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Occupational Training Among Peruvian Men

Does It Make a Difference?

Ana-Maria Arriagada

Postschool training offers significant benefits for private sector wage employees. Job-based and postsecondary training increase wages by 10 and 20 percent, respectively. But workers with limited formal schooling are unlikely to get job training, revealing that training and formal education are complementary investments in Peru.

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Data on job training offered to urban males in Peru since the 1960s support these findings:

The heaviest enrollment is in job-based training programs — on-the-job or off-the-job programs offered by public sector institutions. The second heaviest enrollment — contrary to common expectations — is in "academes," the prototypical proprietary (for-profit) training organizations.

The probability of receiving training is largely determined by educational attainment. In general, workers with less-than-secondary education — more than half of Peru's urban male labor force — do not receive job skills from institutional training programs. Only workers who attain secondary schooling or higher are likely to get job training. So workers with limited schooling also face limited training opportunities.

Training increases salaried workers' wage rates. Job-based training increases wage rates more than 10 percent; training from postsecondary programs, 20 percent; and training from "academes" seems to have no impact on wage rates. Postschool training appears not to affect the earnings or profits of self-employed workers, after controlling for such factors as enterprise characteristics, formal schooling, and the probability of having received training in school.

[This report is the first evaluation of the patterns of participation in, and outcomes of, the postschool job training that began in Peru in the 1960s. Conclusions are based on analysis of data on a sample of 1,259 wage workers in the private sector and 925 self-employed nonfarm workers — all urban men between the ages of 15 and 65 — drawn from the Peruvian Living Standards Survey. The study results suggest that investments in training offer significant benefits in salaried employment in the private sector, but because training costs were unavailable, the study is only a partial evaluation.]

This paper is a product of the Education and Employment Division, Population and Human Resources Department. Copies are available free from the World Bank, 1818 H Street NW, Washington DC 20433. Please contact Cynthia Cristobal, room S6-001, extension 33640.

CONTENTS

I. INTRODUCTION

A critical bottleneck for economic development is the lack of qualified human resources. In order to ease this constraint, most developing countries have invested heavily in education and training in recent decades. Government training programs outside the formal education system have at least three general objectives. First, they aim to eliminate shortages of skilled workers by upgrading the labor force. Second, they aim to reduce inequality. Third, they aim to augment the stock of human capital available for economic development, thereby raising the earnings and probability of employment of trainees. Accordingly, one of the indicators of the success of these programs is that the earnings of the trainees increase above what they would have increased without training (Ashenfelter, 1979).

Since the late 1960s Peruvian governments have placed considerable emphasis on education in order to improve the quantity and quality of human resources available for economic development. Policies aimed at the promotion of worker training were based on the belief that investments in job-training would enhance productivity and therefore earnings of the new entrants to the labor force, as well as those already employed. These policies were implemented through the establishment of several sectoral training institutions attached to various agencies in the public sector and financed by payroll and sales taxes. In addition, technical institutes, universities, and proprietary institutions developed their own training programs during the 1970s and 1980s.

This report presents the first evaluation of the outcomes of the Peruvian training sector since its outset in the 1960s. The paper examines the private returns to post-school training among male wage and non-farm self-employed workers in the urban areas of Peru. In particular, this study focus on two issues: First, who are the recipients of post-school training, and what are the determinants of participation in post-school training? Second, what is the impact of job-training on the wages of employees and self-employed workers? Analyses of patterns and determinants of training participation offer important information to policymakers on the particular groups benefiting from training, on the groups with no access to training, and on the potential client populations of policies that establish or expand alternative training schemes. From the point of view of society as a whole, any government training program uses resources that could be allocated for other purposes. The direct benefit of training investments to society might be represented by additional output available because of the increased productivity of participants in training programs. Earnings can be used as a proxy of workers productivity, and estimates of the returns to training can be used as a criterion to approximate the benefits of training programs in the labor market[1/]. In addition, these analyses may inform policymakers whether

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1/ A number of criticisms have been levied against the use of quantitative analysis to examine the external effects of training programs. First, that joint evaluation of different programs is undesirable because it implies aggregation of training programs which are likely to have different labor market impacts. The differences between programs are said to be crucial because training programs not only include several types of instruction, but also different proportions of academic and technical training which are likely

formal schooling and post-school training are complements or substitutes in raising workers' productivity.

The results of the Peruvian Living Standards Survey (PLSS) reveal that "post-school" training activities are widespread in the Peruvian labor force. About 14 percent of all Peruvian workers between 15 and 65 years of age reported attendance at some sort of occupational training course. Among males, significant variation in job-training participation according to sector of employment was found. Thus, 42 percent of public sector employees reported training courses compared to 26 percent of private sector employees. Among those self-employed in non-agricultural activities, 15 percent declared post-school training courses.

In the Latin American context, there are very few quantitative evaluations of the economic impact of job-training programs. Research on the effects of Colombia's in-service training, SENA,[2/] indicates a positive effect of training on the earnings of men in wage employment, and complementarity between investments in job-training and other forms of human capital investment such as schooling and experience (Jimenez and Kugler 1986, 1987, Horn 1987).

The Data

The data for this study came from the Peruvian Living Standards Survey (PLSS)[3/]. The survey gathered information on the post-school training activities of respondents 14 years of age and older. In this paper, urban men 15 to 65 years old were classified into wage or non-farm self-employment according to the activity they reported as the main job in the seven days prior to the survey. This job was defined as the occupation in which the interviewed worked "more hours in that past week" without using any "earnings" criterion. Wage workers are those private sector employees who reported positive hours of work as well as positive earnings during the week prior to the interview. The self-employed workers are those who reported income from a business during the week prior to the interview, as well as information on the assets, revenues, and expenditures of that business. There are 1,259 wage workers and 925 self-employed individuals in the sample. Overall, these two

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to have different impacts on short-term productivity. Second, and specifically concerning the earnings functions approach, it has been said that these studies fail to account for selectivity bias, and use earnings horizons too close to the period of training to detect the training effect (Dougherty 1986). This study controls for selectivity and uses a sample of individuals who received training during a ten year period.

2/ SENA stands for Servicio Nacional de Aprendizaje.

3/ This survey was conducted by The World Bank and Instituto Nacional de Estadistica under a World Bank Research Project (RPO 673-26), between June 1985 and July 1986. The survey collected information on the resources available to 5,000 households as well as socioeconomic information on their 27,000 household members.

groups account for 50 percent of the male labor force in Peru (World Bank-Instituto Nacional de Estadistica, December 1986).

Stelcner, et. al., (1987) showed that the Peruvian wage labor market is heterogeneous. Considerable differences were detected among private sector workers in Lima and Other Urban Areas (OUAs)[4/]. The observed pattern indicates that wage rates and the level of educational attainment of salaried workers decrease as the degree of urbanization diminishes. However, with regard to occupational training, male workers exhibit similar levels of activity in both locations. Therefore, in this paper, the analysis is carried out jointly for Lima and OUAs, excluding workers in rural areas where post-school training activities are very limited.

The training information is based on reported attendance in any "occupational training" program[5/]. This includes information on the longest training event attended[6/], the type of institution providing that training, the year taken, the hours attended, and the diplomas obtained. The small number of wage and self-employed workers in training courses at the time of the survey did not allow focus on current job-training. In fact, sample size considerations prevented analysis for separate vintages of trainees. Given the objectives of this paper, the sample of trainees is restricted to those individuals who received training after 1975, period in which most training programs were already established and in operation. Also, most of the training reported in the survey took place since the mid-1970s[7/]. The PLSS information on the type of institution providing training (where the training was obtained) includes the most important programs in existence ranging from off-the-job or on-the-job training and in-service training programs, technical institutes, and university "continuing education" programs, to proprietary training centers "academes". Self-reported training measures are not wholly reliable since they tend to understate how much training has been received through failure to report the more informal kinds of training.

Shortcomings of the PLSS data for this analysis are that the survey does not include information on the particular training programs and their content (e.g. managerial, skilled manual, clerical), that it records only the longest training period, and that it is unknown whether this training is used in the current job. This implies that in this analysis it is assumed that the

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4/ Lima includes metropolitan Lima (capital city) and the Callao province. OUAs include other urban settlements with more than 2,000 inhabitants.

5/ That is, those who reported having taken a course to learn an occupational skill (capacitacion ocupacional), in any training program offered by a public or private training institution outside the school system.

6/ Defined in terms of total hours of training. That is, the training program where the respondent received the most hours of training.

7/ Seventy-three percent and 65 percent of all reported job-training took place after 1975 in Lima and OUAs, respectively.

recorded event is the one affecting the labor market outcomes of training observed at the time of the survey. Nevertheless, this is a national household survey which contains a representative sample of the Peruvian salaried and self-employed workers. Therefore, it permits one not only to map out the patterns of occupational training observed among these groups of the labor force, but also provides useful insights into workers' behavior regarding acquisition of skills outside the formal education system.

The analysis applies a straightforward earnings-participation approach based on the wage model adjusted for self-selection developed by Heckman (1979). The impact of training on employment and earnings is estimated after taking into account non-random selection into the programs. The choice of this approach was based on three considerations: the cross-sectional nature of the data set, the lack of information on occupation and earnings prior to the training course, and the scope of the training information gathered through the PLSS.

The next section of this paper reviews the available background information on the Peruvian training system. Section III describes the training patterns observed among salaried and self-employed workers in Lima and Other Urban Areas (OUAS). Section IV presents an analysis of the determinants of selection into post-school training, and Section V considers the labor market outcomes of training for workers in the private sector and for the self-employed.

II. OVERVIEW OF THE POST-SCHOOL TRAINING SYSTEM[8/]

Peruvian workers receive post-school training from several sources. **Job-based training programs,**[9/] off or on-the-job, are offered by decentralized public agencies with financial and educational autonomy. These agencies, are administered by boards representing employers, workers, and the relevant ministries (Mining, Labor, Health, Industry, Agriculture, Fisheries). Training in **Post-secondary level programs** is provided by public and private technical institutes and universities, as well as by institutions managed by some enterpreneurial associations (such as the Institute for Business Administration, IPAE) or by a group of firms. In addition, there exist a variety of **proprietary schools** offering a number of job-training programs to heterogeneous client populations. These institutions, which are profit-making operations or non-profit educational organizations, operate outside the publicly coordinated training subsector.

1. Job-Based Training Programs

Available enrollment data and a brief description of the largest training agencies are indicative of the situation of post-school training in Peru.

"Servicio Nacional de Aprendizaje y Trabajo Industrial" (SENATI) is the largest training institution in Peru. It was established in 1963 as a decentralized agency of the Ministry of Industry to train and upgrade manpower for the manufacturing sector. Until 1981 SENATI was financed by a 1.5% tax on the payroll of all industrial enterprises with 15 or more workers. In 1981 the tax base was expanded to all industrial enterprises with 5 or more workers, and all firms in other sectors dealing with the installation, maintenance or repair of machinery and equipment. SENATI claims to have provided training courses to over 200,000 workers between 1963 and 1976 (UNESCO, 1978). Accounting for the fact that some workers participate in more than one training course, the World Bank (April 1982) estimates that about 100,000 workers have received training at SENATI through 1980. The main programs offered are as follows:

(i) Apprenticeship: this program starts with three cycles of 5.5 months each in a training center, and one cycle of the same length in the firm sponsoring the trainee. The areas offered are carpentry, leather goods manufacturing, electricity mechanics, and auto-mechanics. The entrance requirements are sponsorship by an enterprise, three years of secondary school, age between 14 and 20 years, and a passing of a general knowledge

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8/ Note that this review does not present a comprehensive survey of job-training programs in Peru because no data are available on overall enrollments and expenditures on these programs. Moreover, the information on resources and performance of the Peruvian training institutions and their trends overtime is extremely limited.

9/ Defined here as off or on-the-job training received in training centers, in plant, or in the military.

test. However, according to the World Bank (April, 1982) all accepted applicants to this program have completed secondary schooling. Upon completion of the program, the enterprise has no obligation to hire the graduates. ›rld Bank reports estimate that about 12,000 youths participated in the program between 1963 and 1980.

(ii) In-service upgrading: this program offers short intensive courses (from 60 to 90 hours) to employed skilled workers in large firms. The areas covered by this program are machine shop mechanics, textiles, and drafting and design. About 35,000 workers participated in this program between 1963 and 1980.

(iii) In-house training: this program consists of short courses at the supervisory and skilled worker levels, tailored to enterprise needs. The subjects are work methods, industrial security, and safety. About 33,500 workers participated in this program up to 1980.

(iv) Support to small and medium size industries: through 1980, some 2,500 workers had participated in the short courses offered by this program in the areas of production and sales, financial resources, cost control, quality control, marketing, and financial administration.

(v) Mobile units: SENATI has seven mobile units with machinery, tools, classroom and teaching materials. The units provide courses in several cities in auto-mechanics, metal construction and machine maintenance, machine shop, and electricity. Since the mobile units have been in operation about 6,000 workers have participated in these courses.

