

The Structure of Worker Compensation in Brazil, With a Comparison to France and the United States*

Based on RAIS Annualized Average Monthly Wages

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1 Data

Table 1: MEAN LOG WAGES AND EMPLOYMENT SHARES

	Mean Log Wage				Employment Shares			
	Manuf	Servcs	Comm	Agric	Manuf	Servcs	Comm	Agric
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Year:</i>	Sector							
1990	8.016	7.953	7.461	7.352	.398	.433	.151	.018
1997	8.872	8.797	8.406	8.056	.288	.500	.171	.041
<i>1990:</i>	Education							
Some college or more	9.014	8.589	8.261	8.146	.093	.217	.070	.027
High school or less	7.913	7.776	7.400	7.330	.907	.783	.930	.973
<i>1997:</i>	Occupation							
Some college or more	9.891	9.462	9.202	9.128	.103	.225	.069	.022
High school or less	8.754	8.604	8.347	8.032	.897	.775	.931	.978
<i>1990:</i>	Gender							
White collar	8.469	8.124	7.503	7.718	.292	.660	.679	.131
Blue collar	7.829	7.620	7.372	7.297	.708	.340	.321	.869
<i>1997:</i>	Gender							
White collar	9.288	8.923	8.420	8.727	.293	.720	.685	.092
Blue collar	8.699	8.475	8.377	7.988	.707	.280	.315	.908
<i>1990:</i>	Gender							
Male	8.174	8.040	7.549	7.421	.728	.558	.648	.802
Female	7.593	7.842	7.299	7.073	.272	.442	.352	.198
<i>1997:</i>	Gender							
Male	8.987	8.881	8.469	8.094	.744	.520	.625	.844
Female	8.536	8.706	8.301	7.854	.256	.480	.375	.156

Source: RAIS São Paulo state 1990 and 1997 (prime age workers in their highest-paying job). Wages in current USD (1990 and 1997 exchange rates). The log U.S. CPI change between 1990 and 1997 is .187.

Table 2: EMPLOYMENT SHARES 1990

	Manuf	Servcs	Comm	Agric	Total
	(1)	(2)	(3)	(4)	(5)
Sector					
	.398	.433	.151	.018	1.000
Education					
Primary School Education (or less)	.537	.550	.485	.806	.539
Some High School Education	.375	.239	.455	.172	.324
Some College Education	.034	.063	.028	.008	.046
College Graduate	.054	.148	.031	.013	.091
<i>Total</i>	1.000	1.000	1.000	1.000	1.000
Occupation					
Professional or Managerial Occ.	.079	.224	.061	.043	.139
Technical or Supervisory Occ.	.096	.155	.328	.026	.155
Other White Collar Occ.	.117	.279	.288	.062	.212
Skill Int. Blue Collar Occ.	.551	.140	.166	.689	.317
Low-skill Int. Blue Collar Occ.	.157	.203	.156	.180	.177
<i>Total</i>	1.000	1.000	1.000	1.000	1.000
Gender					
Female	.272	.442	.352	.199	.356
Male	.728	.558	.648	.801	.644
<i>Total</i>	1.000	1.000	1.000	1.000	1.000
Observations	2,364,007	2,585,223	894,885	109,786	5,953,901

Source: RAIS São Paulo state 1990 (prime age workers in their highest-paying job).

Table 3: EMPLOYMENT SHARES 1997

	Manuf (1)	Servcs (2)	Comm (3)	Agric (4)	Total (5)
Sector					
	.288	.500	.171	.041	1.000
Education					
Primary School Education (or less)	.487	.489	.490	.755	.499
Some High School Education	.410	.285	.441	.223	.345
Some College Education	.037	.051	.033	.007	.042
College Graduate	.066	.175	.036	.015	.114
<i>Total</i>	1.000	1.000	1.000	1.000	1.000
Occupation					
Professional or Managerial Occ.	.072	.169	.057	.035	.117
Technical or Supervisory Occ.	.081	.190	.271	.014	.166
Other White Collar Occ.	.140	.361	.356	.043	.284
Skill Int. Blue Collar Occ.	.589	.089	.172	.856	.278
Low-skill Int. Blue Collar Occ.	.117	.191	.143	.053	.156
<i>Total</i>	1.000	1.000	1.000	1.000	1.000
Gender					
Female	.256	.480	.375	.156	.384
Male	.744	.520	.625	.844	.616
<i>Total</i>	1.000	1.000	1.000	1.000	1.000
Observations	1,837,461	3,204,738	1,090,146	262,683	6,395,028

Source: RAIS São Paulo state 1997 (prime age workers in their highest-paying job).

2 Wage Structure in Manufacturing

Table 4: MANUFACTURING WAGES IN BRAZIL, FRANCE AND THE U.S.

	Brazil 1990	Brazil 1997	France 1992	U.S. 1990
	(1)	(2)	(3)	(4)
Primary School Education (or less)	-1.075 (.002)	-1.000 (.002)	-.338 (.009)	-.526 (.008)
Some High School Education	-.923 (.002)	-.881 (.002)	-.256 (.009)	-.404 (.007)
Some College Education	-.339 (.003)	-.316 (.003)	-.200 (.009)	-.334 (.007)
College Graduate			-.064 (.016)	-.123 (.007)
Professional or Managerial Occupation	.856 (.002)	.912 (.002)	.760 (.009)	.359 (.004)
Technical or Supervisory Occupation	.600 (.002)	.632 (.002)	.401 (.007)	.206 (.004)
Other White Collar Occupation	.262 (.002)	.249 (.002)	.169 (.011)	-.039 (.005)
Skill Intensive Blue Collar Occupation	.239 (.001)	.225 (.001)	.155 (.007)	.083 (.003)
Potential Labor Force Experience	.095 (.0005)	.082 (.0007)	.069 (.003)	.083 (.002)
Quadratic Experience Term	-.003 (.00005)	-.003 (.00007)	-.004 (.0002)	-.003 (.0001)
Cubic Experience Term	.00005 (2.29e-06)	.00008 (2.86e-06)	.0001 (1.00e-05)	.00007
Quartic Experience Term	-3.01e-07 (3.24e-08)	-7.64e-07 (3.89e-08)	-1.20e-06 (1.00e-07)	-4.70e-07 (3.00e-08)
Female	.060 (.005)	.070 (.006)	.052 (.024)	-.078 (.019)
Female × Primary School Education (or less)	.106 (.004)	.051 (.004)	-.0006 (.021)	.041 (.016)
Female × Some High School Education	-.016 (.004)	-.058 (.004)	-.016 (.021)	-.009 (.015)
Female × Some College Education	.018 (.005)	-.005 (.005)	.025 (.021)	-.019 (.015)
Female × College Graduate			-.062 (.029)	-.022 (.015)
Female × Professional or Managerial Occupation	-.101 (.004)	-.058 (.005)	-.049 (.016)	-.086 (.007)
Female × Technical or Supervisory Occupation	-.173 (.003)	-.250 (.004)	-.006 (.011)	.037 (.008)
Female × Other White Collar Occupation	.088 (.003)	.071 (.003)	.033 (.013)	.046 (.006)
Female × Skill Intensive Blue Collar Occupation	-.208 (.002)	-.167 (.003)	-.045 (.010)	-.043 (.008)
Female × Potential Labor Force Experience	-.056 (.0008)	-.036 (.001)	-.047 (.004)	-.016 (.003)
Female × Quadratic Experience Term	.002 (.0001)	.002 (.0001)	.004 (.0003)	.0003 (.0002)
Female × Cubic Experience Term	-.00006 (4.35e-06)	-.00005 (5.63e-06)	-.0001 (1.00e-05)	.00000
Female × Quartic Experience Term	7.06e-07 (6.32e-08)	5.40e-07 (7.78e-08)	1.20e-06 (1.10e-07)	1.80e-08 (4.00e-08)
R^2 (within)	.508	.468	.817	.617
Residual degrees of freedom	2,326,428	1,828,049	23,920	148,992

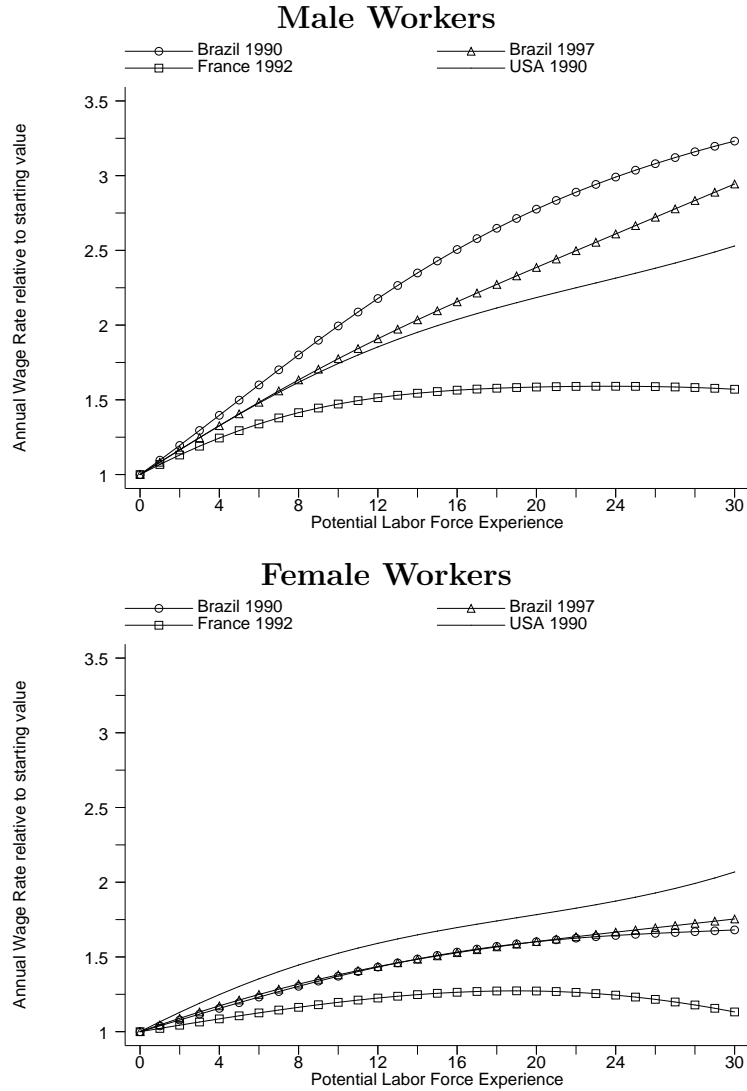
Sources: RAIS São Paulo state manufacturing 1990 and 1997 (prime age workers in their highest-paying job), Abowd, Kramarz, Margolis and Troske (2001) for France and the U.S., controlling for establishment fixed effects. Estimates for Brazil relative to college graduates, for France and the U.S. relative to workers with post-graduate degree. Standard errors in parentheses (insignificant point estimates at the five percent level in *italics*).

Table 5: MANUFACTURING WAGES IN BRAZIL, FRANCE AND THE U.S.

	Brazil 1990 (1)	Brazil 1997 (2)	France 1986 ^a (3)	U.S. 1990 (4)
Professional or Managerial Occupation	1.329 (.002)	1.384 (.002)	.952 (.002)	.532 (.003)
Technical or Supervisory Occupation	.756 (.002)	.812 (.002)	.417 (.001)	.256 (.004)
Other White Collar Occupation	.338 (.002)	.326 (.002)	.147 (.002)	-.019 (.005)
Skill Intensive Blue Collar Occupation	.246 (.001)	.227 (.002)	.170 (.001)	.091 (.003)
Potential Labor Force Experience	.094 (.0005)	.069 (.0007)	.040 (.0006)	.078 (.002)
Quadratic Experience Term	-.004 (.00006)	-.003 (.00008)	-.001 (.00003)	-.003 (.0001)
Cubic Experience Term	.00007 (2.48e-06)	.00006 (3.09e-06)	.00002	.00006
Quartic Experience Term	-5.90e-07 (3.50e-08)	-6.67e-07 (4.21e-08)	-9.40e-08	-4.00e-07 (3.00e-08)
Female	.098 (.003)	.093 (.005)	-.069 (.005)	-.045 (.013)
Female × Professional or Managerial Occupation	-.158 (.004)	-.043 (.005)	-.079 (.005)	-.156 (.006)
Female × Technical or Supervisory Occupation	-.166 (.003)	-.266 (.004)	.006 (.003)	.031 (.008)
Female × Other White Collar Occupation	.127 (.003)	.134 (.003)	.051 (.003)	.039 (.007)
Female × Skill Intensive Blue Collar Occupation	-.232 (.002)	-.183 (.003)	-.016 (.004)	-.055 (.008)
Female × Potential Labor Force Experience	-.056 (.0009)	-.041 (.001)	-.011 (.0009)	-.021 (.003)
Female × Quadratic Experience Term	.002 (.0001)	.002 (.0001)	.0005 (.00005)	.0004 (.0002)
Female × Cubic Experience Term	-.00006 (4.70e-06)	-.00005 (6.09e-06)	-1.00e-05	.000 (1.00e-05)
Female × Quartic Experience Term	7.17e-07 (6.82e-08)	6.23e-07 (8.41e-08)	6.10e-08 (1.00e-08)	<i>-4.70e-09</i> (5.00e-08)
R^2 (within)	.424	.376	.729	.592
Residual degrees of freedom	2,326,434	1,828,055	388,272	149,000

^aAbowd et al. (2001) do not report the estimation results for France 1992 underlying their wage variability measures (see our Table 7).

Sources: RAIS São Paulo state manufacturing 1990 and 1997 (prime age workers in their highest-paying job), Abowd et al. (2001) for France and the U.S., controlling for establishment fixed effects (metropolitan area indicator for France not reported). Estimates for Brazil relative to college graduates, for France and the U.S. relative to workers with post-graduate degree. Standard errors in parentheses (insignificant point estimates at the five percent level in *italics*).



Sources: RAIS São Paulo state manufacturing 1990 and 1997 (prime age workers in their highest-paying job), Abowd et al. (2001) for France 1992 and the U.S. 1990. Wage levels relative to zero experience wage levels from wage component estimates (Table 4). Calculations for France 1992 and the U.S. 1990 based on Abowd et al.'s (2001) estimates and summary statistics.

Figure 1: **Potential experience profiles in Brazil, France and the U.S.**

Table 6: RELATIVE MANUFACTURING WAGES IN BRAZIL, FRANCE AND THE U.S.

	Brazil 1990	Brazil 1997	France 1992	U.S. 1990
	(1)	(2)	(3)	(4)
Education^a				
<i>Male worker:</i>				
College Degree	2.516	2.412	1.376	1.693
Some College	1.793	1.758	1.057	1.073
Primary School (or less)	.859	.888	.920	.885
<i>Female worker:</i>				
College Degree	2.556	2.556	1.488	1.746
Some College	1.855	1.854	1.101	1.062
Primary School (or less)	.970	.990	.935	.930
Occupation^b				
<i>Male worker:</i>				
Professional or Managerial	2.355	2.488	2.139	1.432
Technical or Supervisory	1.821	1.882	1.493	1.228
Other White Collar	1.299	1.283	1.184	.962
Skill-intensive Blue Collar	1.270	1.252	1.168	1.087
<i>Female worker:</i>				
Professional or Managerial	2.128	2.348	2.037	1.313
Technical or Supervisory	1.532	1.466	1.484	1.275
Other White Collar	1.419	1.377	1.224	1.006
Skill-intensive Blue Collar	1.031	1.059	1.116	1.041
Gender^c				
Female worker	.893	.915	.803	.899

^aRelative to worker with some or complete high school education, controlling for occupation.

