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Education and Earnings in Peru's Informal Nonfarm Family Enterprises

Peter Moock,
Philip Musgrove,
and
Morton Stelcner

Education improves the earnings of self-employed individuals very little when they engage in traditional economic activities. It becomes valuable when they take up new methods of production, or engage in activities that require literacy, numeracy, or the ability to adjust to change.

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Moock, Musgrove, and Stelcner used data from the 1985 Living Standards Survey in Peru to categorize 2,735 nonfarm family enterprises — "informal" businesses that hire little or no labor — and to explain earnings per hour of family labor.

The central question they addressed: Does formal schooling make a difference?

Regression analyses show that schooling affects earnings significantly, for all enterprises combined. This cannot reflect only "screening" but must indicate productivity (allowing for enterprise capital, location, and the age and sex of the workers).

Returns differ markedly among four subsectors — retail trade, textile manufacturing, other manufacturing, and personal services — and by gender and location (Lima, other cities, rural).

Postsecondary education has a fairly significant payoff in urban areas, for both men and women. Returns for women are higher than for men, perhaps because education is still less frequent among women.

Primary education is especially valuable for women, who dominate the textile trades — for which only primary schooling pays off. Men dominate in the personal services subsector, for which post-primary education is valuable. Thus male-female differences are strongly associated with sectoral differences in the value of schooling.

In the retail trade sector, post-primary education appears to be valuable in urban but not in rural areas.

In general, as might be expected, education pays off in jobs that require literacy, numeracy, or the ability to adjust to change. These results are consistent with earlier research indicating that education improves farmers' earnings very little so long as they follow traditional farming practices, where the necessary knowledge is transmitted informally. Education becomes especially valuable only when individuals take up new methods of production, because schooling enables them to apply these methods more quickly and more profitably to their particular circumstances.

This paper is a product of the Education and Employment Division, Population and Human Ressources Department. Copies are available free from the World Bank, 1818 H Street NW, Washington DC 20433 Please contact Mary Fisher, room J7-146, extension 34819 (40 pages with tables).

EDUCATION AND EARNINGS IN PERU'S INFORMAL NONFARM FAMILY ENTERPRISES

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1. Introduction

The standard approach to assessing education's effect on labor market outcomes, particularly income, is to estimate some variant of the human capital earnings function, in which earnings are specified as a function of years of schooling and work experience [Mincer (1974)]. This approach presents relatively few problems when the analysis is confined to employees, for whom income is largely in the form of wages and for whom, therefore, the regression coefficient on years of school can be interpreted as the private return to investment in schooling. The model performs best in the case of wage employees who work continuously after completing their schooling. For self-employed workers, however, application of the usual human capital earnings function raises methodological issues that most empirical studies have failed to address satisfactorily.

First, with the exception of a growing number of studies of small-scale farming [for a survey of this research, see Lockheed, Jamison, and Lau 1980] and only a very few studies of nonfarm enterprises in developing countries [e.g., Strassmann (1987); Blau (1985); Teilhet-Waldorf and Waldorf (1983)], most of the research on the self-employed has taken the <u>individual</u> as the unit of analysis rather than the <u>enterprise</u>, thereby ignoring the contributions to income of capital and other nonlabor inputs. When two or more people work in the same enterprise, and none of them is an employee of another, there is a further problem of how income is shared among the workers in the business, but the problem of nonlabor factors in generating the income remains even when the enterprise consists of a single worker. The result is not just an asymmetry between the treatment of farm and nonfarm family businesses, but far more serious, the likelihood of upwardly biased estimates

of the returns to human capital investment, if the latter is correlated with nonhuman assets.

Second, many empirical studies have not made clear the definition of the self-employed "earnings" measure used -- whether it refers to gross production (sales plus the value of self-consumed output) or net production (gross production less the cost of materials and other inputs). Moreover, although the role of women in family businesses is given due recognition in most discussions of the subject, many empirical studies have excluded women (and children) from the analysis because women and children are often unpaid family workers, reporting zero income from self-employment. Studies parallel to this one by Arriagada (1988a) and Moock and Bellew (1988) have measured the business earnings of Peruvian men by using net production; the study by King (1988) and Arriagada (1988b) have done the same for women in self-employment. Each of these studies, however, has looked only at individuals working alone; none has treated as determinants of income any variables other than the characteristics of the individual worker.

This study presents an analysis of non-farm family businesses in Peru. It uses the enterprise rather than the individual as the unit of analysis, and it incorporates enterprise characteristics (capital, nonlabor inputs, locus of operation) explicitly, and in that respect parallels an analysis of Peruvian farm enterprises by Jacoby (1988). The central question addressed is: does formal schooling make a difference? Women (and children) are included in the analysis since they play an important, if not the preeminent, role in Peru's family business sector. We can thus see whether the payoff, i.e., the private return, to education differs between male and female entrepreneurs, after controlling for other factors.

The family enterprises we study compose what is usually called the "informal" sector of the Peruvian economy -- small businesses that are loosely organized, usually pay no taxes, and may or may not comply with the variety of other legal requirements for setting up and running a business in Peru. But the word "informal" should not be taken to mean that these enterprises operate irregularly, or that they require no particular skills, or that they make no use of purchased inputs: we discuss some of these characteristics in section 2. Because we are trying to explain the earnings of businesses within this sector, we do not address the issue of whether these businesses are more or less productive than so-called "formal" enterprises employing wage labor, or whether they are more or less innovative. There is no presumption here that family enterprises are the dumping-ground for life's losers -- for people who could not obtain more serious jobs and therefore had to create their own livelihood. Nor do we presume that these businesses are particularly dynamic, because they operate out from under the heavy hand of government regulation. This is an interesting and important debate in Peru [Kafka (1984); de Soto (1986); Vargas Llosa (1987); World Bank (1987)], but the data obtained in the Peru Living Standards Survey of 1985, analyzed here, do not help much to resolve it. For our purposes, it is sufficient to recall that, not so many decades ago, virtually the entire Peruvian economy consisted of family enterprises, both farm and nonfarm, and that while wage employment has greatly increased in importance, as a consequence of the expansion of the public sector and modern, large-scale private enterprises, family businesses continue to employ a large share of the Peruvian working population.

The paper proceeds as follows. Sections 2 and 3 describe, respectively, the data and the regression model. Section 4 presents the

empirical results. Section 5 assesses these results, including those for nonschooling variables, and section 6 discusses the implications with regard to education, comparing our findings with those obtained for some of the same people, considered as individuals, in other analyses.

2. Description of Nonfarm Family Enterprises

The Peru Living Standards Survey [Grootaert and Arriagada (1986)] generated information on 3,158 nonfarm family businesses nationwide and on 4,652 family members working in such businesses. Just over half (2,526) of the households in the sample owned and operated at least one such business. Nonfarm family enterprises are nearly equally divided among Metropolitan Lima, other urban areas, and rural areas (35 percent, 38 percent, and 27 percent, respectively) -- see table 1.

Four activities are predominant among nonfarm businesses in Peru: (1) retail trade, including both food services (street kiosks as well as sit-down restaurants) and nonfood merchandising; (2) textile manufacturing, including both the weaving of cloth and the sewing of clothing; (3) other manufacturing, i.e., all types of goods-producing enterprises <u>other</u> than textile manufacturing, such as food processing and furniture making); and (4) personal services, such as domestic work, laundering, auto repairs, and barbering. The analysis here, of education's contribution to business earnings, will be conducted separately for these four principal sectors as well as for the entire nonfarm family business sector.

Table 1

DISTRIBUTION OF HOUSEHOLDS, ENTERPRISES, AND WORKERS BY REGION

Region	Households	Enterprises	Workers
Metropolitan Lima	823 (32.6)	1,106 (35.0)	1,531 (32.9)
Other Urban Areas	930 (36.8)	1,186 (37.6)	1,836 (39.5)
Rural areas	773 (30.6)	866 (27.4)	1,285 (27.6)
All Peru	2,526 (100.0)	3,158 (100.0)	4,652 (100.0)

Note: Column Percentages in Parentheses

The most frequently encountered sector of nonfarm business activity in Peru is retail trade, which accounts for just under 40 percent of nonfarm enterprises in Lima and nearly half in other urban areas and rural areas. The next largest sector is textile manufacturing. About a fifth of enterprises in rural areas and a tenth in urban areas produce or stitch textiles. Manufacturing other than textiles accounts for approximately a tenth of enterprises in both urban and rural areas. Personal services are numerically important only in urban areas -- 18 percent of businesses in Lima and 13 percent in other cities are in this sector. In rural areas this sector accounts for only 5 percent of firms. All other sectors combined (wholesale trade, construction, transportation, financial and other nonpersonal services, and forestry, fishing, and mining) account for only about a quarter of non-farm family enterprises in urban areas and 15 percent in rural areas, and yielded too few observations in the survey for separate analysis -- see table 2.

The typical family business in Peru is small -- what might be called a "micro-enterprise." The vast majority (85 percent) consist of either one or two family workers. The average firm includes 1.5 people, who contribute 165 hours of labor per month, or about 25 hours per person per week, as table 3 shows. The use of hired labor is negligible: only 18 percent of all firms use any nonfamily labor at all. Women are important contributors, accounting for 55 percent of all family workers. In two of the four principal sectors, textiles and retail trade, women are over-represented relative to the average in all sectors. About 75 percent of textile workers and 60 percent of retail

Table 2

DISTRIBUTION OF ENTERPRISES AND FAMILY WORKERS BY REGION AND BY SECTOR

COUNT (Row %) / (Col. %) (Total %)	Metropolitan Lima				Other Urban Areas				Rural Areas				ALL PERU			
Sector	Enterprises		Workers		Enterprises		Workers		Enterprises		Workers		Enterprises		Workers	
1. Manufacturing	199	(28.9)	248	(25.5)	216	(31.4)	330	(34.0)	273	(39.7)	394	(40.5)	688	(100.0)	972	(100.0)
	(18.0)	(6.3)	(16.2)	(5.3)	(18.2)	(6.8)	(18.0)	(7.1)	(31.5)	(8.6)	(30.7)	(8.5)	(21.8)	(21.8)	(20.9)	(20.9)
a. Textiles	102	(26.2)	126	(22.5)	109	(27.9)	163	(29.1)	179	(45.9)	271	(48.4)	390	(100.0)	560	(100.0)
	(9.2)	(3.2)	(8.2)	(2.7)	(9.2)	(3.5)	(8.9)	(3.5)	(20.7)	(5.7)	(21.1)	(5.8)	(12.3)	(12.3)	(12.0)	(12.0)
b. Food processing	24	(28.6)	32	(26.9)	32	(38.1)	48	(40.3)	28	(33.3)	39	(32.8)	84	(100.0)	119	(100.0)
	(2.2)	(0.8)	(2.1)	(0.7)	(2.7)	(1.0)	(2.6)	(1.0)	(3.2)	(0.9)	(3.0)	(0.8)	(2.7)	(2.7)	(2.6)	(2.6)
c. Wood products/furniture	29	(24.6)	40	(22.1)	48	(40.7)	84	(46.4)	41	(34.7)	57	(31.5)	118	(100.0)	181	(100.0)
	(2.6)	(0.9)	(2.6)	(0.9)	(4.0)	(1.5)	(4.6)	(1.8)	(4.7)	(1.3)	(4.4)	(1.2)	(3.7)	(3.7)	(3.9)	(3.9)
d. Other manufacturing *	44	(45.8)	50	(44.6)	27	(28.1)	35	(31.3)	25	(26.0)	27	(24.1)	96	(100.0)	112	(100.0)
	(4.0)	(1.4)	(3.3)	(1.1)	(2.3)	(0.9)	(1.9)	(0.8)	(2.9)	(0.8)	(2.1)	(0.6)	(3.0)	(3.0)	(2.4)	(2.4)
2. Construction	51	(38.3)	61	(38.9)	57	(42.9)	66	(42.0)	25	(18.8)	30	(19.1)	133	(100.0)	157	(100.0)
	(4.6)	(1.6)	(4.0)	(1.3)	(4.8)	(1.8)	(3.6)	(1.4)	(2.9)	(0.8)	(2.3)	(0.6)	(4.2)	(4.2)	(3.4)	(3.4)
3. Commerce	448	(30.2)	751	(30.1)	600	(40.5)	1,073	(43.0)	435	(29.3)	671	(26.9)	1,483	(100.0)	2,495	(100.0)
	(40.5)	(14.2)	(49.1)	(16.1)	(50.6)	(19.0)	(58.4)	(23.1)	(50.2)	(13.8)	(52.2)	(14.4)	(47.0)	(47.0)	(53.6)	(53.6)
a. Wholesale trade	33	(47.8)	40	(40.8)	20	(29.0)	25	(25.5)	16	(23.2)	33	(33.7)	69	(100.0)	98	(100.0)
	(3.0)	(1.0)	(2.6)	(0.9)	(1.7)	(0.6)	(1.4)	(0.5)	(1.8)	(0.5)	(2.6)	(0.7)	(2.2)	(2.2)	(2.1)	(2.1)
b. Retail trade	415	(29.3)	711	(29.7)	580	(41.0)	1,048	(43.7)	419	(29.6)	638	(26.6)	1,414	(100.0)	2,397	(100.0)
	(37.5)	(13.1)	(46.4)	(15.3)	(48.9)	(18.4)	(57.1)	(22.5)	(48.4)	(13.3)	(49.6)	(13.7)	(44.8)	(44.8)	(51.5)	(51.5)
(i) Nonfood	336	(28.0)	600	(29.3)	490	(40.8)	877	(42.8)	376	(31.3)	573	(28.0)	1,202	(100.0)	2,050	(100.0)
	(30.4)	(10.6)	(39.2)	(12.9)	(41.3)	(15.5)	(47.8)	(18.9)	(43.4)	(11.9)	(44.6)	(12.3)	(38.1)	(38.1)	(44.1)	(44.1)
(ii) Food	79	(37.3)	111	(32.0)	90	(42.5)	171	(49.3)	43	(20.3)	65	(18.7)	212	(100.0)	347	(100.0)
	(7.1)	(2.5)	(7.3)	(2.4)	(7.6)	(2.8)	(9.3)	(3.7)	(5.0)	(1.4)	(5.1)	(1.4)	(6.7)	(6.7)	(7.5)	(7.5)

