KDIS Working Paper 24-18

Wage Rigidity during the Great Depression: Plant-level Evidence

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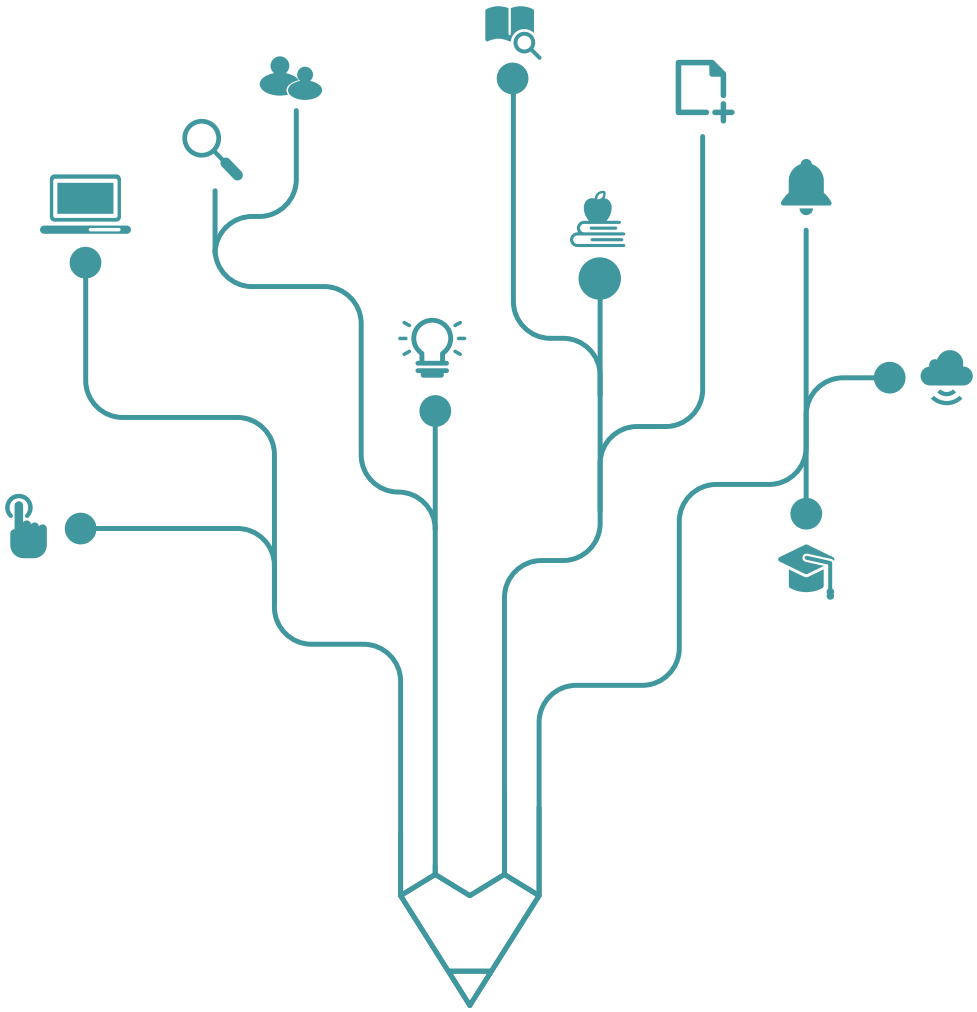

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Changkeun Lee[1]

Abstract

Conventional wisdom posits that sticky wages were a key factor in deepening and prolonging the Great Depression. It is also argued that leaders of large businesses sought to delay or minimize wage reductions to preserve workers' purchasing power. However, these claims have not been rigorously tested against micro-level data. This paper examines the wage-setting behaviors of individual employers during the Great Depression using plant-level microdata from the biennial Census of Manufactures (1929–1935). The analysis reveals that wages were rigid in both nominal and real terms during the first two years of the downturn. Between 1931 and 1933, however, wages declined more sharply than consumer and wholesale price indices. Importantly, these larger reductions in hourly wages were often accompanied by smaller reductions—or even increases—in working hours, helping workers maintain their labor income. Furthermore, this paper demonstrates that relying on aggregate data to measure wage rigidity can lead to overestimation. Plants that closed between 1929 and 1931 tended to pay significantly lower wages, introducing a composition bias commonly found in individual-level studies.

JEL Codes: E24, N12, N32, N62

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1. Introduction

Macroeconomists widely regard sticky wages as a crucial factor in understanding the depth and persistence of the Great Depression. Bernanke and Carey (1996), in one of the most influential papers on this topic, succinctly summarize this perspective:

"…nominal wages adjusted quite slowly to falling prices, and that the resulting increases in real wages depressed output."

The prevailing approach in this literature is to employ neoclassical general equilibrium models and fit them to macro-level time series data. Notable examples include Bordo, Erceg, and Evans (2000) and Cole and Ohanian (2004). These studies argue that wages were less flexible than prices, causing a "labor wedge" that disrupted equilibrium and delayed the economy's natural recovery. Even alternative methodologies, such as those used by Ebel and (2008), arrive at similar conclusions. On the empirical side, Dighe (1997) reinforces this view by analyzing high-frequency aggregate data from the Conference Board and the Bureau of Labor Statistics.

Building on this conventional perspective, some researchers have explored the underlying causes of wage rigidity. O'Brien (1989), a seminal study in this vein, examines qualitative evidence to understand firms' behavioral motives for maintaining wages during a severe downturn. He suggests that negative experiences from wage cuts during the 1920–1922 downturn led many managers to adopt policies to preserve workers' purchasing power. This rationale was particularly evident among large firms, as corroborated by a monograph from the National Industrial Conference Board, which described the idea as widespread and strongly held(National Industrial Conference Board 1930).

Later studies adopting micro-level approaches have challenged this conventional wisdom. For instance, Hanes and James (2012) argue that nominal wages during the 1929–1933

downturn were not “unusually rigid” but followed the expected trajectory based on the Phillips Curve. Other micro-level studies present mixed or contradictory findings. Simon (2001),examining wages in job postings, finds that wages for female clerical workers declined by more than half during this period—a change not attributable to shifts in labor quality, leading him to conclude that labor supply was inelastic. Similarly, Rose (2010) uses news reports to investigate the impact of President Hoover’s conferences with business leaders on the timing of wage cuts and finds no supporting evidence.

