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Work-sharing During the Great Depression: Did the 'President's Reemployment Agreement' Promote Reemployment?

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The President's Reemployment Agreement (PRA) of 1933 directed firms to reduce workweeks during the Great Depression so existing jobs could be spread into additional employment opportunities. Similar 'work-sharing' policies have recently been implemented across Europe in hopes of reducing unemployment. I find that, *ceteris paribus*, the work-sharing aspects of the PRA created nearly 2.5 million new employment opportunities in around four months. However, the programme also required firms to raise hourly wage rates, offsetting close to half of these gains. Furthermore, most of the remaining employment gains were wiped out after cartel-oriented industry-specific codes of fair competition supplanted the PRA.

INTRODUCTION

> The essence of the plan is a universal limitation of hours of work per week for any individual by common consent, and a universal payment of a wage above a minimum . . . I am asking the employers of the nation to sign this common covenant . . . in the name of patriotism and humanity.
>
> (President Franklin D. Roosevelt, 24 July 1933)

Following the passing of the National Industrial Recovery Act (NIRA) on 16 June 1933, executives from hundreds of industries began the long process of negotiating the contents of their cartel-oriented 'codes of fair competition'. Unhappy with the speed of these negotiations, on 20 July 1933 the Roosevelt administration outlined a new programme termed the 'President's Reemployment Agreement' (PRA). The PRA asked firms to declare 'a truce on selfishness' by quickly signing and abiding by a so-called 'blanket code' agreement to reduce the average workweek and raise hourly wage rates—two major components that, to be approved, would ultimately have to be included alongside more business-friendly, cartel-oriented provisions in all industry-specific codes of fair competition.

The logic behind the PRA's labour provisions was twofold. First, it was thought that higher wage rates would increase aggregate purchasing power, spending, production and, ultimately, employment. The second rationale behind the PRA was that by reducing the workweek from 45–50 hours to around 35 hours, work could be 'spread' or 'shared' among more people—three jobs could effectively be created where there were previously two, even holding constant any other effects of New Deal fiscal, monetary or structural policy. Of course, similar 'work-sharing' plans have been instituted in Europe during the past 30 years—most recently in France, where the Aubry Act of 2000 reduced the legal standard work week from 39 to 35 hours—in hopes of reducing unemployment. The economics literature, both theoretical and empirical, on the employment effects of work-sharing has come to conflicting findings regarding the efficacy of such measures.

The Roosevelt administration claimed that the reemployment programme was a fantastic success, stating in November 1933 that it had put 4 million Americans to work.

A contemporary study by Lyon *et al.* (1972) was sceptical of the magnitude of this claim, but still estimated that 1.75 million jobs were created by late 1933. To more precisely quantify the economic effects of the PRA as a programme separate from the cartel-oriented NIRA, particularly in light of other important changes in fiscal and monetary policy, this paper employs an industry-level monthly panel dataset. Such an empirical approach is necessary since some industries were covered by the PRA provisions for several months, while others were covered only briefly or not at all before passing their industry-specific NIRA code whereby the blanket code was superseded.

While my primary objective is to estimate the effects of the PRA upon reemployment—both through number of jobs and, more broadly, through its impact on aggregate employment hours worked—I also examine how industry payroll, output and prices, among other variables of interest, were affected during the months between the PRA's passage and the implementation of an industry-specific code. I find that the 'share the work' goal of the PRA was achieved, as an additional 2.47 million Americans were able to draw (albeit smaller) paychecks thanks to work-sharing provisions, *ceteris paribus*. I also find that the PRA's wage-increasing provisions had the economic consequence predicted by orthodox economic theory—lower firm output and higher prices, i.e. a negative supply shock—rather than the positive demand effects predicted by the Roosevelt administration. In fact, my empirical analysis suggests that around 45% of the job gains created by the PRA work-sharing aspects were wiped out by hourly wage rate increases. Still, while the PRA has received little attention by economists, the results suggest that the programme put 1.34 million persons to work in around four months.

I. THE NIRA, THE PRA AND THE BLUE EAGLE

As many within the Roosevelt administration believed that the Great Depression resulted from 'ruinous' or 'cut-throat' competition, it appeared logical that collusion could help to promote industrial recovery. To that end, the NIRA suspended anti-trust laws for participating firms and required industries to negotiate and abide by a code of economic conduct which could include restrictions on pricing, output, new capacity, production practices and labour conditions. In particular, the Roosevelt administration noted that collective action with respect to labour policy was necessary to prevent the cycle wage cuts.[1]

Although the administration hoped that industry-specific 'codes of fair competition' would be implemented swiftly, the process of getting an NIRA code passed was cumbersome since the contents of these codes were not left solely to the discretion of industrial executives. To better allow the codes to represent the interests of all affected parties, industry-proposed codes had to be approved by a diverse advisory board composed of a deputy administrator of the National Recovery Administration (NRA)—the NIRA's enabling body—as well as a labour representative, a consumer representative, an industry representative and two representatives from the NRA legal division. Furthermore, the text of the NIRA stated that the codes could not be used to 'promote monopoly', placing the NRA advisory board into a delicate balancing act between firms' desires to fix prices and reduce output and the somewhat nebulous concept of 'fair competition'.

The cotton textile industry code was the first to be approved, on 9 July 1933. Three other industries followed with approved codes in July—coats and suits, shipbuilding, and woollen textiles. The sluggish speed of code passage—only four codes passed in over six weeks of negotiation, while hundreds of other industries continued to haggle—provided the impetus for the PRA 'blanket code'. In contrast to industry-specific

'permanent' codes, some of which were scores of pages long, the PRA blanket code was to be a brief agreement on wage rates and workweeks between a *firm* and the President. With the exception of the four industries noted above, firms within every other industry were to be subject to the PRA 'blanket code' from 1 August 1933, continuing until their industry-specific code was passed. In some cases, such as the iron and steel industry, whose code was approved on 19 August, this meant a few weeks; in other cases, such as the laundry and hat industries, whose codes were not passed until February 1934, or the Zinc ore industry, whose code was not passed until March 1935, this meant many months.

As firms were unlikely to voluntarily sign and abide by an agreement to raise wage rates and reduce workweeks absent some exogenous incentive, the administration announced that firms which signed on to the PRA could display the patriotic Blue Eagle emblem on their products and advertisements, and in store windows.[2] What was to have given this emblem economic significance was President Roosevelt's call for households to engage in a nationwide shopping spree at Blue Eagle firms and to effectively boycott those without the emblem. In a radio address on 24 July 1933, Roosevelt said: 'In war, in gloom of night attack, soldiers wear a bright badge on their shoulders to be sure that comrades do not fire on comrades. On that principle, those who cooperate in this program must know each other at a glance . . . and I ask that all those who join me shall display [the Blue Eagle] prominently' (*New York Times*, 25 July 1933, p. 2). Roosevelt's address appears to have inspired firm owners nationwide as the White House received over 20,000 telegrams and letters over the following 48 hours from businesses large and small pledging to raise wage rates and cut hours in exchange for the right to display the compliance emblem (*New York Times*, 28 July 1933, p. 9).

The PRA 'blanket' agreement that firms were asked to sign consisted of three parts. First, a firm generally had to agree to shorten workweeks to no more than 35 hours (40 hours for clerical and sales workers). Second, the firm had to agree to raise its minimum hourly wage rates, generally to 40 cents an hour, depending on city population. Furthermore, in the spirit of the agreement, wage rates of those workers already above this level were to be increased, or, at the very least, were not to be cut. Finally, the firm had to state that it would recognize the rights of workers to bargain collectively. Mail carriers delivered generic copies of the reemployment agreement to all known firms. Firm owners were asked to sign and pledge immediate adherence to PRA guideposts. Upon receipt of the signed pledge at the post office, the code would be approved by the NRA, generally within 24 hours. Once a firm's 'blanket code' was accepted, its name would be included on the NRA 'Honor Roll' of complying firms at the local post office. In many small towns these Honor Rolls, or new additions to them, were printed in local newspapers.[3] Furthermore, the firm owner could obtain—free of charge—posters, stickers and other Blue Eagle paraphernalia at the post office. Some firms chose to advertise compliance via newspaper advertisements—an example from the 1 August 1933 *New York Times* is shown in Figure 1.

In late August 1933, the NRA began a drive to get consumers to formally pledge their support by signing a 'Statement of Cooperation' reading 'I will cooperate in the reemployment by supporting and patronizing employers and workers who are members of the NRA'. The NRA mobilized 1.5 million volunteers to go door to door canvassing with a goal of obtaining 20 million consumer signatures. The *Chicago Tribune* noted that 'such a mobilization has not been seen since the liberty bond drives in the world war' (29 August, p. 5). Signers of this pledge typically received lapel pins and posters (to be placed in windows) that showed the Blue Eagle accompanied by the phrase 'NRA Consumer'.[4]

FIGURE 1. Stern Brothers advertisement, *New York Times*, 1 August 1933.

