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Formal Measures of the Informal-Sector Wage Gap in Mexico, El Salvador, and Peru*

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At the end of a meeting in Ciudad Nezahualcóyotl near Mexico City, several microentrepreneurs were asked why they chose informal-sector employment. One answered, "While I sew uniforms at home, I can also watch over my children and the house." A second said, "I hate having to answer to a boss; I prefer to make my own decisions." A third said, "I make more money in my shop than I would in a factory."[1] Others might work in the informal sector simply because they could not find formal jobs.

The diversity of experiences of economic informality is reflected in the literature.[2] Some analysts view the informal sector as that part of the economy which is "unregulated by the institutions of society, in a legal and social environment in which similar activities are regulated."[3] In these models, economic activity freely shifts between the formal sector, where licensing is enforced and worker entitlements are protected, and the unregulated informal sector.[4] Other analysts, alleging that the restricted modern sector is incapable of generating sufficient employment, underscore the obstacles to intersectoral mobility. In this view, when workers are excluded from formal-sector jobs, the small firms of the informal sector offer second-best opportunities in easily entered, competitive markets.[5]

The latter view intertwines naturally with the study of labor market segmentation. Theories of segmentation generally make two assertions. The first is that "rewards in different economic sectors may differ for workers of equal potential productivity"[6] or, in the words of

W. T. Dickens and K. Lang, "that there is a distinct low-wage (second-ary) labor market in which there are no returns to schooling and work-ers do not receive on-the-job training."[7] The second assertion is, in T. H. Gindling's words, that "because of institutional barriers to occu-pational mobility between sectors, a worker in the lower sector has less than full access to a job in the upper sector held by an observationally identical worker."[8] The image of workers queued for high-wage for-mal-sector jobs fits this frame.

What do the data show? Using individual- and household-level data from surveys of urban areas in three different countries, we ask what type of person works in the informal sector and whether informal-sector workers earn lower wages than observationally equivalent workers in the formal sector do. We find significant wage premiums associated with work in the formal sector in El Salvador and Peru. In Mexico, on the other hand, a premium is associated with work in the informal sector. Our article does not formally test the segmentation hypothesis.[9] However, the evidence we offer on wage differentials does challenge the widespread notion that infor-mal-sector employment is, by its nature, the last resort of those who have no other choice.

Papers using recent large-scale household surveys from different countries in a completely consistent approach to the analysis of the informal sector are few and far between. Our work is close in spirit to Gindling's analysis of informal, private formal, and public labor mar-kets in Costa Rica. K. Terrell estimates wage regressions for Guate-mala City. Both M. B. Tannen and E. E. Telles have studied the wage structures of parts of Brazil. J. J. Heckman and V. J. Hotz explore a more general notion of primary and secondary labor markets in Pan-ama. A recent working paper by E. Funkhouser presents interesting comparative analysis of household data from the five Spanish-speaking Central American countries.[10]

In the first section of this article we describe our data, our defini-tions, and the characteristics of workers and jobs in the formal and informal sectors. In the second section, we estimate separate wage regressions for men and women in each sector, finding that the wage structures differ significantly, that statistically significant wage premi-ums are associated with formal-sector employment in Peru and El Salvador, and, unexpectedly, that a premium is associated with infor-mal-sector work in Mexico. In the third section, we examine the possi-ble impact of endogenous sample selection on the wage gaps. The fourth section contains the summary and conclusion.

I. Overview, Data, and Definitions
We use data from three large government-sponsored household sur-veys.[11] Six thousand households were surveyed in El Salvador in 1990,

11,000 in Mexico in 1990, and 5,000 in Peru between July 1985 and May 1986.[12]

Two different operational definitions of the informal sector are common in empirical work. Analysts who emphasize the generation of employment generally focus on firm size as the defining criterion.[13] Those who emphasize social regulation focus on coverage by the social security system.[14] We have worked with both definitions. Our firm size criterion places in the informal sector those workers who are self-employed or who operate or are employed in firms with five or fewer employees (four or fewer in the case of El Salvador), with the exception of professionals,[15] who are considered to be in the formal sector. Our benefits criterion or social security criterion places in the formal sector those workers who receive social security coverage or pay social security taxes as a condition of employment, regardless of occupational status. Following common practice, we define domestic service as a separate sector.[16] We also exclude from the wage regressions those who work without pay in family enterprises.

Each of the economies has a large informal sector. Even excluding domestic servants and unpaid family workers, roughly half the urban workforce is in the informal sector in Peru and El Salvador, and Mexico's informal sector is only slightly smaller (table 1).[17] The size criterion yields a smaller informal sector than the benefits criterion does. Almost all of the workers who are in the informal sector as defined by firm size also lack benefits (92%, 97%, and 89% in Mexico, El Salvador, and Peru, respectively); the converse is not true.

The gender composition of the paid labor force of each country is shown in table 2, along with the percentage of male and female workers who are in the informal sector. In El Salvador and Peru, but not in Mexico, women are more likely than men to be in the informal sector.[18]

There are marked differences between sectors in the age and schooling of workers. These differences are displayed in figures 1 and 2, using the social security criterion. In figure 1, we divide all paid workers into four age groups: 13–20, 21–35, 36–60, and older than 60.

TABLE 1

URBAN LABOR FORCE BY SECTOR (%)

	El Salvador	Peru	Mexico
By size of firm:			
Formal	52.1	42.5	69.2
Informal	47.9	57.5	30.8
By social security coverage:			
Formal	37.2	38.2	56.8
Informal	62.8	61.8	43.2

TABLE 2

GENDER AND THE INFORMAL-SECTOR WORKFORCE (%)

	El Salvador	Peru	Mexico
Proportion of paid labor force:			
Males	59.9	65.2	69.9
Females	40.1	34.8	30.1
Percent informal by firm size:			
Males	41.2	53.0	33.4
Females	57.8	66.0	24.8
Percent informal by benefits:			
Males	60.0	58.0	46.3
Females	67.0	69.0	36.1
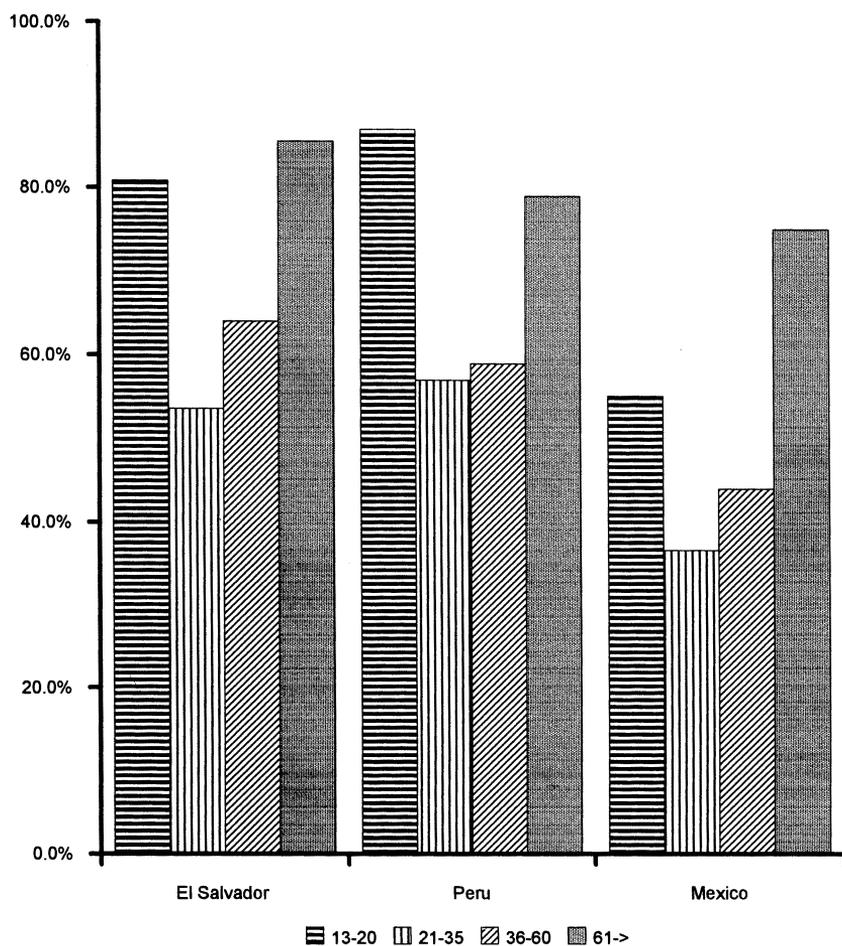
FIG. 1.—Percentage of age group in informal sector

