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# Economic Notes

## The Informal Sector in Nicaragua

Carola Pessino

February 1996

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This series presents the findings of work in progress or background material prepared as inputs to the Department's Economic and Sector Work. This Note was prepared by Carola Pessino (Consultant), as a background report for the Nicaragua Poverty Assessment (June 1995). The findings, interpretations, and conclusions are the author's own and should not be attributed to the World Bank. Questions or comments should be addressed to Ms. Pessino, email address: [carola@cema.edu.ar](mailto:carola@cema.edu.ar)@INTERNET.

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## *The Informal Sector in Nicaragua*

### **I. Introduction**

1. Nicaragua has a large and growing urban informal sector, accounting for more than 50% of the employed. While part of this increase can be attributed to the macroeconomic adjustment programs, a large share of this increase occurred because of formal labor market inflexibility and its increased taxation in the form of high tariffs and corporate taxes.

2. The labor market in Nicaragua is characterized by: (i) a formal sector and an informal sector either characterized by segmentation or differences in human capital; (ii) rising wages concurrent with high unemployment; (iii) low labor productivity; and (iv) excessive regulation in the formal sector of the economy. These characteristics, along with the uncertainty generated by property rights and titling issues, provide barriers to growth of the private sector and reduce the ability of the labor market to promote growth through the efficient allocation of resources and increasing labor productivity. Moreover, duality and other rigidities in the labor market affect unemployment, underemployment, and earnings, all of which have significant impacts on the levels and types of poverty.

3. Labor market flexibility is required for several reasons that range from increasing the rate of growth in the overall economy, allowing labor to move in the face of a productive reconversion, augmenting labor productivity to decreasing unemployment, underemployment and informality.

4. This paper is complementary to Pessino (1994)<sup>1</sup>, and otherwise noted the reader is referred to that work for sample and variables definitions. This study gives explicit consideration to the sectoral allocation of male and female workers. In particular, it analyses wage differences by sector, what are the determinants of choice or segmentation in each sector and whether there are differences in rates of return to human capital. It also considers explicitly the current macroeconomic environment in Nicaragua with low inflation but also relatively low real exchange rate.

5. Section II analyzes different definitions of informality and describes the evolution of informality in Nicaragua and the main differences in sociodemographic characteristics of workers in formal and informal sectors. Section III analyzes differences in wages between sectors by sex, education, industry and age cohorts. It also estimates human capital wage equations similar to Pessino (1994) with the inclusion of the dummy for informality. Section IV estimates wage equations for formal and informal workers separately. Since the allocation between sectors is presumably non-random, switching regressions techniques are used to explicitly consider the allocation of workers among sectors. It also considers the double selection involved in selecting whether to participate or not in the paid labor force and then whether to work in the formal or the informal sector. Section V presents conclusions and policy recommendations.

### **II. Informal Sector Employment**

6. The data used in this analysis are from the Living Standard Measurement Survey (LSMS) carried out in February-June 1993 by INEC, IDA and co-financed by several donors. Survey information includes socio-demographic characteristics, amounts of various sources of income including income from independent employment (type of activity, expenditure, income and inventory and capital), expenditure patterns, occupation and housing characteristics, health including anthropometric measures, and migration.

7. Work on the informal sector in Latin America has followed the ILO/PREALC approach. There are

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<sup>1</sup> Available upon request.

three common methods used to estimate the size of the informal sector: (i) by size of establishment where they work; (ii) adding up numbers of employers, self-employed (excluding professionals), unpaid family workers and domestic workers; and (iii) counting the number of individuals earning less than the minimum wage or some measure of poverty line. Estimates from the 1970s of the size of the informal sector in Latin America generally place it at about 25 to 40% of the urban population.

8. There is evidence that the size of the informal sector rather than shrinking has been increasing at least in Managua since the stabilization plan. Table 1 shows the evolution of the urban informal sector during the last two decades at intervals where information is available. Most of the information refers to Managua. The two basic sources of data are FIDEG and INEC. FIDEG includes in the informal sector independent workers,<sup>2</sup> employers and employees of firms with less than 5 workers (PREALC) and domestic service. INEC defines as informal all the firms, or organizations of less than 5 workers, excluding independent professionals, state firms and religious organizations. There are two distinctive periods where the rate of growth of urban informality differs significantly. From 1970 to 1989, the informal sector increased slightly from 43.6% to 47.6% of employment; a total increase of 9%. From 1989 to 1991, in only two years, we have the same 9% increase in the share of the informal sector. According to information for 1992, the share of this sector increased by 25%, that is 65.4% of those working in April 1992 belonged to the informal sector.

**Table 1: Evolution of the Urban Informal Sector Managua\***

	<u>Formal</u>	<u>Informal</u>	<u>Total</u>
1970 <sup>1</sup>	56.4	43.6	100.0
1982 <sup>2</sup>	55.0	45.0	100.0
1985 <sup>3</sup>	51.8	48.2	100.0
1989 <sup>4</sup>	52.4	47.6	100.0
1991 <sup>5</sup>	47.9	52.1	100.0
1992 <sup>6</sup>	34.6	65.4	100.0

SOURCE: <sup>1</sup> and <sup>2</sup> FIDEG (1991) based on a study of UCA, percentages are calculated in relation to the labor force.

<sup>3</sup> INEC (1989) using data from ESDENIC 85, the percentage is calculated with respect to the employed in all activities except agriculture. They refer to Nicaragua.

<sup>4</sup> INEC (1990) using data from Encuestas de Coyuntura. Percentages are calculated with respect to the employed in Managua, and are an average of the percentages of the 4 waves of the Survey undertaken in January, June, August and December 1989.

<sup>5</sup> and <sup>6</sup> FIDEG (July 1992) using data from the household surveys in Managua conducted in June/August 1991 and April 1992, respectively. They are calculated as a percentage of the employed.

\* Unless otherwise noted. See 1985 for an exception.

9. While in the first period considered, especially the second half, Nicaragua experienced the war and macroeconomic instability; from 1988 to 1992 we have periods of hyperinflation followed by stabilization plans, until the last plan started in March 1991. While the increase in the first period appears to be associated with the war and instability while there was a centralized economy with formal worker protection; the second period is more associated with hyperinflation that makes informality more profitable (given the absence of explicit contracts) and the ensuing stabilization plan. The reduction in government jobs through the "labor reconversion program" and the privatization of state-owned firms, at the time of existing collective bargaining agreements might have created excess supply of workers that had no other choice than informality, unemployment, underemployment or leaving the labor force. Another hypothesis is that the increase in informality from 1989 on coincides with the overvaluation of the Cordoba that lowered the price of inputs in the case of manufacturing and of final products in the case of street vendors or salesmen, and increased the premium of being informal. While Nicaragua is not a country that imposes high taxation on wages in the formal sector, it has high sales, corporate and foreign

<sup>2</sup> Except those belonging to liberal professions (such as doctors, engineers, lawyers, etc) since following FIDEG, they work under similar conditions as those in the formal sector (they have balances and keep legal accounts, pay taxes, etc.).



trade taxes that creates an incentive to work in the "illegal" informal sector.

10. Using the LSMS information, Table 2 reports the extent of informality by urban and rural areas, and Table 3 the main socio-demographic characteristics of each group under the three definitions followed by ILO/PREALC (para. 7). According to the first definition, 30% of the population aged 12 or more work in the formal sector while 70% in the informal sector. This definition attributes the largest percentage of the working population to the informal sector: under the second definition, by type of occupation, 53% work in the informal sector, and according to the third definition based on poverty lines, 45.4% of the population are in the informal "poor" sector of the economy.<sup>3</sup> Notice that it is not surprising that this last definition has the smallest share of "informals" since as is apparent from the previous discussion, the informals are profitable especially in the services sector.

**Table 2:** The Informal Sector under Alternative Definitions, by Rural/Urban Location and by Gender

		Men			Women			Total		
		Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
(1)	Formal	42.9	20.4	31.1	30.9	21.0	27.9	37.8	20.5	30.0
	Informal	57.1	79.6	68.9	69.1	79.0	72.1	62.2	79.5	70.0
(2)	Formal	66.4	37.1	51.0	43.3	25.8	38.1	56.6	34.6	46.6
	Informal	33.6	62.9	49.0	56.7	74.2	61.9	43.4	65.4	53.4
(3)	Formal	71.3	27.9	48.5	77.1	42.8	66.8	73.8	31.2	54.6
	Informal	28.7	72.1	51.5	22.9	57.2	33.2	26.2	68.8	45.4

Note: (1) Formal = employees in firms with 5 or more employees + professionals; Informal = employees in firms with less than 5 employees + domestic workers + self-employed workers. 20% of the observations did not match these categories, and were then classified in formal if they had INSSBI insurance.

(2) Formal = wage-employed + employees + self-employed (if professionals) + independent professionals. Informal = domestic workers + self-employed (not professionals) + unpaid family workers + employers.

(3) Formal = below the poverty line of C\$214.47 (US\$ 35.75) per month as estimated in World Bank (1993c). Informal = above the poverty line.

11. Table 3 presents the main characteristics of workers by formal/informal sector under the three alternative definitions of informality. For all definitions, informal sector workers tend to be younger; they have a higher proportion of the youth and old who are the groups with more unstable labor force attachment. The overall share of women in the labor force is of 33.3% similar to their share under definition (1) in both formal and informal sectors. However, under definition (2) they have a lower share in the formal sector and under definition (3) based on poverty, they have a higher share than the average in the formal sector. This last finding is consistent with the fact that women have a lower incidence of poverty than men in 1993 in Nicaragua.<sup>4</sup>

12. Education is a better predictor of informality under all the definitions considered. While overall, 57% of the employed did not complete primary education, between 65% and 80% (using the alternative definitions of informality) of the employed in the informal sector belong in this category, compared to only between 38% and 43% of the formal sector workers. Conversely, 5% of the employed have complete or incomplete tertiary education, between 9% and 13% reached that level among the employed in the formal sector and only between 0.4% and 1.4% of the employed in the informal sector.

<sup>3</sup> The alternative definitions of informality used, although correlated, they obviously misclassify individuals into the two sectors. For example, using the first and second definition, 19% is misclassified differently (definition 1 classifies them as in the formal sector and definition (2) in the informal sector or viceversa). The misclassification is worst when using the third definition; compared either to definition (1) or (2), approximately 43% is misclassified.

<sup>4</sup> The World Bank (1993c) found that female-headed households were under-represented among the extremely poor and the poor, which is consistent with the under-representation of women in informality defined using poverty indexes. Moreover, Pessino (1994) found that in terms of unemployment, underemployment and wage differentials with males, females were relatively better off.

Table 3: Main Characteristics of Formal and Informal Sectors, 1993 (%)

	(1)		(2)		(3)		Total
	Formal	Informal	Formal	Informal	Formal	Informal	
Total	30.0	70.0	46.7	53.3	54.6	45.4	100.0
Age categories							
12-14	2.6	4.9	1.7	6.4	1.8	7.1	4.2
15-24	25.5	26.1	28.2	23.9	22.6	30.1	26.0
25-54	66.6	57.4	63.9	56.9	65.8	53.4	60.2
55-64	3.8	7.0	4.5	7.3	6.2	5.8	6.0
65+	1.5	4.6	1.7	5.4	3.6	3.8	3.7
15-64	95.9	90.5	96.6	88.2	94.5	89.2	92.1
Sex							
Men	69.0	65.7	72.8	61.3	59.2	75.7	66.7
Women	31.0	34.3	27.2	38.7	40.8	24.3	33.3
Household component							
Household head	44.8	47.1	45.9	47.0	47.1	45.6	46.4
Other	55.2	52.9	54.1	53.0	52.9	54.4	53.6
Education							
Never assisted	16.2	32.4	19.0	34.9	14.0	43.7	27.5
Primary incomplete	21.5	32.2	23.8	33.5	24.4	34.5	29.0
Primary complete	12.2	14.7	13.1	13.8	16.7	10.6	13.9
Secondary incomplete	21.7	15.1	21.3	13.4	23.8	9.0	17.1
Secondary complete	15.3	4.1	12.2	3.3	12.1	1.9	7.5
Sup/University incompl.	3.0	1.0	2.3	1.0	2.8	0.1	1.6
Sup/University compl.	10.2	0.6	7.3	0.1	6.2	0.2	3.5
Occupational Category							
Worker	31.7	14.8	42.7	0.0	15.0	25.7	19.8
Employee	62.1	10.4	55.6	0.0	36.6	13.0	25.9
Domestic Worker	0.0	8.1	0.0	10.6	4.5	7.1	5.6
Self-Employed	1.5	49.7	0.9	65.4	33.2	37.6	35.2
Independent profess.	0.2	0.4	0.8	0.0	0.5	0.2	0.4
Unpaid Family Worker	4.1	15.6	0.0	22.9	9.0	15.9	12.2
Employer	0.4	0.6	0.0	1.1	0.8	0.3	0.6
Industry							
Agriculture	22.8	37.3	21.6	43.1	14.3	55.3	32.9
Mining	0.1	0.1	0.2	0.1	0.1	0.2	0.1
Manufacturing	13.6	10.7	13.5	9.9	15.0	7.5	11.6
Electr. gas and water	4.0	0.1	2.7	0.1	1.7	0.8	1.3
Construction	4.5	2.6	5.6	1.1	3.2	3.1	3.2
Commerce	13.4	25.1	13.8	28.2	29.8	11.5	21.5
Transportation	4.9	3.0	5.8	1.5	4.9	2.0	3.5
Financial	3.8	0.6	3.0	0.3	2.5	0.5	1.6
Personal Services	33.1	19.8	33.5	15.4	27.9	18.9	23.8
Poverty							
Extreme poor	8.5	18.7	11.5	19.3	0.0	34.4	15.6
Poor	22.9	32.7	26.5	32.7	0.0	65.6	29.8
Non-poor	68.6	48.6	61.9	48.0	100.0	0.0	54.6
Underemployed							
Yes	8.6	21.7	12.4	22.6	9.6	27.6	17.8
No	91.4	78.3	87.6	77.4	90.4	72.4	82.2

Note: The criteria for formality/informality is defined in the note to Table 2.

