THE EFFECT OF POLICY REGIME CHANGE WITHIN THE NEW DEAL ON INDUSTRIAL OUTPUT AND LABOR MARKETS

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Abstract

Markets during the New Deal operated under a number of different institutional regimes, which were marked by executive orders, the passage of various pieces of legislation, and Supreme Court rulings on their constitutionality. Specifically, we break the New Deal period into the following six policy regimes: the Hundred Days, the President's Reemployment Agreement, the National Recovery Administration Codes of Fair Competition, the *Schechter* era, the National Labor Relations Act, and the Fair Labor Standards Act. Under these various regimes industrial markets were subject to different regulations relating to hourly wage rates, hours of work, production, and unionization. Using a VAR framework this paper uses panel data from 11 industries to examine the performance of employment, weekly hours worked, real wage rates, prices, and output during each regime. We use the residuals from these regressions to examine when "unexpected" shocks occur. We find that the timing of these shocks are associated with regime changes, suggesting that the uneven pace of recovery during the 1930s can, at least in part, be explained by important policy and legal changes within the New Deal.

Key Words: New Deal, National Industrial Recovery Act, Labor Policy, Wage Rates, Unemployment, Great Depression.

JEL Classification: N32, N42, J38.

Introduction

Recent research has focused on the question of why the Great Depression of the 1930s lasted so long, and, in particular, whether New Deal economic policies sped up or slowed down the nation's recovery. The sharp divergence of conclusions in answer to this question is startling. To illustrate, consider two of the most influential papers on this topic from the past decade: Cole and Ohanian (2004) and Eggertsson (2008). Cole and Ohanian open by noting that "recovery from the Great Depression was weak" (p. 779). Eggertsson, however, notes in his introduction that "1933-1937 registered the strongest output growth (39 percent) of any four-year period in US history outside of wartime" (p. 1477). Of course one's view of whether economic performance during under the New Deal was weak or strong is subjective. Output did grow rapidly during the New Deal, but it also remained well below its potential level until the Second World War. Cole and Ohanian attribute what they view as a weak recovery to President Roosevelt's cartelization and high-wage policies. Eggertsson attributes what he views as a strong recovery during the 1930s to Roosevelt's policy actions, which entailed the elimination of key policy dogmas that constrained the Hoover Administration. While both Cole and Ohanian and Eggertsson employ dynamic general equilibrium models to address the broad question of whether the New Deal promoted or hindered economic recovery, the conclusions that they reach could not be more starkly different. On one side, Roosevelt's policies promoted recovery and on the other side, they stood in its way.

The purpose of the discussion above is not meant to discount the contributions of these two works as they both provide valuable insight into what policies worked and what policies did not work during the Great Depression era. The juxtaposition of these papers does illustrate, however, that those on the two sides of the debate on the New Deal's effectiveness seem to be talking past each other. Our purpose here is to provide a different perspective—one which acknowledges that the question of whether the New Deal promoted economic recovery is far too broad to have a one word answer. Some aspects of the New Deal certainly promoted recovery while other aspects certainly hindered it.

In this paper, we model the New Deal not as one policy, but rather, as a set of several different policy regimes. To illustrate, consider the institutional changes the

economy experienced between March 1933 and November 1938: A national bank holiday and elimination of the Gold Standard, the first ever federal imposition of minimum wage and maximum hour provisions (first at the firm level and then at a negotiated industry level), a requirement that firms recognize employees' rights to collective bargaining, cartelization, the repeal of wage and hours requirements and repeal of the requirement to recognize union rights, a return to relatively laissez-faire labor and product markets, the re-imposition of employees' rights to collective bargaining, and finally the imposition of economy-wide minimum wage and maximum hour provisions.

Of course the pace of economic recovery was also very uneven between 1933 and 1939. According to Vedder and Gallaway's (1993, p. 77) monthly estimates of the unemployment rate during the time period, unemployment fell 5 percentage points between Roosevelt's inauguration in March 1933 and July 1933 and then stayed relatively steady between July 1933 and May 1935, falling from 23.3 percent to 20.1 percent. In 1936 and early 1937, unemployment experienced a fairly precipitous drop reaching 12.3 percent in May 1937. By May 1938, however, unemployment was back up above 20 percent and remained in the 17 to 20 percent range until outbreak of war in Europe. The swings documented above suggest that the broad question of whether Roosevelt's New Deal helped or hindered recovery misses the mark. The better question is can changes in New Deal policies, and key Supreme Court rulings on the constitutionality of those policies, explain the uneven pace of recovery between 1933 and World War II?

To address this question, we employ an industry-level panel VAR to estimate the endogenous relationships between employment, weekly hours worked, wage rates, prices, and output. We then use the residuals from these regressions to examine when "unexpected" shocks occurred in relation to the implementation of different policy regimes. The exercise strongly suggests that key policy and legal changes were associated with large and statistically significant movements in key variables. Our findings suggest that policy regime changes can help explain the uneven pace of economic recovery during the 1930s, holding constant changes in fiscal and monetary policy. Some of Roosevelt's policies worked well, while others did not.

Historical Background and Literature Review on Various Regimes

We break the New Deal period into the following six regimes, each of which will be outlined in greater detail in this section:

1) *The Hundred Days.* Begins in March 1933 and continues until July 1933.[1]
2) *President's Reemployment Agreement*. Begins in August 1933 and continues until an industry's "code of fair competition" was passed.
3) *National Recovery Administration Codes.* Begins with the month the industry passed its NRA code and continues until May 1935, when the Supreme Court ruled the legislation unconstitutional in *Schechter Poultry Corp. v United States.*
4) *Schechter Era.* Begins in June 1935 and continues through March 1937.
5) *National Labor Relations Act.* Begins in April 1937 with the Supreme Court's surprise ruling that the National Labor Relations Act was constitutional and continues until October 1938.
6) *Fair Labor Standards Act.* Begins November 1938 and continues until the end of our sample (December 1940).

Regime 1: The Hundred Days

During his March 4, 1933 inauguration speech, President Roosevelt asked Congress to grant him "broad Executive power to wage a war against the emergency, as great as the power that would be given to me if we were in fact invaded by a foreign foe." [2] During "The Hundred Days," as the press would later call Roosevelt's frenetic first months in office, the President helped steer 15 major laws through Congress and created an "alphabet soup" of new government agencies known largely by their acronyms. In recent years, several books in the popular press have focused on the Hundred Days that Cohen (2009) contends "created modern America" (in addition to Cohen, see Alter, 2006 and Badger, 2008).

During his first two weeks in office, Roosevelt focused heavily on reforming the financial system as all 48 states had declared bank holidays or had imposed some type of

[1] We recognize this period—March 4 until July 31 actually consists of 149 days, but the term "100 days" has taken on a special significance historically.
[2] Text of Roosevelt's inauguration speech is from http://www.bartleby.com/124/pres49.html, accessed September 6, 2011.

restriction on payments.[3] On March 5, Roosevelt declared an immediate national bank holiday and on March 9 the Emergency Banking Act (EBA) was signed into law. Three days later, Roosevelt delivered the first of his "fireside chats" to an estimated 60 million radio listeners in which he explained the banking reforms. The President announced that, after a meticulous examination by government regulators, banks deemed fit would begin to open again. By March 15, the survey of national and state member banks was complete and around half of the banks, which held 90 percent of all bank assets, were reopened while the rest were either designated for conservatorship or permanently closed. Dighe (2011) provides details of the government's review of roughly 7,000 banks in five days. The process was understandably haphazard, but the results were extraordinary as confidence returned and the banking panic was over. By the end of March, Dighe (p. 52) notes that over $1.2 billion in currency, more than half of it in gold, had returned to the banking system.

On April 5, Roosevelt issued an executive order requiring individuals to surrender their gold to the Federal Reserve and on April 19 the government prohibited gold shipments abroad.[4] This began a process of dollar devaluation that culminated in February 1934 with a formal dollar-gold exchange rate of $35 per ounce versus $20.67 before the devaluation. Wigmore (1987) concludes that these actions, more so than deposit insurance or the systematic review of banks during the holiday, broke the panic and put the financial system on sound footing. With the banking crisis largely over, Roosevelt turned toward relief for the unemployed with the passage of the Civilian Conservation Corps (CCC) on March 31 and the Federal Relief Emergency Act (FERA) on May 12. To help raise prices for farmers, the Agricultural Adjustment Act (AAA) was signed into law on May 12. The AAA created a cartel-like allotment system for farmers and paid subsidies for cutting back production (see Alexander and Libecap, 2000). The Tennessee Valley Authority (TVA), which was to bring economic development to the Tennessee River valley through flood control, electricity generation, and fertilizer production, among other things, was signed into law on May 18. On May 27 the Federal Securities Act (which would later be augmented by the Securities

[3] Moley (1966), p. 139.
[4] Hamby (2004, p. 127).

Exchange Act of 1934) created new regulations for stock and bond markets. On June 13, the Home Owners Refinancing Act created the Home Owners Loan Corporation (HOLC), which was charged with helping individuals in need of refinance existing mortgages or attain new home loans. On June 16, exactly 100 days after the inauguration, the Glass-Steagall Act created the Federal Deposit Insurance Corporation (FDIC) to guarantee bank deposits for middle class Americans. The Act also created a wedge between commercial and investment banking and strengthened the Federal Reserve's influence over interest rates. Also on June 16, the National Industrial Recovery Act (NIRA) was passed. In addition to the wage and cartelization aspects of the legislation, which are discussed in more detail below, the NIRA created the Public Works Administration (PWA) and provided $3.3 billion to be spent on public works projects throughout the US. After these frenetic 100 days of legislative action, Congress adjourned with much of the New Deal's policy infrastructure in place.

Regime 2: The President's Reemployment Agreement

The NIRA was designed to have industry leaders meet and agree upon industry-level "codes of fair competition." These codes had to contain increases in hourly wage rates and reductions in hourly workweeks (in hopes of sharing or spreading the work). In addition, the codes had to include a statement declaring that firms within the industry would recognize the right of labor to bargain collectively. Of course these codes could also contain cartel-oriented provisions affecting production, pricing, information-sharing, and other business practices. The NIRA was, in essence a *quid pro quo* whereby businesses agreed to make major concessions to labor and in return were given the right to collude.

The process of getting these codes approved, first at the industry level and then at the government level, was far from instantaneous. Within six weeks of the NIRA's passage only four industries—cotton textiles, coats and suits, shipbuilding, and woolen textiles—had approved codes. To more quickly get the labor provisions of the NIRA in place, the Roosevelt Administration announced the President's Reemployment Agreement (PRA), which was to be a simple agreement on wage rates, workweeks, and collective bargaining between a firm and the President rather than a code applying to an entire industry. The so-called PRA "blanket"

agreement had three main facets. 1) Workweeks would be shortened to no more than 35 hours (40 hours for clerical and sales workers). 2) The firm agreed to raise its hourly wages rates, generally to a minimum of 40 cents an hour (wage rates of those workers above 40 cents were to be increased, or, at the very least, not cut to finance the increases to some).[5] 3) The firm had to recognize employee's rights of collective bargaining.

During the final week of July 1933, generic copies of the reemployment agreement were delivered to firms who were then asked to return the signed pledge and to implement the new labor policy beginning on August 1, 1933. In exchange for abiding by the PRA, firms were allowed to display the Blue Eagle emblem in their places of business or, where applicable, on their packaging. As President Roosevelt encouraged citizens to only buy from firms displaying the emblem—i.e. those in compliance with his economic plan—firms had reason to believe that the Blue Eagle was economically important.[6] Taylor (2011) shows, both anecdotally and empirically, that compliance with PRA labor policy was high and that wage rates and work hours were significantly affected by the PRA. He finds that, *ceteris paribus*, the work-sharing aspects of the PRA increased the number of workers employed by 2.5 million in just four months, but that the mandated increase in hourly wage rates offset around half of these gains.

Once an industry code of fair competition was passed by the industry and approved by the National Recovery Administration, the PRA was superseded by the specific wage and hour agreements contained within the industry code. Some industries passed their codes shortly after the PRA's implementation, and hence were not subject to this regime for long. For example, the Iron and Steel code as passed on August 19, 1933. Other industries, such as Machine and Machine Tools, whose code of fair competition was not passed until March 17, 1934, were subject to the PRA regime far longer. Of course, the PRA was a subprogram of the NIRA so, for the most part, the existing literature treats the Act more broadly as one regime—i.e. the labor provisions of the PRA and the cartel provisions embedded in the industry-specific codes of fair competition. We feel, however, that there is significant value added, both in terms of exposition and empirics, in separating these into two distinct policy regimes.

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[5] The logic behind wage increases under the PRA and NIRA was that higher wages would boost purchasing power and aggregate demand. See O'Brien (1989) and Taylor and Selgin (1999).

[6] Taylor and Klein (2008) employ the Blue Eagle's prominence in newspaper advertisements as a proxy for its economic importance and suggest that the emblem did alter economic behavior.

Regime 3: National Recovery Administration Codes

While the PRA focused on labor policy, the National Industrial Recovery Act's more dramatic attempt to bring about economic recovery centered on the cartelization of American industries. Not only could industrial executives discuss traditional cartel objectives such as higher prices, product standardization, and other profit-enhancing limits to competition, but the legislation also set up an enforcement mechanism, which included fines and potential imprisonment for code violators.[7] The third of our six regimes, then, reflects what largely amounted to a continuation of the labor provisions of the PRA, but also includes the ability of firms to collude.[8]

The literature on the NIRA, and its enabling body the National Recovery Administration (NRA) is substantial. Hawley (1966) and Weinstein (1980) conclude that the NIRA's labor and cartel provisions created a negative supply shock that harmed economic recovery. Bernanke (1986, p. 106) finds that the NRA code provisions themselves "had little systematic impact," particularly in comparison to the far more consequential long-term impact subsequent unionization had on workers. Vedder and Gallaway (1993) show the persistence of unemployment during the 1930s can be traced to the NIRA and other wage-increasing New Deal policies. Powell (2003, p. 118) likewise emphasizes the role that the high-wage policies of the NIRA played in accelerating the substitution of capital for labor, further exacerbating the unemployment problem. Cole and Ohanian (2004, p. 813) employ a general equilibrium empirical analysis and conclude that the "joint policies of increasing labor's bargaining power and linking collusion with paying high wages prevented normal recovery" from the Great Depression. With regards to its economic impact, the general consensus is that the NIRA was neutral at best and, by raising wage rates and facilitating cartelization in the face of unemployment, may have been detrimental by intensifying the jobs shortage.[9]

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[7] See Lyon, et. al., 1935, pages 91-92.

[8] While the industry-specific codes had to include minimum hourly wage rates and maximum hours (as well as a statement recognizing the right of collective bargaining), these restrictions could potentially be slightly looser than those of the PRA.

[9] A separate but related literature employs the NRA codes of fair competition as a means to gain insight into various aspects of cartel theory. While the objectives of Alexander (1994, 1997), Krepps (1997), and Taylor (2002, 2007, 2010) are not to assess the NIRA's impact on the macroeconomy, their conclusions largely support the broad notion that the cartel-enabling legislation created deadweight losses and harmed recovery.

Regime 4: The Schechter Era

On May 27, 1935, the Supreme Court unanimously ruled the NRA codes unconstitutional on the grounds that Congress could not give the President what Justice Cardozo called "a roving commission" to make laws in the form of industry codes.[10] Additionally, the Court ruled that the NRA codes illegally attempted to regulate interstate commerce. The *Schechter* ruling invalidated the NIRA completely—the wage and hours provisions, the cartel provisions, and the requirement of firms to recognize labor's right to collective bargaining were all repealed. The day after the ruling, *The New York Times* reported that "Leading bankers and industrialists characterized the decision on the NRA as 'the best thing in years.'"[11] The *Denver Post* likewise called it "the most reassuring development this country has experienced in many a year" as it will "loosen the bureaucratic brakes which have been clamped on business and individual initiative." These statements suggest a belief that the removal of the NRA code provisions would alter behavior in labor and product markets. On the other hand, the Birmingham, Alabama *Age-Herald* wrote that, "Many of the standards set by NRA are now so well established that a continued widespread observance of them on a voluntary basis may be expected."[12] One of the objectives of this paper is to determine how much, if at all, economic behavior changed after the NRA regime was struck down.

In fact, both the constitutional questions surrounding the NRA prior to the *Schechter* decision and the fact that the legislation was scheduled to expire (with major uncertainty of its renewal) in June 1935 meant that policy makers had already begun the process of writing bills that would, if passed, permanently continue certain provisions of the NRA codes. In February 1935, Senator Robert Wagner, introduced the first version of what would become the National Labor Relations Act (NLRA), also known as the Wagner Act, which was signed into law by President Roosevelt on July 6, 1935. The NLRA continued the provision that employees had the right to organize and bargain collectively.

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[10] *New York Times*, May 28, 1935, "Court is Unanimous. President Cannot Have "Roving Commission" to Make Laws by Code." P. A1.
[11] New York Times, May 28, 1935, "Wall Street Hails New Deal Defeats," p. 1.
[12] The quotes from the Denver and Birmingham papers come from a roundup of views from other news organizations in the *New York Times*, May 28, 1935, "Press Generally Sees Ruling as a Victory for Fundamental Law," p. 12

Should July 1935 then represent another major regime-change? We argue that it should not because the NLRA's constitutionality was questioned to the extent that the legislation was largely inept. The National Association of Manufactures denounced the NLRA as unconstitutional on the day of its passage and in the months that followed there was widespread non-compliance with the Act and federal courts issued nearly 100 injunctions against the operation of the NLRA (National Labor Relations Board 60th Anniversary Committee, 1995, p. 14).[13] In fact, on December 22, 1935, Judge Merrill E. Otis of the US District Court of Kansas City ruled the NLRA unconstitutional as a violation the interstate commerce clause.

Because the NLRA had little or no bite in terms of promoting widespread unionization as it was in constitutional limbo, the "*Schechter Era*" regime (June 1935 through April 1937) was one largely free of federal restrictions on wages and hours and was one in which labor did not have a guaranteed right to collective bargaining—a clear departure from the NRA Code regime that preceded it. It is interesting to note that the dates of this regime corresponded with a strong economic rebound. The National Bureau of Economic Research's Index of Production of Manufacturing, Seasonally Adjusted (NBER Series 1054) output stood at 86.7 in June 1935, six percent *below* its level in June 1933 when the NIRA was passed. However, by June 1936 the index was at 106.4 and by April 1937 it stood at 122—a nearly 41 percent jump in less than two years. Likewise, Vedder and Gallaway's (1993, p. 77) monthly estimates of unemployment show a drop from 20.1 percent at the time of the May 1935 *Schechter* decision to 13.2 percent by April 1937 when the regime ended. Of course the federal government and the Federal Reserve were also pursuing expansionary fiscal and monetary policy as this time as well.