These conflicting perspectives highlight the need for further research. This paper contributes to the literature by analyzing the wage-setting behaviors of individual employers during the Great Depression using plant-level microdata from the biennial Census of Manufactures (1929–1935). Although the data are low frequency, they offer rich detail on individual plants above a certain size threshold. Most importantly, the panel structure of the data allows for tracking the same plants over time, providing a unique opportunity to address questions of wage rigidity with a level of granularity previously unavailable. This approach enables the measurement of individual plants’ wage adjustments, identifying where adjustments were most significant and exploring the aggregate implications of such heterogeneity.

Though historical in focus, this study engages with contemporary debates in the literature in several ways. First, it adopts an employer-centric perspective. Swanson (2004)noted that much of the research on wage rigidity has centered on individuals, overlooking the distinct considerations of employers who set wages. For instance, while workers may prioritize preserving real consumption wages (wages adjusted by the consumer price index), employers are more concerned with stabilizing real product wages (wages adjusted by the price index). Second, this investigation parallels recent studies on wage rigidity during the Great Recession. Findings such as those by Elsby, Shin, and Solon (2016) suggest that real wages were pro-cyclical and that downward wage rigidity was less binding than often assumed, partly due to composition bias (Solon, Barsky, and Parker 1994). This paper addresses both these issues by leveraging plant-level microdata from the manufacturing sector.

The remainder of the paper is organized as follows. Section 2 introduces the data and

measurement of key variables. Section 3 examines changes in the wage distribution over time. Section 4 explores the relationship between wage reductions and plant characteristics, with particular attention to plant size, as existing studies suggest that larger employers were more resistant to cutting wages. Section 5 discusses the macroeconomic implications of these micro-level findings. Finally, Section 6 concludes the paper.

2. Data and Measurement

The primary data source for this study is the original schedules from the biennial Census of Manufactures for 1929 and 1935. While Raff and Bresnahan (1996) initially collected plant-level data for several industries, the dataset remained incomplete for an extended period. However, through the collaborative efforts of multiple researchers, establishment-level microdata for numerous industries was eventually made available through the ICPSR (ICPSR 37114). This dataset provides detailed information on firm performance and employment, enabling an analysis of changes in wages, salaries, hours, and employment across 24 industries: sugar refining, linoleum, matches, soap, rubber tires, glass, blast furnaces, steel works, motor vehicles, cigars and cigarettes, agricultural implements, bone black, cane sugar, cement, concrete, ice, macaroni, malt, radio, sugar refining, aviation, beverages, ice cream, and planning mills. In this paper, I focus on three industries: petroleum refining, blast furnace, and motor vehicles. As shown in Table 1, they account for about 10% of total manufacturing employment.

Table 1 – Summary of Selected Industries

Industry	Number of Establishments				Number of Production Workers (in 000s)				Share in Manufacturing Total (%)			
	1929	1931	1933	1935	1929	1931	1933	1935	1929	1931	1933	1935
Petroleum Refining	390	376	389	393	80.6	68.8	69.0	77.4	0.91	1.06	1.14	1.00
Blast Furnace Prod.	105	80	72	72	25.0	13.6	12.1	15.2	0.28	0.21	0.20	0.20
Motor Vehicles	210	178	122	121	224.7	134.9	97.9	147.0	2.55	2.07	1.62	1.90
Sum	705	634	583	586	837.4	607.0	616.1	687.2	9.49	9.33	10.17	8.88
Manufacturing Total	209,862	174,255	141,769	169,111	8,821.8	6,506.7	6,055.7	7,738.8				

Source: Census of Manufactures, 1935

Most existing studies on wage rigidity use individual-level data to analyze gross earnings and hours worked over time to derive average hourly wages. This paper adopts a similar approach using plant-level data, as the manufacturing censuses conducted during the Great Depression recorded earnings and hours but did not report hourly wages directly. A significant challenge, however, is the inconsistency in measurements across different years. The questions from the original census schedules relevant to this research are presented in Figure A1 in the Appendix, and Table 2 provides a summary of the available data.

Table 2. Availability of Wage and Salary Information from the Census

Census Question	was asked in the census of year			
	1929	1931	1933	1935
a. Number of days plant operation	O	O	O	O
b. Normal number hours of plant operation per day	O			
c. Normal number hours of plant operation per week	O		O	O
d. Normal number shifts per day	O			O
e. Normal number hours per week for the individual wage earner	O	O		
f. Number days per week	O	O		O
g. Number of wage earners by month	O	O	O	O
h. Number of salaried workers	O		O	O
i. Total wage payment	O	O	O	O
j. Total salary payment	O		O	O
k. Man-hours by month			O	O

Gross earning can be calculated for years because each census form includes sections titled *"Wage Earners Employed, by Months"* and *"Wages, Cost of Materials, etc."* (Figure A1).

These sections provide data such as the total number of production workers by month (denoted as *g* in Table 1) and the total wages paid to them (denoted as *i* in Table 1). Using this information, I calculate a plant's Average Monthly Earnings (AME) for a given year by dividing the total wage payments by the total number of production workers. [2]

$$\text{AME}_t = \frac{\text{total wage payment}_t}{\text{total wage earner-months}_t}$$

Calculating hourly wages presents an additional challenge, as it requires information on hours worked. The census form includes a section titled *"Time in Operation and Hours of Labor."* For our purposes, the most helpful information would be the *"normal number of hours per week for the individual wage earner"* (denoted as *e* in Table 1). However, as shown in Table 1 and Figure A1, this information is unavailable for the 1933 and 1935 censuses.

An alternative measure is the *"number of hours the plant was operated (day shift only) during the week including December 15"* (denoted as *c* in Table 1), which is consistently reported in the 1933 and 1935 censuses. The key question is whether this serves as a reliable proxy, which depends on whether plants operated multiple shifts.[3] Fortunately, the 1929 census provides the necessary information to evaluate this relationship, including data on plant operation hours, the number of shifts, and individual workers' normal working hours.

An exemplary analysis of motor vehicle industry data from the 1929 census reveals a stable relationship across plants: *hours of operation = normal hours for the individual wage earner × number of shifts.* For example, a Ford plant in Cleveland, Ohio was operated 48 hours per week and it ran only one shift. The normal hours of work for the individual wage earner was also 48 hours. In contrast, a Ford plant in Chester, Pennsylvania was operated 80 hours per week, running two shifts. The census schedule recorded that the normal hours of work for the individual wage earner was 40 hours. Given that the 1933 and 1935 censuses specify hours of

[2] Wage earners refer to production workers, and salaried workers refer to nonproduction workers.