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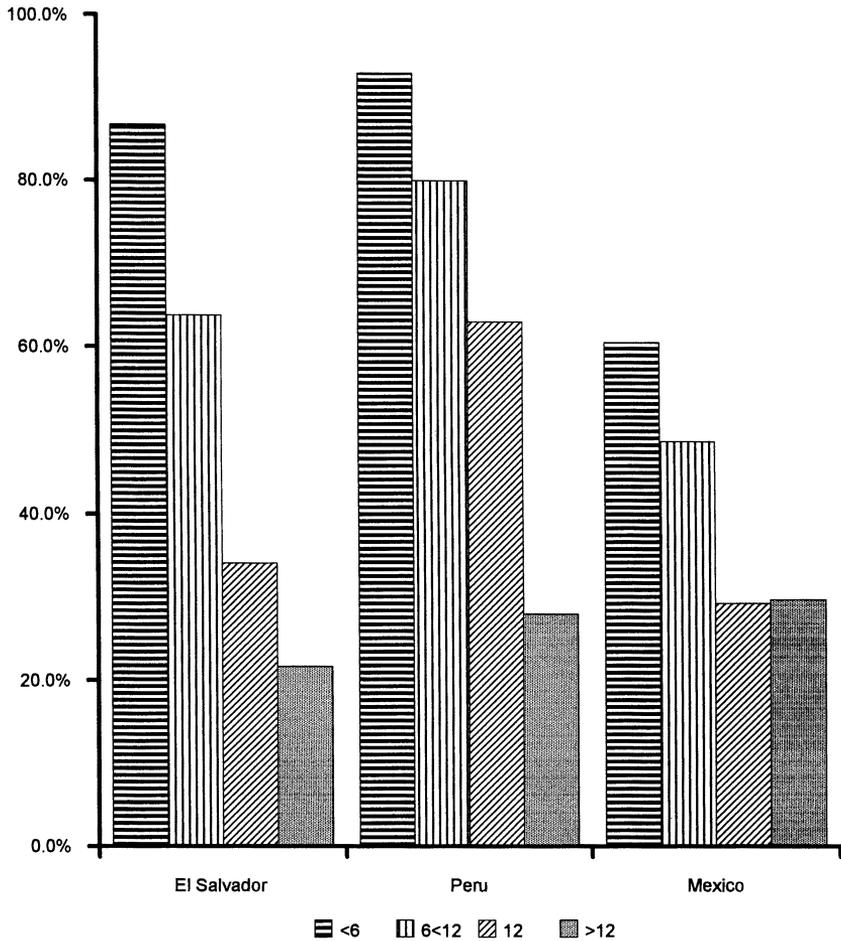
FIG. 2.—Percentage of education group in informal sector

The oldest and the youngest workers are especially likely to be in the informal sector. However, different age groups have different roles within the informal sector. The youngest workers are likely to be wage workers in small firms, while older workers are more likely to be self-employed or the owners of small businesses. In El Salvador, for example, 15% of informal-sector workers 13–20 years old are owners or self-employed, compared to 46% of informal-sector workers 21–35 years old and 72% of informal-sector workers older than 35 years.

In figure 2, we show the distribution of schooling, using four educational groups: fewer than 6 years of primary school, at least 6 years of primary school but less than completed secondary schooling, completed secondary, and some postsecondary schooling. The propensity to be in the informal sector declines with education in all three countries.

Five industries account for roughly two-thirds of informal-sector employment in each country: retail trade, construction, clothing and footwear manufacturing, transportation, and personal services. Figure 3 shows the distribution of the informal-sector workforce across the five industries, and figure 4 shows the informal sector's share of total employment in each industry. Under the social security criterion, 63% of employment in El Salvador is in the informal sector, 62% in Peru, and 43% in Mexico. Informal-sector employment is more common than average in retail trade, construction, transportation, and personal services in each of the three countries. Only in clothing and footwear manufacturing does the propensity to be in the informal sector vary notably across the countries.
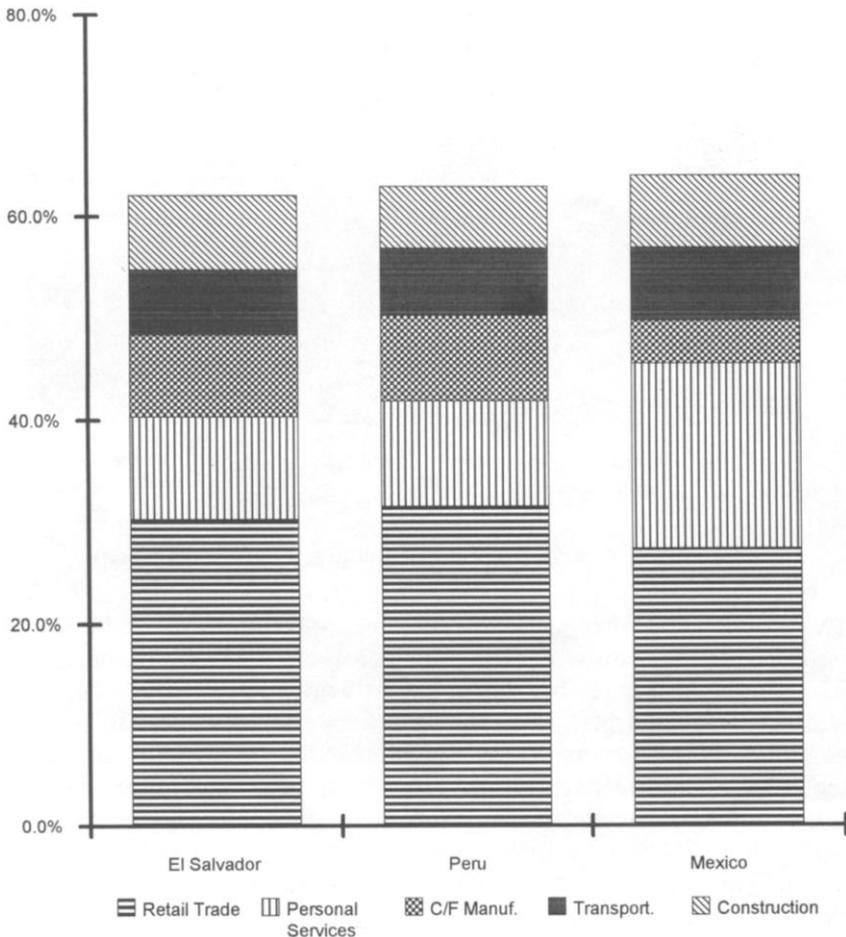
FIG. 3.—Percentage of informal sector by industry
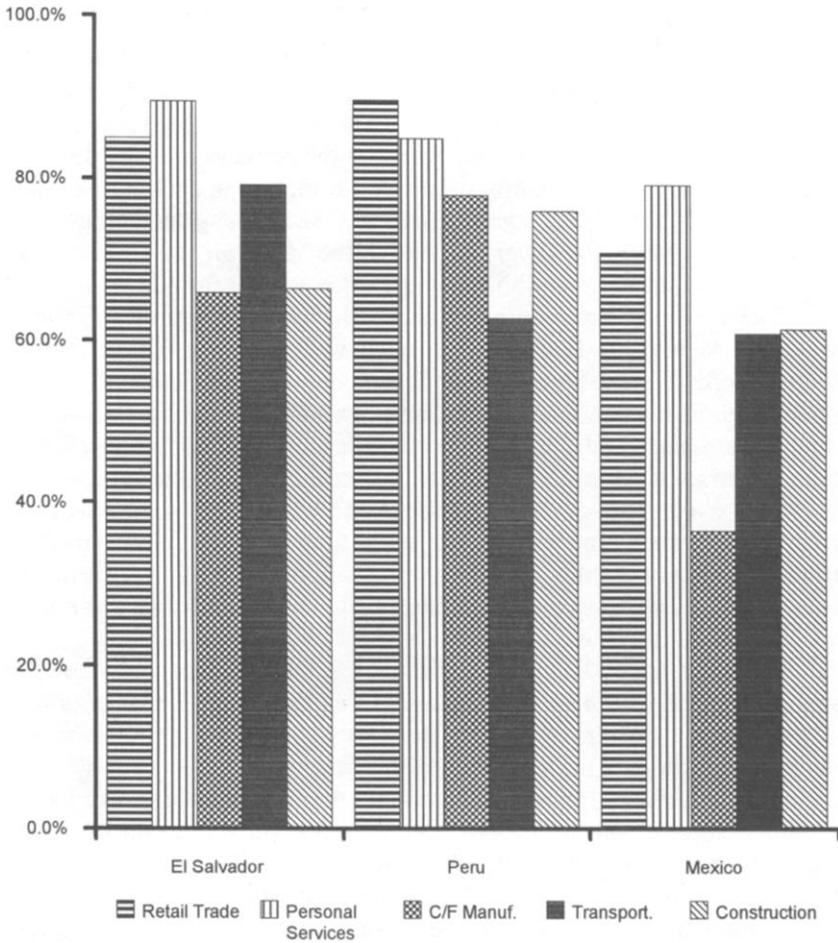
FIG. 4.—Percentage of industry in informal sector

