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EMPLOYMENT EFFECTS OF LEGAL MINIMUM WAGE IN PHILIPPINE MANUFACTURING INDUSTRIES

by

Armando Armas, Jr.

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Despite our long experience with legal industrial minimum wages their employment effects remain undetermined, or at best speculated. Minimum wages are stuck in our industrial policies and legislators intermittently hike them. Since the advent of Martial Law, minimum wages had stayed in our labor statute and were further raised on May 1, 1976 by virtue of Presidential Decree No. 928.

Local studies done so far have looked into historical employment before and after minimum wage increases. This method, however, rarely succeeds in finding out employment effects especially when the size of other influences are too large relative to the minimum increases. In other words, the all-important ceteris paribus condition is not really met by the repeated use of before-and-after methods. In spite of this, many of our researchers nevertheless conclude that minimum wages have no significant disemployment effects.

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*Assistant Professor, School of Economics University of the Philippines. I thank Prof. C. Miranda and Mr. Felipe Medalla for their comments on the early draft. I wish also to thank Ms. Rebecca Gaddi and Ms. Annabella Patag for their data gathering and computation works. The views expressed, however, are solely mine and not of the acknowledged persons.

Some even have gone further to assume that minimum wages do not distort industrial wages, thus, there are no sizeable disemployment effects [ILO 1974]. This economic belief has arisen not so much from empirical evidence as from poor data and research techniques.

This paper deals with the wage and employment effects of the industrial minimum wages, viz: ₱4 daily wage in 1951-65, ₱6 in 1965-70, and ₱8 in 1970-77 (a 100 percent increase) Due to data constraint, however, the study is limited to the 1956-74 period. Evidence on the effect of minimum wage increases would center on key parameters, namely, the elasticities of labor demand and the elasticities of average wages to minimum wages. This is acceptable because if one can get some significant negative demand elasticities and positive wage elasticities, the hypothesis that minimum wages adversely affect employment would easily be accepted.

I. Industrial Employment and Wages

Tables 1 and 2 summarize respectively the employment and wage situation in the manufacturing sector during the period 1956-74. Average total employment in this period

Table 1

Employment in Manufacturing Industries, 1956-74

ISIC No.	Industry	Average Employment 1956-74	Industrial Employment % Distribution	Average Annual Growth 1956-74	Coefficient of Variation of Employment
20	Food	70,833	21.48%	3.85%	20.4%
21	Beverage	13,005	3.94	7.41	27.6
22	Tobacco	16,841	4.95	4.40	26.0
23	Textiles	39,870	12.09	13.94	52.6
24	Footwear	26,865	8.15	-1.07	42.2
25	Wood & Cork	34,287	10.40	7.75	34.0
26	Furniture & Fixtures	7,399	2.24	4.97	26.3
27	Paper & Paper Products	7,352	2.23	10.66	49.5
28	Printed & Published Materials	13,609	4.13	5.92	17.1
29	Leather	1,703	0.52	11.54	30.6
30	Rubber	7,460	2.26	11.93	35.4
31	Chemicals	19,495	5.91	7.68	30.7
33	Non-Metallic	13,309	4.04	9.86	33.9
34	Basic Metal	6,608	2.00	18.44	55.7
35	Metal Products	16,335	4.95	7.18	27.1
36	Machinery	6,265	1.90	15.00	43.5
37	Electrical Machinery	10,743	3.26	22.77	45.5
38	Transport Equipment	11,802	3.58	9.94	30.4
39	Miscellaneous	6,537	1.98	2.07	22.1
	Organized Sector	340,947	100.00	5.60	28.8
	Unorganized Sector	861,484	71.60	-3.66	9.8
	Total Manufacturing	1,202,421	100.00	2.40	13.9
	Paid Workers	622,900	52.1	5.1	26.6
	Unpaid Family Workers	123,105	10.3	4.6	19.8
	Self-Employed Workers	450,105	37.6	-0.6	7.3

Source: NCSO Annual Survey of Establishments
NCSO Census of Establishments

was placed at 1.2 million with 71.6 per cent employed in the unorganized sector composed of establishments with less than 5 workers. Although this sector employed the greatest number, its average annual employment declined by about -3.7 per cent. In contrast, the organized sector while employing on the average only 28.4 per cent of the total industrial workers, recorded an employment growth of 5.6 per cent. On the whole, manufacturing employment grew at an average annual rate of 2.4 per cent. Paid employment (52.1 per cent of total employment) grew by an annual average of 5.1 per cent as unpaid family workers (10.3 per cent of total employment) increased by 4.6 per cent but self-employed workers (37.6 per cent of total employment) annually declined by -0.6 per cent during 1956-1974. Surprisingly, employment looked more unstable in the organized sector with a coefficient of variation of 28.8 per cent compared to the unorganized sector with only 9.8 per cent.

In the organized sector, employment shares and growth rates of 2-digit ISIC industries widely varied. The first five largest employers accounted for about 58.1 per cent of total employment in the sector. The food industry employed, on the average, about 21.5 per cent; followed by textile with 12.1 per cent; wood & cork, 10.4 per cent; footwear, 8.2 per cent; and chemicals, 5.9 per cent. The rest of the

industries each employed less than 5 per cent of the total employment in the organized sector. The industries with the lowest employment were paper & paper products with 2.2 per cent; basic metal, 2.0 per cent; miscellaneous, 1.98 per cent; machinery, 1.9 per cent and, lastly, the leather industry which employed the least number of workers of about .5 per cent.

In terms of employment growth, the heavy industries led: electrical machinery recorded 22.8 per cent average annual growth; basic metal, 18.4 per cent; machinery, 15.0 per cent; textile, 13.9 per cent; and rubber industry, 11.9 per cent. In contrast, the furniture & fixtures industry experienced about 5.0 per cent annual increase followed by tobacco with 4.4 per cent; food industry, 3.8 per cent; miscellaneous, 2.1 per cent; and footwear which had the lowest employment growth of -1.1 per cent. To summarize, while 12 industries (mostly heavy ones) enjoyed more than seven per cent annual increases in employment, only two industries recorded less than 3 per cent employment growth. Employment seemed unstable with coefficient of variation ranging from 17.1 per cent (printed & published materials) to as high as 55.7 per cent (basic metal).