[3] One may point out that the census form did not ask for working hours per week as of December 15, 1929 and 1931. But see the "5. Persons Engaged" part of the census 1929. It asks the number of salaried workers and wage earners as of December 14, 1929. The next part asks the number of wage earners on the 15th day. It can be seen that the census sets the week of December 15th as the base week.

operation for the day shift only, this measure can serve as a proxy for individual wage earners' weekly working hours in those years.[4]

With the average working hours per week calculated, I derive the Average Hourly Earnings (AHE) of a plant for a given year using the following formula:

$$\text{AHE}_{i,t} = \frac{\text{AME}_{i,t}}{4.35 \times \text{average weekly working hours}_{i,t}}$$

Here, 4.35 represents the average number of weeks in a month.

Like other historical statistics, not all reported numbers are reliable. In some cases, plant managers misunderstood the questions on the census forms. For example, many managers reported operating "168 hours" during the day shift, even though this figure technically cannot exceed 84 hours. It is clear that these responses included multiple shifts. For the 1935 census, such cases were corrected because the data also included information on the normal number of shifts per day. However, this information is unavailable in the 1933 census. Additionally, the 1935 data show that "168 hours" could correspond to two, three, or even four shifts, making any corrections for 1933 potentially unreliable. As a result, observations with more than 84 reported hours in the 1933 data and extreme values such as "2920 hours" were excluded from the analysis.

Given the definitions of earnings and hours, the percentage changes in Average Hourly Earnings (AHE) can be calculated as follows:

$$(\%\Delta)\text{AHE}_t = (\%\Delta)\text{AME}_t - (\%\Delta)\text{weekly working hours}_t$$

For small changes, log approximation can also be employed:

$$\Delta\ln(\text{AHE}_t) = \Delta\ln(\text{AME}_t) - \Delta\ln(\text{weekly working hours}_t)$$

[4] On can consider another alternative – using man-hours by month of 1933 and 1935 (k in Table 1). The appearance of these questions seems to be related to the National Recovery Administration's "Share-the-work" initiative that limited working hours. But I find that the number of man-hours are extremely noisy and cannot be used for the analysis before extensive cleaning.

As with most studies on wage rigidity, this analysis focuses on changes in AHE, which represents the factor price of labor. However, average monthly earnings (AME) are still of significant economic importance as they reflect the labor income of the average worker. Previous studies have suggested that both government policymakers and business leaders sought to avoid wage reductions to maintain workers' purchasing power. In this context, AME is a better measure of workers' purchasing power than AHE.

Moreover, AME facilitates comparisons between the compensation adjustments of wage earners (production workers) and salaried employees (non-production workers). Most salaried workers are not paid based on hours worked but instead receive fixed annual salaries over the pay period (typically a year). Consequently, adjusting hours is not an option when firms need to reduce labor costs for salaried workers. Firms must either reduce the total salaries paid or resort to layoffs.

3. Distribution of Wage Changes: How Rigid, by What Standards?

I first describe notable wage change patterns in the selected industries. Figure 1 illustrates the distribution of changes in average nominal hourly wages over each two-year period using estimated kernel density functions for each industry. Note that only continuing plants in each period are included. Vertical lines indicate the change in consumer price index (solid line) and wholesale price indices (various dashed lines). They serve as reference points for the judgment of real rigidity. From the worker's perspective, there is real wage rigidity if the change in nominal wage exceeds the change in consumer price index (CPI). From the firm's viewpoint, real rigidity means that nominal wages do not fall as much as the wholesale price index (WPI).

Panel A of Figure 1 shows that nominal wages barely fell during the first two years of downturn, from 1929 to 1931. In the same period, CPI fell 12.9 percent, and WPIs of the selected industries fell even more. Hourly wages were also rigid in the real term. Wage distribution's peaks are on the right of the respective WPI changes, except the motor vehicle industry. This is consistent with the observations of previous studies that wages did not fall

much before the fall of 1931. However, the figure also shows that many plants, especially auto and blast furnace ones, cut their wages more than WPIs did. Table 3 shows the shares of these "flexible" plants in employment. About 20 percent of production workers at petroleum refining plants and more than 60 percent of production workers at auto plants experienced wage cuts greater than output price decline. The observed dispersion in the magnitude of wage reduction naturally leads to a new question which is addressed in the next section – who cut wages more?

Panel B illustrates the distribution of wage changes during the next two years, between 1931 and 1933. It shows that employers overreacted this time. Nominal wages fell more than CPI and WPIs did. According to Table 3, more than 60% of petroleum refining workers and about half of blast furnace and auto workers experienced excessive wage cuts. However, hourly wages rebounded quickly once the recovery started in 1933. This was when Roosevelt took office, the NRA started, and various measures to keep wages and shorten hours were in effect. Panel C of Figure 3 shows that the peaks of hourly wages lie on the right of the CPI and WPI lines. Hourly wages rose more than output, and consumer prices recovered. Table 3 shows that 80 percent and more workers were affected by this unusually large pay increase.

Table 3 - Share of "Flexible" Plants in Production Workers (%)

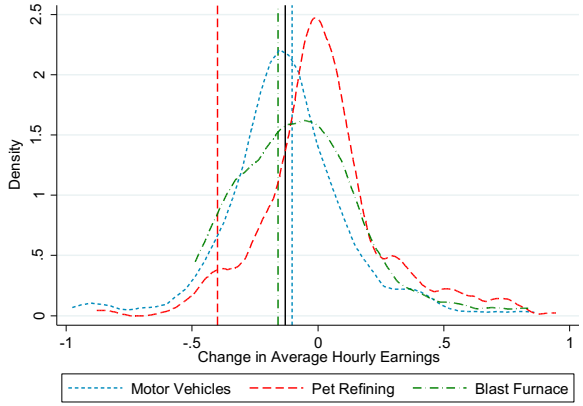
A. Plants with Wage Cut more than CPI Change

Industry	1929-31	1931-33	1933-35
Petroleum Refining	13.9	54.4	17.7
Blast Furnace Products	22.9	44.7	13.9
Motor Vehicles	61.5	25.9	23.3

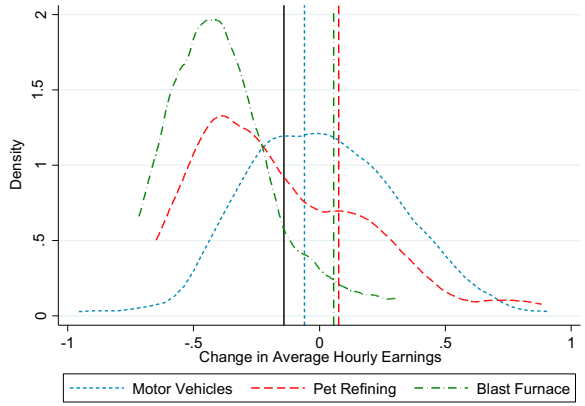
B. Plants with Wage Cut more than WPI Change