[table continued next page]

[Continuation of Table 2]

COUNT / (Col. %) / (Row %) / (Total %)	Metropolitan Lima				Other Urban Areas				Rural Areas				ALL PERU			
Sector	Enterprises		Workers		Enterprises		Workers		Enterprises		Workers		Enterprises		Workers	
4. Transportation	83	(45.4)	91	(44.2)	70	(38.3)	83	(40.3)	30	(16.4)	32	(15.5)	183	(100.0)	206	(100.0)
	(7.5)	(2.6)	(5.9)	(2.0)	(5.9)	(2.2)	(4.5)	(1.8)	(3.5)	(0.9)	(2.5)	(0.7)	(5.8)	(5.8)	(4.4)	(4.4)
5. Financial services	52	(60.5)	58	(61.1)	32	(37.2)	35	(36.8)	2	(2.3)	2	(2.1)	86	(100.0)	95	(100.0)
	(4.7)	(1.6)	(3.8)	(1.2)	(2.7)	(1.0)	(1.9)	(0.8)	(0.2)	(0.1)	(0.2)	(0.0)	(2.7)	(2.7)	(2.0)	(2.0)
6. Nonfinancial services	262	(50.4)	306	(49.8)	200	(38.5)	238	(38.8)	58	(11.2)	70	(11.4)	520	(100.0)	614	(100.0)
	(23.7)	(8.3)	(20.0)	(6.6)	(16.9)	(6.3)	(13.0)	(5.1)	(6.7)	(1.8)	(5.4)	(1.5)	(16.5)	(16.5)	(13.2)	(13.2)
a. Personal	200	(50.9)	238	(50.4)	152	(38.7)	182	(38.6)	41	(10.4)	52	(11.0)	393	(100.0)	472	(100.0)
	(18.1)	(6.3)	(15.5)	(5.1)	(12.8)	(4.8)	(9.9)	(3.9)	(4.7)	(1.3)	(4.0)	(1.1)	(12.4)	(12.4)	(10.1)	(10.1)
b. Nonpersonal	62	(48.8)	68	(47.9)	48	(37.8)	56	(39.4)	17	(13.4)	18	(12.7)	127	(100.0)	142	(100.0)
	(5.6)	(2.0)	(4.4)	(1.5)	(4.0)	(1.5)	(3.1)	(1.2)	(2.0)	(0.5)	(1.4)	(0.4)	(4.0)	(4.0)	(3.1)	(3.1)
7. Forestry, fishing, and mining	11	(16.9)	16	(14.2)	11	(16.9)	11	(9.7)	43	(66.2)	86	(76.1)	65	(100.0)	113	(100.0)
	(1.0)	(0.3)	(1.0)	(0.3)	(0.9)	(0.3)	(0.6)	(0.2)	(5.0)	(1.4)	(6.7)	(1.8)	(2.1)	(2.1)	(2.4)	(2.4)
ALL SECTORS	1,106	(35.0)	1,531	(32.9)	1,186	(37.6)	1,836	(39.5)	866	(27.4)	1,285	(27.6)	3,158	(100.0)	4,652	(100.0)
	(100.0)	(35.0)	(100.0)	(32.9)	(100.0)	(37.6)	(100.0)	(39.5)	(100.0)	(27.4)	(100.0)	(27.6)	(100.0)	(100.0)	(100.0)	(100.0)

* Chemicals, metalworking, machinery, and not elsewhere classified.

Table 3

CHARACTERISTICS OF NONFARM FAMILY ENTERPRISES

	1a Textiles	1b Food processing	1c Wood manufact ring	1d Other manufacturing	2 Construction	3a Wholesale trade	3b(i) Retail nonfood	3b(ii) Retail food	4 Transportation	5 Financial services	6a Nonpersonal services	6b Personal services	7 Forestry/ fishing/mining	ALL SECTORS
METROPOLITAN LIKA (N)	102	24	29	44	51	33	336	79	83	52	62	288	11	1,084
Enterprise age (years)	8.3 (10.4)	6.5 * (11.4)	6.2 * (6.4)	6.5 (7.8)	12.3 (10.5)	6.4 (8.2)	7.4 (9.5)	6.2 (7.9)	8.0 (9.3)	7.1 (9.2)	7.5 (7.6)	9.2 (10.5)	9.3 * (7.8)	7.9 (9.5)
Operation during yr (mths)	8.4 (3.9)	8.3 * (3.7)	8.7 * (4.0)	7.6 (4.4)	7.3 (4.2)	9.7 (3.0)	9.1 (3.8)	9.1 (3.8)	9.9 (3.3)	8 0 (4.3)	7.9 (3.9)	8.9 (3.9)	8.3 * (4.8)	8.8 (3.9)
Value of output (I.100/mnth)	24.0 (98.2)	31.3 * (73.8)	27.7 * (49.7)	26.6 (34.9)	20.2 (40.1)	137.8 (188.2)	68.1 (146.7)	38.1 (48.7)	37.6 (48.8)	56.5 (252.3)	7.2 (14.5)	11.2 (38.2)	46.3 * (79.4)	38.5 (113.7)
Family labor input														
Number of family workers	1.2 (0.7)	1.3 * (0.9)	1.4 * (0.7)	1.1 (0.3)	1.2 (0.6)	1.2 (0.5)	1.8 (1.2)	1.4 (0.7)	1.1 (0.3)	1.1 (0.3)	1.1 (0.3)	1.2 (0.5)	1.5 * (0.7)	1.4 (0.8)
Fam. time input (hrs/mnth)	105.5 (110.6)	103.4 *(126.9)	152.6 *(125.2)	129.9 (125.4)	115.3 (85.9)	168.6 (111.7)	244.0 (230.8)	164.5 (155.3)	161.1 (128.6)	80.2 (74.8)	59.7 (91.4)	109.2 (126.3)	223.7 *(236.1)	150.6 (173.7)
Labor hired (%)	12.7	33.3 *	34.5 *	31.8	47.1	30.3	17.8	26.6	13.3	34.6	16.1	15.5	45.5 *	21.8
Tot. oper. costs (I.100/mnth)														
Current period	7.3 (35.6)	11.4 * (27.6)	11.8 * (28.1)	13.3 (29.8)	8.3 (19.0)	149.5 (360.2)	43.7 (128.7)	17.6 (29.3)	22.2 (34.9)	5.7 (9.0)	2.2 (4.8)	7.9 (35.3)	49.8 * (66.7)	25.1 (108.8)
Typical period	8.1 (31.2)	22.8 * (57.8)	15.6 * (40.4)	16.9 (32.7)	6.3 (13.4)	100.8 (385.8)	24.7 (90.5)	17.4 (26.8)	40.5 (78.4)	23.2 (105.4)	2.4 (5.1)	9.3 (37.6)	15.9 * (28.8)	20.5 (92.4)
Capital assets (I.1,000)	5.3 (19.3)	8.6 * (28.1)	4.6 * (9.8)	8.1 (16.8)	2.3 (5.8)	46.8 (213.2)	10.8 (49.3)	4.2 (13.9)	38.2 (144.7)	8.6 (19.8)	11.9 (45.1)	8.9 (65.7)	19.1 * (16.2)	11.6 (68.6)
Credit used (%)	2.8	4.2 *	3.4 *	9.1	2.8	6.1	9.2	2.5	8.4	3.8	1.6	3.8	8.8 *	5.4
Net earnings (I.100/mnth)														
Current period	16.7 (80.5)	19.8 * (47.5)	15.9 * (30.5)	13.4 (21.2)	11.9 (37.3)	-11.7 (193.8)	16.4 (57.8)	12.5 (27.7)	15.4 (27.1)	50.7 (252.1)	4.9 (11.5)	3.3 (33.1)	-2.7 * (31.3)	13.4 (78.6)
Typical period	15.8 (78.8)	8.3 * (32.8)	12.1 * (30.3)	9.7 (26.9)	13.9 (41.4)	37.8 (236.1)	35.3 (166.7)	12.7 (40.3)	-2.9 (62.5)	33.3 (149.2)	4.8 (11.6)	1.8 (34.7)	39.4 * (72.2)	18.8 (112.6)
Earnings per family hr (I.)														
Current period	16.8 (38.1)	12.8 * (31.6)	22.2 * (33.7)	56.3 (287.8)	25.5 (79.5)	-13.6 (154.2)	57.5 (584.3)	13.8 (39.6)	24.1 (69.9)	81.8 (281.8)	24.1 (75.3)	13.8 (88.1)	18.8 * (26.1)	32.2 (334.8)
Typical period	15.7 (38.2)	8.8 * (20.9)	24.1 * (42.9)	66.2 (357.5)	35.2 (127.4)	35.6 (184.8)	98.3 (789.6)	16.3 (52.9)	3.2 (122.9)	47.5 (123.8)	25.1 (85.2)	18.7 (98.3)	12.7 * (24.8)	44.8 (406.1)
OTHER URBAN AREAS (N)	109	32	48	27	57	20	498	98	78	32	48	152	33	1,077
Enterprise age (years)	14.7 (12.7)	10.1 (14.8)	17.3 (16.8)	10.8 * (9.9)	15.2 (12.5)	6.6 * (5.3)	9.2 (11.8)	8.8 (9.1)	11.1 (11.4)	10.2 (8.2)	9.6 (9.1)	9.8 (11.5)	8.8 * (9.1)	10.5 (11.8)
Operation during yr (mths)	9.3 (3.5)	8.5 (4.4)	9.8 (3.4)	7.7 * (4.2)	7.8 (3.7)	10.8 * (3.4)	9.7 (3.5)	9.7 (3.7)	9.6 (3.2)	9.5 (3.8)	8.4 (4.8)	9.2 (3.7)	8.3 * (3.8)	9.4 (3.6)
Value of output (I.100/mnth)	8.1 (22.4)	48.2 (141.4)	18.5 (32.6)	13.5 * (20.3)	9.3 (18.5)	187.2 *(298.6)	53.8 (318.8)	24.9 (38.8)	23.6 (24.5)	28.3 (28.8)	13.7 (34.3)	5.5 (9.4)	28.2 * (57.5	37.8 (212.5)
Family labor input														
Number of family workers	1.5 (0.9)	1.5 (0.9)	1.8 (1.1)	1.3 * (0.5)	1.2 (0.5)	1.3 * (1.1)	1.8 (1.8)	1.8 (1.3)	1.2 (0.5)	1.1 (0.5)	1.2 (0.5)	1.2 (0.6)	1.8 *	1.5 (1.8)
Fam. time input (hrs/mnth)	165.4 (163.7)	181.9 (233.1)	227.4 (243.2)	162.5 *(114.8)	129.2 (84.1)	173.8 *(282.7)	241.4 (203.3)	274.8 (238.5)	285.3 (189.5)	99.4 (108.8)	72.5 (104.6)	107.8 (128.1)	151.8 *(118.2)	195.7 (192.7)
Labor hired (%)	9.2	25.8	25.8	44.4 *	58.8	45.8 *	14.8	28.8	11.4	18.8	25.8	18.5	27.3 *	18.2
Tot. oper. costs (I.100/mnth)														
Current period	4.2 (16.3)	27.8 (65.8)	17.8 (58.3)	11.2 * (22.1)	8.5 (26.2)	143.5 *(228.2)	43.5 (225.2)	13.6 (26.6)	33.1 (82.5)	4.5 (8.7)	3.8 (9.6)	2.1 (5.1)	6.7 * (16.8)	26.5 (151.7)
Typical period	4.6 (17.5)	27.8 (66.3)	28.5 (68.4)	11.1 * (22.6)	6.8 (21.1)	45.1 * (96.8)	26.8 (222.2)	15.7 (26.5)	126.8 (284.2)	54.2 (243.3)	4.8 (11.8)	2.3 (5.3)	29.2 * (77.5)	25.3 (158.4)
Capital assets (I.1,000)	2.4 (6.1)	8.5 (33.3)	15.6 (53.3)	6.8 * (18.6)	1.7 (2.4)	38.3 * (53.5)	12.1 (72.5)	6.6 (18.8)	38.3 (85.5)	8.4 (18.4)	12.8 (38.8)	8.2 (48.8)	18.2 * (68.5)	11.6 (58.1)
Credit used (%)	8.4	3.1	8.3	8.8 *	8.8	5.8 *	15.8	14.4	4.3	3.1	2.1	3.3	8.8 *	9.6
Net earnings (I.100/mnth)														
Current period	3.8 (18.7)	21.1 (62.2)	1.6 (46.2)	2.4 * (18.8)	8.8 (27.3)	23.7 *(229.3)	18.5 (158.8)	11.3 (23.8)	-8.5 (77.8)	15.8 (28.7)	8.8 (27.1)	3.3 (8.6)	18.5 * (58.2)	11.3 (112.2)
Typical period	3.5 (12.3)	28.3 (88.6)	-1.8 (47.8)	2.4 * (18.8)	2.4 (28.7)	122.: *(387.4)	38.1 (222.7)	8.1 (48.2)	-183.2 (283.8)	-33.8 (246.3)	8.6 (26.7)	3.1 (8.8)	-2.8 * (88.5)	12.4 (173.4)
Earnings per family hr (I.)														
Current period	4.3 (17.5)	7.8 (28.8)	3.6 (38.4)	35.4 *(157.2)	8.7 (68.4)	23.6 *(142.3)	13.8 (87.7)	13.7 (58.1)	-4.8 (35.1)	31.4 (84.3)	48.5 (152.3)	8.8 (34.8)	12.8 * (24.8)	12.8 (81.7)
Typical period	3.8 (15.2)	4.8 (21.4)	1.7 (28.4)	45.8 *(285.1)	8.8 (68.8)	138.6 *(337.5)	27.6 (135.7)	8.4 (42.6)	-51.8 (152.3)	-15.1 (282.8)	24.8 (182.2)	8.1 (33.8)	-7.4 * (72.2)	15.8 (122.6)

