

Labor Market Tightness during WWI and the Post-War Recession of 1920-1921*

Haelim Anderson
Federal Deposit Insurance Corporation

Jin-Wook Chang
Federal Reserve Board

This Version: June 11, 2022

Abstract

The behaviors of labor markets between the end of World War I and the recession of 1920-1921 can provide important lessons for the economic conditions today. The U.S. economy entered the 1920s with a robust job market and high inflation but fell into a recession following the Federal Reserve's discount rate hikes to tame inflation. Using a newly constructed data set, we study labor market dynamics during this period. We find that the labor markets were tight when the Federal Reserve began tightening of monetary policy, but they became loose following the tightening as the recession deepened. The demand-supply imbalance in the labor market was driven by a sharp decline in the number of job openings. We also show that the recession had an uneven effect on labor markets across sectors and by gender.

Keywords: Inflation, Recession of 1920-1921, Vacancies, Unemployment, Labor Market Dynamics

JEL classification: E32, E24, J23, J63

*The views expressed herein are those of the authors and do not necessarily reflect the position of the Federal Reserve Board, the Federal Reserve System, or the Federal Deposit Insurance Corporation.

Authors Affiliations: Haelim Anderson, Federal Deposit Insurance Corporation; handerson@fdic.gov; Jin-Wook Chang, Federal Reserve Board; jin-wook.chang@frb.gov.

1. Introduction

The U.S. labor market has gone through tremendous stress and transformation with the COVID-19 outbreak and subsequent long recovery. The current assessment of the Federal Reserve (Fed) is that labor market tightness is helping drive the extraordinary inflation the United States is experiencing (Board of Governors of the Federal Reserve System, 2022). Indeed, in a speech given on March 21, 2022, Chairman Powell of the Federal Reserve stated that a main goal of raising interest rates is to reduce inflation by cooling the labor market, primarily by reducing new wage postings (Powell, 2022). Furthermore, the Federal Reserve is focused on monitoring the heterogeneous effect of inflation, as well as of raising rates, on labor market participants.

The existing empirical literature provides little guidance on how detailed labor market outcomes—such as job postings, filling, and vacancies—will change in reaction to a tightening of monetary policy when there is high inflation. This is because such labor market information began to be systemically collected only in recent years, whereas the last high-inflation episode in the United States occurred in the early 1980s.¹ This paper helps to fill this hole in the literature by introducing a new data set, which allows for a detailed analysis of the functioning of the labor market in a historical period with a similar macroeconomic situation.

At the end of World War I (WWI), the United States was experiencing strong growth and unruly inflation, driven in part by an expansionary fiscal policy and an accommodative monetary policy, a macroeconomic state which parallels that of the United States in 2022. Furthermore, to tame inflation in 1920, the Federal Reserve raised rates in a bid to loosen tight labor markets. We examine how labor markets fared during and after WWI by using data published by the NY public employment office in the *Labor Market Bulletin*, a monthly publication that reported a variety of labor statistics for New York, including counts of job seekers, vacancies, and job placements, as well as wages. Further, starting in 1918, the *Labor Market Bulletin* published these data by industry-occupation group and included a breakdown by gender. With these data, we examine labor market conditions in New York and analyze how a tightening of monetary policy affected labor supply and demand in a period of high inflation.

¹ The Bureau of Labor Statistics began reporting these types of labor statistics with the Job Openings and Labor Turnover Survey in 2002. Before this survey, the Bureau of Labor Statistics had not collected or disseminated job-opening statistics covering the economy on a regular basis (Clark and Hyson (2001)).

A main takeaway from this work is that in the immediate aftermath of WWI, the demand for labor increased as the economy reverted back to peacetime and households looked to increase consumption following the lifting of war-time restrictions. Somewhat surprisingly, we find that the supply of labor remained steady (at an elevated rate) over this period despite the major disruptions to the economy such as the return of soldiers from Europe after WWI and the winding down of war-related industries. With the tightening of monetary policy, labor demand quickly fell off and the economy entered a deep recession. Furthermore, the labor market effects were heterogeneous, with male workers suffering to a larger extent.

The similarities between the U.S. economy at the end of WWI and at the beginning of 2022 are striking. Both fiscal and monetary policies were expansionary to support WWI. Likewise, since the outbreak of COVID-19 in 2020 until the beginning of 2022, the federal government has pursued an expansive fiscal policy to counteract the adverse economic effects of the pandemic, and at the same time, the Federal Reserve has maintained an accommodative monetary policy. Further, in both the historical and current periods, labor markets were tight and considered the main driver of high inflation. Finally, to tame inflation in both periods, the Federal Reserve tightened monetary policy. In our historical period, the Federal Reserve accomplished this in two steps: It first raised discount rates from 3.75 percent, their level during WWI, to 4.56 percent starting in June 1918. It then adopted a more aggressive stance, rapidly raising the discount rate to 6 percent in January 1920 and then to 7 percent in June 1920. In May 2022, the Federal Open Market Committee announced an increase in the target rate range from $\frac{1}{4}$ – $\frac{1}{2}$ percent to $\frac{3}{4}$ –1 percent and signaled that further increases are likely.²

A further similarity across these two time periods is the occurrence of national pandemics. Whereas the current COVID-19 pandemic is a major driver of economic outcomes over the entire length of our current period of analysis, the 1918 influenza pandemic's effect on the economy is relatively short. Nevertheless, our labor market data allow for us to better understand how labor supply and demand react to pandemic-related economic shocks.

To better understand the labor market dynamics following the Fed's rate hikes in 1920, we separately consider the conditions during the mild recession of August 1918 to March 1919 and the severe recession of January 1920 to July 1921. The federal government reduced fiscal

² See the FOMC statement issued after the May meeting, which is available on the Monetary Policy portion of the Board's website at <https://www.federalreserve.gov/newsevents/pressreleases/monetary20220504a.htm>.

spending during both recessions, however, the Fed maintained an easy monetary policy during the mild recession and then tightened monetary policy during the severe recession.

We find that New York's labor markets were relatively tight during WWI and maintained that tightness during the mild recession between August 1918 and March 1919. A tight labor market naturally led to high employment and rising real wages. The labor market remained tight until the Federal Reserve began rapidly increasing the discount rate in January and July of 1920. By September 1920, labor market tightness had fallen sharply, largely driven by a contraction in labor demand as the recession deepened.

We then turn to studying the heterogeneous effect of tightening monetary policy on the economy and find an uneven effect across industries. During WWI, manufacturing and other industries that mobilized for war production naturally experienced the worst labor shortages. Then following the end of WWI, labor demand from these manufacturing sectors declined. Nevertheless, labor markets remained tight overall likely in part to laborers being able to reallocate themselves across industries. With the tightening of monetary policy and the severe recession of January 1920 to July 1921, however, labor demand sharply contracted with manufacturing and other industrial sectors leading the way with large reductions in job vacancies. This reduction was driven by a contraction in job openings and, given that labor supply remained relatively stable, resulted in an imbalance between labor demand and supply.