Industry	1929-31	1931-33	1933-35
Petroleum Refining	0.9	60.3	7.8
Blast Furnace Products	19.9	47.3	10.7
Motor Vehicles	63.8	45.2	21.9

Figure 1 – Distribution of Nominal Hourly Wage Changes



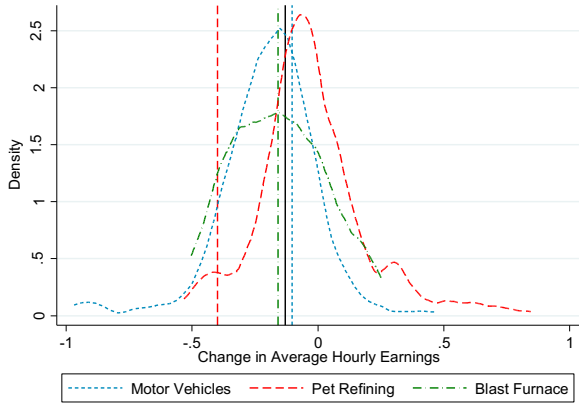
A. 1929-31



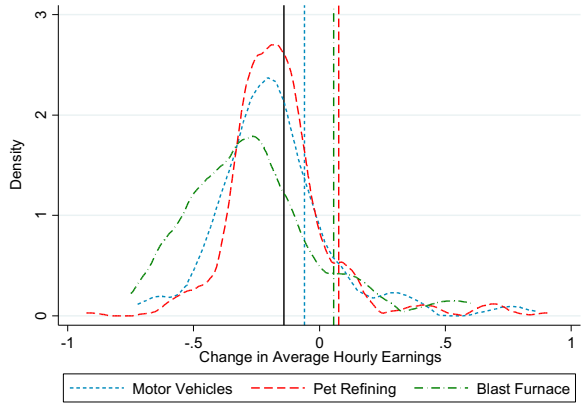
B. 1931-33

C. 1933-35

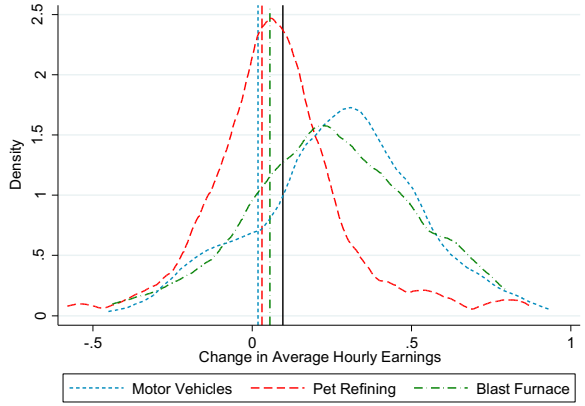
Figure 2 – Distribution of Nominal Monthly Wage Changes



A. 1929-31

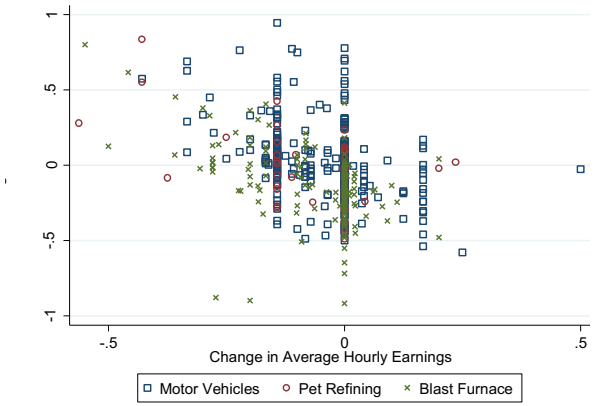


B. 1931-33

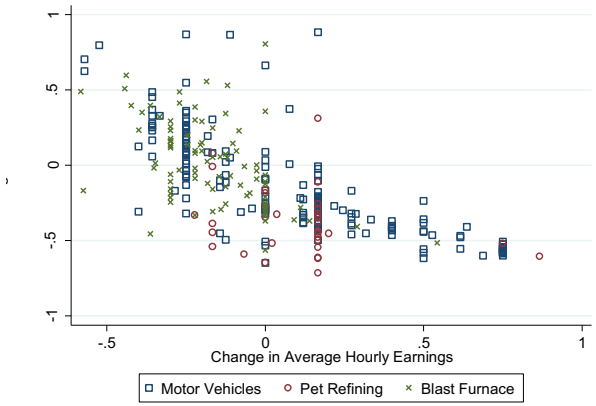


C. 1933-35

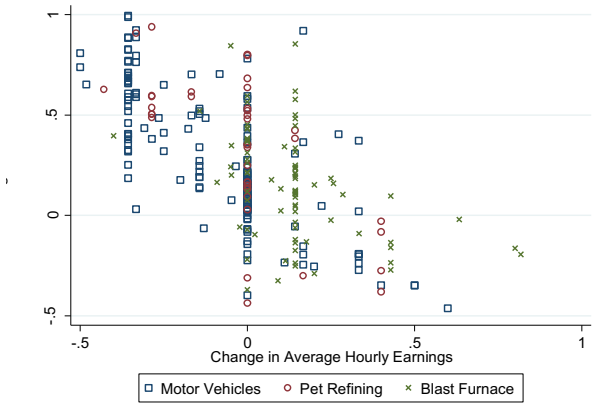
Figure 3 –Channels of Adjustment: Hours and Hourly Wage



A. 1929-31



B. 1931-33



C. 1933-35

The observations thus far indicate that hourly wages were indeed rigid during the first two years of the Great Depression, both in nominal and real terms. However, they became significantly more flexible in the subsequent two years. The magnitude of wage adjustments—both downward and upward—exceeded the changes in consumer and product prices. Among the industries examined, blast furnace plants exhibited particularly high sensitivity to wage adjustments, whereas auto plants demonstrated relative stability in their wage-setting practices.

Turning to average monthly earnings (AME), Figure 2 illustrates the distribution of changes in nominal AME. A notable feature is that wage changes tend to cluster around changes in the Consumer Price Index (CPI). While Panel A of Figure 2 resembles Panel A of Figure 1, the other panels reveal distinct differences when compared to the distributions of hourly wages in Figure 1. What explains these differences? Figure 3 provides insight by showing a negative correlation between changes in Average Hourly Earnings (AHE) and changes in hours worked throughout the Depression. When a plant reduced its hourly wage rate more than average, it often "compensated" by increasing working hours. This adjustment likely helped stabilize production workers' overall labor income.