(vi) Instructor training and upgrading: This program provides 16-month courses for training instructors in machine shop/fitting, metal construction, electricity/industrial electronics, drafting and design, and auto-mechanics. Between 1975 and 1981, 1,630 individuals were enrolled.

(vii) Distance-learning programs: This program started in 1978 through correspondence courses. It intended to raise the education standards of prospective trainees with less than complete secondary schooling. Thus far, only 740 individuals have participated in the program.

There has been little evaluation of SENATI's performance. According to the World Bank (Report 3897-PE), low efficiency at a high cost seems prevalent in all SENATI's programs. This appears to be the result of lengthy training programs, unnecessary entrance tests, high drop-out rates, and large administrative structures. Thus, in 1980, the drop-out rates were 32 percent, 37 percent and 52 percent in the apprenticeship, support to industries, and mobile units programs, respectively. The apprenticeship program represented only 9.4 percent of SENATI's enrollment while absorbing 58 percent of its recurrent expenditures. Its output was estimated at less than 500 trainees per year, and expenditures on the administrative (non-teaching) staff reached 60 percent of the total salary bill of the institution.

"Servicio Nacional de Capacitacion para la Industria de la Construccion" (SENCICO), the institution responsible for training in the

construction sector, was created in 1977 as a decentralized agency of the Ministry of Housing. It is financed by a 0.5% payroll tax on construction sector enterprises, and trained about 24,000 workers between 1977 and 1980. SENCICO provides training courses of 100 to 230 hours at four levels: non-skilled (peones), semi-skilled (oficiales), skilled (operarios), and site supervisors (maestros de obra). The courses offered are: masonry, carpentry, metal structures, electrical installations, and sanitary installations. World Bank estimates (April, 1982) report that about 23,600 construction workers were trained by SENCICO between 1977 and 1980.

Available information on SENCICO's performance show high drop-out rates and an excessively large administrative structure. Thus, in 1981 the overall drop-out rate was 42 percent. This wastage seems mostly due to many workers that change work sites during their training courses. SENCICO's excessive staff is reflected by its expenditures on administrative staff salaries, which represented some 86 percent of its total wage bill (Ibid.).

CENFOTUR "(Centro Nacional de Formacion en Turismo)" providing training for the tourism sector, was established in 1977 as a decentralized agency of the Ministry of Industry, partly financed by a special tax charge on hotel and restaurant bills. It appears to be the only public training agency that obtains about 30% of its revenues from fees and direct charges to trainees. It offers several 6-semester courses to individuals with 8 or 9 years of schooling, and 5-semester courses to individuals who have completed secondary schooling. The main hotel trades covered by CENFOTUR are: reception, restaurant, kitchen/bar, storage, costs and sales, and hotel security. The main tourism trades include: tourist guide, high mountains guide, excursion planning, sales and distribution, promotion, and marketing. Available data on CENFOTUR operations indicate that by 1980 its output was about 1,500 participants per year (World Bank, April, 1982).

CEFOCAP, "(Centro de Formacion y Capacitacion de Personal)" is an agency created in 1977 under the auspices and financial support of the Ministry of Mining. It is linked to Electro-Peru, a state enterprise and to Electro-Lima, a private business. Its training activities include skilled workers, plant supervisors, technical, administrative, and managerial staff of the above mentioned enterprises. CEFOCAP also operates a mining school which offers short upgrading courses (1 to 2 weeks), and a 2-year program for workers with complete secondary schooling in the areas of exploration, exploitation, topography, and mineral concentration. Available figures indicate that about 8,000 individuals participated in its courses in 1977.

In addition to these sectoral training agencies, there are several somewhat smaller job-based training programs sponsored by the government. In 1972 a handicrafts enterprise was created under the supervision of the Ministry of Industry to provide handicrafts training and marketing services to ceramics, textiles and wool handicrafts workers. The latest available estimates show this program had about 550 participants in its courses and seminars in 1977. In 1981 it was converted into a self-financed commercial enterprise. Data on the current size of its operations are not available.

The Ministry of Labor operates 5 training centers and a mobile unit. They offer 4 to 9-month courses in masonry, carpentry, electricity, metal structures, welding, auto-mechanics, maintenance mechanics, and technical drawing. Entrants to these centers must have more than 5 years of schooling. They are reported to have about 400 participants per year.

The Ministry of Fisheries has operated a Training Office since 1971 to train fishermen and fish processing plant personnel. It provides courses of 50 to 100 hours in the areas of fish capture, fish processing, continental water fishing, and electromechanics. Estimates indicate about 3,000 participants per year in its courses (UNESCO, 1978).

Finally, the military also offers training for skills of use in the civilian sector such as mechanics, electricity, welding, plumbing, etc. This training is provided to enlisted men during their military service period.

In 1983, the World Bank prepared an investment project in Peru's non-formal vocational training system (Report 4678-PE). Although the Bank did not carry out an empirical evaluation of the sector, it identified several sectoral issues: lack of coordination between sectoral training agencies; weakness in investment planning; limited output of training activities in relation to training needs; and low efficiency of training programs (World Bank, LAC Projects, April 1983).

2. Post-secondary Training Programs

Besides the job-based training programs offered by the sectoral and public training agencies, Peruvian workers can obtain occupational training in technical institutes[10/]. These institutes offer training courses ranging from six months to one and a half years to individuals with secondary schooling. In general, they train people for middle-level jobs in a wide range of subjects: electronics, computing, accounting, bookkeeping, secretarial, public relations, marketing, business administration and the like. In addition, several universities[11/] provide training outside their regular curricula. They offer courses and workshops from 40 hours to 1,000 hours to upgrade employed middle-level management personnel and university graduates. These continuing education programs cover the same subjects as universities' regular curricula. For example, they offer upgrading courses for primary and secondary teachers, micro-computing, library science, etc.

10/ They are called "Institutos Superiores Tecnologicos".

11/ Including public and private universities.

3. Proprietary Training Schools

An additional training alternative available to Peruvian workers is to enroll in an "academe"[12/] or proprietary school. Although they operate with a wide variety of institutional arrangements, teach a variety of trades, and attract different client populations, they have several common features. Unlike formal schools, they have flexible starting schedules, initiating classes several times a year, and offer classes at different times of the day. Prices and course lengths vary greatly. Since the large majority of these agencies are not coordinated or supervised by the government, the number of private training agencies operating in Peru is unknown. According to unofficial estimates of the Ministry of Education there were more than 2,000 such academes in the country in 1986. They offer short, classroom type training courses (ranging from one week to six months) in a set of trades and occupations which require low capital investments and have a low operating cost, for the most part due to inexpensive instructors. The most common courses offered cover clerical skills, some health-related skills, cosmetology, hairdressing, interior design, tailoring, cooking, and languages. They do not appear to screen entrants by schooling certificates, and advertise the possibility of training while working part-time.

12/ In Peru these schools are called "academias".

III. OVERALL PATTERNS OF POST-SCHOOL TRAINING

This section examines the PLSS data on the participation of male workers in job-training programs[13]. The purpose of this section is to characterize the recipients of post-school training in Peru by sector of employment and training status, and to review the longest training experience of wage and self-employed workers.

1. The recipients of post-school training in Peru

Table 1 compares mean individual characteristics, employment conditions, enterprise characteristics, labor supply and earnings of workers with and without training in the wage and nonwage sectors.

The schooling information is presented by the distribution of educational attainment and the two proxies of school quality used in this paper: public versus private schooling attendance, and whether the last primary school attended provided free meals. Food at school was selected among other proxies because in the Peruvian context it may capture not only physical resources available in a school, but also its degree of organization. In other words, a school that has and manages a free meal programs for its students is likely to be a school with sufficient physical facilities and good management, and hence be a better school. The family background variables presented here, are meant to capture socioeconomic conditions and the cultural factors that possibly affected not only the school attainment of the workers, but also their training preferences.

13/ See variable definitions in Annex A, Table A-1.

Table 1
Distribution of the Sample by Sector of Employment and Training Status

Characteristics	Wage Workers		Self-employed	
	Training[a/]		Training[a/]	
	With	Without	With	Without
No. of Observations	294	965	159	766
Lima	206	540	91	349
Other Urban Areas (OUAs)	88	425	68	417
Age	31.2*	34.1	31.8*	40.6
	(8.8)	(12.9)	(9.6)	(12.3)
Schooling				
Years of schooling	10.2*	7.9	10.3*	7.3
	(2.8)	(3.6)	(3.0)	(3.7)
Primary (0-5 yrs)	0.07*	0.33	0.08*	0.43
Some secondary (6-9 yrs)	0.16*	0.25	0.21	0.20
Secondary (10 yrs)	0.44*	0.25	0.30	0.21
Some higher (11-13 yrs)	0.18*	0.06	0.25*	0.07
Higher (14 & + yrs)	0.13	0.10	0.14*	0.07
School last attended was public	0.78*	0.87	0.80*	0.88
Free meals last primary school	0.39	0.29	0.39	0.30
Background				
Father's years of schooling	6.3	4.8	5.6	4.2
Mother's years of schooling	4.1	3.2	3.7	2.7
Father's job farmer	0.19*	0.37	0.26*	0.42
Married or as if	0.60	0.58	0.66*	0.77
Ever migrated	0.68	0.68	0.67	0.76
Main Occupation				
Potential work experience (years)	14.7*	19.8	15.2*	27.0
	(9.5)	(14.0)	(9.9)	(14.0)
Job specific experience (years)[b/]	6.1*	8.3	7.0*	11.4
	(6.1)	(9.0)	(7.0)	(11.0)
Monthly earnings (intis June 1985)	1,387	1,146	1,222	1,187
	(1,238)	(1,437)	(1,356)	(1,369)

Real hourly wage rate (intis June 1985)	7.09* (6.3)	5.68 (7.0)	7.0* (10.2)	6.0 (6.5)
Usual weekly hours worked	47.4 (14.0)	49.3 (15.7)	48.4 (21.0)	50.6 (21.1)
Months worked last 12 months	9.7 (3.8)	9.4 (3.9)	9.0* (4.3)	10.3 (3.2)
Union in the firm	0.32	0.28		
Has social security	0.62	0.51		
Firm size:				
1 - 20 workers	0.43*	0.55		
21 - 200 workers	0.28	0.23		
201 + workers and State enterprises	0.26*	0.19		
Enterprise total capital (Intis June 1986)			28,3708 (120,297)	27,282 (172,936)
Mobile enterprise			0.49	0.50
Hired labor			0.35	0.25
Family labor			0.38	0.40

Note: [a] t-tests used to estimate differences between workers with and without training in each sector.

* Differences among means are statistically significant at 10 percent level or better.

[b] This variable and the others below refer to the main occupation during the 7 days prior to the interview.

Standard deviations in parentheses.

Training is widespread among male workers in urban areas. As expected, more wage workers receive training compared to the self-employed. In Lima, 28 percent of the wage workers and 17 percent of self-employed workers report post-school training. In OUAs, 21 percent of wage workers and 14 percent of self-employed workers report training. Individuals who pursue training are significantly younger than those who do not, regardless of sector of employment. Males with job-training have significantly more formal schooling than those with no training. The figures indicate that post-school training is mostly pursued by individuals with secondary schooling, followed by those with some post-secondary education. This pattern suggests the existence of a gap between the skills imparted by the secondary school system relative to the skills demanded in the labor market, where training is perceived as a "complement" to formal education. In addition, this pattern

indicates that workers with less than secondary education, who constitute over 50 percent of the urban labor force in Peru, do not receive job-skills from the post-school training system. A comparison between wage and self-employed workers (with and without training) reveals that both groups of workers exhibit similar profiles of educational attainment, and of tenure on the current job[14/].

Regarding socioeconomic background, no significant differences were found between parental schooling of individuals with and without job-training. Nevertheless, trainees seem to come from urban backgrounds rather than from farming environments.

As expected, an overall comparison of hourly wage rates shows that workers with job-training command significantly higher wages in the two sectors. Table 1 also shows similar average wage rates between trained men in the wage and nonwage sectors.

Turning to employment conditions in the wage sector, it appears that trained workers hold "better jobs", even though the mean values for the subsamples are not statistically different. Trainees work in larger enterprises, have a union in the firm, and enjoy greater access to social security benefits. In general, utilizing one classification criterion used in Peru, institutionally trained workers are found mainly in the so-called "formal sector"[15/]. Contrary to expectations, given the content of the most important training programs described in Section II, where most programs addressed improved "production" related skills, no clear patterns emerge from current occupation or industry of employment of wage workers (see Annex B, Table B-1). In fact, higher proportions of "professionals" and "clerical workers" are found among the trainees, while there are surprisingly lower proportions of trained individuals in "production"-related occupations in the manufacturing, construction and transport sectors. In industry of employment there are slightly higher proportions of trained workers than untrained in the manufacturing, mining and financial services sectors. These findings suggest that either the training efforts in the productive sectors (e.g. SENATI in manufacturing, SENCICO in construction, CEFOCAP in mining), are restricted to

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14/ These results differ from earlier characterizations of the urban nonwage sector in Peru. Estimates for 1970 using a definition of non-farm self-employment compatible to the PLSS survey, indicate that workers in the sector had on average 4.4 years of schooling, compared to 7 years among workers employed in the formal sector (Webb, 1975). Table 2 also shows that the mean years of tenure on the current job among the self-employed is similar to that of the wage workers, and on average about seven years. These results do not show the high employment instability, low attachment to one firm, low earnings, characteristics of the urban self-employed sector in the early 1970s (Webb, 1975). In general, it appears that the self-employed sector has undergone substantive changes bewteen 1970 and 1985.

