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REAL WAGES TRENDS IN COLOMBIAN  
MANUFACTURING AND CONSTRUCTION  
DURING THE TWENTIETH CENTURY

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REAL WAGES TRENDS IN COLOMBIAN MANUFACTURING  
AND CONSTRUCTION DURING THE TWENTIETH CENTURY\*

A. Berry

Introduction

Considerable interest attaches to the historical development of real wages in a less developed country's (LDC's) manufacturing and construction sectors, both because of the direct implications for what is usually an increasing share of the occupied population, and for the more general lessons it may provide on the growth mechanism.<sup>1</sup>

Available information on changes in real wages in one sector or another of Colombia's economy leaves substantial uncertainty as to the underlying mechanism which generates these levels and trends. The fact that agricultural real wages appeared to be about the same in 1968 as they had been in 1935 (though there was a decline and subsequent rise during the interval)<sup>2</sup> might suggest either a labor surplus situation or a development process with labor saving technological change as an important component and/or a high substitutability between capital and labor (as the capital-labor ratio rises). More fragmentary information on construction wages in Bogota also suggests a 1950 wage below the 1935 (or 1935-39) level; like agricultural wages, construction wages (reference is, again, to Bogota but it seems highly probable that trends were broadly similar in the other major cities) rose after about 1955 so that by 1965 these were perhaps 75% above the level of the early

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<sup>1</sup>Rightly or wrongly, a constancy or near constancy over time of the real wage rate of unskilled labor in agriculture and manufacturing has frequently been taken to be a partial test for existence of a labor surplus situation. More generally, if average productivity per person engaged in the manufacturing sector is rising faster than average wages, this bespeaks something either of the nature of substitutability between labor and other factors, and/or the nature of technological change.

<sup>2</sup>A. Berry, The Development of the Agricultural Sector in Colombia, Chapter 6, forthcoming.

\*Tables with a letter before the number (e.g. Table A-2) constitute a statistical appendix which can be obtained by requesting from the author.

50's. (Table 1) In general these two series appear to bear a rather close relationship to each other, especially when a specific region is singled out, as in Table 1 (the Bogota and Cundinamarca region).

Another well known piece of information is that manufacturing sector wages, (in plants of 5 or more workers) have risen dramatically since 1955 when the central statistical office (DANE) began systematic collection and production of a wage series; depending on what deflator is used and whether fringe benefits are included, the increase in real wages over the period 1955-1968 appears to have been in the range of 80 to 130 percent.<sup>1</sup> While it is true that agricultural and construction wages, like those in manufacturing, were generally rising in the period 1945-1965<sup>2</sup>, there remains a substantial difference in degree of increase indicated, the increase being greatest in manufacturing, second in construction, and third in agriculture. A number of interpretations (apart from data problems) are possible. One, of course, is that industrial wages are more importantly affected by union pressures than the others. Another is that the skill component in the industrial sector has risen much more rapidly over time. Many other hypotheses could also be formulated.

This study is primarily a statistical exercise in piecing together scattered information on the earnings of some or all of the industrial and construction workers, (the main focus is on the former group) and in checking consistency among these sources. It involves decomposing the industrial labor force, an exercise which, apart from its possible relevance in reflecting underlying economic structure, indicates the extent to which some sub-groups have participated in the increases and others have not, and may give hints regarding the extent to which the typical

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<sup>1</sup> Depending also on the assumptions about the reasons for observed inconsistencies in the wage series.

<sup>2</sup> Our index suggests that agricultural wages rose about 25.7% between 1945-50 (average) and 1963 while Bogota construction wages were increasing by 50% or more (a rough guess since we have no figures for the period 1945-50 except that for 1950 itself).

Table 1

Unskilled Construction Wages in Bogota, Compared to Other Selected Wage Series  
(all wages expressed in pesos per day)

Year	C U R R E N T P R I C E S					1 9 5 8 P R I C E S				
	Unskilled Construction Workers: Bogota		Agricultural Salaries:		Unskilled Construction Workers: Bogota	Agricultural Salaries:		Agricultural Salaries:		Agricultural Salaries: Colombia
	(1)	(2)	(3)	(4)		(5)	(6)	(7)	(8)	
1935	(.80)				4.44	4.90	4.85	4.60	5.60	
1936	(.75)				3.85	3.77	3.74	3.74	5.15	
1937	(.93)				4.91	3.89	3.85	3.85	5.77	
1938	(.94)	.60			4.40	4.38	4.34	4.34	5.04	
1939	(.96)	.60	0.60	0.74	4.31	4.02	3.97	3.97	4.66	
1940	(.95)	.80	0.80	0.78	4.40	5.74	5.68	5.68	5.38	
1941	(.94)	.80	0.90	0.71	4.42	5.42	5.70	5.70	5.19	
1942	(.92)	0.65	0.60	0.72	3.98	4.06	3.73	3.73	4.23	
1943		0.60	0.60	0.73		3.38	3.34	3.34	3.52	
1944		0.90	0.80	0.94		5.04	3.46	3.46	3.78	
1945		1.05	1.00	1.09		4.02	3.80	3.80	4.04	
1946		1.50	1.50	1.25		5.29	5.24	5.24	4.20	
1947		1.75	1.50	1.62		4.86	4.17	4.17	4.42	
1948		1.85	1.70	2.02		4.74	4.35	4.35	4.74	
1949		2.05	2.00	2.03		5.07	4.91	4.91	4.53	
1950	2.24	2.50	2.30	2.52	3.97	4.85	4.45	4.45	4.46	
1951	2.34	2.90	2.60	2.84	3.81	5.08	4.55	4.55	4.55	
1952	2.45	2.70	2.40	2.81	4.08	4.68	4.16	4.16	4.85	
1953	2.50	2.95	2.55	2.92	3.88	4.61	3.99	3.99	4.66	
1954	2.74	3.42	2.90	3.27	3.91	4.58	3.89	3.89	4.66	
1955	2.93	3.67	3.25	3.46	4.14	5.16	4.44	4.44	5.16	
1956	3.98	3.92	3.35	3.54	5.32	5.32	4.55	4.55	4.76	
1957	4.30	4.37	3.90	3.89	4.92	4.91	4.38	4.38	4.25	
1958	5.01	5.05	4.50	4.55	5.01	5.05	4.50	4.50	4.55	
1959	6.00	5.25	4.75	5.00	5.60	5.02	4.52	4.52	4.78	
1960	6.50	5.90	5.25	5.51	5.84	4.90	4.35	4.35	5.05	
1961	7.60	6.50	5.80	6.29	6.28	5.24	4.69	4.69	5.08	
1962	8.50	7.10	6.55	6.92	6.85	5.99	5.49	5.49	5.66	
1963	10.20	9.15	8.40	8.99	6.23	5.73	5.25	5.25	5.52	
1964	12.55	10.10	9.75	10.60	6.52	5.60	5.06	5.06	4.92	
1965	15.00	11.65	11.60	11.28	7.50	6.78	6.30	6.30	5.60	
1966	16.00	13.72	12.60	13.17 <sup>c</sup>	6.70	6.15	5.63	5.63	5.33	
1967	17.00 <sup>a</sup>	15.67	14.20	14.07 <sup>c</sup>	6.58	7.33	6.76	6.76	5.52	
1968	18.00 <sup>a</sup>	16.80	14.50	14.82 <sup>d</sup>	6.58				5.13	
1969	19.00 <sup>a</sup>	18.50	17.22	17.00 <sup>e</sup>	6.31					
1970	20.00 <sup>a</sup>			6.21						
1971	21.57 <sup>b</sup>			6.30						

Source: A. Berry, "Changing Income Distribution under Development: Colombia," University of Western Ontario, Department of Economics, Research Report # 7306, 1973.

<sup>a</sup>Interpolated by guessing.

<sup>b</sup>First semester. Calculated as 20.39 (the figure reported by a DANE survey and excluding fringe benefits) plus an estimated 1.5 for those benefits.

<sup>c</sup>DANE, Anuario General de Estadística, 1966-67.

<sup>d</sup>Interpolated (in the absence of access to the correct figure) taking into account an estimate of the change in the real agricultural wage between 1967 and 1968.

<sup>e</sup>DANE, Boletín Mensual de Estadística No. 240, p. 32; equal weight was given to cold and hot regions.

individual over his occupational history in the industrial sector receives an increasing real wage as he moves from one occupational level to another, and the extent to which either (a) education, and/or (b) learning by doing are important components in the increasing average wage level over time. The construction wage rate is of particular interest since the skill level of many construction workers tends to be low and union power in this industry is essentially absent. Hence it is meaningful to assume that the wage is something of an equilibrium one.

Some of the more detailed figures and consistency checks are given in the Appendix. Here we present what seem the most plausible interpretations of overall wage movements, distinguishing in most of the discussion the periods 1923-1954, and 1954 and on.