Lastly, we show the uneven effect of the recession on the labor markets by gender. We find that labor markets for male workers were less tight than those for female workers. Labor demand for men was higher from manufacturing, whereas labor demand for women was higher from service sectors, such as hotels and wholesale. Labor demand for the manufacturing sector contracted sharply while labor demand for the service sector contracted mildly during the severe recession of 1920–21, suggesting that finding employment would have been harder for male workers than for female workers.

Our findings have policy implications for today. Policymakers are concerned about inflation, which has risen to the highest level in the past 40 years in the United States, amid the recovery from the COVID-19 pandemic. In response, the Federal Reserve has begun raising interest rates to curb inflation and has started to scale back on quantitative easing. Our study shows that it is important for the Federal Reserve to adjust policy rates at the right pace. Strong (tight) labor markets can become weak (slack) faster than policymakers may anticipate. Indeed,

our results demonstrate that labor demand reacted sharply and quickly to the tightening of monetary policy, at a speed which can outpace policymakers' abilities to track current economic conditions.

Our study is related to several strands of literature. First, it is related to the literature on the performance of the U.S. economy during WWI, the 1918 influenza pandemic, and the recession of 1920–21. These studies have attempted to estimate gross national product, labor force, and other macroeconomic indicators to understand how changes in aggregate demand affected output (Romer, 1988; Rockoff, 2004). More recently, Barro, Ursúa, and Weng (2020) found that deaths due to the 1918 influenza pandemic and WWI had a large macroeconomic effect, responsible for declines in GDP and consumption for a typical country of 6 and 8 percent, respectively. We make contributions to this literature by providing a detailed analysis of labor markets.

Second, our study is related to the literature on the Federal Reserve's monetary policy and its effect on the recession of 1920–21. These studies focus exclusively on the banking sector and exploit the fact that each regional Federal Reserve Bank implemented different monetary policies (Wicker, 1966; Gorton and Metrick, 2013; White, 2015; Tallman and White, 2020; Roberds and White, 2020; Rieder, 2021; Carlin and Mann, 2022). Unlike these studies, we look at the behavior of labor markets during the recession.

Third, our study is related to the broad literature on frictional labor markets. On the theoretical side, search-and-matching models have become the canonical framework to introduce equilibrium unemployment in macroeconomic models (Mortensen and Pissarides, 1994). The theory relies on the aggregate matching function that relates the flow of new hires to the stocks of vacancies and unemployment. On the empirical side, previous studies applied a flow approach to labor markets to understand the labor dynamics at the aggregate level using the micro-level data from the Job Openings and Labor Turnover Survey (JOLTS) (Davis and Haltiwanger, 1992; Davis, Haltiwanger, and Schuh, 1998). However, not much research has been done to study labor market dynamics in historical periods. Exceptions are Lee (2009, 2016) and Lee and Yoon (2022), who constructed a data from public employment offices to study labor markets during the Great Depression. We contribute to this literature by providing empirical evidence on labor market conditions during WWI and the post-WWI recession of 1920–21.

The remainder of this paper is organized as follows. Section 2 provides historical background. Section 3 describes data sources and variable construction. Section 4 describes the empirical analysis and presents results. Section 5 concludes.

2. Historical Background

This section delves into two key aspects that affected U.S. labor market behavior between 1918 and 1921: (1) the recession of 1920–1921, which was a sharp recession following the end of WWI and the influenza pandemic in 1918, and (2) public employment offices, which were created to match workers and employees and reduce inefficiencies in the labor market.

2.1. Recession of 1920-1921

During WWI, economic growth continued and even accelerated as the United States mobilized for the war in Europe. After the war ended in November 1918, the global economy began to decline. Between 1916 and 1921, the U.S. economy experienced two recessions. The recession immediately following WWI was mild and extremely short, lasting for only seven months from August 1918 to March 1919. A second much more severe recession occurred between January 1920 and July 1921, when the global economy contracted sharply.

The United States experienced a large expansion during and after WWI. Economic growth was driven in part by loose monetary policy. During the war, the Federal Reserve System kept the interest rates low to help finance the war. It facilitated war bond sales by providing loans at preferential rates to banks purchasing Treasury certificates. After the end of WWI, the Federal Reserve continued to keep interest rates low until the end of 1919 to prevent capital losses on the final war bond offering, lower the costs of servicing outstanding debt, and facilitate a smooth shift to peacetime conditions. The upsurge in discounts to member banks continued and contributed to inflationary pressures. In April 1918, the Federal Reserve Bank of New York had set its rates for discounts and advances on eligible paper at 4 percent, well below the market rates, and maintained this rate until November 1919.

During this period in 1919, policymakers were beginning to worry about inflation. Annual consumer price inflation rates had jumped well above 20 percent by the end of the war. To combat inflation, policymakers began austerity measures. On the fiscal side, federal spending

was reduced by 65 percent (from \$18.5 billion to \$6.4 billion) between 1919 and 1920. Federal spending was further reduced over the next two years to \$3.3 billion in 1922. On the monetary side, the Federal Reserve Banks began to raise discount rates. In December 1919, the Federal Reserve Bank of New York raised its rate to 4.75 percent. The other Reserve Banks followed suit. In January 1920, the Federal Reserve Bank of New York and other reserve banks raised their discount rates to 6 percent. In June 1920, the Federal Reserve Bank of New York raised its discount rate to 7 percent. Three other Reserve Banks (Boston, Chicago, and Minneapolis) also raised their rates. The remaining districts maintained the prevailing 6 percent rate.

As the Federal Reserve Banks were increasing rates, a sharp, deep recession began in 1920 lasting until 1921. Up to that point, the recession was one of the deepest measured and is still often referred to as the Depression of 1920. Manufacturing production declined by 22 percent, and unemployment rate rose by 11 percent, from 5.2 percent to 11.3 percent. Price levels declined as well. However, the economy rebounded quickly and experienced a long economic expansion.

2.2. Public Employment Offices

Public employment offices (PEOs) are organized to match job-seekers and employers. In the United States, individual municipalities established the first publicly financed employment offices to help unskilled and casual labor. The recurrent cycles of unemployment, accompanied by the abuses of private employment agencies, the lack of farm labor in agricultural states, and the presence of great numbers of unemployed wage-earners in the industrial centers, resulted in the creation of employment offices at the municipal level (Lee, 2009). In 1890, Ohio established employment offices in the five largest cities of the state, and other states gradually introduced these offices (Lee, 2009). The federal government's public employment work goes back to 1907 when Congress introduced the Division of Information in the Department of Commerce and Labor. Between 1890 and 1920, the largest influx of immigrants in American history occurred, reaching a high of 1.4 million in 1907. The division was responsible for distributing immigrants among the states and helping them find jobs (Lee, 2009).