Finally, the distribution of hours worked per week differs across sectors. The tails of the hours distribution are fatter in the informal than in the formal sector. In Peru, 23% (7%) of women (men) in the informal sector work fewer than 20 hours each week, compared with only 8% (4%) of women (men) in the formal sector. Likewise, 14% (17%) of women (men) in the informal workforce report working more than 65 hours per week, compared to only 2% (8%) of women (men) in the formal workforce. The standard deviation of mean weekly hours is 10.6 for Mexican formal-sector workers and 15.9 for informal-sector workers, 12.2 for Salvadoran formal-sector workers and 19.9 for informal-sector workers, 15.7 for Peruvian formal-sector workers and 21.0 for informal-sector workers.

II. Sectoral Wage Differentials

Controlling for gender, age, and schooling, do the returns to labor differ systematically between the formal and informal sectors for observationally identical workers?[19] Judging by a Chow test for differences between estimated earnings functions, we find that the process of wage determination does differ significantly between the sectors in each of the countries. We find statistically significant formal-sector wage premiums in El Salvador and Peru. However, we find in the Mexican case that it is the informal-sector workers who enjoy the unexplained premium.

The form of our earnings function is quite standard. For male workers, we regress the log of the hourly wage[20] on years of schooling, a dummy for completion of secondary school, experience and experience-squared (as represented by the proxy age-schooling-six), six industry dummies, and a dummy for residence in San Salvador, Lima, Guadalajara, or Monterrey. Since the variable, age-schooling-six, is likely to be a less adequate proxy for the experience of women workers than it is for men, for women we substitute age and age-squared for the experience variables. Our data do not include job tenure. Domestic servants and unpaid workers are excluded. The means of key variables are presented in table 3.

Earnings functions were estimated separately for men and for women in each of the sectors under each of the operational definitions of informality. Results under the social security criterion are presented here; similar results under the criterion of firm size are available from us. The coefficients for both women and men have the expected signs (tables 4 and 5). The returns to schooling are substantial in both sectors. Although high returns to schooling in both sectors do not disprove the segmentation hypothesis, high returns in the informal sector do run counter to the description of a secondary sector as given by Dickens and Lang.[21]

Because all six regressions show the expected pattern, one wonders whether the processes of wage determination really differ at all between the sectors. However, as table 6 shows, Chow tests reject in every case the hypothesis of the equality of all coefficients across sectors.[22]

The raw wage gap observed between workers in the formal and informal sectors can be decomposed into two parts, one explained by the difference between the sectors in the independent variables, the other not so explained:

$$
\begin{aligned}
\overline{\ln W_f} - \overline{\ln W_i} &= (\overline{X}_f - \overline{X}_i)' \beta_f + \overline{X}_i'(\beta_f - \beta_i) \\
&= (\overline{X}_f - \overline{X}_i)' \beta_i + \overline{X}_f'(\beta_f - \beta_i).
\end{aligned}
\tag{1}
$$

Table 7 reports the raw formal log wage premium, $\overline{\ln W_f} - \overline{\ln W_i}$, the unexplained premium weighted by the average characteristics of the

TABLE 3

MEANS OF DEPENDENT AND INDEPENDENT VARIABLES

	EL SALVADOR		PERU		MEXICO	
	Sector		Sector		Sector	
	Formal	Informal	Formal	Informal	Formal	Informal
Female workers:						
Independent:						
Years schooling	11.6	4.9	13.5	8.5	10.8	8.8
High school completed	.67	.11	.95	.48	.57	.31
Age	33.3	39.8	33.5	35.5	29.7	34.4
Agriculture	.01	.04	.002	.04	.001	.004
Manufacturing	.20	.25	.13	.18	.28	.18
Construction	.01	.002	.00	.00	.01	.01
Commerce	.15	.57	.12	.55	.19	.53
Transportation and						
communication	.02	.01	.03	.01	.03	.01
Services	.54	.12	.62	.21	.42	.25
Dependent:						
Log hourly wage	1.60	.64	1.90	1.02	1.12	1.04
Sample size	942	2,255	465	981	2,645	1,393
Male workers:						
Independent:						
Years schooling	9.6	5.5	12.0	9.5	9.9	8.4
High school completed	.42	.11	.78	.63	.36	.22
Experience	20.8	26.3	20.3	20.4	17.6	20.9
Agriculture	.02	.20	.02	.08	.002	.01
Manufacturing	.20	.23	.20	.20	.39	.16
Construction	.09	.13	.04	.10	.06	.11
Commerce	.13	.18	.13	.30	.16	.32
Transportation and						
communication	.07	.10	.08	.11	.06	.09
Services	.40	.15	.38	.19	.28	.30
Dependent:						
Log hourly wage	1.59	.88	1.92	1.42	1.20	1.17
Sample size	1,738	3,056	1,176	1,603	5,580	4,378

formal-sector workers, $\overline{X}'_f$ ($\beta_f - \beta_i$), and the unexplained premium weighted by the average characteristics of the informal-sector workers, $\overline{X}'_i$ ($\beta_f - \beta_i$).[23] Corresponding results under the firm size criterion are given in the appendix.