We present first series on blue and white collar wages for the industrial sector as a whole or for as much of it as possible. Disaggregation of wage movements by industry, by plant size and by region is carried out, with a view to providing a fuller picture of the process of change. The final section discusses trends in construction wages.

A. The Manufacturing Sector: General Wage and Employment Trends

A.1 Real Wages of Blue Collar Workers in Manufacturing 1923-1954

It is unfortunately impossible, for either blue collar workers in industry or in construction, to create a money-wage or real wage series applicable to the nation as a whole for any extended period. Only since 1955 have current wage statistics been collected on a more or less national basis for industry; before that, all available indices (usually of quite dubious quality) were on a regional basis. For construction no official figures are available at all.

Based on the patchwork evidence available, a best guess as to the historical pattern of average real wages of blue collar workers in manufacturing would be as follows: a substantial increase in the 1920s (a conclusion based, however, solely on data with respect to female workers in certain industries in Medellin and therefore undeniably weak); a considerable decrease in the 1930s based again primarily on the data from Medellin, though it is substantiated for the latter part of the period by data from Bogota; a small increase in the early 1940s (based primarily on Bogota data); a considerable, but possibly erratic and geographically unevenly distributed increase between 1945 and 1955; a very rapid upward trend since some time between 1950 and 1955, with a levelling off in the last few years.

Such an average trend may, of course, cover up many divergent movements for given sub-groups of the workers in question. Only for the most recent period (from the early 1950s on) can any interesting and reasonably trustworthy breakdowns be effected on an annual basis. In any case during the pre World War II period average skill levels were presumably low,<sup>1</sup> and the work force as a whole was probably

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<sup>1</sup>It is interesting, however, to note that the Industrial Census of 1944/45 showed 88% of the blue collar workers to be literate, at a time when perhaps two-thirds of total national male labor force and 82% of the urban male labor force was literate. (Interpolations between the 1938 and 1951 population censuses.) The figure may, of course, be biased upward as a result of misstatement by the individual or the person filling out the questionnaire.



substantially more homogenous than it has become in the late 1950s and 60s with the surge of industrial growth, and in particular with the development of industries of relatively more complex technology than the ones developed earlier.

Table 2 presents estimates of the real wage trend over the period 1923-1939 for female workers in certain industries in Medellin, indicating considerable rise during the 1920s, and a decrease during the 1930s,<sup>1</sup> specifically after 1931 or 1932 when the cost of living appears to have begun to rise after falling dramatically in the years 1928-1932. (The money-wage series has been deflated by a price series of food products in Medellin; no cost of living index was available during this period.)

The Medellin data on real wages of female workers in the selected industries suggests a sharp drop after the peak in either 1932 or 1933. Monetary wages peaked in 1928 or 1929 and the subsequent apparent increase in the real wage was probably due to rapidly falling prices. Quite possibly there was decreasing industrial employment during this period of downward spiral in both series. Price series started to rise again in 1933 in Medellin and real wages, as just noted,

<sup>1</sup>The series for one factory in Bogota suggests fairly parallel movements of money wages there (See Table A-1). Over the period 1923-24 to 1936-37, the Medellin money wage index rose by 47% while that in the Fenicia factory rose by 37%; the real wage increase for the Medellin workers was 35-71% depending on which of the price series presented in Table 1.5 is considered superior, and for workers in the Fenicia Plant it was about 5%, using the central bank 15 product price series as deflator. (Movement was different for skilled and unskilled workers--see Table A-3.)

Table 2  
 Estimates of a Real Wage Index for Female Workers  
 in Selected Industries in Medellin  
 (Base 1923=100)

Year	(1) <u>Index of Money Wages</u>	(2) <u>Real Wage Index (Based on deflation by Lopez price series)</u>	(3) <u>Real Wage Index (Based on deflation by Central Bank price series)</u>	(4) <u>Lopez price series</u>	(5) <u>Central Bank price series</u>
1923	100	100	100.0	100	100
1924	109	104	97.3	105	112
1925	114	102	108.6	112	105
1926	123	79	95.3	155	129
1927	151	100	131.3	151	115
1928	173	107	145.4	161	119
1929	165	119	158.7	139	104
1930	146	151	189.6	97	77
1931	115	142	174.2	81	66
1932	98	175	188.5	56	52
1933	111	166	201.8	67	55
1934	110	118	142.9	93	77
1935	135	138	164.6	98	82
1936	152	143	181.0	106	84
1937	152	131	161.7	116	94
1938	153	121	133.0	126	115
1939	172	126		137	104
1940				125	101

Sources and Methodology for Table 2 : The money-wage series —(Col (1), on which the real wage series calculated here are based, has been published, among other places, in the "Indice Económico de Antioquia", published periodically in the Anales de Economía y Estadística. The original source was various issues of the publication "Anuario Estadístico de Medellín". (it is also reproduced by Luis Ospina Vásquez in his study "Industrial y Protección en Colombia, 1810-1930," p. 410.

In column 2 the money-wage series just alluded to has been deflated by Col (4), a price index for food articles constructed for Medellín by Alejandro López starting in 1918. In Column (3), the same money-wage series has been deflated by Col (5), a food price series for Medellín based on a splicing together of two indices constructed by the Central Bank. This latter price series is probably superior for this purpose to the López index. The two series spliced together to produce it are (a) a series of the Bank of the Republic running from 1923 to 1939, with base year 1923 and (b) a second series running from 1935 to the present, with base year 1935. The first of these was an unweighted average of three different series, one for grain products, including rice, cocoa, beans, wheat, coffee and corn; a second for animal products, including beef, pork, lard, milk and eggs; and a third for other articles, including sugar, platanos, potatoes, salt, and yucca. Since no cost-of-living study had been done there was no possibility of giving these different products an accurate weighting, and it appears that no weighting was done at all. The second series was alleged to be more "technical" (see the publication Colombia, 1953-1954: Edición Extraordinaria de El Mercado Agrícola, Corporación de Defensa de Productos Agrícolas: INA, p 116).

Since the López series was designed to reflect the costs of a middle-class family, it is not conceptually appropriate as a deflator for a blue-collar wage series. On the other hand, it does have the advantage of some sort of weighting. It seems possible, however, that the major difference between the two series would be in the adequacy of data collection and here one might guess that the Central Bank series should have been the better of the two. In any case we have effected the deflation by both series.

started to fall in either 1933 or 1934 according to which price series is more accurate. The Bogota unskilled workers money wage in the Fenicia factory seems to have been as downwardly flexible as that of the Medellin female workers; it seems plausible that the lower the level of skills the more downwardly flexible the wage rate.

The Medellin female workers series suggests that the real wage was probably falling from 1932 or 1933 until almost the end of the decade; the pattern in Bogota's Fenicia factory was similar. Evidence is conflicting, however, as to just when the bottoming out of these various series occurred, and it is not necessarily to be expected that it would be the same in all cases. Evidence from a group of relatively large firms (average size 30 or more workers in almost every year) over the period 1936-42 suggests that there was probably little change over this period as a whole (see Table A-10).

The interpretation of statistics from about 1936 on is somewhat easier due to the availability of a probably fairly adequate cost of living series for blue collar workers, at least in Bogota, another one beginning in Medellin in 1940, etc.

Table 3 presents a blue collar wage series for the period 1938-1954 corresponding basically to Bogota firms (though some from cities in nearby departments were also included). In Column (1), no allowance is made for the relative increase in fringe benefits; Column (2) reflects an attempt to estimate this increase and include it as part of the real wage. The series indicates very little real wage increase over the 16 year period, almost none unless fringe benefits are included. While the period 1945 to 1950 showed markedly higher wages than the period 1938 to 1945, there was a subsequent drop-off in the post 1950 years, especially in 1952 to 1954. It seems likely that there is a downward bias in this series and that in fact real wages rose by perhaps 12-15% over the period as a whole.<sup>1</sup> But it also appears

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<sup>1</sup>See the discussion in Appendix A.

Table 3

Real Wages, Manufacturing Workers in Cundinamarca,  
Boyaca, Norte de Santander and Santander<sup>1</sup>

<u>Year</u>	(1) <u>No allowance for Fringe Benefits (prestaciones sociales)</u>	(2) <u>Allowance for Fringe Benefits</u>
1938	100.0	100.0
1939	98.3	98.3
1940	101.7	102.0
1941	100.5	100.0
1942	100.6	101.3
1943	106.7	107.8
1944	106.2	107.4
1945	108.3	109.9
1946	112.3	114.5
1947	118.0	120.4
1948	109.2	112.4
1949	115.9	119.8
1950	114.4	118.8
1951	109.9	114.7
1952	114.1	119.5
1953	107.8	113.4
1954	102.9	108.7

<sup>1</sup>Although some reporting firms were located in each of these departments, the majority were in Bogota.