Regime 5: The National Labor Relations Act

In February 1937, President Roosevelt announced a plan to "pack" the Supreme Court with additional judges—one for each current judge over the age of 70—with the intention of creating a Court that would be friendlier to New Deal reforms. That same month, the Supreme Court heard the five test cases that would determine the validity of the NLRA. A February 9,

[13] According to a September 1935 article in the *New York Times* (p. 1), "An opinion widely held among lawyers and industrialists is that the Wagner act is unconstitutional for the same reasons that the NRA was ruled unconstitutional by the Supreme Court—that its provisions could not apply to companies that were transacting an interstate business." (September 13, 1935, *New York Times* "Wagner Act Void, Legal Critics Hold," p. 1.)

1937 article in the *Chicago Tribune* wrote that most lawyers expected the Court to rule against the NLRA, which could create more pressure in Congress to adopt Roosevelt's court-packing plan.[14] On April 12, 1937, the Court surprisingly ruled, 5 to 4, in favor of the NLRA on four of the five test cases and unanimously in favor of the NLRA in the other. These rulings, the most important of which was *National Labor Relations Board v. Jones & Laughlin Steel*, combined with its 5 to 4 ruling two weeks earlier in favor of minimum state-level wage laws in *West Coast Hotel v. Parrish* initiated what historians refer to as the "Constitutional Revolution" of 1937 when the Court began to consistently rule in favor of major New Deal reforms.

Data on union density and the number of recognition strikes strongly support the notion that the NLRA regime should be treated as beginning with the April 1937 rulings rather than the July 1935 date that it officially became law. In 1934, when labor was given the right to collective bargaining by the NIRA, 701,101 workers were involved in recognition strikes, but this number fell to 202,118 and 272,013 in 1935 and 1936 respectively. In 1937, the number of workers involved in recognition strikes surges to 941,802.[15] Likewise, annual data on union membership support the notion that 1937 was a key turning point. Estimates from Freeman (1998, p. 289) show that union membership rose from around 2.60 million to 3.46 million between 1933 and 1935, when labor was given the right to collectively bargaining by the NIRA, and then rose slightly to 3.85 million in 1936. But 1937 and 1938 saw a tremendous spike as the number of union members rose to 6.76 million and 7.76 million respectively.[16] Additionally these two years saw a surge in sit-down strikes, before the National Labor Relations Board and courts ruled them to be illegal. Of course whether specific workplaces became unionized or not, the permanent and court-approved right to collective bargaining put pressure on firms to make concessions to labor in terms of hourly wage rates, workweeks, and working conditions, among other worker objectives. For example, a firm may have granted concessions in hopes of preventing organization. One caveat, however, is that historians such as Fine (1969) view the General Motors sit-down strike in Flint, Michigan as a major turning point in union activity. This strike primarily took place in January and February of 1937, two months before the *Jones &*

[14] Chicago Tribune, February 9, 1937, "Test New Deal Labor Laws in Supreme Court," p. 9.
[15] Recognition strike data are from the US Department of Labor, Bureau of Labor Statistics, *Monthly Labor Review*, May 1936-May 1940.
[16] Union density data from the BLS and from Troy (1965) show a similar pattern.

Laughlin. Clearly more work is needed to assess the importance of the Supreme Court's upholding of the NLRA in terms of union activity.

Regime 6: The Fair Labor Standards Act

While the NLRA had salvaged the NIRA's right to collective bargaining, the Roosevelt Administration had, since the *Schechter* decision contemplated how to reinstate regulation of wage and hours. In late 1935, Senator Hugo Black, with the strong backing of the American Federation of Labor, introduced a 30-hour workweek bill, claiming that it would help alleviate the unemployment problem. However, President Roosevelt and Secretary of Labor Frances Perkins refused to endorse any new labor standards legislation until constitutional issues were settled.[17] After his overwhelming reelection in 1936, which he viewed as an endorsement of the New Deal, Roosevelt decided to move ahead with a wage and hour measure and assigned Solicitor General Stanley Reed the task of drafting a constitutional bill. Paulsen (1986, pp. 245-247) notes that a key debate within the Administration was whether to create a broad bill that would apply to the economy as a whole or a bill that would allow flexibility for different wage and hour standards within different industries as the NRA codes had done. Ultimately Roosevelt broke the stalemate and endorsed the creation of a bill to cover the entire economy.

In May 1937, following New Deal legislative victories in the Supreme Court, Senator Hugo Black and representative William Connery introduced identical bills to the Senate and House labor committees that would provide "fair labor standards," including a 40 hour workweek and a 40 cent per hour minimum wage for all firms engaged in interstate commerce.[18] The June 1938 passage of the Fair Labor Standards Act (FLSA) made minimum wage rates and maximum hours a permanent part of the US labor market.[19] The FLSA also forbade the

[17] Paulsen (1986, 241)

[18] Actually the specific numbers were left blank in the originally proposed bills for hourly workweek and hourly wage rate. President Roosevelt had suggested in a speech days earlier that the standards should be 40 cents per hour and 40 hours per week. An article in the *Chicago Tribune* suggested that the specifics were left blank to "remove any suggestion of White House dictation such as accompanied the submission of Mr. Roosevelt's court packing bill." (*Chicago Tribune*, May 27, 1937, "Congress Gets Bills to Control Pay and Hours," p. 1).

[19] The original Black-Connery bill would have created a powerful national board, similar to the National Recovery Administration, which would have had the power to determine what "fair labor standards" were over time and in specific cases. Fears about the creation of a "ghost of the NRA" led to the defeat of the bill in the House in December 1937 (Paulsen, p. 252). The bill

employment of workers under the age of 16 and the it allowed workers to recover twice the amount they were underpaid if the firm was proven guilty of not abiding by the Act's rules. Finally, it set an additional fine of up to $10,000 and six months in prison for violations.

The 40/40 standards were phased in over time rather than instituted all at once. Beginning on October 24, 1938, firms engaged in interstate commerce had to pay at least 25 cents per hour and had to pay time and a half on hours beyond 44 hours per week. The Roosevelt Administration estimated at this time that the FLSA would cause the hourly wage rates of up to 750,000 workers to rise and the hours of work to be shortened for 1.5 million.[20] Still the law was not expected to have anywhere near the impacts upon wages, hours, costs, and prices that the NIRA had five years earlier since most firms were already either in compliance with the new standards or were fairly close to them.[21] In October 1939, the minimum hourly wage rose to 30 cents per hour and further increases followed until it reached 40 cents per hour by the end of World War II. Of course wartime inflation had substantially eaten away the real value of this increase since the overall price level rose nearly 40 percent between 1939 and 1946.[22] The maximum workweek (without overtime pay) fell to 42 hours in October 1939 and then to 40 hours in October 1940.

Data & Empirical Model

In order to assess the effects of regime change during the New Deal we examine five different dependent variables using monthly data from 11 industries between 1922 and 1939.[23] These are the size of the workforce (Employment), the average number of hours a worker was employed during a week (Hours), the average hourly earnings of a worker (Wage Rate), the total production of the industry (Output), and the average price (Price) of an industry's output. The

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was then simplified and the board was eliminated and the measure was approved with little opposition.

[20] *New York Times*, October 23, 1938, "Andrews Sets Up New Regulations For Wage Records," p. 1.

[21] *New York Times*, October 23, 1938, "Wage Law Causes Few Price Changes," p. 1.

[22] Bureau of Labor Statistics, Consumer Price Index, All Urban Consumers, US City Average, All Items.

[23] The eleven industries are Automobiles, Boots and Shoes, Chemical Manufacturing, Iron and Steel, Leather Manufactures, Machine and Machine Tools, Meat Packing, Paper and Pulp, Rubber Products, Silk Rayon, and Wool Manufacturing**.**

data set was assembled from the National Bureau of Economic Statistic's Macrohistory Database.[24]

The data are converted into indices with April 1929 as the base period representing the peak of economic activity before the Depression.[25] The top panel of Figure 1 charts the average of each variable across industries, by month, from January 1930 through the end of 1939. The bottom panel charts a series of controls that we will use in estimating the VAR model. The vertical dotted lines mark the month that each of the six regimes outlined above begin.[26] Visually, there are obvious differences in the levels of Employment, Hours, Wage, Prices, and Output between these periods. The timing of the changes also appears to correspond to some of the periods of regime change.

Employment, Hours, Price, and Output rose significantly in the 5 months following Roosevelt's inauguration. However, precisely at the month of the enactment of the PRA there is a sudden jump in Wage Rates and a large drop in Output and Hours. Employment continues to rise, but not on the trend that existed before the regime change. Further reductions in Output and Hours followed the passage of the last industry-specific NRA code. There also appears to have been strong changes in the direction of the variables following the Supreme Court's 1937 decision upholding the NLRA as well as the enactment of the FLSA in 1938. Interestingly, the raw data do not appear to show any pronounced one-time changes around the *Schechter* decision that repealed the NRA codes.

Associating these patterns as causal is, of course, more complicated. A good framework for measuring the impact of different policy regimes on labor input, wages, prices, and output would be to compare the path of these variables in one industry that was treated with regime

[24] See the Data Appendix for a detailed description of each series.
[25] The index in the base period is assigned a value of zero.
[26] For illustrative purposes we begin the NRA code regime in April 1934 in Figure 1. This is the month in which the last industry in the sample adopted an NRA code. The empirical estimation takes into account the specific month that the NRA code begins for each industry. If the code was passed prior to the 16th day of the month, that month was counted as an NRA code month. The month that the NRA Code dummy variable turns on is as follows for each industry: Automobiles, September 1934; Boots and Shoes, October 1934; Chemical Manufacturing, February 1934; Iron and Steel, September 1933; Leather Manufactures, September 1933; Machine and Machine Tools, April 1934; Meat Packing, January 1934; Paper and Pulp, December 1933; Rubber Products, December 1933; Silk Rayon, September 1933; and Wool Manufacturing, August 1933. Date of code passage was obtained from U.S. National Recovery Administration (1933-1935).

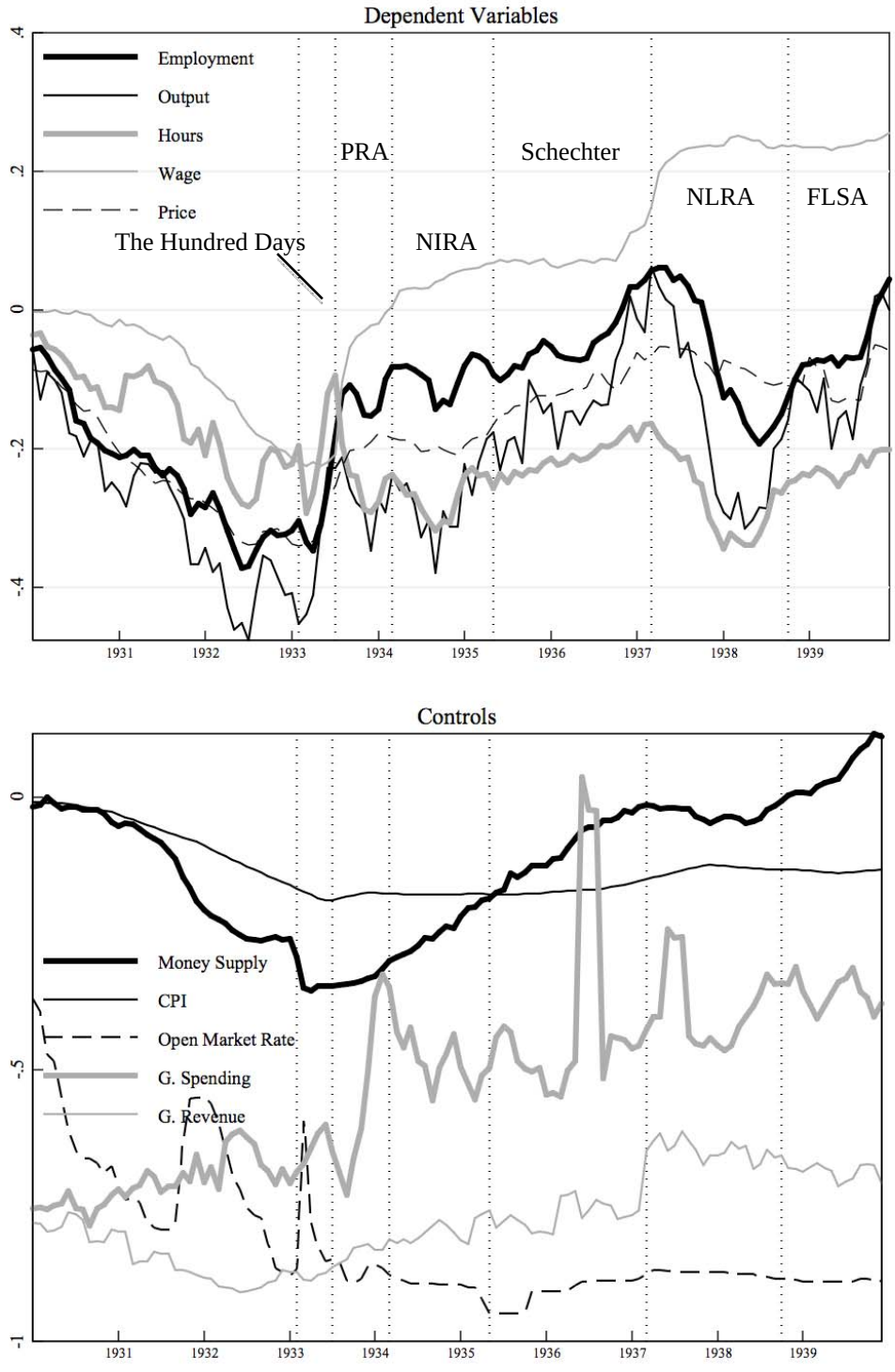
change with another industry that was not. Furthermore, one would like to assure that both the treated and non-treated industries were otherwise subject to the same conditions. Unfortunately neither requirement occurred in reality. All industrial segments of the economy were covered by the regime changes. There were also countless other shocks that occurred during the 1930s that surely impacted labor markets and output. We are faced with the further challenge that, with the exception of the industry-specific codes, there is no cross-sectional variation in the timing of regime change. Consequently it is important in any estimating technique to control for as many unobservable variables as possible. There is a substantial literature documenting the large increases and fluctuations in government spending associated with various New Deal programs such as the Civil Works Administration, the Works Progress Administration, and the Public Works Administration.[27] Additionally, there is a vast literature examining monetary policy during the Depression.[28] Consequently, we will attempt to control for factors such as fiscal and monetary policy that may have affected our dependent variables. Equation 1 illustrates our estimating equation.

$$1) \quad Y_{it} = \sum_{j=1}^{k} \alpha_j^E Employment_{it-j} + \sum_{j=1}^{k} \alpha_j^H Hours_{it-j} + \sum_{j=1}^{k} \alpha_j^W Wage_{it-j} + \sum_{j=1}^{k} \alpha_j^O Output_{it-j} + \sum_{j=1}^{k} \alpha_j^P Price_{it-j} + \alpha_i + \mathrm{M}_i + \mathrm{A}controls_t + \varepsilon_{it}$$

The VAR regresses each dependent variable on the lagged values of itself and the other endogenous variables. In addition we include a number of fiscal and monetary measures (*controls*) to control for changes in fiscal and monetary policy. These include indices of the money supply (M-1), federal government spending, federal government revenue, the Federal Open Market Interest Rate, and the Consumer Price Index.[29] Finally, we estimate industry fixed

[27] See Fishback, Horrace, & Kantor (2005); Fishback, Kantor, & Wallis (2003); Fleck (1999a); Kesselman (1978).
[28] See, for example, Friedman and Schwarz (1963), Hamilton (1987), Wheelock (1990), Bordo, Chourdhri, and Schwarz (2002), Eggertsson (2008), and Richardson and Troost (2009).
[29] Because monetary and fiscal policy might act with delay we include the contemporaneous as well as 6 lags of each. See the Data Appendix for source details.

Figure 1
Average Labor Market and Output Measures



effects (α) and industry specific month effects (M) to control for any seasonal patterns. Our sample period begins in July of 1922 and ends in December of 1939.[30]

The VAR serves two purposes. First the lagged dependent variables better control for the pre-existing state of the economy. Second the lagged dependent variables estimate the reduced form long run relationship between all five dependent variables. Using the coefficients estimated from the VAR we can simulate what the long run effect of a shock associated with the implementation of different regimes should have been on the various dependent variables through the use of impulse-response functions. For example, the PRA and NRA Code regimes called for an increase in Wage Rates. Based on the estimated relationship between Employment, Hours, Wage Rates, Prices, and Output, we can predict what we would expect to happen to each variable if Wage Rates were increased by any specific amount.

The VAR model requires the assumptions that the errors are uncorrelated across time. Thus it is important to select the appropriate number of lagged dependent variables. We find a lag length of 2 minimizes the Hannan and Quinn information criterion, but that a lag length of 6 is required to eliminate serial correlation in the residuals, and hence a lag length of 6 is employed. Additionally each of these variables was found to be stationary using a Fisher-type unit root test for panel data.[31]

VAR Results

Before examining the shocks associated with regime changes it is necessary to establish the validity of the VAR model. As is common when presenting results from a VAR we will relegate the coefficient results to the Appendix and instead examine Granger Causality tests and impulse response graphs. Table 1 presents the results from Granger Causality tests. At a 5 percent significance level Employment is Granger Caused by all of the other variables. Hours is Granger Caused by all but Price. Wage is Granger Caused by Employment and Price, while Output is Granger Caused by all but Wage. Finally Price is not Granger Caused by any of the other dependent variables.

[30] The start date is chosen so as not to be influenced by the post-World War I depression while the end date is chosen so as not to be influenced by the start of World War II.
[31] As developed by Maddala and Wu, "Comparative Study of Unit Root Tests".

Table 1

Granger Causality Tests

Null Hypothesis		p-value
Employment is NOT Granger Caused by	Hours	0.000
	Wage	0.003
	Output	0.000
	Price	0.006
	ALL	0.000
Hours is NOT Granger Caused by	Employment	0.000
	Wage	0.000
	Output	0.000
	Price	0.122
	ALL	0.000
Wage is NOT Granger Caused by	Employment	0.000
	Hours	0.186
	Output	0.345
	Price	0.005
	ALL	0.000
Output is NOT Granger Caused by	Employment	0.000
	Hours	0.000
	Wage	0.198
	Price	0.029
	ALL	0.000
Price is NOT Granger Caused by	Employment	0.61
	Hours	0.576
	Wage	0.929
	Price	0.298
	ALL	0.689

In order to determine the overall magnitude and sign of these relationships we generate a series of impulse-response functions. These show the effect of a one-unit shock to a particular variable on the other four. Confidence intervals are constructed using asymptotic standard errors.

