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What Factors Cause Jobless Recoveries in Minnesota?

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Abstract

Since the 1990-91 recession, the US economy has experienced recoveries in which the level of employment remains low in comparison with the growth rate of economic activity, an episode known as jobless recoveries. The literature considers three main explanations for jobless recoveries in the US: a consequence of sectoral shifts, organizational restructuring of firms, and more flexible hiring strategies in the economy. This paper employs multiple regression analysis to evaluate all three hypotheses on labor markets in Minnesota. By means of sequential structural break tests, the study finds that there were four breaks (March 1989, December 1992, May 2000, and April 2007) in the employment trend and also three breaks (November 2001, September 2003, and around June and September 2009) in the number of hours worked. This paper finds that jobless recoveries in Minnesota can be explained by a combination of different factors: a change in the structure of labor markets due to sectoral shifts and a change in the hiring strategies of firms from the hiring on extensive margins to the hiring on the combinations of extensive margins and intensive margins. In terms of policy, the results suggest that current monetary policy might only have a marginal effect in reducing unemployment rates in the U.S. In this context, a more effective policy for the Minnesotan economy could include incentives to hire on the extensive margin as well as tax credits to promote job training programs.

Keywords: Jobless Recoveries, Structural Change, Hodrick-Prescott Filter

1. Introduction

Since the 1990-91 recession, the US economy has experienced recoveries in which the increase in the level of employment remains low in comparison with the growth rate of economic activity, an episode known as ***jobless recoveries***. Indeed, during the last three recoveries, the number of months that employment has taken to return back to pre-recession levels has been considerably higher than that of postwar recoveries.[1] Figure 1 shows the cumulative growth rate of non-farm employees in the US[2] after troughs of the last six recessions. The line of 'average before 1980' line shows the average of the cumulative growth rate of non-farm employees of six postwar recessions prior to 1980. Employment growth after last three recessions has been considerably slower than the average prior to 1980. As compared with Figure 2, the cumulative growth rate of real GDP of the U.S. for each recovery is higher than those of the cumulative growth rate of non-farm employment. It shows that the growth in employment is slower than the recovery of economic activity in the U.S. This is strong evidence of the existence of jobless recoveries in the U.S. Arguably, an economic recovery without a marked improvement in the employment rate becomes a serious social problem. In light of this, it is important to understand the pattern of jobless recoveries and analyze their possible causes. This paper focuses on the behavior of labor markets in Minnesota and studies the possible existence of jobless recoveries as well as their causes and potential implications.

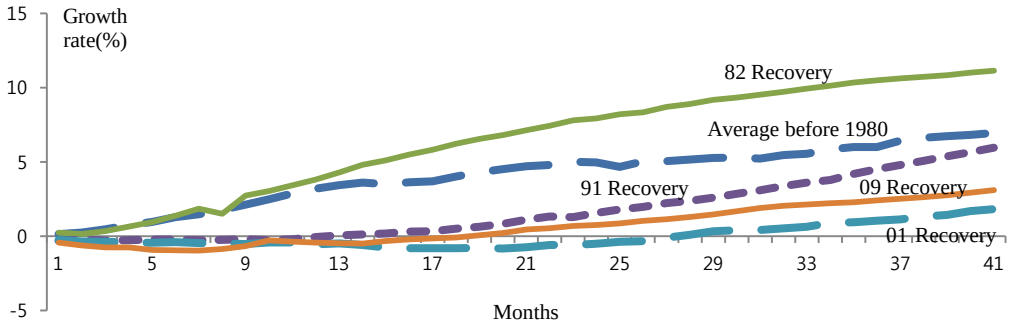

Figure 1: The cumulative growth rate of the non-farm employees of the U.S. following the trough
It shows the cumulative growth rate of non-farm employees of the U.S. for 41 months since the trough