While signing the PRA code gave the firm the initial right to display the patriotic emblem, to maintain that right, the firm had to continuously follow through on their signed agreement. A firm that was found by the NRA Compliance Director to be in violation of its agreement would be ordered to 'cease displaying the Blue Eagle and deliver all NRA insignia in his possession to the local postmaster' (US Committee of Industrial Analysis 1937, p. 70). The Blue Eagle, or more specifically, consumers' reaction to the emblem's presence, then, was critically important to the PRA having any meaningful effect on economic outcomes. If firms felt that they had nothing to gain from displaying the Blue Eagle, then they would have been unlikely to have signed on to, much less abided by, the wage and hour requirements of the reemployment agreement, leaving the programme inept.

Once an industry-specific code was in place, firms within that industry legally had to comply with the rules set out within it or face prosecution, with penalties of up to $500 and six months' incarceration, as well as loss of the Blue Eagle emblem. In truth, the Roosevelt administration rarely sought legal recourse in the courts, but instead relied only on the threat of removing the Blue Eagle to attain compliance with the industry-specific codes. Firms did not legally have to sign a PRA agreement, however, so the potential impact that the presence (or absence) of the Blue Eagle was expected to have on a firm's business was the only tool the administration had with respect to compliance with this programme. While the vast majority of firms signed a PRA code, the Ford Motor Company was a notable exception. Biles (1991, p. 92) shows that Ford maintained market share in the domestic automobile market despite not being able to display the

Blue Eagle. Consumers may not have punished Ford because the company was already exceeding the wage and hour guideposts of the PRA and, later, the NIRA automobile code, even though it never signed either.

II. Contemporary Accounts of the PRA

The extent to which firms and consumers actually signed on to PRA pledges is a critically important factor with regard to how much impact the programme could have potentially had. A survey of newspapers, both large and small, between August and November 1933, as well as the results of the NRA's periodic surveys of firms and households, strongly suggests that the vast majority of firms signed on to a PRA agreement. Furthermore, we can be reasonably confident that at least some measure of compliance with the PRA wage and hour restrictions generally followed from signing since employees themselves would presumably have a strong incentive to report cheating to the local NRA compliance board or the media.

To illustrate, during the weeks following the PRA's announcement, the *Chicago Tribune* published nearly daily updates on the number of area firms that turned in a PRA pledge form, and listed the identities of the largest firms to sign each day. On 19 August, it was reported that '3,442 additional concerns in this area sent in pledges to join President Roosevelt's reemployment program, raising the total of employees under the NRA standard to 1,192,829'. On 20 August (p. 2), the *Tribune* noted that '532 more signed on covering 9,384' workers. The paper listed Goss Printing Press with 400 employees, J. Greenbaum Tanning with 1236, and Gordon Baking Company with 450, amongst the area's largest firms which had signed on in the past 24 hours.

The 31 August *Washington Post* (p. 2) provided several examples of specific area firms increasing employment: 'Sanitation Grocery Co., it was announced has increased its pay roll $9,500 a week for Washington and Maryland. The Great Atlantic and Pacific Tea Co. . . . has raised its Nation-wide annual payroll by $8,000,000 and added 8,340 employees.' Other Washington DC area firms were simply listed alongside the number of new workers they had hired since signing on to the reemployment agreement: 'Riggs National Bank, 16; Texas Oil Co., 7 at South Washington plant and 2 men per station at all filling stations; American Oil Co., 14 at Rosslyn plant and 100 at Lord-Baltimore filling stations; Continental Bakeries, 14; Havenner Bakery, 11; Chevy Chase Dairy, 35; Thompson's Dairy, 15; Palace Laundry, 34, Sherwood Brothers filling stations, 192; Cities Service filling stations, 10.' Of course, these numbers are self-reported so there is no way to know the extent of their individual accuracy.

On 28 August 1933, the Roosevelt administration began its first door-to-door 'census' of firms and households to estimate the extent of compliance and the number of jobs that the PRA had created. In the weeks that followed, newspapers around the nation reported the specific results of this survey. For example, on 21 September the *Syracuse Herald* (p. 3) reported that the PRA had created 2700 jobs in Syracuse and 51,808 in upstate New York. Given the 1930 populations (209,326 in Syracuse and around 4.5 million in upstate New York) and an assumption of a 40% labour force participation rate, this represents around 3% of the labour force obtaining employment in just over a month in each locale. In Tulare, California, it was reported that 'through NRA compliance 97 jobless Tulareans have been given regular employment' (*Fresno Bee Republican*, 18 November 1933, p. 8). Again, under an assumption of a 40% labour force participation rate, 97 workers represents approximately 4% of Tulare's labour force given its 1930 population of 6207. Interestingly, the article also noted that an additional 69 Tulareans had gained employment through New

Deal work relief programmes. This suggests that the PRA work-sharing programme may have been more important in many communities than better-known work relief aspects of the New Deal with respect to reemployment.

In Jefferson City, Missouri, the *Post Tribune* of 15 September 1933 (p. 1) noted that 'practically all local employers are operating under the president's re-employment agreement or special codes' and that 75% of the city's households were displaying the emblem in their windows. The *Journal and Star* of 10 September (p. 16) reported that 94% of Lincoln, Nebraska's 2015 employers had signed the PRA. In Fitchburg, Massachusetts, the *Sentinel* of 2 September (p. 1) reported that 1100 firms had signed the PRA, which had lead to the creation of 688 new jobs. The *Bee* of 3 September (p. B-3) reported that 2030 Fresno firms had signed on, creating 1914 jobs. Furthermore, the Fresno County Welfare Board reported a 50% drop in requests for food aid since 1 August and attributed this to PRA job creation. The *Chronicle–Telegram* of 21 September (p. 2) reported that 99.32% of Elyria, Ohio households canvassed had signed onto the consumers' pledge of cooperation—only 68 households refused to sign. While this evidence is clearly anecdotal, it provides micro-level insight into the potential impact of the PRA.

With respect to nationwide aggregate numbers, the NRA periodically released a running score from its reemployment censuses. The first figures on the PRA's effects were announced on 30 August, when the NRA declared that the reemployment programme had created 2 million new jobs in just one month (*Washington Post*, 30 August 1933, p. 9). On 13 September, NRA Administrator Johnson noted that 85% of employers nationwide had signed on to the PRA or were covered by an NRA code (*Middletown Times Herald*, 13 September 1933, p. 11). On 14 October, it was reported in an Associated Press article that the administration had tallied 3 million jobs created by the PRA (*Lansing State Journal*, 14 October 1933, p. 1). Finally, in an Associated Press article of 7 November 1933, Johnson credited the reemployment programme as bringing the nation 'a quarter of the way out' of the depression, saying that it 'had put 4 million men back to work and raised the wages of millions of others'.[5] If these numbers are accurate, it would offer important insight into the current 'work-sharing' policy debate. In the following sections, I employ industry-level panel data to see whether the media-reported anecdotal evidence above and the government 'reemployment census' can be supported empirically.

III. Data and Empirical Issues

Many empirical studies, including Cole and Ohanian (2004), Taylor (2002), Vedder and Gallaway (1997), Bernanke (1986) and Weinstein (1980), have examined the effects of the NIRA on either the labour market specifically, or the macro economy more generally. These studies generally conclude that the legislation's labour and cartelization policies were important factors behind the weak recovery of the 1930s as the cartels reduced output and higher wage rates further exacerbated the unemployment problem. Other scholars, such as Alexander (1994, 1997), Krepps (1997) and Taylor (2007), have employed the NIRA experiment to gain insight into cartel theory.[6] While past studies have generally examined the NIRA labour and cartel policies across the legislation, none has examined the specific effects of the PRA, which likely had a far more dramatic short-run impact on labour outcomes during the late summer and autumn of 1933 via significant increases in wage rates and reductions in work hours.

In terms of priors, the employment effects of a shortening of the workweek from a standard of 45–50 hours to the PRA-suggested 35 are controversial. While there is a

popular belief that unemployment can be reduced via cuts in the workweek—a belief that has driven 'work-sharing' policy initiatives in Germany, France and Belgium, among other European nations in the past three decades—theoretical and empirical studies by economists have found ambiguous results. On the theoretical side, Calmfors and Hoel (1988) and Brunello (1989), for example, generally predict negative employment effects, while FitzRoy et al. (2002), Marimon and Zilibotti (2000) and Rocheteau (2002) predict positive ones. The ambiguity generally stems from work-sharing restrictions making labour less attractive than capital and thus causing firms to substitute these factors. With respect to empirical studies of recent 'work-sharing' programmes, Crepon and Kramarz (2002) find a negative employment effect from France's 1982 workweek reduction. Logeay and Schreiber (2006) conclude that the Aubry Act's (2000) policy mix of shorter workweeks, greater managerial flexibility, and government subsides to social security payments had beneficial employment effects. However, when Schreiber (2006) isolates the effects of shorter workweeks, he concludes that the non-work-sharing reforms drove these employment gains—in fact, shorter workweeks had adverse employment effects. Studies of West Germany's work-sharing reforms by Franz and Konig (1986) and Hunt (1999) have come to opposite conclusions, with the former suggesting positive employment effects and the latter negative ones.[7]

While providing jobs to the unemployed was the primary goal of the PRA, I also wish to examine, more broadly, the impact that the programme had on aggregate hours worked in the economy. The priors regarding this variable differ markedly between the predictions of modern orthodox economic theory and the 'high-wage doctrine' theory prevalent in the 1920s and 1930s. Orthodox theory suggests that the mandated exogenous increases in hourly wage rates under the PRA would, other factors constant, reduce total employment hours by causing a leftward movement along the labour demand curve. The Roosevelt administration, however, repeatedly stated belief that higher wage rates would ultimately increase production and employment by boosting aggregate demand (O'Brien 1989; Taylor and Selgin 1999).