15/ As defined by firm size, legal status benefits, occupational status, and income level criteria. For a review of the discussion on the formal versus informal sector classifications in Peru, see R. Suarez, April 1987.

a very small proportion of the salaried workers in the private sector, or that the individuals are not using the training received in their current jobs. If the latter is the case, then the training received might have been used as a means to move away from productive to service occupations. Note that this apparent lack of matching between training and current job might be also due to the fact that this study covers a ten-year interval, rather than current job-training.

With regard to the self-employed, note that the estimates of monthly income and hourly wage rates presented here are based on the responses to a "summary income" question[16/] where it is uncertain whether returns to other household members' labor and non-labor inputs were excluded. Hence, when examining reported income from the enterprise and the calculated hourly wage rate for the self-employed, it is necessary to keep in mind that it is not clear whether these variables are in fact comparable to those of salaried workers. With respect to characteristics of the enterprise, "total capital" (all physical assets and inventory) seems to be the only variable significantly different between self-employed with and without job-training. Besides assets, both groups appear to operate similar businesses. They run a street business, use family labor, and make similar use of hired labor. As expected, (see Annex B, Table B-2) most of the self-employed were found in retail trade (38 percent). About 47 percent were engaged in production-related occupations, mainly in the manufacturing, transportation and construction sectors. Trainees were mostly found in liberal professions in the finance sector, and in production related occupations in the manufacturing and transport sectors.

2. Participation by Type of Training Institution

An examination in detail of trainees in the wage and nonwag sectors will provide a more comprehensive picture of the training reported. The "time" of the longest training event in the life cycle of urban males, takes place not during or immediately after schooling, but several years after entering the labor force. In fact, less than 2 percent of all male trainees received training while at school, and less than 4 percent immediately after. This result suggests that in the case of Peru, the longest training spell--supposedly the most significant--is received by workers already employed, rather than by new entrants in the labor force.

Table 2 presents a summary of the basic features of the training event recorded by the PLSS, grouped by type of training institution. The criteria for grouping agencies are based on the information on the Peruvian training system overviewed in Section II. Recall that job-based programs (JBP) were defined as those courses received on-the-job or off-the-job in occupational training agencies, and in the military. Post-secondary training programs (PST) include the courses provided by technical institutes and universities. Finally, "academes" (ACT) (proprietary schools) are kept separate because of the large number of wage and self-employed workers who

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16/ The specific question reads: How much money did you make from this activity?

received training in them. The remaining category, "other", includes correspondence courses as well as all other job-training received from unidentified sources. Table 3 also displays some key characteristics of the trainees in regard to the choice of provider.

Table 2
Wage and Self-employed Workers
Data on Longest Course and Trainees by Type of Institutions

Characteristics	Type of Training Institution			
	Job Based (JBP)	Post-sec. Institute (PST)	Academes (ACT)	Other
Number of observations				
Wage workers	136	58	72	28
Self-employed	65	21	47	26
Mean age when trained				
Wage workers	27.1	26.8	24.0	28.8
Self-employed	27.2	21.9	25.3	27.1
Mean years of schooling when trained				
Wage workers	9.7	11.5	9.8	10.0
Self-employed	9.4	11.2	10.2	10.5
Mean years ago training was undertaken				
Wage workers	4.7	4.5	5.0	4.5
Self-employed	5.9	5.8	5.5	6.5
Years between labor force entry and training				
Wage workers	11.1	9.0	7.9	12.3
Self-employed	11.4	4.3	8.7	10.2
Percentage < 3 years in the labor force when trained				
Wage workers	0.14	0.22	0.28	0.35
Self-employed	0.21	0.62	0.32	0.42
Percentage same job as when trained				
Wage workers	0.50	0.43	0.39	0.42
Self-employed	0.46	0.38	0.49	0.38
Percentage received training diploma				
Wage workers	0.63	0.65	0.57	0.71
Self-employed	0.63	0.66	0.65	0.61
Mean hours of training				
Wage workers	505	623	368	273
Self-employed	440	1,104	399	436

In general, the figures of Table 2 show similar profiles between trainees in the wage and nonwage sectors. Job-based programs (JBP) and proprietary institutions (ACT) have the highest demand for job-training among male urban workers. The high proportion of male workers who receive job-training in these "academes" is an unexpected finding. In developing

countries, the role of this type of for-profit proprietary school has been usually discounted as marginal because of low effectiveness by education authorities and planners (Dougherty, 1986). However, and possibly because of their low opportunity cost, they appear to be in high demand. They may provide certain "job-skills" that are not available through the usually free, officially sponsored schemes, or have client populations that have no access to the official training system. It may be that Peruvian ACTs have close links to job-placement services, typical of this type of training institution in developed countries (Freeman, 1974). They may offer part-time or night courses, or have other arrangements that keep students out of the labor market only for a short period of time, or not at all. Table 3 shows that academes provide comparatively shorter courses.

On average, the longest training course received was about 5 years ago, when most participants were in their mid-twenties, and had about 10 years of work experience. Secondary schooling is the lowest level of formal schooling of participants in <u>all</u> types of job-training programs in Peru. This holds true even for trainees in JBP, which are supposed to provide mainly production-related skills. Not surprisingly--since the training event reported is the longest course ever attended--the average length of the training program is quite substantial, particularly in JBP and PST. Consistent with the drop-out figures of the major training institutions (Section II), Table 2 shows that about 60 percent of the trainees completed the course and received a diploma. Finally, the table shows that over 40 percent of the trainees have the same job they held when the training event took place.

IV. DETERMINANTS OF POST-SCHOOL TRAINING PARTICIPATION

This section explores the factors that determine the probability that wage and self-employed workers will receive training, with particular emphasis on the effect of educational attainment. To find out whether schooling and training investments are complements or substitutes would provide an essential piece of information to policymakers. In addition, information on the determinants of individual participation decisions provide policymakers with useful data to appraise the potential effects of their decisions. Finally, self-selection into training courses is a critical methodological issue for the evaluation of the impacts of training programs. First, because the participation decision is endogenous, and second, because training decisions depend on past labor market outcomes. Hence, there is a correlation between the variables in the training, earnings and employment equations before and after training.

In general, the choice of training depends on a comparison of the costs with the present value of expected future earnings associated with each alternative. Since expected earnings vary across individuals according to socioeconomic characteristics, family background and ability, a set of regressors was included (Z) which are likely to affect the decision to train. As for the self-employed, one would expect they have fewer incentives to train than do wage workers in the private sector. First, they must pay the full cost of training. Second, they are likely to benefit more from general training, since their productivity depends not only on productive skills but on their supervisory and organizational skills as well (Fredland and Little, 1981).

In a binary choice[17] model the training choice is defined as:

$$P_1 = f(V_1 + v_1)$$

and the probability of not choosing training is:

$$P_0 = f(V_0 + v_0)$$

In this case,

$$V_1 = Z\gamma_1 \text{ and } V_0 = Z\gamma_0$$

where Z represents a vector of observed characteristics likely to affect the choice of training. Each characteristic affects each alternative differently, as reflected by the choice specific coefficients γ_1 and γ_0 and v_1 and v_0 are randomly distributed error terms. The individual will choose training if:

$P_1 > P_0$, or equivalently if:

17/ Where the dummy variable "P" equal to 1 if training was undertaken between 1975 and the date of the survey.

$$V_1 - V_0 > v_0 - v_1$$

This framework of analysis will be applied first to the probability of training participation, and second to the probability of receiving training from different types of institution.

Previous studies (Ashenfelter, 1978, Ashenfelter and Card, 1985) have shown that participation in training programs depends strongly on labor market performance in the period prior to the training event. Individuals whose earnings have fallen or were abnormally low before training are more likely to enroll in training programs. Unfortunately, past earnings and a complete occupational history are not reported in the data. Nevertheless, by assuming no breaks in either schooling or labor market participation, retrospective information was constructed on labor market experience, schooling and migration of the workers at the time of the choice and ten years ago. The date of the longest training event was known for those who attended a course. Therefore, to find out what their schooling and labor market experience were at the time of the decision was straightforward for this subsample. This information was not available for the non-participant group, since it was not known when they decided not to train. For these cases, the approach of Jimenez and Kugler (1987) in Colombia was used. That is, an assumption was made that the date of the decision not to train was when trained workers of the same age received the longest course. The procedure is as follows. First, estimates were made of the mean age at which each age cohort received training. For example, the cohort of trainees whose age is 20 years obtained training when on average they were 17.2 years old. Second, each of these age-specific means was used to impute the age at which the non-trained decided not to train. In the example, those non-trained whose current age was 20 years, would have made that choice when they were 17.2 years old. Once an age of training choice was imputed for non-participants, their labor market experience, migration, and schooling at the time was calculated.[18/]

The set of explanatory variables used in the model includes estimated formal schooling indicators, labor market experience and migration prior to the training event, and family background. Schooling effects are captured by five dummy variables for the last level of formal schooling completed (see Annex A, Table A-1, for definitions of the variables used in the analysis). These variables are expected to capture changes in the probability of training associated with different levels of schooling. Two proxies for school quality were also included. One of them indicates whether the last school attended was public or private, and the other indicates whether the individual received free meals at the last primary school attended.

18/ The age at which formal schooling was completed for those who have at least high school was used to test the sensitivity of the estimates to this assumption, using the mean for the rest. The results obtained with this alternative assumption were similar to those of the participation model estimated here.

Workers in the PLS3 sample participated in training long after they entered the labor market, and on average, over 5 years before the date of the survey. Therefore, it was apropriate to consider labor market factors that made this alternative an optimal choice to maximize earnings potential at the time the decision was made. The following proxies included in the model are expected to capture individual's labor market performance at that time. First, three dummy variables indicating the occupational status of each individual ten years ago: self-employed, wage workers, still in school. Second, a dummy variable indicating whether the individual was a new entrant to the labor force at the time of training. Finally, the total number of years of potential work experience before training.

Socieconomic background is proxied by father's years of schooling, by a dummy variable equal to 1 if the father's occupation most of his life was farming, and by dummies for non-city place of birth, and by migration at the time of training. These variables are expected to capture the impact of socioeconomic and family environment on individual preferences for job-training. The inclusion of the vector of family background variables in the decision to train, may bias the true relationship between schooling and training because these variables also determine school attainment. However, a comparison of the results of the model with alternative specifications without the vector of background variables did not reveal such a bias.

1. Wage Workers

Table 3 presents the results of the participation model. The first column shows the probit coefficients. In order to be able to interpret the coefficients as the change in the probability of receiving training associated with a unit of change in the explanatory variable, the second column shows the estimated marginal effects of the independent variables on the likelihood of receiving training. Given the non-linearity of the probit model, these marginal effects are not constant. Here, they were evaluated at the mean probability in the sample.[19/]

19/ This marginal effect is given by $\Phi \beta$ (Xi), where β is the probit coefficient on a particular variable, and Φ is the cumulative density function of the standarized normal for the average individual in the sample.

Table 3
Wage Workers: Selection into Training

Independent variables	Probit coeff.	Marginal effect[a]
Constant	-1.460* [0.22]	-0.545*
New entrant in LF	-0.395*	-0.153*
at the time	-0.153* [0.11]	
Potential experience at the time (years)	0.027* [0.006]	0.010*
Salaried worker 10 years ago	-0.487* [0.11]	-0.189*
Student 10 years ago	-0.0221 [0.11]	-0.008
Some secondary schooling (6-9 years)[b]	0.662* [0.15]	0.257
Secondary schooling completed (10 years)	1.340* [0.15]	0.520*
Some post-secondary schooling (11-13 years)	1.610* [0.16]	0.625*
Post-sec. schooling complete (14+ years)	1.119* [0.18]	0.434*
Last school attended was public	-0.180 [0.11]	-0.069
Received free meals last primary school schooling	0.295* [0.09]	0.114*
Father's occupation farmer	-0.346* [0.11]	-0.134*
Father's years of schooling	0.004 [0.01]	0.001
Born in country side, village or town	0.062 [0.13]	0.024

Never migrated	-0.402* [0.09]	-0.156*
Lima	0.149 [0.09]	0.057
-2 log likelihood	569.71	
No. observations	1,259	

Note: a/ Evaluated at the mean probability in the sample.
b/ Excluded category is primary schooling.
* Statistically significant at the 10 percent level or better.
Standard errors in brackets.