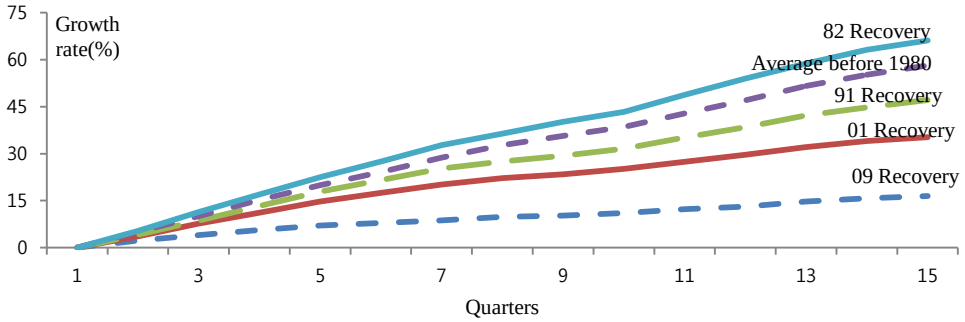

Figure 2: The cumulative growth rate of the real GDP of the U.S. following the trough
It shows the cumulative growth rate of the real GDP of the U.S. for 15 quarters since the trough

2. Motivation

The study conducts a preliminary exercise to determine the possible existence of jobless recoveries in Minnesota since 1980. According to the National Bureau of Economic Research (NBER), there are five U.S. business cycle expansions and contractions since 1980. The study determines the number of months that the unemployment rate and employment rate in Minnesota took to return to its pre-recession levels for five all recessions. The number of months has been increasing since the 1982 recession. This indicates that employment has been sluggish in Minnesota since the 1982 recession.

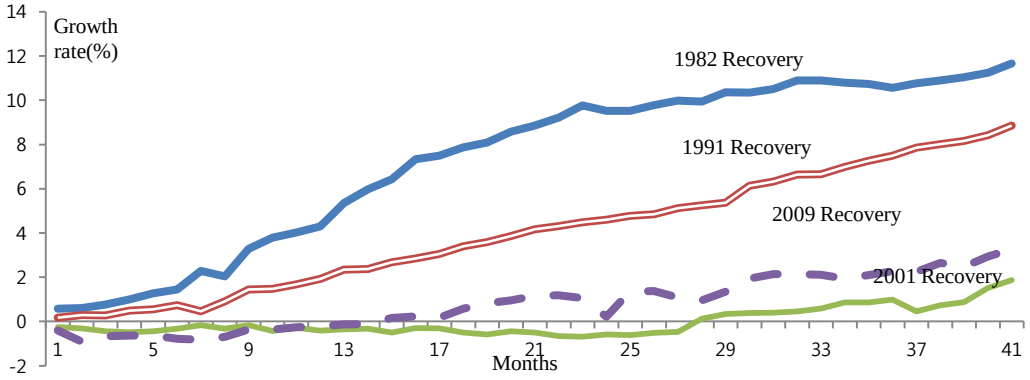

Figure 3: The cumulative growth rate of non-farm employees of Minnesota following the trough
It shows the cumulative growth rate of non-farm employees of the MN for 41 months since the trough

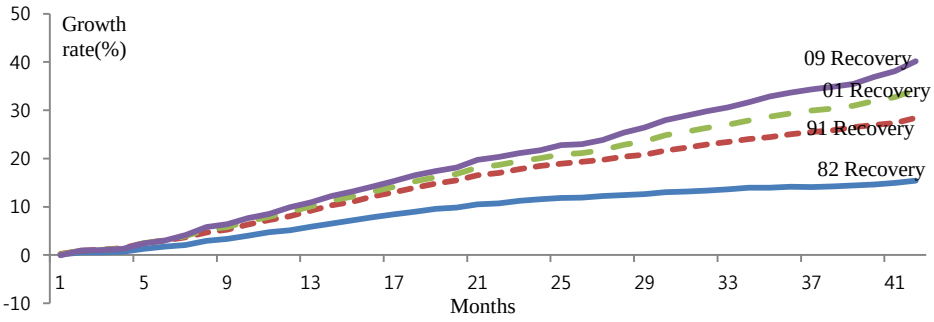

Figure 4: The cumulative growth rate of coincident economic activity index of Minnesota following the trough
It shows the cumulative growth rate of coincident economic activity index of MN for 41 months since the trough

Figure 3 clearly illustrates the existence of jobless recoveries in Minnesota. Since the 1982 recovery, the cumulative growth rate of the number of non-farm employees has been decreasing. The past two recoveries especially had a markedly lower cumulative growth rate compared to the two other recoveries. According to Figure 4, the Minnesotan economy has a higher cumulative growth rate following the each trough. In terms of growth pattern, the labor market in Minnesota has been sluggish than its economy. In light of this evidence, it is argued that Minnesota's labor market has experienced severe jobless recoveries than the national market.