Sources and Methodology for Table 3: The money-wage series from which this real wage series is constructed come from the various issues of DANE, Anuario General de Estadística. The data were collected by DANE and come primarily from relatively large firms in the major cities of Cundinamarca, Boyacá, Norte de Santander and Santander; this presumably means from Bogotá and Bucaramanga, and to a lesser extent perhaps from Tunja and Cúcuta. I have been able to learn very little about the way in which the firms were chosen or whether there was any attempt to keep the sample updated from time to time, but I suspect that no such attempt was made. The latter suggests a possible downward bias in the series, since new firms frequently pay higher wages than old ones. The fact that the firms were probably above average size would imply that the absolute wages reported were above the average for all firms over the whole of the period, although since average size of firm was probably increasing during this period, this upward bias might decrease as time went on, and therefore constitute a downward bias in the trend indicated in the series.

Another reason for doubting the veracity of the figures is the fact that the series referring to all workers was occasionally inconsistent with the individual series for male wages and female wages. I tried to check whether this had led to any serious bias by going back to the original wage series for each component industry (there were about 15); it had apparently not led to serious errors in the overall series. Its presence does, of course, suggest that other weaknesses may well be present.

probable that the series is meaningful in terms of the decrease it indicates for the early fifties.

The data for the region covered by this series are not, apparently, typical of the country as a whole. A comparison of the 1953 and 1944/45 industrial census wage data suggests a real wage increase of 24.6% for the country as a whole but only about 12%<sup>1</sup> for Cundinamarca (mainly Bogota). Other evidence indicates that for a number of occupations wages fell in Bogota during the early fifties,<sup>2</sup> perhaps related to the rapid rural to urban migration stimulated by the violencia, by better communications, etc. Whether this occurred in other large cities is unclear, but the industrial census data would suggest a smaller decline for them if there was one at all.<sup>3</sup>

If the region to which the DANE sample referred (Cundinamarca, Boyaca, and the Santanderes) was not atypical of the country during the earlier 1938-45 period, one would conclude that average wages rose by about 35% over the period 1938-1953 as a whole,<sup>4</sup> i.e., at a healthy enough annual rate of 2%. The evidence available

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<sup>1</sup>Unadjusted figures indicate a growth of 13.6% but when an incomparability in the distinction between obreros and empleados in the printing industry is corrected for the figure is about 12%.

<sup>2</sup>Unpublished information collected by Alan Udall for his Yale Ph.D. dissertation.

<sup>3</sup>Over the long run many economic variables seem to have had quite parallel movements in the different regions of the country, but this was perhaps less so before the early 1950s than since then, when economic integration has been more marked, along with the mobility of labor (and probably capital). The impact of the violence and other factors leading to migration to the cities may have had differential impacts according to the city. The employment index (presented along with the salary index during this period) does indicate a relatively rapid increase in employment, especially for Bogota, in this 1951-1954 period.

<sup>4</sup>The DANE study indicated an increase of 8.6% over 1938 to 1944/45 and the calculated increase between the two censuses, as noted earlier, was 24.6%.

suggests that a secular increase began in the early 40s, an increase which has in effect continued up to the present.<sup>1</sup> The similarity of the long run pattern with that in agriculture (where a bottoming out appeared to occur about 1942-43) is striking. The same is true, broadly, for construction (see below).

A.2 Blue Collar Manufacturing Wages: The Recent Period (1953 and on)

For the early fifties to the present there is a more adequate money-wage series, as well as relatively good cost-of-living data. There are, however, serious ambiguities, though not such as to cast doubt on the fact of a rapid increase in the real wage in the post 1954 period. Columns (1) - (4) of Table 4 give alternate estimates of the trend in real wages (base January 1955 = 100), when fringe benefits are not included. Columns (5) - (8) give the same alternatives with fringe benefits included. Columns (1), (2), (5), and (6) correspond to low and high estimates of change in real hourly earnings, (see Sources and Methodology) while the remaining columns deal with changes in real monthly payments.

An alternative series (see Table 5) based on the wage payments data from DANE's annual industrial survey is broadly consistent with the data of Table 3, in that both show very substantial real wage increases for blue collar workers. The wage bill data, which may be more accurate, indicates a smaller increase. It appears probable that in fact the increase was about 60-65% for 1955-68 and 70-75% for 1953-68.

The two types of series are valuable checks on each other, and despite the fact that blue collar and white collar workers cannot be separated from most years in the DANE Industrial Survey data, the consistency of movement over the period as a whole is reassuring. In general, the annual "wage bill" information is more

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<sup>1</sup>Both Table 3 and Table A-10 suggest very little if any increase over the period 1936-42.



Table 4  
 Real Wages Indices: Blue Collar Manufacturing Workers:  
 1955-1968  
 (Base January 1955=100)

Year	Without Fringe Benefits				With Fringe Benefits			
	(1) Real Hourly Wage	(2)	(3) Real Monthly Wage	(4)	(5) Real Hourly Wage	(6)	(7) Real Monthly Wage	(8)
	Estimate No. 1	Est. No. 2	Est. No. 1	Est. No. 2	Est. No. 1	Est. No. 2	Est. No. 1	Est. No. 2
1955	102.8	106.3	112.3	116.2	102.8	106.3	112.3	116.2
56	108.2	115.6	120.0	128.2	110.9	118.5	123.0	131.4
57	121.5	132.8	123.4	134.5	124.8	136.4	126.7	138.1
58	121.9	134.4	124.0	136.6	128.5	141.7	130.7	144.0
59	123.3	137.5	126.5	142.2	131.1	146.7	134.5	151.7
1960	134.3	151.6	133.3	151.4	143.7	162.2	142.6	162.0
61	142.5	160.9	136.4	154.2	154.9	174.9	148.3	167.6
62	154.8	176.6	154.3	176.1	172.3	196.6	171.7	196.0
63	171.2	195.3	167.3	190.8	193.8	221.1	189.4	216.0
64	165.3	189.1	161.7	184.5	188.92	215.46	184.25	210.14
65	171.64	195.75	167.5	191.03	197.14	224.84	192.38	219.41
66	167.25	190.75	163.2	186.13	195.75	223.25	191.01	217.85
67	170.81	194.81	166.6	190.01				
68	175.36	200.00	171.1	195.14				

Sources and Methodology for Table 4: The basic money-wage series and cost-of-living series (in this case both on a national basis) on which these real wage indices are based are published in the Boletín Mensual de Estadística of DANE. The series published are hourly salary, hours worked per week, and hours paid per week. Our estimates of the real monthly wage are based on a multiplication of the real hourly salary figures times the hours paid per month figure. The difference between the set of estimates labelled "1", (the lower estimates), and the set "2" is based on a different interpretation of a gap in the series which resulted when the base of the sample survey on which the figures are based was changed in 1962. The average wage based on the new population of firms was considerably higher (15-20%) than that corresponding to the old population. We assume, as seems reasonable, that the new base, being more ample and better selected, gives a better estimate than the old one; the more difficult question is whether the old base gave a downward biased estimate of hourly earnings throughout the whole of the period 1955-1962, or whether it became increasingly downward biased during this period, after having given an accurate figure in 1955. Some downward bias over time seems plausible, but it would be surprising if it accounted for such a differential over seven years; if it did not, then there must have been underestimation even in 1955. To provide limits here, we use what are hopefully extreme assumptions. The low estimates-set "1"-assume that the original series was downward biased by the same percent throughout, while estimates "2" assume that it was correct in 1955 and that it became increasingly biased during these seven years, this bias accounting for the full 15-20% difference in 1962. The second series is based on an adjustment to the original real wage series incorporating the assumption of no bias in either the 1955 or the 1962 figures; the adjustment is based on the assumption that the downward bias increased linearly over the period 1955-62, starting at zero in 1955 and reaching the observable difference between the old and the new figures in 1962. The correct index hopefully lies between the two calculated here.

Columns (5) to (8) are based on salary figures of Columns (1) to (4) with an upward adjustment according to the ratio of fringe benefits to total payments received, as indicated in the annual wage payments figures published in the Anuario General de Estadística, and coming from their periodic surveys of the manufacturing sector. (Fringe benefits formed an increasing share of total remuneration during the period). This annual payments data is not fully comparable with the wage rate data on which the basic real wage series have been constructed, but since the industrial surveys of DANE are quite comprehensive, the problem introduced in this way is probably insignificant.

For more detailed discussion see Tables B-4 and B-4.