The outbreak of war in Europe in 1914 enabled the Department of Labor to expand its limited employment functions. Initially, the war created an imbalance in the labor market because labor demand declined. Many firms lost their foreign markets with the beginning of

WWI, leading to the rise in unemployment. The Division of Information responded to this by expanding its employment office role to cater not only to immigrants but to all workers and creating a nationwide information system about employment opportunities. However, the labor surplus in the U.S. labor market abruptly turned into a shortage because of increased labor demand in war-related industries as well as the military service when the United States entered WWI (U.S. Bureau of Labor Statistics, 1931). Accordingly, the federal government reorganized the Division of Information as the U.S. Employment Service (USES) to serve as a nationwide labor market intermediary to accommodate the labor market during the war effort in 1917. The employment service made a large contribution to mobilizing the nation's workers for the war effort during 1917 and 1918 (Kellogg, 1933). The employment service continued to serve as an important labor market intermediary in 1918 and 1919 after the end of WWI for returning soldiers and workers, who had previously been transferred to war-related industries (U.S. Employment Service, 1919; U.S. Bureau of Labor Statistics, 1931). The federal government became less in employment services after the war because the USES faced large budget cuts. As a result, many federally funded employment offices were closed, and most offices were maintained and operated by state and municipal governments in the 1920s (U.S. Employment Service, 1935).

PEOs operated primarily to clear the labor market. A job seeker registered at a local PEO, and a prospective employer sent a request. Applicant's registrations and employer's orders were kept on file and were required to provide the basics of job matching: industry, occupation, gender, age, degree of skill, location, desired wage or salary, duration of employment (regular or casual), race, nationality, and other particulars. Officials at a PEO used this information to match a job seeker with a vacant job. They provided employers with an introduction card that listed an interviewee's information and the opening being considered. A placement was made when either the employer or the candidate notified a designated official at the PEO about the employment. In most cases, the introduction card was signed by the employer and returned to the PEO (Stewart and Stewart, 1933).

In addition, employment offices collected and disseminated information on labor market conditions. They released information about labor supply (registrations), labor demand (help wanted), referrals (referred), and job placement (placed/filled). They tried to compile these facts by occupational or industrial groups to reflect accurate conditions of the labor market. These

offices closely monitored the following ratios: number registered per 100 help wanted, number placed per 100 registered, number placed per 100 help wanted, and number placed per 100 referred. These numbers were used to assess 1) the relation of the supply and demand for labor, 2) the probability of getting a job through the employment office for employees, 3) the probability of hiring a worker from the employment office for employers, and 4) the efficiency of the offices to fit the people with the jobs. These ratios are referred to as job-finding rates, job-filling rates, and labor market tightness today (Illinois State Department of Labor, 1917).

3. Data and Measurement

To assess labor market conditions, we construct data on the number of job seekers, vacant jobs, and new hires. We use the *Labor Market Bulletin* and construct data for New York State. The Bulletin provides information on labor supply (registrations), labor demand (help wanted), referrals (referred), and job placement (placed/filled) on a monthly level from January 1916 to August 1921.³ This information was broken down for men and women. Beginning in 1918, the bulletin also reports labor market information by industry-occupation group, which is similar to the one-digit SIC code. The information on labor market by industry-occupation group was further broken down by men and women as well. Focusing on New York allows us to determine the overall state and reallocation of workers across industries. We also collect data on manufacturing wages.

[Insert Figure 1]

To understand the macroeconomic conditions at the time, we examine selected macroeconomic data around the time in Figure 1. Panel A plots the time series for manufacturing production and consumer price index from 1910 to 1925. It shows that manufacturing output rose quickly, with price levels also increasing sharply. After Federal Reserve banks began raising policy rates in December 1919, economic activity started contracting. The recession, beginning in January 1920 and reaching a trough in July 1921, was severe. Both manufacturing output and price levels declined sharply.

³ Information on “workers seeking employment” and “workers called for by employers” are available from May 1915. However, we examine labor market conditions from January 1916 because the Bulletin began offering information on “filled jobs.” Starting in March 1918, the Bulletin offered this information for each industry.

Panel B of Figure 1 focuses on labor statistics and plots unemployment rate, factory employment, and average weekly earnings. During WWI, labor demand peaked, and unemployment rate had fallen to just 1.2 percent. Unemployment rose slowly afterward, peaking 11.4 percent at the height of the recession in 1921. Factory employment also fell slightly. The most notable feature of the labor market is the magnitude of changes in average weekly earnings. The average weekly earnings rose by 73 percent between 1917 and 1920 but plunged by 15 percent between 1920 and 1921. In other words, the Fed's rate hikes succeeded in slowing wage increases although it also raised the unemployment rate.

[Insert Figure 2]

These statistics reveal that economic activity contracted sharply during the recession of 1920–1921. However, little is known about the behavior of labor markets during this period. To assess the state of the labor market during this period, we examine labor market data for New York. Figure 2 plots labor market tightness, the job-finding rate, and the job-filling rate. In Panel A, we plot the vacancies to unemployed from January 1916 to August 1921. It shows that the labor market was very tight in the 1910s. The labor market tightness fell during the mild recession between 1918:Q3 and 1919:Q1, but it rebounded quickly afterward. When the U.S. economy reached a peak in January 1920, the labor markets were tight. The labor market tightness fell sharply in the middle of 1920 after the recession deepened following the Fed's discount rate increases in 1920. Interestingly, the labor market was tighter for women than for men. Nonetheless, the demand for female workers contracted during the recession. It is important to note that the labor market dynamics were largely driven by labor demand rather than labor supply during this period.

In Panels B and C, we plot the job-finding rate and the job-filling rate. Panel B shows that the job-finding rate was relatively stable throughout the period until the recession deepened in 1920. This is because the number of job seekers was relatively stable compared to that of job vacancies. Panel C plots the job filling rates. As the economy was reaching its peak, job-filling rates fell. After 1918 Q3, the job-filling rate rose.

[Insert Table 1]

Next, we examine whether labor market conditions varied across industries during expansions and contractions. In Table 1, we investigate, job-finding rates, job-filling rates, and

labor market tightness by industry from 1918 M3-1921 M6. We divide them into four periods: 1918 M3-1918 M8 (WWI expansion), 1918 M9-1919 M3 (post war contraction), 1919 M4-1920 M1 (expansion), and 1920 M2-1921 M8 (recession). The labor markets were relatively tight, even through the mild 1918 recession, until the more severe 1920 recession. Job-finding rates were relatively stable, while job-filling rates rose after 1920 because labor demand contracted sharply during the recession of 1920–1921.