The premiums are substantial in El Salvador. As table 7 shows, the mean log wage rate for Salvadoran women in the formal sector is 0.96 higher than the mean log wage rate in the informal sector. Part of this raw difference can be explained by intersectoral differences in the industrial composition of employment and in the observed characteristics of the average worker. The rest of the difference, between 0.38 and 0.48 (40%–50%), depending on the weighting scheme, is an unexplained premium for formal-sector work; Salvadoran women in the formal sector simply earn more on average than do women with the

TABLE 4

FORMAL AND INFORMAL SECTOR WAGE EQUATIONS: FEMALES

	EL SALVADOR		PERU		MEXICO	
	Sector		Sector		Sector	
	Formal	Informal	Formal	Informal	Formal	Informal
Years schooling	.0646	.0413	.0543	.0821	.0787	.0496
	(11.06)	(5.92)	(3.95)	(4.65)	(16.58)	(5.31)
High school diploma	.0299	.2534	.1697	.0094	.0404	.1144
	(.55)	(2.99)	(.95)	(.08)	(1.23)	(1.48)
Age	.0389	.0421	.0801	.0916	.0430	.0577
	(4.40)	(7.02)	(3.97)	(7.27)	(8.53)	(8.28)
Age^2	−.00033	−.00043	−.00084	−.00091	−.00040	−.00062
	(2.86)	(6.51)	(3.20)	(5.98)	(5.71)	(7.33)
Urban 1	.0620	.1151	.1219	.0062	.0074	.0920
	(2.11)	(2.85)	(1.76)	(.09)	(.29)	(1.80)
Urban 2	· · ·	· · ·	· · ·	· · ·	.0524	.1831
					(2.32)	(3.48)
Agriculture	−.3477	−.0804	−.4011	−.9883	−.0815	.2971
	(2.34)	(.30)	(.58)	(3.47)	(.29)	(.84)
Manufacturing	−.2020	−.1338	−.1700	−.1317	−.2229	−.1127
	(3.09)	(.52)	(1.19)	(.54)	(4.94)	(.73)
Construction	−.2178	−.1878	· · ·	· · ·	−.1262	.3500
	(1.42)	(.41)			(1.34)	(1.17)
Commerce	−.2984	−.1828	−.4319	.1631	−.2954	−.0900
	(4.59)	(.71)	(3.06)	(.69)	(6.39)	(.60)
Transportation and communication	.2040	.6793	.2066	.5819	−.0485	.3910
	(1.65)	(1.89)	(1.02)	(1.31)	(.75)	(1.50)
Services	.0380	−.1117	−.0589	−.2269	−.2136	.0161
	(.66)	(.43)	(.51)	(.94)	(4.99)	(.11)
Constant	−.0294	−.3618	−.6218	−.1620	−.4402	−.5693
	(.17)	(1.26)	(1.49)	(4.47)	(4.24)	(2.66)
Sample size	942	2,255	465	981	2,645	1,393
R^2	.46	.09	.18	.18	.33	.14

NOTE.—*t*-values are in parentheses.

same observable characteristics working in the same industries in the informal sector. The mean log wage of Salvadoran men in the formal sector is 0.71 higher than the mean log informal-sector wage. Of this raw difference, 0.26–0.36 (37%–51%) cannot be explained by differences in observed personal characteristics.

Table 7 shows that the premiums are relatively large for Peruvian women but also significant for Peruvian men. For women, personal differences explain only half the difference in mean log wages. One-quarter of the difference remains unexplained for men.

Unexpectedly, controlling for observable characteristics completely washes out the small wage advantage that formal-sector workers appeared to have in Mexico. Table 7 shows that observationally

TABLE 5

FORMAL AND INFORMAL SECTOR WAGE EQUATIONS: MALES

| | EL SALVADOR | | PERU | | MEXICO | |
| | Sector | | Sector | | Sector | |
	Formal	Informal	Formal	Informal	Formal	Informal
Years schooling	.0726	.0614	.1132	.1035	.0860	.0617
	(17.73)	(10.69)	(14.58)	(8.41)	(24.82)	(13.29)
High school diploma	.0543	.2594	−.1605	−.0438	.1401	.2080
	(1.45)	(3.85)	(2.16)	(.52)	(4.99)	(4.98)
Experience	.0267	.0407	.0363	.0599	.0385	.0458
	(10.59)	(14.52)	(6.73)	(13.07)	(21.14)	(21.76)
Experience^2	−.00023	−.00051	−.00038	−.00082	−.00052	−.00064
	(5.37)	(12.48)	(3.48)	(10.32)	(14.21)	(17.18)
Urban 1	.0469	.1909	.0759	.1907	.1592	.2193
	(2.12)	(5.46)	(1.86)	(4.00)	(8.34)	(8.74)
Urban 2	...	...	...	...	.1058	.1643
					(6.25)	(6.30)
Agriculture	−.3709	−.6307	−.4141	−.5457	−.4905	−.8583
	(4.36)	(4.39)	(2.76)	(3.29)	(3.05)	(6.24)
Manufacturing	−.0662	−.2057	−.1925	−.0712	−.1174	−.3111
	(1.51)	(1.45)	(2.90)	(.48)	(3.40)	(3.00)
Construction	−.1508	−.0862	−.2108	.1527	−.0921	−.3015
	(2.88)	(.60)	(1.90)	(.96)	(2.07)	(2.86)
Commerce	−.2004	−.1577	−.3201	.0369	−.1927	−.3476
	(4.25)	(1.11)	(4.36)	(.25)	(5.21)	(3.40)
Transportation and communication	.0050	.1662	−.0986	.2328	−.0411	−.1139
	(.09)	(1.14)	(1.16)	(1.48)	(.92)	(1.07)
Services	−.0240	−.1284	−.2003	.0731	−.2052	−.2257
	(.59)	(.90)	(3.50)	(.49)	(5.89)	(2.21)
Constant	.5089	.1383	.3054	−.2913	−.0698	.2743
	(8.31)	(.91)	(2.65)	(1.59)	(1.41)	(2.47)
Sample size	1,738	3,056	1,176	1,603	5,580	4,378
R^2	.38	.25	.27	.21	.34	.23

NOTE.—t-values are in parentheses.

identical workers earned more in Mexico in 1990 in the informal sector than in the formal sector.

Three points should be added here. First, benefits obviously differ between workers who are covered by social security and those who are not. On this ground alone, compensating differentials theory would lead one to expect informal-sector wages to be higher than formal-sector wages. This may help to explain the informal-sector premium in Mexico; it cannot explain the formal-sector premiums in El Salvador and Peru. Similarly, a risk premium for informal-sector operations could help explain the Mexican result, but not those of El Salvador and Peru.

Second, because of their numerical importance in the informal

TABLE 6

CHOW TESTS FOR DIFFERENCES IN WAGE COEFFICIENTS

	Females	Males
El Salvador, F-value	12.02**	16.69**
	(12, 3,173)	(12, 4,770)
Peru, F-value	7.51**	3.02**
	(11, 1,424)	(12, 2,755)
Mexico, F-value	3.58**	13.48**
	(13, 4,012)	(13, 9,932)

NOTE.—Numbers in parentheses are degrees of freedom.
** Indicates the F-value is significant at the .01 level.

TABLE 7

TOTAL AND UNEXPLAINED WAGE GAPS

	Females	Males
El Salvador:		
Mean log formal wage	1.60	1.59
Mean log informal wage	.64	.88
Difference in mean log wages	.96	.71
Unexplained difference (FW)	.48**	.26**
	(19.7)	(16.2)
Unexplained difference (IW)	.38**	.36**
	(24.4)	(29.2)
Peru:		
Mean log formal wage	1.90	1.92
Mean log informal wage	1.02	1.42
Difference in mean log wages	.89	.50
Unexplained difference (FW)	.31**	.14**
	(7.3)	(5.9)
Unexplained difference (IW)	.56**	.12**
	(19.1)	(5.9)
Mexico:		
Mean log formal wage	1.12	1.20
Mean log informal wage	1.04	1.17
Difference in mean log wages	.09	.02
Unexplained difference (FW)	−.07**	−.11**
	(5.6)	(13.5)
Unexplained difference (IW)	−.09**	−.13**
	(5.4)	(14.5)

NOTE.—FW uses the mean characteristics of formal sector workers; IW uses the mean characteristics of informal sector workers. The t-values (in parentheses) are calculated from pooled regression standard errors.
** Significant at the .01 level.