13. By occupational category the classification between formality and informality is almost definitional, except that by analyzing the breakdown by definition iii) that does not use occupational categories and is based only on poverty, the self-employed are equally represented in both sectors. This is the main difference with the previous definitions (where self-employed are almost universally in the informal sector), showing moreover that the self-employed in Nicaragua are not necessarily the poorest.

14. When looking at the distribution by sector, the anomaly in the classifications by various determinants gets cleared up. Services, especially commerce is over-represented in the informal sector under the first two definitions, but being a profitable activity it is under-represented in the poverty definition of informality. However, when looking at the distribution of poverty using the first two definitions, the

informal sector does have a higher share of extreme poor and poor, but the main reason is their largest share in agricultural employment. Rural workers are over-represented among the poor in Nicaragua. The last classification in Table 3 shows that a higher share of the underemployed are in the informal sector, consistent with workers entering this sector while looking for a better job in the formal sector.

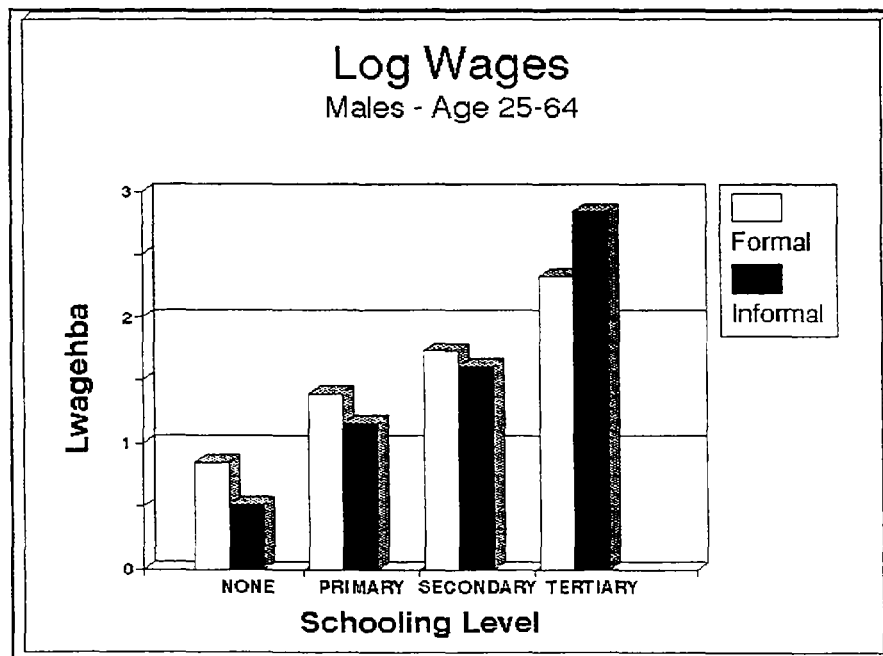
15. Notice that the first definition of informality accords with the one used in Nicaragua to classify urban informal workers. Comparing Tables 1 and 2, in 1992 using the FIDEG definition of the urban informal sector in Managua, 65.4% belonged to this sector. According to Table 2, for the whole country the urban informal sector in 1993 corresponds almost exactly to that definition. In most of this work then we will study informality using definition (1).

### III. Wage Differences Between Sectors

16. In this Section, we investigate differences in wages between workers in the formal and informal sector according to the first definition since it allows comparison with previous work of formality and informality in Nicaragua. First, we analyze raw differences in wages by education and gender. Second, we incorporate differences in age, industry and other characteristics. Finally, we control for differences in human capital endowments among workers in both sectors to analyze if differences in wages still persist. We use dummy endogenous variable techniques to control for the self-selection of workers into the formal or informal sectors.

17. Figure 1 shows log wages by educational level (complete or incomplete) for formal and informal sector male workers age 25-64 at the time of the Survey.<sup>5</sup> Figure 2 presents the same information for female workers. Note that male workers have higher wage rates in the formal sector except for those with tertiary studies. This is just explained by the low (Table 3) proportion of workers in the informal sector with tertiary complete and incomplete studies (as compared to formal sector workers) and because this small number are mainly employers with less than five workers. Notwithstanding this anomaly, the figure shows that average log wages are smaller and growth in earnings by educational level is higher in the informal sector even considering only the first three educational categories.

Fig.1

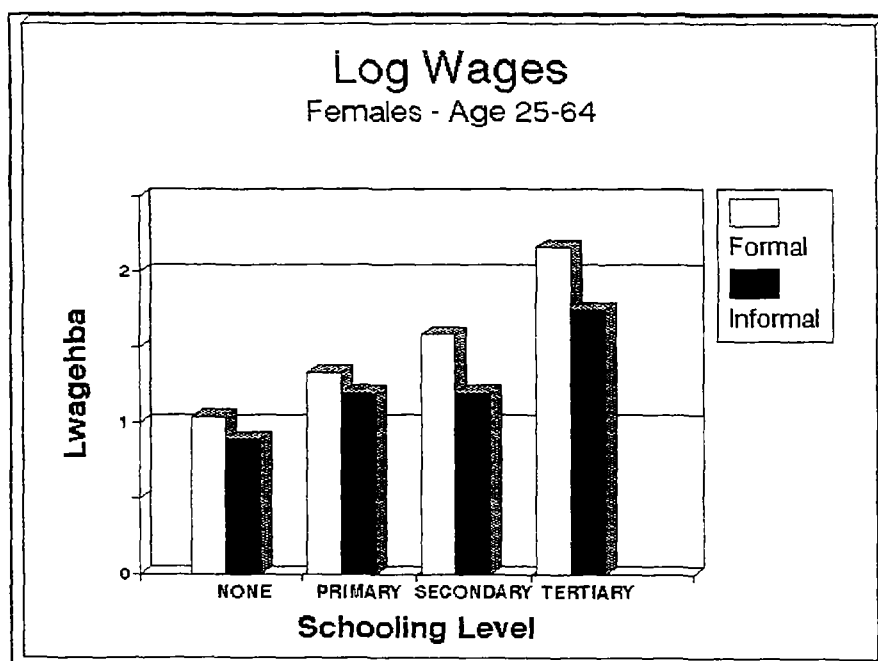


<sup>5</sup> The sample definition is the same used in Pessino (1994) and corresponds basically to the sample of males and females head of households or spouses of household heads that reported earnings in the seven days preceding the survey.

18. Differences in wages for females between these sectors are much more marked and consistently higher for each educational level in the formal sector. However, contrary to males, the rate of growth of earnings is higher in the formal sector, hence we expect a higher rate of return to education there. Note also that the previous finding by Pessino (1994) about the higher (relative to males) log wage for females at the no-educational level continues to hold under this breakup of the sample of workers in the sense that both formal and informal females have higher wages than males without education. However, the relatively flat educational profile for females is more pronounced in the informal sector, where until reaching the secondary level, wages fluctuate in less than 20% for females.

19. Table A1 presents log wages for males and females in each sector by age categories, educational level and industry of employment. There are several interesting features encountered in this Table. First, although Pessino (1994) finds no significant differences in average log wages between males and females, this is a product of higher average wages for females in both sectors, but their higher participation in the informal sector where wages are comparatively lower. Note that on average, wages in the formal sector are 44% higher than in the informal sector. Second, for the youngest cohort, age 25-34, we encounter the largest difference in earnings between males and females in favor of females, agreeing with the fact that female labor tends to be more favored under the current macroeconomic environment than males (if

Fig.2



younger cohorts are more representative of current labor force trends). This is true whether considering the formal or informal sector, noticing that the same favorable conditions occurred for females in both sectors. Third, by industry, wages are considerably higher in the formal agricultural sector (60% higher) and they are almost 40% higher in the formal manufacturing sector than in their informal counterpart. Notice, however, that although we still encounter higher wages for the formal sector in all industries, differences are smaller in the services and non-tradeable goods sectors. Although this reflects in part the less advantageous conditions in the informal sector, it is also an artifact of the definition of formality used where workers in firms with less than 5 employees are considered belonging to the informal sector. That is, part of the difference in wages is capturing differences in scale and technology of production.

20. Differences in (log) wages just analyzed did not control for characteristics of workers belonging to each sector. To analyze if there are still differences in wages after controlling for human capital endowments and other socio-demographic characteristics, Tables A2 and A3 show wage equations similar to those in Pessino (1994) with the addition of a dummy for informality (definition 1) for men and women

respectively. Since we are in the presence of a dummy endogenous variable, we estimated the model controlling for sectoral selection.<sup>6</sup>

21. For Nicaragua as a whole, when controlling for worker characteristics and self-selection, the dummy for informality is barely significantly greater than zero for males and less than zero for females. In Managua, there are no significant differences in wages between formal and informal sectors for males or females when controlling for nonlinearities in education. However, if we only consider education as a continuous variable (the first two columns in each region in Tables A2 and A3), women earn less in the informal sector. Most of the differences in wages are in the urban informal sector, where informal male workers tend to earn more than their formal counterpart while informal female workers tend to earn less than female workers in the formal sector.

22. These results indicate that when controlling for selection into the formal or informal sector, adding different specifications for regions and the more extended is the specification of the wage equation, the lesser are the differences between wages in the formal and informal sectors of this country. With all these controls, the only significant difference is in favor of the informal sector for males in Other Urban areas (and this might be due to the fact we are aggregating across urban regions) predicting that on average males in the informal sector earn 23.5% more than workers in the formal sector.

#### IV. Segmentation or Human Capital?

23. The last Section showed that differences in wages between formal and informal sectors for men and women are not consistently higher in the formal sector after controlling for human capital endowments in each sector. This is not a definite test of labor market segmentation or of duality in the labor market. A better approximation to test the hypothesis of duality is to estimate separate wage functions for each group and if they still differ between these groups in terms of differences in slopes<sup>7</sup> and predicted wages, then it could be argued that workers are in segmented markets.

24. Tables A4 and A5 present OLS regressions of the log wage equations in the formal and informal sectors for men and women. For men, there are substantial differences in the log wage equations. In particular, rates of return to education, experience and training are *higher* in the informal sector. This contradicts standard criticisms to the competitive market where workers are disadvantaged in the informal sector. However, for women (Table A5), rates of return to education and training are higher in the formal sector. Note that labor market segmentation theories hold that women are more probable to satisfy the premises of this theory than men, since their participation in the labor market is not continuous. Hence, the OLS results show in principle no segmentation for men and potential segmentation for women.<sup>8</sup>

25. Tables A13 to A16 report the results of estimating these same OLS regressions by sector for each

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<sup>6</sup> We report only the ordinary least squares and selectivity corrected regressions, since in next section we discuss more fully the determinants of sectoral choice. These probits are available upon request.

<sup>7</sup> Note that although the labor segmentation hypothesis in one of its versions argues that pricing of human capital variables differ among sectors, this same conclusion holds without segmentation since implicit prices of skills can differ across sectors because there can be specific skills in each sector, unobservable compensating wage differentials or just the fact that skills are bundled in workers and cannot be separated.

<sup>8</sup> It could be argued that women choose to enter the informal sector without any constraint or rationing since it is optimal for them to enter a market in a discontinuous way that does not put a premium on experience or job-specific experience and that it is fairly easy to enter and leave.

region: Managua, Other Urban and Other Rural areas for men and in Managua for women.<sup>9</sup> The conclusion that rates of return to education are higher for men continues to hold in Managua and in Other Urban areas. However, rates of return to education are higher in the rural informal sector for males and mean log wages are consistently lower as reported in the last Section.