[Insert Table 2]

In Table 2, we examine the uneven effects on employment by gender during the recession. We compare whether labor market tightness for male workers and female workers differed. In general, labor markets were tighter for women than for men. While labor demand for men was higher in manufacturing, labor demand for women was higher in service sectors, such as hotels and wholesale. Labor markets for these service sectors were tighter than those for manufacturing sectors during the recession of 1920–1921, suggesting that finding employment would have been harder for male workers than for female workers.

[Insert Table 3]

In Table 3, we report the share of job seekers, job vacancies, and new hires by industry. There was a reallocation of jobs following the end of WWI. During the war, most job seekers applied for jobs in manufacturing and other war-related industries, most vacancies came from industries related to war production, and, as a result, most hires were in war-related industries. Following the end of WWI, the importance of manufacturing and other war-related industries decreased. The share of job seekers, job vacancies, and hires in these industries decreased following the end of WWI. In contrast, the share of job seekers, job vacancies, and hires in retail and other non-manufacturing sectors increased.

The share of labor supply and demand by sectors provides an important insight into how the differences across industries affected labor market conditions at the aggregate level. Even though the importance of manufacturing and other industrial sectors decreased after the end of WWI, jobs from these sectors still accounted for more than a quarter of total jobs during the recession of 1920–1921. This implies that a large contraction in labor demand from these sectors during the recession would have had a large effect on the labor market at the aggregate level.

[Insert Table 4]

Table 4 shows that there were differences in labor supply, labor demand, and new hires across gender. For male workers, most labor demand came from industrial sectors during the war and industrial and agricultural sectors after the war. For female workers, most labor demand came from industrial sectors during the war and from service sectors after the war. Given manufacturing and agricultural sectors suffered the most during the recession, these patterns imply the uneven effects on employment caused by gender.

[Insert Figure 3]

Figure 3 and Table 5 provide information on labor market tightness, employment, and wages for the manufacturing sector. Labor market tightness has been associated with high rates of employment. Both labor market tightness and employment fell after WWI but remained stable until 1920. They fell sharply after mid-1920. Wages grew much faster than employment after WWI. Much like employment, wages fell sharply after mid-1920.

[Insert Table 5]

The recession had a differential effect across industries within the manufacturing sector. Table 5 provides information on labor market tightness, employment, and wages across different classes of manufacturing sectors. It shows that employment in metal and machinery accounted for 40 percent of total employment in manufacturing, driving wage growth in the entire sector. The textile industry was also important, accounting for 10 percent of total employment in manufacturing. A level of contraction in labor market tightness and employment was largest for these sectors, driving a downward pressure of employment in the manufacturing sector.

[Insert Table 6]

Because the labor market conditions were largely determined by labor demand during this period, we further study labor demand during downturns compared with business cycle peaks. In Table 6, we study the contribution of selected industries to changes in labor demand during the recession of 1918 M3–1919 M3 and the recession of 1920 M1–1921 M7. As mentioned earlier, the Fed's monetary policy was expansionary during the mild recession while the monetary policy was contractionary during the severe recession. Labor demand grew 14 percent compared with the peak in August 1918 during the mild recession, but it contracted 74 percent compared with the peak in January 1920 during the deep recession. While industries such as agriculture, building, and hotels contracted during the mild recession, manufacturing and

other industries had a growth in labor demand. In contrast, building, manufacturing, and other industrial sectors had large contractions in labor demand during the severe recession.

[Insert Figure 4]

In Figure 4, we plot the number of workers looking for jobs and vacancies to examine whether a decline in labor demand led to a decline in the number of job openings or an increase in layoffs. If a demand-supply imbalance in the labor market was driven by a decline in the number of job openings, the number of workers looking for jobs would be relatively stable. On the other hand, if the imbalance was driven by an increase in layoffs, we would see a rise in the number of workers looking for jobs. We find that the supply of workers was relatively stable, but the number of job openings declined sharply, falling below the number of workers looking for jobs. These patterns imply that a large decline in job openings derailed the labor market, raising the unemployment rate.

To sum, labor markets were relatively tight until 1920. Labor market tightness contracted sharply in mid-1920. The recession had an uneven effect across industries and by gender. Manufacturing and industrial sectors had the largest effect, whereas service sectors had the least effect. The recession had a larger effect on male employment than female employment because male workers relied heavily on manufacturing for employment. A large contraction in labor demand by manufacturing and other industrial sectors drove aggregate labor market dynamics.

4. Conclusion

The U.S. economy is recovering from the COVID-19 pandemic with a robust job market and high inflation. With the highest inflation in nearly 40 years, the Fed chair considers the tight labor market as a key driver of surging prices. To fight inflation, the Federal Reserve has been raising rates. During the process, the Federal Reserve hopes to reduce the large number of job openings, rather than spur layoffs. Fewer open jobs would slow wage growth and help curb inflation. Hence, one of the important policy questions policymakers and academics have been attempting to answer is how quickly to raise interest rates to tame inflation without disrupting the job market or inciting a recession. The U.S. economy experienced a similar situation after WW1. In 1920, the Federal Reserve Banks hiked their discount rates to tame inflation, and the U.S. economy promptly entered a severe recession, now known as the Depression of 1920. Using a

newly constructed data set from public employment offices, we measure job-finding rates, job-filling rates, and labor market tightness from the end of WWI to the recession of 1920–1921 to investigate the labor market dynamics in detail.

We find that labor markets were tight in New York during and after WWI despite a mild recession between August 1918 and March 1919. The tight labor market resulted in high employment and rising real wages. By mid-1920, after the next recession started, labor markets became much less tight because of large contractions in labor demand. Importantly, labor market tightness fell sharply in September 1920 following additional tightening of monetary policy.

We also find that the decline in labor market tightness was driven by a decline in the large number of job openings during the recession of 1920–1921. We find that the supply of workers was relatively stable, but the number of job openings declined sharply, falling below the number of workers looking for jobs. In other words, a large decline in job openings derailed the labor market, raising the unemployment rate.

In addition, we find that the effect of the recession was uneven across industries. During WWI, manufacturing and other industries mobilized for war production experienced the worst labor shortages because of the war effort. Following the end of WWI, labor demand from manufacturing sectors declined, but labor demand from service sectors increased. Overall, labor demand increased despite a mild recession between August 1918 and March 1919. In contrast, labor demand contracted sharply during the recession of January 1920–July 1921, as manufacturing and other industrial sectors reduced a large number of vacancies.

Lastly, we document the uneven effect of the recession on the labor markets by gender. We find that labor markets for male workers were less tight than those for female workers. Labor demand for men was higher from manufacturing, whereas labor demand for women was higher from service sectors. Because manufacturing sectors contracted more sharply than service sectors, job losses were greater for men than women.