With respect to wages, it is unfortunate that data on the unorganized sector are hardly available. Table 2, therefore, pertains only to annual wages in the organized sectors. During 1956-74, the five lowest paying industries were textile (₱3,999 per annum), wood & cork (₱3,610), tobacco (₱3,615), furniture & fixtures (₱3,512) and footwear (₱2,641). All five industries are classified as light industries, employing on the average, about 24.0 per cent of the total employment in the organized sector. On the other hand, the five highest wage industries were chemicals (₱7,278), beverages (₱5,961), printed & published materials (₱5,766), basic metal (₱5,397), and transport equipment (₱5,370).

On total wage share, the food industry accounted for about 19.9 per cent; followed by textiles with 10.5 per cent; chemicals, 10.0 per cent; wood & cork, 8.9 per cent; and metal products, 5.5 per cent. These five industries paid about 54.7 per cent of the total wage bill in the organized sector while the remaining industries each paid less than 5 per cent.

In terms of average wage growth, six industries experienced more than 10 per cent average annual wage increases. The beverage industry led with 12.9 per cent; followed by

Table 2

Average Wages in Manufacturing Industries (1956-74)

ISIC No.	Industry	Average Wages 1956-74	Distribution of Total Wage Bill	Annual Growth Rates of Avenage Wages 1956-74	Coefficient of Variation of Average Wage
20	Food	4,181	19.86%	8.34%	34.7%
21	Beverages	5,961	5.27	12.95	35.7
22	Tobacco	3,615	4.04	7.48	36.0
23	Textiles	3,999	10.47	5.85	43.0
24	Footwear	2,641	4.21	10.36	29.6
25	Wood & Cork	3,810	8.93	6.58	30.4
26	Furniture & Fixtures	3,512	1.75	7.15	31.6
27	Paper & Paper Products	5,313	2.81	8.98	34.6
28	Printed & Published Materials	5,766	4.88	8.11	29.5
29	Leather	3,558	.41	6.95	25.8
30	Rubber	5,004	2.59	10.28	31.1
31	Chemicals	7,278	10.03	12.00	41.3
33	Non-Metallic	4,798	4.39	10.07	36.8
34	Basic Metals	5,397	2.66	11.48	36.2
35	Metal Products	4,982	5.46	9.11	32.1
36	Machinery	5,214	2.21	8.48	30.0
37	Electrical Machinery	5,305	4.10	9.20	34.5
38	Transport Equipment	5,370	4.23	8.29	27.8
39	Miscellaneous	4,173	1.76	6.33	23.6
	Organized Sector	4,730	100.00	5.90	33.8

Source : NCSO Annual Survey of Establishments
NCSO Census of Establishments

chemicals with 12.0 per cent; basic metal, 11.5 per cent; footwear, 10.4 per cent; and rubber, 10.3 per cent. All industries have increased average wages by more than 5 per cent annually, with textile recording the lowest increase of 5.8 per cent. Like employment, however, annual wages also displayed high fluctuations, with a coefficient of variation from 23.6 per cent (miscellaneous) to 43.0 per cent (textiles).

II. The Model

In an economy where unemployment prevails, a legal minimum wage increase would reduce employment growth and the higher the increase, the greater the reduction, ceteris paribus. This hypothesis critically assumes a negative elasticity of demand for labor. Moreover, disemployment effects vary among workers and among industries because labor demands have varying elasticities. Thus the model relies heavily on industrial employment functions and their corresponding labor demand elasticities. Symbolically, the employment function can be specified:

$$(1) \qquad N_{ij} = a_0 - a_1 W_{ij} + a_2 (VA)_j + \ldots$$

where N_{ij} is the number of workers in the ith group employed in the jth industry. W_{ij} and V_{ij} are,

respectively, the wage and value-added pertaining to N_{ij}. Assuming away "giffen" labor [Russell 1964, Winch 1965, and Ferguson 1968], the coefficient of W_{ij} is usually negative.[1/] In contrast, the sign of the coefficient of VA_{ij} is normally positive but it may turn negative due to possible scale effects [Todaro 1969].

A minimum wage increase, however, can affect N_{ij} to the extent that it affects W_{ij} first. Thus the model equally relies on wage functions that have minimum wage as one of the independent variables. Symbolically, a wage function is specified:

$$(2) \qquad W_{ij} = b_0 + b_1(MW) + b_2(VA)_j + \ldots$$

where MW is the industrial minimum wage. An increase in minimum wage raises not only the wages of below-minimum workers but more so those of above-minimum workers due to wage differential adjustments [Peterson 1962 and Granclich 1976].

[1/] Ignoring the false analogy theorem, "giffen" input is not the only case for the indeterminacy of labor demand, as the "giffen" output is not the only condition for an upward sloping demand curve. On the latter possibility, see Vandermeulen 1972.

By definition $\eta_1 = (dL/L)/(dW/W)$ and $\varepsilon_w = (dAW/AW)/(dMW/MW)$ where: η_1 is the elasticity of labor demand, ε_w is the elasticity of average wage to the minimum wage, L is labor, and W is wage rate. In effect, the employment effect due to minimum wage (dL/L) is estimated by $(\eta_d)(\varepsilon_w)(dMW/MW)$. During 1956/74, however, dMW/MW = 100% (from ₱4 to ₱8 daily minimum wage). Moreover, in the Philippines, with labor surplus, we can assume that only minimum wage changes affect the changes in the average wages. Thus the employment affect dL/L is straightforwarded determined by $(\eta_1)(\varepsilon_w)$.[2/]

Because the employment of covered workers would grow less under a higher minimum, the employment in uncovered or non-enforcing sectors may increase or remain unaffected. In other words, the model is not inconsistent with employment behavior not explainable by wages, particularly minimum wage. The informal sector or even small firms in the organized sector may likely violate the minimum wage law. Thus the model is perhaps only valid to explain or predict wage and disemployment effects of minimum wage increases in the large

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2/ Multiple regression techniques are used to isolate the effects of minimum wages from other numerous factors [Moore 1971, Kalchek 1969, and Kosters and Welch 1972]. And more recent studies use regression to determine wage and employment effects through measures of structural parameters particularly labor demand elasticities [Zucker 1973, Katz 1973, Mattila 1973, Gramlich 1976, and Mincer 1976].

firms in the formal (organized) sector.