In addition to quantifying the PRA's effect on the total number of jobs and aggregate hours worked, I also examine, more generally, whether the legislation provided a boost to other economic factors of interest, such as output, the aggregate wage bill to labour, average take-home pay and prices. As past research generally demonstrates that the NIRA codes of fair competition brought about the cartel outcome of lower output, it seems unlikely that the *industry codes themselves* could have been anything but counterproductive with respect to the aforementioned policy goals. Still, since industries typically took several months to pass their specific codes of fair competition, an empirical study of the PRA's general economic impact provides insight into an important, but largely neglected, aspect of New Deal history.

The priors on movements of these variables are worthy of brief discussion. With respect to the total wage bill, under modern orthodox theory, it is unclear which way this variable would be expected to move under the PRA since higher hourly wage rates would cause fewer hours of work in aggregate.[8] The 'high-wage doctrine' would, of course, predict an unambiguous rise in the wage bill. With respect to the PRA's impact on prices and output, orthodox neoclassical theory would expect the exogenous rise in firms' labour costs to cause output to fall and prices to rise, consistent with a negative supply shock brought about by higher marginal costs. Still, the high-wage doctrine theorizes that the higher hourly wage rates would boost demand so as to offset any negative supply or employment effects they may cause. Of course, output could also have fallen (and prices have risen) from collusion under the PRA—although firms could not legally

implement cartel strategies until official code passage, simply having the ability to openly discuss collusive strategies could have facilitated cartel outcomes.

To separate the impact of the PRA from the effects of the NIRA as a whole, I create two dummy variables, together comprising the NIRA time period, by employing the date of passage for each industry's specific code. Because the PRA was to take effect on 1 August 1933, the PRA dummy takes on a value of 1 for each month between August 1933 and the month an industry's specific code was passed.[9] If an industry's code was passed later than the fifteenth of the month, that month was counted as a PRA month. The 'industry code' dummy takes on a value of 1 for each month between code passage and May 1935, when the NIRA was ruled unconstitutional under the *Schechter* decision.

Note that these dummy variables account for the time periods in which firms within each industry were supposed to comply with either the PRA or industry-specific codes. However, past studies (e.g. Brand 1988; Alexander 1994, 1997; Taylor 2002; Taylor and Klein 2008) have demonstrated that non-compliance was a major issue under the NIRA, particularly after the first few months. This adds to the importance of examining the empirical effects of the PRA. If the coefficients on the PRA dummy variables are small or insignificant, this would suggest that non-compliance was an issue from the start of the NIRA. On the other hand, if I find statistically different and large movements in economic variables during the months when industries were covered by the PRA, this would suggest that compliance was widely maintained, at least initially. This would be consistent with the 'compliance crisis' literature which suggests that firms complied with the NIRA rules at the outset, but later defected, causing many of the industry cartels to break down.

My sample consists of industries covered by an NIRA 'code of fair competition' whose employment, payroll, work hours, output or prices were reported by month in the *National Bureau of Economic Research Macrohistory Database* for the time period January 1927 to December 1937. The 1927 start point is largely due to a lack of monthly data prior to this time, and the end date is chosen to avoid any movements in the data caused by Second World War production. These data generally came, in roughly equal proportions, from two sources: the National Industrial Conference Board and the Bureau of Labor Statistics. The data cover mainly large industries, so my sample covers a significant percentage of the NIRA-covered workforce. I have an index of employment (number of workers on payrolls) for 28 industries. Because I employ log differences (growth rates) in my empirical analysis, the employment index behaves identically to a measure of raw employment numbers. Fifteen of these industries also report average hours of work per week, allowing me to examine percentage changes in *aggregate employment hours for labour as a whole* within each industry (growth rate in employment index multiplied by average hours per week) rather than simply growth in number of workers on the industry's payroll (jobs). Price data are reported for 38 industries, and output data are reported for 66 industries that were covered by the NIRA.

Table 1 lists the 75 industries in the sample along with the date the 'code of fair competition' that covered each industry was passed and a column describing what data I have for each industry. The median date of industry-specific code passage in the sample was 17 November 1933, meaning that the median firm was covered by the PRA blanket code for around 4 months (the average in the sample was close to 5 months) and by the NIRA specific code for 18 months, although, as Table 1 demonstrates, there was a great deal of variability in code passage dates by industry. Since employment is the primary variable of interest, Table 2 reports the annual growth rates in employment for the 28 industries for which I have this data. (Monthly rates are not reported, in the interests of saving space.) Finally, Figure 2 shows movements in indexes of manufacturing sector output and real wage rates, as well as the money supply across the sampled time period.

IV. Empirical Results

Although I report specifications with subsets of these independent variables and employ alternate dependent variables, the general model that I estimate is

$$\text{GrthEMPLOYMENT}_{it} = \beta_0 + \beta_1 \text{PRA}_{it} + \beta_2 \text{NIRACODE}_{it} + \beta_3 \text{GrthWAGERATE}_{it}$$
$$+ \beta_4 \text{GrthMONEY}_t + \beta_5 \text{GrthGOVSPD}_t + \beta_6 \text{GrthGOVREV}_t$$
$$+ \beta_7 \text{NLRA}_t + \beta_8 \text{TIMETREND}_t + \varepsilon_{it},$$

where

- $\text{GrthEMPLOYMENT}_{it}$ is the growth rate in the number of wage earners employed in industry i at time t
- PRA_{it} is a dummy variable equal to 1 for months during which industry i was covered by the President's Reemployment Agreement blanket code of labour provisions
- NIRACODE_{it} is a dummy variable equal to 1 for months during which industry i was covered by an industry-specific NIRA cartel code of fair competition
- GrthWAGERATE_{it} is the growth rate average real hourly wage rate for industry i in month t[10]
- GrthMONEY_t is the growth rate of the money supply in month t
- GrthGOVSPD_t is the growth rate in real government spending in month t
- GrthGOVREV_t is the growth rate in real government revenues collected in month t
- NLRA_t is a dummy variable equal to 1 for months after April 1937
- TIMETREND_t is a monthly time dummy which rises by one unit per month.

I also employ 11 month dummies (January is the base month) to control for seasonality. Although other specifications and methods (such as period fixed effects, discussed later) are employed, I primarily estimate generalized least squares (GLS) panel regressions using industry fixed effects. In recognition that my control variables may affect each industry differently, I estimate the model using cross-section-specific coefficients for each independent variable that does not vary by industry (e.g. money supply, government spending, month dummies)—this creates a separate coefficient for each industry for these variables. I also employ cross-section weights so as to estimate feasible GLS specifications assuming the presence of cross-section heteroscedasticity. Standard errors are calculated using a White period method which is robust to arbitrary serial correlation and time-varying variances in the disturbances. The major results of the paper do not change if I use an ordinary coefficient covariance method. Finally, I use growth rates in all non-dummy variables both to help control for serial correlation, which is strongly present when these regressions are run in log levels, and to allow the expansion of my data set to include both indexed and raw data.