Figure 2.a
Impulse Responses to a One Unit Shock to Employment with 95% Condidence Intervals

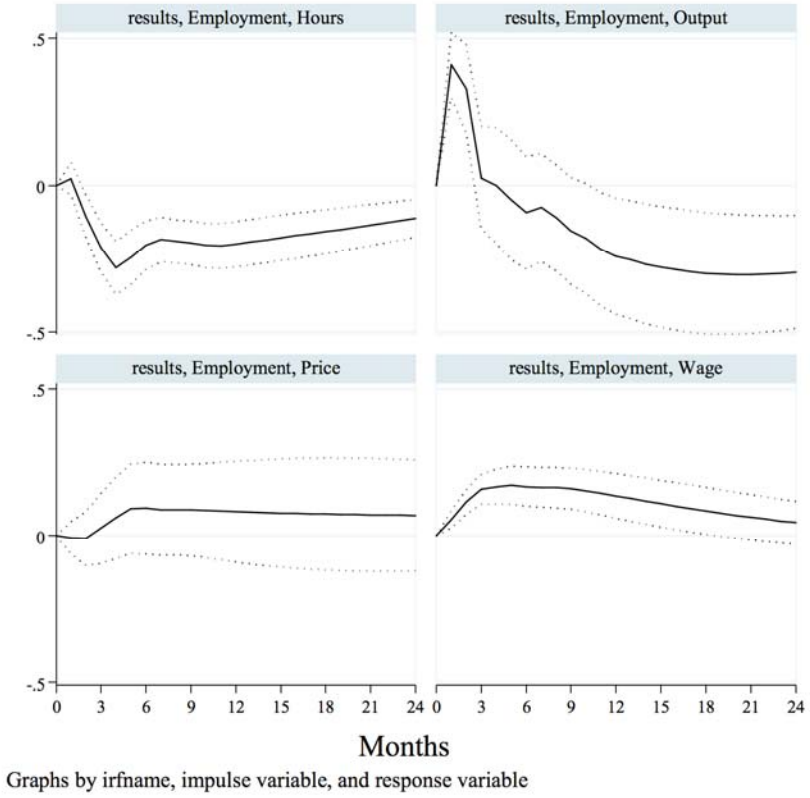


Figure 2.a shows that a positive one-unit shock to Employment results in an initial decrease in Hours, a large increase then modest decrease in Output, no statistically significant impact on Price, and a modest increase in Wage Rates. Figure 2.b demonstrates that a similar shock to Hours is followed by an increase in Employment and Hours, no statistically significant change in Price, and a modest increase in Wage. Together these results are consistent with a pattern of firms first increasing Hours in response to an increase in product demand, resulting in increased Output, and higher Wages associated with the increase in labor demand. Additionally one might interpret the negative relationship between Employment and Hours in Figure 2.a as suggesting firms eventually hire additional workers and reduce the Hours any given worker is employed.

Figure 2.b
Impulse Responses to a One Unit Shock to Hours with 95% Condidence Intervals

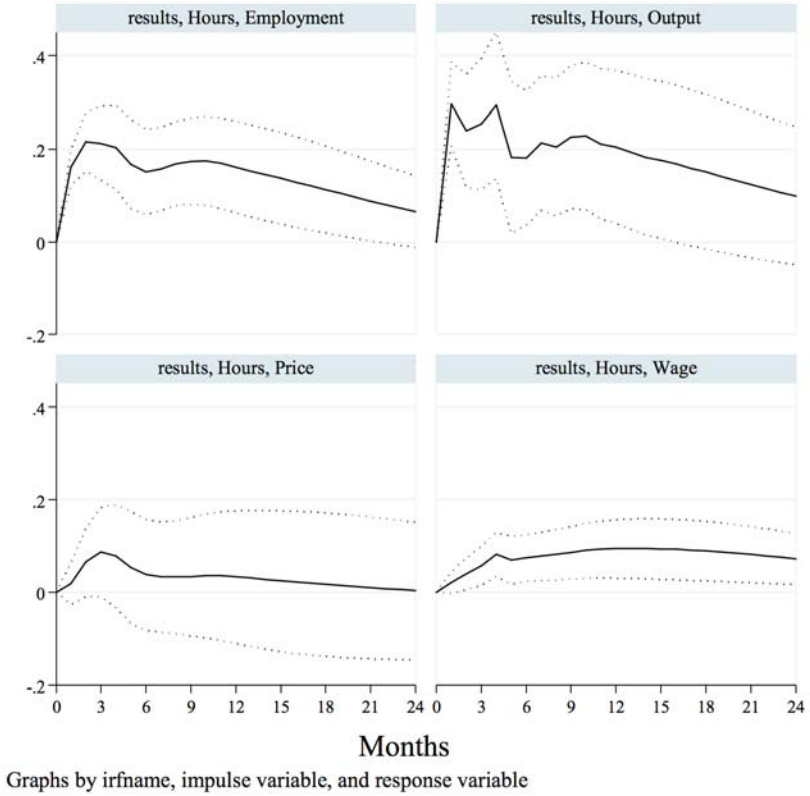


Figure 2.c
Impulse Responses to a One Unit Shock to Wage Rate with 95% Condidence Intervals

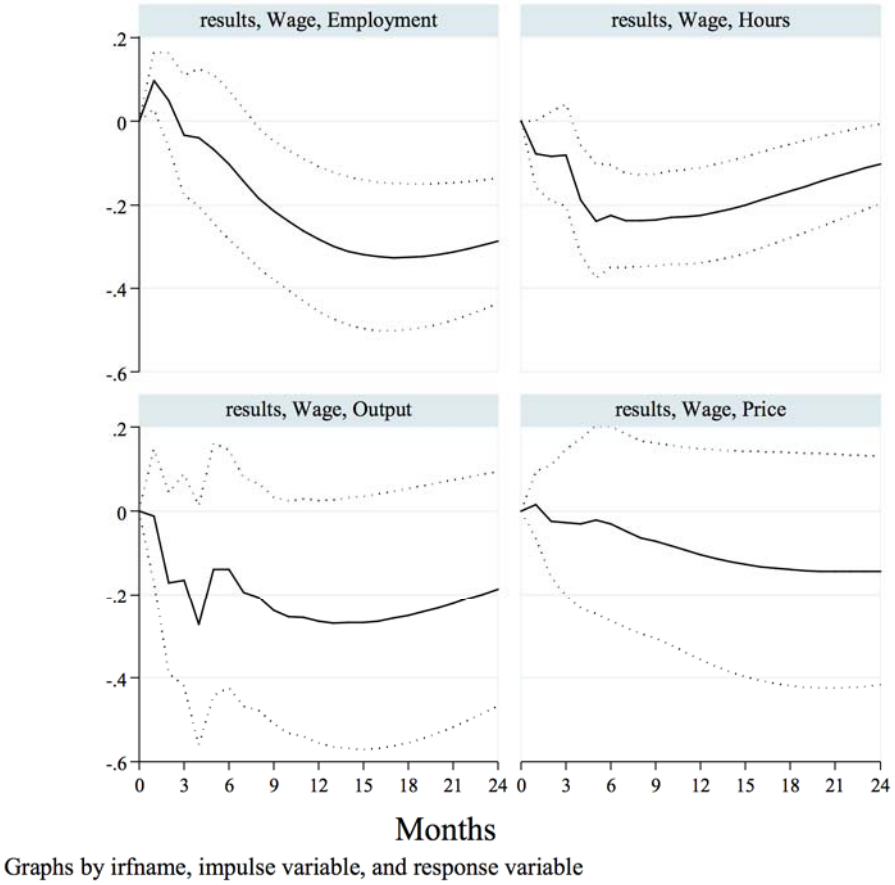


Figure 2.c shows that a positive one-unit shock to Wage rates results in decreased labor input as measured by both Employment and Hours. Output decreases, although the effect is not quite statistically significant. And there is no statistically significant effect on Price. These results are important given the Wage increases called for in the PRA and NRA codes.

Figure 2.d
Impulse Responses to a One Unit Shock to Output with 95% Condidence Intervals

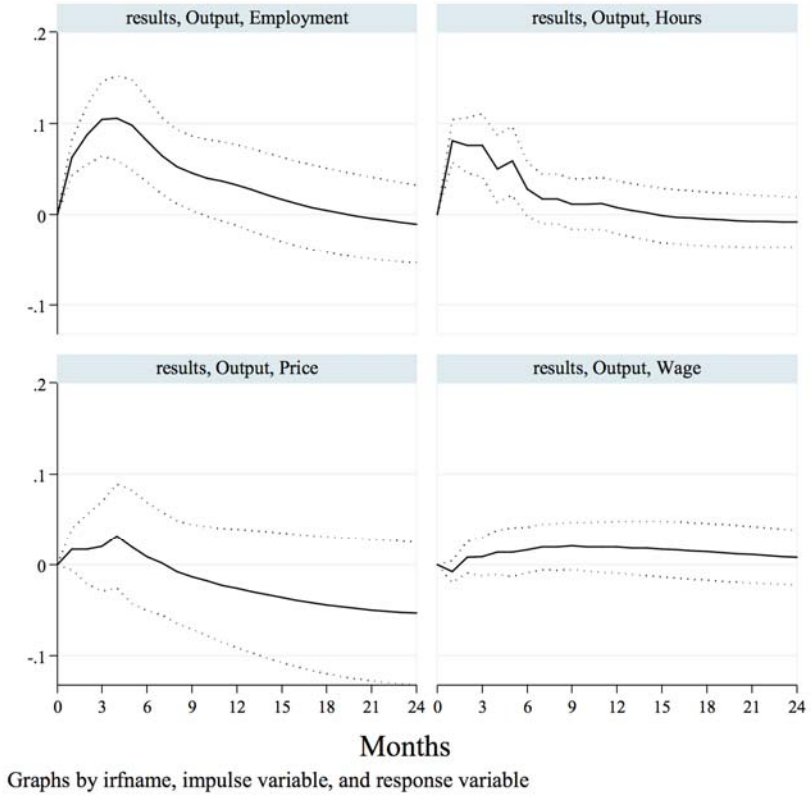
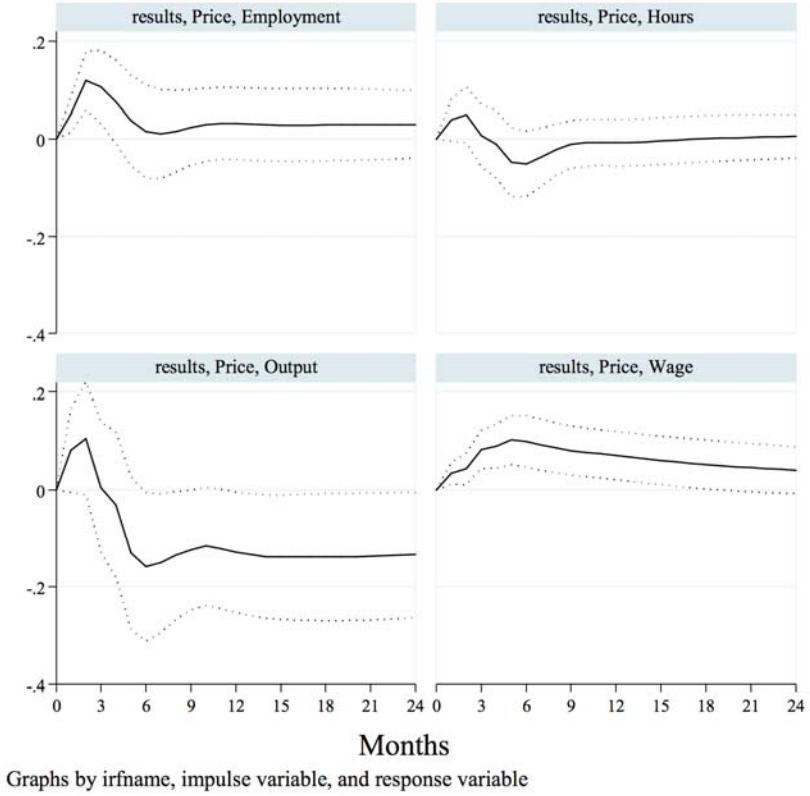


Figure 2.d indicates that a positive one-unit shock to Output is also followed by an increase in labor input as measured by Employment and Hours with no statistically significant effect on Price or Wage. Finally in Figure 2.e one can see a positive shock to Price has relatively little effect on Employment and Hours, but is followed by a modest decrease in Output and increase in Wages.

Figure 2.e
Impulse Responses to a One Unit Shock to Price with 95% Condidence Intervals



The next step in our analysis is to use the estimated VAR relationships to examine the timing of any shocks to these variables during the 1930s by examining the residuals from the VAR regression. Our initial method for doing this is simply to test whether the residuals are statistically different from zero during different regimes. In order to accomplish this we run the regression found in Equation 2.

2) $$r_{it} = \beta^{H} hundred_{t} + \beta^{P} PRA_{it} + \beta^{N} NIRA_{it} + \beta^{S} Schechter_{t} + \beta^{F} FLSA_{t} + \varepsilon_{it}$$

The variables *hundred, PRA, NIRA, Schechter, NLRA,* and *FLSA* are dummy variables set to one if an observation comes from the respective regime. The coefficient estimates on these dummy variables will give the average size of the residual during the regime. The results of this regression are found in Table 2.

Table 2
Average Residuals Across Regimes
(p-values)

	Hundred Days Regime	PRA Regime	NIRA Code Regime	Schechter Regime	NLRA Regime	FLSA Regime
Employment	1.3%	1.2%	-0.2%	0.1%	-0.2%	0.5%
	(0.001)	(0.011)	(0.257)	(0.532)	(0.267)	(0.043)
Hours	1.6%	-0.7%	-0.4%	0.2%	-0.2%	0.1%
	(0.000)	(0.240)	(0.071)	(0.320)	(0.387)	(0.841)
Real Wage Rate	0.2%	1.6%	0.2%	0.0%	0.0%	0.1%
	(0.334)	(0.000)	(0.079)	(0.810)	(0.813)	(0.324)
Output	4.0%	0.1%	-0.5%	0.2%	-0.2%	0.6%
	(0.000)	(0.957)	(0.268)	(0.582)	(0.674)	(0.272)
Prices	1.1%	0.4%	-0.3%	0.2%	0.0%	0.3%
	(0.013)	(0.428)	(0.263)	(0.443)	(0.849)	(0.277)

For the most part the residuals average out to zero across most regime periods. There are some notable exceptions, however. During the "Hundred Days" regime the VAR model under predicts the path of Employment, Hours, Output, and Prices. In other words economic activity is greater in this period than one would expect based on fiscal and monetary policy or past economic activity as captured by the lagged dependent variables. Specifically on average Employment received a positive 1.3 percentage point shock each month during the period. Hours received 1.6 percentage point shocks, while Output and Prices received on average 4.0 and 1.1 percentage point shocks. Clearly there was an important, and positive, shift in market behavior in the months following President Roosevelt's inauguration.

Some of the residuals during the PRA regime are also statistically different from zero. For example, Employment received, on average, a 1.2 percentage point shock during each month of the regime. Wages, on average, saw an even larger 1.6 percentage point shock each month. These results are consistent with the PRA's policy of increasing hourly wage rates as well as the number of workers on payrolls. Surprisingly, the residuals from the Hours equation are not statistically significant as one might expect given the PRA's objective of sharing work through a shorter workweek. The Hours residuals are, however, negative and marginally statistically significant while the Wage residuals are positive and marginally significant during the NIRA code period.

With the exception of the residuals from the Employment equation during the FLSA regime, the residuals in the last three regime periods are not statistically different from zero. Alone these results would seem to suggest that the repeal of the NIRA, the upholding of the NLRA, and the passage of the FLSA had little effect on these industries. However, these regimes are generally longer than the first two and estimating the average across the entire regime might be masking more interesting dynamics—for example large one-time movements in residuals during the first two or three months of a regime may get washed out when averaged with 15 or 20 months of little or no movement. In order to address this and to further explore the timing of the shocks, we compute the average residual by month between January 1929 and December 1939. These are plotted in Figures 3.a—3.e along with 95% confidence bounds. Again, the vertical dashed lines represent the timing of the various regimes outlined earlier.