III. The Data

The aggregate employment data were taken from the Labor Force published by the National Census and Statistics Office (NCSO). The labor survey was conducted semi-annually, usually in May and October (or November) during 1956-72, and recently on a quaterly basis. To be consistent, the average semi-annual or quarterly employment estimates were used. The NCSO Annual Survey of Establishments supplied the wage and value-added data while the Statistical Bulletin of the of the Central Bank was the data source on consumer price index used to deflate wages and/or value-added.

The Labor Force limits the estimation of labor demand and wage elasticities to the total industrial employment, yet it presents industrial employment into three major classes, namely, (1) self-employed, (2) unpaid family, and (3) paid workers. One can further divide the aggregate industrial employment into (1) organized sector, composed of establishments employing more than 5 workers, included in the Annual Survey of Establishments, and (2) unorganized or informal sector, composed of establishments with less than 5 workers as extrapolated in the Labor Force.

For the organized sector, the annual publications of the NCSO Annual Survey of Establishments on manufacturing industries provided the main source of time-series data during 1956-60, and 1968-74. During 1961, 1967, and 1972, NCSO censuses on establishments were conducted instead of the annual survey. From these annual surveys and censuses were taken the needed data particularly on employment, wages, and value-added at the 2-digit ISIC industries in the organized sector.[3/]

Labor groups in industries of the organized sector can be subdivided according to the size of the establishments employing them: (1) small establishments with less than 20 workers, (2) large establishments with more than 20 workers. One can also have further employment subdivision by industries. Since there are 19 industries at the 2-digit ISIC levels one can estimate labor demands and wage equations of the 38 industrial labor groups, in addition to the more aggregated labor groupings.

3/ The industrial censuses, however, displaed some deviations from the annual survey estimates of some variables. Employments in almost all industries, for instance, are remarkably higher in the censuses than as estimated, in the surveys. It is tempting then to conclude that the annual surveys' time-series are not continuous thru 1961, 1967, and 1972. Yet for lack of better alternatives for the regressions 1961, 1967, and 1972 observations are included. Moreover, small and large establishments are differently defined in the censuses compared to the surveys.

IV. Regression Results

The model was estimated with time-series annual data (1956-74) using the Ordinary Least Square regression model. It was fitted to each wage and employment group with available data. Here, however, only acceptable regression results are presented. Regression estimates were accepted on the basis of significant t-values of every independent variable, theoretically right coefficient sign, high $\bar{R}^2$, and DW statistics that indicate at least an inconclusive test of serial correlation.

Tables 3-5 summarize the estimates of wage functions for the organized manufacturing industries having the minimum wage as one of the explanatory variables. The most important estimate here, as in other wage functions, is the elasticity of minimum wage (measured by the elasticity at the mean value). Table 3 presents estimates for the organized sector. The elasticity at the mean value of the minimum wage variable ranges from .5 to 1.0 which exceeds those of other explanatory variables. The estimated elasticities imply that a 10 percent increase in the minimum wage would raise the industrial average wage in the organized sector by 5 to 10 per cent. Such implication is hardly surprising because substantial wage differential adjustments usually go with the compulsory wage increases.

Table 3

Regression Results: Wage Equations on Organized Manufacturing Sector 1956-74

Selection	Intercept	Independent Variables MW	VA	t	$\bar{R}^2$	D W
1	607.8	261.9	0.1		0.97	2.1
		(6.9)	(7.0)			
		0.6	0.2			
2	503.0	219.6		87.7	0.93	0.9
		(2.7)		(3.5)		
		0.5		0.3		
3	-107.5	486.3			0.89	1.3
		(12.0)				
		1.0				

(Numbers in parentheses are t-values. Numbers below the parentheses are elasticities at the mean values.)

Note:

Dependent Variable

AW = average nominal wage per annum in the organized sector

Independent Variables

MW = industrial legal minimum wage per day

VA = value-added in the organized sector

t = time variable; 1 for 1956, 2 for 1957, . . ., 19 for 1974

Source of Raw Data: NCSO Annual Survey of Establishments
NCSO Census of Establishments

For sectoral estimates, Table 4 summarizes the results on wage functions at the organized 2-digit ISIC industries. Results seem significant only in 9 industries: namely, food, wood & cork, furniture & fixtures, printed & published materials, rubber, basic metals, machinery, electrical machinery, and miscellaneous. A 10 percent minimum wage would affect the average wages by 5.3 percent (printed & published materials) to 7.0 percent (electrical machinery).

In terms of dichotomized sectoral results, Table 5 presents the estimated wage functions by size of establishments in the 2-digit ISIC industries. In 13 industries the legal minimum (together with value added) seems to have influenced the average wages. In all these industries, however, the legal minimum has affected the average wages only in large establishments. An increase of minimum wage by 10 percent would raise average wages from 4.3 per cent (rubber industry) to 8.2 per cent (tobacco). Most industries affected by wage adjustments are not necessarily low-wage ones. In other words, the industries that seem to have insignificant wage adjustments are not necessarily high-wage industries. Perhaps the results can be explained partly by the strong labor unions, high profits, less wage violations (and/or more reliable data) in the large vis-a-vis small firms in the affected 13 industries and also compared to the large firms in the unaffected six industries.