-- TABLE CONTINUED ON NEXT PAGE --

Table 3 (continued)

	1a Textiles	1b Food processing	1c Wood manufacturing	1d Other manufacturing	2 Construction	3a Wholesale trade	3b(1) Retail nonfood	3b(11) Retail food	4 Transportation	5 Financial services	6a Nonpersonal services	6b Personal services	7 Forestry/ fishing/mining	ALL SECTORS
-- TABLE CONTINUED FROM PREVIOUS PAGE --														
RURAL AREAS (N)	179	26	41	25	25	16	376	43	30	2	17	41	43	697
Enterprise age (years)	18.5 (14.4)	7.1 * (9.1)	21.8 (17.7)	14.8 * (13.4)	15.3 * (10.0)	13.8 * (11.7)	8.9 (11.6)	9.8 (11.3)	6.6 (7.0)	12.0 * (6.5)	13.8 * (14.3)	11.3 (13.1)	10.6 (8.6)	12.1 (13.1)
Operation during yr (mnths)	8.8 (3.7)	7.7 * (4.6)	7.7 (4.6)	5.2 * (3.4)	5.5 * (4.0)	7.2 * (3.2)	9.2 (3.8)	9.5 (3.9)	8.4 (4.2)	12.0 *	9.9 * (4.2)	8.3 (4.2)	7.8 (4.8)	8.6 (4.8)
Value of output (I.100/mnth)	2.0 (2.7)	5.8 * (8.4)	4.1 (5.3)	2.5 * (2.7)	10.7 * (12.6)	81.3 *(142.2)	10.8 (39.3)	13.1 (15.5)	30.9 (42.3)	10.4 * (4.8)	3.9 * (5.3)	5.3 (10.9)	9.3 (20.1)	13.8 (35.7)
Family labor input														
Number of family workers	1.5 (0.9)	1.4 * (0.7)	1.4 (0.8)	1.1 * (0.3)	1.2 * (0.6)	2.1 * (1.4)	1.5 (0.9)	1.5 (1.0)	1.1 (0.4)	1.0 *	1.1 * (0.2)	1.3 (0.5)	2.0 (1.4)	1.5 (0.9)
Fam. time input (hrs/mnth)	126.7 (114.9)	93.7 * (96.4)	124.9 (146.3)	45.6 * (42.3)	116.6 * (96.3)	247.3 *(161.2)	144.0 (149.5)	170.3 (190.1)	188.3 (114.9)	54.9 * (44.9)	43.6 * (47.0)	83.2 (104.3)	137.3 (140.9)	131.2 (138.2)
Labor hired (%)	3.9	28.6 *	14.6	24.0 *	52.0 *	37.5 *	10.6	18.6	26.7	50.0 *	11.8 *	7.3	16.3	13.3
Tot. oper. costs (I.100/mnth)														
Current period	0.7 (2.2)	3.6 * (7.1)	1.2 (1.8)	3.9 * (16.8)	1.7 * (3.3)	49.7 * (79.2)	16.2 (42.8)	5.9 (6.9)	30.8 (63.6)	1.7 * (1.9)	1.9 * (5.7)	1.3 (3.5)	0.9 (1.6)	10.8 (33.5)
Typical period	0.6 (1.8)	12.6 * (28.7)	1.1 (1.8)	3.9 * (16.8)	1.7 * (3.6)	34.9 * (88.6)	7.3 (40.1)	11.2 (42.8)	30.3 (62.8)	2.7 * (3.3)	2.6 * (6.5)	2.1 (5.8)	1.2 (2.6)	6.4 (32.9)
Capital assets (I.1,000)	0.5 (1.8)	9.2 * (34.3)	2.2 (2.5)	1.2 * (3.4)	0.5 * (0.5)	1/.7 * (38.7)	3.3 (8.8)	3.2 (5.5)	78.5 (169.3)	6.5 * (9.3)	13.8 * (48.8)	2.3 (5.8)	3.1 (12.3)	5.6 (36.2)
Credit used (%)	1.1	3.8 *	0.9	8.8 *	0.8 *	12.5 *	8.2	2.3	3.8	8.8 *	5.9 *	4.9	9.8	4.7
Net earnings (I.100/mnth)														
Current period	1.3 (2.9)	2.2 * (11.0)	3.0 (4.4)	-1.4 * (17.3)	9.1 * (11.2)	31.6 * (78.2)	1.8 (40.2)	7.3 (11.7)	8.1 (73.6)	8.8 * (6.6)	1.8 * (3.2)	4.1 (9.8)	8.4 (19.2)	3.1 (32.5)
Typical period	1.4 (2.8)	-6.8 * (24.8)	3.8 (4.4)	-1.4 * (17.3)	9.8 * (18.7)	46.5 *(127.8)	18.7 (:4.3)	2.8 (44.8)	8.6 (72.7)	7.8 * (8.1)	1.2 * (3.8)	3.2 (5.7)	8.1 (19.1)	6.7 (44.9)
Earnings per family hr (I.)														
Current period	2.8 (11.1)	9.1 * (53.4)	12.1 (38.2)	-6.8 * (79.8)	19.8 * (32.1)	6.1 * (45.8)	3.5 (84.4)	8.1 (69.8)	4.1 (89.9)	16.6 * (1.5)	5.4 * (18.2)	18.6 (22.5)	8.3 (18.8)	5.1 (69.6)
Typical period	3.8 (1..3)	-8.6 * (45.5)	12.4 (36.1)	-6.6 * (79.8)	19.7 * (32.1)	20.3 * (78.8)	21.7 (143.6)	-36.1 (333.9)	4.4 (88.5)	12.3 *. (4.7)	6.2 * (12.8)	9.6 (16.8)	8.3 (18.9)	18.8 (123.6)
ALL PERU (N)	398	84	118	96	133	69	1,282	212	183	86	127	393	65	2,788
Enterprise age (years)	14.8 (13.6)	8.1 (12.2)	16.2 (16.3)	9.6 (18.6)	14.1 (11.6)	8.8 (8.8)	8.6 (11.1)	7.8 (9.2)	8.8 (8.9)	8.4 (8.9)	8.8 (8.4)	8.7 (11.2)	20.1 (6.6)	10.8 (11.6)
Operation during yr (mnths)	8.8 (3.7)	8.2 (4.3)	8.8 (4.1)	7.8 (4.2)	7.2 (4.8)	8.2 (3.3)	9.4 (3.7)	8.5 (3.8)	8.5 (3.4)	8.6 (4.1)	8.3 (4.8)	8.8 (3.8)	7.4 (4.8)	8.8 (3.8)
Value of output (I.100/mnth)	8.4 (52.2)	29.2 (86.5)	16.2 (33.5)	16.7 (27.7)	13.7 (26.7)	133.2 (216.8)	48.1 (218.8)	24.4 (38.2)	31.1 (48.3)	41.8 (187.1)	8.2 (23.6)	8.4 (22.7)	18.4 (46.4)	31.2 (148.2)
Family labor input														
Number of family workers	1.4 (0.8)	1.4 (0.8)	1.5 (0.8)	1.2 (0.4)	1.2 (0.6)	1.4 (1.8)	1.7 (1.8)	1.8 (1.1)	1.1 (0.4)	2.1 (0.4)	1.1 (0.4)	1.2 (0.5)	1.7 (1.2)	1.5 (0.8)
Fam. time input (hrs/mnth)	132.8 (131.8)	130.1 (171.7)	173.4 (192.3)	117.1 (114.8)	121.5 (88.7)	188.4 (155.4)	211.8 (201.8)	212.5 (207.3)	168.7 (148.8)	86.7 (88.4)	62.4 (92.2)	105.7 (121.7)	154.4 (157.8)	165.8 (176.4)
Labor hired (%)	7.7	28.6	23.7	33.3	48.6	36.2	14.1	22.2	14.8	29.1	18.8	12.7	23.1	17.8
Tot. oper. costs (I.188/mnth)														
Current period	3.4 (28.3)	14.8 (48.7)	18.6 (48.1)	18.2 (25.8)	7.1 (28.8)	124.6 (278.8)	35.8 (161.2)	13.5 (25.4)	27.8 (51.6)	5.2 (8.8)	2.8 (7.1)	5.8 (25.6)	18.8 (38.2)	21.5 (112.1)
Typical period	3.7 (18.7)	21.1 (53.6)	12.6 (44.8)	11.8 (26.8)	5.7 (16.2)	68.4 (273.2)	28.2 (151.6)	15.4 (38.1)	71.8 (183.8)	34.2 (168.8)	3.8 (8.4)	5.8 (27.3)	8.4 (34.4)	18.4 (118.2)
Capital assets (I.1,888)	2.3 (18.6)	9.2 (31.8)	8.2 (34.6)	5.7 (14.8)	1.7 (4.8)	34.1 (158.7)	8.8 (53.5)	5.8 (15.7)	44.8 (133.8)	8.8 (18.4)	12.5 (48.6)	7.8 (55.8)	7.8 (27.4)	18.8 (57.3)
Credit used (%)	2.8	3.6	4.2	4.2	8.8	7.2	11.6	7.5	6.8	3.5	2.4	3.3	8.8	6.8
Net earnings (I.188/mnth)														
Current period	8.1 (41.8)	14.5 (57.1)	5.6 (33.5)	8.4 (28.5)	6.6 (29.8)	8.6 (188.2)	13.1 (188.8)	18.8 (23.2)	3.4 (68.2)	36.8 (186.8)	8.4 (18.7)	3.4 (24.3)	8.4 (28.8)	9.8 (84.8)
Typical period	5.8 (41.2)	8.1 (55.2)	3.6 (34.3)	4.8 (21.8)	8.8 (29.8)	63.8 (248.8)	28.8 (178.3)	9.8 (41.2)	-48.7 (188.2)	7.7 (191.1)	8.1 (18.5)	2.5 (25.4)	18.8 (48.4)	12.8 (127.6)
Earnings per family hr (I.)														
Current period	6.7 (23.4)	9.3 (37.8)	11.1 (33.8)	34.8 (215.2)	17.6 (64.7)	1.7 (132.5)	22.8 (328.8)	12.3 (55.8)	8.7 (68.8)	48.4 (161.2)	38.1 (187.8)	11.5 (61.3)	18.8 (28.2)	17.5 (287.8)
Typical period	6.5 (23.8)	4.1 (31.3)	18.8 (35.3)	41.2 (268.1)	21.4 (88.4)	58.6 (226.6)	45.8 (384.4)	2.7 (158.2)	-17.7 (132.6)	23.4 (158.4)	22.5 (115.7)	18.8 (67.8)	7.8 (34.1)	24.3 (268.4)

Notes: Means (standard deviations in parentheses).
* : fewer than 38 cases; statistics unreliable.
I. = June 1985 Intis (one U.S. dollar = approximately 1.11).

trade workers are female. In the personal services and other manufacturingsectors, about four out of ten and three out of ten workers, respectively, are female.