Figure 3.a

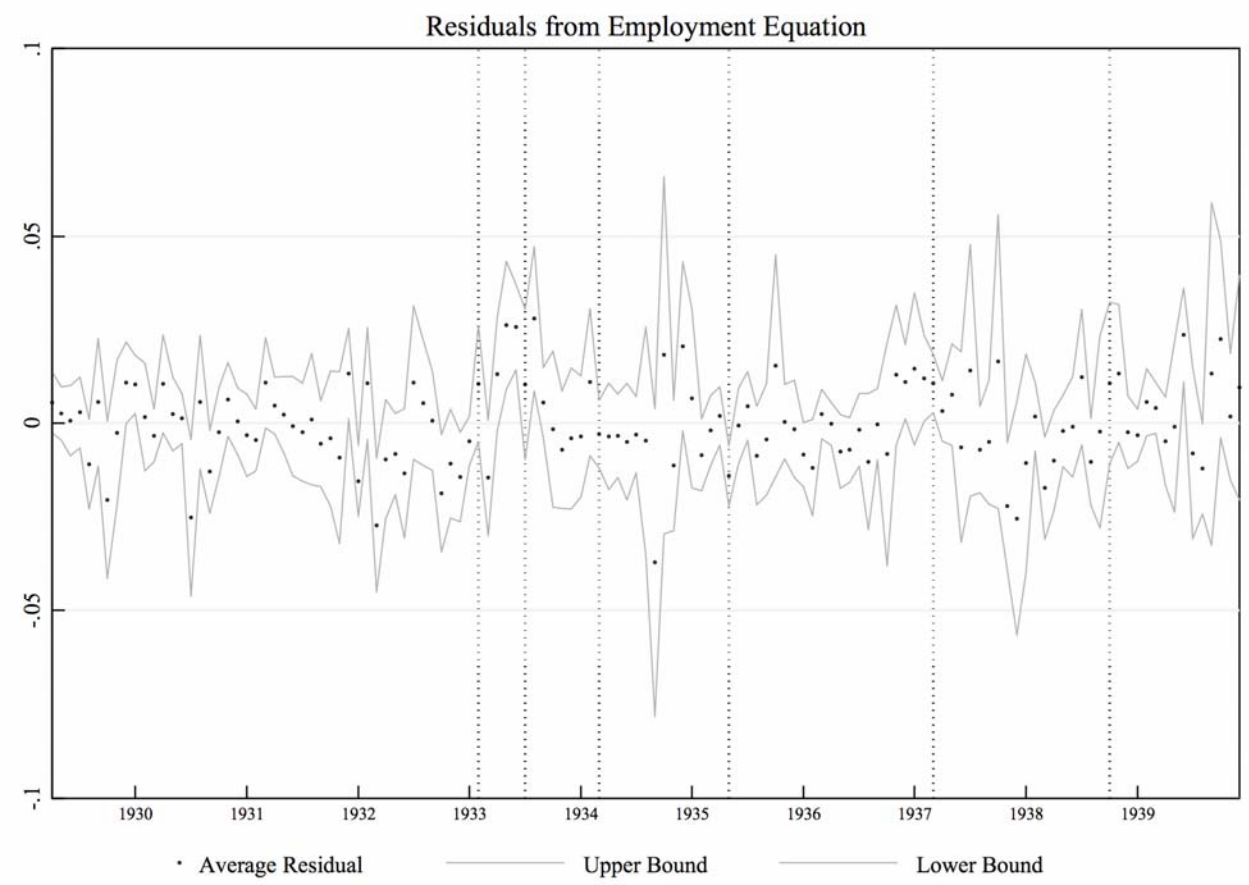
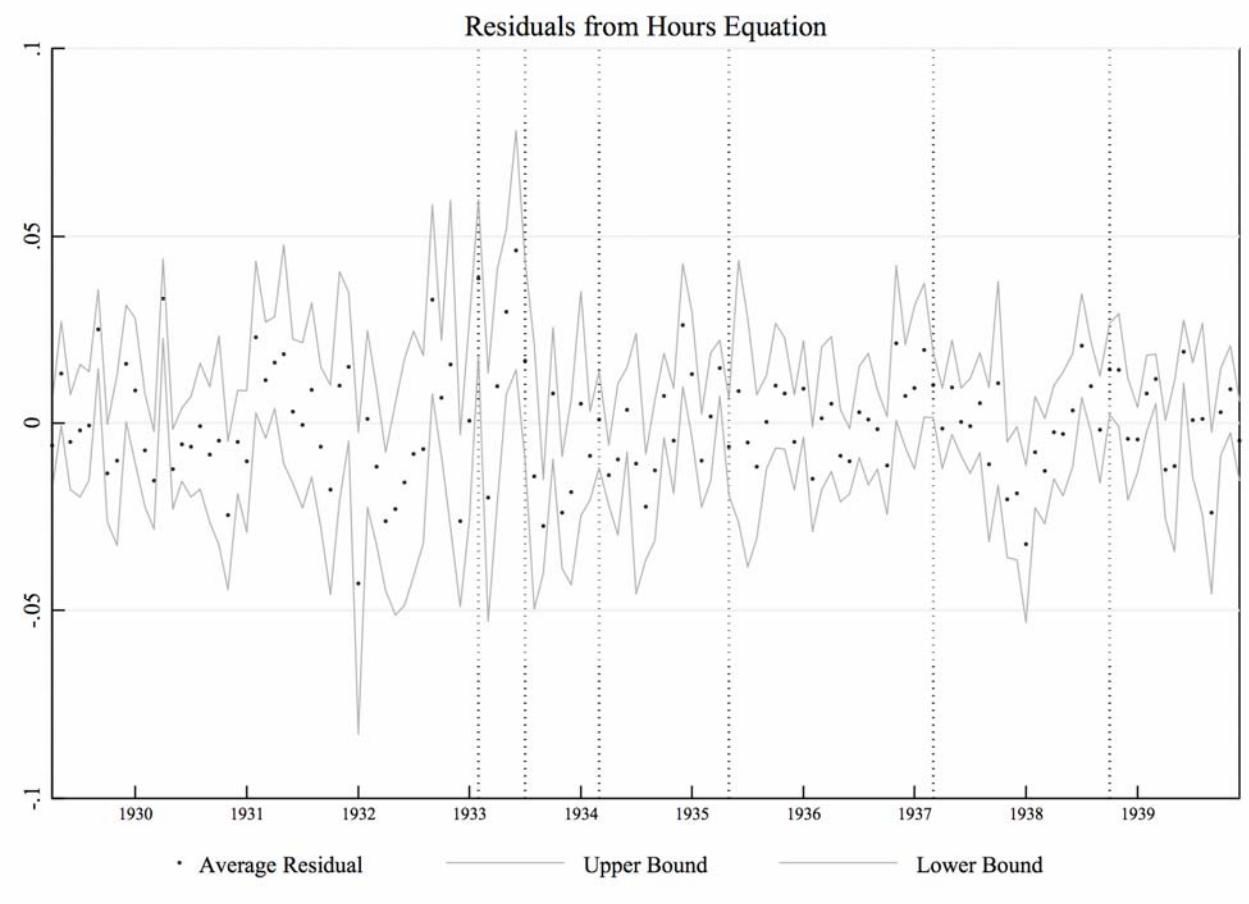


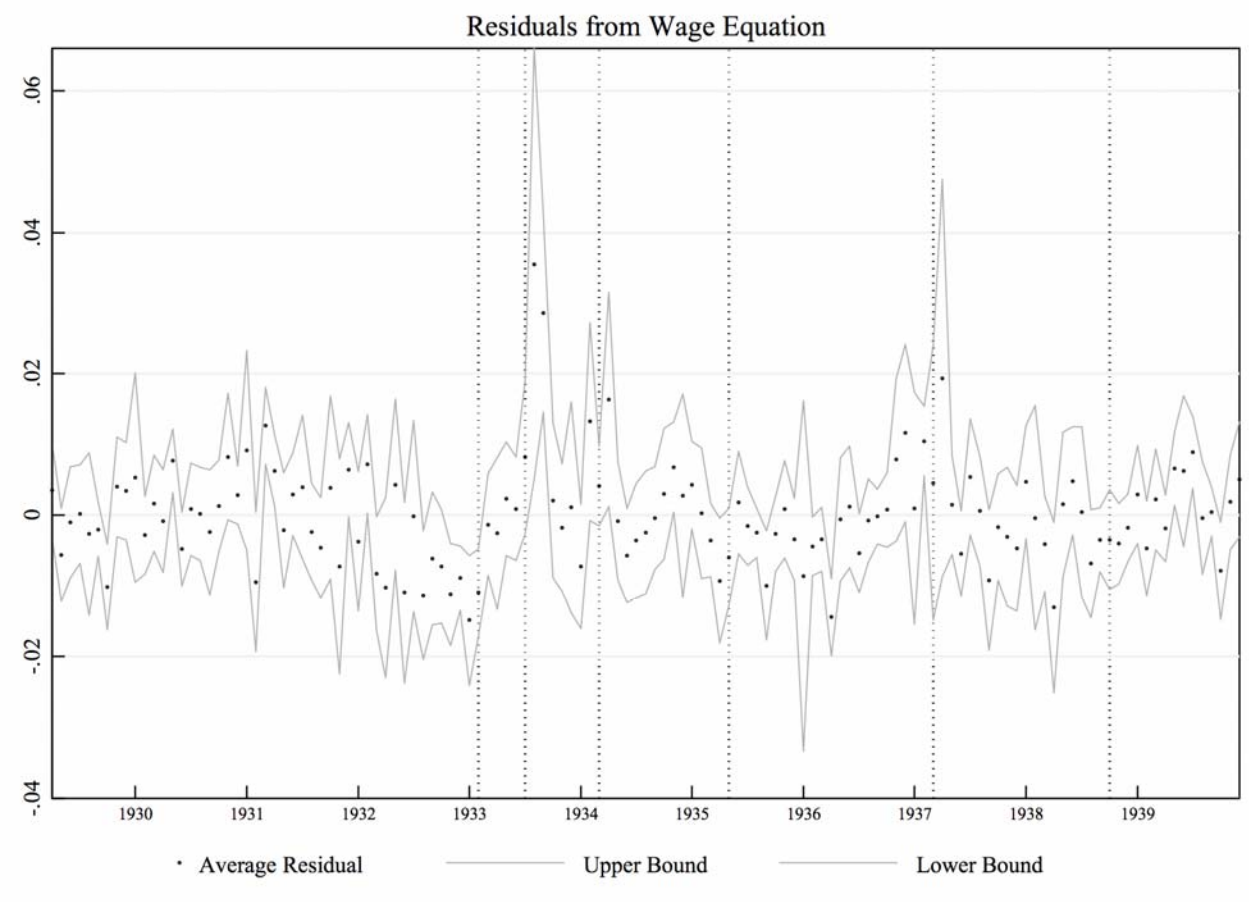
Figure 3.a suggests that the VAR model fits the path of Employment over the decade fairly well. The residuals in any given month are generally small and not statistically different from zero. There are some interesting exceptions however. The VAR clearly under predicts Employment during the Hundred Days regime. In April, May and June of 1933, there were positive and statistically significant employment shocks ranging from 1.0 to 2.5 percentage points per month. There is also a positive and statistically significant shock in the first month of the PRA regime—August 1933—of approximately 3 percentage points. While the results in Table 2 indicate that the residuals are not different from zero in the last three regimes, one can see from Figure 3.a that there are some months when large and statistically significant shocks to employment do occur. Most notably in the months leading up to the upholding of the NLRA the residuals are generally positive (and some are statistically significant). However, within six months of the Supreme Court ruling these generally turn negative (and some are statistically significant).

Figure 3.b



The residual pattern from the Hours regression has some similar patterns. During the Hundred Days regime there were positive shocks to Hours. During the PRA regime the residuals are generally negative, as would be expected given the PRA's mandate of a 35 hour maximum workweek. There are also some negative and statistically significant residuals in the Hours equation during the early part of the NIRA regime, however, these trend higher in the final 8 months of the regime. Taylor and Klein (2008), following up on contemporary sources, suggest that the NIRA cartels underwent a "compliance crisis" in the late spring of 1934 and that many firms had abandoned the cartel rules well before the *Schechter* decision. The Hours residuals would seem to support this story as firms may have "cheated" by hiring their most productive workers for more hours than their code rules specified. Finally like those for Employment, the Hours residuals are generally positive in the months leading up to the upholding of the NLRA, but turn negative and statistically significant by mid to late 1937.

Figure 3.c

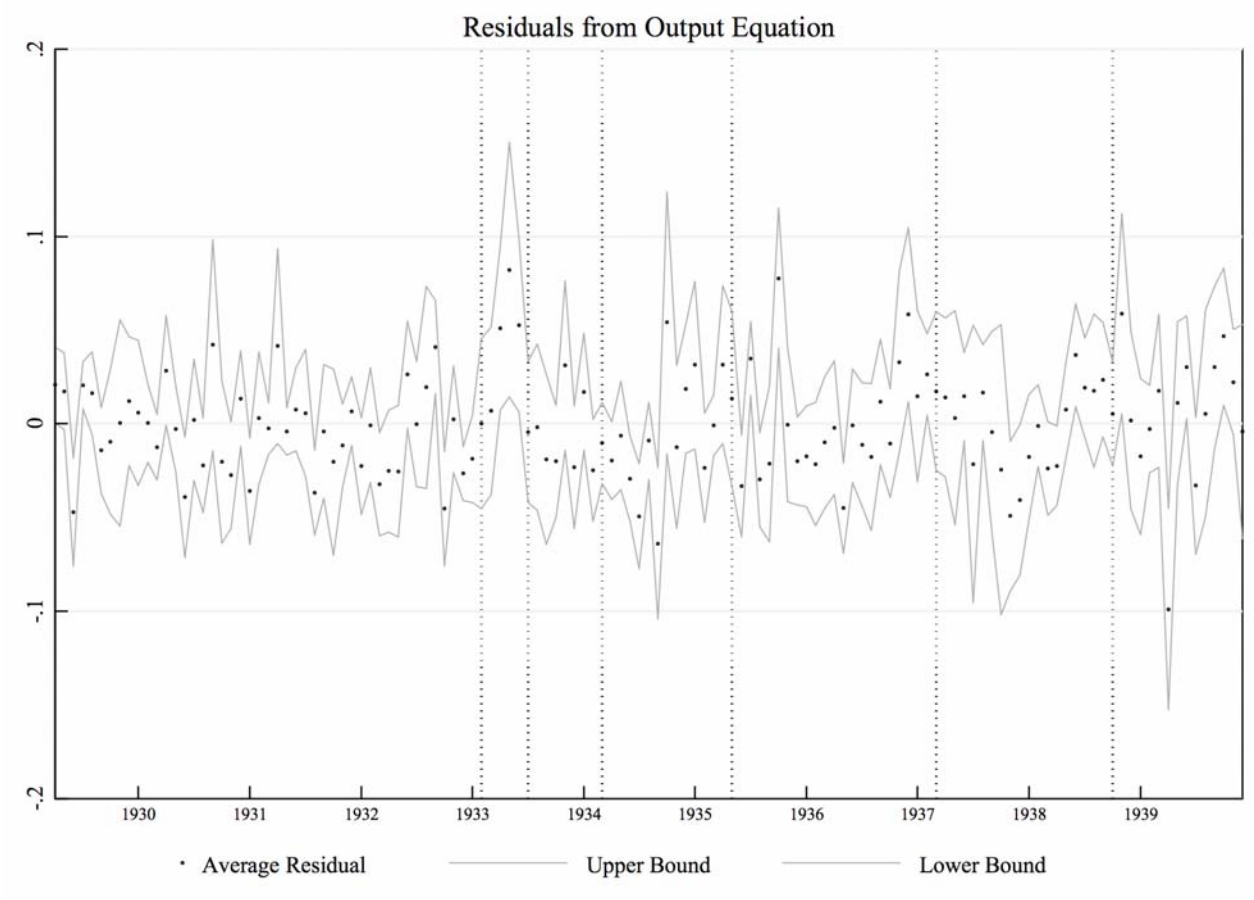


The residual pattern from the Wage regression is perhaps the most dramatic. Immediately following the implementation of the PRA there are 2 months (August and September) of statistically significant positive shocks of over 3 percentage points in magnitude. There are also smaller positive, and marginally statistically significant, shocks in the early part of the NIRA regime. This strongly suggests that much of the 20 percentage point increase in wages that occurred between mid 1933 and 1934 were due to the President's Reemployment Agreement rather than the NIRA codes themselves.

While the results from Table 2 suggested the Wage residuals were not statistically different from zero in the last 3 regimes, a more nuanced picture emerges from Figure 3.c. In the 12 months following the *Schechter* decision in 1935 the Wage residuals were, with only two exceptions (June and November), negative. This is consistent with a story of firms attempting to return to pre-NRA wage rates. The size of these negative shocks is small, however, when compared with the positive shocks associated with the PRA suggesting that the high wage

polices of the NIRA became largely entrenched even after their repeal. Finally, there is a large, though statistically insignificant, spike in the wage residual in April 1937, the month of the *Jones & Laughlin* decision.

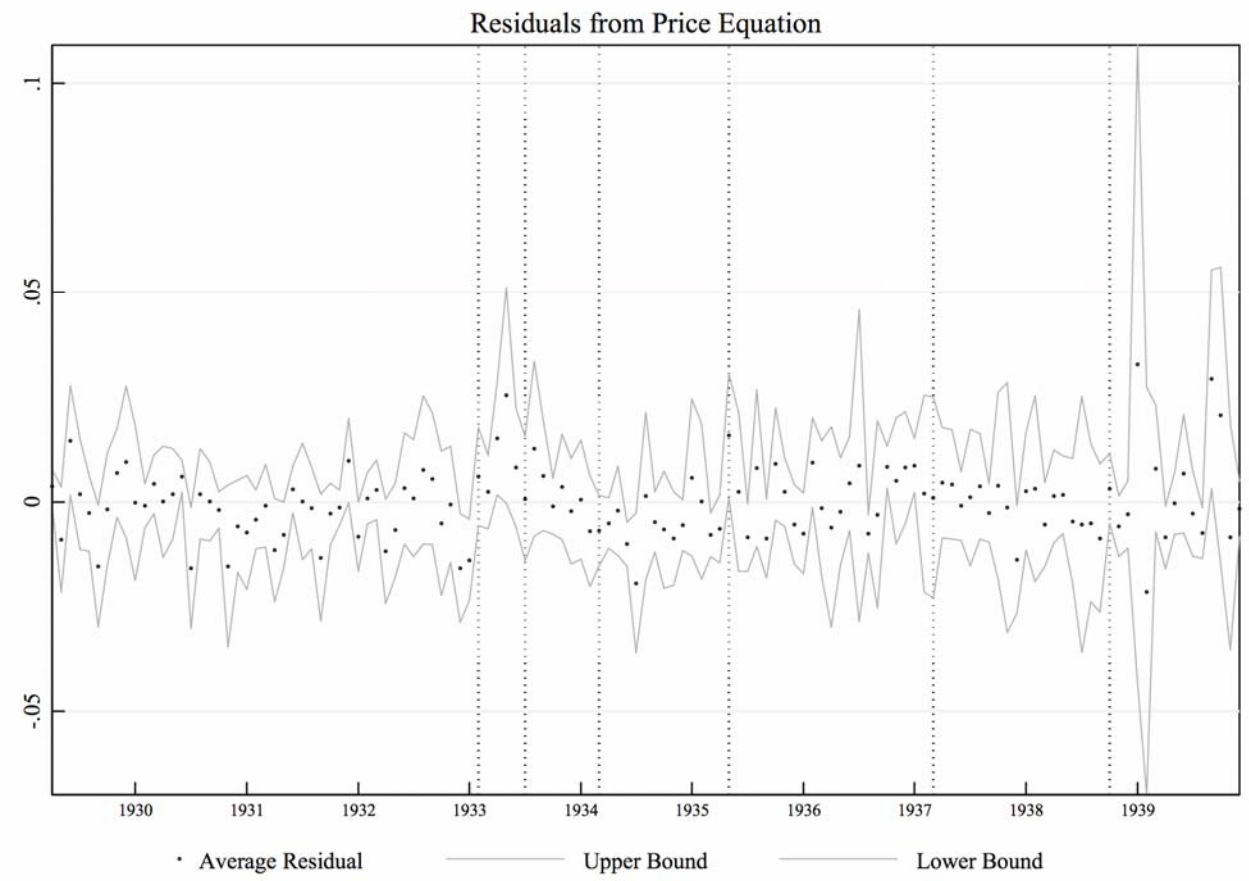
Figure 3.d



The residuals from the Output regression, Figure 3.d, also illustrate the unexplained uptick in economic activity following Roosevelt's inauguration. There are also statistically significant negative residuals during the early part of the NRA code regime, consistent with the notion that the cartels reduce production. However, the Output residuals turn generally positive in late 1934 and early 1935, which again could support the notion that a compliance crisis hit the NRA cartels in 1934. The Output residuals also exhibit the pattern found in the Employment and Hours residuals surrounding the upholding of the NLRA as they are generally positive before the ruling and turn negative and statistically significant by 1938. Given the spike in labor union membership and labor strikes in the months after *Jones & Laughlin*, mentioned earlier, it is not

surprising that Output fell relative to the prediction of the model in the months following the NLRA regime.