Specifications (1) and (4) of Table 3 report the results of extremely parsimonious regressions of the NIRA's impact on employment measured both as *number of workers on payroll* (i.e. jobs) in specification (1) and as *aggregate employment hours* worked in the economy in specification (4). These regressions show that the growth in the number of workers on firms' payrolls rose when covered by both the PRA and the NIRA industry-specific cartel codes; however, growth in aggregate employment hours of labour was not significantly different during these months. In terms of magnitude, specification (1) suggests that during the months when firms were covered by the PRA, the number of workers with industrial employment grew 1.65% faster than otherwise. Since, on average, a firm in the 28-industry sample was covered by the PRA for 4.43 months, this translates into a 7.5%

TABLE 1

DATE OF INDUSTRY-SPECIFIC CODE PASSAGE FOR INDUSTRIES IN DATASET, AND THE DATA SERIES FOR EACH INDUSTRY

Industry	Code passage	Data	Industry	Code passage	Data
Alcohol	21 Aug 1934	Q, P	Lumber	19 Aug 1933	Q, P, E
American cheese	2 Feb 1935	Q	Machinery	17 Mar 1934	Q, E, W, H
Asphalt	6 Nov 1933	Q, P	Meat	4 Jan 1934	Q, E, W, H, P
Auto parts	8 Nov 1933	Q, P	Men's clothes	26 Aug 1933	E
Baking	28 May 1934	E	Men's shoes	3 Oct 1933	Q
Beef and veal	4 Jan 1934	Q, P	Mercht. pig iron	19 Aug 1933	Q, P
Bituminous coal	18 Sep 1933	Q, P	Metal	2 Nov 1933	Q, P
Books	17 Feb 1934	Q	Milk, NY	4 Jan 1934	Q
Bricks	26 Mar 1934	Q, P	Newsprint	17 Nov 1933	Q, P
Butter	4 Jan 1934	Q, P	Paper and pulp	17 Nov 1933	Q
Cement	27 Nov 1933	Q, E	Paper production	17 Nov 1933	Q, E, W, H, P
Cheese	2 Feb 1935	Q, P	Passenger cars	26 Aug 1933	Q, E, W, H, P
Chemicals	10 Feb 1934	Q, E, W, H, P	Pig iron	19 Aug 1933	Q, W, H, E
Condensed milk	4 Jan 1934	Q, P	Pork	4 Jan 1934	Q, P
Construction	31 Jan 1934	Q	Raw silk	7 Oct 1933	Q, E, W, H, P
Copper	21 Apr 1934	Q, P	Rayon	26 Aug 1933	Q, E, W, H
Corn grinds	4 Jan 1934	Q, P	Rayon yarn	26 Aug 1933	Q, P
Cotton	9 Jul 1933	Q, P, W	Refined lead	24 May 1934	Q, P
Cotton goods	17 Nov 1933	Q, E	Rice	4 Jan 1934	Q
Crude petroleum, appl.	19 Aug 1933	Q, P	Rubber	15 Dec 1933	Q, E, W, H, P
Crude petroleum, RTS	19 Aug 1933	Q	Slab zinc	26 Mar 1935	Q, P
Douglas fir lumber	19 Aug 1933	Q, P	Small cigarettes	9 Feb 1935	Q, E
Electrical manufacturing	4 Aug 1933	W, H	S. pine lumber	19 Aug 1933	Q, P

Industry	Date	Data
Evaporated milk	4 Jan 1934	Q, P
Fertilizers	31 Oct 1933	Q
Fine paper	17 Nov 1933	Q
Furniture	7 Dec 1933	E, W, H
Glass	3 Oct 1933	Q, E, P
Hardware	2 Nov 1933	E
Hats	5 Feb 1934	E
Ice cream	4 Jan 1934	Q
Knit outerwear	18 Dec 1933	E
Large cigars	19 Jun 1934	Q, E
Laundry	16 Feb 1934	E
Lead ore	24 May 1934	Q, P
Leather	7 Sep 1933	Q, E, W, H, P
Locomotives	16 Feb 1934	Q
Lubricants	19 Aug 1933	Q, P
Steel ingots	19 Aug 1933	Q
Steel sheets	19 Aug 1933	Q, E, W, H, P
Total shoes	3 Oct 1933	Q, P, W, H, E
Trucks	26 Aug 1933	Q
Tyre pne. casings	21 Dec 1933	Q
Tyre tubes	21 Dec 1933	Q
Tyres	21 Dec 1933	Q, W
Wheat flour	4 Jan 1934	Q, P
Women's clothing	31 Oct 1933	E
Women's shoes	3 Oct 1933	Q
Woodwork machinery	14 May 1934	Q, E, W, H
Wool	26 Jul 1933	Q, E, W, H, P
Wrapping paper	17 Nov 1933	Q
Zinc ore	26 Mar 1935	Q

Notes

Median date of code passage is 17 November 1933. The 'Data' column denotes which data series I have for each industry, where Q is output, E is employment and payroll, W is hourly wage rate, H is average workweek, P is prices.

TABLE 2
ANNUAL EMPLOYMENT (NUMBER OF WORKERS ON PAYROLL) GROWTH RATES FOR SAMPLED INDUSTRIES, 1927–1937

Industry	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937
Baking	4.26	9.60	6.76	−8.12	−5.39	−2.15	14.42	5.30	6.09	6.26	−0.14
Cement	−12.24	−0.47	−11.21	−16.97	−23.14	−29.90	14.71	10.76	−1.37	43.85	−2.08
Chemicals	3.43	7.43	−0.84	−12.16	−0.75	−4.22	27.77	3.99	−4.33	9.75	−1.29
Cotton goods	−2.48	−3.32	−7.98	−20.09	−1.92	1.26	28.77	−3.33	−4.77	14.22	−12.40
Furniture	−2.84	3.11	−8.14	−25.20	−13.58	−21.42	17.06	12.21	13.68	26.00	−12.71
Glass	−7.16	6.07	−2.75	−22.08	−11.48	−10.34	56.41	2.84	7.74	2.75	1.34
Hats	5.52	−5.96	−6.44	−13.03	1.32	−19.53	4.26	0.28	6.33	10.45	5.23
Hardware	−6.78	11.07	0.81	−23.48	−16.19	−11.06	35.90	0.64	11.91	1.60	−10.57
Knit outerwear	0.59	0.78	−2.02	−6.69	8.64	−1.65	3.16	0.38	2.19	−16.22	−0.72
Large cigars	5.36	−9.22	−4.78	−9.19	−6.21	−8.78	−0.63	7.89	−5.99	5.44	−3.24
Laundry	4.33	3.67	3.07	−3.97	−4.14	−10.30	1.64	1.38	5.20	12.21	−0.36
Leather	−1.41	−8.37	−0.33	−13.30	−8.63	−0.85	29.02	1.20	3.49	0.84	−19.48
Lumber	−6.47	3.85	−6.56	−29.56	−22.67	−9.15	24.49	9.78	14.10	11.63	−12.75
Machinery	−13.05	18.36	−1.15	−31.75	−30.09	−17.86	43.48	6.14	22.46	16.63	7.99
Meat	−1.85	5.97	−1.88	−8.76	−6.84	−6.52	26.49	2.35	−6.95	12.93	−7.96
Men's clothes	7.76	−3.87	1.31	−14.33	−1.40	−6.56	4.57	10.07	4.43	21.02	−13.61
Paper production	−3.75	3.10	5.14	−15.22	−7.62	−7.77	26.18	4.54	1.06	6.12	−3.00
Passenger cars	5.02	29.44	−30.13	−13.39	0.14	−18.70	41.81	25.73	7.48	6.37	−20.62
Pig iron	−6.55	10.13	−3.42	−21.58	−18.35	−14.87	38.10	10.16	12.94	20.13	−9.73
Raw silk	−1.47	−0.20	0.80	−8.23	−7.24	−4.07	9.71	14.56	−8.41	1.34	−21.41
Rayon	−1.47	−0.20	0.80	−8.23	−7.24	−4.07	9.71	14.56	−8.41	1.34	−21.41
Rubber	2.56	4.99	−13.35	−20.25	−10.45	−3.69	32.21	−2.38	−1.66	15.10	−10.75
Small cigarettes	5.36	−9.22	−4.78	−9.19	−6.21	−8.78	−0.63	7.89	−5.99	5.44	−3.24
Steel sheets	−6.55	10.13	−3.42	−21.58	−18.35	−14.87	38.10	10.16	12.94	20.13	−9.73
Total shoes	−4.29	−0.43	2.36	−14.75	1.10	0.73	5.42	8.47	0.63	8.94	−9.14
Women's clothing	8.04	10.58	3.12	−6.32	−11.81	−2.75	7.27	22.50	9.21	11.77	−13.36
Woodwork machinery	−13.05	18.36	−1.15	−31.75	−30.09	−17.86	43.48	6.14	22.46	16.63	7.99
Wool	−11.58	−1.13	−0.89	−21.85	−14.64	10.79	25.57	2.83	17.50	4.58	−27.09

Notes
Growth rates are calculated from January to January using the monthly dataset described in the text. Monthly growth rates are not reported for each industry, in the interest of saving space.
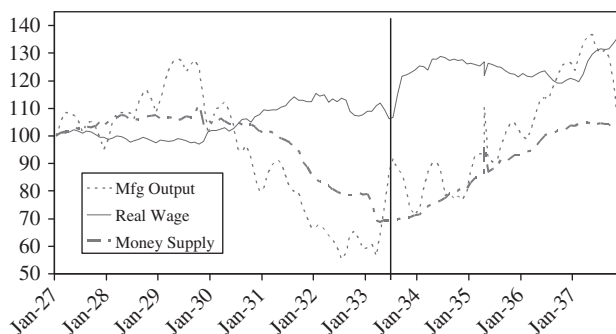
FIGURE 2. Monthly movements in manufacturing output, real wage rates and the money supply.