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TABLE 8

OWNERS AND SELF-EMPLOYED AS
PERCENT OF ALL INFORMAL-
SECTOR WORKERS

El Salvador:	
Female	75.7
Male	40.7
Peru:	
Female	75.0
Male	62.9
Mexico:	
Female	46.0
Male	51.7

sector (see table 8), we have included self-employed people and small entrepreneurs in all of the above analyses. However, we recognize that measuring the earnings of the self-employed is an especially difficult problem. Profits may be confused with returns to labor, and the return to the work of unpaid family members may have been lumped into the measured income of the self-employed person.

We also note that students of wage determination in the United States have found a positive correlation between wage rates and firm size. This literature does not focus on truly small firms (by our firm size definition, informal-sector firms have five or fewer workers), and its estimated elasticities of the wage with respect to firm size imply premiums much smaller than those we find in Salvador and Peru.[24] Nonetheless, the work on firm size in some ways parallels work on sectoral wage differentials. If the categorical variables on firm size in our data permitted it, we would examine the parallels more closely.

III. Endogenous Sample Selection

We calculate wage premiums on the basis of the estimated coefficients of the sectoral earnings functions. However, if workers freely choose between employment in the formal and informal sectors, the wage and the sector of employment are simultaneously determined, and the same unobserved individual peculiarities that drive one result may also drive the other. One of Ciudad Nezahualcóyotl's microentrepreneurs said that he earned more in his car parts shop than he could through formal-sector employment. The same unobserved personal characteristic that makes him likely to choose informal-sector work may also raise his informal-sector wage above that of a person of the same observed characteristics drawn randomly from the population. If everyone in the informal sector shares that "certain something," then the wages we actually observe among informal-sector workers are higher than those we should expect for the population as a whole, and the OLS parameter estimates are biased.[25]

Well-established techniques are available for incorporating this simultaneity into empirical work when the selection rule is clear. Unfortunately, as we have noted, there is no clear consensus about how workers sort themselves—or are sorted—between sectors.

We propose a very simple model that is consistent with our hypothesis that those who choose to work can also freely choose the sector in which they will work. Consider an individual's multiplicatively separable utility function $U = Y(M)Z(N)$, where M is the quantity consumed of a marketed composite good and N is the nonmarket, nonwage benefit accruing from work in a particular sector. Then $V = X(E)Z(N)$ expresses utility as a function of N and of expenditure on the marketed good E. Assume that X is linearly homogeneous in E and that E is equal to hours worked, h, times the real wage, w, with w measured in units of the composite good. We assume that w and N depend on the sector chosen but that h does not. Then the utility derived from work in sector s will be $V_s = w_s X(h) Z(N_s)$. Taking logs and subtracting, the difference in utility between sector 1 and sector 0 is

$$\ln V_1 - \ln V_0 = \ln w_1 - \ln w_0 - [\ln Z(N_0) - \ln Z(N_1)]. \qquad (2)$$

A worker will choose sector 1 if $\ln V_1 - \ln V_0 > 0$. Let B represent the net relative nonwage benefit of working in sector 0, $B = [\ln Z(N_0) - \ln Z(N_1)]$. Then a worker will choose the formal sector ($s = 1$) if and only if the formal-sector wage premium, which could be either positive or negative, exceeds the net nonwage benefit associated with informal-sector work, B, which could also be positive or negative:

$$\begin{cases} \ln W_f - \ln W_i > B \Rightarrow s = 1 \\ \ln W_f - \ln W_i \leq B \Rightarrow s = 0. \end{cases} \qquad (3)$$

The notion of net nonwage benefits of informal-sector work may require some explanation. Formal-sector work often brings nonwage benefits, but nonwage benefits may be associated with informal-sector work, as well. One of the women of Nezahualcóyotl said that she valued the sense of independence that comes with informal-sector employment; this is a nonmarket, nonwage benefit. Informal-sector work is often done close to one's home under flexible scheduling, and, as another of the women said, it may be carried on in conjunction with child care and home vigilance. Some might see this as a way to avoid the child care costs associated with formal-sector employment; others might see it as a quality of informal-sector employment that is desirable in itself. The term B is meant to capture the balance of nonwage benefits between sectors.

We expect B to vary with the characteristics of a worker and the person's position in the household. We suggest, in an admittedly ad hoc manner, that the value attached to the independence and flexibility of informal-sector employment will depend on whether or not one is married (legally or through *unión consensual*), on whether or not one is the household head, on the number of infants in the household who are not yet one year old, and on the number of inactive adults (alternative caregivers?) present in the household. All of these effects are likely to depend on whether one is male or female.

We also hypothesize that the earnings of other members of the household affect sectoral choice. There is no wage uncertainty in our model, but our data show that the variance of the informal-sector wage exceeds the variance of the formal-sector wage, and it seems plausible that informal-sector incomes may in fact be more subject to shocks than formal-sector incomes. If so, the earnings of other members of the household might serve as a sort of insurance fund, permitting a worker to take the risk of accepting informal-sector work, and we include this variable as a possible determinant of B.[26]

All the variables determining the wage in the earnings functions of Section II and the variables thought to influence B were substituted into a stochastic variant of equation (3) (eq. [3']) and the reduced form probit was estimated.

$$\begin{cases} \ln W_f - \ln W_i > B + \epsilon_0 \Rightarrow s = 1 \\ \ln W_f - \ln W_i \leq B + \epsilon_0 \Rightarrow s = 0. \end{cases}$$
$$\epsilon_0 \sim N(0, 1)$$
$$(3')$$

The results are given in table 9, using the criterion of coverage by the social security system.[27] Likelihood ratio tests show that the variables we have chosen have significant explanatory power.[28]

The probability of formal-sector employment increases with schooling and first increases, then decreases, with age or experience. The results for the other variables differ somewhat from country to country; the Peruvian coefficients are often statistically insignificant. Consider men first. In general, for men, the probability of formal-sector work increases with marriage and with being a household head. The number of infants has no effect. The number of inactive adults in the household raises the probability of being a formal-sector worker, as expected. The probability of being in the formal sector also rises, unexpectedly, with the other labor income of the household. For women, marriage either has no significant effect or decreases the probability of formal-sector work, as do the number of infants in the household and the earnings of other members of the household. The number

TABLE 9

PROBITS FOR BENEFITS CRITERION

	EL SALVADOR		PERU		MEXICO	
	Females	Males	Females	Males	Females	Males
Years schooling	.1270	.0595	.2008	.1654	.0313	.0382
	(10.84)	(7.19)	(9.34)	(12.89)	(2.99)	(6.20)
High school diploma	.2256	.3464	.2977	−.5810	.2581	.0517
	(2.03)	(4.34)	(1.60)	(5.90)	(3.39)	(1.00)
Experience*	.0710	.0186	.1115	.0674	.0497	.0167
	(4.38)	(3.46)	(4.83)	(8.73)	(4.69)	(4.41)
Experience^2†	−.00100	−.00036	−.00120	−.00111	−.00077	−.00049
	(4.90)	(4.45)	(3.98)	(8.38)	(5.63)	(7.61)
Married	.0336	.2638	.1655	−.0079	−.2337	.2127
	(.45)	(4.27)	(1.32)	(.10)	(4.00)	(2.23)
Head of household	.1761	.2671	−.0765	.1004	−.1627	.1154
	(1.88)	(3.73)	(.42)	(1.20)	(2.13)	(2.23)
Number of infants	−.2566	−.0022	−.1401	−.130E − 04	−.0179	−.0457
	(2.54)	(.04)	(1.01)	(.00)	(.23)	(1.13)
Inactive people	.0483	.0521	.0798	.0518	.0543	.0420
	(2.03)	(3.02)	(2.51)	(2.62)	(3.24)	(4.17)
Labor income of other household members	.425E − 05	.646E − 04	.115E − 04	.970E − 05	−.508E − 04	.280E − 04
	(.15)	(2.90)	(.80)	(.79)	(2.77)	(2.11)