Table 4

Regression Results: Wage Equations on the Organized Manufacturing Sector by Industry, 1956-74

ISIC No.	Industry	Intercept	Independent Variables		$\bar{R}^2$	D
			MW	VA		
20	Food	739.1	448.6	0.01	0.76	2
			(2.7)	(2.1)		
			0.60	0.22		
25	Wood & Cork	669.2	465.1	0.01	0.76	1
			(3.4)	(1.2)		
			0.68	0.14		
26	Furniture & Fixtures	294.7	420.2	0.22	0.83	2
			(4.6)	(2.4)		
			0.67	0.25		
28	Printed & Published Materials	1,362.5	544.5	0.08	0.64	2
			(2.6)	(1.6)		
			0.53	0.24		
30	Rubber	1,152.7	486.2	0.07	0.64	1
			(2.8)	(1.9)		
			0.54	0.23		
34	Basic Metals	1,331.2	589.2	0.05	0.69	1
			(2.2)	(1.6)		
			0.61	0.14		
36	Machinery	1,348.9	615.6	0.05	0.63	1
			(4.0)	(1.4)		
			0.65	0.08		
37	Electrical Machinery	669.9	665.3	0.04	0.76	2
			(3.4)	(1.7)		
			0.70	0.17		
39	Miscellaneous	800.3	512.7	0.05	0.61	2
			(5.5)	(2.3)		
			0.69	0.12		

(Numbers in parentheses are t-values. Numbers below the parentheses are elasticities at mean values.)

Note : Dependent Variable:
AW = average nominal wage per annum
Independent Variables:
MW = industrial minimum wage per day
VA = annual industry value added
t = time variable: 1 for 1956, 2 for 1957, ..., 19 for 19

Source of Raw Data.: NCSO Annual Survey of Establishments
NCSO Census of Establishments

Table 5

Regression Results: Wage Equations on the Organized Manufacturing Sector by Industry and Size of Establishment, 1956-74

ISIC No.	Industry	Size of Establishment	Intercept	Independent Variables MW	VA	t	$\bar{R}^2$	DW
20	Food	Large	77.2	368.5	0.005		0.76	2.43
				(3.5)	(2.93)			
				0.76	0.22			
22	Tobacco	Large	121.3	318.3	0.01		0.83	1.94
				(4.1)	(1.7)			
				0.82	0.12			
23	Textiles	Large	675.7	119.1	0.01		0.84	2.09
				(3.0)	(3.1)			
				0.52	0.16			
25	Wood & Cork	Large	231.4	301.7	0.02		0.86	2.32
				(78.0)	(1.9)			
				0.75	0.15			
		Large	255.0	253.2		58.0	0.85	1.95
				(2.3)		(1.7)		
				0.63		0.86		
26	Furniture & Fixtures	Large	368.5	206.4	0.2		0.81	2.56
				(2.9)	(2.8)			
				0.57	0.25			
27	Paper & Paper Products	Large	230.9	448.3	0.04		0.84	2.40
				(3.7)	(2.3)			
				0.78	0.14			
30	Rubber	Large	878.9	220.3	0.07		0.78	2.34
				(1.8)	(2.5)			
				0.43	0.27			
31	Chemicals	Large	823.2	399.9	0.03		0.91	2.29
				(2.0)	(4.1)			
				0.48	0.34			
		Large	-209.9	478.5		215.4	0.86	1.77
				(1.7)		(2.5)		
				0.58		0.47		

Con't.

Table 5
(Continuation)

Regression Results: Wage Equations on the Organized Manufacturing Sector by Industry and Size of Establishment, 1956-74

ISIC No.	Industry	Size of Establishment	Intercept	Independent Variables			$\bar{R}^2$	D
				MW	VA	t		
34	Basic Metals	Large	331.4	429.7	0.03		0.82	2
				(3.2)	(1.9)			
				0.77	0.12			
35	Metal Products	Large	731.2	258.3	0.05		0.81	2
				(2.1)	(2.5)			
				0.48	0.27			
36	Machinery	Large	711.4	347.8	0.07		0.74	2
				(3.7)	(3.0)			
				0.64	0.12			
37	Electrical Machinery	Large	457.8	315.1	0.06		0.92	2
				(3.4)	(4.3)			
				0.58	0.27			
		Large	-1.5	380.5		92.9	0.86	1
				(2.3)		(1.9)		
				0.70		0.30		
38	Transport Equipment	Large	1,083.6	270.7	0.05		0.72	2
				(1.7)	(2.3)			
				0.45	0.23			

(Numbers in parentheses are t-values. Numbers below parentheses are elasticities at mean values.)

Note:

Dependent Variable
AW = average nominal wage per annum
Independent Variables
MW = industrial minimum wage per day
VA = value-added
t = time variable: 1 for 1956, 2 for 1957, ..., 19 for 1974

Source of Raw Data: NCSO Annual Survey of Establishments
NCSO Census of Establishments

To summarize the wage estimates, contrary to popular hunch,[4/] the results argue that the minimum wage has significantly affected the average wages in the organized manufacturing industries, particularly large firms. Although it is possible that average wages may influence the minimum, more often, however, collective bargaining wage revisions are based on the prevailing minimum wage (and not vice versa).

Tables 6-10 report regression results on industrial employment functions. The most important estimate here pertains to labor demand elasticity estimated by the elasticity of mean value of the wage variable. Compared to wage results (Table 3-5), the employment regressions had more acceptable results because two wage variables, nominal or real wage, were alternatively tried.

4/ ILO 1974, for instance, went as far as to conclude that there is "little in historical pattern of wage movements in industrial establishments even in the Manila area (where the minimum wage is most effectively enforced) which would indicate that minimum wage exercised a major influence on changes in the earnings level of unskilled workers" (p. 353). Such observation is perhaps due to the ILO's use of Central Bank data on earnings or wages from established corporations. Moreover, it is difficult to detect a relation, much more causation, from ocular inspection of historical diagrams, as done in ILO 1974. My estiamtes here, however, depend crucially on the satisfactory fulfillment of the usual assumptions involved in time-series Ordinary Least Square regression model.

Table 6 presents regression results pertaining to the aggregate manufacturing sector. Selection 1-3 argue that, with other factors, the average real wage in the organized sector explains more than 90 per cent of the variation in total manufacturing employment. Labor demand elasticity ranges from -0.3 (for paid workers) to -0.6 (for total workers) which implies that employment is negatively related to real wage; and also, that demand is inelastic, i.e., less than one. In the organized sector, selections 4-6 also suggest that real wage, to a significant extent, adversely affect the employment in the organized sector. Labor demand elasticity ranges from -0.6 to -0.8. In contrast, regression results on the unorganized sector, unpaid family, or self-employed workers in the manufacturing sector do not indicate any significant wage-employment relation.