Notes: Solid line at August 1933 denotes passage of the NIRA. Although my empirical analysis employs industry-level data on real wage rates and output, the data above are aggregate data. Sources are 'US index of production in manufacturing' (NBER Series 01175), 'Money stock, commercial banks plus currency held by public' (NBER Series 14144), 'Average hourly earnings for twenty-five manufacturing industries' (NBER Series 0812) and 'Index of general price level' (NBER Series 04051).

increase in the number of industrial jobs brought about by the PRA. Given that the NIRA covered an estimated 22 million workers at its midpoint, the regression coefficients suggest that 1.65 million more Americans had jobs because of the PRA's labour provisions. This is relatively close to the 1.75 million estimate for job growth in the fall of 1933 provided by Lyon *et al.* in their 1935 appraisal of the NIRA, which was based on a straightforward examination of BLS industry-level data comparing average employment in April–June 1933 to that of September–December 1933. This non-*ceteris-paribus* analysis can be seen visually in Figures 3 and 4, which show a pronounced jump in jobs, but little movement (and initially a decline) in aggregate employment hours after passage of the NIRA.

To go beyond the parsimonious analysis and better estimate the effect that the legislation had on employment, I must control for other important factors that affected movements in employment during this time. For example, the money supply increased by 24.9% between the June 1933 passage of the NIRA and the May 1935 ending of the legislation. Likewise, government spending rose much faster than revenues during these months. To control for changes in fiscal and monetary policy unrelated to the NIRA, or its subprogramme the PRA, I include monthly measures of the money supply, real government spending and real government revenues.[11] I also include a time trend dummy since employment may rise over time due simply to population growth rather than economic conditions, as well as month dummies to control for seasonality, although my results are not generally sensitive to the inclusion of either of these controls. Finally, I include a dummy variable accounting for the months after the Supreme Court upheld the National Labor Relations Act in April 1937, since this legislation also impacted the way my variables interacted during the sample time period, although again, the results are not sensitive to its inclusion.

Specifications (2) and (5) (Table 3) include these six control variables as cross-section-specific coefficients. This estimation method is less restrictive than a common coefficient one as it allows these control variables to interact differently with each industry. I find that during months when firms were covered by the President's Reemployment Agreement, the number of workers with industrial employment grew 1.35% faster than

TABLE 3
INDUSTRY FIXED EFFECTS PANEL ESTIMATION OF THE EFFECTS OF THE PRA ON EMPLOYMENT GROWTH

Dependent variables (log differences)
Sample: January 1927 to December 1937

	Industrial employment (number of workers on payroll)			Aggregate employment hours (number of workers × hours per week)		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	− 0.00178	− 0.00089	− 0.00036	− 0.00362	− 0.00100	− 0.00028
	(− 9.28)**	(− 4.62)**	(− 1.39)	(− 8.61)**	(− 2.16)*	(− 0.65)
PRA dummy (Aug 1933 to code passage)	0.01645	0.01345	0.03302	− 0.00748	− 0.01987	0.00375
	(5.15)**	(4.16)**	(9.63)**	(− 0.66)	(− 2.07)*	(0.47)
NIRA code dummy (code passage to May 1935)	0.00361	− 0.0032	− 0.00436	0.00361	− 0.01565	− 0.01187
	(4.00)*	(− 2.76)**	(− 2.86)**	(1.75)	(− 4.56)**	(− 3.74)**
Log difference industry wage rate			− 0.14994			− 0.69023
			(− 2.51)*			(− 4.79)**
Includes cross-section-specific coefficients on						
Dummies for each month	No	Yes	Yes	No	Yes	Yes
Log diff. money supply	No	Yes	Yes	No	Yes	Yes
Log diff. real government spending	No	Yes	Yes	No	Yes	Yes
Log diff. real government revenue	No	Yes	Yes	No	Yes	Yes
Time trend	No	Yes	Yes	No	Yes	Yes
NLRA dummy	No	Yes	Yes	No	Yes	Yes
Number of cross-sections	28	28	15	15	15	15
Number of observations	3668	3668	1965	1965	1965	1965
R^2	0.395	0.438	0.350	0.234	0.320	0.356

Notes
Cross-section-specific coefficients (variables in italics) and industry intercepts are not reported in the interest of saving space. I report *t*-statistics computed from White period standard errors which are robust to arbitrary serial correlation and time-varying variances in the disturbance.
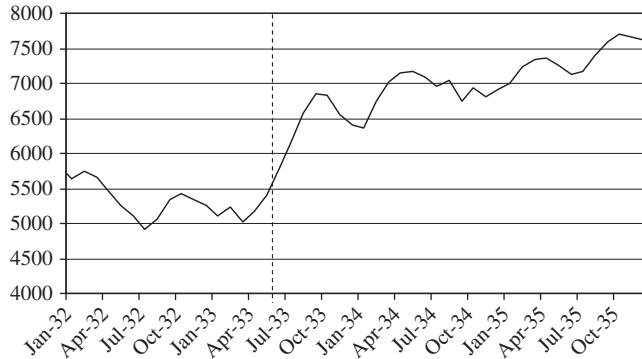*Significant at 5% level; **significant at 1% level.

FIGURE 3. Number of workers on payrolls (thousands), manufacturing, 1932–1935.

Notes: Dashed line coincides with passage of the NIRA. Source is 'Production worker employment, manufacturing total' (NBER Series 8010b).
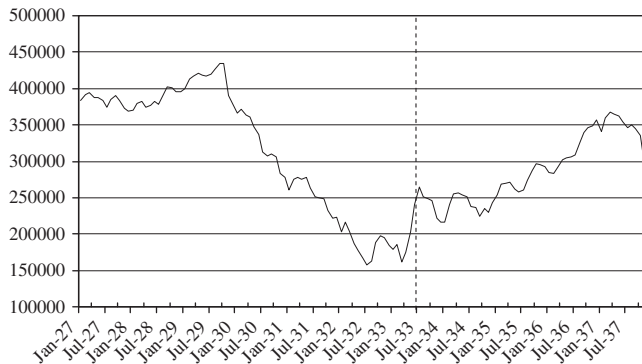

FIGURE 4. Aggregate employment hours (thousands) in manufacturing, 1927–1937 (number of workers × average workweek).

Notes: Dashed line coincides with passage of the NIRA. Series is derived by multiplying 'US average hours of work per week, manufacturing total' (NBER Series 8029a) by 'Production worker employment, manufacturing total' (NBER Series 8010b).

otherwise, *ceteris paribus*, which translates to 1.34 million additional jobs created by the PRA's labour provisions. Interestingly, it is clear that work-sharing (rather than aggregate employment creation) was the sole basis for this increase in the number of workers on payrolls. In terms of growth in aggregate hours worked (specification (5)), PRA months actually saw this measure fall nearly by 2% per month, translating to a 9.1% drop over the 4.43 months when the average industry was covered by the PRA.[12]

Furthermore, once the industry-specific NIRA cartel codes were passed, the employment picture became quite bleak. The coefficient on the NIRA code dummy in specification (2) shows that cartelized firms hired 0.32% fewer workers per month, which translates to a loss of 1.26 million jobs over the 17.5 months when a typical firm was covered by an industry-specific code. Aggregating the total effect of the NIRA from

August 1933 to May 1935, specification (2) suggests a net effect of only around 80,000 jobs created—1,340,000 gained under the PRA and 1,260,000 lost under the industry-specific cartel codes. Specification (5) shows a still bleaker picture with respect to aggregate hours worked once the industry-specific codes were passed, as aggregate employment growth fell by 1.57% per month, *ceteris paribus*. Since the average industry in my 15-industry sample was covered by its specific code for 18.73 months, this translates to a 33.6% drop in aggregate hours worked when firms were covered by NIRA industry-specific codes, *ceteris paribus*. Figure 4 reveals a drop in the raw data on aggregate hours worked, but not of such a large magnitude. My results suggest that the fiscal and monetary stimulus of the period offset much, but not all, of the negative effect that cartelization and high wage rates had on aggregate hours worked.

The finding of a strongly negative aggregate hours worked effect under the industry-specific NIRA cartel codes is consistent with the contemporary conclusions of Lyon *et al.* (1972, p. 844), who pointed out the negative impact that cartelization and higher wage rates likely have on employment: 'It is our view that the NRA has had the effect of restricting production below the levels it would otherwise have attained, hence that it has reduced the total amount of employment as measured by the number of man hours of work done. . . . Merely dividing a smaller amount of work among more workers is neither recovery nor a good substitute for it.' The finding is also broadly consistent with more recent empirical studies of the NIRA's macroeconomic effects such as Weinstein (1980), Vedder and Gallaway (1997), Taylor (2002) and Cole and Ohanian (2004). Finally, the finding of a modestly positive *net* impact of the NIRA on employment—80,000 jobs—is in line with Bernanke (1986, p. 99) who used an eight-industry sample and found that 'the NRA tended to increase employment and reduce hours', although he concludes that the legislation's overall effects on employment were small.