^bRelative to non-skill-intensive blue collar occupations, controlling for education.

^cFemale relative to male workers, controlling for education and occupation.

Sources: RAIS São Paulo state manufacturing 1990 and 1997 (prime age workers in their highest-paying job), Abowd et al. (2001) for France 1992 and the U.S. 1990. Wage levels relative to comparison-group wage levels from component estimates (Table 4). For France and the U.S., wage prediction of college graduates reassigned to predicted fixed effects component.

Table 7: VARIABILITY OF MANUFACTURING WAGES IN BRAZIL, FRANCE AND THE U.S.

	Mean	St.Dev.	Correlation with			
			$\ln w_i$	$x_i\hat{\beta}$	$\hat{\psi}_j$	$\hat{\varepsilon}_i$
	(1)	(2)	(3)	(4)	(5)	(6)
Brazil 1990						
Log Annual Wage ($\ln w_i$)	8.019	.785	1.000			
Worker Characteristics ($x_i\hat{\beta}$)	.962	.491	.667	1.000		
Establishment-Fixed ($\hat{\psi}_j$)	7.056	.203	.358	.160	1.000	
Residual ($\hat{\varepsilon}_i$)	.000	.550	.700	.000	-.000	1.000
Brazil 1997						
Log Annual Wage ($\ln w_i$)	8.872	.778	1.000			
Worker Characteristics ($x_i\hat{\beta}$)	.878	.441	.622	1.000		
Establishment-Fixed ($\hat{\psi}_j$)	7.994	.267	.435	.161	1.000	
Residual ($\hat{\varepsilon}_i$)	-.000	.549	.705	-.000	-.000	1.000
France 1992^a						
Log Annual Wage ($\ln w_i$)	10.158	.414	1.000			
Worker Characteristics ($x_i\hat{\beta}$)	.637	.287	.791	1.000		
Establishment-Fixed ($\hat{\psi}_j$)	9.521	.172	.581	.237	1.000	
Residual ($\hat{\varepsilon}_i$)	.000	.190	.457	-.003	.000	1.000
U.S. 1990						
Log Annual Wage ($\ln w_i$)	10.174	.544	1.000			
Worker Characteristics ($x_i\hat{\beta}$)	.672	.271	.598	1.000		
Establishment-Fixed ($\hat{\psi}_j$)	9.502	.266	.610	.242	1.000	
Residual ($\hat{\varepsilon}_i$)	.000	.350	.627	-.029	.000	1.000

^aMeans converted to USD (December 31st, 1990).

Sources: RAIS São Paulo state manufacturing 1990 and 1997 (prime age workers in their highest-paying job), Abowd et al. (2001) for France 1992 and the U.S. 1990. Estimates for all three countries from establishment-fixed effects wage regressions relative to other blue-collar occupations, *not* controlling for education to achieve comparability (Table 5). Statistics based on estimation sample. The log U.S. CPI change between 1990 and 1997 is .187.

3 Sectoral Comparisons for 1990 and 1997

Table 8: WAGE STRUCTURE IN BRAZIL 1990, BY SECTOR

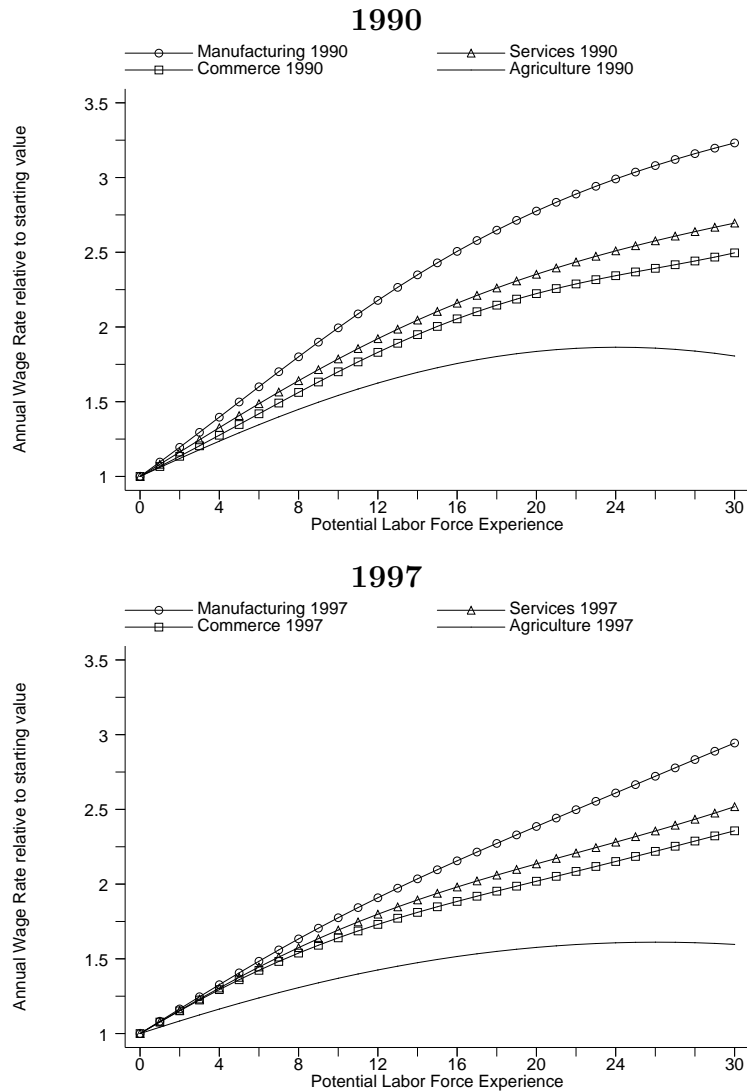
	Manufact. (1)	Services (2)	Commerce (3)	Agriculture (4)
Primary School Education (or less)	-1.075 (.002)	-.948 (.002)	-1.229 (.005)	-1.247 (.014)
Some High School Education	-.923 (.002)	-.848 (.002)	-1.115 (.005)	-1.061 (.014)
Some College Education	-.339 (.003)	-.303 (.003)	-.374 (.007)	-.518 (.022)
Professional or Managerial Occupation	.856 (.002)	.623 (.002)	.654 (.004)	.467 (.008)
Technical or Supervisory Occupation	.600 (.002)	.497 (.002)	.221 (.002)	.343 (.011)
Other White Collar Occupation	.262 (.002)	.237 (.002)	.090 (.002)	.130 (.008)
Skill Intensive Blue Collar Occupation	.239 (.001)	.314 (.002)	.171 (.002)	-.065 (.004)
Potential Labor Force Experience	.095 (.0005)	.081 (.0006)	.065 (.0006)	.060 (.002)
Quadratic Experience Term	-.003 (.00005)	-.003 (.00007)	-.001 (.00008)	-.002 (.0002)
Cubic Experience Term	.00005 (2.29e-06)	.00005 (2.92e-06)	-.00003 (3.89e-06)	.00003 (8.60e-06)
Quartic Experience Term	-3.01e-07 (3.24e-08)	-3.17e-07 (4.06e-08)	7.35e-07 (5.83e-08)	-3.31e-07 (1.21e-07)
Female	.060 (.005)	-.255 (.004)	-.388 (.009)	-.438 (.031)
Female × Primary School Education (or less)	.106 (.004)	.215 (.003)	.397 (.008)	.394 (.029)
Female × Some High School Education	-.016 (.004)	.130 (.003)	.326 (.008)	.256 (.030)
Female × Some College Education	.018 (.005)	.080 (.004)	.175 (.010)	.099 (.041)
Female × Professional or Managerial Occupation	-.101 (.004)	.116 (.003)	-.062 (.007)	.147 (.026)
Female × Technical or Supervisory Occupation	-.173 (.003)	.053 (.003)	-.028 (.004)	.092 (.021)
Female × Other White Collar Occupation	.088 (.003)	.151 (.002)	.122 (.004)	.193 (.015)
Female × Skill Intensive Blue Collar Occupation	-.208 (.002)	-.160 (.004)	-.083 (.006)	.044 (.009)
Female × Potential Labor Force Experience	-.056 (.0008)	-.038 (.001)	-.029 (.001)	-.034 (.004)
Female × Quadratic Experience Term	.002 (.0001)	.002 (.0001)	.0007 (.0001)	.0007 (.0004)
Female × Cubic Experience Term	-.00006 (4.35e-06)	-.00004 (4.66e-06)	<i>7.72e-06</i> (6.72e-06)	<i>-1.15e-06</i> (.00002)
Female × Quartic Experience Term	7.06e-07 (6.32e-08)	4.10e-07 (6.43e-08)	-3.75e-07 (1.01e-07)	<i>3.39e-08</i> (2.52e-07)
Observations	2,330,883	2,530,777	876,164	107,641
R^2 (within)	.508	.367	.320	.322

Sources: RAIS São Paulo state 1990 (prime age workers in their highest-paying job), controlling for establishment-worker fixed effects (manufacturing Table 4). Standard errors in parentheses (insignificant point estimates at the five percent level in *italics*).

Table 9: WAGE STRUCTURE IN BRAZIL 1997, BY SECTOR

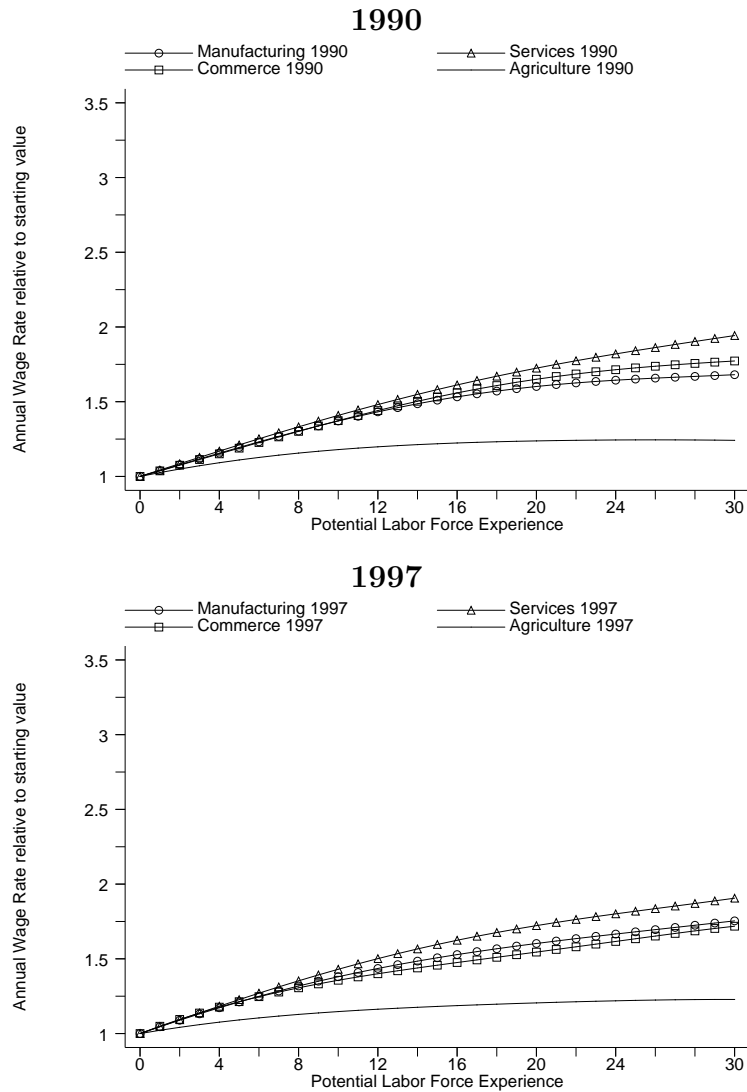
	Manufact. (1)	Services (2)	Commerce (3)	Agriculture (4)
Primary School Education (or less)	-1.000 (.002)	-.826 (.002)	-1.027 (.004)	-.840 (.008)
Some High School Education	-.881 (.002)	-.769 (.002)	-.932 (.004)	-.731 (.009)
Some College Education	-.316 (.003)	-.173 (.003)	-.337 (.005)	-.374 (.014)
Professional or Managerial Occupation	.912 (.002)	.740 (.002)	.656 (.003)	.736 (.007)
Technical or Supervisory Occupation	.632 (.002)	.556 (.002)	.093 (.002)	.675 (.009)
Other White Collar Occupation	.249 (.002)	.220 (.001)	.007 (.002)	.331 (.007)
Skill Intensive Blue Collar Occupation	.225 (.001)	.301 (.002)	.125 (.002)	.085 (.004)
Potential Labor Force Experience	.082 (.0007)	.078 (.0007)	.078 (.0006)	.043 (.001)
Quadratic Experience Term	-.003 (.00007)	-.003 (.00007)	-.004 (.00007)	-.001 (.0001)
Cubic Experience Term	.00008 (2.86e-06)	.00007 (2.97e-06)	.0001 (3.20e-06)	.00002 (5.47e-06)
Quartic Experience Term	-7.64e-07 (3.89e-08)	-5.59e-07 (4.05e-08)	-1.03e-06 (4.65e-08)	-2.00e-07 (7.50e-08)
Female	.070 (.006)	-.264 (.004)	-.270 (.007)	-.191 (.021)
Female × Primary School Education (or less)	.051 (.004)	.146 (.002)	.263 (.005)	.208 (.018)
Female × Some High School Education	-.058 (.004)	.068 (.002)	.212 (.005)	.143 (.018)
Female × Some College Education	-.005 (.005)	.032 (.003)	.114 (.007)	.121 (.027)
Female × Professional or Managerial Occupation	-.058 (.005)	.073 (.003)	-.020 (.005)	-.069 (.019)
Female × Technical or Supervisory Occupation	-.250 (.004)	.140 (.002)	.060 (.003)	-.193 (.021)
Female × Other White Collar Occupation	.071 (.003)	.187 (.002)	.163 (.003)	.034 (.013)
Female × Skill Intensive Blue Collar Occupation	-.167 (.003)	-.074 (.005)	-.046 (.005)	-.075 (.010)
Female × Potential Labor Force Experience	-.036 (.001)	-.032 (.001)	-.027 (.001)	-.020 (.003)
Female × Quadratic Experience Term	.002 (.0001)	.002 (.0001)	.001 (.0001)	.0001 (.0003)
Female × Cubic Experience Term	-.00005 (5.63e-06)	-.00007 (4.48e-06)	-1.00e-05 (5.51e-06)	.00002 (1.00e-05)
Female × Quartic Experience Term	5.40e-07 (7.78e-08)	6.98e-07 (6.11e-08)	1.27e-08 (8.02e-08)	-2.42e-07 (1.71e-07)
Observations	1,831,566	3,185,721	1,087,388	261,579
R^2 (within)	.468	.376	.332	.259

Source: RAIS São Paulo state 1997 (prime age workers in their highest-paying job), controlling for establishment-worker fixed effects (manufacturing Table 4). Standard errors in parentheses (insignificant point estimates at the five percent level in *italics*).



Source: RAIS São Paulo state 1990 and 1997 (prime age male workers in their highest-paying job). Wage levels relative to zero experience wage levels from wage component estimates (Tables 8 and 9).

Figure 2: Potential experience, Male workers Brazil 1990 and 1997



Source: RAIS São Paulo state 1990 and 1997 (prime age female workers in their highest-paying job. Wage levels relative to zero experience wage levels from wage component estimates (Tables 8 and 9).