Table 3 shows that among wage workers the probability of receiving occupational training is strongly determined by the level of school attainment. Increases in formal education raise the training likelihood. For the average person in the sample, those who have completed secondary school or more have the highest probability of enrolling in training courses. These results support the hypothesis that training is a "complement" to formal education, particularly at the secondary and post-secondary level. They also suggest that the "quality" of the education received matters for participation in training. A possible interpretation of these findings is that excess demand for higher education is directed into training programs. However, as seen earlier, workers do not undertake job-training immediately after leaving school, but delay the job-training experience for several years. It is also possible that these findings reflect a gap between the skills imparted by the secondary school system and the skills required in the labor market for some jobs and pay levels. As a third interpretation, the screening hypothesis would argue that it is the search for "certification" that motivates these individuals to seek job-training. If the attainment of a certificate were a criterion to enter job-training, those who do not have a formal education "diploma" would have a significantly higher probability of enrollment in training programs. However, the inclusion of school diplomas in the participation model does not lend support to this hypothesis[20/].

As seen in Table 3, more experienced workers have a higher likelihood of participation in training programs. This likelihood is significantly lower for new entrants in the labor force. That is, workers with less than three years of experience at the time, have a chance of participating in training about 15 percentage points lower than that of more experienced workers. Those who already had wage employment ten years ago also consistently, exhibit lower probability of participation in training courses relative to those unemployed, self-employed or out of the labor force. The opportunity costs of job-training are likely to be highest for those already in wage employment. In addition, it is possible that these workers fail to

20/ This was tested for secondary-technical, post-secondary, and university diplomas.

report the informal or non-institutional training they may have obtained in their jobs. Those who were students ten years ago also exhibit a lower probability of participation in training. In general, these findings suggest that the choice of investment in job-training in Peru is largely a "career choice" made by experienced workers in order to improve opportunities in the workplace.

Even though most workers undertake training well into their working lives, the impact of background variables on the participation decision is strong. In contrast with results for Colombia (Jimenez and Kugler, 1987), the father's education has no significant impact on the decision to participate in training programs among salaried males in urban Peru. However, individuals whose fathers were farmers most of their lives are less likely to enter training courses. The other proxies show the relative disadvantage of individuals of rural origin regarding chances to train. Finally, that there is no difference in the likelihood of receiving training between those who live in Lima and in OUAs.

In order to further explore the relationship between schooling and training, the participation model is applied to the choice of different types of institution: those offering job-based programs (JBP) or post-secondary training programs (PST), and academes (ACT). Table 4 summarizes the estimated marginal effects of different levels of school attainment on the probability of training by type of institution, evaluated at the mean probability of the sample.

Table 4
Wage Workers: Effects of Educational Attainment on the Probability of Training by Type of Institution

Educational Attainment	Job Based (JBP)	Post-secondary Training (PST)	Academes (ACT)
Some secondary[a/] (6-9 years)	0.095 (1.52)	0.265 (1.57)	0.065 (0.91)
Secondary complete (10 years)	0.302* (5.10)	0.529* (3.59)	0.133* (1.89)
Some post-secondary (11-13 years)	0.160* (2.00)	0.754* (4.88)	1.145* (2.87)
Post-secondary complete (14+ years)	0.114 (1.39)	0.583* (4.35)	-0.003 (0.97)

Notes: [a/] Excluded category is primary schooling.
* Statistically significant at the 5 percent level or better.
t values in parentheses.

The table shows that the strong complementarity between educational attainment and training found earlier applies to all institutions. In fact, formal schooling is an important determinant of the probability of participating in the programs offered by all providers. However, some specific patterns appear by type of provider. Compared with the omitted group--primary school leavers--the probability of receiving training from a JBP is highest for employees with completed secondary education, followed by those with some post-secondary schooling. As expected, given the entry requirements, those with more than secondary education have the highest likelihood to receive training from a PST. Even though formal schooling shows a relatively lower impact on the probability of receiving training from ACT, its effect is still different from zero.

The labor market variables, not shown in Table 4 because they basically parallel findings reported in Table 3, have the strongest effect on the likelihood to receive training from a JBP. As expected, given that many of these programs are directly related to the employer, being a new entrant in the labor force decreases the probability of receiving JBP by 6 percent. Potential labor market experience shows a negative effect on the probability of training in an ACT, suggesting that new entrants to the labor force are more likely to train at academes. The lack of job experience entry requirements for ACT programs may be part of its appeal.

2. Self-employed Workers

Table 5 presents the results of estimating the participation model. As before, the marginal effects are evaluated at the mean probability in the sample. The participation decision of the self-employed is presumed to be determined by the same earnings maximization objective as the salaried workers. In addition to the regressors described earlier, an additional dummy variable "enterprise age" with the value of 1 was included to denote that the household operated the business before the particular individual began to work in it. This variable may be expected to have a negative effect on the probability of training for two reasons. First, an individual who took over an established family business is likely to have inherited customers, suppliers, etc., thereby reducing the potential benefits of training. Second, the presence of accumulated skills in a long existing enterprise may afford opportunities for informal training (apprenticeship) and this may act as a substitute for institutional training.

Table 5
Self-Employed Workers: Selection into Training

Independent variables	Probit coeff.	Marginal effect
Constant	1.232 [0.26]	-0.486
Potential experience	0.026* [0.002]	0.010*
Enterprise age	-0.215* [0.10]	-0.084*
Student 10 years ago	0.284* [0.16]	0.111*
Self-employed 10 years ago	0.356* [0.12]	-0.140*
Secondary schooling complete (10 years)[a/]	0.638* [0.13]	0.248*
Some post-secondary schooling (11-13 years)	1.091* [0.17]	0.428*
Post-sec. schooling complete (14+ years)	0.620* [0.20]	0.245*
Last school attended was public	-0.172 [0.15]	-0.067
Received free meals last primary school	0.234* [0.11]	0.009*
Father's years of schooling	0.007 [0.01]	0.003
Father's occupation farming	-0.021* [0.12]	-0.086*
Born in country side, village or town	-0.175 [0.15]	-0.068
Never migrated	-0.101 [0.11]	-0.039
Lives in Lima	0.095 [0.11]	0.037

Log likelihood	-368.84
No. observations	925

Notes: a/ Excluded category is less than secondary.
* Statistically significant at the 10 percent level or better.
Standard errors in brackets.

As in the case of wage workers, the figures of Table 5 suggest a strong complementarity between secondary schooling and participation in occupational training. Also, the more experienced self-employed have a higher likelihood of training, and those who were already in non-farm self-employment ten years ago are less likely to have undertaken training. As expected, those self-employed who did not initiate the business--those who work in an existing family business--exhibit a lower probability of participating in training courses. Finally, those individuals who were students ten years ago appear to be more likely to enroll in training courses than those already in the labor force.

Given the small number of observations by type of provider in the self-employed sample, no estimate was made of the impact of educational attainment on the probability of training by type of institution.

V. THE ECONOMIC IMPACT OF TRAINING

The objective of this section is to estimate the labor market outcomes of job-training for workers in the wage and nonwage sectors, testing the hypothesis that training increases workers' productivity measured in an actual increase in earnings. Also explored is whether the effect of training on wages (if any) is due to productivity gains or to the presence of a credentialism effect. In this analysis examined first are workers in the wage sector, and second, workers in the nonwage sector[21/]. The definition of the variables used in this analysis can be found in Annex A, Table A-1.

The results of this exercise have several policy implications. From society's point of view, if training enhances the productivity of labor there are net social gains. Therefore, government support to job-training programs can be justified. If, however, training is a screening device, then it does not have any impact on social productivity. While more productive individuals command higher salaries, this is a function of their innate ability rather than of training. Moreover, there is a negative overall impact on society because social output falls by an amount equal to the direct and indirect costs of that training. Given that most training schemes in Peru are financed with public resources (payroll and sales taxes), to assess the effect of training is a critical issue for policy-making. If no enhancement in productivity is found, then investing in or subsidizing these schemes can only be wasteful. In that case, the financing arrangements of the training subsector established in the early 1970s should be modified.

Since earnings are observed for wage and self-employed workers, the general form of the wage equation for individuals with and without training in each sector can be expressed as:

$$\begin{aligned} \ln W_1 &= \beta_1 X + \alpha T + u_1 \\ \ln W_2 &= \beta_2 X + u_2 \end{aligned} \qquad (1)$$

where W_i denotes the wage rate of individual "i" in each group, X represents observed characteristics that determine wage rates, β is a vector of parameters, α is the post-training earnings coefficient, and u is a normally distributed stochastic error. The human capital model of the wage

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21/ Research on the labor market effects of training for Peruvian women found that training has a significant and positive effect on employment status. (Arriagada, 1988) To examine employment effects of training among males, a sector of employment multinomial logit model was estimated on the probabilities of employment in the wage private or self-employed sectors, relative to working for the public sector, working with no pay, or not working at all. The results of this estimation (not reported here) show that job-training does not have any effect on the choice of sector of employment among urban men in Peru. That is, receiving job-training does not increase individuals' probability of obtaining a job in the private sector or of becoming self-employed in the nonwage sector.

function (Becker 1964, Mincer 1974) can be represented by the following functional form:

$$\ln W = \delta + \beta S + \rho X + \kappa X^2 + \alpha T + u \qquad (2)$$

where LnW is the hourly wage rate, S is years of schooling, X is labor market experience, T is a dummy variable equal to 1 if the individual received training, 0 otherwise, and u is the error term N(0,1). In this simple model "α" reflects the effect of training on the wage rate. Wages are increased by a constant amount after receiving training. It is equally plausible that training could enhance wage growth, and trained workers would exhibit steeper age-earnings profiles than those of workers without training. The difference of age-earnings profiles is greater, the greater the cost of, and returns from the investment in training (Becker, 1964).

However, ordinary least squares (OLS) estimates of (2) will be inconsistent if participation in post-school training is not random. That is, the observed choice is not exogenous but may be an "optimal choice" of the earnings maximizing individual. The workers who received training would have had different wages from those of the workers who did not train, even in the absence of post-school training. Here, the problem of selection bias arises when the decision to train is not random with respect to the error term of the wage equation. This may arise for two reasons. First, the unobserved characteristics partly determine participation in job-training, and that choice truncates the error term in the wage equation. Second, there may be dependence between the observable determinants of the participation decision and the error term in the wage equation (Heckman and Robb, 1985).

To account for self-selection the Heckman's two-stage estimation method is used (Heckman, 1979). In the first stage, the probability of training equation was estimated as defined in Section IV. Then, the selectivity factor lambda (λ, inverse of the Mills ratio) is included as a regressor in the wage equation. With this correction, the estimates of the wage equation take into account differences in individual probabilities of undertaking training.

The wage functions for the trained and untrained group becomes:

$$\ln W_1 = \beta^1 X + \frac{\sigma_{1v}}{\sigma 11} \lambda_1 + u \qquad (3)$$

$$\ln W_2 = \beta_2 X + \frac{\sigma_{2v}}{\sigma_{22}} \lambda_2 + u$$

where σ_{11} is the standard deviation of u_i, u = trained, not trained, σ_{iv} is the covariance between u_i and v. And,

$$\lambda_1 = \frac{\phi (Z \gamma^1)}{F(Z\gamma^1} \qquad \text{and} \qquad \lambda^2 = \frac{-\phi (Z \gamma^2)}{1-F(Z\gamma^2)}$$

where ϕ is the cumulative distribution function, and F is the normal density function. With this procedure the coefficient of the training

variable will show the true effect of training on wage rates by holding the probability of participation in training constant.

The wage equation follows the human capital literature where schooling, participation in job-training programs and work experience are expected to have a positive effect on earnings because they enhance individual workers' productivity. The proxies for formal education are three splines for years of schooling at primary, secondary and post-secondary levels, and public school attendance. Work experience is proxied by years of tenure in the current job, and by the usual measure of years of potential work experience. The empirical specification extends the standard model to include several personal and family background factors, as well as place of residence in order to capture regional differences in cost of living. The analysis of the effects of training in the nonwage sector also includes business' total capital, number of hired workers, and number of family workers. The effect of job-training on wage rates is estimated by the set of dummy variables defined in Annex A, Table A-1.

1. Wage Workers

Table 6 presents estimates of the wage model adjusted for self-selection in training courses for the pooled sample of salaried workers. For comparative purposes OLS estimates are also presented. Annex C, Table C-1 presents separate estimates of the subsamples of workers with and without training.