It would be interesting to examine the effects of the PRA's 'work-sharing' provisions *themselves* on employment. As previously mentioned, 15 of the 28 industries for which employment data are reported also report hourly wage rates. If one includes industry hourly wage rate as an independent variable along with the PRA and NIRA code dummy variables in the same regression, the policy dummies take on new meaning—the coefficients can be interpreted as *the effect of the policy independent of its mandated wage rate increases*. In essence this can help to separate out the effects of a pure work-sharing policy via workweek reduction only. In specification (3), I hold wage rates constant and find that the PRA's non-wage share-the-work provisions increased job growth, as measured by the number of workers on payrolls, by 3.3% per month. Since the 15 industries in this sample were covered by the PRA for an average of 3.27 months, this translates to 2.47 million new employment opportunities *attributable to the PRA's work-sharing provisions themselves*, *ceteris paribus*. With 11,086,000 Americans reported as unemployed at the beginning of the PRA, this estimate would have represented an astounding 22.2% drop in unemployment in less than four months.[13]

Combining the information from specification (3) with that from specification (2), which suggested 1.34 million net jobs gained, of the 2.47 million additional jobs attributable to work-sharing, over 1.1 million were effectively offset by the workweek reduction's concurrent requirement that firms pay higher hourly wage rates. Hence the total effect of the PRA (the 1.34 million jobs gained) was to reduce the ranks of unemployed by around 12.1%, *ceteris paribus*. This estimate should be viewed as an upper bound since, from a general equilibrium framework, some of the additional jobs created in NIRA-covered industries may have come at the expense of jobs in non-covered ones such as agriculture. Still, it appears that the PRA was worthy of the massive, and

largely positive, media attention given it in the late summer and early autumn of 1933. In terms of raw National Industrial Conference Board (NICB) unemployment data, the quantity of unemployed workers fell from 11,086,000 in July 1933 to 9,206,000 in October 1933, before rising again beginning in November, when industry-specific NIRA codes were being enacted *en masse*. While some of the nearly 1.9 million person drop in unemployment can be attributed to fiscal and monetary expansion during these months, my results suggest that the majority of employment gains are attributable to the PRA's work-sharing provisions. Still, my regressions suggest that the employment gains could have been much larger had it not been for the concurrent increases in hourly wage rates mandated by the programme.

With regard to aggregate hours worked, all 15 industries for which I have data on employment and hours of work also report wage rate data, so the sample size is not diminished by holding wage rates constant. The results reported in specification (6) suggest that the PRA's non-wage (i.e. workweek reduction) provisions had no significant impact on aggregate hours worked, although the sign of the coefficient switches from negative to positive. This squares with expectations of such a policy—the idea of work-sharing is to spread existing work hours to more people rather than to create new employment. Interestingly, specifications (3) and (6) suggest that the drop in both measures of employment under the industry-specific NIRA codes was caused primarily by cartelization (rather than wage increases), since the employment growth declines are significant even holding wage rates constant, and the coefficient on the NIRA dummy does not decline much (around 24%) between specifications (5) and (6). In summary, the results reported in Table 3 suggest that while PRA work-sharing (i.e. a reduction in hourly workweeks) promoted reemployment by putting more workers on company payrolls, growth in aggregate hours worked actually fell under the PRA and continued to do so when firms became covered by their industry-specific cartel codes.

The finding of a relatively large positive impact on job creation under the PRA's work-sharing provisions may be viewed as evidence that workweek reductions today could help to alleviate unemployment, as has been the goal of more recent policies in Europe. A key difference, however, between the PRA and these programmes is the use of an overtime payment scheme. The PRA essentially placed a hard cap on work hours, while most work-sharing programmes today allow firms to hire workers for hours beyond the cap but require a premium, typically between 25% and 50%, to be paid for overtime hours. In fact, the assumption of overtime provisions is a key factor driving many of the theoretical predictions that work-sharing policies may harm employment. Additionally, it should be noted that my analysis of the PRA is over an extremely short time period. In the long run, the PRA's work-sharing restrictions may, indeed, have caused firms to shift from labour to capital and harmed employment, again as predicted by some models. A final difference to consider is that the PRA work-sharing was implemented to cure a large measure of cyclical unemployment, while recent European programmes primarily target structural unemployment.

Non-employment economic effects of the PRA

While reemployment was clearly the primary goal of the PRA, it may be interesting to briefly examine how the programme affected other economic variables. Table 4 reports the results of regressions examining the effects of both the the PRA and the industry-specific NIRA codes on real industry payroll (the real wage bill to labour), real take-home pay for the average worker, industry output and industry prices. The regressions

TABLE 4

INDUSTRY FIXED EFFECTS PANEL ESTIMATION OF THE EFFECTS OF THE PRA ON FOUR ECONOMIC
VARIABLES

	Dependent variables (log differences) Sample: January 1927 to December 1937			
	Industry real payroll (1)	Take-home pay for average worker (2)	Industry output (3)	Industry prices (4)
Constant	− 0.00171 (− 5.98)**	0.00043 (2.01)*	− 0.03090 (− 3.54)**	− 0.00212 (− 11.53)**
PRA dummy (Aug 1933 to code passage)	0.00908 (4.84)**	− 0.01128 (− 2.32)*	− 0.02359 (− 3.44)**	0.00845 (3.23)**
NIRA code dummy (code passage to May 1935)	− 0.00298 (− 1.40)	− 0.00453 (− 2.97)**	− 0.01392 (− 5.96)**	− 0.00119 (− 0.94)
Includes cross-section-specific coefficients on				
Dummies for each month	Yes	Yes	Yes#	Yes
Log diff. money supply	Yes	Yes	Yes#	Yes
Log diff. real government spending	Yes	Yes	Yes#	Yes
Log diff. real government revenue	Yes	Yes	Yes#	Yes
Time trend	Yes	Yes	Yes#	Yes
NLRA dummy	Yes	Yes	Yes#	Yes
Number of cross-sections	28	16	66	38
Number of observations	3668	2096	8372	4978
R^2	0.523	0.230	0.099	0.179

Notes
See Table 3 notes.
#With 66 cross-sections, I was unable to compute cross-section-specific coefficients for these variables, so I estimated common coefficients in specification (3).
*Significant at 5% level; **significant at 1% level.

duplicate those from specifications (2) and (5) of Table 3, employing the money supply, real government spending, real government revenue, NLRA dummy, month dummies and a time trend as independent variables.

In specification (1), the sample includes 28 industries for which aggregate payroll data are reported. Like the employment data, the payroll measure is an index (1923–1925 = 100); however, since I use monthly growth rates, it makes no difference whether I have indices or raw numbers. Again, I divide these payroll data by a macroeconomic price index to convert to real values. A stated goal of the Roosevelt administration was to increase the 'purchasing power' of labour. I find that the PRA did increase the total real wage bill to labour. Payrolls grew 0.91% per month faster under the PRA, *ceteris paribus*, translating into a 4.1% growth in real income to labour for a typical industry in the sample covered by this programme for 4.4 months, although, again, this varied from industry to industry since some were covered by the PRA for far longer than others.

Specification (2) examines the growth rate of real take-home pay of an average worker by multiplying the industry's average hourly nominal wage rate by the industry's

average workweek for the 16 industries for which data are reported for these two variables—again, I divide this nominal measure by the price level to obtain real take-home pay. I find that real take-home pay fell for the typical worker under both the PRA and the industry-specific codes. Specifically, under the PRA, take-home pay growth fell by 1.1% per month—since industries in this subsample were covered by the PRA for an average of 3.3 months, this translates to a total drop in real take-home pay of 3.8%, *ceteris paribus*. Thus it appears that the increases in hourly wage rates (and prices) under the PRA were not enough to overcome the shortening of the workweeks to 'fatten pay envelopes', or even keep them steady as the Roosevelt administration had suggested was a goal. The work-sharing provisions, then, brought an income burden on those who had a job and kept it throughout, but, as shown in Table 3, created more opportunities for employment.

Specifications (3) and (4) examine the PRA's effect on industry output and prices, respectively. While the Roosevelt administration suggested that higher hourly wage rates would create more aggregate demand, which should increase output and prices, neoclassical economic theory suggests that higher labour costs will cause profit-maximizing firms to reduce output (and employment) and, generally, raise prices, as would be consistent with a negative supply shock. I find evidence supporting neoclassical theory rather than the high-wage doctrine. Under the PRA, output growth was 2.4% per month lower, *ceteris paribus*. Since the average industry in this sample was covered by the PRA for 4.98 months, this translates into a 12.3% drop in industry output across the PRA. Not surprisingly, output growth continued to fall under the industry-specific cartel codes—around 26.5% in total across the 17 months. Additionally, I find that prices rose by 0.8% per month under the PRA. In this case the 38 industries in the sample were covered by the PRA for an average of 3.92 months, so this translates to a 3.4% rise in prices under the programme. I do not, however, find any significant impact on growth of industry prices under the NIRA codes. This suggests that the majority of the price increases brought about by the NIRA, as documented by Romer (1999) and Weinstein (1980), occurred when firms were covered by the PRA blanket code rather than by the NIRA cartel codes themselves.