Urban 1	.4285	.3042	.2395	.2025	− .0395	.0069
	(6.94)	(6.76)	(2.54)	(3.68)	(.72)	(.21)
Urban 2	. . .	. . .	. . .	. . .	.1851	.3287
					(3.48)	(10.29)
Agriculture	− 1.17	− 1.84	− 1.43	− 1.54	− 1.18	− 1.74
	(4.30)	(12.56)	(2.63)	(9.18)	(2.35)	(8.51)
Manufacturing	− .9380	− .9296	− .5015	− .7991	− .1438	− .2727
	(4.63)	(7.60)	(2.43)	(6.83)	(1.14)	(2.99)
Construction	− .8279	− .9292	. . .	− 1.31	− .1200	− 1.19
	(1.97)	(7.12)		(8.94)	(.48)	(12.04)
Commerce	− 1.53	− 1.18	− 1.11	− 1.40	− .9843	− 1.21
	(7.60)	(9.45)	(5.58)	(11.94)	(8.01)	(13.28)
Transportation and communication	.7739	− 1.14	.2431	− 1.10	.2265	− 1.16
	(2.39)	(8.63)	(.70)	(8.33)	(1.15)	(11.61)
Services	− .3818	− .3344	− .2388	− .5631	− .2651	− .8808
	(1.91)	(2.76)	(1.24)	(4.99)	(2.19)	(9.76)
Constant	− 2.05	− .7279	− 5.13	− 1.58	− .2257	.1630
	(5.85)	(4.82)	(10.24)	(8.47)	(.95)	(1.46)
Sample size	3,197	4,794	1,446	2,779	4,038	9,958
χ^2	1,631	1,507	800	922	760	1,604

NOTE.—*t*-values are in parentheses.
* Age for females.
† Age^2 for females.

of inactive people in the home again raises the likelihood of formal-sector work.

The possible importance of incorporating sectoral selection into the wage regressions can be shown as follows. Equation (3') implies that those in the formal sector are workers for whom

$$\epsilon_0 < \ln W_f - \ln W_i - B. \tag{4}$$

The earnings function for formal-sector workers, as estimated in Section II, had the form

$$\ln W_f = X_f' \beta_f + \epsilon_f. \tag{5}$$

Estimating equation (5) by OLS over those observed in the formal sector is strictly appropriate only if the expected value of ϵ_f is zero.

Given a variance of ϵ_0 equal to one and covariance between ϵ_f and ϵ_0 equal to σ_{0f}, it is well known[29] that

$$E(\epsilon_f | \epsilon_0 < \ln W_f - \ln W_i - B) = -\sigma_{0f} \frac{\phi(\ln W_f - \ln W_i - B)}{\Phi(\ln W_f - \ln W_i - B)}$$
$$\equiv -\sigma_{0f} \lambda_f, \tag{6}$$

where ϕ is the density and Φ the cumulative distribution of a standard normal random variable and

$$\lambda_f \equiv \frac{\phi(\ln W_f - \ln W_i - B)}{\Phi(\ln W_f - \ln W_i - B)}. \tag{7}$$

Therefore,

$$E(\ln W_f | \epsilon_0 < \ln W_f - \ln W_i - B) = X_f' \beta_f - \sigma_{0f} \lambda_f. \tag{8}$$

Including λ_f as an additional regressor in equation (5) permits unbiased estimation by ordinary least squares, even if unobserved personal characteristics cause the error terms at the two levels of the model to be correlated with one another.

For those observed to work in the informal sector, the equation corresponding to (8) is

$$E(\ln W_i | \epsilon_0 \geq \ln W_f - \ln W_i - B) = X_i' \beta_i + \sigma_{0i} \lambda_i, \tag{9}$$

where

$$E(\epsilon_i | \epsilon_0 \geq \ln W_f - \ln W_i - B) = \sigma_{0i} \frac{\phi(\ln W_f - \ln W_i - B)}{1 - \Phi(\ln W_f - \ln W_i - B)} \equiv \sigma_{0i} \lambda_i, \quad (10)$$

and

$$\lambda_i \equiv \frac{\phi(\ln W_f - \ln W_i - B)}{1 - \Phi(\ln W_f - \ln W_i - B)}. \quad (11)$$

We used our reduced form probit model of sectoral assignment to calculate a selectivity factor $\hat{\lambda}_f$ for each person in the formal sector, and a factor $\hat{\lambda}_i$ for each person in the informal sector. The selectivity factors were added to the wage regressions, which were then run using ordinary least squares with TSP's White-style correction for hetero-skedasticity.[30] The estimated coefficients on the selectivity factors in the wage regressions are given in table 10, again using the social security criterion of informality.[31]

Consider first the informal-sector wage equation. In Peru, the co-efficients on $-\lambda_i$ are insignificantly different from zero. This implies that there is no covariance between the error terms in the sectoral choice and the wage equations, and that the straightforward OLS pa-rameter estimates given in tables 4 and 5 are unbiased. For Salvadoran men and women and for Mexican men, the coefficient on $-\lambda_i$ is nega-tive, implying, by equation (9), that σ_{0i} is positive. In these cases, individuals with high ϵ_0, which makes them likely to choose the infor-mal sector (eq. [3]), also tend to have high ϵ_i, giving them an informal-sector wage higher than that of a randomly selected person with the same observable characteristics. The people in the informal sector are those with a comparative advantage for informal-sector work. In tables 4 and 5, we estimated informal-sector wage equations using data only on workers actually observed in the informal sector, who now seem to be people with that "certain something" that leads to success in informal-sector work. Therefore, informal-sector wage estimates based on the parameters of tables 4 and 5 may overstate the wage a Salvadoran or a Mexican man ought to expect when moving into informal-sector work. For Mexican women in the informal sector the opposite effect was found: the estimated coefficient on $-\lambda_i$ is positive, and wage estimates based on table 4 may understate the expected wage of a woman moving into informal-sector employment.

In the formal sector, sample selection seems to have no significant impact on the wage regressions for Salvadoran or Peruvian women. For Mexican women, the coefficient on λ_f is significantly positive. This implies, by equation (8), that σ_{0f} is negative. Therefore, Mexican women with low ϵ_0, who are likely to choose formal-sector employ-ment (eq. [3]), tend to have high ϵ_f, generating a relatively high formal-

TABLE 10

COEFFICIENTS ON SELECTIVITY VARIABLE IN WAGE REGRESSIONS

	EL SALVADOR		PERU		MEXICO	
	Females	Males	Females	Males	Females	Males
Formal wage equation:						
Selection coefficient: λ_f	−.207	−.271**	−.071	−.960**	1.17**	−.406**
	(.98)	(3.30)	(.27)	(4.24)	(8.87)	(3.78)
Informal wage equation:						
Selection coefficient: $-\lambda_i$	−.517**	−1.13**	−.206	−.262	1.04**	−1.36**
	(3.13)	(9.38)	(.93)	(.90)	(4.65)	(9.22)

* Significant at the .05 level.
** Significant at the .01 level.

sector wage. Thus, wage estimates based on the coefficients of table 4 overestimate the expected wage of a randomly selected Mexican woman moving into formal-sector employment. Unexpectedly, however, for men in each of the countries, λ_f is negative, implying that σ_{0f} is positive. In these cases, wage estimates based on tables 4 and 5 may understate the wage to be expected by a man who moves into formal-sector employment.