Figure 3.e



The residuals from the Price regression are generally smaller and exhibit few, if any, meaningful patterns for much of the decade. One notable exception is the Hundred Days regime which saw some positive and significant Price shocks. In the Discussion section we explore the possibility that these were a sign of firms anticipating the coming cartelization of industry written into the NRA.

Residuals In Months After NRA Code Adoption

Using the graphs above to examine the pattern of shocks following regime change is effective for most of the regimes, however the date of the passage of industry-specific NRA codes differs by industry (see footnote 27). In order to examine with more precision the effect of

the implementation of the NRA codes of fair competition, we regress the residuals on 4 dummy variables, which respectively equal 1, one month, two months, three months, and four months after the codes are adopted. These results are found in Table 3.

Table 3
Average Residual In Month of NIRA Code Passage
(p-values)

	1st Month	2nd Month	3rd Month	4th Month
Employment	0.0%	-2.3%	-0.5%	0.3%
	(0.957)	(0.008)	(0.531)	(0.760)
Hours	-1.6%	0.0%	-2.4%	0.3%
	(0.119)	(0.987)	(0.015)	(0.786)
Wage Rate	0.8%	1.1%	0.7%	-0.5%
	(0.140)	(0.034)	(0.167)	(0.378)
Output	0.3%	-3.2%	0.9%	-1.3%
	(0.885)	(0.113)	(0.654)	(0.507)
Prices	0.8%	-0.1%	-1.4%	-0.9%
	(0.433)	(0.887)	(0.155)	(0.384)

These results give a much clearer picture of the potential effect of the NIRA codes of fair competition upon our dependent variables. Two months after code passage there is a statistically significant 2.3 percentage point negative shock to Employment. The month of passage there is a marginally statistically significant 1.6 percentage point negative shock to Hours followed 2 months later by a statistically significant negative 2.4 percentage point shock. Wage Rates are shocked upwards 1.1 percentage points in the second month. While Output experiences a marginally statistically significant negative 3.2 percentage point shock in the second month. These results would suggest that overall labor input and output each fell as firms were able to successfully collude during the initial months of the NIRA cartel regime.

*Labor Input (Employment * Hours)*

We are concerned that the structural relationship between Employment and Hours may have changed during the Depression due to work-sharing provisions (shorter workweeks designed to encourage more workers on payrolls). Therefore, as a robustness check, we re-estimate the VAR and repeat the analysis above using labor input, that is total hours worked. We create the Labor Input variable by multiplying Employment (number of workers on payrolls) by

Hours (average hourly workweek). As before we will focus on Granger Causality tests and impulse response functions. The coefficient results can be found in Appendix 2.

Table 4 presents the results from Granger Causality tests. As before Price is not Granger Caused by any of the other dependent variables. However, at a 5 percent significance level the other three are all Granger Caused by one another and Price with the exception of Output in the Wage regression.

Table 4

Granger Causality Tests

Null Hypothesis		p-value
Labor Input is NOT Granger Caused by	Wage	0.001
	Output	0.000
	Price	0.001
	ALL	0.000
Wage is NOT Granger Caused by	Labor Input	0.000
	Output	0.428
	Price	0.007
	ALL	0.000
Output is NOT Granger Caused by	Labor Input	0.000
	Wage	0.032
	Price	0.011
	ALL	0.000
Price is NOT Granger Caused by	Labor Input	0.480
	Wage	0.908
	Output	0.257
	ALL	0.465

Turning to the impulse response graphs in Figures 4.a—4.d one sees that a positive shock to Labor input is followed by a statistically significant increase in Output and Wage. A positive shock to Wage alternatively is followed by statistically significant decreases in Labor Input and Output, while a positive shock to Output is followed by a statistically significant increase in Labor Input. Finally a shock to Price is followed by statistically significant increases in Labor and Wage, and a decrease in Output.

Figure 4.a
Impulse Responses to a One Unit Shock to Labor Input with 95% Condidence Intervals

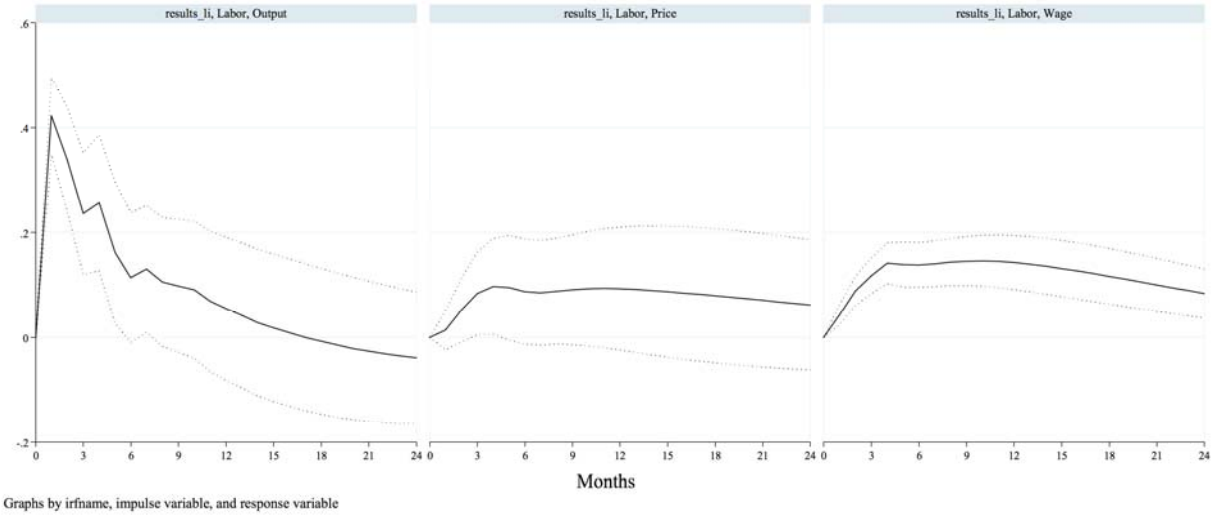


Figure 4.b
Impulse Responses to a One Unit Shock to Wage with 95% Condidence Intervals

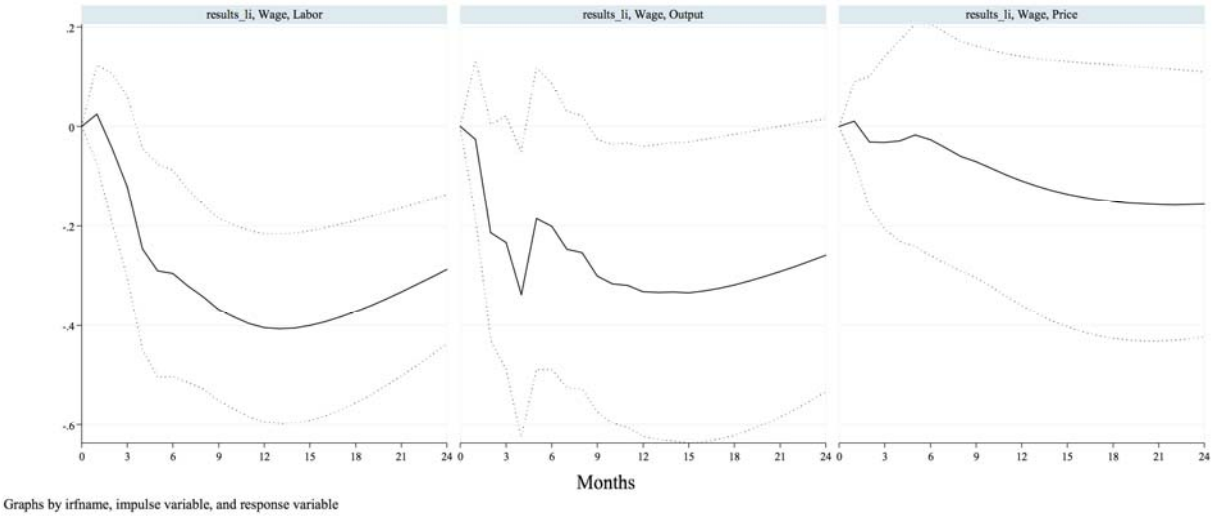


Figure 4.c
Impulse Responses to a One Unit Shock to Output with 95% Condidence Intervals

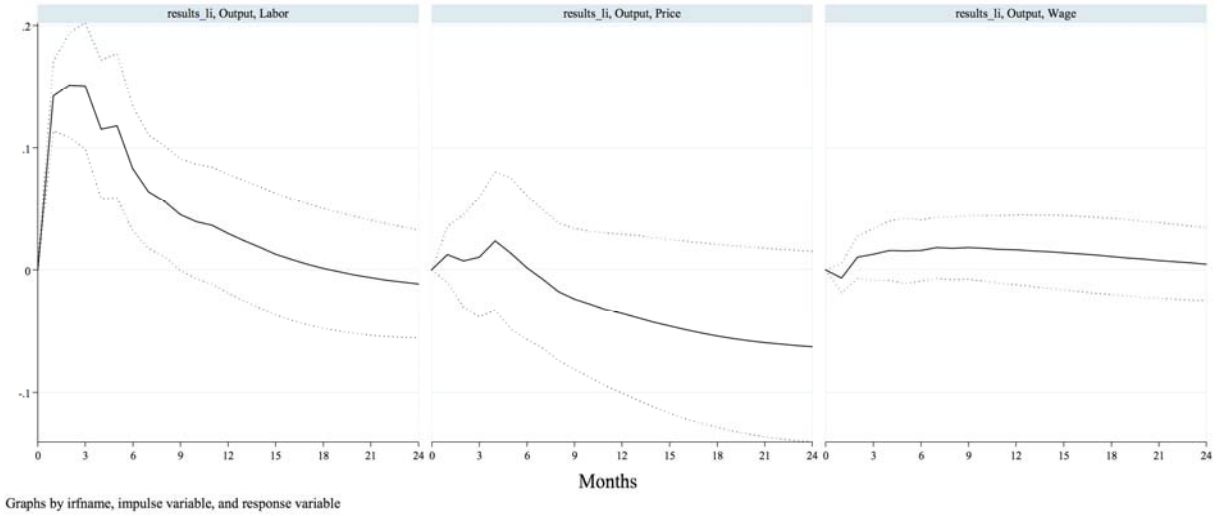
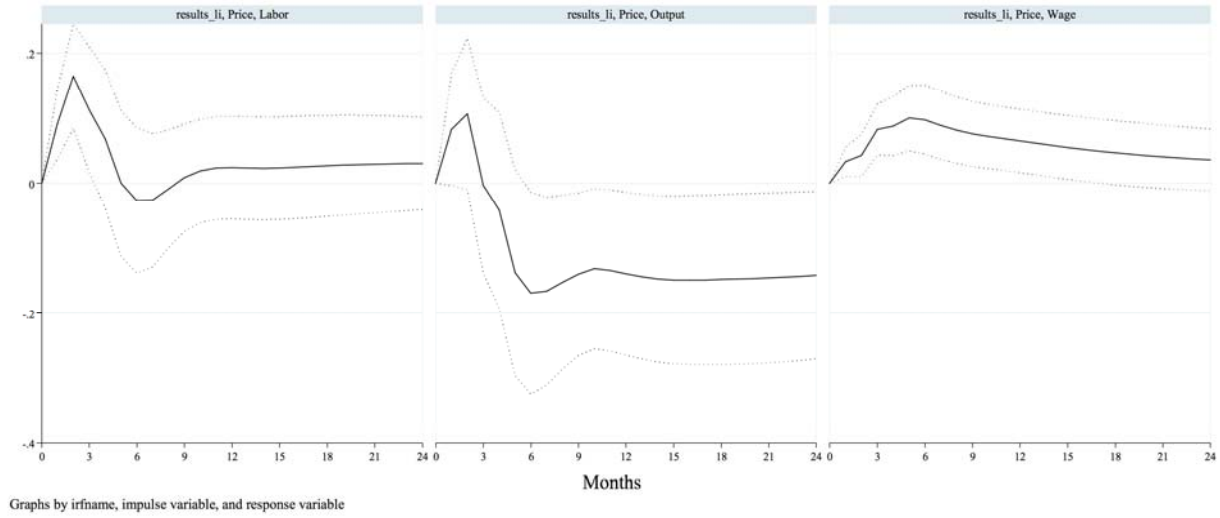


Figure 4.d
Impulse Responses to a One Unit Shock to Price with 95% Condidence Intervals



Once again we use the VAR estimates to construct residuals for each of the dependent variables. Table 4 lists the coefficient results when the residuals are regressed on regime dummies. A similar general pattern emerges as before. During the Hundred Days regime there is an unpredicted upturn in Labor Input, Output, and Prices. During the PRA there are

statistically significant positive shocks to Wages.[32] These positive Wage shocks continue during the NRA code regime. The residuals from the Labor Input regression are also negative and significant during the NIRA code regime. Finally, as before, the residuals for all dependent variables in the last 3 regimes are not statistically different from zero.

Table 5

Average Residuals Across Regimes

	Hundred Days Regime	PRA Regime	NIRA Code Regime	Schechter Regime	NLRA Regime	FLSA Regime
Labor Input	2.4%	0.3%	-0.6%	0.3%	-0.3%	0.4%
	(0.000)	(0.680)	(0.038)	(0.245)	(0.307)	(0.245)
Wage Rate	0.2%	1.7%	0.2%	-0.1%	0.0%	0.2%
	(0.459)	(0.000)	(0.049)	(0.636)	(0.734)	(0.209)
Output	4.0%	0.1%	-0.6%	0.2%	-0.3%	0.8%
	(0.000)	(0.912)	(0.235)	(0.632)	(0.565)	(0.149)
Prices	1.1%	0.5%	-0.3%	0.1%	0.0%	0.3%
	(0.014)	(0.415)	(0.270)	(0.511)	(0.868)	(0.270)

Again we chart the average residuals by month in Figures 5.a—5.d. They tell a similar story as that when Employment and Hours are included in the VAR separately. During the Hundred Days regime there are unexpected increases in Labor Input, Output, and Prices. However, this changes abruptly during the PRA regime when there are statistically significant negative shocks to Labor Input at the same time there are large statistically significant shocks to Wages. During the early part of the NIRA regime there are negative shocks to Labor Input and Output with continued positive shocks to Wages. At the end of the regime, however, Labor Input residuals trend higher and in some cases are statistically significant. Following the repeal of the NIRA, the residuals from the Wage regression trend negative and in a few cases are statistically significant. Finally Labor Input and Output residuals trend positive in the months ahead of the NLRA being upheld, but turn negative and statistically significant by 1938.

[32] Labor Input is likely unaffected because while the number of workers on payrolls, i.e. employment, went up, hours of work went down, as seen in the residuals from Table 2.

Figure 5.a

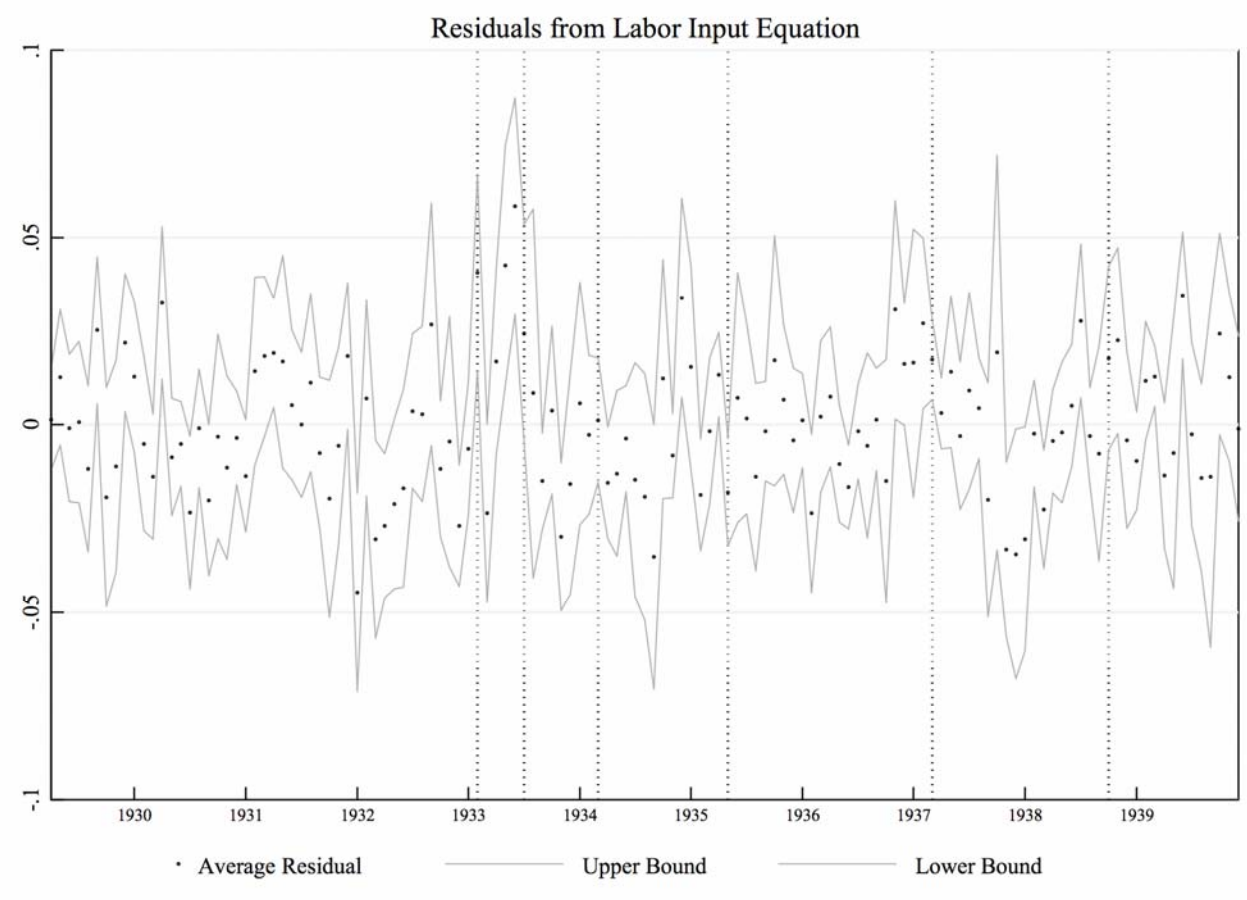

Residuals from Labor Input Equation
.1
.05
0
-.05
-.1
1930
1931
1932
1933
1934
1935
1936
1937
1938
1939
Average Residual
Upper Bound
Lower Bound