Figure 3: Potential experience, Female workers Brazil 1990 and 1997

Table 10: WAGE VARIABILITY IN BRAZIL BY SECTOR, 1990

	Mean	St.Dev.	Correlation with			
			$\ln w_i$	$x_i\hat{\beta}$	$\hat{\psi}_j$	$\hat{\varepsilon}_i$
	(1)	(2)	(3)	(4)	(5)	(6)
Manufacturing 1990						
Log Annual Wage ($\ln w_i$)	8.019	.785	1.000			
Worker Characteristics ($x_i\hat{\beta}$)	.056	.541	.727	1.000		
Establishment-Fixed ($\hat{\psi}_j$)	7.963	.183	.346	.163	1.000	
Residual ($\hat{\varepsilon}_i$)	.000	.508	.647	.000	-.000	1.000
Services 1990						
Log Annual Wage ($\ln w_i$)	7.956	.830	1.000			
Worker Characteristics ($x_i\hat{\beta}$)	.177	.480	.600	1.000		
Establishment-Fixed ($\hat{\psi}_j$)	7.779	.335	.436	.054	1.000	
Residual ($\hat{\varepsilon}_i$)	-.000	.573	.691	.000	.000	1.000
Commerce 1990						
Log Annual Wage ($\ln w_i$)	7.464	.742	1.000			
Worker Characteristics ($x_i\hat{\beta}$)	-.476	.403	.573	1.000		
Establishment-Fixed ($\hat{\psi}_j$)	7.939	.214	.345	.105	1.000	
Residual ($\hat{\varepsilon}_i$)	.000	.571	.768	-.000	-.000	1.000
Agriculture 1990						
Log Annual Wage ($\ln w_i$)	7.355	.584	1.000			
Worker Characteristics ($x_i\hat{\beta}$)	-.795	.300	.507	1.000		
Establishment-Fixed ($\hat{\psi}_j$)	8.150	.295	.499	-.012	1.000	
Residual ($\hat{\varepsilon}_i$)	.000	.407	.698	-.000	.000	1.000

Source: RAIS São Paulo state 1990 (prime age workers in their highest-paying job). Estimates from establishment-fixed effects wage regressions in Table 8. Statistics based on estimation sample.

Table 11: WAGE VARIABILITY IN BRAZIL BY SECTOR, 1997

	Mean	St.Dev.	Correlation with			
			$\ln w_i$	$x_i\hat{\beta}$	$\hat{\psi}_j$	$\hat{\varepsilon}_i$
	(1)	(2)	(3)	(4)	(5)	(6)
Manufacturing 1997						
Log Annual Wage ($\ln w_i$)	8.872	.778	1.000			
Worker Characteristics ($x_i\hat{\beta}$)	.084	.498	.695	1.000		
Establishment-Fixed ($\hat{\psi}_j$)	8.788	.241	.423	.176	1.000	
Residual ($\hat{\varepsilon}_i$)	.000	.507	.651	.000	.000	1.000
Services 1997						
Log Annual Wage ($\ln w_i$)	8.797	.805	1.000			
Worker Characteristics ($x_i\hat{\beta}$)	.255	.483	.612	1.000		
Establishment-Fixed ($\hat{\psi}_j$)	8.542	.292	.382	.033	1.000	
Residual ($\hat{\varepsilon}_i$)	-.000	.566	.703	.000	.000	1.000
Commerce 1997						
Log Annual Wage ($\ln w_i$)	8.407	.628	1.000			
Worker Characteristics ($x_i\hat{\beta}$)	-.356	.345	.580	1.000		
Establishment-Fixed ($\hat{\psi}_j$)	8.763	.181	.347	.107	1.000	
Residual ($\hat{\varepsilon}_i$)	-.000	.479	.763	-.000	.000	1.000
Agriculture 1997						
Log Annual Wage ($\ln w_i$)	8.056	.606	1.000			
Worker Characteristics ($x_i\hat{\beta}$)	-.345	.253	.480	1.000		
Establishment-Fixed ($\hat{\psi}_j$)	8.402	.351	.624	.108	1.000	
Residual ($\hat{\varepsilon}_i$)	.000	.401	.662	.000	.000	1.000

Source: RAIS São Paulo state 1997 (prime age workers in their highest-paying job). Estimates from establishment-fixed effects wage regressions in Table 9. Statistics based on estimation sample. The log U.S. CPI change between 1990 and 1997 is .187.

Table 12: RELATIVE WAGES IN BRAZIL BY SECTOR, 1990 AND 1997

	Manufacturing		Services		Commerce		Agriculture	
	1990	1997	1990	1997	1990	1997	1990	1997
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Education^a								
<i>Male worker:</i>								
College Degree	2.516	2.412	2.334	2.159	3.049	2.539	2.890	2.078
Some College	1.793	1.758	1.724	1.815	2.097	1.813	1.721	1.430
Primary School	.859	.888	.905	.945	.892	.909	.830	.897
<i>Female worker:</i>								
College Degree	2.556	2.556	2.051	2.017	2.201	2.054	2.237	1.801
Some College	1.855	1.854	1.641	1.751	1.803	1.643	1.470	1.398
Primary School	.970	.990	.986	1.022	.957	.957	.953	.958
Occupation^b								
<i>Male worker:</i>								
Profess'l or Managerial	2.355	2.488	1.864	2.097	1.923	1.927	1.596	2.088
Technical or Superv.	1.821	1.882	1.643	1.743	1.247	1.098	1.409	1.964
Other White Collar	1.299	1.283	1.267	1.247	1.094	1.007	1.139	1.393
Skill-int. Blue Collar	1.270	1.252	1.370	1.351	1.187	1.134	.938	1.089
<i>Female worker:</i>								
Profess'l or Managerial	2.128	2.348	2.094	2.254	1.807	1.889	1.848	1.949
Technical or Superv.	1.532	1.466	1.733	2.004	1.212	1.165	1.545	1.619
Other White Collar	1.419	1.377	1.474	1.503	1.235	1.185	1.382	1.441
Skill-int. Blue Collar	1.031	1.059	1.167	1.254	1.092	1.082	.979	1.010
Gender^c								
Female worker	.893	.915	.879	.882	.925	.944	.941	.958

^aRelative to worker with some or complete high school education, controlling for occupation.

^bRelative to non-skill-intensive blue collar occupations, controlling for education.

^cFemale relative to male workers, controlling for education and occupation.

Source: Source: RAIS São Paulo state 1990 and 1997 (prime age workers in their highest-paying job). Wage levels relative to comparison-group wage levels from component estimates (Tables 8 and 9).

4 Comparisons to Results from OLS Estimates

Table 13: WAGE STRUCTURE IN BRAZIL 1990, BY SECTOR

	Manufact.	Services	Commerce	Agriculture
	(1)	(2)	(3)	(4)
Primary School Education (or less)	-1.130 (.002)	-1.033 (.002)	-1.330 (.005)	-1.296 (.016)
Some High School Education	-.955 (.002)	-.929 (.002)	-1.204 (.005)	-1.089 (.017)
Some College Education	-.340 (.003)	-.271 (.003)	-.377 (.007)	-.553 (.027)
Professional or Managerial Occupation	.869 (.002)	.642 (.002)	.675 (.004)	.403 (.009)
Technical or Supervisory Occupation	.632 (.002)	.525 (.002)	.242 (.002)	.348 (.012)
Other White Collar Occupation	.274 (.002)	.363 (.002)	.117 (.003)	.115 (.009)
Skill Intensive Blue Collar Occupation	.251 (.001)	.319 (.002)	.149 (.003)	-.052 (.004)
Potential Labor Force Experience	.098 (.0005)	.085 (.0007)	.069 (.0007)	.077 (.002)
Quadratic Experience Term	-.003 (.00006)	-.002 (.00008)	-.0009 (.00009)	-.003 (.0002)
Cubic Experience Term	.00004 (2.43e-06)	.00002 (3.31e-06)	-.00004 (4.11e-06)	.00008 (1.00e-05)
Quartic Experience Term	-2.11e-07 (3.42e-08)	1.58e-07 (4.61e-08)	9.61e-07 (6.17e-08)	-8.66e-07 (1.42e-07)
Female	.081 (.005)	-.254 (.005)	-.469 (.009)	-.387 (.036)
Female × Primary School Education (or less)	.087 (.004)	.177 (.003)	.463 (.008)	.331 (.034)
Female × Some High School Education	-.047 (.004)	.051 (.003)	.396 (.008)	.167 (.034)
Female × Some College Education	.005 (.006)	.037 (.004)	.184 (.011)	.059 (.047)
Female × Professional or Managerial Occupation	-.128 (.004)	-.035 (.003)	-.041 (.007)	.068 (.030)
Female × Technical or Supervisory Occupation	-.198 (.003)	.073 (.003)	-.012 (.004)	-.144 (.023)
Female × Other White Collar Occupation	.068 (.003)	.229 (.002)	.142 (.004)	.008 (.016)
Female × Skill Intensive Blue Collar Occupation	-.233 (.002)	-.177 (.004)	-.074 (.007)	.065 (.011)
Female × Potential Labor Force Experience	-.057 (.0009)	-.036 (.001)	-.027 (.001)	-.037 (.004)
Female × Quadratic Experience Term	.002 (.0001)	.001 (.0001)	.0004 (.0001)	.001 (.0005)
Female × Cubic Experience Term	-.00006 (4.60e-06)	-.00003 (5.28e-06)	.00002 (7.11e-06)	-.00002 (.00002)
Female × Quartic Experience Term	6.92e-07 (6.69e-08)	3.09e-07 (7.30e-08)	-5.80e-07 (1.07e-07)	2.69e-07 (2.93e-07)
Const.	7.951 (.003)	7.748 (.003)	7.978 (.006)	8.139 (.018)
Observations	2,330,883	2,530,777	876,164	107,641
R^2	.529	.374	.329	.264

Source: RAIS São Paulo state 1990 (prime age workers in their highest-paying job). *Not* controlling for establishment-worker fixed effects. Standard errors in parentheses (insignificant point estimates at the five percent level in *italics*).

Table 14: WAGE STRUCTURE IN BRAZIL 1997, BY SECTOR

	Manufact.	Services	Commerce	Agriculture
	(1)	(2)	(3)	(4)
Primary School Education (or less)	-1.091 (.002)	-.885 (.002)	-1.096 (.004)	-.930 (.010)
Some High School Education	-.963 (.002)	-.778 (.002)	-1.006 (.004)	-.772 (.011)
Some College Education	-.265 (.003)	-.046 (.003)	-.318 (.005)	-.369 (.018)
Professional or Managerial Occupation	.940 (.003)	.642 (.002)	.686 (.003)	.900 (.008)
Technical or Supervisory Occupation	.687 (.002)	.473 (.002)	.114 (.002)	.925 (.011)
Other White Collar Occupation	.283 (.002)	.107 (.001)	.029 (.002)	.506 (.008)
Skill Intensive Blue Collar Occupation	.273 (.002)	.157 (.002)	.105 (.002)	.127 (.005)
Potential Labor Force Experience	.083 (.0007)	.083 (.0007)	.081 (.0006)	.063 (.002)
Quadratic Experience Term	-.003 (.00008)	-.003 (.00008)	-.004 (.00008)	-.002 (.0002)
Cubic Experience Term	.00006 (3.14e-06)	.00005 (3.28e-06)	.00009 (3.40e-06)	.00003 (6.94e-06)
Quartic Experience Term	-5.74e-07 (4.28e-08)	-1.72e-07 (4.47e-08)	-9.07e-07 (4.94e-08)	-1.78e-07 (9.51e-08)
Female	.071 (.006)	-.383 (.004)	-.302 (.007)	-.112 (.027)
Female × Primary School Education (or less)	.050 (.004)	.143 (.003)	.302 (.006)	.252 (.022)
Female × Some High School Education	-.069 (.004)	.017 (.003)	.243 (.006)	.157 (.023)
Female × Some College Education	-.079 (.006)	.018 (.004)	.104 (.008)	.174 (.034)
Female × Professional or Managerial Occupation	-.064 (.005)	.105 (.003)	-.031 (.006)	-.060 (.024)
Female × Technical or Supervisory Occupation	-.290 (.004)	.177 (.002)	.052 (.004)	-.293 (.026)
Female × Other White Collar Occupation	.051 (.004)	.334 (.002)	.164 (.003)	-.151 (.016)
Female × Skill Intensive Blue Collar Occupation	-.216 (.003)	.079 (.005)	-.045 (.005)	-.172 (.012)
Female × Potential Labor Force Experience	-.035 (.001)	-.032 (.001)	-.027 (.001)	-.027 (.004)
Female × Quadratic Experience Term	.001 (.0001)	.002 (.0001)	.0009 (.0001)	.001 (.0004)
Female × Cubic Experience Term	-.00003 (6.20e-06)	-.00006 (4.94e-06)	<i>-9.04e-06</i> (5.86e-06)	<i>-1.00e-05</i> (.00002)
Female × Quartic Experience Term	4.29e-07 (8.56e-08)	5.75e-07 (6.74e-08)	<i>-6.63e-08</i> (8.52e-08)	<i>1.21e-07</i> (2.19e-07)
Const.	8.786 (.003)	8.613 (.003)	8.782 (.004)	8.321 (.012)
Observations	1,831,566	3,185,721	1,087,388	261,579
R^2	.484	.382	.338	.235

Source: RAIS São Paulo state 1997 (prime age workers in their highest-paying job). *Not* controlling for establishment-worker fixed effects. Standard errors in parentheses (insignificant point estimates at the five percent level in *italics*).

Table 15: CORRELATION OF WAGE COMPONENTS IN BRAZIL BY SECTOR, 1990

	Mean	St.Dev.	Correlation with		
			$\ln w_i$	$x_i\hat{\beta}$	$\hat{\varepsilon}_i$
	(1)	(2)	(3)	(4)	(5)
Manufacturing 1990					
Log Annual Wage ($\ln w_i$)	8.019	.785	1.000		
Worker Characteristics ($x_i\hat{\beta}$)	.067	.571	.727	1.000	
Residual ($\hat{\varepsilon}_i$)	-.000	.539	.686	.000	1.000
Services 1990					
Log Annual Wage ($\ln w_i$)	7.956	.830	1.000		
Worker Characteristics ($x_i\hat{\beta}$)	.208	.507	.612	1.000	
Residual ($\hat{\varepsilon}_i$)	-.000	.656	.791	.000	1.000
Commerce 1990					
Log Annual Wage ($\ln w_i$)	7.464	.742	1.000		
Worker Characteristics ($x_i\hat{\beta}$)	-.514	.426	.573	1.000	
Residual ($\hat{\varepsilon}_i$)	-.000	.609	.819	-.000	1.000
Agriculture 1990					
Log Annual Wage ($\ln w_i$)	7.355	.584	1.000		
Worker Characteristics ($x_i\hat{\beta}$)	-.784	.300	.514	1.000	
Residual ($\hat{\varepsilon}_i$)	-.000	.501	.858	.000	1.000

Source: RAIS São Paulo state 1990 (prime age workers in their highest-paying job). Estimates from OLS wage regressions in Table 13. Statistics based on estimation sample.