The fundamental question for us is whether an ad hoc but reasonable model of sectoral assignment explains the unexplained wage premiums found in Section II of this article. In fact, in Peru and El Salvador, informal-sector workers seem not to be drawn from the lower end of the informal-sector wage distribution, nor are formal-sector workers drawn from the upper end of the formal-sector wage distribution. Therefore, the wage premium earned by formal-sector workers in these countries remains unexplained. In Mexico, women working in the formal sector are drawn from the high end of the formal-sector wage distribution, while women in the informal sector are not drawn from the high end of the informal-sector wage distribution; thus, the informal-sector wage premium that we found remains unexplained. Mexican men in the informal sector seem to be drawn from the upper end of the informal-sector wage distribution while men in the formal sector are not drawn from the upper end of their wage distribution. In this one case, endogenous sample selection might contribute to the unexplained wage premium for informal-sector work.

Extravagant claims ought not to be based on this model of sectoral assignment. Little microeconomic work grounds the specification of the rule for sectoral choice. Moreover, the model takes for granted that workers are free to allocate themselves to whichever sector is preferred, which may not be the case. Reviewing parallel attempts to introduce endogenous sample selection into the calculation of union wage gaps, H. G. Lewis wrote, "A substantial fraction of the SE [simultaneous equations] estimates are, I think, preposterously large or outlandishly negative. . . . From the practical point of view of estimating the mean wage gap in the work force, the SE estimates are, I think, considerably less reliable than their OLS counterparts."[32] Although the probit model handily summarizes the characteristics of workers in the two sectors, our complete model of endogenous selection offers little help in explaining the observed differences in wage patterns.

IV. Summary and Lines of Research
One-third to one-half of all paid employment is in the informal sector in Mexico, El Salvador, and Peru. Our analysis reveals patterns in the personal characteristics of informal-sector workers as well as in the characteristics of their work. The young and the old are more likely to

be in the informal sector than are prime-aged workers. Formal-sector workers generally have more schooling than do informal-sector workers. Retail trade is by far the largest single activity of informal-sector workers in all three countries, but construction, transportation, and personal services are also largely informal-sector activities. Jobs calling for very short or very long work weeks are likely to be in the informal sector.

Running OLS wage regressions for men and women in each sector, we found the returns to schooling and experience to have the standard signs and magnitude in all 12 cases. Substantial returns to schooling in the informal sector do not fit the image of a secondary sector as sketched by Dickens and Lang. A Chow test rejected the hypothesis that the two sectors are characterized by identical wage-setting patterns.

The wage regressions were used to calculate unexplained wage gaps between the sectors. In El Salvador and Peru, we found that significant wage premiums are associated with work in the formal sector. Unexpectedly, we found in Mexico that the premium is associated with informal-sector work.

Using a reduced form probit selection model, we found that for men the probability of formal-sector employment increases with heading a household, with marriage, and with the number of inactive adults in the household. For women, the model shows the probability of formal-sector employment decreasing with marriage and with the number of infants in the household and increasing with the number of inactive adults in the household. Incorporation of the selectivity factor into the wage regression proved in most cases to reinforce the wage gaps that we found in straight OLS estimation.

We have been as inclusive as possible in our analysis, including not only very young and very old workers and part-time workers but also the self-employed. Since self-employment is at the heart of the informal-sector experience, we do not wish to exclude it from our analysis. However, both earnings and hours worked may be measured with special imprecision by the self-employed. We have also been careful to include alternative definitions of the informal sector. Results by social security coverage have been presented here; qualitatively similar results under the firm size definition are available from the authors.

Additional data would be useful. Wages might be affected by job tenure and, in some countries, by ethnicity. The choice of sector might depend on household nonlabor income and on whether the worker receives social security coverage through the work of a parent or spouse. Data from additional years might also shed some light on these results. C. Woodruff recently found that self-employed workers and workers in small firms saw their earnings rise relative to the earnings

of other workers during Mexico's process of stabilization and liberalization between 1987 and 1990.[33]

Our research, which has examined in a consistent way data from three different countries, casts doubt on the received wisdom that the informal sector, always and everywhere, is a poorly paid but easily entered refuge for those who have no other option for employment. Mexico, at least, seems to require a different story.

Appendix
Results under Firm Size Definition of Informal Sector
In our research, we have used two different operational criteria for identifying the informal sector, one based on coverage by social security systems and the other based on firm size. In general only the social security results were presented in the article. Complete results under the criterion of firm size are available on request. Here we go directly to the raw mean log wage gap and the unexplained formal-sector premium (table A1).

TABLE A1

WAGE GAPS WITH INFORMAL SECTOR DEFINED BY FIRM SIZE

	Females	Males
El Salvador:		
Mean log formal wage	1.42	1.37
Mean log informal wage	.60	.84
Difference in log wages	.82	.53
Unexplained difference (FW)	.46**	.30**
	(21.7)	(22.6)
Unexplained difference (IW)	.30**	.27**
	(17.7)	(18.0)
Peru:		
Mean log formal wage	1.72	1.79
Mean log informal wage	1.12	1.54
Difference in log wages	.61	.25
Unexplained difference (FW)	.19**	.02
	(4.33)	(.82)
Unexplained difference (IW)	.25**	.04
	(8.48)	(1.84)
Mexico:		
Mean log formal wage	1.13	1.22
Mean log informal wage	.97	1.12
Difference in log wages	.16	.10
Unexplained difference (FW)	.03**	.01
	(3.17)	(1.24)
Unexplained difference (IW)	− .04*	− .08**
	(2.19)	(7.41)

NOTE.—FW uses the mean characteristics of formal sector workers; IW uses the mean characteristics of informal sector workers. The *t*-values (in parentheses) are calculated from pooled regression standard errors.
* Significant at the .05 level.
** Significant at the .01 level.

Relative to the results under the social security definition, the formal-sector premiums are reduced in El Salvador and especially in Peru, where the premium for men is now statistically insignificant; conversely, Mexico's informal-sector premium is less under this definition of the informal sector than it was before. Once again, by demonstrating that a formal-sector wage premium cannot always be found, the results cast doubt on the notion that the informal sector is merely a low-wage but easily entered refuge for those excluded from the formal sector.

Notes

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1. Interview by Douglas Marcouiller, July 1992.

2. The origins of the informal sector literature are usually traced to International Labour Organisation, *Employment, Incomes, and Equality: A Strategy for Increasing Productive Employment in Kenya* (Geneva: ILO, 1972); and to Keith Hart, "Informal Income Opportunities and Urban Employment in Ghana," *Journal of Modern African Studies* 11 (March 1973): 61–89. Contemporary surveys of the extensive literature can be found in Harold Lubell, *The Informal Sector in the 1980's and 1990's* (Paris: OECD Development Centre, 1991); Juan Pablo Pérez Sáinz, *Informalidad urbana en América Latina: Enfoques, problemáticas e interrogantes* (Urban informality in Latin America: Perspectives, puzzles, and questions) (Caracas: Editorial Nueva Sociedad, 1991); *Beyond Regulation: The Informal Economy in Latin America,* ed. Victor E. Tokman (Boulder: Lynne Rienner, 1992); and *Contrapunto: The Informal Sector Debate in Latin America,* ed. Cathy A. Rakowski (Albany: SUNY Press, 1994). Also see Gary S. Fields, "Labour Market Modelling and the Urban Informal Sector: Theory and Evidence," in *The Informal Sector Revisited,* ed. David Turnham, Bernard Salome, and Antoine Schwarz (Paris: OECD Development Centre, 1990). Early models of intersectoral wage differentials are found in John Harris and Michael Todaro, "Migration, Unemployment, and Development: A Two-Sector Model," *American Economic Review* 60 (March 1970): 126–42; Gary S. Fields, "Rural-Urban Migration, Urban Unemployment and Underemployment, and Job Search Activity in LDC's," *Journal of Development Economics* 2 (June 1975): 165–87; and Dipak Mazumdar, "Segmented Labor Markets in LDCs," *American Economic Review* 73 (May 1983): 254–59.