3. Literature Review

A few studies have been conducted to analyze jobless recoveries in the U.S. The literature considers three main explanations for jobless recoveries in the U.S.[3] First, jobless recoveries are a consequence of the structural changes in the composition of the economy that forces workers to acquire new skills, which occurs rather gradually. Autor[4] argues the US labor market has experienced employment polarization with a concentration of high-skill, high-wage jobs and low-skill, low wage job, with a disappearance in middle-skill jobs. He finds employment losses have been concentrated on middle-skill jobs during recent recessions. Faberman[5] studies the movement of job flows by using long time-series on job flows. Since the mid-1980s, the reactions for job creation and destruction toward aggregate shocks have been altered. He finds that job creation has become weak after 1984. The author argues that those changes have caused a slow employment growth pattern. Jaimovich and Siu[6] also claim that job polarization is the prime reason behind jobless recoveries. Slow employment growth during recent recessions results from permanent job losses in middle-skill occupations. They offer the link between job polarization driven by technological change and jobless recoveries by using a simple search-and-matching model. They find job polarization is focused in an economic recession and jobless recoveries are followed after these recessions.

A second, broad explanation behind jobless recoveries focuses on organizational restructuring. During economic expansions, organizational restructuring could produce economic inefficiency, as firms hire above trend patterns. When the economy is in recession, however, large restructuring causes jobless recoveries. For example, Berger[7] finds that the growth rate of employment has lagged output growth while average labor productivity has become acyclical since mid-1980s. In order to explain the two facts, he constructs a quantitative competitive industry model to show that organizational restructuring could explain stylized facts. Firms lay off unproductive workers during recessions while firms hire workers above trend patterns during expansions. Koenders and Rogerson[8] similarly stress that the main reason for jobless recoveries is due to organizational restructuring. With a booming economy, organizations benefit from current situations rather than implementing reorganizational changes. When economy plunges into recession, organizations are more likely to restructure, which reduces hiring of new workers and increases the dismissal of existing workers. As a result, economic recession after long expansions would cause jobless recoveries when the economy starts grow again.

A third is general reason to explain jobless recoveries involves that firms have adopted a more flexible hiring strategy in the last 20 years. Before the economy shows strong signs of recovery, firms increase working hours but do not hire new employees. Panovska[9] argues that recent jobless recoveries can be mainly explained by a tendency of firms to hire on intensive margins, temporary increasing in working hours, rather than extensive margins, committing to opening full-time positions. She finds that the change of sales shocks and relative cost of intensive margins play a major role in the explaining the paths in employment after 1984. Full details of the sales shocks and cost of intensive margins can be found in her paper. According to the results, firms have

changed its hiring strategies from increasing employment to increasing hours per workers. Along the same sides, Schreft and Singh[10] examine jobless recoveries during the 1990-91 and 2001 recessions. They find that jobless recoveries are a consequence of the use of just-in-time employment practices by companies. Not only do firms replace full-time and non-temporary jobs with part-time and temporary jobs, but also expand overtime working hours. Therefore, the greater use of just-in-time employment practices has strongly influenced slow employment growth since the 1990-91 recession. Finally, Bachmann[11] proposes a dynamic stochastic general equilibrium model including an intensive and extensive margin to explain the 1991 and 2001 recessions. He finds that the demand of new hiring is weak while average hours per worker are increased during recession.

4. Research Methods

As detailed in the previous section, there are three leading hypotheses that could potentially explain recent jobless recoveries in the U.S. This study employs multiple regression analysis to evaluate all three hypotheses. According to Bai and Perron's research[12], they produce tests for multiple structural changes of unknown breaks. They propose a sequential procedure. At first, they find whether the sample has a single structural break or not. If there is a single structural break, then sample is divided in two sub-samples and each one is retested. This process will be iterated until there is no structural break for each sample. Following their research, this paper conducts a sequential estimation to obtain an unknown number of breaks as the evidence of structural changes. This study measures a small number of breaks and conducts parameter-constancy test for every subsample to evaluate multiple breaks. First, the study conducts sequential tests to find potentially multiple breaks at which recoveries start to become jobless in Minnesota between 1982 and 2012. Second, the study tests the three main hypotheses in order to examine their validity. In terms of data, employment is measured as the number of non-farm employees in MN. Output is measured by means of the coincident economic activity for MN as a proxy for Gross State Product of MN. The total number of monthly working hours in MN is used to proxy for intensive margins. Also, the product of monthly MN employment and average monthly hours of production and nonsupervisory employees in Manufacturing is used as a proxy for the total number of monthly working hours in MN. All data is monthly. The sample starts in January 1982 and goes through December 2012. All data is obtained from the Bureau of Labor Statistic.