Table 16: CORRELATION OF WAGE COMPONENTS IN BRAZIL BY SECTOR, 1997

	Mean	St.Dev.	Correlation with		
			$\ln w_i$	$x_i\hat{\beta}$	$\hat{\varepsilon}_i$
	(1)	(2)	(3)	(4)	(5)
Manufacturing 1997					
Log Annual Wage ($\ln w_i$)	8.872	.778	1.000		
Worker Characteristics ($x_i\hat{\beta}$)	.086	.541	.696	1.000	
Residual ($\hat{\varepsilon}_i$)	-.000	.559	.718	.000	1.000
Services 1997					
Log Annual Wage ($\ln w_i$)	8.797	.805	1.000		
Worker Characteristics ($x_i\hat{\beta}$)	.184	.498	.618	1.000	
Residual ($\hat{\varepsilon}_i$)	.000	.633	.786	-.000	1.000
Commerce 1997					
Log Annual Wage ($\ln w_i$)	8.407	.628	1.000		
Worker Characteristics ($x_i\hat{\beta}$)	-.375	.365	.581	1.000	
Residual ($\hat{\varepsilon}_i$)	.000	.511	.814	-.000	1.000
Agriculture 1997					
Log Annual Wage ($\ln w_i$)	8.056	.606	1.000		
Worker Characteristics ($x_i\hat{\beta}$)	-.265	.294	.485	1.000	
Residual ($\hat{\varepsilon}_i$)	-.000	.530	.875	-.000	1.000

Source: RAIS São Paulo state 1997 (prime age workers in their highest-paying job). Estimates from OLS wage regressions in Table 14. Statistics based on estimation sample. The log U.S. CPI change between 1990 and 1997 is .187.

Table 17: RELATIVE WAGES IN BRAZIL BY SECTOR, 1990 AND 1997

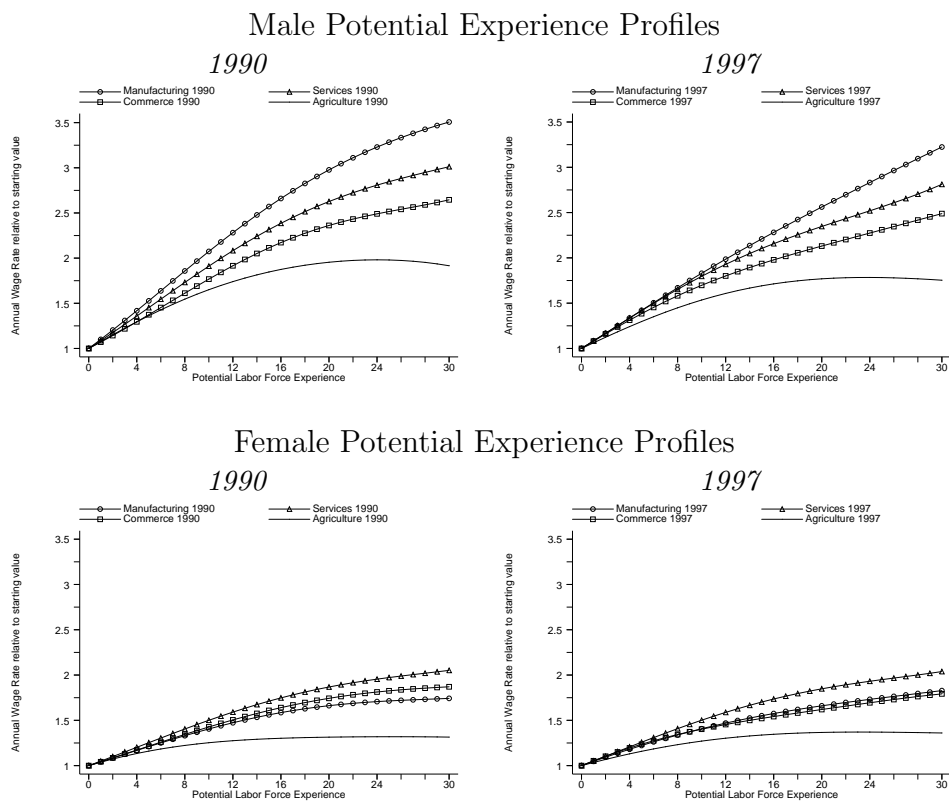
	Manufacturing		Services		Commerce		Agriculture	
	1990	1997	1990	1997	1990	1997	1990	1997
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Education^a								
<i>Male worker:</i>								
College Degree	2.598	2.620	2.532	2.178	3.334	2.736	2.973	2.164
Some College	1.849	2.010	1.932	2.080	2.288	1.990	1.711	1.496
Primary School	.839	.880	.901	.899	.882	.914	.814	.853
<i>Female worker:</i>								
College Degree	2.724	2.807	2.406	2.142	2.244	2.145	2.516	1.850
Some College	1.947	1.989	1.904	2.082	1.851	1.732	1.535	1.522
Primary School	.960	.991	1.022	1.020	.944	.970	.958	.939
Occupation^b								
<i>Male worker:</i>								
Profess'l or Managerial	2.383	2.561	1.900	1.900	1.964	1.986	1.496	2.459
Technical or Superv.	1.882	1.987	1.691	1.605	1.274	1.120	1.417	2.521
Other White Collar	1.316	1.327	1.438	1.113	1.124	1.030	1.121	1.658
Skill-int. Blue Collar	1.285	1.314	1.376	1.170	1.161	1.111	.949	1.136
<i>Female worker:</i>								
Profess'l or Managerial	2.097	2.403	1.835	2.110	1.885	1.926	1.601	2.317
Technical or Superv.	1.544	1.487	1.820	1.914	1.258	1.180	1.226	1.882
Other White Collar	1.409	1.396	1.807	1.554	1.296	1.213	1.130	1.425
Skill-int. Blue Collar	1.018	1.059	1.152	1.266	1.077	1.061	1.013	.957
Gender^c								
Female worker	.883	.900	.848	.845	.924	.942	.934	.961

^aRelative to worker with some or complete high school education, controlling for occupation.

^bRelative to other blue collar occupations, controlling for education.

^cFemale relative to male workers, controlling for education and occupation.

Source: RAIS São Paulo state 1990 and 1997 (prime age workers in their highest-paying job). Wage levels relative to comparison-group wage levels from component estimates with *no* establishment-fixed effects (Tables 13 and 14).



Source: RAIS São Paulo state 1990 and 1997 (prime age workers in their highest-paying job). Wage levels relative to zero experience wage levels from wage component estimates, as reported in Tables 13 and 14.

Figure 4: Potential experience profiles in Brazil

4 COMPARISONS TO RESULTS FROM OLS ESTIMATES *Annualized Average Monthly Wage*

Table 18: WAGE STRUCTURES IN BRAZILIAN MANUFACTURING 1990 AND 1997, WITH AND WITHOUT ESTABLISHMENT FIXED EFFECTS

	<i>RAIS 1990</i>		<i>RAIS 1997</i>	
	FE	OLS	FE	OLS
	(1)	(2)	(3)	(4)
Primary School Education (or less)	-1.075 (.002)	-1.130 (.002)	-1.000 (.002)	-1.091 (.002)
Some High School Education	-.923 (.002)	-.955 (.002)	-.881 (.002)	-.963 (.002)
Some College Education	-.339 (.003)	-.340 (.003)	-.316 (.003)	-.265 (.003)
Professional or Managerial Occupation	.856 (.002)	.869 (.002)	.912 (.002)	.940 (.003)
Technical or Supervisory Occupation	.600 (.002)	.632 (.002)	.632 (.002)	.687 (.002)
Other White Collar Occupation	.262 (.002)	.274 (.002)	.249 (.002)	.283 (.002)
Skill Intensive Blue Collar Occupation	.239 (.001)	.251 (.001)	.225 (.001)	.273 (.002)
Potential Labor Force Experience	.095 (.0005)	.098 (.0005)	.082 (.0007)	.083 (.0007)
Quadratic Experience Term	-.003 (.00005)	-.003 (.00006)	-.003 (.00007)	-.003 (.00008)
Cubic Experience Term	.00005 (2.29e-06)	.00004 (2.43e-06)	.00008 (2.86e-06)	.00006 (3.14e-06)
Quartic Experience Term	-3.01e-07 (3.24e-08)	-2.11e-07 (3.42e-08)	-7.64e-07 (3.89e-08)	-5.74e-07 (4.28e-08)
Female	.060 (.005)	.081 (.005)	.070 (.006)	.071 (.006)
Female × Primary School Education (or less)	.106 (.004)	.087 (.004)	.051 (.004)	.050 (.004)
Female × Some High School Education	-.016 (.004)	-.047 (.004)	-.058 (.004)	-.069 (.004)
Female × Some College Education	.018 (.005)	.005 (.006)	-.005 (.005)	-.079 (.006)
Female × Professional or Managerial Occupation	-.101 (.004)	-.128 (.004)	-.058 (.005)	-.064 (.005)
Female × Technical or Supervisory Occupation	-.173 (.003)	-.198 (.003)	-.250 (.004)	-.290 (.004)
Female × Other White Collar Occupation	.088 (.003)	.068 (.003)	.071 (.003)	.051 (.004)
Female × Skill Intensive Blue Collar Occupation	-.208 (.002)	-.233 (.002)	-.167 (.003)	-.216 (.003)
Female × Potential Labor Force Experience	-.056 (.0008)	-.057 (.0009)	-.036 (.001)	-.035 (.001)
Female × Quadratic Experience Term	.002 (.0001)	.002 (.0001)	.002 (.0001)	.001 (.0001)
Female × Cubic Experience Term	-.00006 (4.35e-06)	-.00006 (4.60e-06)	-.00005 (5.63e-06)	-.00003 (6.20e-06)
Female × Quartic Experience Term	7.06e-07 (6.32e-08)	6.92e-07 (6.69e-08)	5.40e-07 (7.78e-08)	4.29e-07 (8.56e-08)
Const.	7.963 (.003)	7.951 (.003)	8.788 (.003)	8.786 (.003)
Obs.	2,330,883	2,330,883	1,831,566	1,831,566
R^2 (overall)	.529	.529	.483	.484

Source: RAIS São Paulo state manufacturing 1990 and 1997 (prime age workers in their highest-paying job). Wage levels relative to zero experience wage levels from wage component estimates. OLS regressions do not control for establishment-worker fixed effects. Standard errors in parentheses (insignificant point estimates at the five percent level in *italics*).

Table 19: RELATIVE WAGES IN BRAZILIAN MANUFACTURING 1990 AND 1997, WITH AND WITHOUT ESTABLISHMENT FIXED EFFECTS

	<i>RAIS 1990</i>		<i>RAIS 1997</i>	
	FE (1)	OLS (2)	FE (3)	OLS (4)
	Education^a			
<i>Male worker:</i>				
College Degree	2.516	2.598	2.412	2.620
Some College	1.793	1.849	1.758	2.010
Primary School	.859	.839	.888	.880
<i>Female worker:</i>				
College Degree	2.556	2.724	2.556	2.807
Some College	1.855	1.947	1.854	1.989
Primary School	.970	.960	.990	.991
	Occupation^b			
<i>Male worker:</i>				
Profess'l or Managerial	2.355	2.383	2.488	2.561
Technical or Superv.	1.821	1.882	1.882	1.987
Other White Collar	1.299	1.316	1.283	1.327
Skill-int. Blue Collar	1.270	1.285	1.252	1.314
<i>Female worker:</i>				
Profess'l or Managerial	2.128	2.097	2.348	2.403
Technical or Superv.	1.532	1.544	1.466	1.487
Other White Collar	1.419	1.409	1.377	1.396
Skill-int. Blue Collar	1.031	1.018	1.059	1.059
	Gender^c			
Female worker	.893	.883	.915	.900

^aRelative to worker with some or complete high school education, controlling for occupation.

^bRelative to other blue collar occupations, controlling for education.

^cFemale relative to male workers, controlling for education and occupation.

Source: RAIS São Paulo state manufacturing 1990 and 1997 (prime age workers in their highest-paying job). Wage levels relative to zero experience wage levels from wage component estimates. Wage levels relative to comparison-group wage levels from component estimates with and without establishment-fixed effects (Table 18).

5 Components of Wage Inequality in 1990 and 1997

Table 20: COMPOSITION OF MANUFACTURING WAGE INEQUALITY

	Manufacturing 1990		Manufacturing 1997	
	FE	OLS	FE	OLS
	(1)	(2)	(3)	(4)
Annual Wage ^a	1.1488	1.1488	1.1684	1.1684
Log Annual Wage ($\ln w_i$)	.0096	.0096	.0077	.0077
Worker Char. ($x_i\hat{\beta}$)	.0048	.0051	.0034	.0037
Experience	.0015	.0016	.0008	.0009
Occupation	.0013	.0013	.0011	.0011
Education	.0013	.0013	.0011	.0012
Gender	.0007	.0008	.0004	.0005
Establishm.-Fixed ($\hat{\psi}_j$) ^b	.0008		.0010	
Residual ($\hat{\varepsilon}_i$)	.0040	.0045	.0033	.0040

^aAnnualized mean monthly wage (USD of Dec 31).

^bRegression const. for OLS.

Source: RAIS São Paulo state manufacturing 1990 and 1997 (prime age workers in their highest-paying job). Inequality index: squared coefficient of deviation ($2GE(2)$), based on estimation samples (component estimates from wage regressions in Tables 8, 13, 9, and 14).

Table 21: COMPONENTS OF MANUFACTURING LOG WAGE INEQUALITY

	1990		1997	
	FE ^a	OLS ^b	FE ^a	OLS ^b
	(1)	(2)	(3)	(4)
Worker Characteristics ($x_i\hat{\beta}$)	.501	.529	.445	.484
Experience	.158	.170	.110	.121
Occupation	.137	.139	.139	.141
Education	.134	.140	.145	.161
Gender	.072	.080	.051	.061
Establishment-Fixed Effect ($\hat{\psi}_j$) ^c	.081		.131	
Residual ($\hat{\varepsilon}_i$)	.418	.471	.424	.516

^aComponent estimates from log wage regressions in Table 4, columns 1 and 2.

^bComponent estimates from log wage estimates of model (??), but omitting the fixed effect.

^cRegression constant for OLS.

Source: RAIS São Paulo state manufacturing 1990 and 1997 (prime age workers in their highest-paying job). Inequality index: squared coefficient of deviation ($2GE(2)$), based on estimation samples (component estimates from wage regressions in Tables 8, 13, 9, and 14).

Table 22: COMPOSITION OF WAGE INEQUALITY 1990, BY SECTOR

	Manuf.		Services		Commerce		Agric.	
	FE	OLS	FE	OLS	FE	OLS	FE	OLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Annual Wage ^a	1.1488	1.1488	1.3179	1.3179	1.6509	1.6509	.9387	.9387
Log Annual Wage ($\ln w_i$)	.0096	.0096	.0109	.0109	.0099	.0099	.0063	.0063
Worker Char. ($x_i\hat{\beta}$)	.0048	.0051	.0038	.0041	.0031	.0033	.0016	.0017
Experience	.0015	.0016	.0006	.0007	.0014	.0015	.0004	.0005
Occupation	.0013	.0013	.0011	.0011	.0006	.0006	.0004	.0004
Education	.0013	.0013	.0019	.0021	.0010	.0011	.0005	.0006
Gender	.0007	.0008	.0001	.0001	.00003	.00002	.0003	.0003
Establishm.-Fixed ($\hat{\psi}_j$) ^b	.0008		.0019		.0010		.0016	
Residual ($\hat{\varepsilon}_i$)	.0040	.0045	.0052	.0068	.0058	.0067	.0031	.0046

^a Annualized mean monthly wage (USD of Dec 31).

^b Regression const. for OLS.