Our findings have policy implications for today. As stated in Friedman and Schwartz (2008), the Federal Reserve miscalculated the lag times inherent in monetary policy changes, leading the central bank to raise interest rates during the early stages of a recession. Moreover, the rates were raised too quickly. While it is important for the Federal Reserve to tighten monetary policy and manage inflation, it is also important to adjust policy rates at an appropriate

pace. Monetary policy tightening under multiple macroeconomic risks can create uneven slacks in the labor markets across sectors and by gender.

References

- Barro, Robert J., José F. Ursúa, and Joanna Weng (2020). “The Coronavirus and the Great Influenza Pandemic: Lessons from the ‘Spanish Flu’ for the Coronavirus’s Potential Effects on Mortality and Economic Activity,” NBER Working Paper Series 26866. Cambridge, Mass.: National Bureau of Economic Research, March, <https://www.nber.org/papers/w26866>.
- Board of Governors of the Federal Reserve System (2022), *Monetary Policy Report*, February. Washington: Board of Governors.
- Carlin, Bruce I., and William Mann (2018). “An Experiment in Tight Monetary Policy: Revisiting the 1920–1921 Depression.” *Available at SSRN 3242429*, 2022.
- Clark, Kelly A., and Rosemary Hyson (2001). “New Tools for Labor Market Analysis: JOLTS.” *Monthly Labor Review*, vol. 124 (12), pp. 32–7.
- Davis, Steven J., and John Haltiwanger (1992). “Gross Job Creation, Gross Job Destruction, and Employment Reallocation.” *The Quarterly Journal of Economics*, vol. 107 (3), pp. 819–63.
- Davis, Steven J., John C. Haltiwanger, and Scott Schuh (1998). *Job Creation and Destruction*. Cambridge, Mass.: MIT Press.
- Friedman, Milton, and Anna Jacobson Schwartz (2008). *A Monetary History of the United States, 1867–1960*. Princeton, N.J.: Princeton University Press.
- Gorton, Gary, and Andrew Metrick (2013). “The Federal Reserve and Panic Prevention: The Roles of Financial Regulation and Lender of Last Resort,” *Journal of Economic Perspectives*, vol. 27 (4), pp. 45–64.
- Illinois State Department of Labor (1933). *The Annual Report of the Department of Labor*. Chicago: Illinois State Department of Labor.
- Kellogg, Ruth M. (1933). *The United States Employment Service*. Chicago: University of Chicago Press.
- New York State Industrial Commission (1916). *The Labor Market Bulletin*. Albany, NY.
- New York State Industrial Commission (1917). *The Labor Market Bulletin*. Albany, NY.
- New York State Industrial Commission (1918). *The Labor Market Bulletin*. Albany, NY.
- New York State Industrial Commission (1919). *The Labor Market Bulletin*. Albany, NY.
- New York State Industrial Commission (1920). *The Labor Market Bulletin*. Albany, NY.
- New York State Industrial Commission (1921). *The Labor Market Bulletin*. Albany, NY.

Rieder, Killian (2021). “Financial Stability Policies and Bank Lending: Quasi-experimental Evidence from Federal Reserve Interventions in 1920-1921.” CEPR Discussion Paper No. DP16490. London: Centre for Economic Policy Research.

Roberds, William, and Eugene White. “Central Banks, Global Shocks, and Local Crises: Lessons from the Atlanta Fed's Response to the 1920–21 Recession.” Working Paper Series 2020-15. Atlanta: Federal Reserve Bank of Atlanta, December, <https://www.atlantafed.org/research/publications/policy-hub/2020/12/18/15-lessons-from-atlanta-feds-response-to-1920-21-recession>.

Romer, Christina D (1988). “World War I and the Postwar Depression: A Reinterpretation Based on Alternative Estimates of GNP,” *Journal of Monetary Economics*, vol. 22 (1), 91–115.

Rockoff, Hugh. “Until it’s Over, Over There: The US Economy in World War I, in Stephen Broadberry and Mark Harrison, eds., *The Economics of World War I*. Cambridge: Cambridge University Press, pp. 310–43.

Tallman, Ellis, and Eugene White (2019). “Why Was There No Banking Panic in 1920–1921? The Federal Reserve Banks and the Recession.” unpublished paper, Federal Reserve Bank of Cleveland, December.

Lee, Woong (2009). “Private Deception and the Rise of Public Employment Offices in the United States, 1890–1930,” in David H. Autor, ed., *Studies of Labor Market Intermediation*, Cambridge, Mass.: National Bureau of Economic Research, pp. 155-82.

Lee, Woong (2016). “Slack and Slacker: Job Seekers, Job Vacancies, and Matching Functions in the US Labor Market during the Roaring Twenties and the Great Contraction, 1924–1932,” *The Journal of Economic History*, vol. 76 (3), pp. 840–73.

Lee, Woong, and Yeo Joon Yoon (2022). “Structural Change in the Job Matching Process in the United States, 1923–1932,” *European Review of Economic History*, vol. 26 (1), pp. 107–23.

Mortensen, Dale T., and Christopher A. Pissarides (1994). “Job Creation and Job Destruction in the Theory of Unemployment,” *The Review of Economic Studies*, vol. 61 (3), pp. 397–415.

Powell, Jerome H., “Restoring Price Stability,” speech delivered at “Policy Options for Sustainable and Inclusive Growth,” a conference sponsored the National Association for Business Economics, held in Washington, D.C., March 21–22, 2022, <https://www.federalreserve.gov/newsevents/speech/powell20220321a.htm>

Stewart, Annabel M., and Stewart, Bryce M. (1933). *Statistical Procedure of Public Employment Offices*. New York: Russell Sage Foundation.

U.S. Bureau of Labor Statistics (1931). “Public Employment Services.” *Monthly Labor Review*, vol. 32 (1), pp. 10-32.

U.S. Bureau of Labor Statistics (1915). *Monthly Review of the Bureau of Labor Statistics*, vol. 1, No. 1-6.

U.S. Bureau of Labor Statistics (1916). *Monthly Review of the Bureau of Labor Statistics*, vol. 1, No. 1-6.

U.S. Bureau of Labor Statistics (1917). *Monthly Review of the Bureau of Labor Statistics*, vol. 1, No. 1-6.

U.S. Bureau of Labor Statistics (1918). *Monthly Review of the Bureau of Labor Statistics*, vol. 1, No. 2.

U.S. Employment Service (1919). *Annual Report of the Director General U.S. Employment Service to the Secretary of Labor*. Washington: Government Printing Office.

U.S. Employment Service (1920). *Annual Report of the Director General U.S. Employment Service to the Secretary of Labor*. Washington: Government Printing Office.