On the 2-digit level industries, Tables 7 and 8 present employment function estimates based, respectively, on average nominal and real wages. Employment depends on average nominal wage, among others, in eight industries, namely, food, footwear, wood & cork, chemicals, non-metalic, metal products, machinery, and transport equipment industries (Table 7). The estimated labor demand elasticity ranges from -0.19 (in chemicals) to -1.50 (in the footwear industry). In contrast, real wage "explains" the total sectoral employment

Table 6

Regression Results: Employment Equations on Aggregate Manufacturing Sector, 1956-74

Selection	Dependent Variable	Intercept	Independent Variables RW	VA	t	$\bar{R}^2$	DW
1	N_t	1,431.4	-0.3	0.1		0.92	2.1
			(-2.4)	(12.8)			
			-0.6	0.4			
2	N_p	517.0	-0.1	0.1		0.92	1.6
			(-2.4)	(13.0)			
			-0.5	0.7			
3	N_p	508.9	-0.1		28.0	0.97	1.9
			(-2.1)		(22.1)		
			-0.3		0.4		
4	N_o	375.5	-0.1	0.1	5.1	0.99	1.7
			(-7.2)	(4.6)	(2.1)		
			-0.7	0.5	0.2		
5	N_o	376.2	-0.1	0.1		0.98	1.4
			(-7.6)	(27.1)			
			-0.8	0.7			
6	N_o	393.2	-0.1		15.6	0.97	2.2
			(-4.2)		(19.8)		
			-0.6		0.5		

(Numbers in parentheses are t-values. Numbers below parentheses are elasticities at mean values)

Note:

Dependent Variables

N_t = Employed Workers in the aggregate manufacturing sector

N_p = Paid Workers in the aggregate manufacturing sector

N_o = Employed Workers in the organized manufacturing sector

Independent Variables

RW = average nominal wage per annum deflated by the consumer price index

VA = value-added in the organized manufacturing sector

t = time variable: 1 for 1956, 2 for 1957,...,19 for 1974

Source of Raw Data : NCSO Labor Force
NCSO Annual Survey of Establishments
NCSO Census of Establishments
CB Statistical Bulletin

Table 7

Regression Results: Employment Equations (based on Nominal Wage) on the Organized Manufacturing Sector by Industry, 1956-74

ISIC No.	Industry	Intercept	Independent Variables AW	VA	t	$\bar{R}^2$	DW
20	Food	61,468.2	-7.0		3883.3	0.85	1.3
			(-3.4)		(7.2)		
			-0.42		0.55		
24	Footwear	41,337.4	-15.3	1.2	1234.2	0.72	1.1
			(-4.4)	(4.2)	2.6)		
			-1.50	0.51	0.46		
		34,506.2	-7.3	1.1		0.63	1.5
			(-3.6)	(3.4)			
			-0.77	0.48			
25	Wood & Cork	28,572.9	-5.7		2758.6	0.67	1.6
			(-1.7)		(3.9)		
			-0.64		0.80		
31	Chemical	10,466.8	-0.5		1274.9	0.94	1.3
			(-1.8)		(8.3)		
			-0.19		0.65		
33	Non-metallic	8,684.2	-1.1		973.3	0.79	1.3
			(-2.2)		(6.3)		
			-0.38		0.73		
35	Metal Products	11,658.2	-1.2	0.1	828.2	0.69	1.2
			(-1.8)	(1.8)	(4.2)		
			-0.37	0.15	0.51		
		13,298.7	-1.2		912.5	0.64	1.4
			(-1.7)		(4.4)		
			-0.37		0.56		
36	Machinery	5,859.2	-1.0	0.3	292.5	0.76	1.2
			(-2.6)	(5.6)	(2.8)		
			-0.82	0.42	0.47		
38	Transport Equipment	9,699.1	-1.0		750.6	0.79	1.2
			(-2.5)		(7.04)		
			-0.46		0.64		

(Numbers in parentheses are t-values. Numbers below parentheses are elasticities at mean values.)

Note:
Dependent Variable
N = average number of persons employed during the year
Independent Variables
AW = average nominal wage per annum
VA = value-added
t = time variable: 1 for 1956, 2 for 1957,..., 19 for 1974

Source of Raw Data: NCSO Annual Survey of Establishments
NCSO Census of Establishments

Table 8

Regression Results: Employment Equations (based on Real Wage) on the Organized Manufacturing Sector by Industry, 1956-74

ISIC No.	Industry	Intercept	Independent Variables			$\bar{R}^2$	DW
			RW	VA	t		
20	Food	77,231.7	-7.2	-0.04	2,796.7	0.88	1.86
			(-4.3)	(-1.8)	(6.2)		
			-0.38	-0.10	0.39		
		77,264.4	-5.8	0.09		0.58	1.29
			(-1.9)	(4.2)			
			-0.31	0.22			
		74,176.6	-6.5		2,106.9	0.86	1.74
			(-3.7)		(9.2)		
			-0.34		0.30		
23	Textiles	16,714.7	-1.2	0.6		0.93	1.76
			(-2.0)	(12.7)			
			-0.11	0.69			
25	Wood & Cork	32,244.9	-4.5	0.5		0.68	2.19
			(-1.7)	(5.4)			
			-0.45	051			
26	Furniture & Fixtures	10,042.7	-1.7	0.7		0.69	1.61
			(-2.8)	(4.3)			
			-0.58	0.38			
		12,029.3	-1.9		145.5	0.49	1.72
			(-2.4)		(2.3)		
			-0.82		0.19		
30	Rubber	7,609.4	-0.8	0.2		0.63	1.27
			(-2.6)	(4.9)			
			-0.52	0.50			
		4,782.5	-0.3		417.4	0.88	1.46
			(-1.7)		(10.5)		
			-0.20		0.56		

Con't.