Table 6
Wage Functions for Wage Workers OLS and Selectivity Adjusted

Independent variables	Selectivity Adjusted (1)	Simple OLS (2)
Constant	-0.350*	-0.356*
	(2.48)	(2.52)
Potential experience	0.038*	0.040*
	(5.27)	(5.76)
Potential experience squared	-0.0004*	-0.0004*
	(3.41)	(3.62)
Tenure on current job	0.038*	0.036*
	(4.84)	(4.62)
Tenure on current job squared	-0.0009*	-0.0008*
	(3.79)	(3.59)
Spline primary	0.080*	0.080*
	(2.78)	(2.79)

Spline secondary	0.059* (3.91)	0.071* (5.88)
Spline higher	0.119* (8.54)	0.117* (8.37)
Last school attended was public	-0.060 (1.01)	-0.074 (1.25)
Father's years of schooling	0.028* (4.14)	0.028* (4.20)
Mother's years of schooling	0.021* (2.92)	0.022* (2.93)
Married or as if	0.176* (3.33)	0.173* (3.27)
Lima	0.162* (3.90)	0.170* (4.10)
Lambda (λ)	-0.132 (1.38)	
Training dummy	0.135* (2.13)	0.128* (2.64)
R^2 adjusted	0.382	0.380
Mean depend. variable	1.398	1.398
No. observations	1,259	1,259

Notes: * Statistically significant at the 10 percent level or better.
t-values in parentheses.

Table 6 shows that participation in job-training programs has a positive and significant effect on the wage rates of private sector employees. Training increases wage rates by over 10 percent after controlling for the effects of schooling, work experience, background, and even the probability of entering training courses.

With regard to schooling, the rate of return to an additional year of schooling decreases between primary and secondary education, and then increases between secondary and post-secondary education. Regarding the selectivity factor, the estimated coefficient on λ is not significant[22/]

22/ See λ for each subsample in Annex C, Table C-1.

indicating that despite the observed differences between workers with and without training, there is no evidence of the impact of unobserved self-selection in the determination of the observed average wage rates. Consistently, a comparison of the selectivity corrected and the simple OLS estimates shows that most coefficients do not experience significant changes as a result of accounting for self-selection in training.

It could be argued that institutional features of the labor market may determine the higher average pay of trained workers because they acquire better jobs. However, estimates including firm size and unionization do not lend support to that interpretation.[23/] Given that urban areas outside Lima include a collection of cities[24/] of different degrees of urbanization, significant regional biases could arise. However, estimates controlling by city size did not verify the presence of such biases. An alternative explanation, tested below, suggests that trained workers may be paid a wage premium as a consequence of employers' efforts to attract more qualified workers.

In general, the figures of Table 6 are indicative of the strong influence of parental schooling on workers' wage rates, as might be expected in a country stratified along socioeconomic and cultural lines such as Peru. Each additional year of father's and mother's schooling increases the son's wage rate by 3 and 2 percentage points respectively. Marital status also has a positive impact on the wages of workers with no training suggesting that employers may use this information as an indicator of reliability and job commitment.

There is some evidence (Greenhalgh and Stewart, 1987, Lillard and Tan, 1986) that the skills acquired through job-training depreciate within a decade or so. To detect over time erosion of the training effect, the timing of the training course was included in the wage functions. Two proxies were tested: the number of years since the training event, and a dummy equal to 1 if training was undertaken after 1980. Contrary to expectations, the estimates did not indicate that the effect of training on wage rates erode over time. Nevertheless, this outcome should be examined cautiously because this accounts for only the longest course. The proxies may be also capturing the effects of shorter courses taken during these years, which could conceal the depreciation of training over time.

23/ The firm size variables (see Table 1) were tested at different levels of aggregation without significant results in any specification or sample. Having a union in the firm, did not show any impact on wage rates either.

24/ There are 13 cities ranked by size as follows: Arequipa (over 500,000 inhabitants), Trujillo (over 400,000 inhabitants), Chiclayo and Chimbote (over 300,000 inhabitants each), Piura, Ica, Tacna, Cajamarca, Huancayo, Cuzco, Puno, Iquitos and towns around Lima, each with less than 200,000 inhabitants.

The relationship between wage rates and general and specific job experience exhibit the expected significance and behavior. In order to investigate the relationship between specific training and other forms of human capital investment, interactive models were tested on the experience and schooling variables with participation in job-training (in general and by source). Whether the interactive terms increase or decrease the effect of training indicates complementarity or substitutability between these factors, respectively. The results of this exercise did not provide enough evidence to draw general conclusions. However, there are three particular findings worthy of mention. First, there is significant substitutability between higher education and post-secondary training. Second, there appears to be significant complementarity between training in job-based programs and job-specific experience. Third, there appears to be significant complementarity between potential experience and academes training. (See estimates in Annex C, Table C-2.)

Training Effects by Type of Training Institution

This section discusses whether training received from the various types of institution yield different labor market outcomes. The objective is to detect whether the various types of institutional training arrangements existing in Peru have different degrees of effectiveness in increasing wage rates. The specification of the wage model reported here replaces the original training variable by three dummies indicating the source of training. Training institutions were grouped according to the classification presented in Section II. They are: JBP to indicate if the individual received training in a job-based program, PST to indicate if training was received in a post-secondary training program, and ACT to indicate if the individual trained in an academe. Table 7 column 1 displays selectivity adjusted estimates and column 2 displays OLS estimates.

Table 7
Wage Functions by Type of Training Institution
Salaried Workers

Independent	Selection Adjusted (1)	OLS (2)
Constant	-0.338*	-0.353*
	(2.40)	(2.49)
Potential experience	0.039*	0.040*
	(5.53)	(5.67)
Potential experience squared	-0.0004*	-0.0004*
	(3.45)	(3.55)
Tenure on current job	0.035*	0.036*

	(4.59)	(4.64)
Tenure on current job squared	-0.0008*	-0.0008*
	(3.64)	(3.62)
Spline primary	0.080*	0.080*
	(2.81)	(2.80)
Spline secondary	0.072*	0.072*
	(5.74)	(5.96)
Spline higher	0.115*	0.114*
	(8.18)	(8.07)
Job based training	0.132*	0.141*
	(1.70)	(2.17)
Post-secondary training	0.200*	0.266*
	(2.03)	(2.77)
Academe training	-0.060	-0.029
	(0.70)	(0.34)
Lima	0.174*	0.172*
	(4.23)	(4.15)
Last school attended was public	-0.076	-0.071
	(1.30)	(1.21)
Father's years of schooling	0.029*	0.028*
	(4.22)	(4.19)
Mother's years of schooling	0.021*	0.022*
	(2.88)	(2.97)
Married or as if	0.176*	0.179*
	(3.33)	(3.38)
Lambda(λ)	0.019	
	(0.44)	
R^2 adjusted	0.384	0.383
No. observations	1,259	1,259

Notes: * Statistically significant at the 10 percent level or better.
t- values in parentheses.

To avoid repetition, the discussion that follows refers only to the training variables. Table 7 shows that the various types of institutional arrangements providing post-school training in Peru have different impacts on

wages. Thus, training received in a job-based program (JBP) raises wage rates by over 10 percentage points, and training received in a post-secondary training program (PST) raise wage rates by over 20 percentage points. In contrast, training received in academes does not have any significant impact on wage rates. These results suggest that training provided by job-based and post-secondary organizations are effective means to enhance wage rates while "academes" seem to be ineffective. The lack of impact of academes on wages is rather surprising. Because they are a for-profit operation, their success would be presumed to depend directly on the labor market performance of their trainees. Possily academes provide benefits other than through wages; perhaps they are ineffective, but people do not find that out easily, and so take courses because of their low cost. The data available in the Peruvian survey do not allow more detailed examination of these issues not permitting conclusions as to whether the government should intervene in these organizations. However, given the proportion of workers that seek training in these institutions in urban Peru, and the lack of information on their activities, they should be the subject of further research. The expansion of similar proprietary training institutions seems to be a matter of concern for the training subsectors of Colombia and Brazil (Dougherty, 1986).

The Effect of Certification

In this section the distinction between the effect of receiving training with or without a certificate on wage rates is explored. Unlike the case of formal education, there are training programs which do not provide a diploma to trainees upon completion, and the PLSS data do not distinguish between completers without certificates and drop-outs. Therefore, only tentative conclusions can be reached with regard to the effect of training certification. A significant effect of diplomas may indicate that training not only increases workers' productivity, but also provides a "signal" to employers to select potentially more productive workers. Holding a certificate may differentiate individuals by innate "ability". If certificate holders actually learn more in a training program than dropouts, holding a diploma may also indicate a true training effect.

The effect of credentials is estimated by replacing the original training variable by two dummies indicating job-training with and without a certificate[25/]. Table 8 presents two specifications of the basic wage model. The first specification (1) includes the training-certificate dummies. Specification (2) adds total hours of training received in the longest course as a means to control for the effect of intensity or amount of training received. As before, OLS and selection adjusted estimates are presented.

25/ When both dummies are zero, the untrained group is selected. See definitions in Annex A, Table A-1.

Table 8
Wage Functions and Certification Effect: Salaried Workers

Independent variables	Selection Adjusted Model (1)	Selection Adjusted Model (2)	OLS Model (1)	OLS Model (2)
Constant	-0.354*	0.354*	-0.352*	0.354*
	(2.52)	(2.52)	(2.49)	(2.49)
Potential experience	0.038*	0.038*	0.040*	0.040*
	(5.29)	(5.30)	(5.72)	(5.72)
Potential experience squared	-0.0004*	-0.0004*	-0.0004*	-0.0004*
	(3.42)	(3.40)	(3.60)	(3.60)
Tenure on current job	0.037*	0.037*	0.035*	0.035*
	(4.75)	(4.76)	(4.57)	(4.58)
Tenure on current job squared	-0.0009*	-0.0009*	-0.0008*	-0.0009*
	(3.70)	(3.71)	(3.54)	(3.55)
Spline primary	0.078*	0.079*	0.079*	0.079*
	(2.74)	(2.75)	(2.75)	(2.76)
Spline secondary	0.058*	0.058*	0.071*	0.071*
	(3.63)	(3.60)	(5.89)	(5.84)
Spline higher	0.116*	0.117*	0.115*	0.118*
	(8.31)	(8.34)	(8.18)	(8.20)
Dummy training without diploma	0.238	0.219	0.029	0.011
	(1.23)	(1.12)	(0.40)	(0.14)
Dummy training with diploma	0.395*	0.374*	0.188*	0.169*
	(2.13)	(1.99)	(3.24)	(2.63)
Hours longest course (/1000)		0.039		0.040
		(0.69)		(0.70)
Last school attended was public	-0.050	-0.051	-0.066	-0.066
	(0.85)	(0.85)	(1.12)	(1.12)
Father's years of schooling	0.028*	0.029*	0.028*	0.028*
	(4.23)	(4.24)	(4.16)	(4.17)
Mother's years of schooling	0.022*	0.022*	0.022*	0.022*
	(3.02)	(2.99)	(3.00)	(2.97)
Married or as if	0.174*	0.173*	0.172*	0.172*
	(3.29)	(3.28)	(3.23)	(3.23)

Lima	0.165*	0.164*	0.173*	0.173*
	(3.92)	(3.92)	(4.18)	(4.16)
Lambda (λ)	-0.128	-0.129		
	(1.15)	(1.16)		
R^2 adjusted	0.383	0.385	0.384	0.383
Mean dependent variable	1.398	1.398	1.398	1.398
No. observations	1,259	1,259	1,259	1,259

Notes: * Statistically significant at the 10 percent level or better.
t-values in parentheses.

Both specifications show a significant effect associated with receiving training and a diploma. This effect remains significant even in the presence of amount of training received (measured in hours).[26/] This result may be indicating a certification effect, a learning effect if completers learn more per hour of training than drop-outs do, and a completion effect if the nature of the training program is such that individuals need to conclude the program before mastering the skills taught. Training without diploma does not show an impact on wage rates. Since this category includes completers as well as drop-outs, the implications of this finding are unclear. A reestimation of these models for each of the sources of training (not shown here) indicates that the impact of certificates varies by provider. Receiving training and a diploma in a PST program was found to increase the wage rate by over 30 percentage points, while receiving training and a diploma in a JBP was found to increase the wage rate by about 15 percentage points.

2. Self-employed Workers

Because of the difficulties in obtaining a reliable measure of income from non-farm self-employment activities, this section not only estimates the effects of training on the hourly wage rates of the self-employed, but also estimates the effects of training on their enterprise's profits. First wage functions estimates using self-reported earnings are presented, followed by estimates of profit functions using enterprise level information.

26/ Hours of the longest training course is likely to be a poor proxy for actual training received. Results similar to these were obtained in Colombia when using data on hours of training in SENA from a labor force survey (Encuesta de Educacion y Fuerza de Trabajo, CCRP, 1975) while results of specially designed training surveys indicated otherwise (Reyes y Gomez, 1979). Additional attempts were made to test the effect of length of training on hourly wage rates. In spite of the various linear and non-linear forms used, no evidence of the impact of training duration on wages was found.

The self-employed did not report the value of earnings by component, but only the nominal value of the "total earnings" obtained from the business[27]. This self-reported "business income" may be inaccurately measured for several reasons. First, it is not certain whether it reflects income earned by the individual or by all individuals working in the enterprise. Second, this income is likely to be biased, because most family businesses do not keep detailed records of costs and revenues; because they carry out a significant amount of non-monetary transactions with their customers and suppliers; and because there is an important amount of consumption by the household of enterprise goods and services.