Table 5  
Annual Blue Collar and White Collar Wage Earnings,  
(Including Fringe Benefits),<sup>a</sup>

Year	Blue Collar		White Collar		All Workers	
	Annual Wage	Index, 1953 = 100	Annual Wage	Index 1953 = 100	Annual Wage	Index 1953 = 100
	(1)	(2)	(3)	(4)	(5)	(6)
1953	2774	100.0	9345	100.0	3598	100.0
1955					4286	119.1
					4391	122.0
					4476	124.4
					4643	129.0
					4763	132.4
1960					5227	145.3
					5513	153.2
					6068	168.7
					6372	177.1
					6339	176.2
1965	5151	185.7	12,580	134.6	6557	182.2
1966	5130	184.9	12,332	132.0	6520	181.2
1967	5475	197.4	13,498	144.4	7086	196.9
1968	5216	188.0	13,295	142.3	6821	189.6
1969	5501	198.3	13,985	149.7	7176	199.4

<sup>a</sup>Based on DANE Industrial Survey Data: 1953-1968. All wage figures are in 1958 pesos. Columns 2, 4, and 6 are indices, all computed with base 1953=100.

Source: Tables B-1, B-2 and B-3.  
Deflation is by the respective cost of living series for blue and white collar workers, and by a weighted average of the two for all workers. (see Table B-1).

consistent with the "estimate 2" wage series, suggesting that failure to update the sample of firms on which wage estimates were made between 1955 and 1962 may not have led to an increasing downward bias.<sup>1</sup> This conclusion cannot be held too firmly, however, since there are other weaknesses in the annual data. One is a downward bias in the estimate of monetary variables for smaller size firms in the period 1962-1965 and thereafter. Since this bias is limited to the smaller firms it might not be quantitatively too serious. The annual data, it should be noted, have also the difficulty that wages are on an annual basis whereas the employment figure is that of a particular date (end of November). Seasonal fluctuations in employment could thus create problems.

#### A.3 White Collar Wages Over Time

Although not the major focus of this study, it is worthwhile providing some comparative data on white collar earnings over time. The pattern of blue and white collar wage increases outlined above has been associated with a more rapid increase in the number of white collar than of blue collar workers (see Table 6). Whereas the latter group about doubled between 1944/45 and 1966, white collar employment rose to about three times its original level.<sup>2</sup>

#### A.4 Summary

To summarize, it is clear from the above that real wages in manufacturing have risen substantially and almost continuously since 1945, with the average increase in blue collar wages probably amounting to about 115% over the entire period. Meanwhile white collar earnings appear to have risen a

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<sup>1</sup>The opposite assumption underlies estimate 1.

<sup>2</sup>Although these growth rates are somewhat dependent on the relative coverage of the sources used, their relative growth would not be very sensitive to the actual differences in coverage.

Table 6

## Trends in the Composition of Factory Manufacturing Employment

Year	Total (1)	Unpaid		Paid (4)	White Collar		Blue Collar			
		(2)	(3) % of Total		(5)	(6) % of Paid	(7) % of Total	(8) Number	(9) % of Paid	(10) % of Total
1944/45 (Industrial Census)	148,500	13,300 <sup>a</sup>	8.96	135,200	15,391	11.38	10.36	119,809	88.62	80.68
1953 (Industrial Census)	199,116	17,826	8.95	181,290	22,205	12.25	11.15	159,085	87.75	79.90
1956	211,979	10,811	5.10	201,168						
1961	265,222	11,043	4.16	254,179						
1966	299,508	11,470	3.83	288,038	56,089	19.47	18.73	231,949	80.53	77.44
1969	326,826 <sup>b</sup>	7,832 <sup>b</sup>	2.40	318,994	65,844	20.64	20.15	253,150	79.36	79.85

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(a) Estimated, see Berry, "The Relevance and Prospects of Small Scale Industry in Colombia," Yale Economic Growth Center Discussion Paper # 142, April, 1972.

(b) The sampling approach was changed substantially in 1969, with the result that many less small firms were included. The figure in column (2) is not comparable with those of earlier years. Total figures appear not to be too sensitive to this change.

Source: Industrial Censuses of 1945 and 1953. For 1956, 1961, and 1966, DANE, Anuario General de Estadística. For 1969 DANE, Industria Manufacturera Nacional 1969.

By columns:

- (3): Col. (2) as a percentage of col. (1)  
 (6): Col. (5) as a percentage of col. (4)  
 (7): Col. (5) as a percentage of col. (1)  
 etc.

little over 100%.<sup>1</sup> The post World War II performance has probably been substantially superior to the pre-war one although it is possible that a considerable increase occurred in the twenties and thirties. Unfortunately the data is limited to Medellin, where increases may have been larger than elsewhere;<sup>2</sup> and, for a variety of reasons, the data are hard to interpret.<sup>3</sup>

White collar wage series are not available (to my knowledge) before 1936. DANE statistics for 1936-42 suggest no increase, possibly even a decrease, over that period. Then, however, this series "took off" as the early phases of the industrial boom (1945-53) apparently caused a large increase in demand for some kinds of white collar labor; this period saw a rise of about 50%. From then on, perhaps in response to the rapid expansion of secondary and university education<sup>4</sup> (in percentage terms), these wages have risen less than for blue collar workers, only by about 42% over 1953-68. Over the entire period since 1945, it is interesting that wages of the

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<sup>1</sup>Made up of an increase of 50% over 1945-53 and an increase of 42% over 1953-68. (See Table B-3) An average white collar wage is perhaps even harder to interpret than an average blue collar one, since the category includes anyone from desk to professional. The composition has probably changed rather rapidly over the period.

<sup>2</sup>Table 2 presented earlier would indicate that for female workers in selected industries of Medellin, the real wage rose by 43-81% over 1923-36 depending on the price series used as deflator. The Lopez cost of living series is presumably superior to the central bank (unweighted) price series, so the 43% figure is probably closer to the truth. But the fact that the real wage increase occurred in 1930-32, i.e., in the depth of the depression, suggests some downward rigidity of wages, i.e., that the wages were not at equilibrium. By 1938 the index was down to 120%, not inconsistent with almost constant real wages in the whole pre 1945 period.

<sup>3</sup>There is, for example, less assurance than for later periods that the cost of living series available for this period (the Lopez series) is a good one. And the data are limited to women.

<sup>4</sup>Or perhaps due to less union organization than for blue collar workers. See the discussion in Miguel Urrutia, The Development of the Colombian Labor Movement, New Haven, Yale University Press, 1969.

two groups have risen by about the same amount, about 115% in each case.<sup>1</sup> With a perfect labor market and homogeneous labor, one could interpret the large increase in blue collar manufacturing wages as implying that, if a labor surplus condition did ever exist, this was no longer the case.<sup>2</sup> But the non-homogeneity of labor implies that some types of labor face a strong demand while others are in excess.<sup>3</sup> To probe deeper, it is useful to separate, as much as possible, those subsectors of manufacturing which presumably use relatively unskilled labor, and also to look more closely at the construction sector, a significant user of such labor.

Within manufacturing, it is useful to separate out certain industries and also small size firms (in whatever industry), these latter presumably tending to use less skilled workers. Finally, consideration of whether the wage increases have characterized all regions of the country is pertinent.

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<sup>1</sup>Urrutia has compared nominal daily wages of various occupations, industrial and non-industrial, for 1939 and 1965 in Bogota. The implicit real wage increase, (using the Bogota blue collar cost of living series as deflator) is 32%-54%. Since this comparison excludes occupations not existing in 1939, and many of these are among the better paying ones in 1965, it clearly underestimates the increase in average blue collar daily wage. When he uses DANE's 1965 average for all industrial workers as the 1965 figure, the implicit real wage increase is 81%-117%. The 1965 figure appears to exclude fringe benefits, so the indicated gain is perhaps still understated. In any case it is clearly consistent with our estimates here, although the data source for 1939 is different from any we use. (See Miguel Urrutia, "Los Salarios Reales en Bogota" in CEDE, Empleo y Desempleo en Colombia Ediciones Universidad de Los Andes, Bogota, 1968, pp. 202-205.

<sup>2</sup>Urrutia (op. cit.) relates the rapid growth of real wages from 1955 on to the fact of more widespread union power and collective bargaining (e.g., p. 253), i.e., to an imperfection in the labor market. This is of course, an extremely complicated issue.

<sup>3</sup>The extensive open unemployment at present would also suggest caution in concluding that no labor surplus exists.

B. Some Aspects of Wage Structure in Manufacturing

B.1 Wages and Wage Change by Industry

There is a general pattern in industrial sectors for wage rates to vary, frequently substantially, across industrial sector, firm size, city size, and region. In most countries there is a higher average wage for male workers than for female workers. The extent to which some of these differences are derived from the others is frequently unclear because the detailed information necessary to deduce causation usually is not available.<sup>1</sup>

All of these types of wage differential are present in Colombia. We do not elaborate on them at length here; rather we focus on how the differentials have been changing over time. Some of this background information is, in turn, used in an attempt to explain the sources and nature of the real wage increases which do appear to have occurred over time.

B.1 Wages and Wage Change By Industry

Table 7 presents annual blue collar wages by two digit sector for 1944-45, 1953, and 1967.