Table 8
(Continuation)

Regression Results: Employment Equations (based on Real Wage) on the Organized Manufacturing Sector by Industry, 1956-74

ISIC No.	Industry	Intercept	Independent Variables RW	VA	t	$\bar{R}^2$	DW
31	Chemicals	11,882.8	-0.4 (-2.1) -0.15		1048.1 (16.8) 0.54	0.94	1.3
33	Non-metallic	10,648.2	-1.1 (-2.1) -0.36	0.3 (6.2) 0.56		0.69	2.0
34	Basic Metals	3,156.3	-0.4 (-2.65) -0.32	0.1 (3.8) 0.22	414.2 (6.5) 0.68	0.95	2.1
36	Machinery	11,360.8	-1.4 (-4.4) -1.08	0.2 (4.3) 0.26		0.84	1.7

(Numbers in parentheses are t-values. Numbers below parentheses are elasticities at mean values.)

Note:

Dependent Variable

N = average number of persons employed during the year.

Independent Variables

RW = average nominal wage per annum deflated by the consumer price index.

VA = value-added

t = time variable; 1 for 1956, 2 for 1957, ..., 19 for 1

Source of Raw Data: NCSO Annual Survey of Establishments
NCSO Census of Establishments

changes in nine industries, namely, food, textiles, wood & cork, furniture & fixtures, rubber, chemicals, non-metallic, basic metals, and the machinery industries (Table 8). Labor demand elasticity ranges from -.11 (in textile) to -1.08 (in machinery). Five industries, namely food, wood & cork, chemical, non-metallic, and machinery have significant labor demand elasticities in terms of nominal and real wages. All in all, however, 11 industries display significant negative elasticities in terms of either nominal or real wages. The 11 industries might have significantly influenced aggregated employment in the organized sector since they employed about 73.4 per cent and paid 64-74 per cent of the total wages in the organized sector (see Tables 1 and 2).

On the other hand, Tables 9 and 10 summarize the estimates of industrial employment functions according to size dichotomy: large vis-a-vis small establishment. Again, employment is specified to depend on nominal or real wage, value-added, and/or time. In Table 9 the estimated labor demand elasticity (based on nominal wage) in small establishments ranges from -0.26 (food) to -1.40 (footwear) while for large ones, elasticity ranges from -0.23 (chemicals) to -1.42 (printed & published materials). In contrast, Table 10 reports that the labor demand elasticity (based on real wage) in small establishments ranges from -0.56 (metal products) to

Table 9

Regression Results: Employment-Equations (based on Nominal Wage) on the Organized Manufacturing Sector by Industry and Size of Establishment, 1956-74

ISIC No.	Industry	Size of Establishment	Intercept	Independent Variables AW	VA	t	$\bar{R}^2$
20	Food	Small	15,263.4	-2.8		479.1	0.40
				(-1.8)		(3.7)	
				0.26		0.30	
		Large	44,080.3	-7.9	0.1	2,690.4	0.84
				(-2.9)	(2.1)	(5.2)	
				-0.39	0.10	0.49	
		Large	40,148.8	-5.2		2,878.5	0.81
				(-1.9)		(5.2)	
				-0.30		0.50	
21	Beverages	Large	8,694.3	-0.9	0.1	392.8	0.86
				(-2.0)	(3.0)	(2.2)	
				-0.31	0.31	0.31	
23	Textiles	Large	19,215.5	-7.1	0.4	2,126.9	0.99
				(-4.0)	(11.5)	(11.1)	
				-0.39	0.35	0.54	
24	Footwear	Small	20,793.1	-13.1		414.7	0.64
				(-5.6)		(2.8)	
				-1.40		0.40	
		Large	14,698.1	-7.7	2.6		0.91
				(-6.9)	(11.1)		
				-0.72	0.32		
25	Wood & Cork	Large	28,963.3	-10.8	0.70	1,206.0	0.83
				(-3.0)	(4.8)	(2.4)	
				-0.76	0.47	0.38	
		Large	126,061.3	-5.3	0.8		0.78
				(-1.7)	(5.3)		
				-0.37	0.55		
26	Furniture & Fixtures	Large	4,687.1	-1.3	0.9	198.1	0.86
				(-5.0)	(5.5)	(4.5)	
				-0.82	0.42	0.42	
		Large	4,226.4	-1.0	1.2		0.70
				(-2.0)	(4.9)		
				-0.41	0.53		

Con't.

Table 9
(Continuation)

Regression Results: Employment Equations (based on Nominal Wage) on the Organized Manufacturing Sector by Industry and Size of Establishment, 1956-74

ISIC No.	Industry	Size of Establishment	Intercept	Independent Variables			$\bar{R}^2$	DW
				AW	VA	t		
28	Printed & Published Materials	Large	9,871.5	-0.9 (-4.3) -0.31		387.0 (8.1) 0.37	0.83	1.75
		Large	1,934.6	-1.0 (-3.5) -1.42		148.1 (4.6) 1.05	0.55	2.18
30	Rubber Products	Small	142.5	-0.1 (-2.4) -0.87		25.9 (5.4) 1.21	0.60	2.62
31	Chemicals	Large	10,725.3	-1.9 (-3.4) -0.48	0.1 (2.5) 0.16	1,334.1 (8.7) 0.73	0.95	1.30
		Large	8,413.2	-0.9 (-2.0) -0.23		1,339.5 (8.0) 0.77	0.94	1.38
33	Non-metallic	Large	8,834.9	-1.5 (-2.5) -0.41	0.4 (5.9) 0.65		0.75	1.25
		Large	7,459.9	-1.4 (-2.2) -0.39		857.4 (5.4) 0.74	0.71	1.62
36	Machinery	Large	6,901.9	-2.2 (-3.5) -1.35	0.4 (6.7) 0.50	213.9 (2.1) 0.44	0.76	1.72
		Large	6,179.6	-1.2 (-2.5) -0.76	0.4 (6.0) 0.49		0.70	1.78
37	Electrical Machinery	Large	5,475.3	-2.0 (-1.7) -0.61	0.2 (1.9) 0.33	723.9 (3.2) 0.72	0.83	1.46

Table 9
(Continuation)

Regression Results: Employment Equations (based on Nominal Wage) on the Organized Manufacturing Sector by Industry and Size of Establishment, 1956-74

ISIC No.	Industry	Size of Establishment	Intercept	Independent Variables AW	VA	t	R^2
38	Transport Equipment	Large	8,709.4	-1.8	0.2	514.0	0.83
				(-3.7)	(2.6)	(4.2)	
				-0.62	0.24	0.51	
		Large	9,453.8	-1.3	0.3		0.66
				(-1.8)	(4.7)		
				-0.42	0.48		
		Large	7,104.0	-1.2		713.6	0.77
				(-2.4)		(6.3)	
				-0.41		0.71	

(Numbers in parentheses are t-values. Numbers below parentheses are elasticities at mean values.)

