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Hysteresis Hypothesis in Job Creation and Destruction: Evidence from the U.S.

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We employ the Im et al. (2005) and the Bai and Carrion-i-Silvestre (2009) tests of panel based unit root types to investigate the hysteresis hypothesis in job creation and destruction using U.S. state-level data. Although the conventional individual unit tests fail to reject the unit root for some of the states job creation and destruction rates, the results based on two panel-based unit root tests indicate that the hysteresis hypothesis in job creation and destruction can clearly be rejected. Our findings suggest that given sufficient time, the job creation and destruction rates will return to their previous paths.

Key Words: Hysteresis hypothesis; Job creation; Job destruction.
JEL Classification Numbers: E24, J23.

1. INTRODUCTION

Conventional wisdom on the fluctuations in unemployment was described as movement around the natural rate. The hypothesis of the traditional theories suggests that the economy is stable because after a shock the economy will eventually return to its normal trend path (Phelps, 1968; Friedman, 1968; Hall and Taylor, 1997). Some early work found evidence in line with the natural unemployment rate paradigm (Shapiro and Stiglitz, 1984; Pissarides, 1990), but subsequent empirical studies found that the unemployment rate is characterized with high and persistent levels (Summers et al., 1986; Groenewold and Hagger, 1998; Groenewold et al., 2004; Gil-Alanaa, 2007).

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The inconsistency between theory and evidence has caused the development of new theories. For example, there are structuralist theories which describe fluctuations in employment as both movements and shifts of the natural rate. Structuralist theories imply that the most shocks result in temporary fluctuations of employment around the natural rate, but some shocks cause a structural change in the natural rate itself (Phelps, 1994; Blanchard and Juan, 1995; Liu et al. 2007). As a result, the unemployment would be stationary around its equilibrium path and is subject to structural breaks. There are increasing empirical studies which found evidence of structural breaks and support the structuralist theories (Papell et al., 2000; Groenewold et al., 2004).

In contrast to the natural rate and structuralist theories, the hysteresis hypothesis emphasizes that movements in unemployment are characterized by a long-term persistence (Blanchard and Summers, 1987).[1] The temporary shocks affecting unemployment will have permanent effects, and thus unemployment moves away from an equilibrium level. In other words, the hysteresis hypothesis implies that unemployment is featured with a unit root, $I(1)$, while the natural-rate of the unemployment hypothesis and the structuralist hypothesis (if breaks are considered in the specification) are characterized by the $I(0)$ process. The hysteresis hypothesis has some empirical support; see, for example, Blanchard and Summers (1986) in France, Germany, the United Kingdom, and Roed (1996) in Australia, Canada and Japan.

To date, there have been a number of studies that have attempted to explain the hysteresis hypothesis in U.S. unemployment.[2] Based on the augmented Dickey and Fuller (1979, hereafter ADF) and Phillips and Perron (1988, hereafter PP) unit root tests, Blanchard and Summers (1986) used data for France, Germany, the United Kingdom and the United States for the 1953 to 1984 period and found that they were unable to reject the non-stationary or unemployment rates for the countries that they studied except for the United States. Furthermore, Song and Wu (1997) explored the hysteresis hypothesis in the annual unemployment rate for the forty-eight contiguous United States from the 1962 to 1993 period. They found that with the standard ADF and PP tests, the unit root null is

[1]Several theoretical models have been developed to explain the sources of hysteresis: insider-outsider theory, long-term unemployment, and capital scrapping. Please see Roed (1997) for a survey on the theories of hysteresis.