Taken together, Figures 1 and 2 suggest that the behavioral motive to preserve workers' purchasing power, as emphasized in past literature, was actively influencing wage and hour adjustments during this period.

4. Plant Characteristics and the Size of Wage Reduction

This paper leverages plant-level data from the Census of Manufactures, providing a unique opportunity to examine heterogeneity in wage-setting behavior and identify which employers were more reluctant to reduce wages during the Great Depression. Scholars have long suggested that large firms were more likely to avoid or delay wage cuts, offering several potential explanations. O'Brien (1989) highlights the purchasing power motive, suggesting that businesses sought to maintain workers' ability to spend. Cole and Ohanian (2004) point to the desire to ensure industrial peace and the influence of public policies. Temin (1990) argues that

organized labor at larger workplaces—so-called "insiders"—prioritized their own interests over those of outsiders. Similarly, Jacoby (1985) emphasizes the development of internal labor markets in the 1920s as a factor in wage rigidity. Dighe (1997) adds that managers feared wage reductions might be perceived as disproportionate or unfair, leading to worker demoralization. While these arguments suggest that large employers had stronger incentives to maintain wages, they lack robust empirical evidence. The plant-level data used in this paper provide a suitable basis for testing these hypotheses.

To investigate the relationship between plant characteristics and the magnitude of wage reductions, I regress changes in Average Hourly Earnings (AHE) and Average Monthly Earnings (AME) on the initial wage level and plant size at the beginning of each period. The results, presented in Table 4, indicate that the initial wage level was the most significant factor influencing subsequent wage changes. For instance, as shown in Columns (1)–(3), a plant paying hourly wages 10% above the industry average in 1929 reduced wages by 4–5 percentage points more between 1929 and 1931. This trend persisted during the 1931–33 and 1933–35 periods. In contrast, plant size—measured by the number of production workers—did not have a significant effect on wage changes. Given that large employers typically pay higher wages, these results suggest that wage reductions were, in fact, more pronounced at larger plants.

Columns (10)–(18) of Table 4 present results for AME instead of AHE. While the patterns are broadly similar, the coefficients for initial AME levels are consistently smaller than those for AHE. This observation aligns with the patterns in Figure 4, which show that a significant reduction in AHE was often accompanied by a smaller reduction in hours worked. Nevertheless, the findings provide little evidence to support the notion that large plants were more likely to maintain either hourly or monthly wages compared to smaller plants.

Table 4- Plant Characteristics and Wage Changes

Dependent Variable:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Change in AHE		1929-31			1931-33			1933-35	
	Pet Ref.	Blast Fur.	Auto	Pet Ref.	Blast Fur.	Auto	Pet Ref.	Blast Fur.	Auto
ln(AHE)	-0.529**	-0.415*	-0.424**	-0.975**	0.0405	-0.741**	-1.178**	-0.691**	-0.547**
	(0.0648)	(0.180)	(0.0975)	(0.163)	(0.100)	(0.178)	(0.108)	(0.175)	(0.109)
ln(Wage Earner-Months)	-0.00375	0.123*	-0.00488	-0.00338	-0.00359	0.00648	0.0409*	0.178	0.0584**
	(0.00759)	(0.0524)	(0.00857)	(0.0146)	(0.0333)	(0.0117)	(0.0194)	(0.0960)	(0.0100)
Constant	-0.252**	-1.248*	-0.256**	-0.636**	-0.254	-0.457**	-0.751**	-1.692*	-0.640**
	(0.0691)	(0.473)	(0.0820)	(0.123)	(0.288)	(0.119)	(0.171)	(0.658)	(0.101)
Observations	321	58	157	178	26	94	173	33	79
R-squared	0.254	0.170	0.095	0.305	0.005	0.273	0.516	0.340	0.469

Dependent Variable:	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Change in AME		1929-31			1931-33			1933-35	
	Pet Ref.	Blast Fur.	Auto	Pet Ref.	Blast Fur.	Auto	Pet Ref.	Blast Fur.	Auto
ln(AME)	-0.630**	-0.405**	-0.328**	-0.456**	0.0592	-0.298**	-0.482**	-0.470**	-0.493**
	(0.0639)	(0.127)	(0.0783)	(0.0895)	(0.120)	(0.0795)	(0.0768)	(0.0838)	(0.105)
ln(Wage Earner-Months)	-0.0101	0.0502	-0.0203**	0.00707	0.00839	0.00153	0.0121	0.140**	0.0446**
	(0.00623)	(0.0343)	(0.00557)	(0.00621)	(0.0318)	(0.00772)	(0.00831)	(0.0476)	(0.0105)
Constant	3.111**	1.455*	1.580**	1.994**	-0.594	1.212**	2.254**	1.256*	2.116**
	(0.324)	(0.616)	(0.389)	(0.459)	(0.637)	(0.380)	(0.358)	(0.580)	(0.490)
Observations	321	58	157	178	26	94	173	33	79
R-squared	0.336	0.116	0.193	0.270	0.006	0.123	0.234	0.493	0.382

Robust standard errors in parentheses. *: significant at 5%, **: significant at 5%

5. Bringing Micro Findings to the Macro Level

This study has explored the wage-setting behaviors of manufacturing plants during the Great Depression. The findings reveal that wages were rigid in both nominal and real terms during the initial two years of the downturn, but from 1931 to 1933, wages adjusted more substantially than changes in the Consumer Price Index (CPI) and Wholesale Price Index (WPI). Notably, plants that implemented significant wage cuts often offset these reductions by reducing working hours less dramatically or even increasing them. This adjustment helped stabilize workers' labor income and preserved their purchasing power. During the early recovery period, hourly and monthly wages increased more rapidly than the CPI and WPI, likely influenced by the New Deal policies of the Roosevelt administration. However, contrary to some qualitative studies, I found no evidence that wage reductions were smaller at large employers.

The question remains: what are the aggregate implications of these micro-level findings? To address this, one must consider how the wage-setting behaviors of individual employers aggregate to broader outcomes. Composition effects play a critical role. The analysis identified substantial heterogeneity in the magnitude of wage reductions across plants. Consequently, wage rigidity at the industry level depends on the relative weights of plants with rigid wage structures versus those with flexible ones. Section 4 demonstrated that wage reductions at large employers were not small, challenging the prevailing view from qualitative studies. Once the initial wage level was accounted for, plant size had no predictive power over subsequent wage changes. This finding reduces the likelihood of significant composition bias toward either more or less wage rigidity among continuing plants.