Family enterprises may be loosely organized and informal with respect to taxes and other laws, but they are not, as a rule, either transitory or irregular in operation. The average firm has been in business for ten years and functions during nine months of the year. Nor are these enterprises dependent solely on the skills of their owners, using no purchased inputs: on average, an enterprise incurs 2,150 Intis of operating costs in order to produce 3,120 Intis of output and makes 980 Intis of earnings per month. Not surprisingly, operating costs are highest in retail trade, where they consist largely of purchasing for resale (the second-highest expenses occur in transportation). Earnings in 1985 averaged 18 Intis, or about $1.60, per hour of labor. These earnings differ quite widely among sectors, as do most of the other variables displayed in table 3.

The purchase of recurrent inputs by a family enterprise is typically double the value of net earnings, but the business operates with fixed capital worth only about as much as ten months' earnings, so that at any plausible rate of return, capital contributes less to output than family labor does, and much less than purchased inputs. If we leave aside the transportation sector, where assets are five times larger than in other sectors, most businesses operate with very little other than labor and materials. Only about one enterprise in 15 reported using credit during the survey reference period (a larger share may have obtained credit to start up the business but do not rely on loans currently), and the difficulty of obtaining credit may be the chief reason assets are so small.

We have already mentioned the importance of women among family workers. This and other characteristics of the 4,652 individuals employed in these firms are shown in table 4. The typical worker is in his or her late 30s and has been working for slightly less than nine years in the enterprise; thus, in the majority of cases, he or she has been in the business since it was founded (cf. table 3). These characteristics do not vary much across sectors, but other attributes do. In particular, there is much variation in the amount of schooling and in the likelihood of having had out-of-school training. Formal schooling averages six years, and (somewhat surprisingly) almost one-fourth of the workers in Peru's nonfarm family enterprises have undergone some kind of training. For the typical worker, the principal enterprise with which he or she works takes up 112 hours a month, out of the total of 166 hours devoted to all remunerated activities including wage employment and other, part-time enterprises.

We excluded from the total of 3,158 enterprises, for purposes of the earnings analysis reported below, all firms satisfying any of the following conditions: (1) an input of family labor smaller than 10 hours per month; (2) no family labor other than that of children under the age of 15; or (3) operating costs greater than or equal to "gross revenues" (defined here to include all receipts plus the value of goods and services produced in the enterprise and consumed by the family). The first two screens reduced the sample size only very slightly: nearly all enterprises include adult workers and absorb a substantial amount of their time.

Table 4

CHARACTERISTICS OF FAMILY WORKERS

	1a Textiles	1b Food processing	1c Wood manufacturing	1d Other manufacturing	2 Construction	3a Wholesale trade	3b(i) Retail nonfood	3b(ii) Retail food	4 Transportation	5 Financial services	6a Nonpersonal services	6b Personal services	7 Forestry/ fishing/mining	ALL SECTORS
METROPOLITAN LIMA (N)	126	32	40	50	61	40	600	111	91	58	60	230	16	1,405
Female worker (%)	75.4	71.9	10.0	30.0	3.3	22.5	57.0	73.8	3.3	13.8	50.0	39.9	18.8 *	46.7
Female head of household (%)	22.2	18.8	5.0	4.0	0.0	7.5	5.8	11.7	1.1	1.7	2.9	9.2	0.0 *	7.5
Age (years)	30.7 (15.0)	33.4 (14.5)	34.4 (15.6)	37.2 (13.8)	40.3 (16.0)	33.9 (12.9)	33.0 (15.0)	37.1 (14.5)	41.3 (13.5)	36.2 (12.4)	37.1 (14.2)	37.7 (14.5)	36.2 * (18.1)	35.0 (16.0)
Formal education [a]														
None (%)	2.4	0.0	0.0	0.0	0.0	0.0	6.0	5.4	0.0	0.0	1.5	3.4	0.0 *	3.5
Secondary (%)	48.4	46.9	57.5	46.0	45.9	45.0	41.5	38.7	57.1	27.6	25.0	50.0	56.3 *	44.9
Post-secondary (%)	11.1	12.5	20.0	30.0	4.9	32.5	9.2	5.4	16.5	72.4	64.7	15.1	25.0 *	16.9
Formal education (yrs)	7.6 (3.3)	7.6 (3.4)	8.8 (3.6)	9.5 (3.5)	6.2 (3.0)	9.5 (3.7)	6.5 (3.8)	5.9 (3.5)	8.6 (3.2)	13.2 (2.8)	12.0 (4.1)	7.5 (3.6)	9.3 * (3.6)	7.6 (4.0)
Diploma/degree last educ. (%)	5.6	3.1	10.0	20.0	3.3	12.5	4.8	4.5	13.2	50.0	33.8	7.6	12.5 *	9.6
Training														
Training ever (%) [b]	64.3	50.0	40.0	48.0	21.3	47.5	30.3	31.5	33.0	55.2	54.4	44.5	56.3 *	39.2
Training diploma (%)	42.9	31.3	12.5	34.0	11.5	27.5	15.5	17.1	25.3	46.6	45.6	29.8	43.8 *	24.5
Experience this enterprise (yrs)	8.1 (10.9)	5.0 (6.8)	6.3 (6.5)	8.7 (8.9)	10.9 (11.4)	5.3 (6.4)	6.0 (8.3)	5.7 (7.2)	7.5 (9.5)	6.9 (9.8)	7.2 (8.2)	8.2 (9.8)	8.8 * (8.4)	6.9 (8.9)
Current market work (hrs/month)														
All market activities [b]	125.3 (101.1)	111.7 (61.9)	151.4 (102.8)	175.8 (109.3)	150.9 (86.3)	177.6 (96.5)	170.4 (117.1)	157.5 (97.8)	216.9 (108.1)	167.8 (81.2)	127.2 (104.8)	147.5 (108.5)	170.7 *(103.6)	160.8 (108.5)
This enterprise	85.4 (90.9)	77.6 (79.5)	110.7 (95.5)	114.3 (107.1)	96.4 (86.2)	139.1 (90.5)	136.7 (120.0)	117.8 (100.5)	147.8 (120.7)	71.9 (69.4)	54.5 (85.7)	91.8 (98.8)	153.8 *(100.1)	114.5 (109.4)
Current housework (hrs/month)	116.2 (98.8)	105.1 (108.5)	23.6 (42.1)	77.7 (110.9)	31.8 (43.4)	40.8 (52.2)	86.2 (86.9)	128.4 (108.1)	41.9 (62.8)	38.9 (52.3)	78.8 (82.4)	77.6 (94.6)	55.0 * (79.6)	88.4 (90.5)
OTHER URBAN AREAS (N)	163	48	84	35	66	25	877	171	83	35	56	182	11	1,673
Female worker (%)	73.0	58.3	8.3	8.6	0.0	28.0 *	57.8	73.1	7.2	22.8	26.8	44.5	0.0 *	49.3
Female head of household (%)	12.9	10.4	1.2	2.9	0.0	4.0 *	8.6	15.2	0.0	2.9	1.8	10.4	0.0 *	8.2
Age (years)	36.8 (14.9)	35.9 (15.4)	34.2 (17.2)	35.7 (14.6)	38.3 (14.6)	34.7 * (13.1)	33.6 (15.8)	33.3 (16.2)	40.2 (14.8)	38.5 (13.2)	37.1 (14.9)	36.9 (15.9)	38.3 * (16.0)	35.8 (15.7)
Formal education [a]														
None (%)	11.7	14.6	1.2	5.7	4.5	0.0 *	7.4	7.0	2.4	2.9	5.4	0.6	9.1 *	7.2
Secondary (%)	30.7	25.0	50.0	37.1	45.5	60.0 *	36.4	31.6	45.8	25.7	32.1	34.6	27.3 *	36.3
Post-secondary (%)	4.9	6.3	14.3	8.6	3.0	16.0 *	10.0	9.9	6.0	62.9	48.2	12.6	0.0 *	11.7
Formal education (yrs)	5.3 (3.7)	5.3 (4.0)	7.7 (3.4)	6.0 (3.5)	6.0 (3.2)	8.3 * (3.2)	6.2 (3.9)	5.8 (3.8)	6.6 (3.1)	12.3 (4.2)	10.2 (4.6)	6.5 (4.1)	5.5 * (2.9)	6.4 (4.0)
Diploma/degree last educ. (%)	3.1	2.1	4.8	8.8	4.5	4.0 *	5.1	3.5	2.4	40.0	23.2	6.0	0.0 *	5.7
Training														
Training ever (%) [b]	31.9	16.7	23.8	22.9	22.1	40.0 *	18.9	17.0	24.1	51.4	37.5	33.5	9.1 *	23.4
Training diploma (%)	19.0	8.3	13.1	17.1	12.1	20.0 *	12.5	10.5	15.7	37.1	32.1	23.6	9.1 *	15.3
Experience this enterprise (yrs)	13.4 (12.8)	8.3 (9.4)	11.5 (13.7)	8.7 (9.8)	13.6 (12.8)	6.5 * (5.6)	7.1 (9.2)	6.8 (8.2)	10.3 (10.8)	10.7 (9.7)	8.9 (10.4)	9.3 (11.8)	11.3 * (11.2)	8.8 (10.4)
Current market work (hrs/month)														
All market activities [b]	154.1 (101.1)	175.4 (125.5)	166.7 (103.3)	190.8 (86.9)	180.0 (103.4)	190.1 *(103.9)	166.7 (108.7)	169.2 (107.4)	216.8 (99.4)	170.1 (89.9)	134.8 (112.9)	143.5 (102.9)	163.3 *(113.4)	166.5 (107.9)
This enterprise	110.6 (95.2)	121.3 (116.3)	129.9 (99.7)	125.2 (88.1)	111.6 (91.3)	139.1 * (85.8)	134.9 (109.5)	144.6 (109.5)	174.8 (116.3)	99.9 (85.6)	62.1 (86.5)	89.4 (92.5)	151.8 *(110.2)	126.4 (106.6)
Current housework (hrs/month)	108.3 (86.9)	96.9 (91.1)	28.4 (53.0)	37.4 (56.2)	26.9 (37.1)	34.5 * (58.3)	78.4 (79.4)	83.1 (75.3)	24.8 (29.8)	29.8 (51.1)	62.9 (75.6)	78.3 (84.8)	38.6 * (33.9)	71.8 (78.2)

-- TABLE CONTINUED ON NEXT PAGE -

Table 4 (continued)