In addition to the problems of measurement of the dependent variable, the specification of the wage equation for the self-employed differs from that of employees for at least two reasons. First, the wage equation for the self-employed should separate the returns to physical capital and assets, and separate other labor inputs (mostly family labor) from the returns to the self-employed individual's human capital. Second, the wage equation for the self-employed should account for managerial ability and risk taking[28].

Table 9 presents OLS and selection corrected estimates of the wage model. In addition to human capital, family background and location variables, a vector of enterprise characteristics is included: total capital, the number of hired workers in the business during the period the reported income was generated, and the number of other household members who worked in the business during the same period. The business variables are expected to have a significant impact on wage rates, accounting for the role of physical factors of production and other labor inputs. They are also expected to lessen potential biases on the parameter estimates of the human capital

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27/ See definition in Annex A, Table A-1.

28/ Evidence on the relationship between formal education and earnings among non-farm self-employed workers is not abundant, partly due to difficulties of separating returns to labor and to non-human assets. Empirical studies using the earnings function approach do not provide consistent results. Chiswick (1976) reports that the rates of return to education in the self-employed sector are lower than those in the wage sector. Fields and Schultz (1982) find little difference in the returns to human capital variables between the two groups of workers. Henderson (1982) compares individuals performing similar jobs and finds that the returns to schooling for the self-employed are equal to those of wage workers. Blau (1986) finds that formal education is apparently not advantageous for the self-employed, while wage workers exhibit the expected returns to schooling. Psacharopoulos, Arriagada and Velez (1987) find that returns to education are similar for self-employed and salaried workers. In general, applications of the earnings function framework to the self-employed have not performed well in identifying the determinants of non-wage non-farm income (Chiswick, 1976; Henderson, 1982; Vijverberg, 1985; Blau, 1986; Soon, 1987). Other research has used the self-employed as the non-screened sector to test whether schooling enhances productivity (Wolpin, 1977; Psacharopoulos, 1980; Jamison and Lau, 1982, Jamison and Moock, 1984).

variables. Annex C, Table C-3 presents separate estimates of the subsamples of individuals with and without training.

Table 9
Wage Functions for Self-employed Workers
OLS and Selectivity Adjusted

Independent variables	Selectivity Adjusted	Simple OLS
Constant	0.032 (0.16)	0.342 (0.17)
Potential experience	0.038* (4.22)	0.037* (4.07)
Potential experience squared (/100)	-0.060* (3.89)	-0.060* (3.79)
Tenure on current job	0.005 (0.60)	0.009 (0.96)
Tenure on current job squared (/100)	0.009 (0 38)	0.003 (0.13)
Spline primary	0.036 (1.10)	0.040 (1.20)
Spline secondary	0.064* (3.39)	0.051* (2.95)
Spline higher	0.073* (3.50)	0.067* (3.21)
Last school attended was public	-0.073 (0.82)	-0.001 (0.02)
Father's years of schooling	0.008 (0.79)	-0.049 (0.55)
Mother's years of schooling	0.028* (2.52)	0.007 (0.64)
Lives in Lima dummy	0.124* (2.13)	0.027* (2.41)
Total capital of enterprise (/1,000)	0.056* (5.59)	0.111* (1.90)
Number hired workers	0.023*	0.056*

in enterprise	(2.23)	(5.52)
Number family workers in enterprise	-0.003 (1.24)	0.025* (2.34)
Training dummy	-0.450 (1.56)	-0.003 (1.12)
λ selectivity factor	0.266 (1.62)	
R^2 adjusted	0.171	0.170
Mean dependent variable	1.402	1.402
No. observations	925	925

Notes: * Statistically significant at the 10 percent level or better.
t- values in parentheses.

As seen in Table 9, the wage-function approach does not perform well in explaining variation of self-employment earnings, in spite of the inclusion of enterprise characteristics in the model. The coefficients on enterprise variables confirm that in fact some of the self-reported income is return to non-labor inputs.

A comparison of these estimates with those for the wage workers (Table 6) shows significant differences in the earnings structure of wage and self-emplomet activities, in the role of schooling in earnings determination, in the age-earnings profiles of the workers in each sector, and in the impact of job-training on hourly earnings. Compared to the returns to schooling of the sample of wage workers, these results indicate that the self-employed have significantly lower returns to primary and post-secondary education, and similar returns to secondary education. The returns to potential experience exhibit the expected life-cycle shape, and its impact on earnings seems to be similar to that found among wage workers. However, the returns to job-specific experience are not significant, implying that tenure on the current job does not increase productivity as measured by hourly wages. It could be argued that this flat job-specific experience-earnings profile is due to the lack of on-the-job investment among the self-employed. Alternatively, the lack of impact of tenure on wage rates could be due to a large number of the self-employed performing jobs that by definition do not require any skill development. Prior evidence (Henderson, 1982, Teihlet-Waldorf and Waldorf, 1983) suggests that both arguments hold in the case of street vendors, but not in the case of other self-employed.

Table 9 also shows no effect of job-training on self-employed wage rates. There are several possible interpretations of this finding. First, because of the variety of roles this group of workers perform operating a business (allocative, supervisory, etc.) they do not benefit from occupation-

specific training[29]. Second, the positive effect of training might be dampened by the presence of a large group of "retail vendors and hawkers". However, estimates excluding the group of vendors did not alter the results presented in Table 10. Third, the relationship of wages and education and training for the self-employed may be highly nonlinear for the highest levels of education. Bourgouignon (1980), and Fredland and Little (1981) argue that estimates of the returns to education for the self-employed are biased if a sample dominated by vendors and peddlers includes a few highly-educated high-income professionals (lawyers, physicians, and the like). However, when professionals were excluded from the sample the results in Table 9 again did not change. Fourth, job-training may have an indirect effect on wage rates through its relation with other variables. Specifications including interaction terms of training with schooling, job tenure, and general experience were estimated. However, the results obtained do not verify any such argument. In spite of these interpretations, the issue of why self-employed individuals would choose to receive training remains, with no satisfactory answer. These workers might have invested in training while in previous salaried employment, or in the hope of obtaining employment in the wage sector. The persistent instability of the Peruvian economy may provide individuals with additional incentives to train, where training for alternative jobs may be taken as a hedge to cope with the chronic recession, unemployment, and rapid inflation experienced by Peru since the mid 1970s.

With regard to business characteristics, a strong and positive impact of total capital and hired labor was found on hourly wage rates. Each additional worker in the business increases the hourly earnings of the self-employed by over 2 percent. Bearing in mind that the amount of labor hired is likely to be correlated with the success of a business, this variable could be capturing the effect of unobservable individual endowments such as managerial ability and personal drive. Consistently, family workers do not seem to make a contribution to the self-employed income in the enterprise. It is unclear whether this lack of contribution of family workers to the enterprise income arises from their low productivity, or to the manner in which income is shared in the household[30]. Finally, ceteris paribus, wage rates are higher in Lima. This may reflect not only cost of living differences, but wage differentials associated with different occupational structures of self-employment activities in Lima and other cities.

A comparison between selectivity adjusted and the OLS estimates reveals some change in several coefficients. First, the returns to secondary

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29/ Fredland and Little, 1981 expect the self-employed to have fewer incentives to get occupation-specific training than do wage workers in the private sector. First, they must pay the full cost of training. Second, they are likely to benefit more from general training, since their productivity depends not only on productive skills but on their supervisory and organizational skills as well.

30/ For a detailed discussion of non-farm family businesses see, Moock and Stelcner, "Education and Earnings in Peru's Informal Non-farm Family Enterprises", 1988 (forthcoming).

and post-secondary schooling increase after adjusting for the probability of training participation. Second, the wage advantage of Lima rises after taking into account self-selection. These results could be expected given that the estimated coefficients on the selectivity variable, λ, show the presence of selectivity bias in the estimates for workers with no training. See Annex C, Table C-3[31/].

Profits and Training

As pointed out earlier, the PLSS gathered information not only at the individuals' level but at the household level. For those households with non-farm self-employment activities during the year prior to the survey, we have information on the characteristics, revenues, expenses, and assets of the businesses operated by the self-employed individuals under analysis.

To test whether "measurement" problems in self-reported hourly wage rates contribute to the results obtained thus far, this section estimates the impact of education and job-training on the natural log of monthly profits per hour. This variable was computed from revenues and expenditures of the enterprise so as to be fully comparable to hourly wage rates. The analysis is restricted to those enterprises operated by one worker that had positive profits at the time of the survey or during the last month they were in operation. These are 331 individuals who represent about 36 percent of the overall sample of self-employed. Individuals in one-worker enterprises show, on average, similar education, job tenure, and labor supply behavior to that of the full sample during the last 12 months[32/]. Few features appear to distinguish them significantly from the rest of the self-employed: they are, on average, 2 years older; and as expected, have less physical capital in the business. They were found performing similar occupations in the same

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31/ Positive selection of "non-trainees" was found, indicating that the average wage distribution observed for non-trained self-employed is actually higher than it would have been for the average individual in the subsample had he received training. That is, the average wage rate of non-trained self-employed with given personal characteristics exceeds what that wage rate would have been for individuals with the same characteristics who instead received training. It is necessary to keep in mind that the signs of the coefficients on the selectivity variables depend on the variance of the error terms of the participation, and the trained and untrained wage equations. If there are "unobservables", unmeasured factors common to all equations, this type of result may be obtained. In this case, the "costs" of undertaking job-training are not considered in the model, and this omission could be the source of positive selection in the untrained group.

32/ In the case of enterprises with more than one worker, it is difficult to separate the particular self-employed labor and business income from those of family and hired workers. In addition, in the presence of unpaid family workers the total salary bill cannot be computed, and hence, profits cannot be calculated without imputing "a wage rate" for these workers. For details see, Moock and Stelcner, 1989 (forthcoming), op.cit.

industries (see Annex 2 for key variables mean values for one-worker enterprises).

Sample size considerations influenced the empirical specification presented here. Table 10 shows hourly profits equations in columns 1 and 2. For comparative purposes, wage functions on the natural log of hourly wages are shown in columns 3 and 4.

Table 10
Self-employed Workers: Determinants of Hourly Profits and Wage Rates (one worker enterprises)

Independent variables	Hourly Profits (1)	Hourly Profits (2)	Hourly Wages (3)	Hourly Wages (4)
Constant	0.571 (4.07)	0.339* (2.01)	0.748* (7.82)	0.555* (4.81)
Years of schooling	0.076* (4.33)	0.092* (4.93)	0.075* (6.26)	0.093* (7.33)
Total capital (/1,000)	0.021* (6.52)	0.020* (6.21)	0.008* (3.57)	0.007* (3.23)
Training dummy	-0.027 (0.14)	0.080 (0.42)	-0.008* (0.46)	0.007* (0.002)
Age of enterprise (years)		0.017* (2.76)		0.014* (3.28)
Enterprise operates a/		-0.401* (2.41)		-0.262* (2.32)
Fixed location b/ enterprise		0.078 (0.07)		-0.244* (1.99)
R^2 adjusted	0.178	0.203	0.156	0.187
Mean dependent variable	1.329	1.329	1.377	1.377
Number of observations	331	331	331	331

Notes: * Statistically significant at the 10 percent level or better.
t- values in parentheses.
a/ Omitted category: enterprise operates in the street (mobile).
b/ Special premises for the business outside the home.

A comparison of the estimates on hourly profits and hourly wage rates reveals first, that even though the mean values of hourly profits and

hourly wages have significantly different distributions, both measures provide similar and precisely estimated values of the returns to schooling and training among these self-employed workers. Table 10 confirms the earlier results with regard to job-training: it does not have an impact on the economic returns to self-employment. The table also confirms the significant contribution of schooling to those returns, measured either as wages or profits.

VI. CONCLUSION

This study finds that post-school training is widespread among Peruvian male workers in urban areas. Over 21 percent of the wage workers and about 14 percent of the self-employed have received at least one post-school training course between 1975 and 1985-86. The probability that salaried males will receive training does not appear to be influenced by city of residence, suggesting that workers from Lima and OUAs wage sectors face similar training opportunities. For the nonwage sector findings suggest otherwise: those in Lima have more training opportunities than those in OUAs.

With regard to the training event, in general, the longest job-training event in a worker's life does not take place upon entry in the labor market, but after several years of work experience. The average participant received training his mid-twenties after about 9 years in the labor market. From the point of view of enrollments, job-based programs, that is, on-the-job or off-the-job courses received from public sectoral training institutes or the military are the most important source of post-school training among wage and self-employed workers in Peru (46 and 40 percent of trainees, respectively). Twenty percent of the wage workers and 13 percent of the self-employed received training from post-secondary training institutions. Unexpectedly, "academes", the prototype of the proprietary training institution, appear as the second most important source of training among urban males (24 and 29 percent of trainees in the wage and nonwage sectors, respectively). This situation suggests that the Peruvian training sector needs to examine the operations and effectiveness of this type of proprietary training school to determine their role in the sector.