Source: RAIS São Paulo state 1990 (prime age workers in their highest-paying job). Inequality index: squared coefficient of deviation ($2GE(2)$), based on estimation samples (component estimates from wage regressions in Tables 8 and 13).

Table 23: COMPOSITION OF WAGE INEQUALITY 1997, BY SECTOR

	Manuf.		Services		Commerce		Agric.	
	FE	OLS	FE	OLS	FE	OLS	FE	OLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Annual Wage ^a	1.1684	1.1684	1.2720	1.2720	1.3003	1.3003	1.1171	1.1171
Log Annual Wage ($\ln w_i$)	.0077	.0077	.0084	.0084	.0056	.0056	.0057	.0057
Worker Char. ($x_i\hat{\beta}$)	.0034	.0037	.0031	.0032	.0018	.0019	.0011	.0013
Experience	.0008	.0009	.0004	.0004	.0007	.0007	.0002	.0002
Occupation	.0011	.0011	.0012	.0011	.0005	.0005	.0005	.0007
Education	.0011	.0012	.0015	.0016	.0006	.0007	.0003	.0003
Gender	.0004	.0005	.00006	.0001	-.00003	-.00004	.0001	.0001
Establishm.-Fixed ($\hat{\psi}_j$) ^b	.0010		.0012		.0006		.0020	
Residual ($\hat{\varepsilon}_i$)	.0033	.0040	.0041	.0052	.0032	.0037	.0025	.0043

^a Annualized mean monthly wage (USD of Dec 31).

^b Regression const. for OLS.

Source: RAIS São Paulo state 1997 (prime age workers in their highest-paying job). Inequality index: squared coefficient of deviation ($2GE(2)$), based on estimation samples (component estimates from wage regressions in Tables 9 and 14).

Table 24: COMPONENTS OF LOG WAGE INEQUALITY BY SECTOR, 1990

	Manufacturing		Services		Commerce		Agriculture	
	FE	OLS	FE	OLS	FE	OLS	FE	OLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Worker Char. ($x_i\hat{\beta}$)	.501	.529	.347	.374	.311	.329	.261	.264
Experience	.158	.170	.059	.066	.138	.148	.067	.072
Occupation	.137	.139	.104	.105	.064	.064	.065	.057
Education	.134	.140	.174	.193	.105	.115	.085	.089
Gender	.072	.080	.010	.011	.003	.002	.043	.046
Establishm.-Fixed ($\hat{\psi}_j$) ^a	.081		.176		.099		.252	
Residual ($\hat{\varepsilon}_i$)	.418	.471	.477	.626	.590	.671	.487	.736

^aRegression const. for OLS.

Source: RAIS São Paulo state 1990 (prime age workers in their highest-paying job). Inequality index: squared coefficient of deviation ($2GE(2)$), based on estimation samples (component estimates from wage regressions in Tables 8 and 13).

Table 25: COMPONENTS OF LOG WAGE INEQUALITY BY SECTOR, 1997

	Manufacturing		Services		Commerce		Agriculture	
	FE ^a	OLS ^b	FE ^a	OLS ^b	FE ^a	OLS ^b	FE ^a	OLS ^b
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Worker Char. ($x_i\hat{\beta}$)	.445	.484	.367	.382	.318	.338	.200	.235
Experience	.110	.121	.043	.049	.122	.131	.035	.041
Occupation	.139	.141	.139	.129	.086	.087	.092	.117
Education	.145	.161	.177	.190	.115	.127	.052	.059
Gender	.051	.061	.008	.015	-.005	-.007	.021	.019
Establishm.-Fixed ($\hat{\psi}_j$) ^c	.131		.139		.100		.362	
Residual ($\hat{\varepsilon}_i$)	.424	.516	.494	.618	.581	.662	.438	.765

^aComponent estimates from log wage regressions in Table 9.

^bComponent estimates from log wage estimates of model (??), but omitting the fixed effect.

^cRegression const. for OLS.

Source: RAIS São Paulo state 1997 (prime age workers in their highest-paying job). Inequality index: squared coefficient of deviation ($2GE(2)$), based on estimation samples (component estimates from wage regressions in Tables 9 and 14).

Table 26: COMPONENTS OF MANUFACTURING WAGE INEQUALITY BY MEASURE, 1990

	Establishment FE				OLS			
	2GE(2)	GE(1)	GE(0)	Gini	2GE(2)	GE(1)	GE(0)	Gini
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Annual Wage ^a	1.1488	.3723	.3425	.4527	1.1488	.3723	.3425	.4527
Log Annual Wage ($\ln w_i$)	.0096	.0047	.0047	.0551	.0096	.0047	.0047	.0551
Worker Char. ($x_i\hat{\beta}$)	.0048	.0047	-.0045	.0270	.0051	.0049	-.0047	.0286
Experience	.0015	.0011	-.0002	.0094	.0016	.0011	-.0002	.0101
Occupation	.0013	.0011	-.0007	.0070	.0013	.0011	-.0007	.0071
Education	.0013	.0018	-.0027	.0062	.0013	.0018	-.0029	.0065
Gender	.0007	.0008	-.0009	.0045	.0008	.0008	-.0010	.0049
Establishm.-Fixed ($\hat{\psi}_j$) ^b	.0008	-.0039	.0133	.0047	.0000	-.0047	.0141	.0000
Residual ($\hat{\varepsilon}_i$)	.0040	.0040	-.0041	.0234	.0045	.0045	-.0046	.0265

^aAnnualized mean monthly wage (USD of Dec 31).

^bRegression const. for OLS.

Source: RAIS São Paulo state manufacturing 1990 (prime age workers in their highest-paying job). Inequality indices based on estimation samples (component estimates from wage regressions in Tables 8 and 13). “Natural” decompositions of inequality indices (Shorrocks 1982).

Table 27: COMPONENTS OF MANUFACTURING WAGE INEQUALITY BY MEASURE, 1997

	Establishment FE				OLS			
	2 GE(2)	GE(1)	GE(0)	Gini	GE(2)	GE(1)	GE(0)	Gini
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Annual Wage ^a	1.1684	.3818	.3464	.4586	1.1684	.3818	.3464	.4586
Log Annual Wage ($\ln w_i$)	.0077	.0038	.0038	.0489	.0077	.0038	.0038	.0489
Worker Char. ($x_i\hat{\beta}$)	.0034	.0033	-.0031	.0209	.0037	.0036	-.0033	.0229
Experience	.0008	.0005	.00007	.0059	.0009	.0006	.00005	.0065
Occupation	.0011	.0009	-.0006	.0061	.0011	.0009	-.0006	.0062
Education	.0011	.0014	-.0020	.0060	.0012	.0016	-.0022	.0068
Gender	.0004	.0004	-.0005	.0028	.0005	.0005	-.0006	.0034
Establishm.-Fixed ($\hat{\psi}_j$) ^b	.0010	-.0027	.0101	.0066	.0000	-.0037	.0110	.0000
Residual ($\hat{\varepsilon}_i$)	.0033	.0032	-.0033	.0215	.0040	.0039	-.0039	.0261

^aAnnualized mean monthly wage (USD of Dec 31).

^bRegression const. for OLS.

Source: RAIS São Paulo state manufacturing 1997 (prime age workers in their highest-paying job). Inequality indices based on estimation samples (component estimates from wage regressions in Tables 9 and 14). “Natural” decompositions of inequality indices (Shorrocks 1982).

6 Comparisons to Household Data

Table 28: JOB ALLOCATION BY FORMALITY AND ACROSS SECTORS

	Manufact.	Services	Commerce	Agricult.	Total
	(1)	(2)	(3)	(4)	(5)
Share of informal jobs (PNAD)					
1990	.220	.543	.444	.605	.415
1997	.352	.518	.492	.429	.457
Job allocation across sectors					
<i>1990:</i>					
Formal jobs RAIS	.398	.433	.151	.018	1.000
Formal jobs PNAD	.490	.338	.128	.044	1.000
Informal jobs PNAD	.195	.566	.144	.095	1.000
<i>1997:</i>					
Formal jobs RAIS	.288	.500	.171	.041	1.000
Formal jobs PNAD	.376	.428	.142	.053	1.000
Informal jobs PNAD	.243	.546	.164	.047	1.000

Sources: PNAD (prime age household members in September) and RAIS (prime age workers in their highest-paying job) São Paulo state, 1990 and 1997.

Table 29: WORKER DEMOGRAPHICS IN FORMAL AND INFORMAL JOBS

	Manufacturing		Services		Commerce		Agriculture	
	<i>formal</i>	<i>inf.</i>	<i>formal</i>	<i>inf.</i>	<i>formal</i>	<i>inf.</i>	<i>formal</i>	<i>inf.</i>
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Share of Male Workers								
<i>1990:</i>								
RAIS	.728		.558		.648		.802	
PNAD	.760	.849	.559	.439	.615	.631	.825	.803
<i>1997:</i>								
RAIS	.744		.520		.625		.844	
PNAD	.777	.844	.525	.458	.600	.612	.880	.828
Share of Workers with Some College Education								
<i>1990:</i>								
RAIS	.093		.217		.070		.027	
PNAD	.099	.024	.153	.162	.069	.074	.020	.005
<i>1997:</i>								
RAIS	.103		.225		.069		.022	
PNAD	.123	.040	.154	.131	.099	.081	.007	.006

Sources: PNAD (prime age household members in September) and RAIS (prime age workers in their highest-paying job) São Paulo state, 1990 and 1997.

Table 30: MEAN LOG WAGES BY DATA SOURCE AND SECTOR

	Manufacturing			Services		
	<i>RAIS</i>	<i>PNAD</i>		<i>RAIS</i>	<i>PNAD</i>	
		<i>formal</i>	<i>informal</i>		<i>formal</i>	<i>informal</i>
	(1)	(2)	(3)	(4)	(5)	(6)
1990	8.016	7.962	7.574	7.953	7.834	7.832
1997	8.685	8.541	8.113	8.610	8.362	8.237
	Gender					
<i>1990:</i>						
Male	8.174	8.072	7.626	8.040	7.927	8.164
Female	7.593	7.612	7.285	7.842	7.716	7.572
<i>1997:</i>						
Male	8.800	8.608	8.151	8.694	8.481	8.542
Female	8.349	8.310	7.906	8.519	8.230	7.979
	Education					
<i>1990:</i>						
Some college or more	9.014	9.138	8.983	8.589	8.959	9.052
High school or less	7.913	7.832	7.540	7.776	7.631	7.597
<i>1997:</i>						
Some college or more	9.704	9.595	8.986	9.275	9.344	9.492
High school or less	8.567	8.394	8.076	8.417	8.183	8.048

Sources: *PNAD* (prime age household members in September) and *RAIS* (prime age workers in their highest-paying job) São Paulo state, 1990 and 1997. Wages in current USD (December exchange rates; *PNAD* September wages transformed into real December values using the Brazilian CPI *INPC*; log U.S. CPI change between 1990 and 1997 of .187 subtracted from 1997 log wages).

Table 32: WAGE STRUCTURE IN BRAZILIAN MANUFACTURING 1990

	<i>RAIS</i>	<i>PNAD</i> Formal	<i>PNAD</i> Informal
	(1)	(2)	(3)
Primary School Education (or less)	-1.361 (.002)	-1.812 (.073)	-1.557 (.484)
Some High School Education	-1.174 (.002)	-1.185 (.074)	-.997 (.496)
Some College Education	-.468 (.003)	-.455 (.080)	.198 (.526)
Blue Collar Occupation	-.328 (.001)	-.180 (.028)	-.359 (.114)
Potential Labor Force Experience	.100 (.0005)	.168 (.029)	.117 (.083)
Quadratic Experience Term	-.003 (.00006)	-.011 (.003)	-.003 (.009)
Cubic Experience Term	.00003 (2.50e-06)	.0004 (.0001)	.00007 (.0004)
Quartic Experience Term	-1.02e-07 (3.52e-08)	-5.10e-06 (1.33e-06)	-1.18e-06 (5.06e-06)
Female	-.096 (.005)	.351 (.221)	1.740 (.944)
Female × Primary School Education (or less)	.200 (.004)	.036 (.175)	-1.399 (.838)
Female × Some High School Education	.059 (.004)	-.172 (.177)	-1.311 (.852)
Female × Some College Education	.044 (.006)	-.074 (.186)	-2.034 (.933)
Female × Blue Collar Occupation	-.079 (.002)	-.184 (.055)	.007 (.208)
Female × Potential Labor Force Experience	-.058 (.0009)	-.117 (.050)	-.041 (.161)
Female × Quadratic Experience Term	.002 (.0001)	.008 (.005)	.00008 (.017)
Female × Cubic Experience Term	-.00005 (4.74e-06)	-.0002 (.0002)	-3.75e-06 (.0007)
Female × Quartic Experience Term	5.33e-07 (6.89e-08)	2.92e-06 (2.56e-06)	2.50e-07 (8.51e-06)
Obs.	2,330,883	2,764	300

Sources: *PNAD* (prime age household members in September) and *RAIS* (prime age workers in their highest-paying job) São Paulo state 1990. *Not* controlling for establishment-worker fixed effects. Standard errors in parentheses (insignificant point estimates at the five percent level in *italics*).

Table 33: WAGE STRUCTURE IN BRAZILIAN MANUFACTURING 1997

	<i>RAIS</i>	<i>PNAD</i> Formal	<i>PNAD</i> Informal
	(1)	(2)	(3)
Primary School Education (or less)	-1.333 (.002)	-1.742 (.076)	-.959 (.321)
Some High School Education	-1.192 (.002)	-1.199 (.076)	-.277 (.325)
Some College Education	-.404 (.003)	-.546 (.086)	.108 (.349)
Blue Collar Occupation	-.305 (.001)	-.179 (.028)	-.266 (.085)
Potential Labor Force Experience	.085 (.0007)	.158 (.030)	.142 (.059)
Quadratic Experience Term	-.003 (.00008)	-.009 (.003)	-.008 (.007)
Cubic Experience Term	.00005 (3.25e-06)	.0003 (.0001)	.0003 (.0003)
Quartic Experience Term	-4.79e-07 (4.42e-08)	-3.35e-06 (1.33e-06)	-4.51e-06 (4.11e-06)
Female	-.101 (.005)	-.041 (.226)	.449 (.734)
Female × Primary School Education (or less)	.124 (.004)	.208 (.155)	-.876 (.712)
Female × Some High School Education	.0003 (.004)	.092 (.152)	-.919 (.716)
Female × Some College Education	-.056 (.006)	.221 (.166)	-.345 (.754)
Female × Blue Collar Occupation	-.051 (.002)	-.133 (.057)	-.041 (.139)
Female × Potential Labor Force Experience	-.036 (.001)	-.092 (.053)	.119 (.098)
Female × Quadratic Experience Term	.001 (.0002)	.007 (.005)	-.013 (.011)
Female × Cubic Experience Term	-.00003 (6.41e-06)	-.0002 (.0002)	.0005 (.0005)
Female × Quartic Experience Term	3.51e-07 (8.85e-08)	2.68e-06 (2.59e-06)	-5.29e-06 (6.45e-06)
Obs.	1,831,566	2,489	442

Sources: *PNAD* (prime age household members in September) and *RAIS* (prime age workers in their highest-paying job) São Paulo state 1997. *Not* controlling for establishment-worker fixed effects. Standard errors in parentheses (insignificant point estimates at the five percent level in *italics*).