Figure 5.b

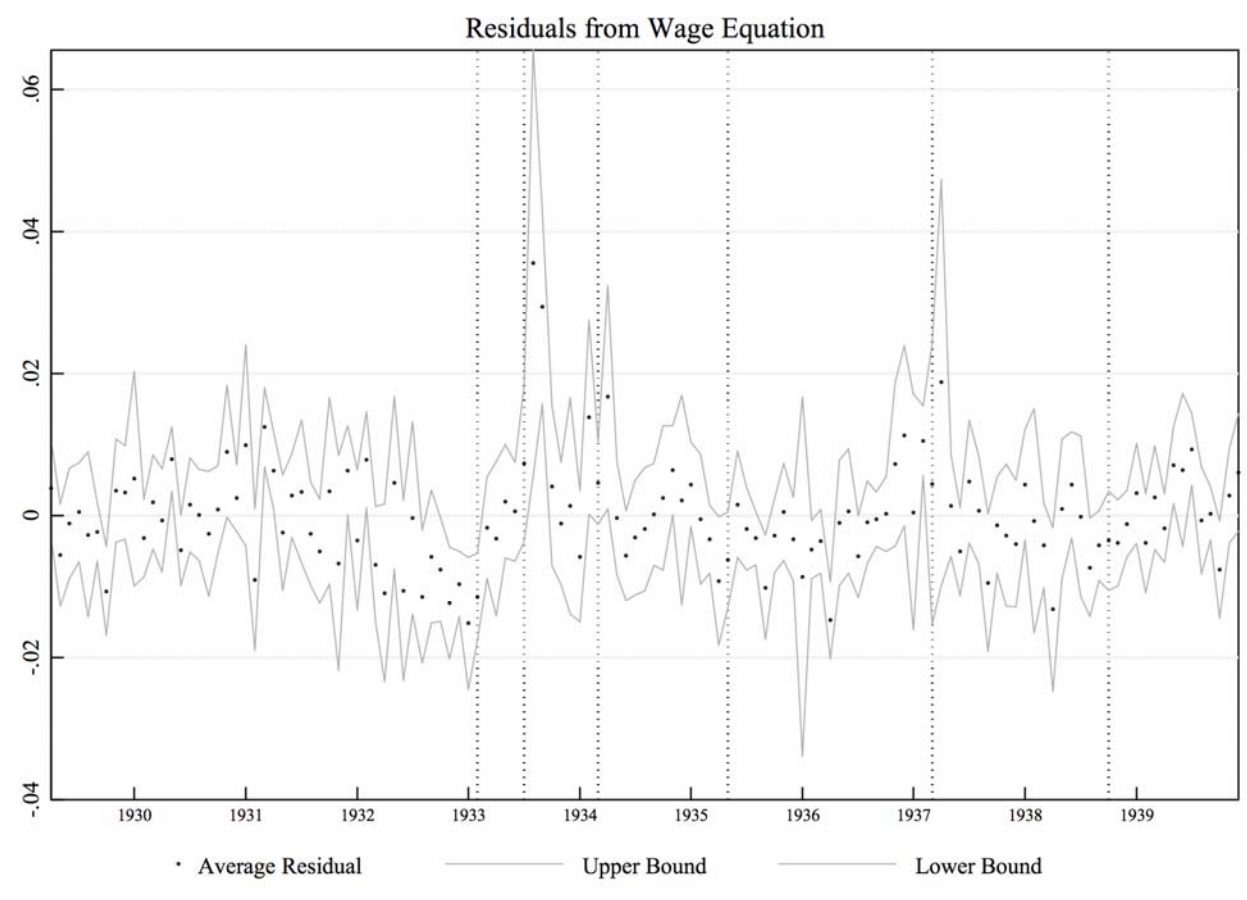

Residuals from Wage Equation
.06
.04
.02
0
-.02
-.04
1930
1931
1932
1933
1934
1935
1936
1937
1938
1939
Average Residual
Upper Bound
Lower Bound

Figure 5.c

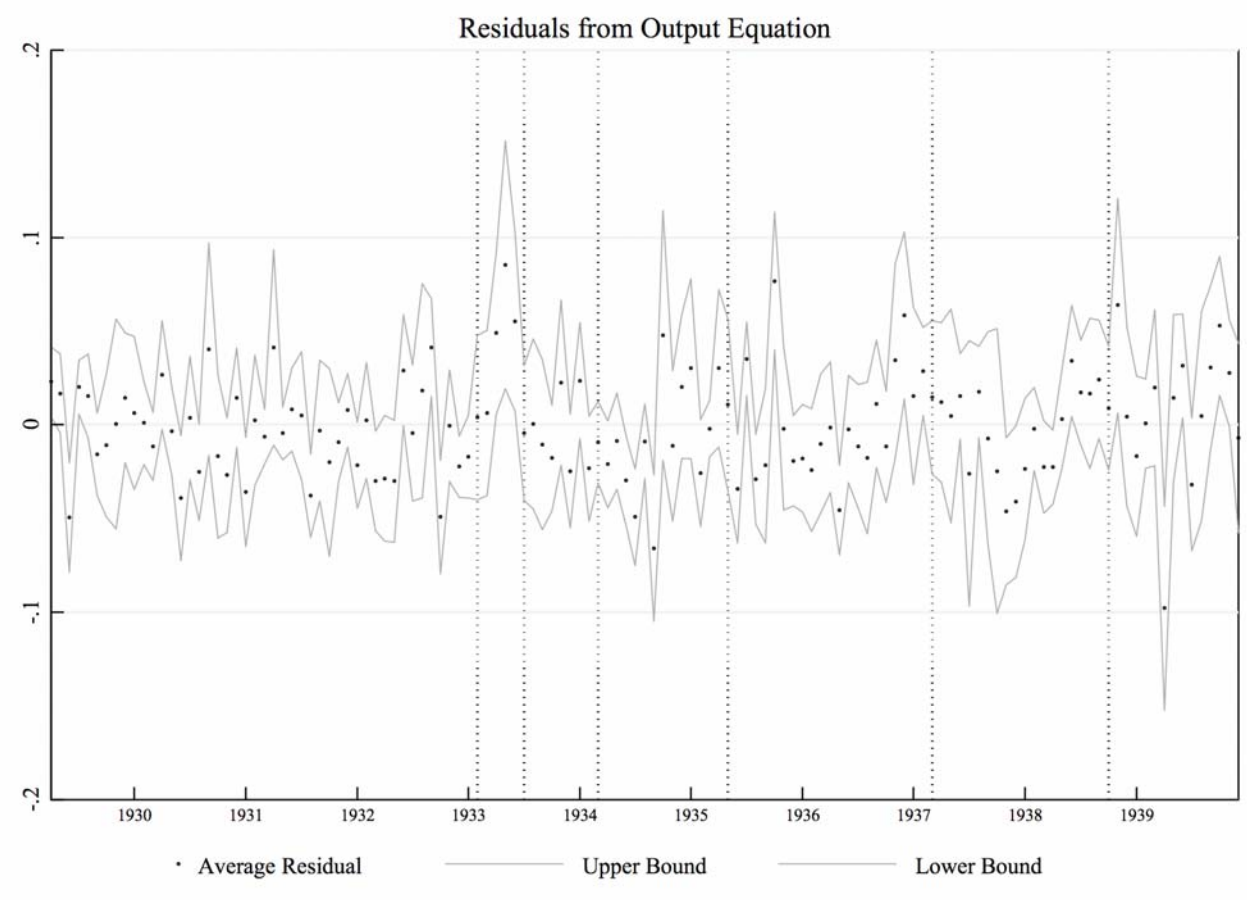
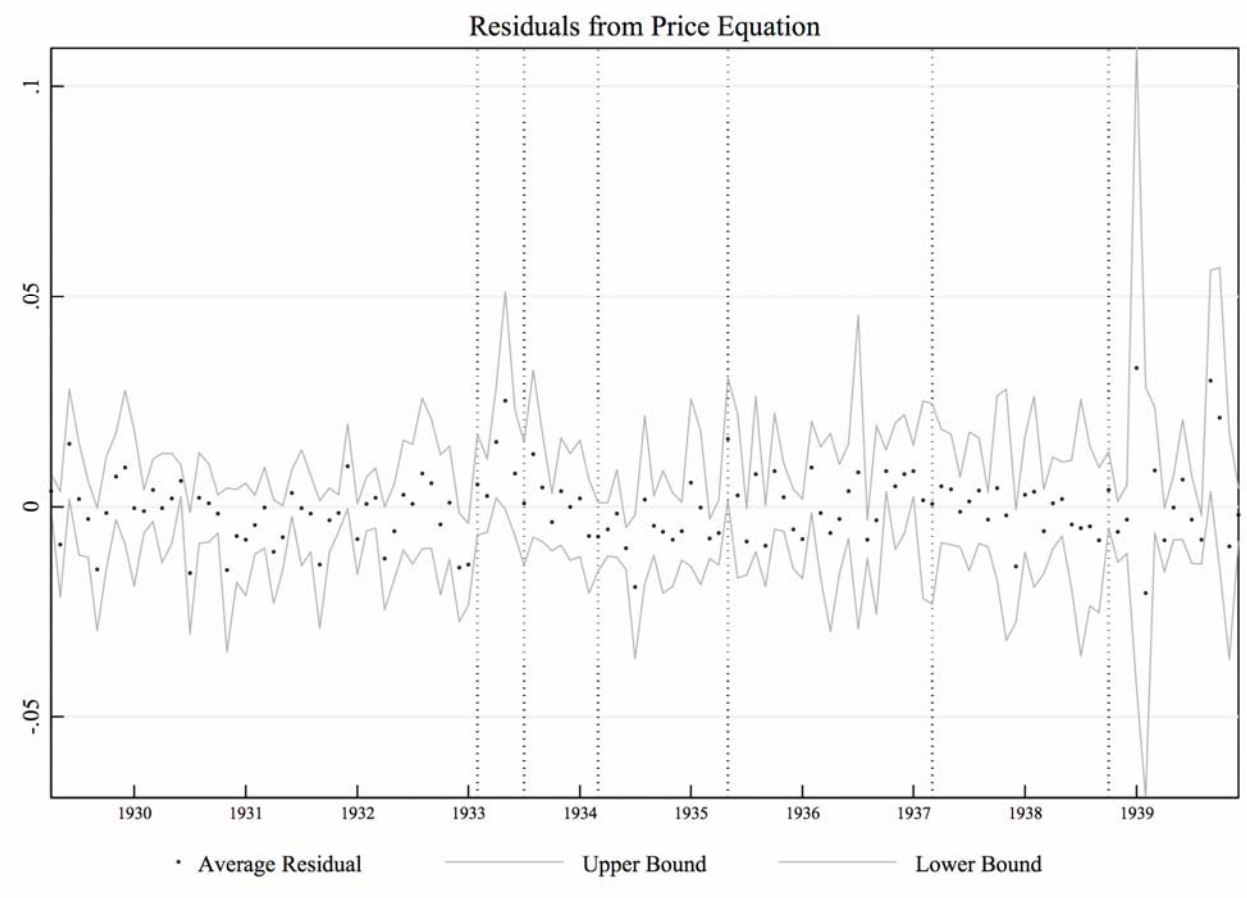

Residuals from Output Equation
.2
.1
0
-.1
-.2
1930
1931
1932
1933
1934
1935
1936
1937
1938
1939
Average Residual
Upper Bound
Lower Bound

Figure 5.d



Other Robustness Checks

In addition to examining the results using Labor Input rather than separating Hours and Employment we conducted a number of additional robustness checks and sensitivity analyses. In one exercise we ran the model only using data from 1929 and on to determine if there may have been a difference in the relationships between the 5 dependent variables between the 1920s and 1930s. The results led to similar conclusions. We also experimented with the dropping of different industries to test whether the results were being driven by any one or two industries in our sample. The conclusions from this excise fit with those above. We also ran the regressions weighting observations by the employment size of the industry. Again the results were similar.

Discussion of Results

The results presented above strongly suggest that there were important shocks to industrial labor markets, output, and prices which corresponded to changes in legal or policy regimes within the New Deal. They also raise some important questions. During the Hundred Days regime immediately following Roosevelt's inauguration there was an unexplained increase in economic activity. At this stage we can only speculate about the cause. Were financial reforms, such as the Emergency Banking Act, primarily responsible for the rapid recovery? From a monetary perspective, since a large cause of the downturn between 1929 and early 1933 was a banking system in shambles—around half of all banks in the US failed during this period—once the banking crisis ended, one might expect to see a fairly heady recovery to occur. Bernanke (1983, p. 272) claims that it could be argued that "federally directed financial rehabilitation … was the only New Deal program that successfully promoted economic recovery." Wigmore (1987, p. 755) likewise views the bank holiday, the government's embargo of gold, and devaluation as a "series of quite effective New Deal policies." Choudhri and Kockin (1980), followed by several other papers summarized in Bernanke (1995), found that countries who left the gold standard sooner recovered faster from the Great Depression than those who remained on gold.

Still, could some aspects of the sharp recovery of the US economy during the spring of 1933 have been artificial? For example, could the anticipation of the NRA cartels have induced firms to boost production? If firms felt that the NRA cartels would impose production quotas based upon market share on the day of their imposition, it would be logical to enter a "race to market share" in the weeks leading up to this date. While Himmelberg (1976, p. 184) notes that the overall framework for the NIRA was first presented to Roosevelt in May of 1932 by Adolph Berle, and was later presented to the President-elect in January 1933, Roosevelt did not make it a priority and gave no hint of such a policy in his public speeches. The first public hints of an NRA-type cartelization plan surfaced only after the April 6 passage of Hugo Black's 30-hour workweek bill in the Senate. Roosevelt felt that the Black bill was dangerously inflexible and had to be defeated, but to do so would require a viable substitute and thus over the next five weeks the NIRA was drafted and presented to Congress on May 17.[33] If there was a race to market share in anticipation of cartelization, we would expect to see strongly positive Output

[33] Himmelberg, 1976, p. 196.

residuals in April, becoming stronger in May, and continuing in June of 1933. Figures 5c and 3d show just such an outcome.

An alternative explanation for the boom between March and July of 1933, before the PRA regime was implemented, relies upon inflationary expectations. Hugh Johnson, the NRA's first administrator suggested such a cause in his memoirs, written in 1935, with regards to industry's "rush to speculative production."[34] The cause, according to Johnson, was fear that currency depreciation and increased wages under NRA would cause high inflation. Thus, economic actors "hurried to turn their money into goods to take advantage of this expected [price] rise … Everybody was stocking up on all staples and a false industrial activity started with a bang."[35] The strongly positive Price residuals in Figures 3d and 5e, for the months leading up to the PRA regime, combined with the positive Output and Employment residuals for these time periods, are consistent with such a story.

Another possible cause for the rapid recovery between March and July 1933 simply relies upon the potential gains Roosevelt brought to business and/or consumer confidence. Roosevelt's fireside chats and policy speeches supposedly delivered a calming influence on the economy. This rise in expectations could have created a major uptick in economic activity as firms began hiring and consumers began spending again. Eggertsson suggests that the recovery between 1933 and 1937 was largely driven by a shift in expectations—including, but not limited to inflationary ones consistent with Johnson's account above. Specifically, Roosevelt discarded three important dogmas—the gold standard, the balanced budget, and commitment to small government—that constrained the Hoover administration. This elimination of these policy dogmas triggered a dramatic change in expectations about inflation, future output, and interest rates. Employing a dynamic stochastic general equilibrium model, Eggertsson's calibrations suggest that the regime change—embodied by the elimination of old policy dogmas—accounts for between 70 and 80 percent of the recovery in inflation and output between 1933 and 1937. Still, Eggertsson does not attempt to explain the unevenness of recovery during the New Deal, as has been our objective here. Clearly more work is needed to determine what combination of factors was responsible for the sharp recovery that began around inauguration day.

[34] Johnson ,1968 (reprint), p. 190.
[35] Ibid, pp. 190-191

Whatever the cause of the rapid recovery during the Hundred Days regime it is clear from our results that this recovery unexpectedly stalls beginning in August 1933 with the imposition of the PRA and NRA code regimes. Our estimates identify large positive shocks to Wage rates along with negative shocks to measures of Labor Input and Output. Of course the NIRA specifically called for higher wages, shorter workweeks, and greater employment. Our results suggest that the PRA and NRA code regimes delivered the first two, but did not bring higher employment when measured as total Labor Input, which was in fact lower under the NRA code regime.[36] This of course is not unexpected given economic theory as the large increases to wage rates likely caused a decrease in quantity of labor demanded. Likewise cartelization under the NIRA should theoretically bring lower Output, and hence less need for Labor Input, as is consistent with our results.

Interestingly, however, at the very end of the NRA code regime we find some evidence that the cartels were breaking down as suggested by contemporary observers, and most recently by Taylor and Klein (2008). In the final months of the regime we estimate unexplained positive shocks to measures of both Labor Input and Output. During the *Schechter* regime following the repeal of the NIRA we find some unexplained negative shocks to Wages. Given its repeal was, in part, a repeal of an industry-specific minimum wage law this is not surprising. However, what is interesting is the small size of these shocks, when compared to the wage increases that preceded them, which suggest that the NIRA's higher wages became largely entrenched.

Explaining the shocks during the NLRA regime is a bit more difficult. Output and measures of Labor Input unexpectedly decrease, although the decrease occurs several months after the *Jones & Laughlin* Supreme Court decision, making it more difficult to argue that they were caused by the NLRA itself. Still, given that the NLRA simply made organization legal, but did not immediately organize industrial labor workers, it is possible the effect of its upholding could have taken some time. More research is required to determine the ramifications of the NLRA, unionization, and strikes during the Depression.

Finally during the FLSA regime we do not find any significant shocks to our dependent variables. We are not entirely surprised by this since the FLSA higher wages and lower

[36] When Employment and Hours are separated, there is some evidence that the PRA work-sharing provisions put more workers on payrolls in August and September 1933, consistent with Taylor (2011).

workweeks were phased in over time. Additionally for most industries in our sample the new minimum wages, particularly before complete phase in which didn't happen until after our time series ends, were not binding.

What if the NRA Shocks Had Not Occurred?