I also ran a two-stage least squares specification because of the potential endogeneity of prices and output. The results of specifications (3) and (4) are unchanged, except that the magnitude of the output decline under the PRA rises, and there is now a statistically significant increase in prices under the industry-specific NIRA codes. As another check, I ran specification (3) with lagged industry prices and specification (4) with lagged industry output. Here the results were largely unchanged from those reported in Table 4.

V. ROBUSTNESS CHECKS

Potential impact analysis

Manufacturing sector level data clearly show that a pronounced increase in the average hourly wage rate and a drop in the average hourly workweek accompanied the PRA in August 1933. Specifically, between July and September 1933, the average hourly wage rate rose from 45.6 cents to 53.6 cents, while the average hourly workweek fell from 42.9 hours to 36.3 hours.[14] Of course, the correlation could be spurious if factors other than the PRA are driving these movements. If such variables are omitted from the regressions, the PRA and CODE dummy variables may be picking up effects not related to the legislation. Given the plethora of policy changes and exogenous events during the New

TABLE 5

AVERAGE HOURLY EARNINGS (CENTS PER HOUR) AND WORKWEEKS IN MAY 1933 AND MAY 1934
IN 18 (AND 16) INDUSTRIES

Industry	Hourly earnings May 1933	Hourly earnings May 1934	Workweek May 1933	Workweek May 1934
Chemicals	45.7	56.3	40.1	38.4
Cotton	29.7	44.4		
Electrical manufacturing	53.5	65.5	35.5	34.6
Furniture	37.9	53	33.2	32.9
Leather	40.6	55.2	45	37.3
Machinery	54.5	62.2	31.8	37.9
Meat	39.5	52.4	49.3	40.2
Paper production	41.5	50.4	41.2	37.7
Passenger cars	56.7	72.4	33.4	31.9
Pig iron	47.7	64.6	35.4	36.6
Raw silk	33.4	49.9	40.9	29
Rayon	33.4	49.9	40.9	29
Rubber	55.8	75.3	34.7	33.1
Steel sheets	47.7	64.6	35.4	36.6
Total shoes	40.3	56.6	40.5	37.4
Tyres	55.8	75.3		
Woodwork machinery	54.5	62.2	31.8	37.9
Wool	34.3	51.9	41.6	32.8

Deal, empirical studies of the time period are particularly susceptible to such a bias. In this section I offer a 'potential impact analysis' as is common in the policy evaluation literature, to support to the notion that the PRA affected firm behaviour with respect to wage rates and hours, and in doing so ultimately affected employment and the other dependent variables that I employ in Tables 3 and 4.

Since the PRA set specific guideposts for wage rates (40 cents) and workweeks (35 hours), I can analyse the extent that each industry differed from these guideposts *prior to* the policy change to gauge the potential impact that the legislation would have had on each industry. For example, the PRA's minimum wage guidepost would potentially have a large impact on the silk industry, whose May 1933 average hourly wage rate was 33.4 cents, but would have a much smaller potential impact on the automobile industry, since its average wage rate of 56.7 cents was well above the guidepost. Likewise, the workweek guidepost would potentially have a high impact on the meat industry, whose average workweek was nearly 50 hours, but would have a low potential impact on the electrical manufacturing industry, whose average workweek in May 1933 was 35.5 hours. Table 5 reports the average hourly earnings and workweeks for the industries in my dataset for May 1933 and May 1934. I chose May 1933 since the NIRA was passed in June—this helps to better measure the impact of the PRA and the industry codes by examining their values before any policy effects could have been experienced—and compare this to May 1934 to minimize seasonal factors. A cursory examination of this table shows that hourly earnings rose in every industry, and workweeks fell in most industries.

The key question is whether the lowest-wage industries saw the largest gain, and whether the highest-workweek industries saw the largest drops. To examine this

empirically, I create a series of industry-level dummy variable representing high, medium and low wage rates and workweeks. Specifically, for the variable High Wage Industry, I assign an industry a 1 if the reported wage rate was above 50 cents per hour in May 1933, and 0 otherwise. The Medium Wage Industry dummy variable likewise denotes industries whose wage rates were between 35 and 50 cents per hour in May 1933. The base group consists of Low Wage Industries—i.e. those with hourly wage rates below 35 cents an hour in May 1933. With respect to workweeks, the dummy High Hour Industry takes on a value of 1 for those industries where workweeks were greater than 45 hours in May 1933. The Medium Hour Industry likewise represents those industries whose workweeks were between 38 and 45 hours. The workweek base group is Low Hour Industries, which are industries with lower than a 38-hour workweek in May 1933.

I duplicate the analysis in Table 3, but employ hourly wage rates and hours of workweek as the dependent variables. I add four interaction dummies which multiply the PRA and NIRA code dummies by the High and Medium impact dummies described above. (High and Medium Wage Industry dummies are employed in specification (1), while High and Medium Hour Industry dummies are employed in specification (2).) If the legislation itself drove changes in these variables, the coefficients on the interactions should be significant. Specifically, one would expect to find that High and Medium Wage industries would see *less of an increase* in wage rates caused by the PRA's 40 cents per hour guidepost than would the Low Wage industries (a negative coefficient on these terms). Furthermore, one would expect to find that the High and Medium Hour industries would have seen *a larger drop* in hourly workweek than would Low Hour industries (again a negative coefficient on the interaction terms). If, on the contrary, the rise in wage rates and cuts in workweeks documented above were caused by, say, a broad change in aggregate demand via increases in consumer confidence or some other measure that would have generally affected industries equally (or randomly), then the coefficient on the interaction dummies should be insignificant.

The results reported in Table 6 offer strong empirical support that the PRA and NIRA affected firm behaviour with respect to wage rates and workweeks. The results reported in specification (1) suggest that while wage rates grew by 18.1% per month under the PRA, *ceteris paribus*, wage rates grew 16.1% *less quickly* in High Wage industries than in Low Wage ones. Furthermore, wage rates grew 13% less quickly in Medium Wage industries than in Low Wage ones. Finally, wage rates grew 3.1% faster (16.1–13) in Medium Wage industries than in High Wage ones. With respect to movements in hours of work per week, specification (2) suggests that while workweeks fell by 1.96% per month under the PRA, High Hour industries saw workweeks fall 4.5% faster than the Low Hour base group industries. Furthermore, Medium Hour industries saw workweeks fall 3.6% faster than Low Hour ones. Finally, High Hour industries saw workweeks fall 0.9% faster (4.5–3.6) than Medium Hour ones. These results offer empirical support to the notion that the PRA itself drove the pronounced movements in wage rates and workweeks that coincided with the legislation. Those industries where the wage and hour provisions had the most potential impact were those that saw the largest increases in wage rates and the largest reduction in workweeks under the PRA and NIRA codes.

Robustness to other specifications

The results of this study are robust to a variety of alternative specifications and methods. For example, an alternative approach to controlling for macroeconomic factors would be

TABLE 6
INDUSTRY FIXED EFFECTS PANEL ESTIMATION PRA POTENTIAL IMPACT ANALYSIS FOR WAGE
RATES AND HOURS OF WORK

	Dependent variables (log differences) Sample: January 1927 to December 1937	
	Hourly wage rates (1)	Hours of workweek (2)
Constant	− 0.00063 (− 3.64)**	− 0.00640 (− 1.69)
PRA dummy (Aug. 1933 to code passage)	0.1806 (6.69)**	− 0.01967 (− 95.70)**
NIRA code dummy (code passage to May 1935)	0.01493 (12.04)**	− 0.00981 (− 10.28)**
Interaction PRA impact dummy (PRA dummy × high wage/hour industry)	− 0.16069 (− 5.91)**	− 0.04463 (− 2.31)*
Interaction PRA impact dummy (PRA dummy × medium wage/hour industry)	− 0.12967 (− 4.43)**	− 0.03604 (− 2.78)**
Interaction NIRA impact dummy (code dummy × high wage/hour industry)	− 0.00920 (− 4.45)**	− 0.00001 (− 0.01)
Interaction NIRA impact dummy (code dummy × medium wage/hour industry)	− 0.00922 (− 6.20)**	− 0.00007 (− 0.21)
Includes cross-section-specific coefficients on dummies for each month	Yes	Yes
Log diff. money supply	Yes	Yes
Log diff. real government spending	Yes	Yes
Log diff. real government revenue	Yes	Yes
Time trend	Yes	Yes
NLRA dummy	Yes	Yes
Cross-sections	18	16
Number of observations	2358	2096
R^2	0.302	0.271

Notes
See Table 3 notes.
*Significant at 5% level; **significant at 1% level.

to employ period fixed or random effects. A potential shortcoming arises, however, in that the PRA dummy activates for every industry at the same time, August 1933. This prevents me from employing period fixed effects along with the PRA and industry-specific code dummies. I am able to employ cross-section fixed effects and period random effects specifications, although the *F*-statistics suggest that the results should be interpreted with caution. These specifications suggest that the PRA created 1.52 million new jobs, versus 1.34 million in specification (2) of Table 3. When real wage rates are held constant, I find that the PRA's non-wage provisions created 2.46 million new jobs, versus the 2.47 million found in specification (3) of Table 3. With respect to the aggregate hours worked, an important difference between these results and those in Table 3 is that the

PRA dummy is positive and significant when wage rates are held constant. Specifically, total hours worked in the manufacturing sector rose 2.9% per month faster during PRA months, which translates to a 9.8% rise in employment hours over the course of the legislation. In the regressions using macroeconomic and monthly control variables, the coefficient was positive but insignificant.