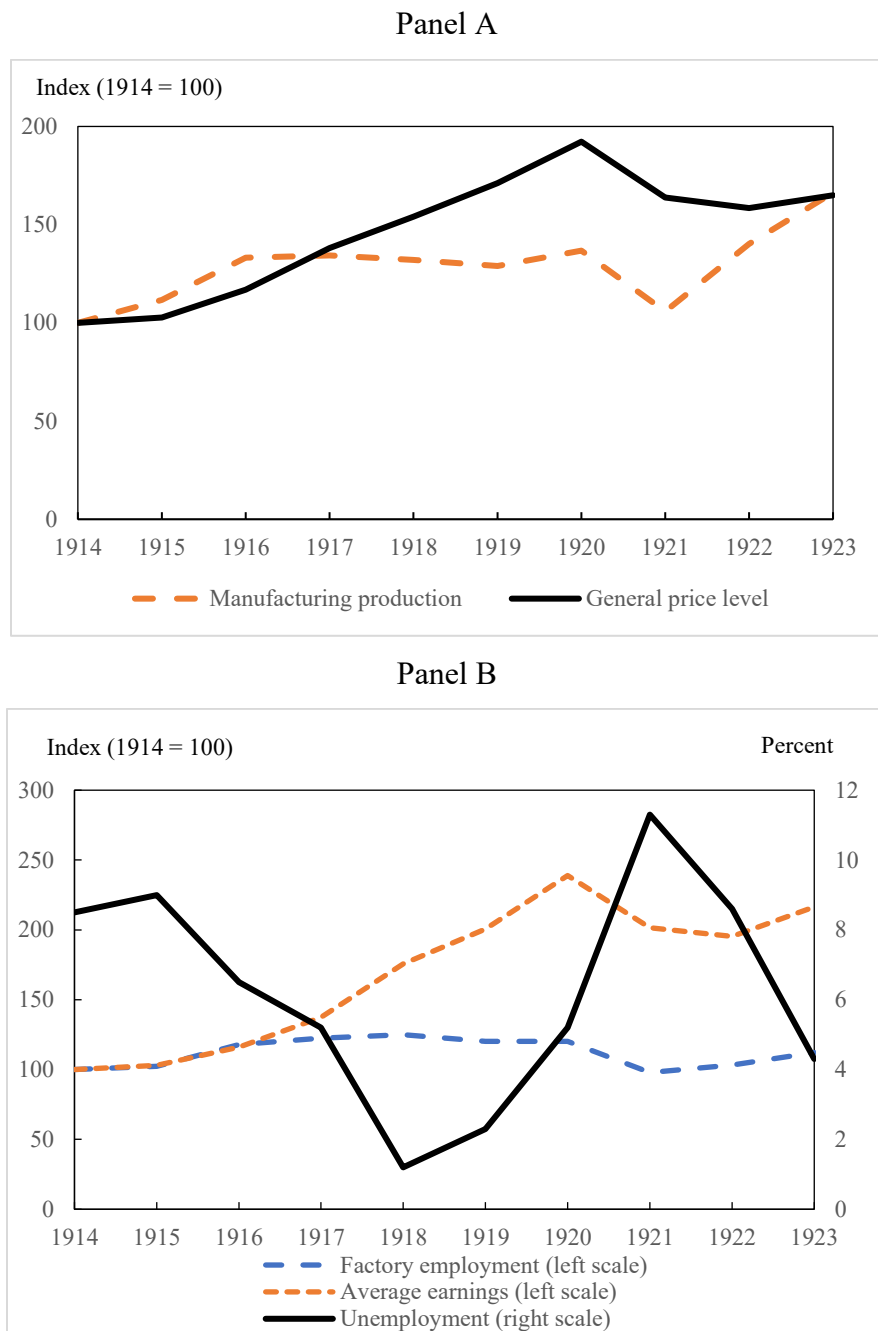
U.S. Employment Service (1921). *Annual Report of the Director General U.S. Employment Service to the Secretary of Labor*. Washington: Government Printing Office.

U.S. Employment Service (1935). "A Historical Sketch of Public Employment." *Employment Service News*, No. 2, pp. 2-8.

White, Eugene N. "Protecting Financial Stability in the Aftermath of World War I: The Federal Reserve Bank of Atlanta's Dissenting Policy." NBER Working Paper Series 21341. Cambridge, Mass.: National Bureau of Economic Research, May, <https://www.nber.org/papers/w21341>.

Wicker, Elmus R. (1966). "A Reconsideration of Federal Reserve Policy during the 1920–1921 depression," *The Journal of Economic History*, vol. 26 (2), pp. 223-238.

Figure 1. Macroeconomic Indicators



Sources: Manufacturing Production, Price Level, Factory Employment, Average Earnings: *NBER Macroeconomy*, Unemployment: *Banking and Monetary Statistics*.

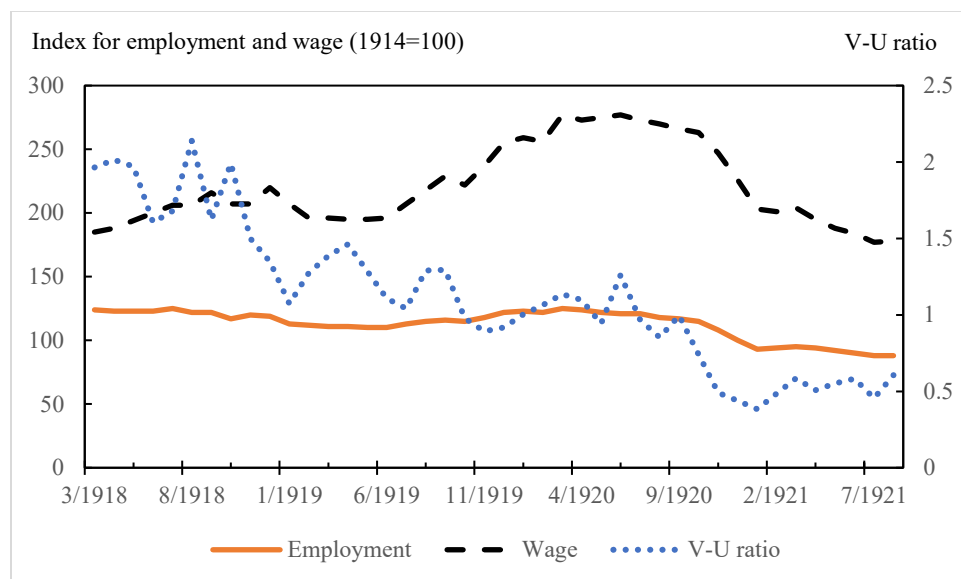
Figure 2. Labor Market Tightness, Job-Finding Rate, and Job-Filling Rate, New York.



Note: “Registrations” was used for the number of job seekers; “Help Wanted” was used for the number of job vacancies; and “Placed” was used for the number of new matches.

Source: *Labor Market Bulletin*.

Figure 3: Labor Market Tightness, Employment, and Wage, 1918:M3-1921:M8.



Source: *Labor Market Bulletin*.