	1a		1b		1c		1d		2		3a		3b(1)		3b(ii)		4		5		6a		6b		7		ALL SECTORS	
	Textiles		Food processing		Wood manufacturing		Other manufacturing		Construction		Wholesale trade		Retail nonfood		Retail food		Transportation		Financial services		Nonpersonal services		Personal services		Forestry/ fishing/mining			
-- TABLE CONTINUED FROM PREVIOUS PAGE --																												
RURAL AREAS (N)	271		39		57		27		30		33		573		65		32		2		10		52		86		1,014	
Female worker (%)	74.5		69.2		8.8		33.3 *		6.7		33.3		59.5		83.1		3.1		0.0 *		22.2		48.1		32.6		55.2	
Female head of household (%)	12.2		7.7		0.0		11.1 *		0.0		0.0		5.6		13.8		0.0		0.0 *		11.1		15.4		9.9		7.9	
Age (years)	37.0	(17.4)	35.4	(15.9)	40.5	(18.8)	39.4 *	(17.9)	38.6	(16.3)	34.4	(17.4)	35.6	(15.9)	35.1	(17.2)	37.4	(12.8)	35.0 *	(11.3)	46.3	(19.3)	38.2	(17.5)	31.7	(15.7)	36.3	(16.6)
Formal education [b]																												
None (%)	35.4		30.8		12.3		29.6 *		6.7		12.1		16.8		29.2		3.1		0.0 *		16.7		23.1		15.1		21.2	
Secondary (%)	11.1		12.8		22.8		14.8 *		16.7		12.1		21.1		13.8		28.1		50.0 *		27.8		26.9		22.1		18.6	
Post-secondary (%)	0.0		0.0		0.0		3.7 *		0.0		6.1		1.6		0.0		3.1		50.0 *		16.7		5.8		0.0		1.6	
Formal education (yrs)	2.6	(2.8)	3.2	(2.9)	3.9	(3.0)	3.3 *	(3.1)	4.4	(3.1)	4.2	(2.8)	4.0	(3.2)	3.1	(2.5)	5.3	(3.1)	12.5 *	(3.5)	6.1	(4.9)	4.8	(4.0)	3.8	(2.8)	3.7	(3.2)
Diploma/degree last educ. (%)	0.0		0.0		0.0		0.0 *		3.3		0.0		1.9		0.0		3.1		50.0 *		0.0		5.8		0.0		0.9	
Training																												
Training ever (%) [b]	7.0		7.7		7.0		7.4 *		10.0		3.0		9.1		6.2		12.5		0.0 *		22.2		9.6		8.1		8.6	
Training diploma (%)	3.3		5.1		5.3		7.4 *		10.0		0.0		4.9		3.1		6.3		0.0 *		5.6		7.7		4.7		4.7	
Experience this enterprise (yrs)	17.7	(15.3)	6.5	(8.2)	16.2	(15.1)	13.8 *	(14.1)	14.8	(13.7)	14.2	(13.8)	7.8	(10.0)	7.0	(9.2)	7.5	(10.8)	10.0 *	(9.9)	13.3	(15.3)	9.8	(12.1)	9.4	(9.8)	10.9	(12.5)
Current market work (hrs/mnth)																												
All market activities [b]	172.4	(93.7)	152.5	(99.0)	175.4	(89.1)	188.7 *	(85.5)	181.8	(80.2)	146.7	(100.4)	172.1	(86.5)	163.2	(120.8)	225.8	(156.8)	176.2 *	(118.5)	157.5	(78.8)	152.2	(97.3)	161.3	(91.7)	170.8	(98.3)
This enterprise	83.7	(68.8)	67.3	(58.2)	89.8	(76.0)	62.3 *	(37.8)	87.2	(82.3)	119.9	(86.7)	95.8	(87.2)	112.7	(110.1)	101.6	(112.5)	56.9 *	(44.9)	41.2	(36.5)	65.6	(73.8)	68.6	(64.1)	88.4	(82.2)
Current housework (hrs/mnth)	84.6	(60.6)	116.1	(95.7)	44.9	(65.4)	45.3 *	(39.5)	32.1	(45.7)	57.8	(60.3)	83.5	(75.3)	94.1	(63.4)	18.8	(29.8)	19.5 *	(27.6)	45.8	(47.1)	66.2	(64.2)	53.8	(48.5)	75.8	(69.6)
ALL PERU (N)	560		119		181		112		157		98		2,050		347		206		95		142		472		113		4,092	
Female worker (%)	74.3		65.5		8.8		24.1		2.5		27.6		58.8		75.2		4.9		16.8		37.3		42.6		27.4		58.1	
Female head of household (%)	14.6		11.8		1.7		5.4		8.8		4.1		6.9		13.8		0.5		2.1		3.5		10.4		8.8		7.7	
Age (years)	37.1	(16.2)	35.1	(15.2)	36.2	(17.5)	37.2	(15.8)	39.3	(15.4)	34.3	(14.4)	34.8	(15.6)	34.8	(15.8)	40.3	(13.9)	37.8	(12.6)	38.2	(15.4)	37.4	(15.3)	33.8	(16.1)	35.6	(15.7)
Formal education [a]																												
None (%)	21.1		16.8		4.4		8.9		3.2		4.1		8.6		10.7		1.5		1.1		4.9		7.6		12.4		9.8	
Secondary (%)	25.2		26.8		43.1		35.7		48.1		37.8		33.6		38.5		48.1		27.4		28.2		41.5		27.4		33.9	
Post-secondary (%)	3.9		6.7		11.8		17.8		3.2		18.4		7.4		6.6		18.2		58.4		52.1		13.1		3.5		18.6	
Formal education (yrs)	4.5	(3.8)	5.2	(3.9)	6.7	(3.9)	6.9	(4.2)	5.8	(3.2)	7.4	(4.8)	5.7	(3.8)	5.4	(3.7)	7.3	(3.3)	12.8	(3.4)	10.6	(4.7)	6.8	(4.8)	4.8	(3.5)	6.1	(4.1)
Diploma/degree last educ. (%)	2.1		1.7		4.4		8.8		3.8		6.1		3.8		3.2		7.3		46.3		25.4		6.8		1.8		5.7	
Training																												
Training ever (%) [b]	27.1		22.7		22.1		38.4		19.7		38.6		19.5		19.6		26.2		52.6		43.7		36.4		15.8		24.4	
Training diploma (%)	16.8		13.4		10.5		22.3		11.5		16.3		11.3		11.2		18.4		42.1		35.2		25.8		10.6		15.4	
Experience this enterprise (yrs)	14.3	(14.2)	6.8	(8.4)	11.8	(13.4)	9.1	(10.8)	12.8	(12.5)	8.6	(10.2)	6.9	(9.2)	6.5	(8.1)	8.6	(10.2)	8.4	(9.8)	8.7	(10.3)	8.8	(10.5)	8.5	(9.1)	8.7	(10.7)
Current market work (hrs/mnth)																												
All market activities [b]	156.5	(99.2)	150.8	(108.9)	166.1	(98.8)	183.3	(95.9)	168.5	(93.4)	170.4	(108.8)	169.3	(108.9)	164.4	(106.9)	218.3	(113.2)	168.8	(88.7)	134.1	(104.9)	146.5	(108.9)	164.7	(94.9)	165.8	(105.2)
This enterprise	91.9	(83.1)	91.8	(93.5)	113.1	(93.6)	108.3	(94.1)	102.9	(87.4)	132.6	(87.6)	124.3	(108.6)	129.8	(107.5)	150.8	(118.8)	78.5	(75.4)	55.6	(61.3)	88.8	(94.8)	88.8	(85.1)	112.8	(102.5)
Current housework (hrs/mnth)	96.3	(79.4)	104.7	(97.8)	32.5	(55.5)	57.3	(83.8)	28.5	(41.1)	44.8	(54.8)	82.1	(88.6)	98.7	(87.8)	31.3	(48.8)	34.8	(51.4)	68.3	(76.5)	77.8	(87.8)	51.8	(52.5)	75.7	(88.4)

Note: Means (standard deviations in parentheses).
* = fewer than 30 cases; statistics unreliable.
[a] Missing category = primary education.
[b] Next category subset of this one.

The third screen excluded, in addition, any firms with zero or negative "net revenues" (which can also be called "value added," or "profits," or "earnings"). Although no business enterprise can operate in the long term with anything other than positive earnings, approximately 10 percent of the enterprises in the sample reported nonpositive earnings during the relatively short reference period specified (out of administrative necessity) in the PLSS. This percentage is quite believable given the small average size and, in some cases, the seasonal operation of family enterprises in Peru. Assuming, however, that this situation is not representative of the longer-term status of these same enterprises, this 10 percent of the total was excluded from the analysis, resulting in a final sample of 2,735. For the four sectors analyzed separately, these screens cut down the sample from a total of 2,495 to 2,185 businesses. This screening may bias upward our estimate of long-run average earnings, but it will not bias the estimated returns to schooling unless less-educated workers' businesses more often make losses.

Because of the important role of women in Peru's family business sector, we perform our analysis separately on two types of firms. The first, which we will call "female-only" firms, are those in which there are no male workers over the age of 19. Family workers in these firms consist exclusively of adult women and children under the age of 20. The second group, "male-included" firms, are those that employ at least one adult male family worker. These firms may employ female and child family workers in addition, but not exclusively. Equations were also estimated which pooled enterprises, without distinction by sex.

3. The Earnings Model

The purpose of the analysis is to specify and estimate the relationship between the performance of family businesses in Peru, on the one hand, and a set of factors deemed to affect such performance, on the other, with the particular aim of measuring the contribution of the education of family workers. The estimating equations take the following general form:

$$Y = f(K, X, Z, H, E, C, G),$$

where Y is a measure of the firm's performance, K the value of the firm's capital stock, X the expenditure on purchased inputs (operating costs), Z the locus of operation, H the number of hours of family labor, E the educational attainment of family worker(s), C the age of family worker(s), and G the gender of family worker(s).

Since the PLSS did not collect information on the prices of inputs or outputs, we were unable to estimate "engineering" production functions relating quantities of inputs to quantity of output. Instead, we experimented with three different specifications, in which the dependent variable, the measure of enterprise performance, took the following forms: (1) gross revenues, (2) net revenues, and (3) net revenues per hour of family labor. Only the third is presented here because it is most analogous to the hourly earnings specification used in studies dealing with wage employees. Both total gross and total net revenues are largely determined by hours of work, which vary considerably among enterprises; since the true relation between earnings and hours may not be the constant-elasticity relation we estimated in medels (1) and (2), inclusion of hours in the function could bias the coefficients on the schooling variables, which are our principal interest.

The definitions of the variables used in the empirical analysis are presented in table 5. All monetary values are in Intis at June 1985 prices. As regards the functional form of the regression equations, we first experimented with a Cobb-Douglas (log-log) specification but found it inadequate because it does not permit zero values for capital or for purchased inputs, a situation encountered for an unacceptably large share of the firms. We tried assigning arbitrary small values to those firms that had zero capital and/or expenses, as well as including dummy variables indicating zero values. We found, however, that the estimates were very sensitive to the particular values assigned.

In the end, we opted for a semi-log specification in which the dependent variable was entered in natural log form and the explanatory variables entered linearly. Earnings equations were first estimated for all enterprises together (all sectors of activity). This specification corresponds most closely to the usual practice in estimating education/earnings relations for wage workers, in which the sector of employment is not taken into account. This global equation was estimated once with, and again without, dummy variables for the four principal subsectors. (The inclusion of sector dummies did not materially change any of the other regression coefficients, and this specification is not reported here.) Equations were estimated for all of Peru and for each of the three regions (Lima, other urban areas, and rural areas) separately. Regressions were then run for each sector of activity (retail trade, textiles, personal services, and nontextile manufacturing), across regions but not for Peru as a whole. Whenever sample sizes permitted, we ran separate regressions for female-only

Table 5

DEFINITIONS OF VARIABLES

Mnemonic	Description
REVENUES	Monthly gross revenues or value of output
EXPENSES	Monthly expenditure on purchased inputs
PROFITS	Value added, or net revenues (REVENUES - EXPENSES)
HOURS	Hours of family labor
PRFHR	Value added per hour of family labor (PROFITS ÷ HOURS)
TOTCAP	Value of capital assets divided by 1,000
LOCHOME	= 1 if locus of operation is the home, 0 otherwise
LOCFXED	= 1 if locus of operation is some other fixed premise, 0 otherwise
(The missing location category is mobile enterprises with no fixed place of business.)	
AGE	Age of the oldest family worker in firm
AGESQ	AGE squared and divided by 100
SPLYSC1	Years of primary education of most educated family worker in firm (spline with minimum value of 0, maximum 5)
SPLYSC2	Years of post-primary schooling of most educated family worker in firm (spline assuming the value 0 if most educated worker attained 5 years of education or less, 1 if 6 years, 2 if 7 years, etc.)
(The sum of SPLYSC1 and SPLYSC2 is SCHYRS, the total number of years of schooling of the most educated family member in the firm)	
FEMENT	= 1 if "female-only" firm (employing only adult women and children as family workers), 0 otherwise

(Two dummy variables, FAMWRK1 and FAMWRK2, indicate that an enterprise employed exactly one and exactly two family members, respectively. These variables were not used in the regressions, but their mean values -- shares -- are reported in tables 6 through 10.)

and male-included enterprises. We also ran a pooled regression for both kinds of enterprises together, entering the dummy variable indicating female-only (FEMENT).

The justification for estimating earnings separately by sector is two-fold. First, it is of interest to see whether differences in schooling account for differences in earnings within sectors, and if so, whether the payoff to education is the same in different activities. This interest is equally applicable to wage employment, but such estimates are rarely undertaken. They would show the return to schooling conditional on working in a given sector. One of the important effects of schooling, however, is to sort people into those sectors or activities where their education will pay off best. Provided people can move easily from one sector to another, or can at least choose the sector in which they work upon completing their schooling, this sorting effect may be as powerful as any differential in earnings generated by differences in education within a sector. If a worker does not own any significant capital to be used in his job and has few or very weak contacts with the suppliers or customers of the business, then what he or she needs to take along in moving from one sector to another consists essentially of human capital and nothing else. To the extent that these conditions characterize wage workers, there is little reason to estimate within-sector effects of schooling.