Table 34: RELATIVE WAGES IN MANUFACTURING BY FORMALITY, 1990 AND 1997

	<i>RAIS</i>		<i>PNAD</i> Formal		<i>PNAD</i> Informal	
	1990	1997	1990	1997	1990	1997
	(1)	(2)	(3)	(4)	(5)	(6)
Education^a						
<i>Male worker:</i>						
College Degree	3.236	3.294	3.271	3.318	2.710	1.319
Some College	2.027	2.199	2.076	1.922	3.303	1.469
Primary School	.830	.869	.534	.581	.571	.506
<i>Female worker:</i>						
College Degree	3.050	3.293	3.887	3.025	10.057	3.306
Some College	1.996	2.079	2.291	2.186	1.603	2.607
Primary School	.956	.984	.658	.652	.523	.528
Occupation^b						
<i>Male worker:</i>						
Blue Collar	.720	.737	.835	.836	.699	.766
<i>Female worker:</i>						
Blue Collar	.665	.700	.695	.732	.704	.735
Gender^c						
Female worker	.880	.896	.892	.899	.909	.918

^aRelative to worker with some or complete high school education, controlling for blue-collar occupation.

^bRelative to white collar occupations, controlling for education.

^cFemale relative to male workers, controlling for education and blue-collar occupation.

Sources: *PNAD* (prime age household members in September) and *RAIS* (prime age workers in their highest-paying job) São Paulo state, 1990 and 1997. Wage levels relative to comparison-group wage levels from component estimates (Tables 32 and 33).

7 Selection Regressions

Table 35: PROBIT PREDICTIONS OF WORKER'S FORMALITY STATUS

	Manufacturing 1990		Manufacturing 1997	
	(1)	(2)	(3)	(4)
Illiterate	-1.330 (.385)	-1.226 (.369)	-.884 (.338)	-.865 (.332)
Primary School Dropout	-1.127 (.343)	-1.065 (.332)	-.690 (.302)	-.702 (.292)
Primary School Graduate	-.777 (.338)	-.711 (.328)	-.905 (.284)	-.891 (.276)
Middle School Dropout	-.621 (.334)	-.565 (.325)	-.947 (.272)	-.942 (.265)
Middle School Graduate	-.526 (.341)	-.342 (.334)	-.390 (.278)	-.393 (.273)
High School Dropout	-.290 (.337)	-.163 (.333)	-.403 (.270)	-.405 (.265)
High School Graduate	.160 (.595)	.233 (.586)	-.161 (.418)	-.147 (.414)
College Dropout	-.225 (.356)	-.169 (.353)	-.428 (.291)	-.425 (.290)
Blue Collar Occupation	.096 (.094)		.014 (.080)	
Potential Labor Force Experience	.130 (.077)	.134 (.071)	.146 (.067)	.146 (.066)
Quadratic Experience Term	-.002 (.008)	-.002 (.008)	-.008 (.007)	-.008 (.007)
Cubic Experience Term	-.0001 (.0003)	-.00007 (.0003)	.0002 (.0003)	.0002 (.0003)
Quartic Experience Term	2.31e-06 (4.26e-06)	1.68e-06 (4.03e-06)	-2.19e-06 (3.85e-06)	-2.04e-06 (3.81e-06)
Female	.618 (.710)	.415 (.682)	-.258 (.620)	-.239 (.618)
Female × Illiterate	.681 (.725)	.142 (.689)	.042 (.748)	-.044 (.738)
Female × Primary School Dropout	.919 (.660)	.536 (.634)	-.049 (.614)	-.078 (.602)
Female × Primary School Graduate	.458 (.643)	.107 (.621)	.136 (.582)	.053 (.572)
Female × Middle School Dropout	.333 (.635)	.017 (.615)	-.118 (.555)	-.150 (.546)
Female × Middle School Graduate	.274 (.645)	-.084 (.625)	-.253 (.564)	-.277 (.558)
Female × High School Dropout	.383 (.641)	.155 (.626)	-.151 (.546)	-.168 (.542)
Female × High School Graduate	-.857 (.928)	-.901 (.874)	-.530 (.765)	-.546 (.763)
Female × College Dropout	.423 (.686)	.388 (.677)	.250 (.586)	.245 (.585)
Female × Blue Collar Occupation	-.495 (.166)		-.086 (.143)	
Female × Potential Labor Force Experience	-.196 (.136)	-.113 (.123)	.088 (.112)	.071 (.111)
Female × Quadratic Experience Term	.015 (.014)	.007 (.013)	-.007 (.012)	-.005 (.012)
Female × Cubic Experience Term	-.0005 (.0006)	-.0002 (.0005)	.0002 (.0005)	.0002 (.0005)
Female × Quartic Experience Term	5.90e-06 (7.38e-06)	2.75e-06 (6.82e-06)	-2.99e-06 (6.63e-06)	-2.23e-06 (6.58e-06)
Constant	.794 (.377)	.783 (.367)	.676 (.313)	.689 (.311)
Observations	3,064	3,581	2,931	2,983
Censored obs. (informal workers)	300	331	442	449
Pseudo R^2	.088	.084	.083	.081

Source: PNAD (prime age household members in Sept.) São Paulo state manuf. 1990 and 1997. Formality: labor ID card (*carteira*). Standard errors in parentheses (insignificant point estimates at the five percent level in *italics*).

Table 36: WAGE STRUCTURES IN BRAZILIAN MANUFACTURING 1990 AND 1997, WITH AND WITHOUT SELECTION CORRECTION

	RAIS 1990 (FE)		RAIS 1997 (FE)	
	Selection (1)	Plain (2)	Selection (3)	Plain (4)
Primary School Education (or less)	-1.041 (.021)	-1.075 (.002)	-.973 (.011)	-1.000 (.002)
Some High School Education	-.914 (.015)	-.923 (.002)	-.869 (.011)	-.881 (.002)
Some College Education	-.329 (.015)	-.339 (.003)	-.301 (.011)	-.316 (.003)
Professional or Managerial Occupation	.863 (.007)	.856 (.002)	.914 (.004)	.912 (.002)
Technical or Supervisory Occupation	.608 (.008)	.600 (.002)	.635 (.004)	.632 (.002)
Other White Collar Occupation	.270 (.008)	.262 (.002)	.251 (.004)	.249 (.002)
Skill Intensive Blue Collar Occupation	.238 (.001)	.239 (.001)	.224 (.002)	.225 (.001)
Potential Labor Force Experience	.083 (.011)	.095 (.0005)	.074 (.006)	.082 (.0007)
Quadratic Experience Term	-.002 (.001)	-.003 (.00005)	-.003 (.0005)	-.003 (.00007)
Cubic Experience Term	.00003 (.00003)	.00005 (2.29e-06)	.00006 (.00002)	.00008 (2.86e-06)
Quartic Experience Term	-1.12e-07 (4.13e-07)	-3.01e-07 (3.24e-08)	-5.57e-07 (2.22e-07)	-7.64e-07 (3.89e-08)
Female	.060 (.056)	.060 (.005)	.112 (.037)	.070 (.006)
Female × Primary School Education (or less)	.097 (.036)	.106 (.004)	.057 (.019)	.051 (.004)
Female × Some High School Education	-.004 (.040)	-.016 (.004)	-.042 (.022)	-.058 (.004)
Female × Some College Education	-.004 (.038)	.018 (.005)	-.017 (.021)	-.005 (.005)
Female × Professional or Managerial Occupation	-.138 (.022)	-.101 (.004)	-.063 (.009)	-.058 (.005)
Female × Technical or Supervisory Occupation	-.211 (.023)	-.173 (.003)	-.256 (.009)	-.250 (.004)
Female × Other White Collar Occupation	.049 (.024)	.088 (.003)	.065 (.009)	.071 (.003)
Female × Skill Intensive Blue Collar Occupation	-.209 (.002)	-.208 (.002)	-.167 (.003)	-.167 (.003)
Female × Potential Labor Force Experience	-.042 (.017)	-.056 (.0008)	-.047 (.009)	-.036 (.001)
Female × Quadratic Experience Term	.0009 (.002)	.002 (.0001)	.002 (.0009)	.002 (.0001)
Female × Cubic Experience Term	-4.62e-06 (.00006)	-.00006 (4.35e-06)	-.00007 (.00003)	-.00005 (5.63e-06)
Female × Quartic Experience Term	-4.86e-08 (7.84e-07)	7.06e-07 (6.32e-08)	8.75e-07 (4.40e-07)	5.40e-07 (7.78e-08)
Predicted Inverse of Mills' Ratio	-.259 (.122)		-.137 (.037)	
Observations	2,331,183	2,330,883	1,832,008	1,831,566

Sources: PNAD (prime age household members in September) and RAIS (prime age workers in their highest-paying job) São Paulo state manufacturing, 1990 and 1997. Regressions control for establishment-worker fixed effects (estimates in columns 2 and 4 are those from column 1 in Tables 8 and 9). Inverse Mills ratios from out-of-sample predictions of formality selection using PNAD (prime age household members in September) coefficient estimates (Table 35). Standard errors in parentheses (insignificant point estimates at the five percent level in *italics*), corrected for selection variation (Heckman 1979).

Table 37: RELATIVE WAGES IN BRAZIL 1990 AND 1997, WITH AND WITHOUT PARAMETRIC SELECTION CORRECTION

	<i>RAIS</i> 1990 (FE)		<i>RAIS</i> 1997 (FE)	
	Selectivity (1)	No correction (2)	Selectivity (3)	No correction (4)
Education^a				
<i>Male worker:</i>				
College Degree	2.494	2.516	2.386	2.412
Some College	1.795	1.793	1.766	1.758
Primary School	.881	.859	.901	.888
<i>Female worker:</i>				
College Degree	2.504	2.556	2.488	2.556
Some College	1.794	1.855	1.812	1.854
Primary School	.974	.970	.996	.990
Occupation^b				
<i>Male worker:</i>				
Profess'l or Managerial	2.370	2.355	2.493	2.488
Technical or Superv.	1.836	1.821	1.887	1.882
Other White Collar	1.310	1.299	1.285	1.283
Skill-int. Blue Collar	1.269	1.270	1.252	1.252
<i>Female worker:</i>				
Profess'l or Managerial	2.065	2.128	2.341	2.348
Technical or Superv.	1.486	1.532	1.460	1.466
Other White Collar	1.376	1.419	1.372	1.377
Skill-int. Blue Collar	1.029	1.031	1.059	1.059
Gender^c				
Female worker	.901	.893	.917	.915

^aRelative to worker with some or complete high school education, controlling for occupation.

^bRelative to other blue collar occupations, controlling for education.

^cFemale relative to male workers, controlling for education and occupation.

Source: *RAIS* (prime age workers in their highest-paying job) São Paulo state manufacturing, 1990 and 1997. Out-of-sample selectivity predictions of formality status from *PNAD* (prime age household members in September) coefficient estimates (columns 1 and 3 in Table 35). Wage levels relative to comparison-group wage levels from component estimates (Table 36).

Table 38: AVERAGE-SQUARED ERROR CROSS-VALIDATION OF NONPARAMETRIC SELECTION ESTIMATION UNDER POLYNOMIAL EXPANSIONS

	Linear model (1)	Partial interactions (2)	Full interactions (3)
<i>1990:</i>			
No occupation covariate	.079	.076	.075
Blue-collar indicator	.083	.080	.078
<i>1997:</i>			
No occupation covariate	.118	.114	.112
Blue-collar indicator	.118	.113	.112

Source: *PNAD* (prime age household members in September) and *RAIS* (prime age workers in their highest-paying job) São Paulo state manufacturing, 1990 and 1997. Crossvalidation by leave-one-out using average squared error criterion.

Table 39: RELATIVE MANUFACTURING WAGES IN BRAZIL UNDER SELECTIVITY

	RAIS 1990 (FE)			RAIS 1997 (FE)		
	No corr.	Param.	Semip.	No corr.	Param.	Semip.
	(1)	(2)	(3)	(4)	(5)	(6)
Education^a						
<i>Male worker:</i>						
College Degree	2.516	2.494	2.516	2.412	2.386	2.412
Some College	1.793	1.795	1.793	1.758	1.766	1.758
Primary School (or less)	.859	.881	.859	.888	.901	.888
<i>Female worker:</i>						
College Degree	2.556	2.504	2.555	2.556	2.488	2.547
Some College	1.855	1.794	1.854	1.854	1.812	1.848
Primary School (or less)	.970	.974	.969	.990	.996	.984
Occupation^b						
<i>Male worker:</i>						
Profess'l or Managerial	2.355	2.370	2.355	2.488	2.493	2.488
Technical or Superv.	1.821	1.836	1.821	1.882	1.887	1.882
Other White Collar	1.299	1.310	1.299	1.283	1.285	1.283
Skill-int. Blue Collar	1.270	1.269	1.270	1.252	1.252	1.252
<i>Female worker:</i>						
Profess'l or Managerial	2.128	2.065	2.129	2.348	2.341	2.349
Technical or Superv.	1.532	1.486	1.533	1.466	1.460	1.467
Other White Collar	1.419	1.376	1.419	1.377	1.372	1.378
Skill-int. Blue Collar	1.031	1.029	1.031	1.059	1.059	1.059
Gender^c						
Female worker	.893	.901	.893	.915	.917	.915

^aRelative to worker with some or complete high school education, controlling for occupation.

^bRelative to other blue collar occupations, controlling for education.

^cFemale relative to male workers, controlling for education and occupation.

Source: RAIS (prime age workers in their highest-paying job) São Paulo state manufacturing, 1990 and 1997. Out-of-sample selectivity predictions of formality status from PNAD (prime age household members in September) coefficient estimates. Wage levels relative to comparison-group wage levels from component estimates.