However, composition bias might still emerge from the differences between exiting and continuing plants. This aligns with critiques by Solon, Barsky, and Parker (1994), who demonstrated that during recessions, low-skill (and thus low-wage) workers are more likely to exit the labor force, skewing aggregate wage measures upward. Similarly, Elsby, Shin, and Solon (2016) found comparable issues during the Great Recession. Drawing on this framework, I conducted a diagnostic analysis at the plant level to test whether low-wage plants were more

likely to exit, thereby introducing upward bias in aggregate wages. The literature on firm dynamics supports this notion, as smaller plants, which tend to pay lower wages, are more prone to closure during economic downturns.

The regression results, presented in Table 5, reveal that plants surviving to the next census year paid, on average, 9% higher hourly wages and 4.5% higher monthly wages than exiting plants. This difference was most pronounced during the first two years of the Depression (1929–1931), with surviving plants paying 14% higher hourly wages and 9.5% higher monthly wages. Figures 2 and 3 further illustrate that wages at continuing plants were sticky. When combined with the exit of low-wage plants, this rigidity among survivors likely exaggerated the degree of wage rigidity observed in aggregate data. These micro-level findings suggest that macroeconomic analyses based solely on aggregate data may overestimate the extent of wage rigidity during this period.

Table 5 -Wage Differentials Between Continuing and Exiting Plantsfive

	(1)	(2)	(3)	(4)
	1929-33		1929-31	
Dependent Variable: log of	AHE	AME	AHE	AME
Continuing Plants	0.0929**	0.0454**	0.140**	0.0946**
	(0.0245)	(0.0157)	(0.0318)	(0.0239)
Observations	1694	1914	701	704
R-squared	0.050	0.221	0.063	0.023
	(5)	(6)	(7)	(8)
	1931-33		1933-35	
Dependent Variable: log of	AHE	AME	AHE	AME
Continuing Plants	0.0373	0.0119	0.112	0.0368
	(0.0320)	(0.0271)	(0.0883)	(0.0301)
Observations	611	629	382	581
R-squared	0.020	0.113	0.100	0.145

Coefficients for industry and year dummies are not reported. Standard errors in parentheses.

*: significant at 5%, **: significant at 5%

6. Conclusion

This study provides new insights into wage rigidity during the Great Depression by leveraging plant-level microdata from the biennial Census of Manufactures between 1929 and 1935. The findings reveal a complex dynamic of wage adjustments, challenging the conventional wisdom of uniformly rigid wages during this period.

The results indicate that wages were relatively rigid in both nominal and real terms during the initial years of the Depression (1929–1931). However, during the deeper downturn of 1931–1933, wages adjusted more significantly, often exceeding the declines in consumer and wholesale price indices. Notably, plants that implemented substantial wage cuts often compensated by reducing hours less drastically or even increasing them, helping to stabilize workers' labor income. This suggests that, contrary to some assumptions, employers sought to mitigate the negative impacts of wage reductions on workers' purchasing power.

The analysis also highlights the role of heterogeneity among plants in wage-setting behaviors. While large firms are often presumed to resist wage cuts, the findings do not support this claim. Instead, wage reductions were more strongly associated with the initial wage levels of plants rather than their size. Furthermore, the study identifies potential composition bias in aggregate wage data caused by the exit of low-wage plants, which likely exaggerates the rigidity of wages at the macroeconomic level.

These micro-level findings carry important implications for our understanding of labor market dynamics during economic downturns. They underscore the limitations of relying solely on aggregate data, which can mask significant heterogeneity in employer behavior. By focusing on plant-level evidence, this study bridges gaps in the literature and offers a more nuanced view of wage rigidity during one of the most severe economic crises in history.

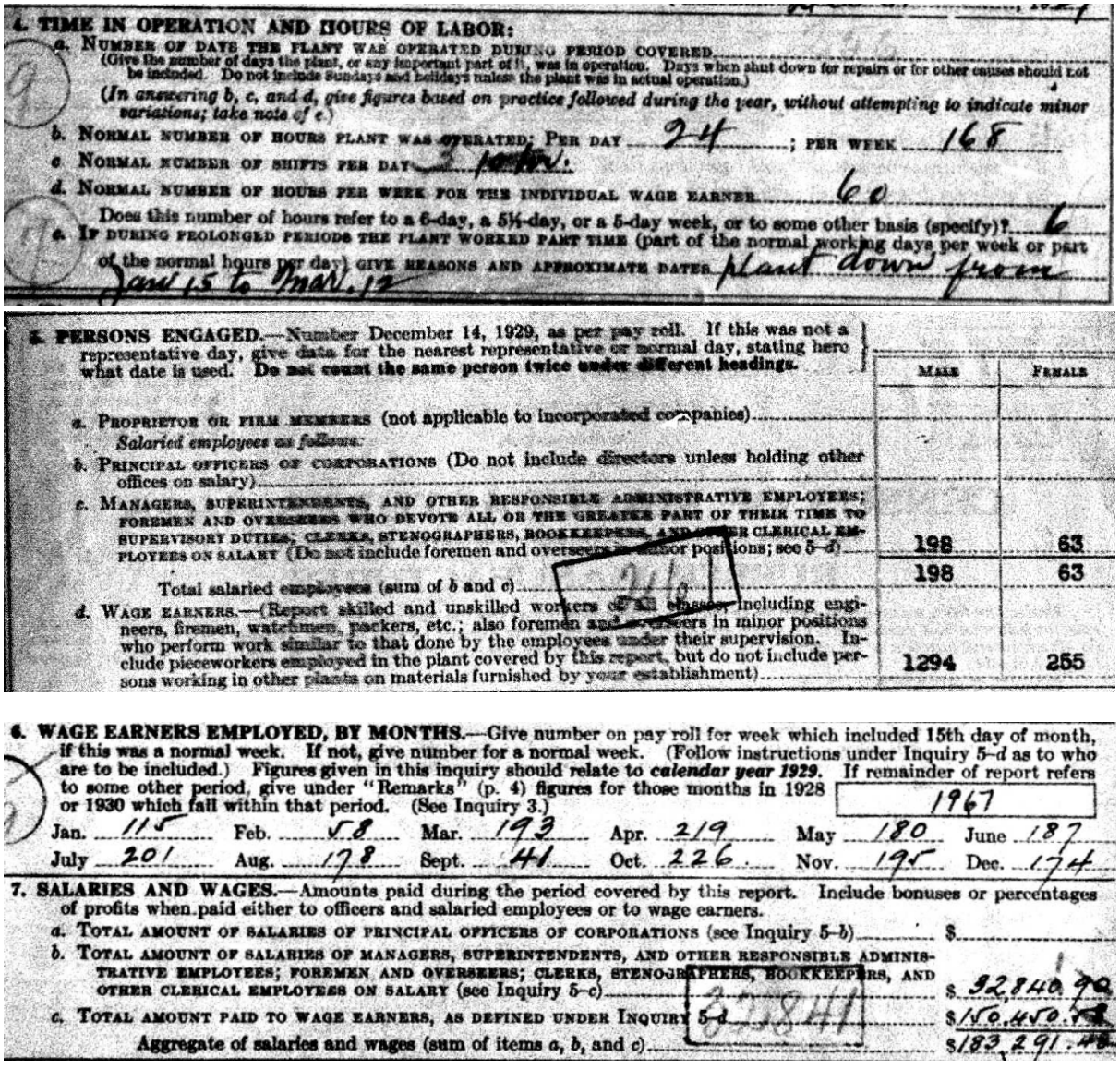
Future research could build on these findings by incorporating additional industries and exploring the interplay between policy interventions, firm characteristics, and wage-setting behaviors. Such efforts would further enhance our understanding of how microeconomic dynamics shape macroeconomic outcomes during periods of economic distress.