In informal sector employment, however, the worker may own some sector-specific capital and may have some highly specific personal relations with suppliers or customers. These cannot be transferred so easily to another activity. The fact that both capital and clientele are difficult to acquire (the former because of the difficulty of obtaining credit and the latter

because of the time required) means that these factors of production may constitute significant barriers to mobility [Catholic University (1988); de Soto (1986)]: "informality" does not mean casual attachment to a particular activity or enterprise. Information on differences in returns to schooling between one sector and another -- when people with the same level of education are found in both sectors -- may therefore tell us something about the importance of such presumed barriers.

The second argument for analyzing sectors separately depends on the entrepreneurial function exercised by the owners of family businesses. Research on farmers' earnings suggests that education is of little value to them so long as they follow traditional farming practices, where the necessary knowledge has been accumulated over long periods of time and is successfully transmitted outside of any formal education [Schultz (1975)]. Education becomes valuable, in contrast, as soon as farmers take up new crops or methods of production, because schooling makes it possible for them to learn faster how to apply these methods to their particular circumstances and increases their ability to deal with disequilibria and volatility (Figueroa 1980). To the extent that some family enterprises deal in more traditional activities than others and therefore require less entrepreneurial skill, we may expect that the returns to education will differ among enterprises; and if there are barriers to movement among sectors, these differences will not be eliminated quickly. The "informal" sector certainly includes many traditional activities, but is not limited to them, just as the "formal" sector is not composed entirely of modern employments.

4. Presentation of Results: Total and by Sector

We show first the results of estimating the model just described, for all family enterprises together; see Table 6. All the regressions are based on 300 or more observations, and the regression as a whole is significant in every case except for female-only businesses in rural areas. Coefficients of determination, however, are only 0.10 or a little more in urban areas, and still lower in the countryside.

Apart from the schooling variables, which show a systematic pattern to be discussed in section 6, earnings in the informal sector are clearly (significantly) related to two factors: total enterprise capital and location. Except among female-only firms in rural areas, businesses operated out of one's home earn less than others. (Businesses with a fixed location outside the home do not earn significantly more or less than itinerant businesses.) Returns to capital appear to be much higher among these rural female-only firms than among any others, which probably reflects the very low average value of assets with which these firms work, less than half and one tenth the capital used in urban areas by female-only and male-included firms, respectively. If the true relation between capital and output is one of approximately constant elasticity, then the semi-log specification used here will lead to higher coefficients at lower capital values, overstating the return to assets. The age variables show the expected signs (positive for age and negative for its square), but there is no sharp profile. It is somewhat surprising that there is any effect at all, since we use only the age of the oldest family worker in the enterprise, and in any case, age may be a poor measure of experience (the variable specified by the human capital model).

Table 6

REGRESSION RESULTS--ALL FAMILY ENTERPRISES

		Metropolitan Lima			Other Urban Areas			Rural Areas		
Variable	Stat.[a]	All	Male	Female	All	Male	Female	All	Male	Female
Observations	N	981	591	390	1,014	585	429	740	405	335
Constant	Beta	1.084	1.169	1.128	1.226	1.021	1.377	1.187	1.606	0.397
	tVal	(2.21)	(1.70)	(1.56)	(2.70)	(1.70)	(1.96)	(1.72)	(2.26)	(0.33)
TOTCAP	Mean	10.77	15.71	3.29	12.13	17.84	4.35	5.38	8.63	1.45
	Beta	0.003	0.003	0.017	0.003	0.003	0.005	0.006	0.005	0.125
	tVal	(4.26)	(3.92)	(3.20)	(4.17)	(3.63)	(2.34)	(2.81)	(3.42)	(2.95)
LOCHOME	Mean	0.31	0.21	0.46	0.34	0.25	0.46	0.49	0.42	0.57
	Beta	-0.55	-0.48	-0.64	-0.50	-0.72	-0.31	-0.37	-0.57	-0.16
	tVal	(4.76)	(2.99)	(3.71)	(4.43)	(4.49)	(1.90)	(2.07)	(3.30)	(0.48)
LOCFXED	Mean	0.20	0.23	0.15	0.24	0.29	0.18	0.12	0.12	0.13
	Beta	-0.15	-0.18	-0.19	0.02	0.07	-0.08	-0.08	-0.27	-0.21
	tVal	(1.15)	(1.13)	(0.77)	(0.20)	(0.47)	(0.40)	(1.10)	(0.52)	(0.60)
AGE	Mean	40.90	41.87	39.44	42.04	43.00	40.73	42.44	43.39	41.30
	Beta	0.016	0.020	0.006	0.005	0.014	-0.004	0.031	0.015	0.032
	tVal	(0.81)	(0.79)	(0.19)	(0.26)	(0.58)	(0.14)	(1.10)	(0.52)	(0.60)
AGESQ	Mean	18.55	19.46	17.16	19.56	20.53	18.23	20.18	21.00	19.19
	Beta	-0.026	-0.032	-0.012	-0.024	-0.030	-0.019	-0.054	-0.037	-0.055
	tVal	(1.21)	(1.17)	(0.33)	(1.21)	(1.19)	(0.58)	(1.78)	(1.27)	(0.93)
SPLYSC1	Mean	4.58	4.77	4.30	4.30	4.59	3.90	3.29	3.80	2.67
	Beta	0.095	0.042	0.149	0.107	0.096	0.114	0.035	0.062	-0.023
	tVal	(1.82)	(0.45)	(2.28)	(2.76)	(1.43)	(2.37)	(0.72)	(1.13)	(0.28)
SPLYSC2	Mean	2.97	3.30	2.47	2.39	2.80	1.85	0.87	1.00	0.70
	Beta	0.104	0.142	0.047	0.051	0.077	0.003	-0.038	-0.075	-0.040
	tVal	(3.84)	(4.00)	(1.11)	(1.94)	(2.21)	(0.07)	(0.87)	(1.44)	(0.33)
SPLYSC3	Mean	0.78	0.97	0.50	0.61	0.78	0.38	0.08	0.06	0.10
	Beta	0.115	0.096	0.126	0.140	0.088	0.267	0.181	0.182	0.111
	tVal	(3.66)	(2.57)	(2.09)	(4.00)	(2.11)	(4.05)	(1.24)	(1.14)	(0.44)
FEMENT	Mean	0.40	0.0	1.0	0.42	0.0	1.0	0.45	0.0	1.0
	Beta	-0.006	---	---	-0.053	---	---	-0.666	---	---
	tVal	(0.06)	---	---	(0.52)	---	---	(3.81)	---	---
OLS Eqn	R-Sq	0.11	0.11	0.10	0.13	0.13	0.12	0.08	0.09	0.02
	FVal	14.81	10.12	6.47	17.92	11.82	8.32	5.90	5.99	1.72
PFRHR	Mean	26.51	28.02	24.20	18.34	23.08	11.88	13.60	15.59	11.19
ln(PFRHR)	Mean	1.92	2.05	1.72	1.47	1.61	1.28	1.07	1.41	0.66
SCHYRS	Mean	10.63	12.02	8.53	10.26	12.03	7.85	5.54	6.72	4.11
FAMWRK1	Mean	0.74	0.70	0.81	0.65	0.58	0.74	0.68	0.60	0.77
FAMWRK2	Mean	0.17	0.20	0.13	0.21	0.25	0.15	0.22	0.25	0.17

Note: [a] Statistics: N = number of observations, Beta = OLS regression coefficient, tVal = t-value, Mean = arithmetic mean, R-Sq = adjusted R-Squared, coefficient of determination, FVal = F-statistic.

Finally, female-only firms in rural areas earn much less than do those including men, but there is no such effect in urban areas. This sharp rural difference is closely associated with a difference in the sector of activity, women being concentrated in textile production; that association, of course, does not explain why making textiles is so badly paid compared to other activities.

The regression results for retail trade, the dominant family business activity in Peru, are displayed in table 7. Just two variables demonstrate consistently significant effects on the performance of retailers: the capital assets of the business and, in urban areas only, the post-primary educational attainment of the most educated family worker (SPLYSC2). The coefficients on capital repeat the pattern seen for the entire informal sector, being stronger for firms with lower capital endowments, which happen to be firms in rural areas and firms run by women.

The coefficients of determination for the regression equations range from virtually zero (female-only firms in rural areas) to 0.16 (male-included firms in other urban areas). Although the determining factors have not been captured in the model, in rural areas, it appears that female-run retail firms are considerably less profitable than male-run retail firms. (In Lima, they are somewhat more profitable, after education and fixed capital have been accounted for.)

The impact of the firm's locus of operation (i.e., in the home, in other fixed premises, or in no fixed premises) is generally quite weak, with two exceptions. In urban areas outside Lima, male-included firms that operate out of homes earned significantly less per hour of family labor than other

Table 7

REGRESSION RESULTS -- RETAIL TRADE

Variable	Stat.[a]	Metropolitan Lima			Other Urban Areas			Rural Areas		
		All	Male	Female	All	Male	Female	All	Male	Female
Observations	N	381	197	184	520	249	271	342	156	186
Constant	Beta	1.073	1.078	1.891	2.621	2.151	3.033	1.089	0.720	0.344
	tVal	(1.32)	(0.85)	(1.31)	(4.02)	(2.28)	(3.63)	(0.88)	(0.67)	(0.17)
TOTCAP	Mean	9.25	13.93	4.22	12.18	21.13	3.96	3.34	4.60	2.28
	Beta	0.007	0.007	0.013	0.004	0.004	0.020	0.035	0.022	0.129
	tVal	(4.42)	(3.70)	(2.45)	(4.58)	(4.11)	(2.93)	(1.94)	(1.98)	(2.31)
LOCHOME	Mean	0.20	0.16	0.23	0.29	0.23	0.35	0.37	0.37	0.38
	Beta	-0.326	-0.260	-0.397	-0.382	-0.863	-0.172	0.305	-0.035	0.527
	tVal	(1.59)	(0.83)	(1.46)	(2.35)	(3.35)	(0.81)	(0.92)	(0.13)	(0.91)
LOCFXED	Mean	0.26	0.29	0.23	0.29	0.33	0.26	0.18	0.14	0.22
	Beta	-0.074	-0.061	-0.140	0.136	0.273	-0.154	-0.202	-0.828	-0.078
	tVal	(0.39)	(0.23)	(0.49)	(0.83)	(1.15)	(0.67)	(0.47)	(2.13)	(0.11)
AGE	Mean	41.34	42.91	39.66	42.50	43.23	41.82	41.60	42.01	41.25
	Beta	0.002	0.009	0.003	-0.044	-0.013	-0.076	0.049	0.053	0.060
	tVal	(0.07)	(0.18)	(0.01)	(1.64)	(0.34)	(1.91)	(0.95)	(1.28)	(0.63)
AGESQ	Mean	18.75	20.26	17.13	19.88	20.73	19.09	19.20	19.60	18.87
	Beta	-0.008	-0.014	-0.009	0.002	-0.006	0.053	-0.072	-0.074	-0.092
	tVal	(0.23)	(0.26)	(0.17)	(0.78)	0.16	(1.23)	(1.33)	(1.76)	(0.85)
SPLYSC1	Mean	4.42	4.71	4.10	4.29	4.65	3.95	3.37	3.78	3.03
	Beta	0.082	0.037	0.099	0.032	-0.020	0.043	-0.053	0.104	-0.181
	tVal	(1.19)	(0.25)	(1.23)	(0.61)	(0.19)	(0.72)	(0.59)	(1.15)	(1.30)
SPLYSC2	Mean	3.07	3.79	2.30	2.94	3.82	2.12	1.03	1.10	0.94
	Beta	0.107	0.115	0.093	0.071	0.079	0.057	-0.104	-0.205	0.066
	tVal	(3.82)	(2.92)	(2.19)	(2.99)	(2.39)	(1.66)	(1.29)	(2.94)	(0.49)
FEMENT	Mean	0.48	0.00	1.00	0.52	0.00	1.00	0.54	0.00	1.00
	Beta	0.261	--	--	0.021	--	--	-0.657	--	--
	tVal	(1.61)	--	--	(0.15)	--	--	(2.15)	--	--
OLS Equation	R-Sq	0.11	0.10	0.09	0.12	0.16	0.11	0.02	0.08	0.01
	FVal	6.73	4.27	3.51	9.88	7.88	5.73	2.05	2.94	1.33
PRFHR	Mean	23.88	27.70	19.78	19.53	25.76	13.81	17.33	18.95	15.98
ln(PRFHR)--Dep.Var.	Mean	1.81	1.18	1.80	1.54	1.66	1.44	1.27	1.64	0.96
SCHYRS	Mean	7.49	8.50	6.41	7.22	8.48	6.07	4.40	4.88	3.97
FAMWRK1	Mean	0.58	0.42	0.72	0.50	0.33	0.66	0.63	0.47	0.77
FAMWRK2	Mean	0.27	0.35	0.17	0.30	0.41	0.20	0.25	0.34	0.17

Note: [a] Statistics: N = number of observations, Beta = OLS regression coefficient, tVal = t-value, Mean = arithmetic mean, R-Sq = adjusted R-squared, FVal = F-statistic.

retail firms; and in rural areas, male-included enterprises earned less when they operated from a fixed, nonhome location. There is no obvious pattern to these differences. Street vendors are the classic example of informal employment and might be expected to earn less than vendors who, at least, have a fixed place of business, but there is no evidence of such a differential in these results: in no case are the two variables, LOCHOME and LOCFXED, both positive and significant.