26. Separate OLS estimates of wage equations (instead of a common regression function for all sectors) for each sector are plagued by selection bias since workers can sort themselves out into each sector (see Cain, 1976). However, it is possible to correct for sample selection bias by performing joint maximum likelihood estimate (MLE) of the decision to enter each sector with the separate log wage equations. This is a standard switching regression model. However, as argued by Heckman and Hotz (1985) and Magnac (1991) this test raises delicate econometric problems so that a definite test of segmentation is not possible. They implement an alternative test based on the premise that without segmentation, conditions of entry into each sector are only determined by the wage function. There is no rationing or queuing in each sector. Hence, if one estimates the probability of entry into each sector, the slope coefficients determining earnings should be proportional (where the constant of proportionality is the standard deviation of log wages) to the slope coefficients determining the entry probability into the informal sector.

27. Since the purpose of this work is not to show academically that we proved or not duality, but rather to draw policy implications, it is important to gain some knowledge of the process of selection into each sector and if there are wide differences between them, we run the switching regression model for men and women in Nicaragua (Tables A6 and A7).

28. What are the determinants of sector selection? In the first place, one more year of education decreases the probability of entering the informal sector for males and females. For males higher experience increases this probability at low experience and decreases it at higher experience. The higher the earnings of the spouse, the higher is the probability of entering the informal sector, both for males and females. We do not have a good explanation for this fact but it might be consequence of the implicit conditioning of this sample to workers. Below we provide estimates for both the probability of participation and sector selection to analyze among other things the unconditional probability of sectoral selection.

29. Does the proportionality hypothesis against labor market segmentation as implemented by Heckman and Hotz (1987) for Panama hold in Nicaragua for men and women? Dividing the coefficients of columns 4 by those in column 1 in Table A6 for men and Table A7 for women should yield the estimated constant of proportionality; or in other words these numbers should be approximately equal for each of the slope coefficients. Although these computations yield some differences, for years of schooling, experience and earnings, there is some evidence that the hypothesis does not hold.<sup>10 11</sup>

30. What happens with differences in slope coefficients after controlling for sectoral selection? Both for males and females the initial difference in rates of return to education survives after the selection control. One more year of education raises wages for males in the formal sector to 10.2%, while in the informal sector to 12.7%. For females, however, the rates of return are 11.1% in the formal sector and 4.8% in the informal sector. According to these estimates, rates of return to education are quite similar for men and women in the formal sector. The major difference between wage equations for males and females

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<sup>9</sup> There are not enough observations for women in each sector to have efficient estimates of the wage equations. That is why we only reported results for Managua, showing that even there rates of return to education are higher in the formal sector. In the remainder of the study we do not separate by regions since not only we confront the problem of few observations for some groups, but the choice of rural/urban location by sex seems to be an integral part of the problem.

<sup>10</sup> More formal tests of this hypothesis would be required.

<sup>11</sup> A similar proportionality hypothesis was implemented by Dickens and Lang (1985) but using endogenous switching regimes. Their test of segmentation establishes that the coefficients on the probability of entering the informal sector should be proportional to the differences in the coefficients of the variables in the log wage equation in each sector.

rests in the informal sector.

31. What kind of selection in unobservables operates in the sectoral choice? According to the Roy Model of self-selection, the correlation between the error term in the sectoral choice (equal to the difference in the unobservable in the wage equation for the informal sector less the unobservable in the wage equation for the formal sector) and the error term in the respective wage equation shows what the earnings of the participants in one sector would have been if they participated in the other and also what kind of (comparative or absolute) advantage workers have, if any, in each sector. Since, the correlation is positive in the formal sector and negative (and significant in both cases) in informal sector, we can conclude that the mean of log wages of those selected into the formal sector exceeds those in the whole population, while the opposite occurs in the informal sector for males and females. In this sense, the more skilled in their latent distribution go to the formal sector and the remaining to the informal sector.

32. Finally, we consider a bivariate probit model of participation decisions together with sectoral choice. We estimate a bivariate probit with selection since we observe sectoral choice once we observe participation. Wage equations are corrected for the double selection process accounting for the possible covariance between these two decision processes (Table A8).

33. Participation in the paid labor force (LFP) when estimating the bivariate probit model are similar to those reported in Pessino (1994): LFP increases with education, first increases and then decreases with experience and for women higher income of the husband and more children both affect the participation decision negatively. The decision to join the informal sector is similar to that reported in Tables A.8 and A.9 that were estimated using univariate probits. The main change, as expected, is that spouses' income does not really affect sectoral choice.

34. After the double selection correction, although rates of return to education increase (in comparison with the models without or with single selection controls) for both sectors and by gender, there are still significant differences in returns across sectors. Notice that the low return experienced by women in the informal sector when controlling only for sectoral selection increases substantially now to reach a return of more than 10%.<sup>12</sup>

35. Previous estimates of wage equations in Nicaragua by sector were conducted by Behrman and Wolfe (1984). They estimated earnings equations only for women in the formal and informal sector controlling for selection in participation (and reporting of earnings) but without considering the non-randomness of the sectoral selection. Their data was collected in 1977-1978. They estimated an overall rate of return to education for women of 11% and found that they receive higher returns to education in the urban formal sector than in the informal sector. These are quite similar results to the ones obtained in this paper, showing that rates of return to female labor have not increased substantially since 1978. However, during 1993, females experienced higher rates of return in the informal sector than the one (almost nil) estimated by the authors.

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<sup>12</sup> The wage equations with double selectivity were estimated using the two step procedure suggested by Lee. Although estimates are consistent, the coefficients of lambda in some of the regressions were outside normal values. More experimentation is needed with a full maximum likelihood procedure to corroborate these findings. In particular, we are skeptical about the coefficient of lambda-b in the wage equation for males in the informal sector and for lambda-a in the wage equation for females in the formal sector. In both cases, we believe that the rates of return to education are biased upwards. In this case, if we stay with the estimate of the return obtained with the simple switching regression model, 12.7% in the informal sector for males, there would not be significant differences in returns across sectors. Similarly, keeping the conservative estimate of 11.1% for the rate of return to education for females in the formal sector, would not differ significantly from the 10.1% return for the informal sector using the bivariate selection model.

## V. Conclusions and Policy Recommendations

36. This paper studied differences in socio-demographic characteristics, wages and human capital returns for both male and female workers in Nicaragua. Particular attention was given to the allocation of workers into these sectors; whether there exists rationing of jobs in the formal sector that precludes workers to enter or they have to queue for accession into the sector. Finally, the macroeconomic situation in Nicaragua was explicitly taken into account in deriving explanations for the empirical results.

37. The main findings are:

- There is evidence of a growing urban informal sector in Nicaragua since 1991. According to the results in this paper, there is no evidence that the increasing trend will stop, since there is a premium to work in the informal sector for male workers (after controlling for differences in human capital endowments and sectoral selection) at least in urban areas.
- While women tend to earn less in the informal sector (after controlling for socioeconomic characteristics, and especially education), their interrupted work careers, less attachment to the labor force, and higher participation when husbands' wages are lower, might increase the attractiveness of the informal sector since there is less penalty for the low accumulation of job specific experience.
- Human capital plays an important role in explaining sectoral selection. Both males and females with more education have higher probability of entering the formal sector.
- Private rates of return to schooling for men are on average higher in the informal sector, while the reverse occurs for women, with higher returns in the formal sector. There is evidence, however, that when controlling for multiple selection rates of return are not significantly different between sectors.
- Moreover, most of the differences in rates of return to education by gender are due to differences in the informal sector of Nicaragua. This is consistent with the explanation given above, since the comparatively lower return to education for women in the informal sector might be compensated for the lower penalty of discontinuity in labor force participation.
- Subject to further research, it is apparent that there is no labor market segmentation in Nicaragua at least in terms of formality and informality as defined in this study. Workers sort themselves into the sector where they receive higher wages according to their specific labor market. Economic conditions (high taxation of business in the formal sector and better situation for the services sector) in Nicaragua seem to favor the growth in informality, at least for males.

38. The main policy recommendations are:

- ▶ More education can decrease the likelihood that a given male or female worker joins the informal sector. If one objective of policy is to reduce the informal sector, this is one way in which, at least, from the supply side of the market, the objective can be achieved.
- ▶ If the objective is reducing informality, there is no gain in principle in diminishing barriers to entry into the formal sector on the supply side. However, less restrictions in hiring and more labor flexibility in the formal sector, can aid in increasing demand for workers there, and hence lowering the threshold value for workers to decide to enter the formal sector.
- ▶ If the objective is just poverty alleviation, without considering explicitly sectoral allocation, there is no evidence that informal sector workers are poorer than their formal sector counterparts after



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controlling for human capital endowments. In this sense, it would not be advisable to restrict entry into the informal sector in the short and medium run. However, the alleviation of poverty in the long run would be only feasible with economic growth and development and the implicit competition between formality and informality (if in this sector they pay lower or no taxation) can curtail this process.

## STATISTICAL APPENDIX

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Table A1	Log Wages by Sector and Gender
Table A2	Wage Equations with Dummy for Informality, Controlling for Selection, Males Age 25-64
Table A3	Wage Equations with Dummy for Informality, Controlling for Selection, Women Age 25-64
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Table A12	Means and Std. Dev. of LWAGEHBA, by Criteria One, Other Urban
Table A13	Wage Equations for Men, Age 25-64, Household Heads
Table A14	Wage Equations for Women, Age 25-64, Household Heads
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Table A16	Wage Equations for Men, Age 25-64, Household Heads, Other Rural

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Table A1: Log Wages by Sector and Gender

	FORMAL			INFORMAL			TOTAL		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Total	1.52 (.82)	1.60 (.70)	1.54 (.78)	1.08 (1.12)	1.14 (.91)	1.10 (1.04)	1.26 (1.03)	1.28 (.87)	1.27 (.97)
Age Categories									
25-34	1.47 (.76)	1.63 (.66)	1.54 (.73)	.96 (1.01)	1.18 (.80)	1.04 (.94)	1.19 (.94)	1.37 (.78)	1.26 (.89)
35-44	1.69 (.85)	1.57 (.72)	1.66 (.82)	1.17 (1.24)	1.17 (.86)	1.17 (1.08)	1.39 (1.12)	1.28 (.84)	1.35 (1.02)
45-54	1.43 (.82)	1.45 (.73)	1.43 (.80)	1.11 (1.05)	1.02 (1.01)	1.07 (1.03)	1.22 (.98)	1.11 (.97)	1.18 (.98)
55-64	1.12 (.81)	1.97 (.94)	1.21 (.87)	1.17 (1.23)	1.19 (1.08)	1.17 (1.17)	1.15 (1.12)	1.25 (1.09)	1.18 (1.11)
Education									
No Education	.85 (.59)	1.04 (.56)	.89 (.59)	.52 (1.00)	.89 (.85)	.65 (.97)	.62 (.91)	.92 (.81)	.71 (.89)
Primary Incomplete	1.32 (.73)	1.30 (.66)	1.32 (.71)	1.06 (1.04)	1.17 (.94)	1.11 (1.00)	1.15 (.96)	1.19 (.91)	1.16 (.94)
Primary Complete	1.50 (.70)	1.41 (.64)	1.48 (.69)	1.35 (.99)	1.24 (.84)	1.30 (.93)	1.41 (.89)	1.27 (.82)	1.36 (.87)
Secondary Incomplete	1.71 (.63)	1.54 (.53)	1.65 (.61)	1.51 (1.03)	1.10 (.87)	1.34 (.99)	1.60 (.88)	1.26 (.79)	1.46 (.87)
Secondary Complete	1.76 (.69)	1.63 (.51)	1.70 (.61)	1.98 (.85)	1.50 (.90)	1.74 (.91)	1.84 (.76)	1.59 (.66)	1.74 (.72)
Tertiary Incomplete	2.01 (.48)	1.96 (.49)	1.98 (.49)	2.89 (1.01)	1.57 (1.06)	2.34 (1.22)	2.44 (.90)	1.80 (.80)	2.14 (.91)
Tertiary Complete	2.38 (.82)	2.21 (.80)	2.31 (.82)	2.72 (.89)	2.01 (.60)	2.36 (.84)	2.41 (.83)	2.19 (.79)	2.32 (.82)
Industry									
Agriculture	.90 (.77)	1.09 (.77)	.93 (.77)	.33 (1.10)	-0.20 (1.02)	.31 (1.11)	.51 (1.05)	.59 (1.08)	.52 (1.05)
Manufacturing	1.71 (.76)	1.77 (.87)	1.72 (.78)	1.42 (.81)	1.31 (.89)	1.37 (.86)	1.57 (.80)	1.40 (.91)	1.50 (.84)
Electricity	1.71 (.76)	1.89 (.47)	1.75 (.72)	1.99 (1.08)	1.38(*) (.00)	1.87 (1.00)	1.73 (.79)	1.86 (.48)	1.76 (.74)
Construction	1.67 (.68)	1.75 (.27)	1.67 (.67)	1.50 (.59)	-	1.50 (.59)	1.58 (.64)	1.75 (.27)	1.58 (.64)
Commerce	1.60 (.72)	1.43 (.66)	1.55 (.71)	1.46 (1.00)	1.16 (.98)	1.26 (1.00)	1.51 (.92)	1.19 (.96)	1.32 (.95)
Transportation	1.76 (.69)	1.99 (.34)	1.79 (.67)	1.56 (.99)	1.86 (1.16)	1.57 (.99)	1.65 (.88)	1.96 (.63)	1.67 (.87)
Financial	2.13 (.71)	2.13 (.79)	2.13 (.75)	2.01 (1.17)	1.54 (.30)	1.90 (1.05)	2.09 (.90)	2.05 (.77)	2.07 (.84)
Personal Services	1.63 (.78)	1.57 (.59)	1.60 (.69)	1.40 (.91)	1.11 (.66)	1.24 (.80)	1.51 (.86)	1.31 (.67)	1.40 (.77)

Note: (\*) Corresponds to a single observation.