References

Appendix.

Figure A1 – Employment and Hours-related Questions in Census Schedule of Each Year

1929



4. TIME IN OPERATION AND HOURS OF LABOR:
a. NUMBER OF DAYS THE PLANT WAS OPERATED DURING PERIOD COVERED
(Give the number of days the plant, or any important part of it, was in operation. Days when shut down for repairs or for other causes should not be included. Do not include Sundays and holidays unless the plant was in actual operation.)
(In answering b, c, and d, give figures based on practice followed during the year, without attempting to indicate minor variations; take note of e.)
b. NORMAL NUMBER OF HOURS PLANT WAS OPERATED: PER DAY 24; PER WEEK 168
c. NORMAL NUMBER OF SHIFTS PER DAY 3 per day.
d. NORMAL NUMBER OF HOURS PER WEEK FOR THE INDIVIDUAL WAGE EARNER 60
Does this number of hours refer to a 6-day, a 5½-day, or a 5-day week, or to some other basis (specify)? 6
e. IF DURING PROLONGED PERIODS THE PLANT WORKED PART TIME (part of the normal working days per week or part of the normal hours per day) GIVE REASONS AND APPROXIMATE DATES. Plant down from Jan 15 to Mar. 12

5. PERSONS ENGAGED.—Number December 14, 1929, as per pay roll. If this was not a representative day, give data for the nearest representative or normal day, stating here what date is used. Do not count the same person twice under different headings.

	MALE	FEMALE
a. PROPRIETOR OR FIRM MEMBERS (not applicable to incorporated companies)		
Salaried employees as follows:		
b. PRINCIPAL OFFICERS OF CORPORATIONS (Do not include directors unless holding other offices on salary)		
c. MANAGERS, SUPERINTENDENTS, AND OTHER RESPONSIBLE ADMINISTRATIVE EMPLOYEES; FOREMEN AND OVERSEERS WHO DEVOTE ALL OR THE GREATER PART OF THEIR TIME TO SUPERVISORY DUTIES; CLERKS, STENOGRAPHERS, BOOKKEEPERS, AND OTHER CLERICAL EMPLOYEES ON SALARY (Do not include foremen and overseers in minor positions; see 5–d)	198	63
Total salaried employees (sum of b and c)	198	63
d. WAGE EARNERS.—(Report skilled and unskilled workers of all classes, including engineers, firemen, watchmen, packers, etc.; also foremen and overseers in minor positions who perform work similar to that done by the employees under their supervision. Include pieceworkers employed in the plant covered by this report, but do not include persons working in other plants on materials furnished by your establishment)	1294	255

6. WAGE EARNERS EMPLOYED, BY MONTHS.—Give number on pay roll for week which included 15th day of month, if this was a normal week. If not, give number for a normal week. (Follow instructions under Inquiry 5–d as to who are to be included.) Figures given in this inquiry should relate to *calendar year 1929*. If remainder of report refers to some other period, give under "Remarks" (p. 4) figures for those months in 1928 or 1930 which fall within that period. (See Inquiry 3.) 1967

Jan.	115	Feb.	158	Mar.	193	Apr.	219	May	180	June	187
July	201	Aug.	178	Sept.	141	Oct.	226	Nov.	195	Dec.	174

7. SALARIES AND WAGES.—Amounts paid during the period covered by this report. Include bonuses or percentages of profits when paid either to officers and salaried employees or to wage earners.

a. TOTAL AMOUNT OF SALARIES OF PRINCIPAL OFFICERS OF CORPORATIONS (see Inquiry 5–b)	$
b. TOTAL AMOUNT OF SALARIES OF MANAGERS, SUPERINTENDENTS, AND OTHER RESPONSIBLE ADMINISTRATIVE EMPLOYEES; FOREMEN AND OVERSEERS; CLERKS, STENOGRAPHERS, BOOKKEEPERS, AND OTHER CLERICAL EMPLOYEES ON SALARY (see Inquiry 5–c)	$ 32,840.90
c. TOTAL AMOUNT PAID TO WAGE EARNERS, AS DEFINED UNDER INQUIRY 5–d	$ 150,450.78
Aggregate of salaries and wages (sum of items a, b, and c)	$ 183,291.68

1931

4. TIME IN OPERATION AND HOURS OF LABOR:

a. NUMBER OF DAYS PLANT WAS OPERATED DURING PERIOD COVERED: 143
(Give the number of days the plant, or any important part of it, was actually in operation. Do not include Sundays and holidays unless the plant was actually in operation, and do not include days when only the office was open.)

b. NORMAL NUMBER OF HOURS PER WEEK FOR THE INDIVIDUAL WAGE EARNER: 72

c. DOES NUMBER OF HOURS (*b*) REFER TO A 6-DAY, A 5½-DAY, OR A 5-DAY WEEK, OR TO SOME OTHER BASIS (specify)? 7

5. WAGE EARNERS EMPLOYED, BY MONTHS.—Report skilled and unskilled workers of all classes, including engineers, firemen, watchmen, repairmen, etc.; also foremen and overseers in minor positions who perform work similar to that done by the employees under their supervision, but NOT overseers, superintendents, etc., engaged solely in supervisory work. Include pieceworkers employed in the plant covered by this report, **but do not include persons working in other plants on materials furnished by your establishment.** DO NOT INCLUDE OFFICERS NOR OFFICE EMPLOYEES.