The regression results for textile businesses are given in table 8. Activity in this sector is 90 percent home-based, so the dummy variables indicating locus of operation were dropped from the analysis. Also, the sector is dominated by women -- 76 percent of the firms are female-only firms in Lima, 70 percent in other cities, and 66 percent in rural areas. In all urban areas, there were too few male-included firms to permit separate regressions to be run for these groups. The majority of textile firms are one-person operations. This is especially true of the female-only firms. In nearly all cases, these are probably women weavers, who at least in rural areas may be using their own (farm-produced) wool. They presumably sell most of their output to middlemen rather than to the final consumer.

The regression results for the textile sector are, with only a few exceptions, not very informative. None of the coefficients in the equations for female-only firms in Lima and in rural areas is statistically significant. The results for other urban areas are more interesting. The coefficient of determination is 0.22, and the slope coefficients on capital and years of post-primary education are statistically significant. Among male-included

Table 8

REGRESSION RESULTS -- TEXTILE MANUFACTURING

		Metropolitan Lima[b]		Other Urban Areas[b]		Rural Areas		
Variable	Stat.[a]	All	Female	All	Female	All	Male	Female
Observations	N	98	74	94	65	167	56	111
Constant	Beta	0.554	-0.886	-0.693	0.109	-0.463	-2.179	0.116
	tVal	(0.31)	(0.45)	(0.43)	(0.06)	(0.46)	(0.99)	(0.11)
TOTCAP	Mean	5.44	2.16	2.31	1.14	0.45	0.71	0.32
	Beta	0.022	0.006	0.087	0.297	-0.121	-0.068	-0.254
	tVal	(2.51)	(0.08)	(3.36)	(2.29)	(1.11)	(0.49)	(1.21)
AGE	Mean	41.95	42.74	41.61	39.92	43.22	48.09	40.76
	Beta	-0.022	0.024	0.026	0.009	0.018	0.067	0.003
	tVal	(0.34)	(0.32)	(0.39)	(0.11)	(0.43)	(0.68)	(0.07)
AGESQ	Mean	19.68	20.39	19.00	17.55	21.21	25.27	19.16
	Beta	0.005	-0.031	-0.045	-0.041	-0.037	-0.084	-0.023
	tVal	(0.08)	(0.40)	(0.65)	(0.48)	(0.81)	(0.81)	(0.45)
SPLYSC1	Mean	4.71	4.65	4.03	3.82	2.57	3.46	2.13
	Beta	0.340	0.330	0.142	0.060	0.147	0.302	0.094
	tVal	(1.76)	(1.63)	(1.36)	(0.49)	(2.46)	(2.52)	(1.34)
SPLYSC2	Mean	3.16	3.01	2.02	2.03	0.49	0.63	0.42
	Beta	0.021	0.339	0.084	0.167	0.026	0.032	0.045
	tVal	(0.32)	(0.45)	(1.27)	(2.06)	(0.29)	(0.21)	(0.37)
FEMENT	Mean	0.76	1.00	0.69	1.00	0.66	0.00	1.00
	Beta	-0.268	--	0.293	--	0.106	--	--
	tVal	(0.67)	--	(0.85)	--	(0.41)	--	--
OLS Equation	R-Sq	0.11	0.06	0.15	0.22	0.06	0.10	0.03
	FVal	2.97	0.89	3.77	4.68	2.76	2.23	1.73
PRFHR	Mean	16.89	12.74	6.20	6.33	2.80	3.42	2.49
lnPRFHR (Dep.Var.)	Mean	1.36	1.16	0.67	0.65	-0.05	-0.08	-0.04
SCHYRS	Mean	7.88	7.66	6.05	5.84	3.07	4.09	2.55
FAMWRK1	Mean	0.84	0.87	0.69	0.86	0.64	0.43	0.75
FAMWRK2	Mean	0.13	0.14	0.20	0.09	0.26	0.39	0.19

Note: [a] Statistics: N = number of observations, Beta = OLS regression coefficient, tVal = t-value, Mean = arithmetic mean, R-Sq = adjusted R-squared, FVal = F-statistic.
[b] Equation for male enterprises not estimated (sample too small).

firms in rural areas, primary school is found to have a significant impact on earnings; there seems to be no such effect for women. Such differences might turn on differences in the product (weaving versus tailoring) or in the degree to which the producer also markets his or her output, but we have no data on these characteristics.

The regression results for personal services are displayed in table 9. There were too few such firms to report regression results for rural areas, even after pooling the male and female samples. The vast majority (78-94 percent) of the personal service firms in urban areas consist of just one family worker. In the case of female-only firms, the regression results for the personal services sector are uninformative, since most of the coefficients are statistically equivalent to zero. The results for the male-included firms in Lima show significant effects for the age of the entrepreneur and for years of post-primary schooling. For the male-included firms in other urban areas, it is troubling to discover that the regression coefficient with the largest t-ratio is the coefficient on the fixed capital variable, and that this coefficient is negative -- we have no explanation for this. There are no clear schooling effects.

The regression results for the non-textile manufacturing sector are presented in table 10. Earnings for this disparate group of businesses are simply not explained by the model. With the exception of some of the coefficients on capital, most of the regression coefficients, and the overall regressions themselves, are not statistically significant. These enterprises are male-dominated, seldom include more than one worker, and usually operate out of the worker's home.

Table 9

REGRESSION RESULTS -- PERSONAL SERVICES[a]

Variable	Stat.[b]	Metropolitan Lima			Other Urban Areas		
		All	Male	Female	All	Male	Female
Observations	N	174	110	64	130	73	57
Constant	Beta	0.569	-1.020	3.986	-0.219	-0.745	-0.082
	tVal	(0.60)	(0.90)	(1.90)	(0.20)	(0.53)	(0.04)
TOTCAP	Mean	9.75	14.65	1.32	7.89	13.75	0.38
	Beta	0.002	0.002	-0.034	-0.009	-0.010	0.065
	tVal	(0.32)	(1.36)	(0.74)	(3.51)	(3.75)	(0.28)
LOCHOME	Mean	0.31	0.24	0.44	0.35	-0.32	-0.40
	Beta	-0.301	0.072	-0.441	-0.345	-0.187	-0.525
	tVal	(1.31)	(0.25)	(1.03)	(1.17)	(0.45)	(1.16)
LOCFXED	Mean	0.15	0.20	0.06	0.18	0.27	0.07
	Beta	-0.566	-0.531	0.037	-0.507	-0.037	-2.012
	tVal	(1.88)	(1.71)	(0.04)	(1.38)	(0.09)	(2.39)
AGE	Mean	40.53	42.68	36.84	40.45	40.45	40.46
	Beta	0.050	0.080	-0.116	0.077	0.062	0.070
	tVal	(1.28)	(1.88)	(1.09)	(1.70)	(1.13)	(0.83)
AGESQ	Mean	18.50	20.72	16.68	18.57	19.02	17.98
	Beta	-0.055	-0.087	0.151	-0.108	-0.091	-0.103
	tVal	(1.32)	(1.92)	(1.13)	(2.23)	(1.52)	(1.15)
SPLYSC1	Mean	4.47	4.74	4.00	4.08	4.55	3.44
	Beta	-0.022	0.153	-0.087	0.117	0.262	0.088
	tVal	(0.22)	(0.99)	(0.43)	(1.30)	(1.44)	(0.74)
SPLYSC2	Mean	3.30	3.75	2.52	2.46	3.33	1.35
	Beta	0.141	0.143	0.102	0.056	0.047	0.032
	tVal	(3.40)	(3.11)	(1.17)	(1.16)	(0.88)	(0.28)
FEMENT	Mean	0.37	0.00	1.00	0.44	0.00	1.00
	Beta	0.005	--	--	-0.341	--	--
	tVal	(0.02)	--	--	(1.15)	--	--
OLS Equation	R-Sq	0.06	0.13	0.01	0.19	0.27	0.05
	FVal	2.34	3.40	0.83	4.72	4.76	1.43
PRFHR	Mean	17.67	15.64	21.17	9.47	10.89	7.66
ln(PRFHR)--Dep.Var.	Mean	1.76	1.80	1.69	1.06	1.83	0.91
SCHYRS	Mean	7.77	8.49	6.52	6.52	7.87	4.79
FAMWRK1	Mean	0.84	0.78	0.94	0.85	0.85	0.86
FAMWRK2	Mean	0.13	0.18	0.05	0.11	0.11	0.11

Note: [a] Earnings equations not estimated for rural areas (samples too small).
[b] Statistics: N = number of observations, Beta = OLS regression coefficient, tVal = t-value, Mean = arithmetic mean, R-Sq = adjusted R-squared, FVal = F-statistic.

Table 10

REGRESSION RESULTS -- OTHER MANUFACTURING

		Metropolitan Lima			Other Urban Areas[b]		Rural Areas[b]	
Variable	Stat.[a]	All	Male	Female	All	Male	All	Male
Observations	N	86	56	30	81	68	76	58
Constant	Beta	0.150	1.419	0.639	1.476	1.912	(*)	(*)
	tVal	(0.10)	(0.72)	(0.23)	(0.87)	(0.95)	(*)	(*)
TOTCAP	Mean	7.86	10.04	3.79	12.28	14.58	4.78	6.14
	Beta	0.008	0.004	0.087	0.008	0.008	(*)	(*)
	tVal	(0.90)	(0.53)	(2.05)	(2.20)	(2.26)	(*)	(*)
LOCHOME	Mean	0.57	0.46	0.77	0.51	0.46	0.78	0.72
	Beta	-0.875	-0.730	-0.325	-0.246	-0.189	(*)	(*)
	tVal	(2.14)	(1.78)	(0.30)	(0.46)	(0.30)	(*)	(*)
LOCFXED	Mean	0.28	0.34	0.13	0.40	0.46	0.13	0.22
	Beta	0.149	0.341	0.179	-0.035	-0.058	(*)	(*)
	tVal	(0.32)	(0.77)	(0.14)	(0.08)	(0.09)	(*)	(*)
AGE	Mean	39.91	39.98	39.97	43.57	44.63	44.00	43.84
	Beta	0.070	0.079	0.023	-0.033	-0.048	(*)	(*)
	tVal	(1.25)	(1.25)	(0.21)	(0.46)	(0.61)	(*)	(*)
AGESQ	Mean	17.84	17.88	17.67	20.95	21.90	22.11	22.07
	Beta	-0.105	-0.123	-0.043	0.027	0.039	(*)	(*)
	tVal	(1.54)	(1.68)	(0.30)	(0.32)	(0.44)	(*)	(*)
SPLYSC1	Mean	4.79	4.89	4.60	4.64	4.78	3.08	3.36
	Beta	0.201	0.043	0.162	0.162	0.153	(*)	(*)
	tVal	(0.86)	(0.12)	(0.41)	(1.03)	(0.87)	(*)	(*)
SPLYSC2	Mean	4.27	4.45	3.97	3.19	3.41	0.66	0.53
	Beta	0.061	0.017	0.126	0.039	0.026	(*)	(*)
	tVal	(1.22)	(0.33)	(1.02)	(0.71)	(0.44)	(*)	(*)
FEMENT	Mean	0.35	0.00	1.00	0.16	0.00	0.24	0.00
	Beta	0.550	--	--	0.198	--	(*)	--
	tVal	(1.75)	--	--	(0.43)	--	(*)	--
OLS Equation	R-Sq	0.22	0.23	0.25	0.04	0.04	(*)	(*)
	FVal	4.01	3.35	2.39	1.44	1.44	(*)	(*)
PRFHR	Mean	39.28	15.82	83.06	11.04	11.62	14.78	16.82
ln(PRFHR)--Dep.Var.	Mean	2.07	2.03	2.16	1.46	1.48	1.35	1.41
SCHYRS	Mean	9.07	9.34	8.56	7.83	8.19	3.74	3.90
FAMWRK1	Mean	0.83	0.80	0.87	0.81	0.56	0.82	0.79
FAMWRK2	Mean	0.13	0.16	0.07	0.21	0.24	0.12	0.14

Note: (*) = nothing significant in regression equation.