As another robustness check, I created a pre-NIRA dummy variable for the months of June and July 1933 to control for the surge in output that followed just before and immediately after the NIRA was passed, but before the 1 August implementation of the PRA and the subsequent passage of industry-specific codes. I include this dummy in all the regressions from Tables 3, 4 and 6. None of the major results change, and the magnitude of the coefficients are basically unaltered. In fact, I do find that output and employment rose significantly during June and July 1933, which is why I thought such a control variable may be warranted. One possible explanation for this is that firms expanded output in a race for more market share in anticipation of production quotas or other production-oriented restrictions being included in their industry-specific codes. Another possibility is that a wave of consumer confidence caused the surge.

I also experimented with log levels of employment (with a lagged dependent variable) rather than log differences. While these specifications suffer from a serial correlation problem, they confirm the major results. In addition, I tried lagging the fiscal and monetary policy variables under the assumption that such a stimulus may have a delayed effect. Again, the results are largely unchanged. Finally, I tried variations upon the macroeconomic control variables, replacing or supplementing the growth rate of the money supply and government budget variables with the growth rate of an index of business activity, an index of durable output, interest rates and various price indices. Again, the major results are robust to all these variations.

VI. CONCLUSIONS

Recent popular press studies by Powell (2003) and Shlaes (2007) embody a recent trend of reexamining the New Deal in a less than flattering light. Roosevelt's call to 'bold, persistent experimentation' clearly resulted in some successful policies as well as some failures—studies that focus on only one of these two aspects can easily paint Roosevelt as either a saviour of capitalism or a leader who stood in way of economic recovery. Consistent with the New Deal as a whole, the President's Reemployment Agreement—a subprogramme of the National Industrial Recovery Act—contained both an economic policy that brought employment relief and one that worked against this goal.

The PRA's 'work-sharing' mandate, accomplished by slashing workweeks, appears by any measure to have been strongly successful with respect to the goal of short-term reemployment. I estimate that, *ceteris paribus*, this policy added 2.47 million workers to private sector payrolls, which would represent a nearly 22% decline in economy-wide unemployment in just a few months. Unfortunately, the PRA's concurrent wage rate increasing mandate offset over 1.1 million of these potential new jobs. Still, in offering an answer to the question embedded in the title of this paper, I conclude that the PRA promoted reemployment in the late summer and early autumn of 1933 when the nation sorely needed it. When I look more broadly at the NIRA as a whole, once industries passed their specific 'codes of fair competition', I find that cartelization had a strongly negative effect on both the number of jobs and the aggregate quantity of hours worked. My analysis of output and prices under the NIRA codes suggests that cartelization

brought about a negative supply shock, as would be predicted by microeconomic theory. This is consistent with recent studies such as Cole and Ohanian (2004), which conclude that the legislation as a whole (PRA included) reduced output and retarded recovery. On net, my analysis suggests that 80,000 jobs were created by the PRA/NIRA between August 1933 and May 1935, but the legislation brought a large drop in aggregate hours worked sector-wide.

Although caution should be observed when applying the experiences of certain countries or time periods to others, perhaps the main lesson that the New Deal work-sharing experiment can provide to the modern policy debate is as follows. Work-sharing, through mandated shorter workweeks, can be an effective short-run tool in combating major episodes of cyclical unemployment. However, while work-sharing may enhance employment opportunities, the political compromises that may be required to enact these provisions may impose significant costs from a macroeconomic perspective.

NOTES

1. In a radio address on 24 July 1933, Roosevelt stated: 'If all employers in each competitive group agree to pay their workers the same wages—reasonable wages—and require the same hours—reasonable hours, then higher wages and shorter hours will hurt no employer. Moreover [it] makes more buyers for his product' (*New York Times*, 25 July 1933, p. 2).
2. In the recent French 'work-sharing' Aubry Act, firms were given an incentive to comply with the 35-hour week via reductions in social security contributions for firms that effectively reduced the workweek and guaranteed a certain level of employment. See Logeay and Schreiber (2006) for more institutional details on French work-sharing.
3. For example, the *Midland Republican* (Michigan) printed the names of all 88 businesses in Midland who were on the Honor Roll on 17 August 1933. As a newspaper serving a much larger metro area, the *Lansing State Journal*, for example, generally published firms 'coming under the provisions of the NRA' from noon the previous day to noon the day of publication during August 1933. Newspapers from the largest metro areas, such as the *Chicago Tribune* and *Washington Post*, generally printed aggregate numbers in terms of the number firms signing on the previous day as well as the names of the largest concerns to do so.
4. Taylor and Klein (2008) employ a game-theoretic model of the NIRA cartel compliance mechanism and present empirical evidence that firms' beliefs in the importance of the Blue Eagle compliance emblem affected economic decisions. They offer evidence that waning enthusiasm for the emblem in the spring of 1934 help lead to cartel breakdown.
5. This was quoted in the *Helena Independent*, 7 November 1933, p. 2. The 4 million job number was also cited in NRA Release no. 1874, p. 5. It is unclear, but this estimate by the Roosevelt administration may also include employment provided by the Public Works Administration which was set up under the NIRA. The analysis here focuses on the NIRA's labour provisions and hence treats such government expenditures as exogenous from the PRA and the NIRA.
6. Alexander (1994) concludes that relaxation of anti-trust law under the NIRA acted as an important coordination device which helped industries to sustain collusion after the legislation expired. Krepps (1997), however, finds that when the sample is expanded to include industries not covered by the NIRA to be used as a comparison group, the NIRA codes did not facilitate collusive outcomes after the NIRA time period. Alexander (1997) also explores the role that cost and product heterogeneity played in facilitating collusion under the NIRA. Taylor (2007) examines how specific attributes of the NIRA codes, such as the presence of production quotas, data filing requirements and restrictions on productive capacity, affected the ability of industries to attain collusive outcomes under the legislation.
7. Work-sharing programmes have also been contentious in the political arena. In May 2007 Nicolas Sarkozy said that it was a 'stupid idea to believe that it is by working less that we will create more wealth and more jobs'. As President of France, Sarkozy drafted a May 2008 bill that would scrap the 35-hour limit (*Wall Street Journal*, 30 May 2008, p. A9).
8. Bernanke (1986) creates a model that could help to explain how hourly wage rates rose while workweeks fell during the Great Depression, apart from any exogenous effects that New Deal

legislation may have had. Of course, to the extent that firms complied with the PRA provisions, rising wage rates and falling workweeks were largely exogenous during these months.

9. Technically, the contracts signed under the PRA expired on 31 December 1933. Rather than duplicating the administrative burden of having all firms not under a 'permanent' industry code sign and get approval of another blanket agreement, Roosevelt announced by Executive Order that 'Display of the Blue Eagle on or after January 1, 1934 . . . shall be deemed an acceptance' of the terms of the firm's previous blanket agreement (*Washington Post*, 21 December 1933, p. 1).

10. All real variables are computed by dividing nominal variables by the 'Index of the general price level' (NBER series 04051).

11. Technically, Title II of the NIRA authorized $3.3 billion of government spending for the financing of public works, so more specifically, regressions that include government spending as a control variable are estimating the NIRA's and PRA's non-Title-II impacts. The private sector employment impact of such relief spending has been analysed by Neumann *et al.* (2009). The authors employ a panel VAR method and find that an increase in work relief spending led to a decline in private employment consistent with the complaints of contemporary employers who claimed that work relief competed with the private sector.

12. The finding that aggregate employment under the PRA fell while the number of jobs rose is interesting in light of Bernanke and Powell (1987). These authors find that during the interwar period, variations in the workweek account for around half of the variation in aggregate employment hours. Downturns often caused reductions in workweeks rather than massive layoffs. However, in the postwar era the relatively steady workweek meant that changes in aggregate employment hours in the face of a demand shock were largely accomplished through layoffs or increased hires.

13. Unemployment data are from the series 'Unemployment', 1929–1944, by the National Industrial Conference Board (NBER Series 08084). Unemployment was measured as the difference between the number of people in the labour force and the number of people working.

14. Wage data are from 'US average hourly earnings, twenty-five manufacturing industries, National Industrial Conference Board' (NBER Series 8142). Workweek data are from 'US average hours of work per week, manufacturing industries, total wage earners, National Industrial Conference Board' (NBER Series 8029a).

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