3. Manuel Castells and Alejandro Portes, "World Underneath: The Origins, Dynamics, and Effects of the Informal Economy," in *The Informal Economy: Studies in Advanced and Less Developed Countries,* ed. Alejandro Portes, Manuel Castells, and Lauren Benton (Baltimore: Johns Hopkins University Press, 1989), p. 12.

4. For contrasting evaluations of the movement between sectors, see Hernando de Soto, *The Other Path: The Invisible Revolution in the Third World,* trans. June Abbott (New York: Harper & Row, 1989); and Bryan Roberts,

"The Changing Nature of Informal Employment: The Case of Mexico," Texas Papers on Mexico, no. 90-02 (Austin, 1990). For one model of intersectoral movement, see Douglas Marcouiller and Leslie Young, "The Black Hole of Graft: The Predatory State and the Informal Economy," *American Economic Review* 85 (June 1995): 630–46.

5. See Victor E. Tokman, "Policies for a Heterogeneous Informal Sector in Latin America," *World Development* 17 (July 1989): 1067–76.

6. Th. Magnac, "Segmented or Competitive Labor Markets?" *Econometrica* 59 (January 1991): 165.

7. William T. Dickens and Kevin Lang, "A Test of Dual Labor Market Theory," *American Economic Review* 75 (September 1985): 792.

8. T. H. Gindling, "Labor Market Segmentation and the Determination of Wages in the Public, Private-Formal, and Informal Sectors in San José, Costa Rica," *Economic Development and Cultural Change* 39 (April 1991): 585.

9. The complexity of such tests is discussed in James J. Heckman and V. Joseph Hotz, "An Investigation of the Labor Market Earnings of Panamanian Males: Evaluating Sources of Inequality," *Journal of Human Resources* 21 (Fall 1986): 509–42; and in Magnac.

10. Papers cited in this paragraph are Gindling; Michael B. Tannen, "Labor Markets in Northeast Brazil: Does the Dual Market Model Apply?" *Economic Development and Cultural Change* 39 (April 1991): 567–83; Katherine Terrell, "Analysis of the Wage Structure in Guatemala City," *Journal of Developing Areas* 23 (April 1989): 405–24; Edward E. Telles, "Urban Labor Market Segmentation and Income in Brazil," *Economic Development and Cultural Change* 41 (January 1993): 231–50; Heckman and Hotz; and Edward Funkhouser, "The Urban Informal Sector in Central America: Household Survey Evidence," Working Paper in Economics 23-94 (University of California, Santa Barbara, May 1994).

11. The Mexican data are from the Encuesta Nacional de Empleo Urbano, third quarter, 1990, carried out by the Instituto Nacional de Estadística, Geografia, e Informática. For El Salvador we use the Encuesta de Hogares de Propósitos Múltiples 1990, carried out by the Ministerio de Planificación. Peruvian data are from the Encuesta Nacional de Hogares sobre Medición de Niveles de Vida, 1985–86, carried out by the Instituto Nacional de Estadística del Peru and the World Bank.

12. The Salvadoran and Peruvian data cover all urban areas. Our Mexican data cover Mexico City, Guadalajara, and Monterrey, which, according to the 1990 census, account for 33% of Mexico's urban population. Our analysis for metropolitan San Salvador and Lima showed qualitatively similar results.

13. On firm size, see Jaime Mezzera, *Informal Sector as in PREALC* (Santiago: Programa Regional de Empleo para América Latina y el Caribe [Regional Employment Program for Latin America and the Caribbean], 1990).

14. On social security, see Roberts.

15. Occupational groups 0/1 and 2 of the 1968 International Standard Classification of Occupations and corresponding categories in the Mexican classification scheme.

16. The rationale for excluding paid domestic servants is that they receive an unknown portion of their pay in kind. See Telles, p. 234; Tokman (n. 5 above), p. 1069.

17. Observations for Mexico and El Salvador are weighted by their survey expansion factors in tables 1 and 2 and figs. 1–4. The size of the Mexican informal sector in table 1 may be understated because the information is limited to the three largest cities. Roberts notes that in an earlier survey in Mex-

ico, "the lowest percentage of informal employment is found in Mexico City . . . [while the] highest percentage of informality is reported for the non-metropolitan areas" (p. 6).

18. Neither the lower female participation rate in Mexico nor the tendency of Mexican women to be formal-sector workers is explained by the fact that our Mexican data do not include smaller urban areas. The 1990 population census (Instituto Nacional de Estadística, Geografía, e Informática, *IX censo general de población y vivienda*) indicates that women constitute an even lower percentage of the nonagricultural labor force in Mexico as a whole than they do in the three cities we use. Using data from 10 smaller cities in Mexico, Selby and his colleagues found that women were less likely than men to be in the informal sector (Henry Selby, Arthur D. Murphy, and Stephen Lorenzen, *The Mexican Urban Household: Organizing for Self-Defense* [Austin: University of Texas Press, 1990]).

19. For the moment we ignore the possibility of endogenous sample selection.

20. Calculated as (12 × monthly earnings)/(52 × weekly hours).

21. We are not the first to find high returns to schooling in the informal sector. For Peru, see Peter Moock, Philip Musgrove, and Morton Stelcner, "Education and Earnings in Peru's Informal Nonfarm Family Enterprises," LSMS Working Paper no. 64 (World Bank, Washington, D.C., 1990); and Elizabeth King, "Does Education Pay in the Labor Market? The Labor Force Participation, Occupation, and Earnings of Peruvian Women," LSMS Working Paper no. 67 (World Bank, Washington, D.C., 1990). For Central America, see Funkhouser.

22. As always, the results are for the social security criterion. Again, firm size results are available on request.

23. Precise weighting rules are controversial. See Ronald L. Oaxaca and Michael R. Ransom, "On Discrimination and the Decomposition of Wage Differentials," *Journal of Econometrics* 61 (March 1994): 5–21.

24. See Charles Brown and James Medoff, "The Employer Size-Wage Effect," *Journal of Political Economy* 97 (October 1989): 1034.

25. For a similar problem with self-employed workers, see Irwin Bernhardt, "Comparative Advantage in Self-Employment and Paid Work," *Canadian Journal of Economics* 27 (May 1994): 273–89.

26. Nonlabor income is not available in the Mexican data.

27. Results under the firm size criterion are available upon request.

28. The test statistic, which is equal to twice the difference between the maximized value of the log likelihood function for the unconstrained case and the value for the case in which all coefficients but the constant are constrained to equal zero, follows a χ^2 distribution. The value of this statistic is also given in table 9.

29. See G. S. Maddala, *Limited-Dependent and Qualitative Variables in Econometrics* (New York: Cambridge University Press, 1983), p. 224.

30. Bronwyn H. Hall, *Times Series Processor Version 4.2 User's Guide* (Palo Alto, Calif.: TSP International, February 1993), p. 46.

31. Again, results for the size criterion are available from the authors.

32. H. Gregg Lewis, "Union Relative Wage Effects," in *Handbook of Labor Economics*, vol. 2, ed. Orley Ashenfelter and Richard Layard (Amsterdam: North Holland, 1986), p. 1144.

33. Christopher Woodruff, "Inflation Stabilization and the Vanishing Size-Wage Effect" (University of California, San Diego, Graduate School of International Relations and Pacific Studies, August 1995, mimeographed).

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