 | 0.108 3.400 |
| Consensual marriage* | -0.010 -0.510 | | -0.014 -0.870 | 0.038 0.780 |
| Married* | -0.003 -0.190 | -0.052 -1.830 | 0.010 0.650 | 0.023 0.450 |
| Single* | 0.049 2.520 | -0.056 -1.960 | 0.063 3.410 | 0.069 1.290 |
| Rural* | -0.054 -4.890 | -0.021 -2.010 | 0.076 5.280 | |
| Temporary job* | 0.149 12.150 | | | |
| Regional dummies | yes | yes | yes | no |
| Nationality dummies | yes | no | no | no |
| Economic sector dummies | yes | no | yes | no |
| obs. P | 0.48 | 0.52 | 0.66 | 0.52 |
| pred. P | 0.45 | 0.52 | 0.69 | 0.52 |
| N | 14928 | 13677 | 11907 | 1565 |
| Pseudo R sq. | 0.14 | 0.09 | 0.22 | 0.07 |

(*) dF/dx is for a discrete change of a dummy variable from 0 to 1.

T-statistics below the coefficients.

Excluded dummy=1 for divorced, separated or widow.

**Dependent Variable: Informal Sector participation, size definition
Specification 2**

| | COSTA RICA | EL SALVADOR | HONDURAS | NICARAGUA |
|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| Years of education | -0.005 <i>-1.220</i> | -0.007 <i>-2.060</i> | -0.032 <i>-9.440</i> | 0.024 <i>2.030</i> |
| Years of education sq. | -0.001 <i>-2.830</i> | -0.002 <i>-7.920</i> | 0.000 <i>-1.890</i> | -0.003 <i>-4.240</i> |
| Age | 0.010 <i>5.160</i> | 0.000 <i>-0.030</i> | -0.003 <i>-1.160</i> | -0.026 <i>-3.150</i> |
| Age sq. | 0.000 <i>-2.320</i> | 0.000 <i>2.030</i> | 0.000 <i>2.560</i> | 0.000 <i>2.420</i> |
| Age < 20* | 0.142 <i>7.580</i> | 0.089 <i>4.750</i> | 0.073 <i>3.920</i> | -0.017 <i>-0.310</i> |
| Age > 50* | 0.024 <i>1.140</i> | 0.024 <i>1.060</i> | -0.012 <i>-0.470</i> | 0.099 <i>1.020</i> |
| Head* | 0.003 <i>0.170</i> | -0.111 <i>-7.460</i> | -0.017 <i>-0.940</i> | -0.107 <i>-2.680</i> |
| Female* | 0.097 <i>6.400</i> | -0.027 <i>-1.910</i> | 0.050 <i>3.330</i> | 0.120 <i>3.360</i> |
| Consensual marriage* | -0.040 <i>-1.760</i> | | 0.002 <i>0.080</i> | 0.046 <i>0.860</i> |
| Married* | -0.041 <i>-1.900</i> | 0.008 <i>0.260</i> | 0.024 <i>1.190</i> | 0.035 <i>0.630</i> |
| Single* | 0.055 <i>2.730</i> | -0.001 <i>-0.040</i> | 0.028 <i>1.390</i> | 0.031 <i>0.550</i> |
| Female x head* | 0.012 <i>0.440</i> | 0.222 <i>10.080</i> | 0.025 <i>0.940</i> | 0.012 <i>0.160</i> |
| Working spouse* | 0.133 <i>5.550</i> | 0.147 <i>8.330</i> | -0.004 <i>-0.160</i> | |
| Rural* | -0.051 <i>-4.660</i> | -0.013 <i>-1.260</i> | 0.076 <i>5.280</i> | |
| Temporary job* | 0.143 <i>11.560</i> | | | |
| Regional dummies | yes | yes | yes | no |
| Nationality dummies | yes | no | no | no |
| Economic sector dummies | yes | no | yes | no |
| obs. P | 0.48 | 0.52 | 0.66 | 0.52 |
| pred. P | 0.45 | 0.52 | 0.69 | 0.51 |
| N | 14928 | 13677 | 11907 | 1565 |
| Pseudo R sq. | 0.14 | 0.11 | 0.23 | 0.09 |

(*) dF/dx is for a discrete change of a dummy variable from 0 to 1.

T-statistics below the coefficients.

Excluded dummy=1 for divorced, separated or widow.

C. Informal Sector Participation Equations: Social Security Coverage Definition

**Dependent Variable: Informal Sector Participation,
social security coverage definition
Specification 1**

| | EL SALVADOR | NICARAGUA |
|----------------------|-------------------|-------------------|
| Years of education | -0.027 -34.450 | -0.047 -22.010 |
| Age | 0.001 2.020 | -0.002 -2.660 |
| Head* | -0.055 -6.490 | -0.020 -0.970 |
| Female* | 0.019 2.600 | 0.002 0.110 |
| Consensual marriage* | | -0.016 -0.560 |
| Married* | -0.043 -1.960 | -0.022 -0.820 |
| Single* | -0.009 -0.450 | 0.047 1.480 |
| Rural* | 0.059 7.370 | |
| Regional dummies | yes | no |
| obs. P | 0.79 | 0.67 |
| pred. P | 0.85 | 0.69 |
| N | 13657 | 3618 |
| Pseudo R sq. | 0.21 | 0.13 |

(*) dF/dx is for a discrete change of a dummy variable from 0 to 1.

T-statistics below the coefficients.

Excluded dummy=1 for divorced, separated or widow.

**Dependent Variable: Informal Sector participation,
social security coverage definition
Specification 2**

| | EL SALVADOR | NICARAGUA |
|-------------------------|----------------|---------------|
| Years of education | -0.038 | -0.034 |
| | <i>-18.060</i> | <i>-4.470</i> |
| Years of education sq. | 0.001 | -0.001 |
| | <i>9.900</i> | <i>-1.260</i> |
| Age | -0.004 | -0.023 |
| | <i>-2.680</i> | <i>-4.740</i> |
| Age sq. | 0.000 | 0.000 |
| | <i>3.630</i> | <i>4.620</i> |
| Age < 20* | 0.076 | 0.080 |
| | <i>7.530</i> | <i>2.170</i> |
| Age > 50* | -0.036 | -0.122 |
| | <i>-2.320</i> | <i>-2.310</i> |
| Head* | -0.038 | -0.006 |
| | <i>-4.270</i> | <i>-0.230</i> |
| Female* | 0.008 | 0.012 |
| | <i>1.000</i> | <i>0.510</i> |
| Consensual marriage* | | -0.003 |
| | | <i>-0.090</i> |
| Married* | 0.016 | -0.013 |
| | <i>0.910</i> | <i>-0.430</i> |
| Single* | 0.034 | -0.002 |
| | <i>1.840</i> | <i>-0.070</i> |
| Female x head* | 0.065 | 0.005 |
| | <i>5.790</i> | <i>0.110</i> |
| Working spouse* | 0.011 | |
| | <i>1.100</i> | |
| Rural* | 0.048 | |
| | <i>7.170</i> | |
| Firm size < 5 employees | 0.184 | |
| | <i>28.120</i> | |
| Regional dummies | yes | no |
| obs. P | 0.79 | 0.67 |
| pred. P | 0.89 | 0.69 |
| N | 13531 | 3618 |
| Pseudo R sq. | 0.31 | 0.14 |

(*) dF/dx is for a discrete change of a dummy variable from 0 to 1.

T-statistics below the coefficients.

Excluded dummy=1 for divorced, separated or widow.