With regard to beneficiaries of training programs, workers with less than secondary schooling, which constitute over 50 percent of the urban male labor force in Peru, do not receive job-skills from the institutional training system. Moreover, the analysis of selection into training indicates that the probability of receiving training is largely determined by educational attainment, where secondary schooling is the lowest entry level into training courses, revealing that in the case of Peru, training and formal education are indeed complementary. These findings apply to workers in both the wage and nonwage sectors. There appear to be several implications for policymakers. First, in Peru, workers with limited schooling also face limited training opportunities. This situation may arise because of a lack of post-school training programs for individuals with little schooling, or because of low demand for training in this group population. However, the scarce available data on the largest public sectoral training agencies suggest that because of high demand, they select participants based on educational attainment, even though many training courses do not require secondary schooling. Second, to the extent that most training institutions in Peru are subsidized, and that they benefit a group of users who also received subsidized secondary and post-secondary schooling, the issues of efficiency and equity in financing Peruvian education sector reach the vocational training sector.

With regard to the labor market effects of post-school training, the main impact of training concerns earnings. Among wage workers in the private sector, training does increase workers' wage rates, after controlling for many

other factors including formal schooling and the probability of having received training. When distinguishing among types of training institution and also controlling for other factors including schooling and the probability of having received training, the effects are as follows. First, training received from job-based programs increases workers' wage rates by over 10 percent. Second, training received from post-secondary programs increases workers' wage rates by 20 percent. Third, training received from "academes", the prototype of the proprietary school, does not have any impact on workers' wage rates. Thus, it may be concluded that the training institutions offering job-based and post-secondary programs are effective means to enhance employee productivity, and academes are not. When distinguishing between training leading to a diploma and training that does not, the positive effect of training holds for the former but not for the latter, even when length of the training event is taken into account. However, given limitations on the certification data available, no interpretation of this finding can be substantiated.

Among the self-employed workers, post-school training does not have the expected positive impact on the earnings or profits of these workers, after controlling for other factors including enterprise characteristics, formal schooling and the probability of having received training. These findings should be interpreted cautiously because of the measurement problems associated with earnings from self-employment activities. Keeping this caveat in mind, these results could be interpreted as providing evidence that training is not of much use for the self-employed because they perform traditional jobs that by definition do not need any skill development. However, it is difficult to accept this argument for those self-employed working in the craft or workshop subsectors. Alternatively, it could be argued that the institutions that constitute the Peruvian training system are oriented to serve the training needs of the modern sector of the economy, and therefore, do not have the kinds of training that would increase self-employed workers' productivity.

In general, the results of this study imply that investments in training have significant benefits vis a vis formal schooling, when related to wage employment in the private sector of the economy. However, since no information is available on the "costs" of the post-school training investments examined in this study, the results presented should not be regarded as a complete evaluation of the economic benefits of training in Peru.

ANNEX A
Table A-1
Definition of the Variables Used in the Analysis

Variable	Definition	Equation TR	WW	WS
Dependent variables				
TRAIN1	= 1 if did job-training course between 1975 and the PLSS, 0 otherwise	X		
COMPTR1	= 1 if did job-training on or off-the-job in occupational training institutes or the military, 0 otherwise	X		
SUPETR1	= 1 if did job-training in a technical institute or university, 0 otherwise	X		
ACADTR1	= 1 if did job-training in an "academe" (proprietary institution), 0 otherwise	X		
LNWAGE a/	= natural log of the real hourly wage rate in the main occupation (Intis at June 1986 prices)		X	X
LNPROFIT b/	= natural log of the real hourly profit rate in the main occupation (Intis at June 1986 prices)			X
Experience				
GEXPR1	= years of potential work experience computed as: age - 6 - years of schooling - years of school repeated		X	X
GEXPR1SQ	= years of potential work experience squared		X	X
GEXPRTR	= years of potential work experience when trained computed as: age when trained - 6 - years of schooling when trained - years of school repeated	X		
XOCM7	= years of job specific experience in main occupation		X	X
XOCSQM7	= years of job specific experience squared		X	X
Education and Training				
LTSECOND	= 1 if 5 - 9 years of schooling, 0 otherwise	X		
SECONDRY	= 1 if 9 years of schooling, 0 otherwise	X		
LTHIGHER	= 1 if 10-13 years of schooling, 0 otherwise	X		
HIGHER	= 1 if 14+ years of schooling, 0 otherwise	X		
SPLYRSC1	= years of primary schooling		X	X
SPLYRSC2	= years of secondary schooling		X	X
SPLYRSC3	= years of post-secondary schooling		X	X
TRDIPLA	= 1 if did job-training and did not receive a diploma		X	X
TRDIPLB	= 1 if did job-training and received a diploma		X	X
THOURS1	= Hours of training of the longest course (/1,000)		X	X
School Characteristics				
PUBSCHL	= 1 if last school attended was public, 0 otherwise	X	X	X

FOODSCHL	= 1 if last primary school attended provided free meals	X		
Background Information				
FYR-SCHL	= father's years of schooling	X	X	X
MYR-SCHL	= mother's years of schooling		X	X
FAGRIC	= 1 if father was a farmer most of his life, 0 otherwise	X		
BORNTWN	= 1 if was not born in a city, 0 otherwise	X		
MIGRTR	= 1 if had migrated when trained, 0 otherwise	X		
STUD10	= 1 if was studying 10 years before the PLSS, 0 otherwise	X		
WAGE10	= 1 if was in salaried employment 10 years before the PLSS, 0 otherwise	X		
SELF10	= 1 if was in self-employment 10 years before the PLSS, 0 otherwise	X		
MARITAL0	= 1 if married or living together, 0 otherwise		X	X
Region				
LIMA	= 1 if lives in metropolitan Lima, 0 if lives in other urban areas (OUAs)	X	X	X
Enterprise information				
AGENTER	= 1 if the business was operated by the household before he started working in it	X		
TOTCAP	= enterprise total capital and assets (intis of June 1986)			X
FAMLAB	= number of family members working in the enterprise			X
HIRWRKRS	= number of hired workers working in the enterprise			X

Notes: a/ Wage workers reported: (i) nominal values of the following earnings component: cash, food, housing, clothing, and transportation. Real monthly earnings were calculated using regional consumer price indices where June 1985 = 100; (ii) the number of months worked in this job during the last 12 months; (iii) the usual number of hours worked in this job in the week prior to the interview. The real hourly wage rate (RHW) was calculated as:

$$\frac{\text{(real monthly earnings x months worked)}}{\text{(annual hours)}}$$

where annual hours were computed as usual weekly hours x months worked in past year x 4.33.

Self-employed did not report the value of earnings by component, but only the nominal value of the "total earnings obtained from the business". They also reported the number of months worked in the business during the last 12 months, and the usual number of hours worked in this job per week. Using the same regional consumer price indices, a real hourly wage rate was calculated as:

$$\frac{\text{(real monthly earnings x months worked)}}{\text{(annual hours in the business)}}$$

where annual hours were computed as usual weekly hours in the business x months worked in past year x 4.33

b/ In the enterprise section of the PLSS, data on revenues and expenditures of the enterprise during two weeks before the survey were collected. Hourly profits were calculated using the following information: (i) the value of sales in cash (SC), (ii) the monetary value of payments in kind received by the enterprise (SK), (iii) the value of all expenses in the business (EX). For those enterprises that did not operate during those two weeks, the same data were collected for the last full month of operation. For the businesses reporting biweekly sales and expenditures those two weeks of operations were assumed typical, and monthly profits (MP) were computed as:

$$(SC + SK - EX)$$

Based on the same criteria used to compute hourly wage rates, hourly profits (HP) were calculated as:

$$\frac{\text{(MP x months worked per year)}}{\text{(annual hours)}}$$

where annual hours were computed as usual weekly hours x months worked in the past year x 4.33

ANNEX B

Table B-1
Wage Workers: Main Occupation and Industry of Employment During the Last 7 Days (No Training)

OCCUPATION \ INDUSTRY	AGRICULTURE FISHING FORESTRY	MINING	MANUFACTURE	ELECTRIC GAS WATER	CONSTRUCTION	COMMERCE	TRANSPORTATION	FINANCIAL	OTHER SERVICES	TOTAL
PROFESSIONAL 1/	0.00	4.76	12.70	6.35	3.17	6.35	12.70	17.46	36.51	63
2/	0.00	7.89	2.93	30.77	2.13	2.08	7.34	18.33	19.33	6.53
GOVERNMENT ADMINISTRATION	0.00	11.11	44.44	0.00	5.56	5.56	5.56	16.67	11.11	18
	0.00	5.26	2.93	0.00	1.06	0.52	0.92	5.00	1.68	1.87
CLERICAL	2.27	0.76	12.12	1.52	2.27	21.97	21.97	25.00	12.12	132
	4.48	2.63	5.86	15.38	3.19	15.10	26.61	55.00	13.45	13.68
SALES VENDORS	0.00	0.88	9.65	0.00	0.00	85.96	0.00	2.63	0.88	114
	0.00	2.63	4.03	0.00	0.00	51.04	0.00	5.00	0.84	11.81
SERVICE WORKERS	2.25	1.12	16.85	0.00	4.49	39.33	2.25	8.99	24.72	89
	2.99	2.63	5.49	0.00	4.26	18.23	1.83	13.33	18.49	9.22
AGRICULTURAL FISHERY FORESTRY WRKR	91.53	0.00	3.39	0.00	0.00	0.00	0.00	0.00	5.08	59
	80.60	0.00	0.73	0.00	0.00	0.00	0.00	0.00	2.52	6.11
PRODUCTION TRANSPORTATION WRKR	1.63	6.12	43.47	1.43	17.14	5.10	14.08	0.41	10.61	490
	11.94	78.95	78.02	53.85	89.36	13.02	63.30	3.33	43.70	50.78
TOTAL	67	38	273	13	94	192	109	60	119	965
	6.94	3.94	28.29	1.35	9.74	19.90	11.30	6.22	12.33	100.00

WAGE WORKERS: MAIN OCCUPATION AND INDUSTRY OF EMPLOYMENT DURING THE LAST 7 DAYS (WITH TRAINING)

OCCUPATION \ INDUSTRY	AGRICULTURE FISHING FORESTRY	MINING	MANUFACTURE	ELECTRIC GAS WATER	CONSTRUCTION	COMMERCE	TRANSPORTATION	FINANCIAL	OTHER SERVICES	TOTAL
PROFESSIONAL 1/	0.00	2.50	22.50	2.50	5.00	7.50	2.50	22.50	35.00	40
2/	0.00	11.11	9.00	12.50	9.09	5.00	5.00	27.27	38.89	13.61
GOVERNMENT ADMINISTRATION	0.00	11.11	55.56	0.00	0.00	11.11	11.11	11.11	0.00	9
	0.00	11.11	5.00	0.00	0.00	1.67	5.00	3.03	0.00	3.06
CLERICAL	1.47	2.94	25.00	5.88	1.47	22.06	11.76	26.47	2.94	68
	16.67	22.22	17.00	50.00	4.55	25.00	40.00	54.55	5.56	23.13
SALES VENDORS	0.00	0.00	17.14	0.00	0.00	77.14	0.00	2.86	2.86	35
	0.00	0.00	6.00	0.00	0.00	45.00	0.00	3.03	2.78	11.90
SERVICE WORKERS	0.00	0.00	5.88	0.00	5.88	47.06	0.00	11.76	29.41	17
	0.00	0.00	1.00	0.00	4.55	13.33	0.00	6.06	13.89	5.78
AGRICULTURAL FISHERY FORESTRY WRKR	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4
	66.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.36
PRODUCTION TRANSPORTATION WRKR	0.83	4.13	51.24	2.48	14.88	4.96	8.26	1.65	11.57	121
	16.67	55.56	62.00	37.50	81.82	10.00	50.00	6.06	38.89	41.16
TOTAL	6	9	100	8	22	60	20	33	36	294
	2.04	3.06	34.01	2.72	7.48	20.41	6.80	11.22	12.24	100.00

NOTES: 1/ ROW PERCENT

2/ COLUMN PERCENT

ANNEX B

Table B-2
Self-employed workers: Main Occupation and Industry of Employment
During the Last 7 Days
(No Training)