4.1 Structural Change

For testing structural changes, the study performs multiple break tests on the overall employment trend, considering a simple AR process for the trend component of employment. More specifically, letting Y_t be the trend component of employment[13]

$$Y_t = \begin{cases} \alpha_1 + \sum_{i=1}^{\rho} \emptyset_i{}^1 Y_{t-1} + e_t, t \le t^* \\ \alpha_2 + \sum_{i=1}^{\rho} \emptyset_i{}^2 Y_{t-1} + e_t, t > t^* \end{cases} \quad (1)$$

If recoveries have become jobless, then employment is more sluggish and the series becomes less persistent. This possible break in tested by considering the null hypothesis Ho: $\emptyset_i{}^1 = \emptyset_i{}^2$(No break or structural change in the trend component of employment) using the QLR (Quandt likelihood Ratio) statistic. To avoid end-of-sample distortions, the study employs the central 70% of the sample. According to Figure 5, the maximum F-statistic[14] (181.92) occurs in May 2000.

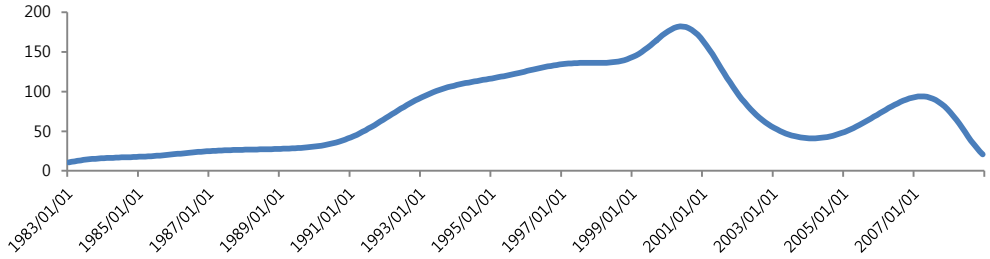

Figure 5: The distribution of F-Statistic (1982 and 2012)

To test for further possible breaks, the sample is split into two subsamples. Then, each sub-sample is tested for additional breaks.

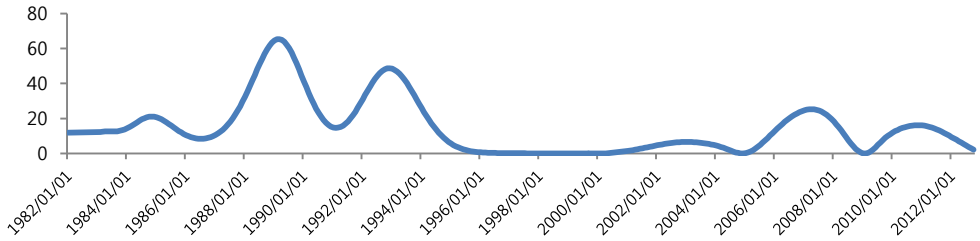

Figure 6: The distribution of F-Statistic (1982-2000.04 and 2000.06-2012)

According to Figure 6 for the first sub-sample between Jan 1982 and May 2000, the maximum F-statistic is 65.37 and occurs in March 1989. The local maximum of F-statistic is found in Dec 1992. The F-statistic is 48.71. Given the proximally to the 1990-01 recession, this is taken as an evidence of a break during this recession period. For the second subsample, the maximum F-statistic (25.29) occurs in April 2007, consistent with the beginning of the 2007-09 recession. In conclusion, the employment trends in Minnesota have four break points: March 1989, December 1992, May 2000, and April 2007 since 1982. These breaks show that the trend component of employment in Minnesota has experienced long-term structural changes rather than cyclical changes. As a result, the trend of non-farm employees experienced four break dates. Not surprisingly, the structural changes of the employment trend in Minnesota coincided with the three most recent recessions.