At present the petroleum sector (products of coal and petroleum) is by far the highest paying industry, with average annual wage almost 50 percent above its closest competitor--beverages. Roughly the same differential was present in 1953, although not in 1944-45. After petroleum, the high paying industries at present are beverages, rubber, tobacco, base metals and paper. All of these industries are now dominated by large, modern, and probably capital intensive

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<sup>1</sup>The higher wages of large cities could, for example, be fully explained, in a statistical sense, by the different composition of industrial output and the larger sized firms found there.



Table 7

Blue Collar Wage (Including Fringe Benefit Benefits) Over Time  
in "Factory" Industry, by Two Digit Sector  
(Values in 1944/45 Prices)

Industry	Wage Bill/Worker			Number of Blue Collar Workers			% Increase in Real Wages 1944/5-67 (7)	% Change in Employment 1944/5-67 (8)	
	1944/5 (1)	1953 (2)	1967 (3)	1944/5 (4)	1953 (5)	1967 (6)			
20 Food	497	639	1,287	24,375	32,675	31,735	158.95	30.19	
21 Beverages	1,093	1,371	2,453	7,543	8,345	9,835	124.43	30.39	
22 Tobacco	426	724	2,228	7,205	5,615	2,899	423.00	-59.76	
23 Textiles	608	856	1,778	26,286	30,755	39,147	192.43	48.93	
24 Clothing and Leather Shoes <sup>a</sup>	529	880	880	13,886	22,736	23,674	66.35	70.49	
25 Wood	638	651	1,051	7,510	3,212	5,155	9,188	67.08	
26 Furniture	789	720	1,085	1,066	3,227	4,033			
27 Paper	396	786	2,034	530	1,626	4,524	413.64	753.58	
28 Printing	846	1,049	1,626	4,524	6,343	8,652	92.20	91.25	
29 Leather	636	1,009	1,339	2,943	3,176	3,391	110.53	15.22	
30 Rubber	646	895	2,284	814	2,216	5,090	253.56	525.31	
31 Chemical	561	635	1,757	4,011	6,918	14,243	213.19	255.10	
32 Petroleum Products	956	1,881	3,495	593	1,346	1,342	265.59	126.31	
33 Nonmetallic Minerals	664	729	1,536	10,246	14,871	20,467	131.33	99.76	
34 Basic Metals	586	1,014	1,978	669	1,116	3,967	237.54	492.97	
35 Metal Products ex- cept Transportation Equipment	690	742	1,387	1,790	5,422	15,630	20,140	104.20	1,025.14
36 Non-electrical Machinery	690	816	1,485		1,300	4,510			
37 Electrical Mach- ery, etc.	885	762	1,801	5,050	1,324	6,885	17,764	91.30	251.76
38 Transportation Equipment	885	984	1,624		4,614	10,879			
39 Various	725	717	1,384	1,834	2,248	7,316	90.90	298.91	
Total	626	785	1,561	119,809	159,085	223,284	149.36	86.37	

<sup>a</sup>Industry 24 includes leather shoes. In the 1944/5 industrial census, this category was included with leather; to make all years' data parallel it was added to the clothing category.

Sources and Methodology for Table 7

Data for 1944/45 and 1953 are from the industrial censuses of those two years--see Table A-1. The data for 1967 come from DANE, Industria Manufacturera 1967, Bogotá, no date.

firms.<sup>1</sup> In 1967 the lowest average wages corresponded to clothing, wood, wooden furniture, leather, food, and metal working industries (excluding machinery). In 1944-45 the list of low paying industries was somewhat different; it included food and clothing, but as noted above it also included tobacco and paper, two of the high paying industries in 1967.

As observed in Column 8 the rate of increase in "factory" employment varies tremendously across industries. It is instructive to separate the influence of changing demand for the product (in some cases influenced heavily by import substitution policies) and changes in the technology and capital intensity of production. The rapid increases in employment in paper, rubber, base metals, and metal products are the result of rather rapid import substitution. For those industries with relatively slower or no import substitution, such as food, beverages, tobacco, and textiles, employment growth has been quite slow, and in a case like tobacco where there has been a rapid increase in capital intensity, the number of workers in 1967 was well below the number in 1944-45.

Since a first hypothesis would be that the two major factors explaining wage differentials among different firms or plants are the industry in which the firm (plant) is located and the firm's (plant's) size, it is useful to present wages as a function of these two variables together.<sup>2</sup> Using 1958 data, Table 8 presents estimates of the part of the difference between a given two digit industry's average wage and the overall industrial wage which is associated with different plant size structure. Table 9 presents the same information for 1967.

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<sup>1</sup>The most dramatic increase between 1953 and 1967 was in tobacco, where the relative importance of the quite small scale cigar producers, etc., diminished sharply and the monopolistic national tobacco company expanded rapidly. In 1944-45 average worker incomes in tobacco were the second lowest (only paper was lower) of all the industries listed.

<sup>2</sup>In Colombia data restrictions limit the discussion to plant size rather than firm size.

Table 8.

## Size Structure of Firms and Wage Differences

by Two Digit Industries, 1958

Industry	Average Wage (without fringe benefits)	Wage Index (total industry = 100)	Predicted Wage <sup>a</sup>		Actual Wage Predicted Wage	Residual "Industry" Effect	Effect of Plant Size Structure
			(1)	(2)			
20 Food	3,193	82		3,506	.911	- 8.9	- 10.0
21 Beverages	5,627	145		4,880	1.153	+ 15.3	25.8
22 Tobacco	3,791	97		4,076	.930	- 7.0	4.3
23 Textiles	4,118	106		3,405	1.209	+ 20.9	- 12.3
24 Shoes	2,433	63		2,649	.918	- 8.2	- 31.4
25 Wood	2,792	72		2,920	.956	- 4.4	- 24.7
26 Furniture	3,297	85		3,860	.854	- 14.6	- 0.6
27 Papers	4,452	114		4,525	.984	- 1.6	+ 15.9
28 Printing	4,247	109		4,341	.978	- 2.2	10.4
29 Leather	3,436	88		3,464	.992	- 0.8	- 11.3
30 Rubber	4,993	128		3,675	1.359	35.9	- 5.8
31 Chemical	4,710	121		4,566	1.032	3.2	17.2
32 Petroleum Products	12,288	316		6,790	1.810	81.0	74.6
33 Nonmetallic Minerals	3,266	84		3,282	.995	- 0.5	- 15.6
34 Basic Metals	5,431	140		4,754	1.142	14.2	22.6
35 Metal Products except Transportation Equipment	3,605	93		3,783	1.604	60.4	- 58.0
36 Non-electrical Machinery	3,895	100		3,577	1.089	8.9	- 8.2
37 Electrical Machinery, etc.	3,994	103		4,027	.992	- 0.8	3.8
38 Transportation Equipment	4,500	116		4,439	1.014	1.4	14.4
39 Various	4,180	107		4,679	.893	- 10.7	19.8
Total	3,890	100		3,890	-	-	-

<sup>a</sup>Predicted Wage =  $a_0 w_0 + a_1 w_1 + \dots + a_n w_n$ ,

where  $a_0$  is the average % of workers in size range 0 for all industries and  $w_0$  is the average wage (in this industry) for size 0.

Sources and Methodology for Table 8

Data from Richard R. Nelson, A Study of Industrialization in Colombia, Rand Corporation Memorandum RM -5412-A1D, Santa Monica, December 1967. The wage figures exclude fringe benefits.

Table 9

Size Structure of Firms and Wage Differences by  
Two Digit Industries, 1967

Industry	Average Wage	Wage Index	Predicted Wage Given Size Structure <sup>a</sup>	Actual Wage Predicted Wage	Residual "Industry" Effect	Effect of Plant Size Structure
	(1)	(2)	(3)	(4) = $\frac{(1)}{(3)}$	(5) = 1 - (4)	6 = $\frac{(2)}{(4)}$ - 100
20 Food	15,751	.8503	16,109	.9778	- 2.22	- 13.04
21 Beverages	28,292	1.5273	20,682	1.3680	+ 36.80	11.64
22 Tobacco	23,413	1.2639	18,426	1.2707	+ 27.07	- 0.46
23 Textiles	20,120	1.0862	22,215	.9057	- 9.43	19.93
24 Shoes	9,543	.5152	15,892	.6005	- 39.95	- 14.20
25 Wood	11,390	.6149	15,897	.7165	- 28.35	- 14.18
26 Furniture	11,450	.6181	13,894	.8241	- 17.59	- 25.00
27 Papers	25,341	1.3680	18,479	1.3713	+ 37.13	- 0.24
28 Printing	18,571	1.0025	17,060	1.0886	+ 8.86	- 7.91
29 Leather	14,610	.7887	17,570	.8315	- 16.85	- 5.15
30 Rubber	27,063	1.4610	21,785	1.2423	+ 24.23	17.60
31 Chemical	25,017	1.3505	18,965	1.3191	+ 31.91	2.38
32 Petroleum Products	44,428	2.3984	22,073	2.0128	+ 101.28	19.16
33 Nonmetallic Minerals	12,115	.6540	18,437	.6571	- 34.29	- 0.47
34 Basic Metals	21,731	1.1731	22,366	.9716	- 2.84	20.74
35 Metal Products except Transportation Equipment	16,039	.8658	16,282	.9851	- 1.49	- 12.11
36 Non-electrical Machinery	16,858	.9101	16,381	1.0291	+ 2.91	- 11.56
37 Electrical Machinery, etc.	21,747	1.1740	18,369	1.1839	+ 18.39	- 0.84
38 Transportation Equipment	16,007	.8641	17,626	.9081	- 9.19	- 4.85
39 Various	16,656	.8992	15,886	1.0485	+ 4.85	- 14.24
Total	18,524	1.000	18,524	1.000	---	---

<sup>a</sup>Workers in a size category, times average national wage in that size category, divided by number of workers in the industry.