Give below for each month number of wage earners on pay roll for week which included 15th day of month, if this was a normal week. If not, give number for a normal week. 252

Jan. 51	Feb. 45	Mar. 45	Apr. 45	May 33	June 33
July	Aug.	Sept.	Oct.	Nov.	Dec.

6. WAGES, COST OF MATERIALS, ETC.—Report the total amounts paid during the period covered by this report for wages, cost of materials, etc., and for contract work. DO NOT INCLUDE ANY OVERHEAD OR MISCELLANEOUS EXPENSES, NOR SALARIES OF OFFICERS AND OFFICE EMPLOYEES.

a. WAGES.—(Report the total wages paid to wage earners, as defined under Inquiry 5) $ 24,038

b. COST OF MATERIALS, FUEL, AND ELECTRIC ENERGY.—(Report the cost of all materials—not including supplies called for under item *c*, below—which were purchased or were transferred from other plants under the same ownership or control, together with the cost of fuel and purchased or transferred electric energy, actually used in the manufacture of products reported under Inquiry 7, during the period covered by this report $ 704,480

c. Report the total cost of furnace supplies—limestone, refractories, etc.—which were purchased or were transferred from other plants under the same ownership, and used during the year. Do NOT include this cost in the cost of materials given above (6–*b*) $ 49,151

1933

3. TIME IN OPERATION AND HOURS OF LABOR:

(*a*) Number of days plant (not merely office) was operated in 1933: 245

(*b*) Number of hours plant was operated (day shift only) during the week including December 15: 56

5. WAGE EARNERS EMPLOYED, BY MONTHS.—Give number on pay roll for week which included 15th day of month, if this was a normal week. If not, give number for a normal week. (Follow instructions under Inquiry 4-*e* as to who are to be included.)

4-1162

Jan. 0	Feb. 0	Mar. 0	Apr. 0	May 64	June 69
July 121	Aug. 161	Sept. 183	Oct. 200	Nov. 189	Dec. 175

6. SALARIES AND WAGES.—Amounts paid in 1933. Include bonuses or percentages of profits when paid either to officers and salaried employees or to wage earners.

(*a*) TOTAL AMOUNT OF SALARIES OF OFFICERS OF THE CORPORATION (see Inquiry 4-*b*) $ None

(*b*) TOTAL AMOUNT OF SALARIES OF MANAGERS, SUPERINTENDENTS, AND OTHER RESPONSIBLE ADMINISTRATIVE EMPLOYEES (see Inquiry 4-*c*) $ 27,614.21

(*c*) TOTAL AMOUNT OF SALARIES OF CLERKS, STENOGRAPHERS, BOOKKEEPERS, AND OTHER CLERICAL EMPLOYEES ON SALARY (see Inquiry 4-*d*) $ 15,290.54

(*d*) TOTAL AMOUNT PAID TO WAGE EARNERS, AS DEFINED UNDER INQUIRY 4-*e* $ 82,920.48

Aggregate of salaries and wages (sum of items *a*, *b*, *c*, and *d*) $ 125,825.23

11. MAN-HOURS (A man-hour is one hour of work by one person).—Report, from the pay roll, the total number of man-hours actually worked during each month by all the wage earners reported under Inquiry 5, above. The figure for each month should be an aggregate for the *entire* month (not for any one week), but should cover only the time actually employed on the job. (To illustrate: 10 wage earners employed 100 hours worked 1,000 man-hours.)

Jan.	0	Feb.	0	Mar.	0	Apr.	0	May	21,576	June	22,080
July	30,752	Aug.	45,632	Sept.	49,440	Oct.	55,304	Nov.	50,880	Dec.	49,104

1935

INQUIRY 3. TIME IN OPERATION AND HOURS OF LABOR.

(*a*) Number of days plant was actually engaged in production during period covered 236 (Do not include Sundays and holidays unless the plant was in operation, and do not include days when only the office or the ***shipping department*** was open.)

(*b*) Normal number of hours per week (day shift only) 40 (*c*) Normal number of shifts per day 1

(*d*) Does number of hours (*b*) refer to a 6-day, a 5½-day, or a 5-day week, or to some other basis (specify)? 5-day week

INQUIRY 5. WAGE EARNERS EMPLOYED, BY MONTHS, AND WAGES PAID.—Report here all time and piece workers employed in the plant (including the power plant and the maintenance, shipping, warehousing, and other departments) covered by this report, NOT INCLUDING employees reported above under Inquiry 4. Include here working foremen and gang and straw bosses, but not foremen whose duties are primarily supervisory. (See Inquiry 4-*c*, above.) ***Clerical*** employees in the factory should not be included here but should be reported under Inquiry 4-*e*, above. Do not include employees in cafeterias, nor persons working in other plants or in their homes on materials supplied by your establishment.

(*a*) Number of wage earners who worked during any part of a week of normal activity in each month, preferably the week ended nearest the 15th day of the month.

		Key			Key			Key
Jan.	2250	C-1	May	1870	C-5	Sept.	810	C-9
Feb.	2310	C-2	June	1010	C-6	Oct.	1110	C-10
Mar.	2280	C-3	July	870	C-7	Nov.	1550	C-11
Apr.	2290	C-4	Aug.	910	C-8	Dec.	1590	C-12

(Specify year, if other than 1935. See General Instructions, section (f))

Code	Key	Total W. E. M.	Key
	A-3	18850	A-4

(*b*) Total amount paid to wage earners, as defined above, during the year (DO NOT include salaries of persons reported under Inquiry 4) $ 2,176,643. — A-5 / D-1

INQUIRY 5a. MAN-HOURS (**a man-hour is one hour of work by one person.**—Report, ***from the pay roll,*** the total number of man-hours actually worked during each month of the year covered by this report by all the wage earners as defined in Inquiry 5, page 2. The figure for each month should be an aggregate for the ***entire*** month. Where the pay-roll period extends from one month into the next, the man-hours of this pay period should be allocated between the two months.

Jan.	464,120	Feb.	431,850	Mar.	460,270	Apr.	433,340	May	252,840	June	157,670
July	129,220	Aug.	118,620	Sept.	77,070	Oct.	190,830	Nov.	250,660	Dec.	221,360

TOTAL FOR THE YEAR 3,187,850