[a] Statistics: N = number of observations, Beta = OLS regression coefficient, tVal = t-value, Mean = arithmetic mean, R-Sq = adjusted R-squared, FVal = F-statistic.

[b] Earnings equation for female enterprises not estimated (sample too small).

5. Assessment of Model's Explanatory Power

All told, the results of the regressions devised here to explain variation in the hourly net revenues of family businesses in Peru are generally disappointing. In no case does the regression equation explain as much as 30 percent of self-employed "wages," which leaves far more unexplained variation than do analogous models estimated for wage employees in the same Peruvian households [Arriagada (1988a); Moock and Bellew (1988); Stelcner, Arriagada and Moock (1987)]. Several factors may underlie this relative lack of success.

First, the model used here is a hybrid, doubtless not ideally suited for analyzing the performance of business enterprises, particularly complex enterprises involving purchased inputs of materials and the use of fixed capital and employing more than one family worker. The human capital earnings function is an extremely parsimonious model that has proved, over years of intensive use, to be highly successful in explaining variation in the earnings of full-time wage employees. The addition of a capital stock measure and a few other variables quantifying characteristics of the enterprise may not, however, bridge the conceptual gulf that differentiates the entrepreneur from the wage employee. Even if the right variables are included, and they are correctly measured, it is not clear that the functional specification we have used is adequate.

To the extent that small businesses are short-lived and individuals tend to move from one activity to another over time, and to the extent that work in any given activity is part-time or seasonal in nature, age (or years since completion of school) may be an extremely poor measure of relevant work experience. Moreover, when two or more family members are involved in a

single enterprise, it is not at all clear whose human capital is most relevant to the success of the business. The choice here of using the age of the oldest and the education of the most educated family worker may not be optimal (although other specifications were tried and proved even less successful than this).

Secondly, even if the earnings model is correctly specified, the problem of measuring business earnings is considerably more difficult than that of measuring an employee's wage. This is especially true in the case of small businesses in developing countries, where written records are not kept and where those who request such information are often suspect. The PLSS was carefully designed and conscientiously pretested; one of its principal objectives was the collection of data on small-scale enterprises comprising Peru's informal sector. Undoubtedly, the PLSS achieved this objective as well as any national survey has done to date. Still, the state of the art, it seems fair to say, is primitive.

Thirdly, there is a question of aggregation across sectors of self-employment, which we have discussed briefly already. There may be important differences -- say, between a weaver and a beautician -- in the amounts and types of physical capital and materials required, the amounts and types of human capital required, and how such human capital is typically acquired. Recognition of these differences -- and the results of a Chow test of sample homogeneity [Chow (1960)] -- prompted us to run separate analyses for textile workers (out of all manufacturing enterprises) and those engaged in personal services (separately from other services). Still, differences remain within what we have defined to be a "sector." The "other manufacturing" sector is especially diverse, and this fact could account for the absence of significant

findings. Should we have disaggregated the sample further, assuming, of course, sufficiently large cell sizes to permit meaningful analysis on the resulting sub-samples? This is an unresolved issue. It should be remembered that researchers estimating earnings functions for wage employees typically pay no attention to sectoral differences, although these may be as large as they are for the self-employed. For analyses of the returns to schooling, what matters is not simply whether a "sector" is relatively homogeneous, but whether education determines in which sector an individual will work, and whether people are relatively free to move from one activity to another to make the best use of their human capital. We have essentially no direct evidence on this, because the PLSS does not provide lifetime employment histories. Even with such information it would be difficult, from household data alone, to estimate the barriers that have kept some people from moving between jobs and, therefore, affected their payoffs to schooling.

Having acknowledged the somewhat poor performance in general of the earnings equations in accounting for differences in hourly earnings within Peru's nonfarm family enterprises, we can step back and look specifically at the results pertaining to the education of family workers. This was the focus of this study, and here there are some patterns worthy of mention.

6. Education and Earnings in Peru's Nonfarm Family Enterprises

The regression coefficients on the primary and post-primary schooling spline variables (primary, secondary and, when all enterprises are analyzed together, post-secondary) are summarized in table 11. Most striking are the differences in the sizes and statistical significance levels of the effects of education on hourly earnings in Peru's family enterprises --differences by

sector, by region, and by gender. In some cases, education seems to have a healthy impact on earnings, comparable to or larger than that found for wage employees encountered in the same household survey. In other cases, the impact is not statistically different from zero. Thirty-two of the 83 coefficients estimated are statistically significant at the 10 percent significance level or better (26 of 83 at the five percent level) so we can feel confident that most of the "significant" positive results are not just chance findings.

Most of the significant coefficients come from the equations for all of the self-employment sectors together. When we look at these equations, three conclusions emerge. First, there are no discernible educational effects on earnings in rural areas. The activities in which both men and women participate in the countryside are presumably for the most part traditional employments, for which schooling is rarely relevant. In many cases -- notably in textile production but probably also in food production and in some retail trade -- the activity is an adjunct to farming, adding value to some agricultural product. Second, post-secondary education always has a fairly high and significant payoff in urban areas, for both men and women. Women's returns are systematically (though not always significantly) higher than men's, perhaps because higher education is still much less frequent among women. Post-secondary schooling is so rare within any one subsector that we cannot test for its effect, and the earnings equations for trade, manufacturing, and services can only distinguish primary from all post-primary education. Third, again within urban areas only, men appear to get a

Table 11

SUMMARY OF SCHOOLING COEFFICIENTS

Sample	Metropolitan Lima			Other Urban Areas			Rural Areas		
	Primary	Secondary	Higher	Primary	Secondary	Higher	Primary	Secondary	Higher
All Sectors									
All firms	0.10++	0.10+++	0.12+++	0.11+++	0.05++	0.14+++	0.04	-0.04	0.18
Female-only firms	0.15++	0.05	0.13++	0.11+++	0.00	0.27+++	-0.02	-0.04	0.11
Male-included firm	0.04	0.14++	0.10++	0.10+	0.08++	0.09++	0.06	- 0.08	0.18
Retail Trade									
All firms	0.08	0.11+++		0.03	0.07+++		-0.05	-0.10	
Female-only firms	0.10	0.09++		0.04	0.06++		-0.18	-0.07	
Male-included firms	0.04	0.12+++		-0.02	0.08+++		0.10	-0.21	
Textile Manufacturing									
All firms	0.34++	0.02		0.14+	0.08		0.15+++	0.03	
Female-only firms	0.33+	0.03		0.06	0.17+		0.09+	0.05	
Male-included firms	(.)	(.)		(.)	(.)		0.30+++	0.03	
Personal Services									
All firms	-0.02	0.14+++		0.12+	0.06		(.)	(.)	
Female-only firms	-0.07	0.10		0.09	0.03		(.)	(.)	
Male-included firms	0.15	0.14+++		0.26+	0.05		(.)	(.)	
Other Manufacturing									
All firms	0.20	0.06		0.16	0.04		0.02	-0.00	
Female-only firms	(.)	(.)		(.)	(.)		(.)	(.)	
Male-included firms	0.04	0.02		0.15	0.03		0.00	-0.18	

Note: +++ = regression coefficient statistically significant at .01 level in one-tailed test (t-value ≥ 2.3)
++ = statistically significant at .05 level in one-tailed test (t-value ≥ 1.66);
+ = statistically significant at .10 level in one-tailed test (t-value ≥ 1.29);
(.) = not estimated (sample too small).

significant return to secondary schooling (but generally not to primary, or at least not clearly so), whereas for women, there are significant returns to the first five years of schooling but not to the next five. This differentiation is associated with the fact that women dominate the textile sector, and only primary schooling pays off there, while men are more frequent in the personal service subsector, where post-primary education is valuable. Thus a considerable part of the effect of schooling on earnings may be due to its allocative effect across sectors of employment, but this is clearly not the whole story: as we will see, there are some strong educational effects within sectors, and these do not necessarily discriminate between men and women.

In the retail trade sector, educational attainment beyond the first five years of education is correlated with higher earnings, in urban areas but not in rural. Each year of post-primary education is associated with a 6- to 8-percent increase in hourly earnings in urban areas other than Lima and with a 9- to 13-percent increase in Lima itself. The point estimates are higher for male-included firms than for female-only firms, but only marginally so. Among retailers in rural areas, education is not associated with higher earnings. (The point estimates are, in most cases, actually negative.)

This suggests that what it means to be "a trader" is very different, far more complex and skills-intensive, in urban areas than in rural areas. This is not to say that as rural areas become more commercialized in the course of development that higher-level skills in the retail sector will not begin to pay off. For the moment, however, such skills would seem to be unnecessary. Indeed the average educational attainment among retailers is significantly lower in rural areas today than in urban areas -- 4 years as compared with 7.

In personal services, there were too few rural observations for analysis. In urban areas, however, some educational effects were found. In Lima, again, education beyond the first five years is associated with higher earnings, significantly so in the case of male-included firms, but not in the case of female-only. For males, each year of post-primary education "results" in a 14-percent boost in hourly earnings. For males in other urban areas, there is weak evidence of a substantial positive impact of schooling over the first five years, but not so beyond five years. As in the case of retail trade, there may be important differences between the specific activities represented in this sector in Lima and those exercised elsewhere, with the former requiring more formal schooling for success. And in all urban areas, men and women probably engage in different personal service activities: our name for this "sector" reflects the relation of the producer to his or her clients but does not describe what skills are needed for the job.

In textile manufacturing, all of the estimates are positive, half of them significantly so, and half of these are significant at the five percent level or better. In general, the impact of education occurs at the primary level rather than the post-primary. The size of the estimated marginal effect ranges greatly, from not significantly different from zero to 0.33 in the case of female-only firms in Lima. In the rest of the manufacturing sector, i.e., outside of textiles, no significant educational effects were found in this study.

How does one account for the altogether different pattern of educational effects in Peru between, say, textile manufacturing (in which primary education is usually the key) and retail trade (in which post-primary education is much the more important of the two educational levels)?

Presumably textile manufacturing, which includes both weaving and tailoring, is the less demanding of the two sectors in terms of literacy, numeracy, and problem-solving skills. Textiles have been produced, in more or less unchanged form, for centuries in Peru. To learn or to be equipped to learn what one needs to know in order to make a "reasonable" living in the textile industry, one probably need not have completed more than a few years of schooling. Indeed, those who have completed more than a few years of schooling and have not managed to move out of textiles into a higher paying sector (the average hourly earnings are quite low in this sector as compared with all of the other three considered here) may be a self-selected, relatively slow-witted group of individuals on average. In summary, the textile sector looks like a classic "traditional" activity in which education has little to contribute because there is essentially no change occurring of the sort that schooling helps entrepreneurs to master (cf. Schultz 1975). Such modernization as has occurred in the sector may be very easy to absorb -- such as the purchase of non-traditional, brightly-colored dyes -- or may have been taken up in what is classified here as another sector, namely that of retail (and wholesale) trade.

Retailing, in contrast, especially in urban areas, can be a relatively complex occupation, where the ability to get ahead depends on a particular mix of special skills, some of which may be innate (the effect of these would be captured in the regression's constant term, to the extent that they are possessed in common by those who enter the sector, and otherwise in the individual residual terms) and others of which require exposure to relatively advanced years of schooling. Certainly, in Peru's urban areas a premium accrues to those retailers who have continued their schooling past the primary

level. In fact, until one has reached that level, the marginal effect of education is small or zero. The skills learned during the first five years of school, at least those that are retained after one has spent several years in the labor force, are not sufficient to raise productivity in the sector. It is plausible, and therefore tempting, to suppose that literacy, and even more, numeracy, are valuable skills in this activity; and that among the people self-employed in retail trade, these skills are typically not consolidated until somewhere in secondary school [Catholic University (1988)]. The children of richer and better-educated parents, who come to school better prepared and may also attend better schools, may of course learn to read and cipher in fewer years, but those children are unlikely to become self-employed retailers.

In sum, one may conclude that education does have an impact on earnings in Peru, not only in the formal wage sector, but in small-scale self-employment as well. Sometimes this impact is quite sizable. It is not, however, constant across all years of education, and the relative impact of different levels of education differs across sectors of employment, between urban and rural areas, and (to a lesser extent) between men and women. These findings are generally supportive of government policies that would encourage school attendance, on the part of men and women, and on the part of those who will become self-employed workers in small family enterprises. Education is not wasted on them, except as they acquire more schooling than is useful in a traditional occupation, and schooling may be their best opportunity to leave those occupations, which generally pay very little.

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