Figure 4: Unemployed, Vacancies, and Filled Jobs, 1920:M1-1921:M8.



Sources: *Labor Market Bulletin*.

Table 1: Job-Finding Rates, Job-Filling Rates, and Market Tightness, New York, 1918:M3-1921M8.

	1918 M3-1918 M8			1918 M9-1919 M3			1919 M4-1920 M1			1920 M2-1921 M8		
	Job-Finding Rate	Job-Filling Rate	V-U Ratio	Job-Finding Rate	Job-Filling Rate	V-U Ratio	Job-Finding Rate	Job-Filling Rate	V-U Ratio	Job-Finding Rate	Job-Filling Rate	V-U Ratio
All	0.56	0.39	1.55	0.53	0.42	1.37	0.54	0.50	1.11	0.52	0.64	0.84
By Selected Industries												
Agriculture	0.54	0.54	1.02	0.61	0.45	1.42	0.64	0.59	1.11	0.68	0.70	0.98
Building	0.46	0.38	1.29	0.51	0.52	1.10	0.45	0.52	0.88	0.44	0.60	0.76
Clerical	0.27	0.44	0.63	0.25	0.40	0.64	0.35	0.51	0.69	0.35	0.59	0.63
Hotels	0.66	0.35	1.90	0.60	0.44	1.37	0.70	0.51	1.38	0.67	0.57	1.23
Laborers	0.81	0.36	2.53	0.76	0.47	1.83	0.74	0.54	1.39	0.65	0.73	0.92
Manufacturing	0.60	0.32	1.90	0.50	0.35	1.46	0.52	0.48	1.11	0.45	0.60	0.78
Miscellaneous	0.25	0.34	0.86	0.59	0.48	1.37	0.41	0.37	1.35	0.24	0.65	0.41
Transportation	0.47	0.29	1.83	0.44	0.41	1.37	0.37	0.53	0.72	0.48	0.69	0.72
Wholesale	0.79	0.44	1.84	0.41	0.27	1.64	0.56	0.48	1.22	0.62	0.61	1.05

Note: Job-finding rates, job-filling rates, and labor market tightness are defined as the ratios of hires per unemployed worker, hires per vacancy, and vacancies per unemployed worker, respectively.

Source: *Labor Market Bulletin*.

Table 2: Job-Finding Rates, Job-Filling Rates, and Market Tightness, By Gender, 1918:M9-1921M8.

	1918 M9-1919 M3			1919 M4-1920 M1			1920 M2-1921 M8		
	Job-Finding Rate	Job-Filling Rate	V-U Ratio	Job-Finding Rate	Job-Filling Rate	V-U Ratio	Job-Finding Rate	Job-Filling Rate	V-U Ratio
Male									
All	0.45	0.41	1.25	0.52	0.54	1.02	0.51	0.67	0.78
by Selected Industries									
Agriculture	0.52	0.40	1.45	0.63	0.60	1.08	0.71	0.71	1.00
Building	0.43	0.48	1.09	0.45	0.52	0.87	0.44	0.60	0.76
Clerical	0.19	0.37	0.52	0.31	0.58	0.55	0.30	0.60	0.53
Hotels	0.52	0.51	1.07	0.76	0.65	1.19	0.72	0.69	1.09
Laborers	0.65	0.44	1.83	0.74	0.54	1.39	0.65	0.73	0.92
Manufacturing	0.39	0.38	1.14	0.46	0.56	0.83	0.34	0.63	0.56
Miscellaneous	0.55	0.45	1.45	0.42	0.38	1.39	0.27	0.66	0.44
Transportation	0.39	0.37	1.36	0.37	0.53	0.71	0.47	0.69	0.71
Wholesale	0.34	0.31	1.20	0.53	0.55	1.00	0.59	0.67	0.91
Female									
All	0.53	0.37	1.94	0.67	0.45	2.08	0.50	0.60	1.29
by Selected Industries									
Agriculture	0.36	0.44	1.24	0.60	0.94	1.81	0.94	1.13	0.99
Building	0.60	0.42	4.01	0.90	0.21	5.03	0.66	0.48	1.59
Clerical	0.28	0.38	0.76	0.40	0.46	0.87	0.39	0.58	0.70
Hotels	0.55	0.33	1.68	0.62	0.38	1.69	0.62	0.46	1.41
Laborers	0.63	0.56	1.74	0.41	0.50	0.94	19.70	0.18	5.31
Manufacturing	0.66	0.24	2.80	0.92	0.33	3.02	0.82	0.57	1.50
Miscellaneous	0.22	0.27	0.83	0.20	0.32	0.65	0.15	0.60	0.27
Transportation	0.47	0.64	1.70	0.67	0.43	1.75	0.41	0.53	1.68
Wholesale	0.54	0.17	3.37	0.83	0.28	3.37	0.75	0.46	1.77

Source: *Labor Market Bulletin*.

Table 3: Share of Job Seekers, Job Vacancies, and Hires, by Industry, 1918:M3-1921:M8.

by Selected Industries	1918 M3-1918 M8			1918 M9-1919 M3			1919 M4-1920 M1			1920 M2-1921 M8		
	Job Seekers	Job Vacancies	New Hires	Job Seekers	Job Vacancies	New Hires	Job Seekers	Job Vacancies	New Hires	Job Seekers	Job Vacancies	New Hires
Agriculture	17.18	10.34	11.15	1.96	1.78	2.00	3.88	3.61	4.33	7.83	9.60	9.79
Building	5.73	4.80	4.23	9.76	6.93	8.40	5.50	3.90	3.89	4.74	3.86	3.31
Clerical	12.14	4.38	4.51	14.51	6.76	6.52	12.50	7.10	7.01	13.13	8.78	7.36
Hotels	5.20	5.86	4.64	3.18	3.22	3.30	6.16	6.93	6.94	7.69	9.93	8.11
Laborers	26.04	34.69	28.22	28.57	34.24	36.49	21.20	24.32	25.30	16.57	16.59	17.51
Manufacturing	12.29	13.67	10.25	19.87	19.77	16.45	14.90	13.61	12.49	14.09	11.53	9.93
Miscellaneous	6.98	3.63	2.74	9.35	8.42	9.33	15.08	18.44	11.26	6.26	2.51	2.33
Transportation	2.30	2.43	1.52	4.68	3.74	3.37	3.79	2.36	2.34	3.30	2.59	2.59
Wholesale	3.68	4.05	3.94	4.22	5.34	3.06	4.61	4.70	4.16	5.40	6.17	5.37

Source: *Labor Market Bulletin*.

Table 4: Share of Job Seekers, Job Vacancies, and Hires, by Industry and gender, 1918:M3-1921:M8.