4.2 Organizational Restructuring

In order to test the organizational restructuring hypothesis, large restructuring causes jobless recoveries in recession, the study employs a simple structural break test of the cyclical component of output. Letting Y_c be the cyclical output[15]:

$$Y^{C}{}_{t} = \begin{cases} \sum_{i=1}^{\rho} \emptyset_i{}^{1} Y^{C}{}_{t-1} + e_t, t \leq t^* \\ \sum_{i=1}^{\rho} \emptyset_i{}^{2} Y^{C}{}_{t-1} + e_t, t > t^* \end{cases} \quad (2)$$

The study tests this hypothesis by considering the null hypothesis Ho: $\emptyset_i{}^{1} = \emptyset_i{}^{2}$(No break in the cyclical component of output) for all i. using the QLR statistic.

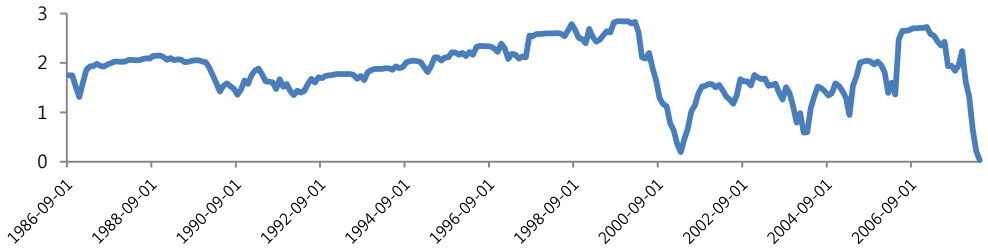

Figure 7: The distribution of F-Statistic (1982-2012)

As seen in figure 7, the results suggest that $Y^{C}{}_{t}$ does not experience a break as the F-Statistics are not greater than the critical F value. Indeed, there is not enough statistical evidence to reject the null hypothesis of no break. This result suggests that there is no evidence that organizational restructuring causes jobless recoveries in Minnesota. It also suggests that there is no change in the hiring process of firms in Minnesota.

4.3 Just-In-Time Hypothesis

Finally, the study explores the relationship between hours per employee and employment for the analysis in firm's hiring practices. In order to this, the study estimates a regression of monthly non-farm employees on the number of working hours per month and output and conducts structural break tests of the regression parameter associated with in the number of working hours per month. Letting N_t be the number of non-farm employees, H_t be the number of working hours per month, and Y_t be output as a control variable; the behavior of N_t, given c break t*, is described by:

$$\log(N_t) = \begin{cases} \alpha_1 + \emptyset_t{}^{1}\log(H_t) + \alpha_2\log(Y_t) + e_t, & t \le t^* \\ \alpha_3 + \emptyset_t{}^{2}\log(H_t) + \alpha_4\log(Y_t) + e_t, & t > t^* \end{cases} \tag{3}$$

where log denotes the natural logarithm. This possible break in tested by considering the null hypothesis Ho: $\emptyset_i{}^{1} = \emptyset_i{}^{2}$(No break in the number of working hours per month) According to Figure 8, the maximum F-statistic (849.22) occurs in September 2009. Since September 2009, the employment and economic growth in Minnesota has steadily increased.

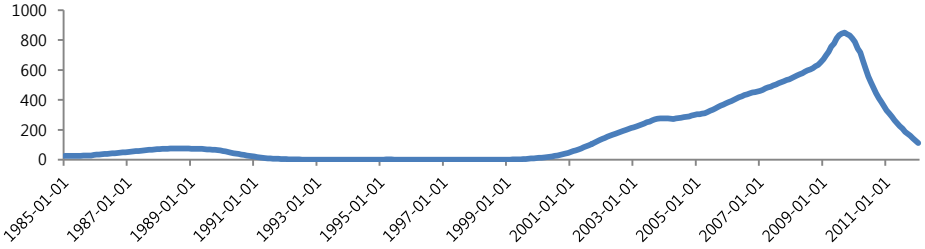

Figure 8: The distribution of F-Statistic (1982-2012)

To test for potential multiple breaks, the subsample period between 1982 and September 2009 is evaluated for further breaks. Given the limited number of observation after 2009, tests for structural breaks in 2009-2012 couldn't be accurately conducted. For the subsample, the maximum F-statistic (393.94) is in September 2003.