Sources and Methodology for Table 9

Figures are from DANE, Industria Manufacturera Nacional, 1967 and DANE, Boletin Mensual de Estadistica, no. 224, March 1970, "La Industria Manufacturera." The data were not perfect to the purpose at hand, since the presentation of plant size structure by two-digit sector in the latter source included only four broad size categories and excluded that category of firms with less than five workers. Also the information on workers by size category was for total employment rather than paid employment. Here we treated the figures for total employees as if they corresponded to those for paid employees.

The above imperfections may explain some of the different relative positions of different industries in 1967 as compared with 1958 (Table 8 ). Another difference was that the figures of Table 8 did not include fringe benefits in the wage calculations whereas these do. There is only a moderate relationship between the two tables in terms of the direction of the industry effect, although the plant size effect had the same sign in two-thirds of the years indicating some relationship. In some of the industries with highly positive or negative values, there is clear, consistent pattern between the two years.

As the figures reveal, differences in average wages by industry appear to be more a result of variations in size structure by industry than of "other" characteristics of the industry, as captured in the "industry" effect of Col. (5). In 1958, for 13 of the 20 industries the size effect is greater than the industry effect; in a slight majority of industries the two effects go in the same direction, implying that wage differentials across industries are smaller at a given firm size than in toto.<sup>1</sup> In 1967 the industry effect was the larger of the two in about two-thirds of the cases; again the two effects went in the same direction in a little over half of the cases.

Also of interest is a decomposition of the total change in real wage over time by change in industrial composition, change in plant size, and increase in wage of a given plant size in a given industry. The results of this calculation suggest that a considerable part of the overall wage increase has been associated with changes in composition and size. Had two-digit composition remained the same as in 1953, average wage in 1968 would have been only about 2% lower than it was, other things being equal.<sup>2</sup> Had size composition remained the same as in 1953, wages would have been about 20% lower than they were in 1966, other things being equal.<sup>3</sup> There is some double counting between these two calculations, but the weighted average increase in the wage corresponding to a given plant size in a given industry has been approximately 65%. ( $90\%^4$  minus 25%), over 1953-1968.<sup>5</sup>

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<sup>1</sup>As is evidenced by comparison of Cols (2) and (4).

<sup>2</sup>There is no assurance that composition would have so little effect if the analysis were done at a three or higher digit level. Rather, it might be expected that the effect would be substantial.

<sup>3</sup>Specifically, percent wage increase in each size category. We used 1966 rather than 1968 as the end year for this calculation due to lack of adjusted wage rates by firm size for 1968.

<sup>4</sup>See Table B-2.

<sup>5</sup>Lack of data giving the industry-size cross prevents our making a direct calculation of this increase.



## B.2 Wage Rates By Plant Size

It is generally believed that small plants have less skilled workers than larger ones; certainly the wages are much lower. If a labor surplus still existed, this might be indicated by a failure of real wages to rise for the small firms. Figures are available only since 1953 and they show fairly small but definite increases in these wages. While firms of 100 workers and up appear to have benefited from a real wage increase of about 100% over 1953-1966, those of less than 50 had an increase, usually in the range of 20 to 30%. (See Table 10). Interestingly, there appears to have been little or no relation between firm size and wage increase within this latter category; in fact, cottage-shop industry (less than 5 workers and less than 24,000 pesos output) also appears to have registered an increase of about the same amount in per capita earnings.<sup>1</sup>

The available information on annual wage payments per person by plant size shown in Table 10 does not permit distinguishing between blue and white collar workers, and this makes comparisons by size difficult if the ratio of these two groups did not change over time for a given plant size, time-series analyses would be more feasible. Unfortunately, also, the published data for recent years (since 1962) are particularly suspect in that there is a downward bias in the official figures for the smallest three size groups due to DANE's calculating technique. Best estimate corrections for this bias are presented here; the resulting figures suggest, contrary to original data, that average wages have increased in all firm sizes from 1962 on, although for the small firm sizes the increase has not been as rapid for the larger ones.

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<sup>1</sup>Specifically, of 24%, over 1953-1964, according to Urrutia-Villalba. (See Miguel Urrutia and Clara Elsa Villalba, "El Sector Artesanal en el Desarrollo Colombiano," Revista de Planeacion y Desarrollo, Vol. 1, October 1969, # 3.

Table 10

Indices of Real Annual Wages of Blue Collar Workers (Obreros)  
by Size of Firm  
(Number of Workers); 1956 = 100

Year	<5	5-9	10-14	15-19	20-24	25-49	50-74	75-99	100-199	>200
1953	91.35		96.3	95.65		96.6	79.5			
1956	100	100	100	100	100	100	100	100	100	100
1957	94.4	91.7	95.0	90.9	100.5	95.6	94.1	94.7	98.8	97.3
1958	96.9	96.0	97.5	96.9	101.3	102.0	99.1	98.2	104.7	110.5
1959	99.9	99.7	104.1	100.2	100.9	103.78	100.9	106.9	103.0	108.3
1960										
1961										
1962	114.4	119.4	124.5	119.3	120.4	126.4	130.2	130.6	141.8	138.5
1963										
1964										
1965										
1966	118-129	136-164	1.14-1.57	116	123	127	131	131	157	154

Sources and Methodology

Wage data for 1956 and on are taken from the Anuario General de Estadística, various issues. The national blue collar worker cost of living index is used as the deflator.

It is not possible to deduce wages by firm size from the published data of either the 1945 or the 1953 industrial census and as noted in the text there is a known downward bias for the smallest three categories during the period 1962-66. Accordingly we include here only the data for 1966, which are adjusted from the original figures by Todd's adjustment factors. For the 1953 industrial census, although there was no information on wages by firm size there was information on value added, and on occupied and paid individuals. (DANE, Boletín Mensual de Estadística, no. 72) Using regularities in the relationship between wages paid and value added from the 1956 and on figures, we have made a best estimate of the wage rate corresponding to 1953 by firm size.

In 1945 there is much evidence on wage scales, but it is not cross-tabulated with size of operation.

We do not consider the available data for any year subsequent to 1966 because of apparent difficulties with it. For 1966, as discussed, John Todd's adjustments permit reasonable correction for the "arrastre" bias implicit in

the DANE methodology. In 1968 DANE indicated that it had performed a complete census of all firms of 15 workers and up, but too many strange anomalies showed up in the 1968 data to permit much confidence to be placed in it. In 1969 DANE indicated that a complete census had been taken of all firms of five workers and up; as a result only a few firms of smaller than five workers were included and they were obviously not representative of the sort of universe sampled in previous years. But it was clear that many firms had also been missed in the smaller categories with more than five workers, and it was to be presumed that the firms included were again not very representative of the universe. Original figures are presented in Table A-13.

The test of the "end of labor surplus" hypothesis may be further refined by excluding those industries in which there is good evidence that even the workers in small firms have considerable skills, as might, for example, be the case in the transportation equipment industry. Table 11 presents the results of this test for the period 1963-69, the only one for which such data are available from the regular DANE source. Unfortunately they are not broken down into as narrow plant sizes as would be desirable, nor is it possible to correct for the biases of the DANE methodology (referred to in Table 10 above). Comparison of the total figures of Table 11 with those of Table 10 suggests that real wages were considerably higher in 1968 than in 1962, assuming the degree of bias in DANE's figures did not change much between 1966 and 1968. (1969 figures are not comparable, because of the much smaller sample of small firms, and so should be disregarded.) Table 11 suggests that the particularly small scale oriented industries were doing as well in terms of wages as the average, providing some support for the idea that earnings of rather marginal workers were rising somewhat at this time. But the wide limits shown in Table 10 apply here too, so no conclusions can be drawn with a high degree of certainty.