**Table A2**  
Wage Equations with Dummy for Informality, Controlling for Selection, Males Age 25-64

	NICARAGUA				MANAGUA				OTHER URBAN				OTHER RURAL			
	(1)		(2)		(1)		(2)		(1)		(2)		(1)		(2)	
	OLS	Selec.	OLS	Selec.	OLS	Selec.	OLS	Selec.	OLS	Selec.	OLS	Selec.	OLS	Selec.	OLS	Selec.
Constant	-0.625 (-3.525)	-1.157 (-6.575)	-0.519 (-2.911)	-1.024 (-5.698)	0.155 (0.578)	0.134 (0.510)	0.272 (0.993)	0.151 (0.560)	0.112 (0.423)	-0.556 (-1.935)	0.284 (1.054)	-0.387 (-1.290)	-0.047 (-0.135)	-0.950 (-2.441)	-0.011 (-0.032)	-0.868 (-2.120)
<u>EDUCATION</u>																
Yearse	0.096 (13.660)	0.100 (15.354)			0.101 (8.839)	0.101 (8.717)			0.114 (9.989)	0.117 (11.413)			0.068 (4.714)	0.067 (4.252)		
Edupi			0.306 (4.842)	0.292 (4.636)			-0.209 (1.582)	0.223 (1.564)			0.355 (2.996)	0.323 (2.749)			0.335 (3.518)	0.321 (3.292)
Edupe			0.501 (6.549)	0.448 (5.965)			0.403 (2.863)	0.415 (2.859)			0.552 (4.029)	0.503 (3.770)			0.436 (3.002)	0.418 (2.838)
Edusi			0.665 (8.052)	0.619 (7.635)			0.653 (4.262)	0.656 (4.341)			0.825 (5.872)	0.766 (5.432)			0.428 (2.672)	0.422 (2.071)
Edus			0.863 (7.581)	0.917 (7.375)			0.871 (4.624)	0.925 (4.939)			1.061 (5.852)	1.065 (4.384)			0.541 (1.404)	0.675 (0.547)
Edut			1.505 (12.957)	1.704 (15.640)			1.504 (8.061)	1.598 (8.301)			1.737 (8.783)	1.907 (10.994)			1.160 (2.996)	1.712 (3.210)
<u>EXPERIENCE/TENURE</u>																
Expn	0.041 (4.303)	0.035 (3.694)	0.036 (3.755)	0.031 (3.138)	0.015 (0.958)	0.014 (0.884)	0.014 (0.859)	0.010 (0.560)	0.042 (2.732)	0.038 (2.186)	0.039 (2.417)	0.037 (2.054)	0.049 (2.412)	0.041 (1.990)	0.045 (2.192)	0.040 (1.798)
Expn2	-0.00042 (-2.971)	-0.00036 (-2.874)	-0.00039 (-2.660)	-0.00034 (-2.328)	-0.00009 (-0.369)	-0.00008 (-0.310)	-0.00012 (-0.473)	-0.00005 (-0.173)	-0.00041 (-1.721)	-0.00037 (-1.419)	-0.00040 (-1.641)	-0.00042 (-1.527)	-0.00058 (-1.980)	-0.00049 (-1.729)	-0.00051 (-1.752)	-0.00047 (-1.558)
Tenure	0.00106 (0.711)	0.00121 (1.325)	0.00101 (0.672)	0.00110 (1.199)	0.043 (3.701)	0.043 (3.548)	0.045 (3.845)	0.045 (3.612)	0.0001 (0.096)	0.0001 (0.062)	0.000 (0.005)	0.000 (-0.029)	-0.011 (-1.204)	-0.015 (-1.511)	-0.010 (-1.082)	-0.014 (-1.376)
Tenure2	-0.0002 (-3.062)	-0.0002 (-3.342)	-0.0002 (-2.904)	-0.0002 (-3.215)	-0.0010 (-2.642)	-0.0010 (-2.718)	-0.0010 (-2.678)	-0.0010 (-2.731)	-0.0001 (-1.009)	-0.0001 (-0.935)	-0.0001 (-0.905)	-0.0001 (-0.922)	-0.0001 (-0.575)	-0.00002 (-0.063)	-0.0002 (-0.649)	-0.00003 (-0.126)
<u>TRAINING</u>																
D_Train	0.162 (2.642)	0.167 (2.921)	0.194 (3.163)	0.197 (3.398)	0.033 (0.340)	0.034 (0.374)	0.045 (0.455)	0.045 (0.462)	0.155 (1.660)	0.148 (1.450)	0.206 (2.180)	0.207 (1.992)	0.601 (4.274)	0.607 (4.576)	0.646 (4.520)	0.643 (4.350)
<u>LOCATION</u>																
D_Urban	0.541 (10.741)	0.491 (10.191)	0.580 (11.168)	0.546 (11.068)	0.377 (3.778)	0.370 (3.821)	0.449 (4.396)	0.415 (4.172)								
D_Reg2	0.451 (4.673)	0.433 (5.253)	0.461 (4.738)	0.444 (5.289)												
D_Reg3	0.561 (6.283)	0.562 (7.230)	0.569 (6.335)	0.568 (7.231)												
D_Reg4	0.485 (4.901)	0.481 (5.345)	0.503 (5.048)	0.501 (5.530)												
D_Reg5	0.523 (4.858)	0.472 (4.912)	0.526 (4.859)	0.474 (4.849)												
D_Reg6	0.139 (1.443)	0.105 (1.176)	0.145 (1.499)	0.107 (1.193)												
D_Reg7	0.473 (4.128)	0.524 (5.124)	0.480 (4.167)	0.523 (5.054)												
D_Infor1	-0.120 (-2.598)	0.111 (1.874)	-0.128 (-2.748)	0.121 (2.075)	0.041 (0.505)	0.041 (0.432)	0.042 (0.510)	0.050 (0.519)	-0.046 (-0.619)	0.239 (2.476)	-0.064 (-0.849)	0.235 (2.371)	-0.408 (-4.876)	0.226 (1.793)	-0.417 (-4.884)	0.171 (1.331)

(CONT.)

Sigma	0.992 (38.673)	0.983 (39.339)	0.765 (31.570)	0.787 (21.495)	0.819 (29.590)	1.036 (23.516)	1.100 (20.956)	1.063 (20.082)						
Rho	0.732 (18.976)	0.720 (18.338)	0.061 (0.330)	0.333 (2.059)	-0.263 (-1.490)	0.740 (12.037)	0.812 (15.184)	0.773 (11.920)						
Log-Likelihood -2202	-2973	-2208	-538	-751	-538	-747	-854	-1177	-859	-1179	-790	-1050	-789	-1043
Mean of Dep.Var.	1.287 (1.075)		1.702 (0.924)		1.559 (0.949)		0.563 (0.977)							
Sample Size	1616		426		624		563							

Note: Asymptotic t-ratio in parentheses.

**Table A3**  
Wage Equations with Dummy for Informality, Controlling for Selection, Women Age 25-64

	NICARAGUA				MANAGUA				OTHER URBAN				OTHER RURAL			
	(1)		(2)		(1)		(2)		(1)		(2)		(1)		(2)	
	OLS	Selec.	OLS	Selec.	OLS	Selec.	OLS	Selec.	OLS	Selec.	OLS	Selec.	OLS	Selec.	OLS	Selec.
Constant	1.130 (4.651)	1.385 (5.251)	1.040 (4.319)	1.036 (3.508)	1.141 (3.067)	1.407 (3.490)	0.830 (2.238)	0.917 (2.004)	1.506 (4.895)	1.648 (4.599)	1.362 (4.478)	1.412 (3.509)	1.523 (2.511)	0.640 (0.723)	1.480 (2.445)	-0.066 (-0.107)
<u>EDUCATION</u>																
Yearse	0.033 (3.661)	0.033 (3.649)			0.049 (3.422)	0.051 (3.707)			0.021 (1.570)	0.021 (1.626)			0.034 (1.455)	0.047 (1.600)		
Edupi			0.138 (1.749)	0.138 (1.814)			0.211 (1.488)	0.214 (1.424)			0.109 (0.916)	0.107 (0.979)			0.113 (0.739)	0.136 (0.834)
Edup			0.192 (1.989)	0.192 (2.011)			0.050 (0.315)	0.054 (0.316)			0.058 (0.391)	0.054 (0.360)			0.841 (3.708)	0.826 (3.603)
Edusi			0.112 (1.059)	0.112 (1.027)			0.138 (0.736)	0.128 (0.640)			0.208 (1.384)	0.211 (1.516)			-0.011 (-0.042)	0.113 (0.332)
Edus			0.295 (2.288)	0.297 (1.955)			0.409 (1.922)	0.371 (1.539)			0.304 (1.725)	0.301 (1.442)			0.327 (0.641)	0.593 (0.984)
Edut			0.769 (4.990)	0.772 (4.263)			1.107 (4.667)	1.047 (3.983)			0.573 (2.478)	0.548 (1.794)			0.408 (0.750)	0.565 (2.570)
<u>EXPERIENCE/TENURE</u>																
Experrn	-0.015 (-1.258)	-0.004 (-0.297)	-0.009 (-0.726)	-0.009 (-0.649)	-0.007 (-0.369)	0.004 (0.190)	0.016 (0.752)	0.016 (0.683)	-0.029 (-1.699)	-0.023 (-1.142)	-0.024 (-1.355)	-0.022 (-1.050)	-0.038 (-1.108)	-0.044 (-1.102)	-0.038 (-1.100)	
Experrn2	0.00026 (1.443)	0.00081 (0.401)	0.00016 (0.821)	0.00016 (0.760)	0.00011 (0.350)	-0.00004 (-0.109)	-0.00026 (-0.768)	-0.00028 (-0.762)	0.00052 (2.025)	0.00041 (1.402)	0.00045 (1.699)	0.00042 (1.383)	0.00051 (1.036)	0.00069 (1.159)	0.00053 (1.070)	
Tenure	0.00044 (0.526)	0.00056 (0.237)	0.00044 (0.531)	0.00044 (0.193)	0.050 (3.673)	0.050 (4.031)	0.044 (3.306)	0.044 (3.607)	0.027 (2.298)	0.024 (1.740)	0.027 (2.267)	0.027 (1.893)	-0.00022 (-0.233)	-0.0003 (-0.013)	-0.0003 (-0.330)	-0.00040 (-0.017)
Tenure2	-0.0001 (-1.279)	-0.0001 (-1.274)	-0.0001 (-1.282)	-0.0001 (-1.196)	-0.0016 (-3.758)	-0.0017 (-4.789)	-0.0015 (-3.394)	-0.0015 (-4.155)	-0.0008 (-2.498)	-0.0007 (-1.796)	-0.0008 (-2.487)	-0.0008 (-1.912)	-0.0001 (-0.475)	-0.0002 (-0.261)	-0.0001 (-0.311)	-0.00003 (-0.042)
<u>TRAINING</u>																
D_Train	0.159 (2.256)	0.162 (2.168)	0.194 (2.714)	0.194 (2.441)	-0.047 (-0.428)	-0.033 (-0.279)	0.002 (0.021)	0.001 (0.008)	0.270 (2.703)	0.267 (2.295)	0.266 (2.607)	0.266 (2.175)	0.525 (2.459)	0.481 (2.073)	0.512 (2.420)	0.565 (2.570)
<u>LOCATION</u>																
D_Urban	0.215 (3.267)	0.230 (3.468)	0.224 (3.386)	0.224 (3.276)	0.121 (0.905)	0.126 (0.925)	0.112 (0.837)	0.109 (0.787)								
D_Reg2	0.109 (0.798)	0.132 (0.928)	0.107 (0.785)	0.107 (0.759)												
D_Reg3	0.360 (2.782)	0.372 (2.767)	0.328 (2.531)	0.327 (2.493)												
D_Reg4	0.250 (1.784)	0.256 (1.782)	0.244 (1.751)	0.244 (1.728)												
D_Reg5	-0.133 (-0.821)	-0.152 (-0.917)	-0.141 (-0.868)	-0.141 (-0.879)												
D_Reg6	-0.251 (-1.652)	-0.202 (-1.385)	-0.250 (-1.654)	-0.250 (-1.764)												
D_Reg7	0.017 (0.095)	0.050 (0.272)	0.031 (0.178)	0.031 (0.172)												
D_Infor1	-0.242 (-3.499)	-0.229 (-4.859)	-0.215 (-3.058)	-0.210 (-1.574)	-0.073 (-0.631)	-0.405 (-2.452)	-0.011 (-0.091)	-0.108 (-0.554)	-0.247 (-2.559)	-0.357 (-2.274)	-0.216 (-2.206)	-0.251 (-1.400)	-0.265 (-1.378)	0.434 (0.860)	-0.282 (-1.471)	0.449 (0.818)

(CONT.)