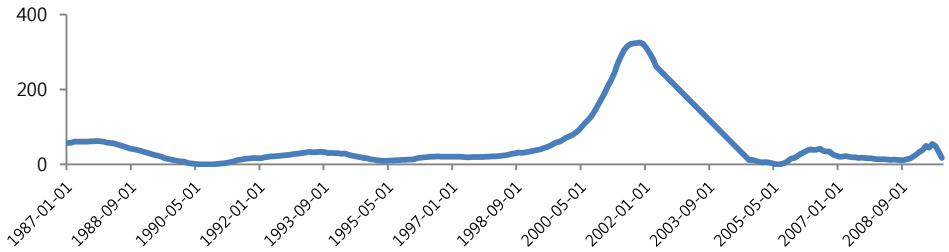

Figure 9: The distribution of F-Statistic for two sub samples: 1982-2003.08 and 2003.10-2009.08)

Subsequently, the study splits the sample period again. In the first subsample from 1982 to September 2003, the local maximum F-statistic (325.78) occurs in Nov 2001. For the second subsample from September 2003 to September 2009, the local maximum F-statistic (54.99) occurs in June 2009. As a result, hours per employee experienced four break points in November 2001, September 2003, June 2009, and September 2009 since 1982. Given their proximity, it is likely that June 2009 and September 09 break dates show an evidence for the end of the great recession in June 2009, so they are taken to indicate this event. These breaks show that the there are structural changes in the intensive margins, hours per employee in Minnesota. In conclusion, the hiring strategies of firms has experienced from the hiring on extensive margins to the hiring on the combinations of extensive margins and intensive margins since 2001. It means that a relatively decline of the hiring on extensive margins can be a cause of jobless recoveries in Minnesota. Not surprisingly, the structural changes of the hours per employee in Minnesota coincided with the two most recent recessions.

5. Conclusion

By means of sequential structural break tests, the study finds that there were four breaks (March 1989, December 1992, May 2000, and April 2007) in the employment trend and also three breaks (November 2001, September 2003, and around June and September 2009) in the number of hours worked. Unlike studies at the aggregate level, this paper finds that jobless recoveries in Minnesota can be explained by a combination of different factors: a change in the structure of labor markets due to sectoral shifts and a change in the hiring strategies of firms from the hiring on extensive margins to the hiring on the combinations of extensive margins and intensive margins. In terms of structural change in the labor markets, all break dates coincide with the three most recent recessions. This suggests that jobless recoveries result from long run structural issues in labor market rather than transitory problems associated with short-run business cycle fluctuations. The break dates in the number of hours worked also occurred around the last two recessions. They suggest that the pattern of hiring strategies of firms in Minnesota began to change from the extensive margin to the intensive margin in 2001. These findings could have potentially important policy implications. For example, it suggests that current monetary policy might only have a marginal effect in reducing unemployment rates, especially in the context of the zero lower bound. Therefore, the current 6.5% trigger as stated by FOMC might not depend on Fed policy since high levels of unemployment are associated with structural issues not the level of liquidity or interest rates in the market. In this context, a more effective policy for the Minnesotan economy could include incentives to hire on the extensive margin as well as tax credits to promote job training programs. Give, the results in this paper, these policies would be better able to cope with jobless recoveries in Minnesota than any other policies.

6. Acknowledgements

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13 Trend component of employment is obtained by using the Hodrick-Prescott filter.

14 F-Statistic shows whether the variances in the two subpopulations are same or not. The maximum F-statistic which is greater than the critical F-value with the appropriate degree of freedom indicates that there is a single break in the sample at the point. In general, the F-statistic in given by R is restricted model and UR is unrestricted model.

$$F = \frac{(RSS_R - RSS_{UR})/k}{(RSS_{UR})/(n_1+n_2-2k)} \sim F[k, (n_1 + n_2 - 2k)$$, RSS=Residual Sum of Squares.

15 The cyclical component of output is obtained by using the Hodrick-Prescott filter.