### B.3 Wage Increases By Region

In factory manufacturing, wage rates have risen substantially in all departments of Colombia. Data are presented in Tables 12 and 13. There is no tight relation between wage levels and % increases, though over 1945-67 there was some broad tendency towards equalization as between the four most industrialized departments as a group and the rest. In 1945 these four had an average wage 43% above the others; over 1945-67 their average wage rose by 135% while in the other departments it rose by 164%. (See Table 12)

Changes in cottage-shop earnings are, of course, hard to measure. The Urrutia-Villalba data indicate a decrease over 1953-64 in four departments (Boyaca, Caldas, Cauca, and Norte de Santander).

Table 11

Real Wages,<sup>a</sup> by Industry and Size Category  
(Values expressed in 1958 pesos)

Industry	Number of Workers	1962	1963	1964	1965	1966	1967	1968	1969
Food	< 10		2047	1881	1210	1863	2220	1899	1832
	10-20		3514	3286	3199	3127	3471	3162	2697
Tobacco	< 10		1145	994	2820	872	926	817	1188
	10-20		1525	1722	1765	1218	1051	1123	1578
Textiles	< 10		2577	2377	2153	1902	3292	2879	1475
	10-20		4499	4217	3532	3036	3614	3206	2518
Clothing	< 10		2275	2013	1921	1788	2632	1929	2175
	10-20		2888	2020	2396	2304	2715	2574	2646
Wooden furniture	< 10		2754	2488	2459	2374	2829	2641	2866
	10-20		3736	3111	3098	3116	3115	3072	3369
Leather	< 10		3323	2695	2540	2395	2379	2136	2594
	10-20		2888	2526	2763	2564	3299	3002	2765
Non-metallic minerals	< 10		2012	1799	1833	1742	2128	2357	2228
	10-20		2839	2591	2608	2622	2980	2643	2893
Transport Materials	< 10		2575	2589	780	2304	2914	2669	3171
	10-20		3890	3445	3452	3023	3986	3865	4160
Total	< 10	2730	2428	2191	2155	2126	2641	2240	2916
	10-19	3319	3531	3226	3170	2967	3584	3294	3510

<sup>a</sup>Calculated from unadjusted DANE data, and therefore suffering the biases discussed in Table 8. Also, inconsistent with Table 8.

Sources and Methodology:

Calculated from unpublished data of DANE, in the case of the individual industries. Figures for all industry ("total") were calculated from the published data of the Boletín Mensual de Estadística.

Table 12

## Average Wage Rates (Including Fringe Benefits) for Blue and White Collar Workers

by Departments: 1944/45, 1953, 1958, and 1967

Department	Current Pesos			Constant Pesos of 1944/45			Percent Real Wage Increase							
	1944/5	1953	1958	1967	1944/5	1953	1958	1967	1953	1958	1967	1944/5	1958	1967
Antioquia	781	2,504	4,805	19,483	781	1,002	1,208	1,841	28.3	20.6	52.4	28.3	20.6	135.7
Atlantico	990	2,485	4,317	17,495	990	1,194	1,413	2,197	20.6	18.3	55.5	20.6	18.3	121.9
Bolivar (including Cordoba)	625	1,509	6,946	20,831	625	725	2,274	2,616	16.0	213.7	15.0	16.0	213.7	318.6
Boyaca	461	1,576	6,319	17,825	461	677	1,793	1,939	46.9	164.8	8.1	46.9	164.8	320.6
Caldas	639	1,916	3,259	13,056	639	710	824	1,206	11.1	16.1	46.4	11.1	16.1	88.7
Cauca	668	1,450	2,861	13,182	668	634	736	1,276	-5.1	16.1	73.4	-5.1	16.1	91.0
Cundinamarca (and Bogotá)	935	2,630	4,742	18,765	935	1,130	1,345	2,041	20.9	19.0	51.7	20.9	19.0	118.3
Huila	442	2,112	3,706	14,143	442	910	886	1,456	105.9	-2.6	64.3	105.9	-2.6	229.4
Magdalena	759	2,180	3,629	19,959	759	991	1,188	2,506	30.6	19.9	110.9	30.6	19.9	230.2
Meta	650	2,529	---	15,062	650	1,010	---	1,638	55.4	---	---	55.4	---	152.0
Nariño	380	1,320	2,343	9,584	380	440	589	907	15.8	33.9	54.0	15.8	33.9	138.7
Norte de Santander	568	1,736	3,556	11,548	568	718	931	1,053	26.4	29.7	13.1	26.4	29.7	85.4
Santander	565	2,104	4,463	16,405	565	870	1,168	1,496	54.0	34.2	28.0	54.0	34.2	164.8
Tolima	825	2,039	4,343	13,553	825	876	1,232	1,474	6.2	40.6	19.6	6.2	40.6	78.7
Valle del Cauca	776	2,481	4,856	20,625	776	1,085	1,179	2,156	39.8	8.7	82.9	39.8	8.7	177.8
Territories	-	---	---	10,126	-	---	---	---	-	-	-	-	-	-
Four Most Industrial- ized Departments <sup>a</sup>	857	2,536	4,730	19,236	857	1,083	1,295	2,011	26.4	19.6	55.3	26.4	19.6	134.7
Rest of Departments	600	1,853	4,285	15,133	600	791	1,173	1,582	31.8	48.3	34.9	31.8	48.3	163.7
Six Most Industrial- ized Departments <sup>b</sup>	815	2,466	4,637	18,788	815	1,052	1,269	1,965	29.1	20.6	54.9	29.1	20.6	141.1
Rest of Departments	599	1,701	4,696	15,723	599	726	1,285	1,644	21.2	77.0	27.9	21.2	77.0	174.5
Total	780	2,375	4,677	18,524	780	1,014	1,280	1,937	30.0	26.2	51.3	30.0	26.2	148.3

<sup>a</sup> Antioquia, Atlantico, Cundinamarca, and Valle del Cauca.<sup>b</sup> Antioquia, Atlantico, Caldas, Cundinamarca, Santander and Valle del Cauca.

Sources and Methodology for Table 12

The data for 1944-45 and 1953 come from the industrial censuses of those two years; that for 1958 comes from the Anuario General de Estadística for that year and the 1967 figures are from DANE, Industria Manufacturera Nacional: 1967. For individual departments, deflation was carried out by the cost of living index of that department or a nearby one, or in cases of departments which seemed equally linked to say two other departments, by an average of the indices for those two departments. Blue collar cost of living indices were used (?).

For the national average figures the national blue collar cost of living index was used, and it was also used where departments were grouped together, the four or six most industrialized and the rest. There is thus some internal inconsistency between the calculations for individual departments and those for groups of departments.

Table 13

## Blue Collar Annual Wage Rates (Including Fringe Benefits)

by Department: 1944/45, 1953, and 1967

Department	Current Pesos			Constant Pesos of 1944/45			Percent Increase in Real Wage			% Change in Employment, 1944/5 to 1953	% Change in Employment, 1953-1967	% Change in Employment, 1944/5 - 1967
	1944/5	1953	1967	1944/5	1953	1967	1953	1967	1967			
	1944/5	1953	1967	1944/5	1953	1967	1944/5	1953	1944/5			
Antioquia	649	1,997	15,498	649	799	1,464	23.1	83.2	125.6	22.90	54.80	90.25
Atlantico	739	1,864	14,489	739	896	1,819	21.2	103.0	146.1	24.71	40.60	75.34
Bolivar (including Cordoba)	-	---	14,244	-	-	1,789	--	---	---	---	---	- 8.28
Boyaca	-	---	14,517	-	-	1,579	--	---	---	---	---	-17.20
Caldas	505	1,438	10,372	505	533	958	5.5	79.7	89.7	25.85	-52.19	-39.83
Cauca	-	---	10,535	-	-	1,020	--	---	---	---	---	24.90
Cundinamarca	750	1,941	14,348	750	834	1,560	11.2	87.0	108.0	59.69	76.43	181.75
Huila	-	---	12,039	-	-	1,239	--	---	---	---	---	4.59
Magdalena	-	---	17,028	-	-	2,138	--	---	---	---	---	19.47
Meta	-	---	12,969	-	-	1,410	--	---	---	---	---	272.22
Nariño	-	---	7,431	-	-	703	--	---	---	---	---	66.75
Norte de Santander	-	---	10,013	-	-	913	--	---	---	---	---	12.07
Santander	423	1,625	13,626	423	672	1,243	58.9	85.0	193.9	6.86	- 4.15	2.42
Tolima	-	---	11,059	-	-	1,203	--	---	---	---	---	-29.68
Valle del Cauca	651	1,908	15,543	651	835	1,625	28.3	94.6	149.6	77.75	29.93	130.96
Territories	-	---	10,126	-	-	---	--	---	---	---	---	--
Four Most Industrialized Departments <sup>a</sup>	691	1,941	14,889	691	829	1,610	20.0	94.2	133.0	44.25	53.91	122.02
Rest of Departments	479	1,468	11,775	479	627	1,273	30.9	103.0	165.8	6.64	5.60	12.61
Six Most Industrialized Departments	653	1,885	14,558	653	805	1,574	23.3	95.5	141.0	39.48	42.60	98.89
Rest of Departments	494	1,407	11,916	494	601	1,288	21.7	114.3	160.7	99.19	38.40	37.28
Total	626	1,826	14,435	626	785	1,560	24.4	93.8	141.2	32.78	42.08	88.66

<sup>a</sup>Antioquia, Atlantico, Cundinamarca, and Valle del Cauca.