Sigma	0.867 (36.665)	0.825 (51.384)	0.842 (21.656)	0.779 (27.812)	0.819 (29.590)	0.804 (32.557)	0.973 (10.824)	0.965 (8.895)
Rho	-0.472 (-4.715)	-0.004 (-0.026)	-0.536 (-3.372)	0.071 (0.321)	-0.263 (-1.490)	-0.083 (-0.379)	0.630 (2.346)	0.666 (2.372)
Log-Likelihood	-1327	-1320	-441	-433	-576	-574	-294	-287
Mean of Dep.Var.	1.298 (0.913)	1.531 (0.856)	1.531 (0.856)	1.531 (0.856)	1.284 (0.856)	1.284 (0.856)	0.846 (0.958)	0.846 (0.958)
Sample Size	992	992	346	346	442	442	202	202

Note: Asymptotic t-ratio in parentheses.



**Table A4**  
Wage Equations for Men, Age 25-64

	FORMAL				INFORMAL			
	(1)	(2)	(5)	(6)	(1)	(2)	(5)	(6)
Constant	0.353 (1.841)	0.428 (2.196)	-0.070 (-0.309)	0.178 (0.719)	-0.628 (-2.358)	-0.380 (-1.410)	-0.832 (-3.196)	-0.548 (-1.785)
<u>EDUCATION</u>								
Yearse	0.106 (14.417)				0.176 (17.331)			
Edupi		0.513 (5.476)	0.207 (2.161)	0.212 (2.245)		0.621 (7.529)	0.333 (4.148)	0.329 (4.082)
Edup		0.677 (6.516)	0.394 (3.763)	0.378 (3.669)		0.987 ( 9.563)	0.484 (4.680)	0.464 (4.464)
Edusi		0.926 (8.712)	0.565 (5.118)	0.481 (4.324)		1.179 (10.335)	0.650 (5.726)	0.626 (5.433)
Edus		1.059 (8.154)	0.601 (4.498)	0.524 (3.900)		1.700 ( 8.918)	1.049 (5.737)	0.986 (5.265)
Edut		1.616 (12.831)	1.218 ( 9.497)	1.155 ( 8.874)		2.845 (11.215)	2.080 (8.664)	1.914 (7.632)
<u>EXPERIENCE/TENURE</u>								
Exper	0.036 (3.163)	0.027 (2.293)	0.025 (2.242)	0.020 (1.784)	0.049 (3.083)	0.035 (2.157)	0.033 (2.151)	0.032 (2.136)
Exper2	-0.00051 (-2.874)	-0.00039 (-2.102)	-0.00045 (-2.481)	-0.00037 (-2.065)	-0.00043 (-1.817)	-0.00026 (-1.075)	-0.00024 (-1.046)	-0.00024 (-1.066)
Tenure			0.023 (2.911)	0.020 (2.486)			0.024 (3.103)	0.023 (2.882)
Tenure2			-0.00050 (-2.176)	-0.00042 (-1.826)			-0.00094 (-4.255)	-0.00089 (-4.011)
D_train		0.150 (2.099)	0.111 (1.637)			0.315 (3.038)	0.337 (3.506)	
D_train_B				0.198 (1.512)				0.523 (2.307)
D_train_A				0.182 (1.546)				0.490 (3.091)
Loc2				-0.090 (-0.646)				-0.590 (-2.242)
Loc34				-0.109 (-0.795)				-0.195 (-1.033)
<u>OTHER</u>								
D_reg2			0.549 (3.615)	0.459 (3.060)			0.415 (3.319)	0.389 (3.095)
D_Reg3			0.552 (3.833)	0.438 (3.065)			0.593 (5.228)	0.575 (5.045)
D_Reg4			0.466 (2.886)	0.372 (2.338)			0.489 (3.940)	0.469 (3.774)
D_Reg5			0.371 (2.127)	0.382 (2.239)			0.487 (3.594)	0.481 (3.560)
D_Reg6			0.190 (1.208)	0.238 (1.539)			0.014 (0.112)	0.012 (0.101)
D_Reg7			0.675 (3.404)	0.652 (3.353)			0.415 (2.968)	0.419 (3.004)
D_Urban			0.400 (5.569)	0.387 (5.373)			0.662 (9.564)	0.670 (9.643)
D_Sindic				0.297 (4.087)				-0.015 (-0.063)
D_Seguro				0.156 (2.321)				0.107 (1.004)
D_Public				-0.220 (-2.461)				-0.269 (-1.895)
Adj R2	0.341	0.337	0.420	0.445	0.230	0.218	0.348	0.350
MSE	8.43	8.45	7.90	7.74	11.57	11.66	10.65	10.63
F-Stat	101.50	38.07	25.90	21.33	103.18	36.93	33.27	25.13
D. of F	3,581	8,576	17,567	23,561	3,1026	8,1021	17,1012	23,1006

Note.- t-statistics in parentheses

**Table A5**  
Wage Equations for Women, Age 25-64

	FORMAL				INFORMAL			
	(1)	(2)	(5)	(6)	(1)	(2)	(5)	(6)
Constant	1.041 (4.129)	0.924 (3.694)	0.791 ( 2.654)	0.676 (2.161)	1.164 (3.790)	1.020 (3.333)	0.975 (2.979)	1.215 (3.267)
<u>EDUCATION</u>								
Yearse	0.080 ( 8.146)				0.039 (3.233)			
Edupi		0.441 (3.077)	0.304 (2.084)	0.308 (2.137)		0.242 (2.583)	0.124 (1.330)	0.110 (1.179)
Edup		0.494 (2.948)	0.357 (2.099)	0.309 (1.841)		0.313 (2.698)	0.152 (1.323)	0.112 (0.974)
Edusi		0.503 (3.241)	0.338 (2.016)	0.313 (1.821)		0.204 (1.535)	0.083 (0.631)	0.040 (0.299)
Edus		0.711 (4.515)	0.527 (3.121)	0.544 (3.162)		0.469 (2.507)	0.208 (1.123)	0.122 (0.644)
Edut		1.275 ( 7.782)	1.074 ( 6.070)	1.102 ( 6.115)		0.936 (3.203)	0.579 (2.019)	0.527 (1.807)
<u>EXPERIENCE/TENURE</u>								
Exper	-0.020 (-1.118)	-0.014 (-0.776)	-0.007 (-0.390)	-0.010 (-0.545)	-0.010 (-0.549)	-0.006 (-0.331)	-0.025 (-1.407)	-0.027 (-1.519)
Exper2	0.00055 ( 1.646)	0.00042 ( 1.256)	0.00023 (0.653)	0.00032 (0.926)	0.00015 (0.574)	0.00010 (0.370)	0.00037 (1.435)	0.00039 (1.885)
Tenure			-0.007 (-0.456)	-0.021 (-1.283)			0.034 (3.510)	0.034 (3.552)
Tenure2			0.00023 (0.363)	0.00074 (1.145)			-0.00102 (-3.704)	-0.00105 (-3.793)
D_train		0.286 (3.317)	0.295 (3.338)			0.196 (1.978)	0.185 (1.926)	
D_train_B				0.075 (0.449)				-0.113 (-0.382)
D_train_A				0.125 (0.753)				0.358 (1.371)
Loc2				-0.019 (-0.094)				-0.176 (-0.405)
Loc34				0.344 (2.140)				-0.118 (-0.442)
<u>OTHER</u>								
D_reg2			0.280 (1.688)	0.236 (1.430)			0.054 (0.296)	0.038 (0.208)
D_Reg3			0.248 (1.529)	0.215 (1.320)			0.358 (2.109)	0.344 (2.019)
D_Reg4			0.322 (1.705)	0.272 (1.439)			0.249 (1.380)	0.243 (1.348)
D_Reg5			-0.157 (-0.659)	-0.157 (-0.673)			-0.113 (-0.551)	-0.103 (-0.505)
D_Reg6			-0.109 (-0.574)	-0.110 (-0.586)			-0.277 (-1.390)	-0.256 (-1.287)
D_Reg7			-0.087 (-0.415)	-0.051 (-0.249)			0.107 (0.461)	0.140 (0.599)
D_Urban			0.128 (1.133)	0.051 (0.445)			0.222 (2.787)	0.221 (2.756)
D_Sindic				0.201 (1.660)				-0.540 (-1.010)
D_Seguro				0.229 (2.156)				0.177 (1.566)
D_Public				0.057 (0.519)				-0.187 (-1.318)
Adj R2	0.258	0.295	0.329	0.357	0.019	0.032	0.108	0.113
MSE	6.98	6.81	6.64	6.50	11.30	11.23	10.78	10.75
F-Stat	31.62	14.79	8.60	7.37	5.72	3.97	6.17	5.00
D. of F	3,261	8,256	17,247	23,241	3,722	8,717	17,708	23,702

Note.- t-statistics in parentheses

**Table A6: Switching Regression Model, Formal and Informal Sectors, Men 25-64 Years Old**

	All Sectors OLS	Formal OLS	Informal OLS	Switching Regressions		
				Switch	Formal	Informal
Constant	-0.697 (-3.979)	-0.193 (-0.851)	-0.983 (-3.765)	0.518 (1.765)	-0.874 (-3.259)	-0.732 (-2.512)
<u>EDUCATION</u>						
Yearse	0.097 (14.016)	0.081 (10.313)	0.107 (9.614)	-0.073 (-6.298)	0.102 (11.850)	0.127 (9.095)
<u>EXPERIENCE/TENURE</u>						
Expn	0.038 (4.030)	0.037 (3.407)	0.045 (3.053)	0.037 (2.394)	0.026 (2.337)	0.036 (2.204)
Expn2	-0.00043 (-3.018)	-0.00056 (-3.301)	-0.00046 (-2.101)	-0.00051 (-2.213)	-0.00042 (-2.478)	-0.00033 (-1.365)
<u>TRAINING</u>						
D_train	0.173 (2.814)	0.070 (1.025)	0.290 (3.005)	-0.186 (-1.905)	0.124 (1.722)	0.329 (3.389)
<u>LOCATION</u>						
D_Urban	0.555 (10.977)	0.372 (5.307)	0.620 (8.975)	-0.087 (-1.072)	0.415 (6.107)	0.636 (8.527)
D_Reg2	0.481 (4.973)	0.510 (3.354)	0.404 (3.214)	-0.557 (-3.608)	0.732 (4.817)	0.516 (4.079)
D_Reg3	0.602 (6.755)	0.527 (3.648)	0.617 (5.423)	-0.596 (-4.155)	0.767 (5.245)	0.736 (6.462)
D_Reg4	0.505 (5.093)	0.436 (2.699)	0.486 (3.912)	-0.125 (-0.771)	0.516 (3.315)	0.482 (3.740)
D_Reg5	0.530 (4.912)	0.394 (2.272)	0.531 (3.904)	-0.360 (-2.145)	0.544 (3.141)	0.599 (4.388)
D_Reg6	0.153 (1.586)	0.215 (1.367)	0.031 (0.255)	-0.555 (-3.609)	0.446 (2.659)	0.146 (1.158)
D_Reg7	0.473 (4.116)	0.678 (3.403)	0.428 (3.051)	-0.051 (-0.260)	0.700 (4.170)	0.427 (3.005)
<u>OTHER</u>						
Sal_2				0.00015 (3.530)		
Hj_00_06				0.019 (0.641)		
Log-Likelihood	-2211.0	-632.9	-1522.1	-2913.7		
Sigma					0.771 (15.695)	1.001 (18.995)
Rho					0.702 (8.522)	-0.476 (-2.993)
Means of Dep.Var.	1.287 (1.075)	1.584 (0.847)	1.092 (1.162)			
Sample Size	1616	584	1030			