In our final exercise we attempt to show what the long run effect of the shocks estimated above may have been on industry during the Depression. Specifically, without these New Deal policy regimes, and the shocks associated with them, how much higher or lower would Labor Input, Output, Wages, and Prices have been. Because we find no pattern during the FLSA regime, and we are less convinced that the shocks during the NLRA regime are due to the legislation, we focus our analysis upon the first half of the New Deal. Figure 6.a shows the difference between the true values of the dependent variables and what our model predicts in the absence of any statistically significant shocks.[37] We employ the VAR model using Labor Input to show the overall effect that these policies had.[38]

Figure 6.a not only assumes that the "bad" shocks associated with the PRA and NRA codes did not occur, but also assumes the unexplained positive shocks associated with the Hundred Days regime did not occur. Because of this Labor Input and Output would have been over 10 percentage points lower than their actual values by mid 1933. However, one can see that without the negative shocks to Labor Input and Output or the Positive shocks to Wages associated with the NIRA regimes, Output and Labor Input would have been over 5 percentage points higher by mid to late 1934.

[37] Figures 6 are overlapped impulse response graphs where we shock a variable in a given month if we estimated a statistically significant shock during that month from Figures 5.
[38] The results are very similar when we repeat the exercise with Employment and Hours separately. These can be found in Appendix 3.

Figure 6.a

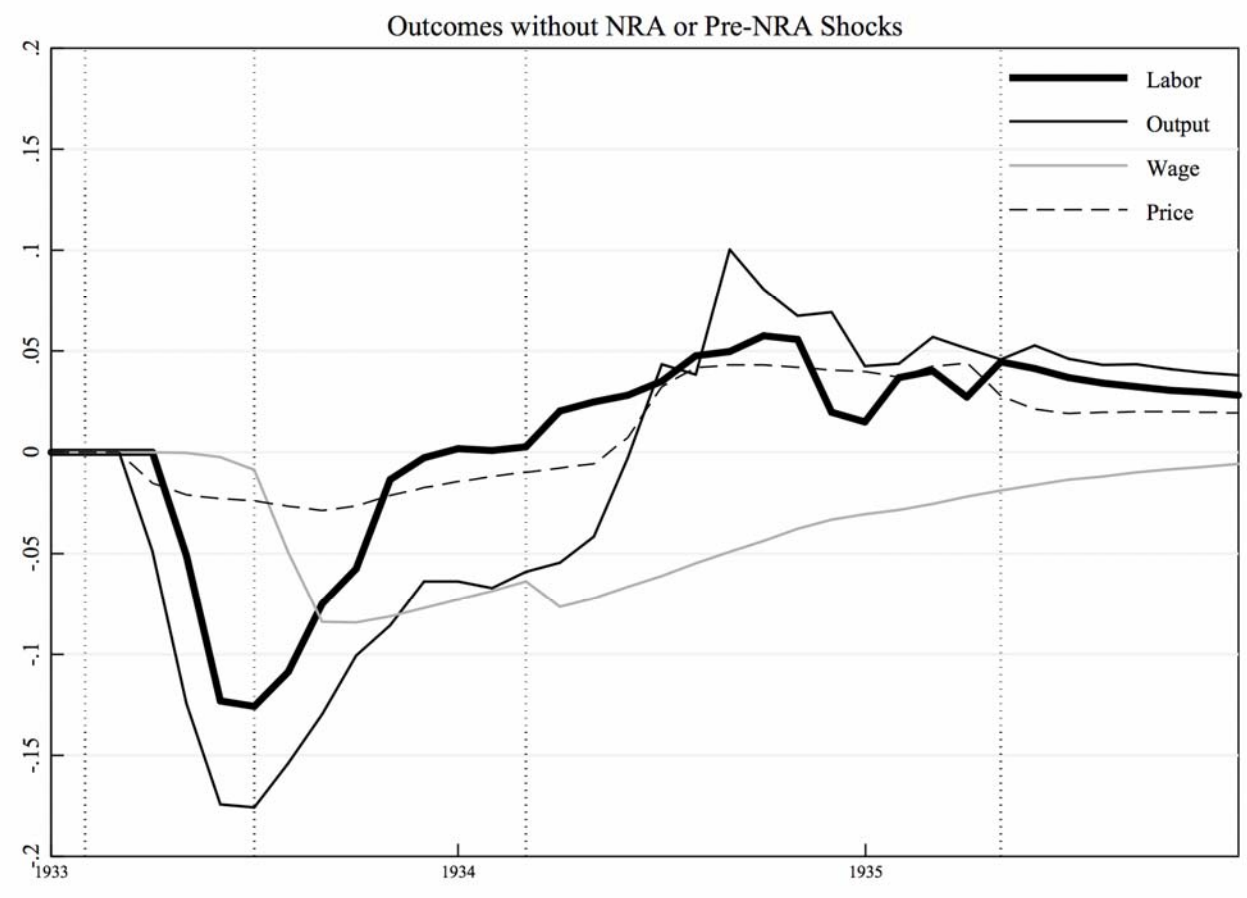
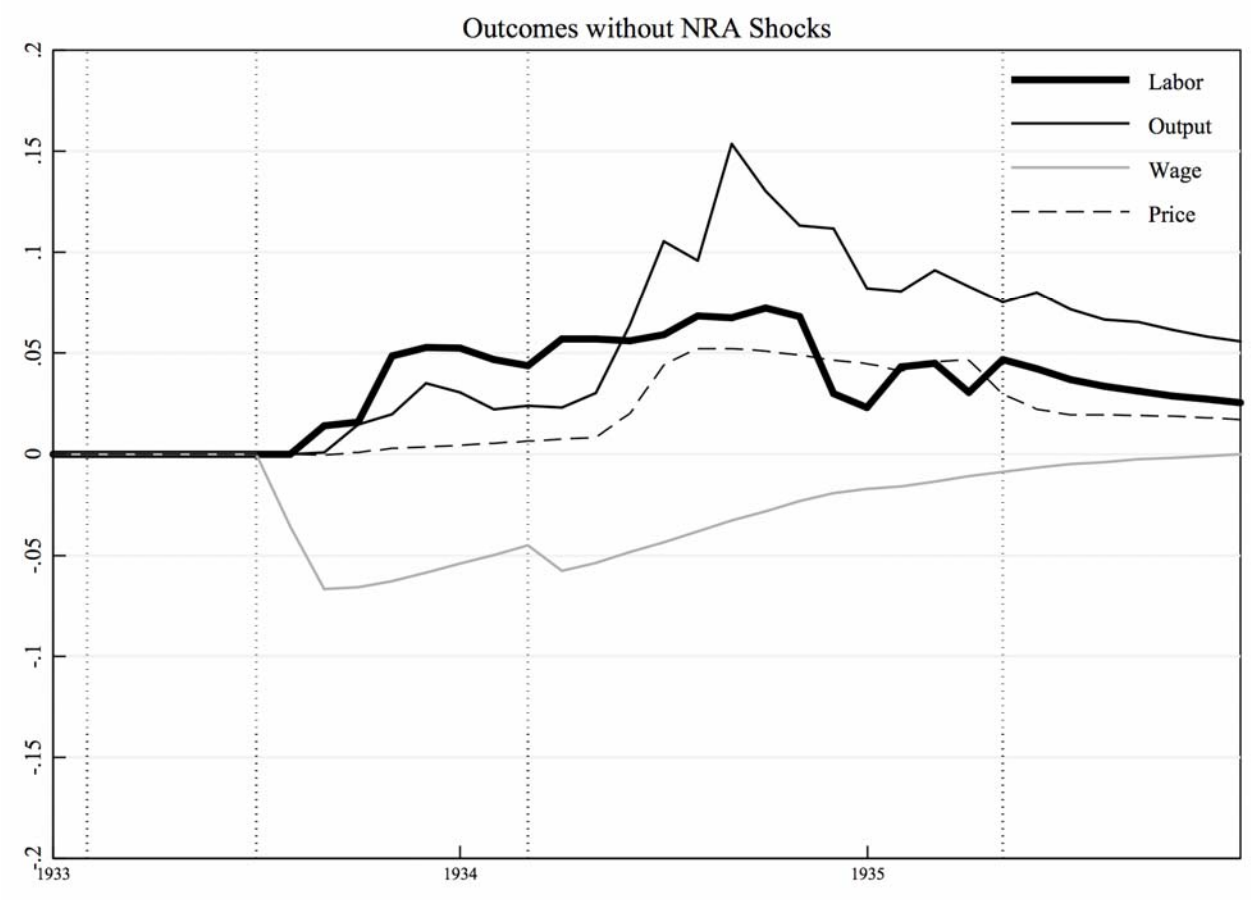


Figure 6.b repeats the exercise but only assumes the shocks associated with the PRA and NRA code regimes do not occur—while allowing those of the Hundred Days regime. This would be more appropriate if one believes that the recovery during the Hundred Days regime was not simply caused by firms increasing production in anticipation of the NRA. In absence of the PRA and NRA cartel shocks, Output is approximately 10 percentage points higher and Labor Input is around 5 percentage points higher by mid 1934 and into 1935. To put this into context, in our sample the average 1935 measures of Labor Input and Output were each approximately 28 percentage points below their 1929 peak. This suggests that if the shocks we estimate were caused by the PRA and NRA, they played a significant role in delaying recovery.

Figure 6.b



Conclusion

Markets during the New Deal operated under a number of different institutional regimes, which were marked by Executive orders, the passage of various pieces of legislation, and Supreme Court rulings on their constitutionality. We examine six specific regimes; the "Hundred Days" marking the period immediately following President Roosevelt's inauguration, the period in which firms operated under the President's Reemployment Agreement (PRA), the period in firms operated under industry-specific National Industrial Recovery Act (NIRA) codes of fair competition, the year and a half following the *Schechter* ruling where the NIRA was ruled unconstitutional, the months following the upholding of the National Labor Relations Act (NLRA) by the Supreme Court, and finally the months following the enactment of the Fair Labor Standards Act.

Using the residuals from a panel VAR regression, we identify shocks to measures of industrial Employment, Hours, Output, Wages, and Prices that are unexplained by changing fiscal and monetary policy. Many of these shocks correspond to the timing of the different regime changes. Specifically there were large positive shocks to Employment, Hours, Output, and Prices during the Hundred Days—Roosevelt's early policies, such as the Emergency Banking Act, or perhaps just the confidence that he brought back to the economy, seemed to have sparked a swift recovery. However, there were generally negative shocks to measures of Labor Input and Output, accompanied by large positive shocks to Wages, following the implementation of the PRA and NIRA codes. The timing of these shocks and their direction strongly suggest that these policies played a significant role in delaying what was shaping up to have been a healthy recovery. Based on the estimated VAR model, we predict that in the absence of the shocks associated with the NIRA, Labor Input would have been approximately five percentage points higher and Output approximately 10 percentage points higher by 1935.

Among other findings of note, we estimate only small negative shocks to Wages associated with the repeal of the NIRA, suggesting its high-wage polices had become entrenched. Additionally, we find negative shocks to Labor Input and Output beginning about six months after the Supreme Court's upholding of the NLRA. These may be attributable to unionization and strike activity that followed, with some lag, the *Jones & Laughlin* ruling, although this conjecture is in need of further study. New Deal research often seems to fall into one of two camps—either the New Deal was bad and slowed recovery, or the New Deal was good and helped save capitalism. Our findings suggest that the uneven pace of recovery during the 1930s, sometimes moving swiftly forward and sometimes going backward, can be explained by changes in legal regimes, which dramatically altered the economic rules that firms faced.

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Appendix 1: Data Sources, Arranged by Industry

Automobiles

Employment: NBER Series m8144, U.S. Index of Factory Employment, Automobiles

Hours: NBER Series m8210a, U.S. Average Actual Hours of Work Per Week, Automobile Manufacturing, Nicb

Wage Rate: NBER Series m8207a, U.S. Average Hourly Earnings, Automobile Manufacturing

Output: NBER Series m1107, Automobile Production, Passenger Cars, Factory Production

Price: NBER Series m4180b, U.S. Index of Wholesale Prices Of Passenger Automobiles, Bureau Of Labor Statistics

Boot and Shoes

Employment: NBER Series m8013, U.S. Index of Factory Employment, Boots and Shoes

Hours: NBER Series m8199a, U.S. Average Actual Hours of Work Per Week, Boot and Shoe Manufacturing, Nicb

Wage Rate: NBER Series m8205a, U.S. Average Hourly Earnings, Boot and Shoe Manufacturing

Output: NBER Series m1099, Total Shoe Production

Price: NBER Series m4133a, U.S. Wholesale Price of Mens' Black Vici Kid Shoes, Goodyear Welt, Manufacturer

Chemical Manufacturing

Employment: NBER Series m8216a, U.S. Index of Factory Employment, Chemicals

Hours: NBER Series m8214a, U.S. Average Actual Hours of Work Per Week, Chemical Manufacturing, Nicb

Wage Rate: NBER Series m8215a, U.S. Average Hourly Earnings, Chemical Manufacturing

Output: NBER Series m1279a, U.S. Index of Production Of Chemical Products, Seasonally Adjusted

Price: NBER Series m4096a, U.S. Index of Wholesale Price Of Chemicals and Drugs, Bureau Of Labor Statistics

Leather Manufactures

Employment: NBER Series m8101, U.S. Index of Factory Employment, Leather

Hours: NBER Series m8198a, U.S. Average Actual Hours of Work Per Week, Leather Tanning and Finishing, Nicb

Wage Rate: NBER Series m8204a, U.S. Average Hourly Earnings, Leather Tanning and Finishing

Output: NBER Series m1211, Cattle Hide and Kip Leather Production

Price: NBER Series m4088a, U.S. Wholesale Price of Leather, Sole, Oak, Scoured Backs

Paper and Pulp

Employment: NBER Series m8104, U.S. Index of Factory Employment, Paper and Pulp

Hours: NBER Series m8234a, U.S. Average Actual Hours of Work Per Week, Paper and Pulp Manufacturing, Nicb

Wage Rate: NBER Series m8235a, U.S. Average Hourly Earnings, Paper and Pulp

Output: NBER Series m1105, Paper Production, All Grades

Price: NBER Series m4165a, U.S. Index of Wholesale Prices Of Paper, Bureau Of Labor Statistics

Rubber Products

Employment: NBER Series m8220a, U.S. Index of Factory Employment, Rubber Products

Hours: NBER Series m8218a, U.S. Average Actual Hours of Work Per Week, Rubber Products Manufacturing, Nicb

Wage Rate: NBER Series m8219a, U.S. Average Hourly Earnings, Rubber Products Manufacturing

Output: NBER Series m1180, Crude Rubber Consumption

Price: NBER Series m4077b, U.S. Wholesale Price of Rubber, Para Island; Plantation, New York

Machine and Machine Tools

Employment: NBER Series m8224, U.S. Index of Factory Employment, Machine and Machine Tools

Hours: m8222, U.S. Average Actual Hours of Work Per Week, Machine and Machine Tools Manufacturing, Nicb

Wage Rate: m8223, U.S. Average Hourly Earnings, Machine and Machine Tool Manufacturing

Output: m1277a, Index of Production Of Machinery

Price: m4066a, U.S. Wholesale Prices of Metal and Metal Products, Bureau Of Labor Statistics. 01/1890-12/1951

Meat

Employment: NBER Series m8087,U.S. Index of Factory Employment-Slaughtering and Meat Packing

Hours: NBER Series m8196a, U.S. Average Actual Hours of Work Per Week, Meat Packing, Nicb

Wage Rates: NBER Series m8202a, U.S. Average Hourly Earnings, Meat Packing, National Industrial Conference Board

Output: NBER Series m1064, Total Meat Consumption

Price: NBER Series m4166,U.S. Index of Wholesale Prices Of Meats, Bureau Of Labor Statistics

Iron and Steel

Employment: NBER Series m8015, U.S. Index of Factory Employment, Iron and Steel Products, Seasonally Adjusted 01/1919-09/1942.