Sources and Methodology: as for Table 12.



An attempt by Ortega to analyze the impact across firms, industries, and cities of education, experience and drive, using sample data, merits special consideration, since the official aggregate data cannot easily (if at all) be used to analyze such possible explanatory variables. The sample included primarily modern firms with export potential in pharmaceuticals, textiles and metal-mechanics, and located in Bogota, Medellin, and Barranquilla.<sup>1</sup>

Coefficients of wage variation for given jobs in given cities and industries indicate considerable ranges, suggesting the possibility of relating wages to such factors as those mentioned above.<sup>2</sup> Average differentials across the various occupations were also relatively wide, especially those between administration positions and blue collar jobs; the range within the blue collar category is apparently relatively wide, although seldom more than two to one.<sup>3</sup> These sorts of differentials were relatively similar across

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<sup>1</sup>Francisco G. Ortega, "Análisis de una Muestra Sobre Salarios Industriales en Colombia," Revista de Planeación y Desarrollo, Volumen 2, Nr. 1, Marzo 1970, página 63.

<sup>2</sup>Typical coefficients of variation for given jobs in given industries, (not standardized for city, I believe) were in the range of 20 to 40. This is relatively high. (Although comparative information on these coefficients of variation are not presented, the implication is that the difference in Colombia is greater than that in advanced countries.)

<sup>3</sup>And Ortega also notes that there was some multicollinearity among the variables; this too might explain the lack of a relation for this variable. With respect to the influence of education, the interpretation of its high coefficient remains open to the possibility that managers define quality by education (or at least use education as a sort of statistical predictor) rather than treating the two as independent variables.

the three major industries studies: textiles, metal-mechanics, and pharmaceuticals.<sup>1</sup>

In explaining the "minimum salary" differentials characterizing different job categories in a given industry, the variable experience was not significant while education and initiative were.<sup>2</sup> (It is possible, however, that experience was confused with age in the respondents' minds.) The correlation coefficients were relatively high. But within job categories (i.e., across firms) these three variables did not explain much, leading the author to suppose that while the market sets a general range of wages for a job category, within that category there remains a range within which custom, management preferences, unions, and so on hold substantial sway.<sup>3</sup> With standardized jobs the differences by industry were not dramatic for either category, though neither were they insignificant.<sup>4</sup>

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<sup>1</sup>Pharmaceuticals was somewhat out of line, but this was hypothesized to be due to the different weighting by cities--this industry was almost exclusively researched in Bogotá.

<sup>2</sup>The methodology must be taken into account here. Only relatively modern plants with export potential were included in the study and the salary information was obtained from the chief of industrial relations; the salary data used by Ortega corresponded more or less to the minimum starting salary of a person with the level of education, experience, and "drive" specified by the firm as required for a person's hiring. This could introduce some differences from the results which would have been obtained if these variables had been measured directly.

<sup>3</sup>Of course, it is also possible that the different industrial relations managers defined the variables in question (variables defining the quality of the workers) in different ways.

<sup>4</sup>For the blue collar category the highest wage industry (pharmaceuticals) was about 19% above the lowest (metal-mechanical), given a fixed bundle of job categories. At the administration level the highest (metal-mechanical) was 23% above the lowest (pharmaceuticals). (See op. cit., p. 83) A part of these differentials is presumably a result of different wage levels by cities (see text). The fact that the rank ordering by industries is the opposite for the two types of worker is perhaps somewhat surprising.

By cities, Medellin had higher figures than Bogota and much higher than Barranquilla, (especially in administration); at the plant level Barranquilla and other cities<sup>1</sup> were lowest.<sup>2</sup> The "city differential appears greater than the "industry" one, although interpretation is difficult. Since neoclassical assumptions would suggest cross city differentials, not cross-industry differentials, the data are therefore, as far as can be judged, not consistent with this expectation. The Bogota market in particular appears to be functioning well, and the others reasonably well.

### C. Construction Wages

Wage series based on wide and continuous samples are unavailable in the construction sector, so only weak conclusions can be drawn with respect to its over time movement.

The figures presented in Table 1 above show available time series for unskilled construction workers in Bogotá, and suggest that wages as of the early fifties were at about the same level as those corresponding to the late thirties but that a sharp increase occurred between the early fifties and the mid-sixties, with the years 1964-66 standing around 75% above the average for 1950-54 or the 1950 figure itself. In short, these statistics do suggest a dramatic increase in the late fifties and early sixties after a period of no net increase between the mid-thirties and early fifties. Uncertainty attaches to the latter contention, however, since the figures corresponding to the late thirties are from a different source, and all of the statistics on construction are probably more dubious than those on manufacturing.

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<sup>1</sup>A few observations were taken in cities outside the main three.

<sup>2</sup>The comparison is by cities for a fixed set of job categories. Any "industry effect" which does not work through job categories is therefore not allowed for.

Another source of information on trends is Urrutia's calculations<sup>1</sup> for male workers in construction. For men engaged in public works nominal wages rose by 12.44% a year over 1939-1965 and their real wages by about 94.4% over the period as a whole. For workers in building and construction, with nominal wage increases of 11.27% a year, real wages would have increased by 48.1%. If composition of construction workers as between skilled and unskilled remained roughly unchanged over time<sup>2</sup> and if the workers whose wages are reported in Table 1 included about the same number of individuals from both of Urrutia's categories, then, since his average wage increase for the two categories was about 70%, one would conclude that these data and Table 1 are mutually reinforcing, giving support to the Table 1 "story" of what happened. And it would suggest that Urrutia's end point wage figures capture an increase, almost all of which occurred in the ten years before the end of the period.

Table 1 taken together with Table 14, which presents further evidence for an earlier period on public sector construction wages in Bogota, the series (though the deflation by a dubiously weighted food price index is open to question) suggest rather strongly that construction wages were not rising during this earlier period either. In short, it appears that by 1950 wages were not very much above their level at the turn of the century.

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<sup>1</sup>Miguel Urrutia, "Los Salarios Reales en Bogota," op. cit., p. 203.

<sup>2</sup>Urrutia does not present absolute figures in either of the two years.

Table 14

Unskilled Construction Wages in Bogota,  
pre 1950 Period

(Real Wages expressed in 1937 prices)

Year	Unskilled Private Sector Construction Workers (Peones): Bogota		Unskilled Public Sector Construction Workers: Bogota	
	Nominal	Real**	Nominal	Real**
	(1)	(2)	(3)	(4)
1915			42	
1916			47	
1917			47	
1918			50	
1919			51	
1920			59	
1921			66	
1922			50	
1923			54	.731
1924			64	.753
1925			62	.682
1926			75	.757
1927			1.04	.984
1928			1.06	1.024
1929			1.05	.856
1930			99	.957
1931			104	1.153
1932	106	164.9	106	1.649
1933	111	166.9	60	.902
1934	117	127.6	70	.763
1935	124	129.0	80	.832
1936	130	124.6	75	.719
1937	137	136.2	93	.924
1938	144	133.5	94	.871
1939	152	128.5	96	.811
1940	160	139.6	95	.829
1941	168	148.7	94	.832
1942			92	.791

Sources and Methodology: Cols. (1) and (3) are from Miguel Urrutia, "Estadistas de Salarios en Bogota, 1863-1933" in Miguel Urrutia and Mario Arrubla, (editors), Compendio de Estadísticas Historicas de Colombia, Direccion de Divulgacion Nacional, Universidad Nacional de Colombia, Bogota, 1970. Deflation has been effected using the food price series collected and published by the Banco de la Republica. It must be remembered that these were not a cost of living series, since equal weights were given to each of a selected set of items.

D. Summary

Wages of blue collar workers in factory manufacturing have risen on the order of perhaps 200-250% since the early twenties. Periods of rapid increase were the twenties (judging from the evidence for Medellin) and 1945 to the late sixties. Over 1930-1945 increases appear to have been substantially less.

Over 1944/5 - 1967 wage increases were particularly high in paper and tobacco, and low in clothing and footwear, wood and furniture, printing, and transportation equipment. Most other industries had real wage increases of 100-250% over this period. Evidence for 1944/5-1967 indicates somewhat more rapid wage increases in the poorer, low wage departments. Over 1953-66 wage increases were somewhat greater for large firms, but still considerable for small ones.

White collar wages rose faster over 1945-53 than did blue collar ones, but more slowly thereafter. Construction wages showed little trend, it appears, over 1935-1950 (at least in Bogota). They rose rapidly through the mid-sixties but then may have fallen again in the late sixties.

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