**Table A7:** Switching Regression Model, Formal and Informal Sectors, Women 25-64 Years Old

	All Sectors OLS	Formal OLS	Informal OLS	Switching Regressions		
				Switch	Formal	Informal
Constant	0.965 (4.038)	0.784 (2.678)	1.019 (3.088)	0.650 (1.347)	-0.238 (-0.557)	1.185 (3.344)
<u>EDUCATION</u>						
Yearsc	0.040 (4.661)	0.065 (6.397)	0.016 (1.296)	-0.104 (-6.476)	0.111 (10.228)	0.048 (2.911)
<u>EXPERIENCE/TENURE</u>						
Expn	-0.018 (-1.457)	-0.017 (-0.973)	-0.017 (-0.975)	0.023 (0.908)	-0.023 (-0.983)	-0.019 (-0.993)
Expn2	0.00027 (1.493)	0.00045 (1.319)	0.00024 (0.958)	-0.00011 (-0.257)	0.00037 (0.815)	0.00026 (0.906)
<u>TRAINING</u>						
D_train	0.167 (2.367)	0.212 (2.595)	0.157 (1.642)	-0.089 (-0.668)	0.314 (2.860)	0.175 (1.688)
<u>LOCATION</u>						
D_Urban	0.225 (3.417)	0.090 (0.819)	0.234 (2.962)	-0.228 (-1.774)	0.270 (2.067)	0.275 (3.143)
D_Reg2	0.109 (0.789)	0.324 (1.987)	0.040 (0.222)	0.009 (0.034)	0.373 (1.609)	0.013 (0.073)
D_Reg3	0.333 (2.560)	0.334 (2.118)	0.368 (2.151)	0.283 (1.198)	0.125 (0.574)	0.278 (1.578)
D_Reg4	0.213 (1.518)	0.395 (2.144)	0.223 (1.228)	0.476 (1.817)	0.099 (0.382)	0.096 (0.510)
D_Reg5	-0.167 (-1.027)	-0.113 (-0.476)	-0.160 (-0.778)	0.533 (1.690)	-0.371 (-1.166)	-0.277 (-1.311)
D_Reg6	-0.253 (-1.653)	-0.049 (-0.265)	-0.299 (-1.486)	0.011 (0.042)	-0.054 (-0.211)	-0.286 (-1.529)
D_Reg7	0.027 (0.154)	-0.045 (-0.218)	0.087 (0.370)	-0.048 (-0.160)	0.019 (0.065)	0.106 (0.453)
<u>OTHER</u>						
Sal_2				0.00006 (2.334)		
Hj_00_06				0.080 (1.568)		
Log-Likelihood	-1334.5	-253.0	-1028.7	-1522.9		
Sigma					0.820 (11.580)	0.969 (23.756)
Rho					0.888 (18.174)	-0.628 (-4.980)
Means of Dep.Var.	1.298 (0.913)	1.628 (0.707)	1.189 (0.947)			
Sample Size	992	264	726			

**Table A8**  
 Bivariate Probit for Participation and Sectoral Choice and Wage Equations, Corrected for Double Selection  
 Males and Females 25-64 Years Old, 1993

	MALES				FEMALES			
	BIVARIATE PROBIT		FORMAL	INFORMAL	BIVARIATE PROBIT		FORMAL	INFORMAL
	LFP	SECTOR			LFP	SECTOR		
Constant	-0.423 (-1.890)	-0.272 (-0.853)	-2.251 (-2.090)	-4.092 (-3.701)	-1.471 (-6.351)	0.797 (1.378)	-0.445 (-0.056)	-0.055 (-0.026)
<u>EDUCATION</u>								
Yearse	0.031 (3.520)	-0.049 (-3.341)	0.132 (4.866)	0.179 (5.501)	0.062 (7.014)	-0.116 (-5.843)	0.197 (0.737)	0.101 (2.058)
<u>EXPERIENCE/TENURE</u>								
Expern	0.030 (2.484)	0.031 (2.113)	0.036 (1.398)	0.105 (4.248)	0.035 (3.007)	0.018 (0.728)	-0.044 (-0.339)	-0.004 (-0.081)
Expern2	-0.00054 (-3.126)	-0.00043 (-1.924)	-0.00070 (-1.538)	-0.00156 (-3.861)	-0.00061 (-3.682)	0.00003 (0.074)	0.00025 (0.159)	0.00005 (0.077)
Tenure			0.021 (2.565)	-0.00009 (-0.087)				0.00025 (0.261)
Tenure2			-0.00046 (-1.884)	-0.00028 (-3.310)				-0.00011 (-0.924)
<u>TRAINING</u>								
D_train	0.054 (0.620)	-0.128 (-1.348)	0.206 (2.225)	0.229 (1.822)			0.280 (1.372)	0.105 (1.113)
<u>LOCATION</u>								
D_Urban	0.376 (6.167)		0.801 (3.053)	1.408 (6.918)	0.402 (6.791)		-0.276 (-0.222)	0.462 (1.561)
D_Reg2	0.028 (0.289)		0.507 (3.977)	0.497 (3.910)	0.433 (4.277)		-0.099 (-0.079)	0.200 (0.576)
D_Reg3	0.198 (2.156)		0.698 (4.244)	0.846 (6.160)	0.381 (4.207)		0.001 (0.001)	0.461 (1.476)
D_Reg4	0.061 (0.580)		0.575 (4.024)	0.558 (4.452)	0.296 (2.887)		0.130 (0.129)	0.239 (0.817)
D_Reg5	-0.018 (-0.188)		0.304 (2.184)	0.439 (3.796)	0.062 (0.594)		-0.087 (-0.116)	-0.117 (-0.463)
D_Reg6	0.248 (2.616)		0.409 (1.958)	0.459 (2.707)	0.052 (0.470)		-0.070 (-0.080)	-0.233 (-0.862)
D_Reg7	0.024 (0.241)		0.630 (4.364)	0.340 (3.045)	0.139 (1.313)		-0.102 (-0.126)	0.068 (0.260)
<u>OTHER</u>								
Sal_2	-0.000028 (-1.006)	0.000034 (0.855)			-0.000034 (-3.639)	0.000044 (1.262)		
Hj_00_06	0.026 (1.024)	0.049 (1.615)			-0.093 (-3.197)	0.067 (1.118)		
Log-Likelihood	-2587.9		-581.8	-1421.2			-218.8	-947.2
Rho	0.571 (3.055)				-0.098 (-0.342)			
Lambda-A			-0.366 (-0.511)	0.329 (0.395)			-2.279 (-0.521)	-0.886 (-0.954)
Lambda-B			1.103 (1.169)	3.808 (3.780)			-1.254 (-0.231)	0.627 (0.736)
Means of Dep.Var.			1.571 (0.879)	1.112 (1.193)			1.578 (0.723)	1.168 (0.954)
Sample Size			585	1031			265	727

Table A9: Means and Std. Dev. of Earnings by Criteria One (Cordobas Oro)

	FORMAL			INFORMAL			TOTAL		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Total	1444 (1400)	1252 (1275)	1382 (1363)	1117 (2281)	955 (1305)	1047 (1925)	1252 (1972)	1047 (1303)	1172 (1745)
Age categories									
25-34	1291 (1236)	1230 (1127)	1267 (1196)	946 (1663)	827 (1024)	898 (1442)	1102 (1495)	1000 (1088)	1062 (1351)
35-44	1735 (1606)	1225 (1187)	1585 (1513)	1268 (2419)	1064 (1400)	1175 (2020)	1470 (2119)	1108 (1347)	1326 (1859)
45-54	1446 (1446)	1339 (1887)	1416 (1585)	1107 (3047)	879 (1026)	1005 (2369)	1228 (2600)	976 (1273)	1127 (2173)
55-64	985 (743)	1698 (1066)	1067 (819)	1275 (1900)	1170 (2074)	1233 (1972)	1187 (1643)	1211 (2019)	1195 (1778)
Education									
No education	643 (448)	686 (403)	652 (440)	532 (770)	647 (771)	571 (772)	566 (691)	653 (721)	593 (701)
Primary Incomplete	1153 (904)	978 (583)	1108 (838)	1035 (2301)	1009 (1411)	1023 (1924)	1074 (1955)	1004 (1319)	1045 (1715)
Primary Complete	1327 (884)	1061 (830)	1277 (880)	1235 (1452)	880 (1005)	1074 (1282)	1272 (1259)	908 (982)	1136 (1177)
Secondary Incomplete	1576 (1277)	1083 (1138)	1408 (1254)	1536 (3197)	1148 (1704)	1367 (2659)	1554 (2523)	1125 (1529)	1384 (2194)
Secondary Complete	1570 (1138)	1027 (661)	1292 (963)	2057 (2354)	1269 (1384)	1673 (1983)	1736 (1673)	1105 (960)	1418 (1397)
Tertiary Incomplete	1882 (886)	1560 (918)	1723 (916)	6919 (6935)	1773 (1709)	4756 (5963)	4328 (5486)	1648 (1308)	3093 (4336)
Tertiary Complete	3043 (2425)	2419 (2176)	2790 (2347)	3257 (1643)	1500 (1346)	2369 (1739)	3057 (1281)	2328 (2127)	2756 (2307)
Industry									
Agriculture	758 (926)	955 (892)	790 (954)	644 (2125)	222 (235)	622 (2074)	679 (1846)	672 (798)	679 (1780)
Manufacturing	1717 (1359)	1480 (1403)	1669 (1371)	1243 (2984)	927 (1273)	1079 (2268)	1478 (2336)	1030 (1316)	1299 (2003)
Electricity	1702 (1228)	1376 (720)	1631 (1145)	2061 (1655)	840(*) (.00)	1812 (1557)	1724 (1261)	1346 (710)	1642 (1174)
Construction	1824 (1591)	1183 (468)	1786 (1555)	1074 (689)	-	1074 (1555)	1431 (1262)	1183 (468)	1424 (1247)
Commerce	1474 (1113)	1257 (995)	1404 (1081)	1692 (2942)	1179 (1615)	1358 (2186)	1621 (2500)	1188 (1559)	1367 (2015)
Transportation	1765 (1330)	1363 (502)	1715 (1264)	1456 (1983)	1899 (1360)	1469 (1969)	1587 (1743)	1485 (820)	1580 (1693)
Financial	2298 (1515)	2477 (2430)	2395 (2060)	2385 (2763)	654 (77)	1971 (2521)	2328 (2026)	2256 (2354)	2294 (2186)
Personal Services	1457 (1647)	1054 (1052)	1245 (1382)	1075 (1308)	673 (523)	854 (981)	1251 (1487)	840 (822)	1030 (1194)