Note:

Dependent Variable
N = average number of persons employed during the year.
Independent Variables
AW = average nominal wage per annum
VA = value-added
t = time variable: 1 for 1956, 2 for 1957, ..., 19 for 197

Source of Raw Data:

NCSO Annual Survey of Establishments
NCSO Census of Establishments

Table 10

Regression Results: Employment Equations (based on Real Wage) on the Organized Sector by Industry and Size of Establishment, 1956-74

ISIC No.	Industry	Size of Establishment	Intercept	Independent Variables RW	VA	t	$\bar{R}^2$	DW
20	Food	Large	44,915.1	-4.2		1,956.4	0.78	2.16
				(-1.7)		(8.5)		
				-0.18		0.35		
23	Textile	Large	20,019.5	-4.5	0.3	1,745.7	0.98	1.88
				(-2.3)	(8.47)	(8.2)		
				-0.22	0.26	0.5		
		Large	23,533.5	-8.4		3,171.4	0.90	0.79
				(-1.9)		(10.6)		
				-0.42		0.8		
24	Footwear	Large	22,223.0	-9.1	2.8	-551.8	0.89	1.74
				(-3.7)	(7.8)	(-3.0)		
				-0.78	0.89	-0.33		
		Large	19,534.8	-8.5	3.0	-675.4	0.89	1.90
				(-3.7)	(10.5)	(-6.1)		
				-0.72	0.94	-0.41		
26	Furniture & Fixtures	Large	6,233.4	-1.6	0.4	62.1	0.79	1.58
				(-3.4)	(2.3)	(1.4)		
				-0.62	0.19	0.13		
		Large	6,531.5	-1.7	0.6		0.78	1.27
				(-3.4)	(5.5)			
				-0.64	0.27			
		Large	6,604.7	-1.8		145.3	0.74	1.89
				(-3.4)		(4.7)		
				-0.68		0.30		
28	Printed & Published Materials	Large	10,024.6	-0.5	-0.15	357.8	0.72	2.03
				(-2.3)	(-1.7)	(3.9)		
				-0.16	-0.14	0.34		
		Large	9,560.4	-0.4		209.9	0.68	1.44
				(-1.6)		(6.1)		
				-0.11		0.20		

Con't.

Table 10
(Continuation)

Regression Results: Employment Equations (based on Real Wage) on the Organized Sector by Industry and Size of Establishment, 1956-74

ISIC No.	Industry	Size of Establishment	Intercept	Independent Variables			$\bar{R}^2$
				RW	VA	t	
30	Rubber	Small	201.1	-0.1 (-2.8) -0.92	0.01 (2.1) 0.26	15.4 (3.8) 0.72	0.64
		Small	432.8	-0.1 (-3.2) -1.34	0.01 (2.9) 0.33		0.33
		Small	187.3	-0.07 (-1.9) -0.64		16.5 (3.8) 0.77	0.56
		Large	4,768.6	-0.6 (-1.6) -0.23		414.1 (10.9) 0.57	0.87
31	Chemicals	Large	12,880.9	-1.7 (-4.7) -0.37	-0.02 (-1.43) -0.06	1,310.4 (10.7) 0.72	0.96
		Large	12,703.5	-1.5 (-4.3) -0.33		1,151.2 (21.5) 0.63	0.96
35	Metal Products	Small	2,615.7	-0.67 (-3.3) -0.56		84.6 (3.9) 0.38	0.68
36	Machinery	Large	9,986.6	-2.1 (-3.6) -1.19	0.26 (4.6) 0.29	-68.5 (-1.0) -0.14	0.76
		Large	9,218.9	-2.1 (-3.5) -1.14	0.23 (4.9) 0.26		0.76

Con't.

Table 10
(Continuation)

Regression Results: Employment Equations (based on Real Wage) on the Organized Sector by Industry and Size of Establishment, 1956-74

ISIC No.	Industry	Size of Establishment	Intercept	Independent Variables RW	VA	t	$\bar{R}^2$	DW
38	Transport Equipment	Large	9,956.4	-1.4	0.04	364.4	0.76	1.58
				(-2.3)	(0.6)	(2.6)		
				-0.41	0.06	0.36		
		Large	11,763.8	-1.5	0.19		0.68	0.94
				(-2.2)	(4.6)			
				-0.44	0.27			
		Large	9,981.2	-1.4		431.5	0.77	1.70
				(-2.5)		(6.1)		
				-0.42		0.43		

(Numbers in parentheses are t-values. Numbers below parentheses are elasticities at mean values.)

Note:

Dependent Variable:
N = average number of persons employed during the year.

Independent Variables:
RW = average nominal wage per annum deflated by the consumer price index.
VA = annual industry value-added in pesos.
t = time variable: 1 for 1956, 2 for 1957, ..., 19 for 1974.

Source of Raw Data:

NCSO Annual Survey of Establishments
NCSO Census of Establishments

-1.34 (rubber) while in large establishments, from -0.11 (printed & published materials) to -1.19 (machinery). In both tables, most elasticity estimates are less than unity.