By selected industries	1918 M9–1919 M3			1919 M4–1920 M1			1920 M2–1921 M8		
	Job seekers	Job vacancies	New hires	Job seekers	Job vacancies	New hires	Job seekers	Job vacancies	New hires
Male									
Agriculture	2.29	2.38	2.58	4.85	4.52	5.76	11.50	16.13	16.32
Building	11.85	9.01	10.29	7.31	5.51	5.61	7.68	7.03	5.95
Clerical	9.54	4.57	4.23	8.25	3.99	4.50	8.06	4.89	4.09
Hotels	2.00	1.85	2.41	4.79	4.92	6.38	6.77	8.44	8.30
Laborers	34.62	44.52	44.47	28.23	34.46	36.86	26.32	28.72	29.88
Manufacturing	18.88	15.86	15.10	17.08	12.60	13.73	17.48	10.97	9.74
Miscellaneous	10.05	10.40	11.09	18.04	23.17	14.69	8.16	4.08	3.80
Transportation	5.63	5.00	4.72	4.95	3.31	3.32	5.26	4.45	4.41
Wholesale	4.24	5.00	3.42	5.43	4.93	5.08	7.01	7.73	7.37
Female									
by Selected Industries									
Agriculture	0.51	0.41	0.22	0.68	1.31	0.84	2.16	1.72	1.97
Building	0.08	0.14	0.15	0.01	0.07	0.02	0.03	0.05	0.03
Clerical	37.42	15.65	15.36	25.72	15.44	12.91	21.62	14.20	12.01
Hotels	8.68	7.78	7.74	10.44	12.40	8.25	9.30	12.21	8.09
Laborers	0.45	0.36	0.42	0.88	0.24	0.36	0.01	0.02	0.06
Manufacturing	24.53	35.68	25.11	8.45	17.16	9.84	8.72	12.15	10.01
Miscellaneous	6.07	2.79	1.97	5.03	3.12	2.37	3.02	0.61	0.52
Transportation	0.29	0.36	0.14	0.12	0.11	0.09	0.04	0.05	0.03
Wholesale	4.25	7.91	3.49	1.99	4.37	2.10	2.78	4.34	2.92

Source: *Labor Market Bulletin*.

Table 5: Job-Finding Rates, Job-Filling Rates, Market Tightness

	Weight of each industry in total	Job- finding rate	Job- filling rate	V-U ratio	Employment	Wage
1918 M3–1918 M8						
All manufacturing	100	0.60	0.32	1.90	123.33	196.50
Chemicals, oils, pints, etc	5.53	0.90	0.34	5.25	135.33	217.33
Clay, glass, and stone products	2.15	0.91	0.39	2.57	92.83	149.33
Clothing, millinery, and furnishings	12.50	0.57	0.30	1.97	94.33	137.00
Food, beverages, and tobacco	8.30	0.75	0.23	5.33	102.00	150.00
Leather, rubber, and allied products	7.48	0.90	0.24	4.59	126.50	211.00
Metals and machinery	40.50	0.57	0.36	1.61	167.33	273.83
Papermakers and workers	1.43	1.00	0.22	4.88	111.17	191.00
Printing and publishing	6.72	0.53	0.24	2.44	99.83	127.00
Textile workers	10.55	0.65	0.29	2.60	104.17	167.83
Woodworking and furniture	4.13	0.55	0.39	2.06	97.33	145.50
1918 M9–1919 M3						
All manufacturing	100	0.50	0.35	1.46	116.29	207.00
Chemicals, oils, pints, etc	5.63	0.92	0.38	2.94	132.43	212.43
Clay, glass, and stone products	2.20	0.89	0.40	2.29	83.86	158.71
Clothing, millinery, and furnishings	11.54	0.47	0.23	2.10	82.29	129.29
Food, beverages, and tobacco	8.77	0.71	0.26	2.88	102.71	171.14
Leather, rubber, and allied products	7.27	0.45	0.29	1.58	116.14	205.43
Metals and machinery	41.04	0.50	0.45	1.22	160.71	295.14
Papermakers and workers	1.47	0.65	0.25	2.72	109.86	208.00
Printing and publishing	6.93	0.60	0.20	2.95	98.57	143.14
Textile workers	9.73	0.32	0.24	1.45	92.00	154.86
Woodworking and furniture	4.03	0.53	0.28	1.90	92.43	152.29
1919 M4–1920 M1						
All manufacturing	100	0.52	0.48	1.11	115.30	221.30
Chemicals, oils, pints, etc	5.53	0.90	0.49	1.88	126.20	224.20
Clay, glass, and stone products	2.41	0.74	0.35	2.42	97.30	192.20
Clothing, millinery and furnishings	12.71	0.87	0.37	2.57	89.20	180.00
Food, beverages, and tobacco	9.00	0.66	0.45	1.63	103.10	193.40
Leather, rubber, and allied products	7.82	0.57	0.47	1.21	123.70	249.80
Metals and machinery	37.35	0.45	0.56	0.82	144.10	269.90
Papermakers and workers	1.58	1.00	0.35	2.92	112.40	230.00
Printing and publishing	7.38	0.63	0.42	1.49	102.90	170.20
Textile workers	10.78	0.39	0.42	1.06	99.40	196.50
Woodworking and furniture	4.63	0.65	0.41	1.64	101.80	188.00

	1920 M2–1921 M8					
All manufacturing	100	0.45	0.60	0.78	106.68	233.32
Chemicals, oils, paints, etc	5.78	0.90	0.63	2.50	121.89	246.11
Clay, glass, and stone products	2.52	0.80	0.51	2.21	93.68	212.00
Clothing, millinery, and furnishings	12.96	0.86	0.63	1.43	83.84	189.26
Food, beverages, and tobacco	9.32	0.69	0.53	1.51	97.74	211.26
Leather, rubber, and allied products	7.56	0.46	0.54	0.88	110.05	244.84
Metals and machinery	35.91	0.33	0.62	0.57	129.74	274.68
Papermakers and workers	1.70	0.90	0.55	2.72	113.42	267.11
Printing and publishing	8.18	0.56	0.56	1.08	104.26	205.58
Textile workers	10.44	0.42	0.54	0.78	88.63	200.21
Woodworking and furniture	4.72	0.63	0.54	1.24	95.84	210.26

Source: *Labor Market Bulletin*.

Table 6: Contributions to Changes in Labor Demand.

	1918 M9–1919 M3		1920 M2–1921 M8
Percentage change relative to 1918: M8	14.63	Percentage change relative to 1920: M1	-74.64
by selected industries			
Agriculture	-1.62		-1.22
Building	-2.29		-10.15
Clerical	1.48		-2.67
Hotels	-0.40		-0.81
Laborers	0.82		-38.82
Manufacturing	4.98		-13.30
Miscellaneous	3.00		-6.80
Transportation	0.85		-2.64
Wholesale	2.77		-0.66

Source: *Labor Market Bulletin*.