Table A10: Means and Std. Dev. of LWAGEHBA, by Criteria One

	FORMAL			INFORMAL			TOTAL		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Total	1.75 (.75)	1.81 (.75)	1.77 (.75)	1.56 (.99)	1.35 (.81)	1.45 (.91)	1.66 (.88)	1.49 (.82)	1.59 (.86)
Age Category									
25-34	1.66 (.72)	1.87 (.68)	1.73 (.71)	1.48 (.86)	1.34 (.70)	1.41 (.79)	1.58 (.79)	1.57 (.74)	1.58 (.77)
35-44	1.98 (.78)	1.90 (.74)	1.96 (.77)	1.65 (1.11)	1.36 (.80)	1.49 (.96)	1.83 (.96)	1.50 (.82)	1.69 (.92)
45-54	1.65 (.71)	1.43 (.78)	1.57 (.74)	1.52 (.79)	1.37 (.87)	1.44 (.84)	1.58 (.76)	1.39 (.85)	1.48 (.81)
55-64	1.48 (.57)	2.20 (.98)	1.61 (.72)	1.65 (1.29)	1.27 (1.05)	1.50 (1.21)	1.59 (1.09)	1.41 (1.09)	1.53 (1.09)
Education									
Never assisted	1.23 (.36)	1.28 (.39)	1.24 (.37)	1.03 (.97)	1.16 (.63)	1.09 (.84)	1.11 (.80)	1.19 (.58)	1.14 (.72)
Primary Incomplete	1.46 (.56)	1.44 (.59)	1.46 (.57)	1.29 (.75)	1.46 (.80)	1.40 (.78)	1.36 (.68)	1.46 (.77)	1.41 (.73)
Primary Complete	1.59 (.60)	1.45 (.51)	1.57 (.59)	1.60 (.85)	1.28 (.82)	1.44 (.85)	1.60 (.75)	1.30 (.80)	1.48 (.79)
Secondary Incomplete	1.76 (.66)	1.64 (.57)	1.73 (.64)	1.83 (.99)	1.15 (.80)	1.54 (.98)	1.79 (.84)	1.31 (.77)	1.62 (.85)
Secondary Complete	1.73 (.77)	1.72 (.51)	1.73 (.69)	2.27 (.80)	1.62 (.89)	1.96 (.90)	1.88 (.81)	1.68 (.68)	1.80 (.76)
Sup/University Inc.	1.97 (.49)	2.05 (.56)	2.00 (.52)	2.95 (1.11)	1.56 (.98)	2.20 (1.25)	2.34 (.92)	1.81 (.83)	2.09 (.92)
Sup/University Compl.	2.51 (.75)	2.56 (.85)	2.53 (.78)	2.79 (.98)	2.16 (.60)	2.47 (.87)	2.53 (.77)	2.50 (.83)	2.52 (.79)
Industry									
Agriculture	1.51 (.93)	1.60(*) (1.28)	1.53 (1.02)	1.27 (1.55)	.07 (.50)	.99 (1.47)	1.38 (1.30)	0.79 (1.22)	1.25 (1.31)
Manufacture	1.82 (.65)	2.31 (.90)	1.92 (.73)	1.61 (.61)	1.56 (.85)	1.58 (.76)	1.75 (.64)	1.75 (.92)	1.75 (.76)
Electr. gas and water	1.97 (.93)	2.76(*) (.00)	2.02 (.92)	3.63(*) (.00)	-	3.63(*) (.00)	2.05 (.98)	2.76(*) (.00)	2.10 (.96)
Construction	1.82 (.72)	1.79 (.24)	1.82 (.70)	1.57 (.46)	-	1.57 (.46)	1.71 (.63)	1.79(*) (.24)	1.71 (.62)
Commerce	1.62 (.74)	1.62 (.54)	1.62 (.69)	1.46 (1.04)	1.38 (.90)	1.41 (.96)	1.53 (.92)	1.42 (.86)	1.47 (.89)
Transportation	1.89 (.65)	2.04 (.29)	1.91 (.62)	1.82 (1.07)	2.86 (.04)	1.87 (1.07)	1.86 (.85)	2.20 (.42)	1.89 (.83)
Financial	2.19 (.81)	2.22 (.80)	2.21 (.80)	2.74 (.84)	2.01(*) (.00)	2.62 (.81)	2.35 (.86)	2.21 (.78)	2.28 (.82)
Personal Services	1.67 (.74)	1.64 (.68)	1.66 (.72)	1.51 (.97)	1.26 (.61)	1.38 (.81)	1.59 (.88)	1.40 (.66)	1.50 (.79)

Note: (\*) Corresponds to three or less observations.

Table A11: Means and Std. Dev. of LWAGEHBA, by Criteria One, Other Rural

	FORMAL			INFORMAL			TOTAL		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Total	.89 (.69)	1.06 (.57)	.92 (.67)	.44 (1.04)	.77 (.99)	.54 (1.03)	.58 (.97)	.83 (.92)	.65 (.96)
Age Categories									
25-34	.89 (.65)	1.09 (.53)	.95 (.62)	.30 (.90)	.92 (.91)	.48 (.95)	.49 (.87)	.97 (.82)	.63 (.88)
35-44	.94 (.67)	.97 (.68)	.95 (.67)	.60 (1.23)	.79 (.96)	.66 (1.16)	.70 (1.11)	.82 (.91)	.73 (1.06)
45-54	.90 (.73)	1.18 (.06)	.92 (.71)	.51 (.96)	.38 (1.12)	.47 (1.01)	.62 (.92)	.46 (1.09)	.59 (.96)
55-64	.58 (.79)	-	.58 (.79)	.33 (.87)	.95 (.86)	.54 (.91)	.39 (.86)	.95 (.86)	.54 (.89)
Education									
Never assisted	.66 (.57)	.64 (.45)	.66 (.56)	.25 (.93)	.55 (.88)	.32 (.92)	.37 (.86)	.56 (.83)	.41 (.86)
Primary Incomplete	1.03 (.74)	.78 (.54)	.97 (.71)	.58 (1.14)	.70 (1.08)	.63 (1.12)	.70 (1.07)	.72 (1.02)	.40 (1.05)
Primary Complete	1.06 (.78)	1.29 (.50)	1.09 (.75)	.90 (1.04)	1.70 (.83)	1.18 (1.04)	.96 (.95)	1.63 (.79)	1.15 (.95)
Secondary Incomplete	1.33 (.42)	1.35 (.20)	1.33 (.36)	.70 (1.12)	.75 (.44)	.72 (.92)	.91 (.99)	.93 (.47)	.91 (.83)
Secondary Complete	1.42(*) (.14)	1.73 (.38)	1.63 (.35)	1.21 (.74)	1.25 (.87)	1.23 (.79)	1.28 (.61)	1.55 (.65)	1.42 (.64)
Sup/University Inc.	1.83(*) (.00)	-	1.83(*) (.00)	1.40(*) (.00)	-	1.40(*) (.00)	1.61(*) (.22)	-	1.61(*) (.22)
Sup/University Compl.	1.53 (.95)	1.39 (.22)	1.46 (.67)	2.46(*) (.06)	-	2.46(*) (.06)	1.74 (.93)	1.39 (.22)	1.57 (.71)
Industry									
Agriculture	.69 (.60)	.90 (.53)	.72 (.59)	.23 (1.02)	-.34 (1.12)	.20 (1.03)	.36 (.94)	.40 (1.02)	.36 (.95)
Manufacturing	1.29 (.57)	.57(*) (.19)	1.22 (.58)	1.08 (.83)	.86 (1.00)	.95 (.94)	1.15 (.75)	.85 (.98)	1.00 (.89)
Electr.gas and water	2.21(*) (.00)	-	2.21(*) (.00)	.77(*) (.28)	-	.77(*) (.28)	1.89 (.61)	-	1.89 (.61)
Construction	1.08 (.27)	-	1.08 (.27)	1.15 (.56)	-	1.15 (.56)	1.12 (.45)	-	1.12 (.45)
Commerce	1.45 (.59)	.30 (.12)	1.05 (.73)	1.18 (.87)	.87 (.99)	.96 (.97)	1.23 (.83)	.85 (.97)	.96 (.95)
Transportation	1.82(*) (.00)	2.22(*) (.00)	1.97(*) (.20)	.90 (.67)	.52(*) (.00)	.88 (.65)	.95 (.68)	1.16(*) (.83)	.96 (.69)
Financial	1.61(*) (.13)	-	1.61(*) (.13)	.11(*) (.00)	-	.11(*) (.00)	1.14 (.71)	-	1.14 (.71)
Personal Services	1.12 (.81)	1.35 (.41)	1.24 (.65)	1.11 (.77)	.88 (.66)	.96 (.71)	1.11 (.79)	1.04 (.63)	1.07 (.70)

Note: (\*) Corresponds to three or less observations.



Table A12: Means and Std. Dev. of LWAGEHBA, by Criteria One, Other Urban

	FORMAL			INFORMAL			TOTAL		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Total	1.64 (.77)	1.55 (.58)	1.60 (.70)	1.39 (.97)	1.13 (.88)	1.26 (1.04)	1.49 (.90)	1.28 (.82)	1.39 (.87)
Age Categories									
25-34	1.59 (.70)	1.59 (.56)	1.59 (.64)	1.23 (.85)	1.15 (.79)	1.20 (.83)	1.38 (.81)	1.37 (.72)	1.37 (.77)
35-44	1.80 (.76)	1.48 (.56)	1.68 (.71)	1.48 (1.04)	1.18 (.80)	1.33 (.93)	1.63 (.94)	1.28 (.74)	1.47 (.87)
45-54	1.64 (.81)	1.55 (.71)	1.61 (.78)	1.44 (1.01)	.93 (.93)	1.20 (1.00)	1.51 (.95)	1.05 (.92)	1.31 (.97)
55-64	1.06 (.85)	1.32(*) (.26)	1.09 (.82)	1.57 (.99)	1.29 (1.22)	1.44 (1.11)	1.42 (.98)	1.29 (1.18)	1.37 (1.06)
Education									
Never Assisted	.90 (.63)	1.10 (.66)	.97 (.65)	1.09 (.86)	1.05 (.84)	1.07 (.85)	1.03 (.81)	1.06 (.82)	1.05 (.81)
Primary Incomplete	1.37 (.81)	1.47 (.63)	1.40 (.77)	1.30 (.98)	1.13 (.86)	1.23 (.94)	1.33 (.93)	1.19 (.84)	1.27 (.90)
Primary Complete	1.66 (.65)	1.42 (.76)	1.60 (.69)	1.35 (1.02)	1.01 (.79)	1.19 (.94)	1.47 (.91)	1.09 (.80)	1.32 (.89)
Secondary Incomplete	1.74 (.61)	1.51 (.53)	1.64 (.59)	1.52 (.86)	1.17 (.98)	1.37 (.93)	1.62 (.77)	1.30 (.85)	1.48 (.82)
Secondary Complete	1.85 (.53)	1.56 (.49)	1.67 (.52)	1.83 (.78)	1.42 (.89)	1.62 (.87)	1.84 (.65)	1.52 (.64)	1.65 (.66)
Sup/University Inc.	2.20 (.43)	1.80 (.27)	1.94 (.38)	2.87 (.86)	1.63(*) (1.41)	2.62 (1.11)	2.67 (.82)	1.76 (.72)	2.28 (.90)
Sup/University Compl.	2.25 (.84)	1.89 (.49)	2.09 (.72)	-	1.49(*) (.12)	1.49(*) (.12)	2.25 (.84)	1.87 (.49)	2.07 (.72)
Industry									
Agriculture	1.52 (.87)	1.42 (.77)	1.50 (.86)	.74 (1.22)	.30 (.86)	.73 (1.21)	1.03 (1.16)	1.22 (.89)	1.05 (1.14)
Manufacture	1.68 (.85)	1.43 (.58)	1.63 (.80)	1.44 (.83)	1.35 (.81)	1.40 (.82)	1.54 (.85)	1.37 (.77)	1.48 (.82)
Electr.gas and water	1.55 (.69)	1.83 (.43)	1.63 (.64)	2.31(*) (.00)	1.38(*) (.00)	1.96(*) (.45)	1.58 (.69)	1.81 (.43)	1.64 (.64)
Construction	1.55 (.49)	1.20(*) (.00)	1.54 (.49)	1.52 (.70)	-	1.52 (.70)	1.53 (.63)	1.20(*) (.00)	1.53 (.63)
Commerce	1.60 (.69)	1.37 (.65)	1.50 (.68)	1.56 (.98)	1.10 (1.00)	1.28 (1.02)	1.57 (.93)	1.13 (.97)	1.31 (.98)
Transportation	1.40 (.70)	1.77 (.43)	1.44 (.69)	1.73 (.88)	-	1.73 (.88)	1.62 (.84)	1.77 (.43)	1.62 (.83)
Financial	2.17 (.56)	1.85 (.69)	2.02 (.64)	1.68 (.98)	1.36(*) (.05)	1.58 (.82)	1.97 (.80)	1.71 (.62)	1.86 (.74)
Personal Services	1.72 (.78)	1.55 (.54)	1.61 (.64)	1.30 (.80)	.98 (.67)	1.12 (.75)	1.50 (.82)	1.29 (.67)	1.38 (.74)

Note: (\*) Corresponds to three or less observations.