OCCUPATION \ INDUSTRY	MINING	MANUFACTURE	ELECTRIC GAS WATER	CONSTRUCTION	COMMERCE	TRANSPORTATION	FINANCIAL	OTHER SERVICES	TOTAL
PROFESSIONAL 1/	0.00	0.00	0.00	0.00	2.08	0.00	41.67	56.25	48
2/	0.00	0.00	0.00	0.00	0.32	0.00	76.92	22.13	6.27
GOVERNMENT ADMINISTRATION	0.00	77.78	0.00	0.00	11.11	0.00	0.00	11.11	9
	0.00	5.22	0.00	0.00	0.32	0.00	0.00	0.82	1.17
CLERICAL	0.00	0.00	0.00	0.00	20.00	20.00	40.00	20.00	5
	0.00	0.00	0.00	0.00	0.32	1.14	7.69	0.82	0.65
SALES VENDORS	0.32	2.58	0.00	0.00	95.48	0.32	0.65	0.65	310
	50.00	5.97	0.00	0.00	94.57	1.14	7.69	1.64	40.47
SERVICE WORKERS	0.00	10.00	0.00	0.00	30.00	12.50	5.00	42.50	40
	0.00	2.99	0.00	0.00	3.83	5.68	7.69	13.93	5.22
PRODUCTION TRANSPORTATION WRKR	0.28	32.49	0.85	22.03	0.56	22.88	0.00	20.90	354
	50.00	85.82	100.00	100.00	0.64	92.05	0.00	60.66	46.21
TOTAL	2	134	3	78	313	88	26	122	766
	0.26	17.49	0.39	10.18	40.86	11.49	3.39	15.93	100.00

SELF-EMPLOYED WORKERS: MAIN OCCUPATION AND INDUSTRY OF EMPLOYMENT
DURING THE LAST 7 DAYS
(WITH TRAINING)

OCCUPATION \ INDUSTRY	MANUFACTURE	ELECTRIC GAS	CONSTRUCTION WATER	COMMERCE	TRANSPORTATION	FINANCIAL	OTHER SERVICES	TOTAL
PROFESSIONAL 1/	9.52	0.00	0.00	0.00	0.00	42.86	47.62	21
2/	5.88	0.00	0.00	0.00	0.00	60.00	23.81	13.21
GOVERNMENT ADMINISTRATION	50.00	0.00	16.67	0.00	16.67	0.00	16.67	6
	8.82	0.00	11.11	0.00	5.88	0.00	2.38	3.77
CLERICAL	0.00	0.00	0.00	20.00	0.00	40.00	40.00	5
	0.00	0.00	0.00	2.50	0.00	13.33	4.76	3.14
SALES VENDORS	0.00	0.00	0.00	97.44	0.00	2.56	0.00	39
	0.00	0.00	0.00	95.00	0.00	6.67	0.00	24.53
SERVICE WORKERS	0.00	0.00	0.00	10.00	0.00	30.00	60.00	10
	0.00	0.00	0.00	2.50	0.00	20.00	14.29	6.29
PRODUCTION TRANSPORTATION WRKR	37.18	2.56	10.26	0.00	20.51	0.00	29.49	78
	85.29	100.00	88.89	0.00	94.12	0.00	54.76	49.06
TOTAL	34	2	9	40	17	15	42	159
	21.38	1.26	5.66	25.16	10.69	9.43	26.42	100.00

NOTES: 1/ ROW PERCENT

2/ COLUMN PERCENT

ANNEX C

Table C-1
Wage Functions for Wage Workers
OLS and Selectivity Adjusted

Independent variables	Selectivity Adjusted			Simple OLS		
	With Training (1)	Without Training (2)	Both (3)	With Training (4)	Without Training (5)	Both (3)
Constant	0.255	-0.345*	0.350*	0.254	-0.343*	-0.356*
	(0.37)	(2.33)	(2.48)	(0.40)	(2.30)	(2.52)
Potential experience	0.034*	0.039*	0.038*	0.041*	0.039*	0.040*
	(1.93)	(4.77)	(5.27)	(2.33)	(4.93)	(5.76)
Potential experience squared	-0.0004	-0.0004*	-0.0004*	-0.0004	-0.0004*	-0.0004*
	(1.05)	(3.12)	(3.41)	(1.15)	(3.14)	(3.62)
Tenure on current job	0.071*	0.032*	0.038*	0.066*	0.032*	0.036*
	(3.43)	(3.58)	(4.84)	(3.13)	(3.74)	(4.62)
Tenure on current job squared	-0.002*	-0.0007*	-0.0009*	-0.002*	-0.0007*	-0.0008*
	(2.46)	(2.92)	(3.79)	(2.31)	(2.97)	(3.59)
Spline primary	0.063	0.076*	0.080*	0.067	0.076*	0.080*
	(0.50)	(2.54)	(2.78)	(0.52)	(2.56)	(2.79)
Spline secondary	0.058	0.062*	0.059*	0.102*	0.062*	0.071*
	(1.46)	(3.51)	(3.91)	(3.38)	(4.62)	(5.88)
Spline higher	0.131*	0.115*	0.119*	0.130*	0.116*	0.117*
	(5.47)	(6.67)	(8.54)	(5.26)	(6.65)	(8.37)
Last school attended was public	-0.108	-0.051	-0.060	-0.137	-0.050	-0.074
	(1.06)	(0.70)	(1.01)	(1.32)	(0.71)	(1.25)
Father's years of schooling	0.007	0.035*	0.028*	0.008	0.035*	0.028*
	(0.55)	(4.34)	(4.14)	(0.62)	(4.32)	(4.20)
Mother's years of schooling	0.009	0.027*	0.021*	0.009	0.026*	0.022*
	(0.64)	(3.04)	(2.92)	(0.68)	(3.01)	(2.93)
Married or as if	0.133	0.200*	0.176*	0.134	0.201*	0.173*
	(1.37)	(3.19)	(3.33)	(1.33)	(3.16)	(3.27)
Lima	0.281*	0.141*	0.162*	0.293*	0.140*	0.170*
	(3.20)	(2.96)	(3.90)	(3.24)	(3.00)	(4.10)

Lambda (λ)	-0.229	0.0008	-0.132			
	(1.61)	(0.06)	(1.38)			
Training dummy			0.135*			0.128*
			(2.13)			(2.64)
R_2 adjusted	0.332	0.376	0.382	0.328	0.375	0.380
Mean depend. variable	1.646	1.322	1.398	1.646	1.322	1.398
No. observations	294	965	1,259	294	965	1,259

Notes: * Statistically significant at the 10 percent level or better.
t-values in parentheses.

Table C-2
Wage Functions for Wage Workers:
Interactive Models

Independent variables	Model (1)	Model (2)
Constant	-0.259* (1.81)	-0.244* (1.71)
Potential experience	0.042* (5.78)	0.039* (5.48)
Potential experience squared	-0.0005* (3.92)	-0.0004* (3.60)
Tenure on current job	0.032* (3.89)	0.031* (3.92)
Tenure on current job squared	-0.0005* (2.28)	-0.0005* (2.28)
Spline primary	0.065* (2.28)	0.065* (2.25)
Spline secondary	0.067* (5.26)	0.068* (5.43)
Spline higher	0.124* (7.96)	0.123* (7.92)
Last school attended was public	-0.100* (1.68)	-0.081 (1.36)
Father's years of schooling	0.030* (4.43)	0.030* (4.37)
Mother's years of schooling	0.023* (3.13)	0.024* (3.25)
Married or as if	0.168* (3.16)	0.178* (3.32)
Lima	0.198* (4.74)	0.191* (4.58)
Training dummy	0.034	

Secondary * training	-0.012 (0.07)	
Higher * training	0.017 (0.09)	
Potential experience * training	0.004 (0.24)	
Potential experience squared * training	-0.00002 (0.53)	
Tenure * training	0.028 (1.31)	
Tenure squared * training	-0.001 (1.47)	
Job based training (JBP)		0.227 (0.76)
Post-secondary training (PST)		-0.739 (0.83)
Academe training (ACT)		-0.705 (1.50)
Secondary * JBP		-0.096 (0.46)
Higher * JBP		0.142 (0.62)
Potential experience * JBP		-0.026 (1.04)
Potential experience squared * JBP		0.0005 (0.90)
Tenure * JBP		0.083* (2.65)
Tenure squared * JBP		-0.003* (2.62)
Secondary * PST		-0.475 (0.53)
Higher * PST		-0.014* (1.68)

Potential experience * PST		0.053 (1.15)
Potential experience squared * PST		-0.008 (0.62)
Tenure * PST		-0.022 (0.38)
Tenure squared * PST		-0.002 (0.74)
Secondary * ACT		0.195 (0.51)
Higher * ACT		0.010 (0.26)
Potential experience * ACT		0.077* (2.24)
Potential experience squared * ACT		-0.001* (2.05)
Tenure * ACT		-0.022 (0.53)
Tenure squared * ACT		-0.001 (0.50)
R^2 adjusted	0.388	0.391
No. observations	1,259	1,259

Notes: Statistically significant at the 10 percent level or better.
t-values in parentheses.

Table C-3
Wage Functions for Self-employed Workers
OLS and Selectivity Adjusted

Independent variables	Selectivity Adjusted			Simple OLS		
	With Training (1)	Without Training (2)	Pooled Sample (3)	With Training (4)	Without Training (5)	Pooled Sample (6)
Constant	-0.114	0.053	0.032	0.164	-0.092	-0.342
	(0.18)	(0.25)	(0.16)	(0.37)	(0.44)	(0.17)
Potential experience	0.049*	0.039*	0.038*	0.050*	0.038*	0.037*
	(1.79)	(3.99)	(4.22)	(1.71)	(3.76)	(4.07)
Potential experience squared (/100)	-0.080	-0.060*	-0.060*	-0.080	-0.060*	-0.060*
	(1.21)	(3.76)	(3.89)	(1.23)	(3.59)	(3.79)
Tenure on current job	-0.008	0.008	0.005	-0.030	0.014	0.009
	(0.24)	(0.81)	(0.60)	(0.09)	(1.42)	(0.96)
Tenure on current job squared (/100)	-0.02	0.004	0.009	-0.040	-0.060	0.003
	(0.23)	(0.16)	(0.38)	(0.32)	(0.24)	(0.13)
Spline primary	a/	0.039	0.036	a/	0.047	0.040
		(1.17)	(1.10)		(1.40)	(1.20)
Spline secondary	0.031	0.083*	0.064*	0.012	0.057*	0.051*
	(0.56)	(3.91)	(3.39)	(0.25)	(3.08)	(2.95)
Spline higher	0.081*	0.058*	0.073*	0.075*	0.057*	0.067*
	(1.87)	(2.50)	(3.50)	(1.70)	(2.14)	(3.21)
Last school attended was public	-0.038	-0.102	-0.073	-0.023	-0.068	-0.001
	(0.20)	(1.02)	(0.82)	(0.12)	(0.67)	(0.02)
Father's years of schooling	0.014	0.009	0.008	0.012	0.006	-0.049
	(0.58)	(0.82)	(0.79)	(0.48)	(0.56)	(0.55)
Mother's years of schooling	0.048*	0.025*	0.028*	0.046	0.024*	0.007
	(1.76)	(2.10)	(2.52)	(1.63)	(1.97)	(0.64)
Lives in Lima dummy	0.110	0.118*	0.124*	0.101	0.098	0.027*
	(0.76)	(1.86)	(2.13)	(0.06)	(1.53)	(2.41)
Total capital of enterprise (/1,000)	0.069*	0.054*	0.056*	0.069*	0.053*	0.111*
	(2.67)	(4.98)	(5.59)	(2.57)	(4.80)	(1.90)

Number hired workers in enterprise	0.054 (1.36)	0.021* (1.91)	0.023* (2.23)	0.57 (1.38)	0.023* (2.09)	0.056* (5.52)
Number family workers in enterprise	-0.261* (3.14)	-0.003 (0.11)	-0.033 (1.24)	-0.253* (2.92)	-0.001 (0.04)	0.025* (2.34)
Training dummy			-0.450 (1.56)			-0.003 (1.12)
λ	0.165 (0.59)	0.563* (2.45)	0.266 (1.62)			
R^2 adjusted	0.209	0.168	0.171	0.213	0.163	0.170
Mean dependent variable	1.492	1.383	1.402	1.402	1.402	1.402
No. observations	159	766	925	159	766	925

Notes: * Statistically significant at the 10 percent level or better. t-values in parentheses.
a/ Not estimated because of small number of trainees with primary education.

Table C-4
Self-employed Workers:
Mean Sample Characteristics of One-Worker Business

Characteristics	With Training	Without Training
No. of observations	49	282
Lima	31	120
Other Urban Areas	18	152
Age	32.0 (9.7)	41.5 (12.4)
Years of schooling	10.4 (2.8)	7.0 (3.7)
School last attended was public	0.73	0.86
Father's years of schooling	5.3	4.2
Mother's years of schooling	3.5	2.6
Father's job farmer	0.20	0.42
Ever migrated	0.65	0.78
Potential work experience (years)	15.2 (10.3)	28.2 (12.6)
Job specific experience (years)	5.9 (6.0)	12.1 (11.0)
Real hourly wage rate (intis June 1986)	5.97 (4.3)	5.60 (5.4)
Usual weekly hours worked	45.9 (20.6)	47.1 (21.1)
Months worked last 12 months	8.3 (4.5)	10.1 (3.5)
Enterprise total capital (intis June 1986)	8,597 (18,421)	8,465 (19,248)
Mobile enterprise	0.55	0.55

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