Table 40: WAGE STRUCTURE UNDER FORMALITY SELECTION IN BRAZILIAN MANUFACTURING 1990 AND 1997, WITH AND WITHOUT ESTABLISHMENT FIXED EFFECTS

	<i>RAIS</i> 1990		<i>RAIS</i> 1997	
	FE	OLS	FE	OLS
	(1)	(2)	(3)	(4)
Primary School Education (or less)	-1.041 (.021)	-1.096 (.020)	-.973 (.011)	-1.080 (.005)
Some High School Education	-.914 (.015)	-.947 (.014)	-.869 (.011)	-.959 (.005)
Some College Education	-.329 (.015)	-.331 (.015)	-.301 (.011)	-.259 (.006)
Professional or Managerial Occupation	.863 (.007)	.875 (.006)	.914 (.004)	.941 (.003)
Technical or Supervisory Occupation	.608 (.008)	.641 (.007)	.635 (.004)	.688 (.003)
Other White Collar Occupation	.270 (.008)	.283 (.007)	.251 (.004)	.283 (.003)
Skill Intensive Blue Collar Occupation	.238 (.001)	.250 (.001)	.224 (.002)	.273 (.002)
Potential Labor Force Experience	.083 (.011)	.086 (.011)	.074 (.006)	.079 (.003)
Quadratic Experience Term	-.002 (.001)	-.002 (.0009)	-.003 (.0005)	-.003 (.0002)
Cubic Experience Term	.00003 (.00003)	.00002 (.00003)	.00006 (.00002)	.00005 (8.46e-06)
Quartic Experience Term	-1.12e-07 (4.13e-07)	-2.05e-08 (4.08e-07)	-5.57e-07 (2.22e-07)	-4.83e-07 (1.05e-07)
Female	.060 (.056)	.081 (.056)	.112 (.037)	.090 (.017)
Female × Primary School Education (or less)	.097 (.036)	.078 (.035)	.057 (.019)	.053 (.009)
Female × Some High School Education	-.004 (.040)	-.035 (.039)	-.042 (.022)	-.062 (.010)
Female × Some College Education	-.004 (.038)	-.018 (.038)	-.017 (.021)	-.084 (.011)
Female × Professional or Managerial Occupation	-.138 (.022)	-.164 (.022)	-.063 (.009)	-.066 (.006)
Female × Technical or Supervisory Occupation	-.211 (.023)	-.236 (.023)	-.256 (.009)	-.293 (.006)
Female × Other White Collar Occupation	.049 (.024)	.030 (.023)	.065 (.009)	.048 (.005)
Female × Skill Intensive Blue Collar Occupation	-.209 (.002)	-.234 (.002)	-.167 (.003)	-.216 (.003)
Female × Potential Labor Force Experience	-.042 (.017)	-.042 (.016)	-.047 (.009)	-.040 (.004)
Female × Quadratic Experience Term	.0009 (.002)	.0009 (.002)	.002 (.0009)	.002 (.0004)
Female × Cubic Experience Term	-4.62e-06 (.00006)	-2.51e-06 (.00006)	-.00007 (.00003)	-.00005 (.00002)
Female × Quartic Experience Term	-4.86e-08 (7.84e-07)	-5.78e-08 (7.74e-07)	8.75e-07 (4.40e-07)	5.76e-07 (2.08e-07)
Predicted Inverse Mills Ratio	-.259 (.122)	-.257 (.120)	-.137 (.037)	-.060 (.017)
Observations	2,331,183	2,331,183	1,832,008	1,832,008

Source: *RAIS* (prime age workers in their highest-paying job) São Paulo state manufacturing, 1990 and 1997. OLS regressions do not control for establishment-worker fixed effects. Inverse Mills ratios from out-of-sample predictions of formality selection using *PNAD* (prime age household members in September) coefficient estimates (columns 1 and 3 in Table 35). Standard errors in parentheses (insignificant point estimates at the five percent level in *italics*), corrected for selection variation (Heckman 1979).

Table 41: WAGE STRUCTURE UNDER FORMALITY SELECTION IN BRAZILIAN MANUFACTURING USING HOUSEHOLD DATA

	PNAD 1990 (OLS)		PNAD 1997 (OLS)	
	Selection (1)	Plain (2)	Selection (3)	Plain (4)
Primary School Education (or less)	-1.424 (.410)	-1.812 (.073)	-1.480 (.191)	-1.742 (.076)
Some High School Education	-1.075 (.390)	-1.185 (.074)	-1.078 (.176)	-1.199 (.076)
Some College Education	-.358 (.419)	-.455 (.080)	-.405 (.199)	-.546 (.086)
Blue Collar Occupation	-.214 (.144)	-.180 (.028)	-.178 (.063)	-.179 (.028)
Potential Labor Force Experience	-.018 (.160)	.168 (.029)	.093 (.066)	.158 (.030)
Quadratic Experience Term	-.0005 (.015)	-.011 (.003)	-.005 (.006)	-.009 (.003)
Cubic Experience Term	.0001 (.0005)	.0004 (.0001)	.0002 (.0002)	.0003 (.0001)
Quartic Experience Term	-2.49e-06 (6.81e-06)	-5.10e-06 (1.33e-06)	-2.49e-06 (2.94e-06)	-3.35e-06 (1.33e-06)
Female	-.392 (1.162)	.351 (.221)	.237 (.492)	-.041 (.226)
Female × Primary School Education (or less)	-.101 (.899)	.036 (.175)	.280 (.352)	.208 (.155)
Female × Some High School Education	-.324 (.912)	-.172 (.177)	.167 (.347)	.092 (.152)
Female × Some College Education	-.267 (.959)	-.074 (.186)	.128 (.378)	.221 (.166)
Female × Blue Collar Occupation	.213 (.319)	-.184 (.055)	-.100 (.125)	-.133 (.057)
Female × Potential Labor Force Experience	.101 (.265)	-.117 (.050)	-.174 (.113)	-.092 (.053)
Female × Quadratic Experience Term	-.011 (.027)	.008 (.005)	.014 (.011)	.007 (.005)
Female × Cubic Experience Term	.0004 (.001)	-.0002 (.0002)	-.0005 (.0004)	-.0002 (.0002)
Female × Quartic Experience Term	-5.27e-06 (1.00e-05)	2.92e-06 (2.56e-06)	5.54e-06 (5.66e-06)	2.68e-06 (2.59e-06)
Constant	9.952 (.778)	8.650 (.116)	9.833 (.317)	9.254 (.121)
Predicted Inverse Mills Ratio	-2.879 (1.143)		-1.276 (.394)	
Observations	2,764	2,764	2,489	2,489

Source: PNAD (prime age household members in September) São Paulo state manufacturing, 1990 and 1997. Not controlling for establishment-worker fixed effects. Inverse Mills ratios from predictions of formality selection (Table 35). Standard errors in parentheses (insignificant point estimates at the five percent level in *italics*), corrected for selection variation (Heckman 1979).

Table 42: WAGE STRUCTURE COMPARISON BETWEEN HOUSEHOLD DATA AND EMPLOYER RECORDS UNDER FORMALITY SELECTION IN MANUFACTURING

	1990 (OLS)		1997 (OLS)	
	<i>RAIS</i>	<i>PNAD</i>	<i>RAIS</i>	<i>PNAD</i>
	(1)	(2)	(3)	(4)
Primary School Education (or less)	-1.321 (.024)	-1.424 (.410)	-1.323 (.005)	-1.480 (.191)
Some High School Education	-1.164 (.017)	-1.075 (.390)	-1.188 (.004)	-1.078 (.176)
Some College Education	-.456 (.017)	-.358 (.419)	-.398 (.005)	-.405 (.199)
Blue Collar Occupation	-.338 (.008)	-.214 (.144)	-.306 (.002)	-.178 (.063)
Potential Labor Force Experience	.086 (.013)	-.018 (.160)	.082 (.002)	.093 (.066)
Quadratic Experience Term	-.002 (.001)	-.0005 (.015)	-.002 (.0002)	-.005 (.006)
Cubic Experience Term	1.00e-05 (.00004)	.0001 (.0005)	.00005 (7.23e-06)	.0002 (.0002)
Quartic Experience Term	1.18e-07 (4.71e-07)	-2.49e-06 (6.81e-06)	-4.04e-07 (9.03e-08)	-2.49e-06 (2.94e-06)
Female	-.139 (.069)	-.392 (1.162)	-.088 (.014)	.237 (.492)
Female × Primary School Education (or less)	.189 (.041)	-.101 (.899)	.126 (.008)	.280 (.352)
Female × Some High School Education	.072 (.046)	-.324 (.912)	.006 (.009)	.167 (.347)
Female × Some College Education	.017 (.043)	-.267 (.959)	-.060 (.009)	.128 (.378)
Female × Blue Collar Occupation	-.036 (.027)	.213 (.319)	-.049 (.004)	-.100 (.125)
Female × Potential Labor Force Experience	-.041 (.019)	.101 (.265)	-.040 (.004)	-.174 (.113)
Female × Quadratic Experience Term	.0004 (.002)	-.011 (.027)	.001 (.0004)	.014 (.011)
Female × Cubic Experience Term	.00002 (.00007)	.0004 (.001)	-.00004 (1.00e-05)	-.0005 (.0004)
Female × Quartic Experience Term	-3.33e-07 (8.94e-07)	-5.27e-06 (1.00e-05)	4.70e-07 (1.79e-07)	5.54e-06 (5.66e-06)
Constant	8.765 (.067)	9.952 (.778)	9.523 (.011)	9.833 (.317)
Predicted Inverse Mills Ratio	-.297 (.139)	-2.879 (1.143)	-.049 (.015)	-1.276 (.394)
Observations	2,331,183	3,064	1,832,008	2,931
Censored obs. (informal workers)	300	300	442	442

Sources: *PNAD* (prime age household members in September) and *RAIS* (prime age workers in their highest-paying job) São Paulo state manufacturing, 1990 and 1997. *Not* controlling for establishment-worker fixed effects. Predicted inverse Mills ratios from *PNAD* coefficient estimates (out-of-sample predictions in the case of *RAIS*), based on estimates in columns 1 and 3 of Table 35. Standard errors in parentheses (insignificant point estimates at the five percent level in *italics*), corrected for selection variation (Heckman 1979).

Table 43: VARIABILITY OF MANUFACTURING WAGES IN 1990 UNDER SELECTIVITY CORRECTIONS

	Mean	St.Dev.	Correlation with				
			$\ln w_i$	$x_i\hat{\beta}$	$\hat{\psi}_j$	$\hat{\epsilon}_i \mathcal{I}_i$	$\hat{\epsilon}_i$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
No Selection Correction							
Log Annual Wage ($\ln w_i$)	8.019	.785	1.000				
Worker Characteristics ($x_i\hat{\beta}$)	.056	.541	.727	1.000			
Establishment-Fixed ($\hat{\psi}_j$)	7.963	.183	.346	.163	1.000		
Residual ($\hat{\epsilon}_i$)	-.000	.508	.647	.000	.000		1.000
Selection Correction under Joint Normality							
Log Annual Wage ($\ln w_i$)	8.019	.785	1.000				
Worker Characteristics ($x_i\hat{\beta}$)	-.032	.541	.727	1.000			
Establishment-Fixed ($\hat{\psi}_j$)	8.096	.183	.346	.164	1.000		
Inverse of Mills' Ratio ($\hat{\epsilon}_i \mathcal{I}_i$)	-.045	.034	.480	.651	.136	1.000	
Residual ($\hat{\epsilon}_i$)	.000	.508	.647	.000	-.000	.000	1.000
Semiparametric Selection Correction under Order Restrictions							
Log Annual Wage ($\ln w_i$)	8.019	.785	1.000				
Worker Characteristics ($x_i\hat{\beta}$)	.056	.541	.727	1.000			
Establishment-Fixed ($\hat{\psi}_j$)	7.963	.183	.346	.163	1.000		
Propensity Score ($\hat{\epsilon}_i \mathcal{I}_i$)	.000	.001	.028	.036	.012	1.000	
Residual ($\hat{\epsilon}_i$)	.000	.508	.647	.000	.000	-.000	1.000

Sources: RAIS São Paulo state manufacturing 1990 (prime age workers in their highest-paying job). Estimates from establishment-fixed effects wage regressions relative to other blue-collar occupations, controlling for education. Statistics based on estimation sample.

Table 44: VARIABILITY OF MANUFACTURING WAGES IN 1997 UNDER SELECTIVITY CORRECTIONS

	Mean	St.Dev.	Correlation with				
			$\ln w_i$	$x_i\hat{\beta}$	$\hat{\psi}_j$	$\hat{\epsilon}_i \mathcal{I}_i$	$\hat{\epsilon}_i$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
No Selection Correction							
Log Annual Wage ($\ln w_i$)	8.872	.778	1.000				
Worker Characteristics ($x_i\hat{\beta}$)	.084	.498	.695	1.000			
Establishment-Fixed ($\hat{\psi}_j$)	8.788	.241	.423	.176	1.000		
Residual ($\hat{\epsilon}_i$)	-.000	.507	.651	-.000	.000		1.000
Selection Correction under Joint Normality							
Log Annual Wage ($\ln w_i$)	8.872	.778	1.000				
Worker Characteristics ($x_i\hat{\beta}$)	.023	.498	.695	1.000			
Establishment-Fixed ($\hat{\psi}_j$)	8.849	.241	.423	.176	1.000		
Inverse of Mills' Ratio ($\hat{\epsilon}_i \mathcal{I}_i$)	-.032	.019	.409	.584	.112	1.000	
Residual ($\hat{\epsilon}_i$)	.000	.507	.651	-.000	-.000	-.000	1.000
Semiparametric Selection Correction under Order Restrictions							
Log Annual Wage ($\ln w_i$)	8.872	.778	1.000				
Worker Characteristics ($x_i\hat{\beta}$)	.084	.498	.695	1.000			
Establishment-Fixed ($\hat{\psi}_j$)	8.789	.241	.423	.176	1.000		
Propensity Score ($\hat{\epsilon}_i \mathcal{I}_i$)	-.001	.005	.037	.049	.017	1.000	
Residual ($\hat{\epsilon}_i$)	.000	.507	.651	-.000	-.000	.000	1.000

Sources: RAIS São Paulo state manufacturing 1997 (prime age workers in their highest-paying job). Estimates from establishment-fixed effects wage regressions relative to other blue-collar occupations, controlling for education. Statistics based on estimation sample.

8 Wage Components and Firm Characteristics

Table 45: MANUFACTURING FIRM CHARACTERISTICS AND WAGES IN BRAZIL, FRANCE AND THE U.S.

	Brazil 1990 (1)	Brazil 1997 (2)	France 1992 (3)	U.S. 1990 (4)
Log Employment^a				
Mean Worker Characteristics ($\bar{x}_k\hat{\beta}$)	1.111 (.141)	.783 (.144)	1.103 (.402)	-.486 (.130)
Mean Establishment-Fixed ($\bar{\psi}_k$)	1.496 (.187)	1.716 (.172)	4.588 (.495)	.223 (.073)
Log Capital Stock				
Mean Worker Characteristics ($\bar{x}_k\hat{\beta}$)	2.336 (.207)	.841 (.185)	2.290 (.510)	-.183 (.154)
Mean Establishment-Fixed ($\bar{\psi}_k$)	2.403 (.274)	1.703 (.219)	6.751 (.628)	.838 (.086)
Log Capital-Labor Ratio				
Mean Worker Characteristics ($\bar{x}_k\hat{\beta}$)	1.244 (.121)	.337 (.149)	1.187 (.200)	.303 (.060)
Mean Establishment-Fixed ($\bar{\psi}_k$)	.920 (.160)	.104 (.177)	2.163 (.247)	.615 (.034)
Non-Production Worker Ratio^a				
Mean Worker Characteristics ($\bar{x}_k\hat{\beta}$)	.052 (.016)	.055 (.019)		.124 (.014)
Mean Establishment-Fixed ($\bar{\psi}_k$)	.091 (.021)	.020 (.022)		-.036 (.008)
High-Skill Occupation Ratio^b				
Mean Worker Characteristics ($\bar{x}_k\hat{\beta}$)	.441 (.021)	.507 (.025)	.572 (.031)	
Mean Establishment-Fixed ($\bar{\psi}_k$)	.279 (.028)	.121 (.030)	.041 (.036)	
Log Value Added per Employee				
Mean Worker Characteristics ($\bar{x}_k\hat{\beta}$)	6.556 (1.260)	-.183 (1.578)	.818 (.084)	.252 (.036)
Mean Establishment-Fixed ($\bar{\psi}_k$)	4.485 (1.668)	5.449 (1.889)	1.157 (.103)	.453 (.020)
Log Sales per Employee				
Mean Worker Characteristics ($\bar{x}_k\hat{\beta}$)	.488 (.069)	.547 (.095)	.930 (.152)	.343 (.044)
Mean Establishment-Fixed ($\bar{\psi}_k$)	.264 (.092)	.354 (.113)	1.428 (.186)	.505 (.025)
Return on Capital				
Mean Worker Characteristics ($\bar{x}_k\hat{\beta}$)	-1.329 (1.107)	.170 (.105)	-.084 (.020)	-.003 (.048)
Mean Establishment-Fixed ($\bar{\psi}_k$)	-1.124 (1.462)	.003 (.125)	.098 (.025)	-.205 (.027)

^aFrom *PIA* data.^bFrom *RAIS* data.