**Table A13: Wage Equations for Men, Age 25-64, Household Heads**

	FORMAL				INFORMAL			
	(1)	(2)	(5)	(6)	(1)	(2)	(5)	(6)
Constant	0.613 (2.184)	0.795 (2.570)	0.516 ( 1.673)	0.799 (2.253)	-0.034 (-0.066)	0.343 ( 0.647)	0.368 ( 0.696)	0.492 ( 0.778)
<u>EDUCATION</u>								
Yearse	0.096 ( 8.223)				0.149 ( 7.702)			
Edupi		0.257 (1.370)	0.148 (0.806)	0.171 (0.945)		0.364 (1.835)	0.254 (1.315)	0.218 (1.117)
Edup		0.447 (2.151)	0.382 (1.847)	0.456 (2.213)		0.641 ( 3.186)	0.367 (1.797)	0.320 (1.522)
Edusi		0.738 (3.580)	0.634 (3.106)	0.593 (2.920)		0.884 ( 3.655)	0.614 (2.549)	0.581 (2.397)
Edus		0.809 (3.481)	0.683 (2.967)	0.612 (2.641)		1.551 ( 4.444)	1.090 (3.115)	1.002 (2.676)
Edut		1.445 ( 6.342)	1.316 ( 5.856)	1.237 ( 5.365)		2.269 ( 5.708)	1.924 (4.920)	1.733 (4.134)
<u>EXPERIENCE/TENURE</u>								
Exper	0.026 (1.598)	0.022 (1.241)	0.010 (0.590)	-0.004 (-0.251)	0.038 (1.220)	0.025 (0.780)	0.005 (0.155)	0.006 (0.193)
Exper2	-0.00028 (-1.055)	-0.00025 (-0.877)	-0.00012 (-0.393)	0.00012 ( 0.399)	-0.00028 (-0.598)	-0.00015 (-0.300)	0.00005 ( 0.099)	0.00002 ( 0.044)
Tenure			0.039 (2.915)	0.044 (3.279)			0.046 (2.231)	0.039 (1.855)
Tenure2			-0.00102 (-2.501)	-0.00118 (-2.905)			-0.00086 (-1.288)	-0.00066 (-0.963)
<u>TRAINING</u>								
D_train		-0.003 (-0.028)	0.004 (0.036)			0.112 (0.544)	0.102 (0.509)	
D_train_B				0.317 (1.611)				1.192 (1.914)
D_train_A				0.221 (1.335)				0.055 (0.156)
Loc2				-0.325 (-1.625)				-0.653 (-1.179)
Loc34				-0.305 (-1.591)				0.052 ( 0.131)
<u>LOCATION</u>								
D_Urban			0.440 (3.385)	0.467 (3.604)			0.411 (2.537)	0.481 (2.776)
<u>OTHER</u>								
D_Sindic				0.242 (2.183)				0.313 ( 0.725)
D_Seguro				0.113 (0.933)				0.095 (0.479)
D_Public				-0.318 (-2.601)				-0.164 (-0.636)
Adj R2	0.293	0.266	0.316	0.347	0.219	0.179	0.248	0.252
MSE	8.83	8.93	8.63	8.43	12.54	12.86	12.31	12.27
F-Stat	29.99	10.97	10.23	7.89	20.19	6.59	7.15	5.06
D. of F	3,217	8,212	11,209	17,203	3,202	8,197	11,194	17,188

Note.- t-statistics in parentheses

Table A14: Wage Equations for Women, Age 25-64, Household Heads

	FORMAL				INFORMAL			
	(1)	(2)	(5)	(6)	(1)	(2)	(5)	(6)
Constant	0.542 (1.213)	0.492 (1.066)	0.455 (0.795)	-0.044 (-0.077)	1.227 (2.538)	0.982 (2.027)	0.995 (2.030)	1.501 (2.654)
<u>EDUCATION</u>								
Yearse	0.095 (4.653)				0.022 (1.207)			
Edupi		0.220 (0.738)	0.230 (0.742)	0.264 (0.891)		0.221 (1.339)	0.196 (1.198)	0.216 (1.336)
Edup		0.289 (0.829)	0.296 (0.824)	0.068 (0.192)		-0.001 (-0.006)	0.001 (0.008)	-0.071 (-0.390)
Edusi		0.411 (1.157)	0.416 (1.087)	0.438 (1.157)		0.049 (0.222)	0.052 (0.234)	-0.022 (-0.102)
Edus		0.557 (1.592)	0.561 (1.488)	0.719 (1.944)		0.384 (1.379)	0.317 (1.148)	0.203 (0.723)
Edut		1.372 (3.942)	1.377 (3.769)	1.555 (4.269)		1.024 (2.818)	0.905 (2.511)	0.830 (2.260)
<u>EXPERIENCE/TENURE</u>								
Exper	0.027 (0.894)	0.048 (1.518)	0.049 (1.447)	0.040 (1.233)	0.011 (0.372)	0.026 (0.879)	0.005 (0.183)	-0.007 (-0.232)
Exper2	-0.00036 (-0.620)	-0.00079 (-1.273)	-0.00080 (-1.206)	-0.00051 (-0.787)	-0.00021 (-0.484)	-0.00043 (-0.984)	-0.00012 (-0.258)	0.00004 (0.090)
Tenure			0.003 (0.077)	-0.020 (-0.573)			0.052 (3.326)	0.055 (3.561)
Tenure2			-0.00018 (-0.121)	0.00092 (0.626)			-0.00166 (-3.416)	-0.00180 (-3.718)
<u>TRAINING</u>								
D_train		0.185 (1.095)	0.182 (1.009)			-0.102 (-0.708)	-0.067 (-0.474)	
D_train_B				-0.593 (-1.339)				-0.228 (-0.466)
D_train_A				-0.564 (-1.129)				0.341 (0.787)
Loc2				0.428 (0.878)				-0.392 (-0.476)
Loc34				0.953 (2.116)				-0.367 (-0.830)
<u>LOCATION</u>								
D_Urban			0.022 (0.069)	0.080 (0.249)			0.134 (0.882)	0.073 (0.471)
<u>OTHER</u>								
D_Sindic				0.473 (1.866)				-1.165 (-1.747)
D_Seguro				0.346 (1.826)				0.286 (1.956)
D_Public				0.121 (0.649)				-0.280 (-1.510)
Adj R2	0.283	0.287	0.260	0.337	0.001	0.024	0.060	0.084
MSE	8.38	8.35	8.51	8.06	11.32	11.19	10.98	10.84
F-Stat	12.84	5.52	3.88	3.69	1.07	1.77	2.48	2.39
D. of F	3,87	8,82	11,79	17,73	3,252	8,247	11,244	17,238

Note.- t-statistics in parentheses

Table A15: Wage Equations for Men, Age 25-64, Household Heads, Other Urban

	FORMAL				INFORMAL			
	(1)	(2)	(5)	(6)	(1)	(2)	(5)	(6)
Constant	0.308 ( 0.986)	0.465 ( 1.393)	0.163 ( 0.444)	0.142 ( 0.336)	-0.122 (-0.322)	0.057 ( 0.146)	-0.281 (-0.697)	0.036 ( 0.079)
<u>EDUCATION</u>								
Yearse	0.086 ( 6.599)				0.145 ( 8.623)			
Edupi		0.354 (1.873)	0.213 (1.120)	0.277 (1.432)		0.364 (2.457)	0.386 (2.545)	0.392 (2.580)
Edup		0.536 (2.644)	0.424 (2.116)	0.432 (2.135)		0.582 ( 3.259)	0.565 (3.156)	0.547 (3.054)
Edusi		0.663 (3.193)	0.581 (2.820)	0.574 (2.682)		0.904 ( 4.926)	0.910 (4.879)	0.854 (4.529)
Edus		0.779 (3.352)	0.552 (2.340)	0.593 (2.427)		1.277 ( 4.640)	1.259 (4.535)	1.248 (4.444)
Edut		1.313 ( 5.568)	1.214 ( 5.184)	1.269 ( 5.200)		2.644 ( 6.981)	2.521 (6.618)	2.369 (5.948)
<u>EXPERIENCE/TENURE</u>								
Exper	0.062 (3.283)	0.051 (2.616)	0.038 (1.936)	0.037 ( 1.861)	0.036 (1.597)	0.037 (1.556)	0.027 (1.130)	0.028 (1.178)
Exper2	-0.00100 (-3.330)	-0.00089 (-2.826)	-0.00075 (-2.403)	-0.00072 (-2.259)	-0.00020 (-0.588)	-0.00028 (-0.776)	-0.00006 (-0.178)	-0.00007 (-0.195)
Tenure			0.031 ( 1.910)	0.025 ( 1.514)			0.030 (2.056)	0.024 (1.836)
Tenure2			-0.00050 (-0.931)	-0.00039 (-0.705)			-0.00101 (-2.739)	-0.00095 (-2.561)
<u>TRAINING</u>								
D_train		0.212 ( 1.898)	0.203 (1.827)			0.190 (1.330)	0.216 (1.510)	
D_train_A				0.046 (0.216)				0.210 (0.615)
D_train_B				0.305 ( 1.472)				0.603 (2.574)
Loc2				0.030 ( 0.127)				-0.627 (-1.853)
Loc34				-0.123 (-0.483)				-0.472 (-1.591)
<u>LOCATION</u>								
D_reg2			0.493 (2.663)	0.433 (2.319)			0.366 (2.061)	0.340 (1.871)
D_Reg4			0.482 (2.497)	0.424 (2.168)			0.408 (2.465)	0.382 (2.288)
D_Reg5			0.225 (0.920)	0.243 (0.993)			0.608 (3.014)	0.584 (2.890)
D_Reg6			0.264 (1.191)	0.286 (1.284)			0.300 ( 1.623)	0.294 ( 1.587)
D_Reg7			0.658 (2.832)	0.644 (2.768)			0.375 (1.848)	0.382 (1.869)
<u>OTHER</u>								
D_Sindic				0.272 (2.039)				-0.152 (-0.433)
D_Seguro				0.067 (0.580)				0.125 (0.753)
D_Public				-0.024 (-0.146)				-0.327 (-1.506)
Adj R2	0.232	0.224	0.268	0.272	0.151	0.135	0.161	0.165
MSE	7.60	7.64	7.42	7.40	9.84	9.94	9.78	9.77
F-Stat	23.02	8.90	6.35	4.89	24.93	8.86	6.17	5.78
D. of F	3,216	8,211	15,204	21,198	3,400	8,395	15,388	21,382

Note.- t-statistics in parentheses

Table A16: Wage Equations for Men, Age 25-64, Household Heads, Other Rural

	FORMAL				INFORMAL			
	(1)	(2)	(5)	(6)	(1)	(2)	(5)	(6)
Constant	0.472 ( 1.025)	0.502 (1.059)	0.045 ( 0.086)	-0.446 (-0.624)	-0.830 (-1.775)	-0.579 (-1.251)	-0.810 (-1.789)	-0.418 (-0.705)
<u>EDUCATION</u>								
Yearse	0.068 ( 4.040)				0.096 ( 4.851)			
Edupi		0.383 (2.517)	0.353 (2.200)	0.331 (2.256)		0.361 (3.013)	0.360 (3.156)	0.325 (2.806)
Edup		0.404 (2.340)	0.406 (2.295)	0.227 (1.359)		0.441 ( 2.078)	0.470 (2.345)	0.470 (2.266)
Edusi		0.416 (1.831)	0.371 (1.558)	0.009 (0.035)		0.372 ( 1.771)	0.319 (1.555)	0.312 (1.471)
Edus		0.578 (0.641)	0.440 (0.490)	0.174 (0.210)		0.537 ( 1.194)	0.339 (0.783)	0.371 (0.844)
Edut		0.828 ( 2.434)	0.853 ( 2.523)	0.651 ( 2.007)		2.639 ( 2.278)	2.408 (2.191)	2.381 (2.169)
<u>EXPERIENCE/TENURE</u>								
Exper	0.021 (0.766)	0.015 (0.529)	0.026 (0.887)	0.050 ( 1.676)	0.061 (2.243)	0.043 (1.590)	0.047 (1.811)	0.044 (1.672)
Exper2	-0.00039 (-0.962)	-0.00028 (-0.683)	-0.00044 (-1.041)	-0.00084 (-1.950)	-0.00076 (-2.016)	-0.00054 (-1.391)	-0.00050 (-1.344)	-0.00044 (-1.181)
Tenure			-0.008 (-0.495)	-0.014 (-1.004)			0.002 (0.179)	0.003 (0.219)
Tenure2			0.00016 ( 0.402)	0.00039 ( 1.053)			-0.00053 (-1.667)	-0.00055 (-1.716)
<u>TRAINING</u>								
D_train		0.419 ( 1.921)	0.314 (1.405)			0.852 (4.697)	0.618 (3.455)	
D_train_A				0.074 (0.145)				0.444 (1.296)
D_train_B				-0.598 (-1.254)				0.897 (2.891)
Loc2				0.392 ( 0.677)				-1.824 (-1.246)
Loc34				1.516 ( 2.520)				-0.433 (-1.180)
<u>LOCATION</u>								
D_reg2			0.544 (2.174)	0.242 (1.039)			0.354 (2.131)	0.355 (2.132)
D_Reg4			0.285 (1.031)	0.231 (0.837)			0.614 (3.351)	0.621 (3.326)
D_Reg5			0.510 (2.098)	0.450 (2.048)			0.441 (2.629)	0.438 (2.601)
D_Reg6			0.255 (1.151)	0.265 (1.328)			-0.098 (-0.657)	-0.098 (-0.656)
D_Reg7			0.799 (2.305)	0.643 (2.024)			0.425 (2.412)	0.425 (2.413)
<u>OTHER</u>								
D_Sindic				0.692 (3.442)				-1.286 (-1.684)
D_Seguro				0.477 (3.161)				0.110 (0.469)
D_Public				0.135 ( 0.284)				-0.341 (-0.949)
Adj R2	0.142	0.141	0.169	0.331	0.049	0.091	0.194	0.195
MSE	7.72	7.72	7.60	6.81	11.17	10.92	10.28	10.27
F-Stat	8.88	3.94	2.94	4.38	8.22	6.24	7.71	5.84
D. of F	3,140	8,135	15,128	21,122	3,416	8,411	15,404	21,398

Note.- t-statistics in parentheses





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