Hours: NBER Series m8208a, U.S. Average Actual Hours of Work Per Week, Iron and Steel Manufacturing, Nicb

Wage Rate: NBER Series m8210a, U.S. Average Hourly Earnings, Iron and Steel Manufacturing

Output: NBER Series m1135, Steel Ingot Production

Price: NBER Series m4134, U.S. Wholesale Price of Structural Steel

Wool Manufacturing

Employment: NBER Series m8232, U.S. Index of Factory Employment, Wool, Nicb

Hours: NBER Series m8230a, U.S. Average Actual Hours of Work Per Week, Wool Manufacturing, Nicb

Wage Rate: NBER Series m8231a, U.S. Average Hourly Earnings, Wool Manufacturing

Output: NBER Series m1098, Total Wool Consumption, Scoured Basis

Price: NBER Series m4087, U.S. Wholesale Price of Wool, Eastern Markets, Boston 01/1917-04/1942

Time Series Controls

Interest Rates: NBER Series m13030, U.S. Weighted Average of Open Market Rates, New York City

Government Spending: NBER Series m15005, U.S. Federal Budget Expenditures, Total

Government Revenue: NBER Series m15004, U.S. Federal Budget Receipts, Total

Money Supply: NBER Series m14144a, U.S. Money Stock, Commercial Banks Plus Currency Held By Public, Seasonally Adjusted

Appendix 2: VAR Coefficient Results

Table A.1

Employment	Employment		Hours		Wage		Output		Price	
L1.	1.150	0.000	0.021	0.454	0.057	0.000	0.416	0.000	-0.007	0.802
L2.	-0.304	0.000	-0.174	0.000	-0.007	0.769	-0.478	0.000	0.000	0.993
L3.	0.025	0.502	0.049	0.258	-0.009	0.690	-0.089	0.304	0.048	0.271
L4.	0.049	0.186	0.010	0.822	-0.017	0.444	0.187	0.031	-0.013	0.761
L5.	0.006	0.877	0.078	0.069	0.009	0.673	-0.002	0.982	-0.003	0.936
L6.	0.007	0.772	-0.019	0.486	-0.012	0.392	-0.060	0.279	-0.011	0.680
Hours										
L1.	0.161	0.000	0.791	0.000	0.020	0.103	0.291	0.000	0.019	0.415
L2.	-0.119	0.000	0.028	0.322	-0.005	0.760	-0.285	0.000	0.022	0.439
L3.	-0.006	0.795	0.014	0.633	-0.008	0.593	0.072	0.209	-0.019	0.503
L4.	0.007	0.761	-0.001	0.969	0.016	0.290	0.044	0.443	-0.027	0.342
L5.	-0.029	0.238	-0.015	0.592	-0.031	0.038	-0.081	0.155	-0.011	0.704
L6.	0.028	0.140	0.079	0.000	0.019	0.115	0.038	0.400	0.019	0.393
Wage										
L1.	0.100	0.004	-0.079	0.055	1.040	0.000	-0.002	0.976	0.015	0.718
L2.	-0.155	0.002	0.058	0.320	-0.096	0.002	-0.183	0.118	-0.057	0.333
L3.	0.016	0.747	0.037	0.521	0.032	0.298	0.181	0.120	0.060	0.303
L4.	0.062	0.214	-0.132	0.023	-0.020	0.510	-0.077	0.506	-0.025	0.668
L5.	-0.031	0.528	0.037	0.526	0.016	0.603	0.196	0.092	0.015	0.793
L6.	-0.021	0.543	0.023	0.576	-0.026	0.212	-0.137	0.090	-0.018	0.658
Ouput										
L1.	0.063	0.000	0.081	0.000	-0.008	0.226	0.764	0.000	0.017	0.153
L2.	-0.046	0.000	-0.052	0.000	0.017	0.029	0.062	0.033	-0.020	0.172
L3.	0.009	0.465	0.009	0.556	-0.014	0.070	0.153	0.000	0.005	0.747
L4.	-0.013	0.286	-0.033	0.023	0.004	0.596	-0.187	0.000	0.007	0.639
L5.	0.008	0.528	0.040	0.006	-0.006	0.414	0.100	0.001	-0.020	0.162
L6.	-0.019	0.062	-0.040	0.001	0.008	0.214	0.038	0.118	0.004	0.728
Price										
L1.	0.051	0.007	0.038	0.084	0.034	0.003	0.084	0.056	1.315	0.000
L2.	-0.021	0.515	-0.035	0.348	-0.040	0.041	-0.103	0.171	-0.363	0.000
L3.	-0.063	0.061	-0.035	0.374	0.040	0.053	-0.081	0.308	-0.078	0.051
L4.	0.044	0.185	0.052	0.189	-0.039	0.060	0.118	0.133	0.111	0.005
L5.	-0.021	0.524	-0.038	0.308	0.022	0.270	-0.094	0.212	-0.046	0.221
L6.	0.017	0.371	0.028	0.206	-0.014	0.228	0.061	0.162	0.030	0.174
omr	0.016	0.353	-0.042	0.038	-0.023	0.029	0.039	0.334	0.057	0.005
omr_1	0.059	0.018	0.108	0.000	0.052	0.001	0.123	0.034	-0.036	0.213
omr_2	-0.035	0.161	-0.052	0.075	-0.041	0.007	-0.190	0.001	-0.009	0.765
omr_3	-0.043	0.088	0.014	0.644	0.004	0.817	0.105	0.073	-0.022	0.463
omr_4	0.065	0.010	0.121	0.000	-0.057	0.000	-0.011	0.849	-0.023	0.436
omr_4	-0.050	0.049	-0.192	0.000	0.119	0.000	-0.086	0.151	0.067	0.026
omr_6	0.000	0.992	0.047	0.023	-0.057	0.000	0.036	0.384	-0.039	0.059

ms	0.308	0.000	0.746	0.000	-0.052	0.181	0.757	0.000	0.136	0.068
ms_1	-0.030	0.740	-0.371	0.000	0.134	0.014	-0.096	0.644	0.095	0.367
ms_2	-0.192	0.032	-0.420	0.000	-0.112	0.042	-0.895	0.000	-0.236	0.025
ms_3	-0.080	0.370	-0.093	0.375	0.076	0.163	0.409	0.049	-0.135	0.198
ms_4	-0.045	0.618	0.228	0.033	-0.065	0.242	-0.046	0.830	0.074	0.492
ms_5	0.049	0.585	0.346	0.001	-0.132	0.016	0.252	0.230	0.208	0.048
ms_6	-0.006	0.930	-0.385	0.000	0.136	0.001	-0.338	0.027	-0.155	0.045
gs	0.003	0.612	0.006	0.387	-0.008	0.034	-0.024	0.093	0.000	0.962
gs_1	0.005	0.417	-0.003	0.698	0.009	0.022	0.038	0.008	0.003	0.653
gs_2	-0.005	0.257	-0.001	0.905	-0.003	0.346	-0.028	0.009	-0.001	0.784
gs_3	0.003	0.609	0.004	0.556	-0.008	0.012	-0.009	0.469	-0.006	0.305
gs_4	0.012	0.006	0.004	0.442	0.006	0.031	0.043	0.000	0.001	0.918
gs_5	-0.011	0.005	-0.006	0.183	0.002	0.357	-0.024	0.008	0.007	0.126
gs_6	-0.001	0.650	-0.005	0.179	-0.004	0.035	-0.007	0.330	-0.005	0.125
gr	0.008	0.584	0.027	0.103	0.027	0.002	0.047	0.147	0.024	0.152
gr_1	0.006	0.703	-0.022	0.269	0.012	0.252	-0.063	0.113	-0.018	0.376
gr_2	-0.022	0.146	-0.040	0.023	-0.026	0.004	-0.033	0.350	-0.019	0.290
gr_3	0.029	0.106	0.072	0.001	0.023	0.036	0.076	0.069	0.046	0.027
gr_4	-0.020	0.278	-0.044	0.037	-0.015	0.179	-0.101	0.017	-0.038	0.074
gr_5	-0.023	0.188	0.012	0.574	-0.031	0.004	0.021	0.609	-0.001	0.959
gr_6	0.024	0.058	-0.001	0.953	0.039	0.000	0.047	0.108	0.017	0.257
cpi	-0.056	0.058	0.043	0.215	-0.063	0.001	-0.091	0.189	0.002	0.956
R-Squared	0.9801		0.9733		0.9835		0.9611		0.9829	

Note: All regressions have 2132 observations. Coefficient results for the Industry Specific Month Effects and Industry Fixed effects are unreported but available on request.

Table A.2

Labor Input	Labor Input		Wage		Output		Price	
L1.	1.006	0.000	0.043	0.000	0.420	0.000	0.014	0.466
L2.	-0.196	0.000	0.002	0.857	-0.415	0.000	0.015	0.565
L3.	0.005	0.872	-0.016	0.240	0.017	0.741	-0.001	0.980
L4.	0.038	0.242	0.011	0.440	0.064	0.222	-0.014	0.595
L5.	-0.007	0.824	-0.023	0.088	-0.039	0.452	-0.008	0.762
L6.	0.057	0.013	0.009	0.373	-0.019	0.598	0.012	0.520
Wage								
L1.	0.024	0.643	1.044	0.000	-0.018	0.824	0.010	0.804
L2.	-0.091	0.217	-0.092	0.003	-0.189	0.107	-0.056	0.343
L3.	0.031	0.666	0.026	0.392	0.173	0.138	0.064	0.275
L4.	-0.086	0.238	-0.021	0.488	-0.079	0.499	-0.017	0.770
L5.	0.081	0.263	0.019	0.529	0.259	0.025	0.012	0.837
L6.	-0.031	0.540	-0.031	0.134	-0.188	0.019	-0.022	0.579
Output								
L1.	0.142	0.000	-0.006	0.302	0.773	0.000	0.012	0.290
L2.	-0.103	0.000	0.016	0.035	0.039	0.176	-0.021	0.145
L3.	0.008	0.664	-0.013	0.076	0.146	0.000	0.009	0.552
L4.	-0.044	0.015	0.003	0.720	-0.179	0.000	0.009	0.545
L5.	0.052	0.003	-0.005	0.481	0.116	0.000	-0.021	0.150
L6.	-0.049	0.001	0.007	0.298	0.030	0.207	0.002	0.857
Price								
L1.	0.090	0.001	0.033	0.004	0.086	0.052	1.315	0.000
L2.	-0.057	0.222	-0.039	0.047	-0.112	0.138	-0.365	0.000
L3.	-0.088	0.075	0.040	0.057	-0.082	0.301	-0.078	0.051
L4.	0.080	0.104	-0.039	0.057	0.123	0.117	0.111	0.005
L5.	-0.052	0.268	0.023	0.250	-0.097	0.200	-0.044	0.244
L6.	0.040	0.142	-0.014	0.212	0.064	0.149	0.028	0.198
omr	0.022	0.880	-0.021	0.042	0.045	0.267	0.057	0.005
omr_1	0.097	0.007	0.050	0.001	0.103	0.076	-0.037	0.206
omr_2	-0.063	0.083	-0.040	0.009	-0.182	0.002	-0.008	0.780
omr_3	-0.045	0.217	0.002	0.898	0.106	0.070	-0.023	0.432
omr_4	0.173	0.000	-0.058	0.000	-0.013	0.821	-0.021	0.482
omr_5	-0.194	0.000	0.119	0.000	-0.091	0.127	0.068	0.023
omr_6	0.030	0.243	-0.057	0.000	0.044	0.291	-0.043	0.039

ms	0.850	0.000	-0.046	0.230	0.774	0.000	0.146	0.049
ms_1	-0.375	0.004	0.127	0.020	-0.133	0.526	0.093	0.372
ms_2	-0.398	0.002	-0.108	0.048	-0.890	0.000	-0.235	0.025
ms_3	-0.151	0.246	0.073	0.178	0.406	0.051	-0.148	0.155
ms_4	0.084	0.529	-0.063	0.261	-0.063	0.769	0.071	0.505
ms_5	0.297	0.024	-0.138	0.012	0.246	0.242	0.209	0.047
ms_6	-0.266	0.005	0.140	0.000	-0.283	0.066	-0.150	0.051
gs	0.011	0.234	-0.008	0.031	-0.024	0.100	0.001	0.932
gs_m	0.000	0.242	0.000	0.238	0.000	0.025	0.000	0.576
gs_1	0.001	0.880	0.009	0.021	0.038	0.009	0.003	0.693
gs_2	-0.007	0.272	-0.003	0.361	-0.028	0.009	-0.001	0.791
gs_3	0.007	0.339	-0.008	0.011	-0.009	0.467	-0.006	0.312
gs_4	0.014	0.032	0.006	0.024	0.043	0.000	0.000	0.933
gs_5	-0.015	0.007	0.002	0.355	-0.025	0.006	0.007	0.127
gs_6	-0.003	0.505	-0.004	0.032	-0.008	0.271	-0.005	0.129
gr	0.000	0.760	0.027	0.001	0.049	0.135	0.024	0.147
gr_m	-0.028	0.259	0.000	0.773	0.000	0.311	0.000	0.911
gr_1	-0.047	0.033	0.011	0.268	-0.066	0.097	-0.019	0.349
gr_2	0.089	0.001	-0.026	0.005	-0.033	0.346	-0.017	0.329
gr_3	-0.070	0.008	0.023	0.038	0.083	0.046	0.046	0.028
gr_4	0.000	0.986	-0.014	0.211	-0.107	0.011	-0.039	0.068
gr_5	0.017	0.355	-0.032	0.003	0.019	0.648	0.000	0.983
gr_6	0.003	0.771	0.039	0.000	0.049	0.097	0.018	0.228
cpi	0.035	0.002	-0.074	0.000	-0.062	0.365	-0.011	0.746
R-Squared	0.9826		0.9834		0.9607		0.9829	

Note: All regressions have 2132 observations. Coefficient results for the Industry Specific Month Effects and Industry Fixed effects are unreported but available on request.

Appendix 3: Simulations using Employment and Hours separately.

Figure A.1

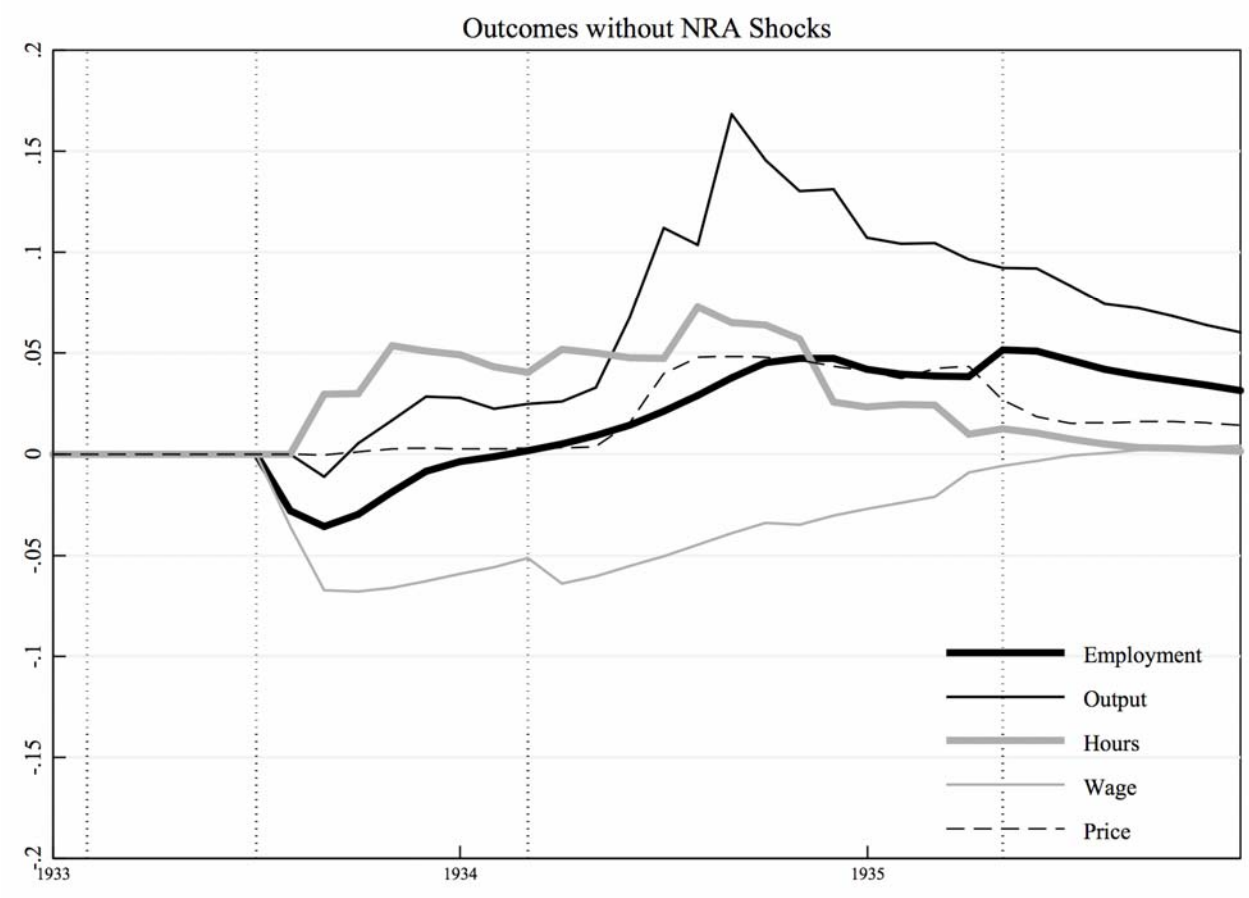
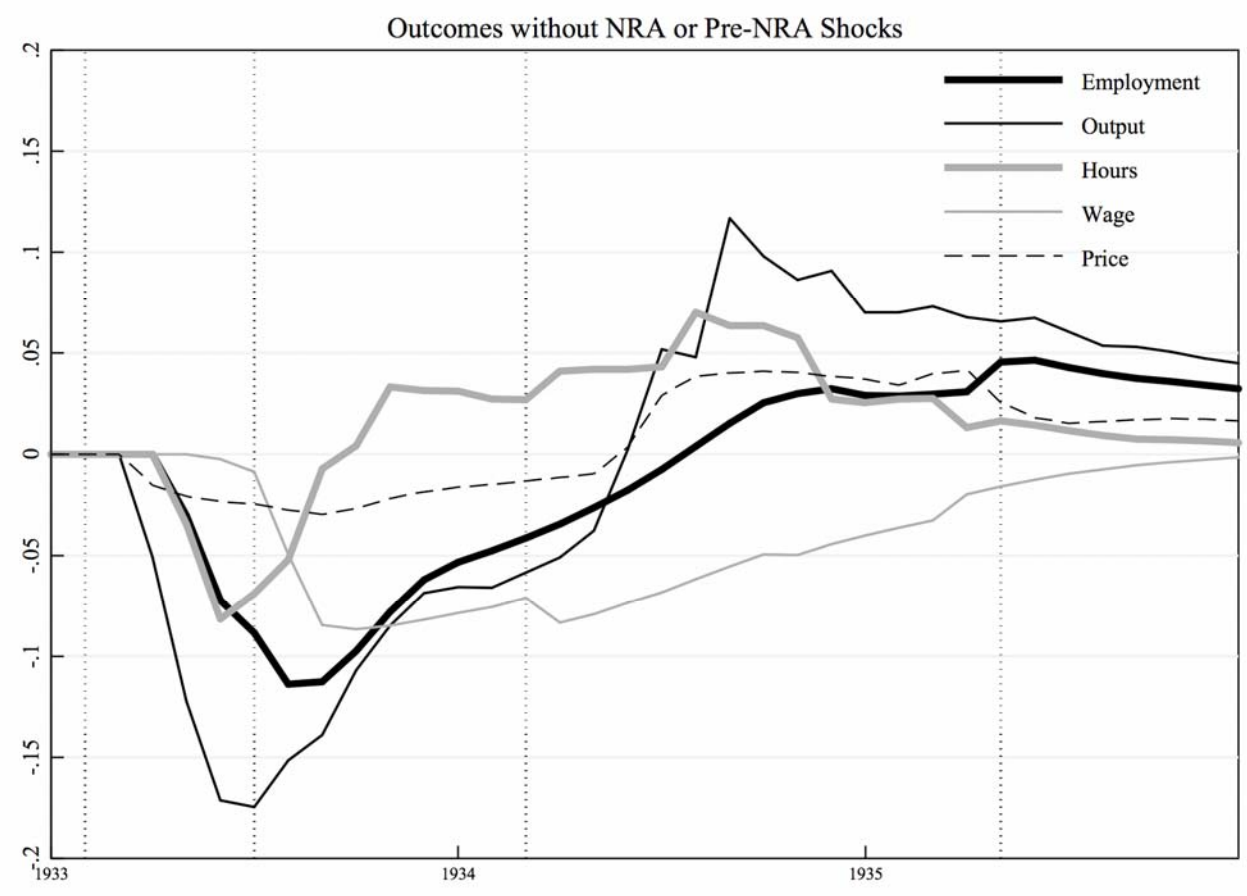


Figure A.2


Outcomes without NRA or Pre-NRA Shocks
Employment
Output
Hours
Wage
Price
.2
.15
.1
.05
0
-.05
-.1
-.15
-.2
1933
1934
1935