Sources: São Paulo state manufacturing firms in *PIA* and *RAIS* on December 31, 1990 and 1997. Abowd et al. (2001) for France 1992 and the U.S. 1990. Partial correlations from individual regressions on mean worker characteristics ($\bar{x}_k\hat{\beta}$) and mean establishment effects ($\bar{\psi}_k$), controlling for sector-fixed effects. Standard errors in parentheses (insignificant point estimates at the five percent level in *italics*).

Appendix

Table 46: MATCHES BETWEEN *RAIS* AND *PIA* RANDOM FIRM TABULATIONS

	Data Source	Frequency	Percent	Cumulated
1990:				
<i>RAIS and PIA firms</i>				
	<i>RAIS</i> -SP establishments but no <i>PIA</i> firm	281,685	97.69	97.69
	<i>PIA</i> firms but no <i>RAIS</i> -SP establishment	3,056	1.06	98.75
	<i>RAIS</i> -SP establishments in <i>PIA</i> firms	3,616	1.25	100.00
	<i>Total</i>	288,357	100.00	
<i>Randomly tabulated three-firm cells</i>				
	<i>RAIS</i> & <i>PIA</i> firms but no cell match	724	37.05	37.05
	Cells but no <i>RAIS</i> & <i>PIA</i> match	61	3.12	40.17
	Cells matched with <i>RAIS</i> & <i>PIA</i>	1,169	59.83	100.00
	<i>Total</i>	1,954	100.00	
1997:				
<i>RAIS and PIA firms</i>				
	<i>RAIS</i> -SP establishments but no <i>PIA</i> firm	376,719	99.04	99.04
	<i>PIA</i> firms but no <i>RAIS</i> -SP establishment	1,511	0.40	99.43
	<i>RAIS</i> -SP establishments in <i>PIA</i> firms	2,158	0.57	100.00
	<i>Total</i>	380,388	100.00	
<i>Randomly tabulated three-firm cells</i>				
	<i>RAIS</i> & <i>PIA</i> firms but no cell match	305	28.21	28.21
	Cells but no <i>RAIS</i> & <i>PIA</i> match	97	8.97	37.19
	Cells matched with <i>RAIS</i> & <i>PIA</i>	679	62.81	100.00
	<i>Total</i>	1,081	100.00	

Sources: São Paulo state manufacturing firms in *PIA* and *RAIS* on December 31, 1990 and 1997.

Table 47: MANUFACTURING SECTORS

<i>Nível</i> 50	English description
2	Mining of minerals (except combustibles)
3	Extraction of petroleum and gas, mining of coal
4	Manufacture of nonmetallic mineral products
5	Manufacture of iron and steel products
6	Manufacture of nonferrous metal products
7	Manufacture of metal products n.e.c.
8	Manufacture of machinery, equipment and commercial installations
9	Maintenance, repair and installation of machinery
10	Manufacture of electrical equipment and components
11	Manufacture of electronic equipment and communication apparatus
12	Manufacture of automobiles, trucks and buses
13	Manufacture of vehicle parts and transportation equipment n.e.c.
14	Manufacture of products and furniture
15	Manufacture of paper and pulp, publishing and printing
16	Manufacture of rubber products
17	Manufacture of non-petrochemical chemicals
18	Manufacture of petrochemical products and petroleum refining
19	Manufacture of miscellaneous chemical products
20	Manufacture of pharmaceutical products, perfumes and detergents
21	Manufacture of plastics products
22	Manufacture of textiles
23	Manufacture of apparel and apparel accessories
24	Manufacture of footwear and leather and fur products
25	Processing of coffee
26	Processing of plant products (including tobacco)
27	Processing of meat, including slaughter
28	Processing of dairy products
29	Processing of sugar
30	Processing of food fats and oils and refining of seed oil
31	Manufacture of other food products and beverages
32	Manufacture of miscellaneous other products n.e.c.

Table 48: EMPLOYMENT

	Manufact.	Services	Commerce	Agriculture
	(1)	(2)	(3)	(4)
Year 1990				
<i>Gender:</i>				
Male	1,707,896	1,421,804	574,460	86,824
Female	636,822	1,128,079	312,049	21,436
<i>Education:</i>				
Some college or more	218,356	554,531	62,476	2,939
High school or less	2,126,362	1,995,352	824,033	105,321
<i>Occupation:</i>				
White collar	685,105	1,682,221	601,577	14,219
Blue collar	1,659,613	867,662	284,932	94,041
Year 1997				
<i>Gender:</i>				
Male	1,363,969	1,656,404	680,349	220,898
Female	468,144	1,529,915	407,698	40,799
<i>Education:</i>				
Some college or more	188,980	717,510	75,185	5,872
High school or less	1,643,133	2,468,809	1,012,862	255,825
<i>Occupation:</i>				
White collar	536,703	2,292,665	745,152	24,030
Blue collar	1,295,410	893,654	342,895	237,667

Source: RAIS São Paulo state 1990 (prime age workers in their highest-paying job).

Table 49: SUMMARY STATISTICS, *RAIS* MANUFACTURING 1990 AND 1997

	Manufact. 1990		Manufact. 1997	
	Mean	St.Dev.	Mean	St.Dev.
	(1)	(2)	(3)	(4)
Log Annual Wage ^a	8.016	.786	8.872	.778
Primary School Education (or less) ^b	.533	.499	.487	.500
Some High School Education	.373	.484	.409	.492
Some College Education	.034	.182	.037	.190
College Graduate	.053	.225	.066	.248
Professional or Managerial Occupation	.079	.270	.072	.259
Technical or Supervisory Occupation	.096	.294	.081	.273
Other White Collar Occupation	.117	.321	.140	.347
Skill Intensive Blue Collar Occupation	.551	.497	.589	.492
Low-skill Intensive Blue Collar Occupation	.157	.364	.117	.322
Potential Labor Force Experience	16.079	9.458	17.252	9.144
Quadratic Experience Term	3.480	3.374	3.813	3.406
Cubic Experience Term	8.653	11.352	9.575	11.696
Quartic Experience Term	23.492	38.335	26.140	40.007
Tenure at establishment	.923	1.106	1.012	1.176
Female	.272	.445	.256	.436
Female × Log Annual Wage	2.062	3.393	2.181	3.738
Female × Primary School Education (or less)	.140	.347	.123	.328
Female × Some High School Education	.106	.308	.102	.303
Female × Some College Education	.010	.101	.011	.105
Female × College Graduate	.013	.114	.019	.137
Female × Professional or Managerial Occupation	.014	.118	.015	.122
Female × Technical or Supervisory Occupation	.027	.163	.022	.147
Female × Other White Collar Occupation	.042	.201	.058	.234
Female × Skill Intensive Blue Collar Occupation	.140	.347	.128	.334
Female × Low-skill Intensive Blue Collar Occupation	.048	.215	.033	.178
Female × Potential Labor Force Experience	3.828	7.904	4.134	8.388
Female × Quadratic Experience Term	.771	2.060	.874	2.216
Female × Cubic Experience Term	1.833	6.110	2.127	6.614
Female × Quartic Experience Term	4.837	19.379	5.677	21.063
Female × Tenure at establishment	.187	.542	.214	.613
Observations	2,364,007		1,837,461	

^aLog annualized mean monthly wage (in current U.S. dollars on December 31).

^bIncluding illiterates.

Table 50: SUMMARY STATISTICS, *RAIS* 1990

	Manufact. 1990		Services 1990	
	Mean	St.Dev.	Mean	St.Dev.
	(1)	(2)	(3)	(4)
Log Annual Wage ^a	8.016	.786	7.953	.830
Primary School Education (or less) ^b	.533	.499	.545	.498
Some High School Education	.373	.484	.237	.425
Some College Education	.034	.182	.063	.242
College Graduate	.053	.225	.147	.354
Professional or Managerial Occupation	.079	.270	.224	.417
Technical or Supervisory Occupation	.096	.294	.155	.362
Other White Collar Occupation	.117	.321	.279	.448
Skill Intensive Blue Collar Occupation	.551	.497	.140	.346
Low-skill Intensive Blue Collar Occupation	.157	.364	.203	.402
Potential Labor Force Experience	16.079	9.458	17.137	9.283
Quadratic Experience Term (/100)	3.480	3.374	3.798	3.462
Cubic Experience Term (/1,000)	8.653	11.352	9.594	11.987
Quartic Experience Term (/10,000)	23.492	38.335	26.414	41.364
Tenure at establishment	.923	1.106	1.047	1.240
Female	.272	.445	.442	.497
Female × Log Annual Wage	2.062	3.393	3.469	3.930
Female × Primary School Education (or less) ^b	.140	.347	.232	.422
Female × Some High School Education	.106	.308	.086	.280
Female × Some College Education	.010	.101	.033	.179
Female × College Graduate	.013	.114	.088	.283
Female × Professional or Managerial Occupation	.014	.118	.130	.336
Female × Technical or Supervisory Occupation	.027	.163	.088	.283
Female × Other White Collar Occupation	.042	.201	.126	.332
Female × Skill Intensive Blue Collar Occupation	.140	.347	.012	.107
Female × Low-skill Intensive Blue Collar Occupation	.048	.215	.087	.282
Female × Potential Labor Force Experience	3.828	7.904	7.642	10.563
Female × Quadratic Experience Term (/100)	.771	2.060	1.700	3.003
Female × Cubic Experience Term (/1,000)	1.833	6.110	4.307	9.428
Female × Quartic Experience Term (/10,000)	4.837	19.379	11.909	31.123
Female × Tenure at establishment	.187	.542	.496	.987
Observations	2,364,007		2,585,223	

^aLog annualized mean monthly wage (in current U.S. dollars on December 31).

^bIncluding illiterates.

Table 50: SUMMARY STATISTICS, *RAIS* 1990, cont'd

	Commerce 1990		Agriculture 1990	
	Mean	St.Dev.	Mean	St.Dev.
	(1)	(2)	(3)	(4)
Log Annual Wage ^a	7.461	.742	7.352	.584
Primary School Education (or less) ^b	.479	.500	.802	.399
Some High School Education	.450	.497	.171	.377
Some College Education	.028	.165	.008	.089
College Graduate	.031	.173	.013	.115
Professional or Managerial Occupation	.061	.240	.043	.203
Technical or Supervisory Occupation	.328	.469	.026	.158
Other White Collar Occupation	.288	.453	.062	.240
Skill Intensive Blue Collar Occupation	.166	.372	.689	.463
Low-skill Intensive Blue Collar Occupation	.156	.363	.180	.385
Potential Labor Force Experience	13.206	9.348	16.163	9.833
Quadratic Experience Term (/100)	2.618	3.047	3.579	3.639
Cubic Experience Term (/1,000)	6.153	9.872	9.227	12.568
Quartic Experience Term (/10,000)	16.139	32.721	26.051	43.426
Tenure at establishment	.512	.699	.600	.808
Female	.352	.478	.199	.399
Female × Log Annual Wage	2.569	3.506	1.401	2.826
Female × Primary School Education (or less) ^b	.165	.371	.161	.368
Female × Some High School Education	.160	.366	.030	.170
Female × Some College Education	.012	.107	.003	.055
Female × College Graduate	.012	.108	.003	.057
Female × Professional or Managerial Occupation	.017	.131	.004	.060
Female × Technical or Supervisory Occupation	.139	.346	.008	.091
Female × Other White Collar Occupation	.136	.342	.022	.147
Female × Skill Intensive Blue Collar Occupation	.015	.123	.132	.339
Female × Low-skill Intensive Blue Collar Occupation	.045	.207	.033	.178
Female × Potential Labor Force Experience	4.281	7.873	3.118	7.704
Female × Quadratic Experience Term (/100)	.803	2.006	.691	2.158
Female × Cubic Experience Term (/1,000)	1.819	5.940	1.795	6.811
Female × Quartic Experience Term (/10,000)	4.670	18.965	5.134	22.808
Female × Tenure at establishment	.165	.435	.096	.342
Observations	894,885		109,786	

^aLog annualized mean monthly wage (in current U.S. dollars on December 31).

^bIncluding illiterates.

Table 51: SUMMARY STATISTICS, *PNAD* HOUSEHOLD DATA 1990

	Formal 1990		Informal 1990	
	Mean	St.Dev.	Mean	St.Dev.
	(1)	(2)	(3)	(4)
Log Annual Wage ^a	8.009	.805	7.241	.943
Primary School Education (or less) ^b	.715	.452	.856	.352
Some High School Education	.188	.391	.101	.301
Some College Education	.074	.262	.036	.187
College Graduate	.023	.150	.008	.088
Blue Collar Occupation	.585	.493	.689	.464
Potential Labor Force Experience	17.684	9.823	14.393	10.639
Quadratic Experience Term (/100)	4.092	3.916	3.200	4.027
Cubic Experience Term (/1,000)	10.959	14.202	8.728	14.414
Quartic Experience Term (/10,000)	32.077	51.187	26.405	52.119
Female	.255	.436	.356	.479
Female × Log Annual Wage	1.941	3.333	2.522	3.429
Female × Primary School Education (or less) ^b	.179	.383	.304	.461
Female × Some High School Education	.052	.222	.039	.193
Female × Some College Education	.021	.143	.010	.101
Female × College Graduate	.004	.063	.003	.051
Female × Blue Collar Occupation	.134	.340	.274	.447
Female × Potential Labor Force Experience	4.139	8.457	5.894	10.080
Female × Quadratic Experience Term (/100)	.886	2.384	1.360	3.104
Female × Cubic Experience Term (/1,000)	2.270	7.620	3.768	10.457
Female × Quartic Experience Term (/10,000)	6.465	25.924	11.459	36.837
Observations	3,551		388	

^aLog annualized September wage (in current U.S. dollars on December 31).

^bIncluding illiterates.

Table 52: SUMMARY STATISTICS, *PNAD* HOUSEHOLD DATA 1997

	Formal 1997		Informal 1997	
	Mean	St.Dev.	Mean	St.Dev.
	(1)	(2)	(3)	(4)
Log Annual Wage ^a	8.751	.784	8.161	.843
Primary School Education (or less) ^b	.605	.489	.679	.467
Some High School Education	.284	.451	.254	.436
Some College Education	.077	.267	.055	.228
College Graduate	.034	.180	.012	.110
Blue Collar Occupation	.584	.493	.636	.482
Potential Labor Force Experience	18.554	10.105	13.677	9.999
Quadratic Experience Term (/100)	4.463	4.069	2.868	3.610
Cubic Experience Term (/1,000)	12.270	14.800	7.382	12.448
Quartic Experience Term (/10,000)	36.473	53.245	21.228	43.441
Female	.241	.428	.323	.468
Female × Log Annual Wage	2.029	3.622	2.578	3.761
Female × Primary School Education (or less) ^b	.123	.328	.199	.400
Female × Some High School Education	.086	.281	.106	.308
Female × Some College Education	.025	.156	.016	.127
Female × College Graduate	.007	.082	.002	.045
Female × Blue Collar Occupation	.116	.320	.180	.384
Female × Potential Labor Force Experience	4.161	8.730	4.443	8.887
Female × Quadratic Experience Term (/100)	.935	2.497	.985	2.688
Female × Cubic Experience Term (/1,000)	2.462	7.952	2.697	8.982
Female × Quartic Experience Term (/10,000)	7.108	26.647	8.180	31.344
Observations	2,798		492	

^aLog annualized September wage (in current U.S. dollars on December 31).

^bIncluding illiterates.

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