Although the nominal wage "explains" employment changes in 13 industries and the real wage, in 10 industries, significant wage-employment relations are obtained, however, mostly in large establishments. Acceptable results on small establishments "explain" only .40 to .64 of employment changes in only three industries while those on large establishments "explain" .65 (transport equipment) to .99 (textiles) of employment changes in 14 industries. In effect, large establishments might have influenced the acceptable results in the more aggregated 2-digit ISIC industries (cf. Tables 7 and 8) or perhaps the wage-employment changes even at the aggregate sector level (Table 6). To be sure, the large establishments in the 14 industries employed about 79.4 per cent of the total workers in the organized sector or 61.2 percent (footwear) to 97.9 percent (textiles) of employed workers in the 14 industries during 1956-74.

V. Estimated Employment Effects

Because the number of acceptable regression results on wage or labor demand elasticities varies among industries and among establishment sizes, the number of estimates on

employment effects of minimum wage also differs among industries. Moreover, the employment effects are estimated only in industries with acceptable regression results on wage and labor demand elasticities. Within each industry, the estimates make use of all combinations of estimated wage and employment elasticiites under consistent cohorts. For instance, labor demand elasticity estimates based on large establishments (industry aggregate) are used with minimum wage elasticity estimates based also on large establishments (industry aggregate). All in all, in addition to the aggregate organized manufacturing sector, only 10 industries have the necessary regression results to estimate employment effects. Depending on the number of regression results, the number of employment effect estimates varies from one (electrical machinery) to as many as seven estimates (furniture & fixtures, and food).

Of course, the most likely employment effect would pertain to that obtained with the use of η_l and ε_w most closely reflecting the true elasticities. Thus the focus is on the average estimated effects since we are not sure of which elasticity estimate reflects the true measure in the manufacturing sector. At any rate, it is not the main aim of this study to estimate the "exact" employment changes due to minimum wage increases but rather to merely indicate the direction of the employment effects.

Table 11 summarizes the estimates on employment effects. Among the ten industries the employment effects, on the average, range from -19 percent (textile, large) to -62 percent (machinery, total). Surprisingly, many heavy industries like machinery, electrical machinery, and transport equipment, seemed to have suffered adverse employment effects. Also, large firms registered higher employment effects than their industry total. Such estimates can perhaps be attributed to the high wage impact in these industries of relatively fixed technical coefficients. In contrast, some high-wage industries like chemicals, basic metals and rubber, experienced some sizeable disemployment due to high labor elasticities. For the total organized manufacturing sector the estimated average employment effect was about 49 percent.

In terms of number of workers, estimated by multiplying the percentage employment effects by the average number of employment in 1956-74, the food industry seemed to have suffered the greatest disemployment of around -13.5 to -15.8 thousand workers. In contrast, machinery, which had the highest percentage disemployment had only about -3.9 to -4.4 thousand workers unemployed due to minimum wage increases. On the whole, the number of displaced workers in the organized sector could be placed at -167.1 thousand.

Table 11

Estimated Employment Effects of the ₱4-₱8 Daily Minimum Wage by Industry and Size of Establishment in the Organized Industrial Sector

ISIC No.	Industry	Size of Establishment	Estimated Employment Effects in percent		Estimated Employment Effects in thousands	
			Range	Average	Range	Average
20	Food	Total	-19 to -25	-22	-13.5 to -17.7	-15.8
		Large	-14 to -23	-19	-9.9 to -16.3	-13.5
23	Textiles	Large	-11 to -20	-16	-4.3 to -8.0	-6.2
24	Wood & Cork	Total	-31 to -43	-37	-10.6 to -14.7	-12.7
		Large	-28 to -57	-43	- 9.6 to -19.5	-14.6
26	Furniture & Fixtures	Total	-39 to -55	-47	-2.9 to -4.6	-3.7
		Large	-23 to -46	-36	-1.7 to -3.4	-2.6
30	Rubber	Total	-11 to -28	-20	-0.8 to -2.1	-1.5
		Large	-10	-10	-0.7	-0.7
31	Chemicals	Large	-11 to -23	-17	-2.1 to -4.5	-3.3
34	Basic Metals	Total	-20	-20	-1.3	-1.3
36	Machinery	Total	-53 to -70	-62	-3.3 to -4.4	-3.9
		Large	-49 to -86	-71	-3.1 to -5.4	-4.4
37	Electrical Machinery	Large	-35	-35	-3.8	-3.8
38	Transport Equipment	Large	-19 to -30	-21	-2.1 to -3.5	-2.4
	Organized Employment		-30 to -80	-49	-102.3 to -272.8	-167.1

Source of Raw Data: NCSO Annual Survey of Establishments
NCSO Census of Establishments

Implications

Obviously, the estimates on employment effects due to minimum wage revision are supposed to be interpreted under the ceteris paribus assumption. This is so in order to isolate the minimum wage effects from the influences of other factors on employment changes. During minimum wage revision, however, numerous factors such as inflation, devaluation, etc. have usually affected relative output and factor prices and thus actual employment. The results therefore do not at all imply that the estimated employment effects due to minimum wage increases can be observed from the historical changes.

The estimates nevertheless give some order of magnitude on the net effects of minimum wage increases on total, sectoral, and subsectoral industrial employment under the assumption that other things were held in abeyance. To be sure, the estimated employment effects may have some biases as the estimates on elasticities of labor demand and wage impact may also have. The use of time-series data, for instance, may not satisfy the assumptions of the Ordinary Least Square method. And the data itself may not reflect the true changes of the variables under study. There is no *a priori* reason, however, to indicate the direction, much more

magnitude, of any bias. Given the results, therefore, one can conclude that the minimum wage, ceteris paribus, has greatly reduced employment generation in the organized manufacturing industries. Moreover, based on the estimates on labor demand elasticities, the higher the legal wage to be imposed in the future, ceteris paribus, the greater will be the disemployment of industrial workers.

Despite adverse employment effects, the labor unions, however, pursue their self-interest by asking government to raise the minimum wage. For one, estimates of labor demand elasticities indicate negative but inelastic demand curves. This may suggest higher wages for those who remain or get employed. It is very difficult, nevertheless, to conclude that income distribution may improve since we do not know whether the benefits of the remaining employed workers outweighed the losses of the numerous employable unemployed or less productive workers. Further research therefore should focus on the income-distribution effects of minimum wage.

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