[2]Following the work of Blanchard and Summers (1986), the hysteresis hypothesis has been examined in both advanced and developed countries. For example, Mitchell (1993) uses one exogenously given the structural break unit root test and found support for hysteresis in the Organization for Economic Cooperation and Development (OECD) countries. In the East Asian countries (Hong Kong, Indonesia, Japan, South Korea, Singapore, Taiwan and Thailand), Lee et al (2010) obtained similar results using the panel-based unit root tests of Levin et al. (2002).

never rejected in the individual unemployment rate. In contrast, when the state unemployment rates are pooled, they found that the unit root null can be rejected in the panel-based unit root test, developed by Levin et al. (2002), and suggested that the natural-rate hypothesis may hold in the U.S. economy. Recently, Romero-Ávila and Usabiaga (2007) applied the panel Lagrange Multiplier (LM) unit root test allowing for up to two breaks to explore the monthly unemployment rate in the fifty United States plus the District of Columbia over the period 1976-2004. They first employed the individual Lagrange multiplier (LM) unit root tests and failed to reject the hysteresis hypothesis in the forty states while the two changes in level are considered. Because the individual unit root tests have less power than the panel based unit tests, Romero-Ávila and Usabiaga (2007) employed panel LM unit root tests with up to two changes in levels and rejected the joint unit root hypothesis. They indicated that the U.S. unemployment rate would be subject to structural breaks and be in favor of regime stationarity. Finally, Sephton (2009) extended the study of Romero-Ávila and Usabiaga to the concept of fractional integration and showed that when they considered two breaks, all the state unemployment rates showed strong evidence in line with the natural rate hypothesis except for the unemployment rates in Connecticut, Massachusetts, and New Hampshire.

The aim of this article is to provide further evidence with regard to the hysteresis hypothesis in the U.S. from the demand side of the labor market — job creation and destruction.[3] We believe that the study of the hysteresis hypothesis in job creation and destruction, specifically for the first time in the literature, provides potentially valuable insights. If we are able to reject the null hypothesis of a unit root in the job creation and destruction rate, this is consistent with the existence of a natural rate of unemployment. This indicates that demand management policies, such as fiscal or monetary stabilization policies, that stimulate aggregate demand will reduce (increase) short run job destruction (job creation), but have no long-run effect on the natural rate of job creation and destruction. If, on the other hand, we find that the job creation and destruction rate is nonstationary, this is consistent with the unemployment hysteresis hypothesis, which states that cyclical fluctuations have permanent effects on job creation and destruction rates. If the hypotheses of the hysteresis in job creation and destruction rates is correct, this provides an empirical foundation for active government policies to fight recessions.

The present study initially employs ADF and PP tests to examine the unit root process in job creation and destruction rates. In order to shed

[3]Following Davis and Haltiwanger (1992) and Davis et al. (1996), the job creation is defined as the sum of employment gains at all plants. Job destruction is defined as the sum of employment losses in all plants. Dividing these by the average employment of all plants at the beginning and end of a period gives the corresponding job flow rates.

more light to the dynamics of the labor market, we also consider the proxy of difference between job creation and destruction — net employment change.[4] Since the study of Perron (1989), it has been recognized that the presence of structural breaks can significantly reduce the power of unit root tests. Moreover, it is well known that individual unit root tests have low power against stationary alternatives in small samples.[5] In order to tackle these problems, we employ the panel version of the LM unit root statistic test that is proposed by Im et al. (2005). The panel LM test statistic is obtained by averaging the optimal univariate LM unit root t-test statistic.

Once we obtain the most significant structural breaks in LM statistics, as a robustness check, the Perron (1989) individual unit root test is employed to further examine the job flow rates. However, the panel LM test assumes that the time series that comprises the panel are cross-sectionally independent, which is unlikely to hold in practice. O'Connell (1999) indicates that the panel unit root test which allows for cross-sectional correlation in the error terms is able to avoid severe size distortions. To deal with this issue, we employ a cross-dependence (CD) test proposed by Pesaran (2004) to check whether the job creation rate and destruction rates are cross-sectionally independent. Finally, we further employ the recently developed panel unit test by Bai and Carrion-i-Silvestre (2009, hereafter BC), which not only permits multiple structural changes but also considers the cross-sectional dependence (through the introduction of a common factor), to examine the hysteresis hypothesis in job creation and destruction.[6] Bai and Carrion-i-Silvestre (2009) point out that the presence of both structural breaks and cross-sectional dependence makes the analysis of the nonstationarity of the panel data more complicated, which allows both to exist, and brings the model closer to the actual empirical settings. The remainder of this paper is organized as follows: Section 2 outlines the methodologies employed in this study. The empirical results are summarized in Section 3. Conclusions are presented in Section 4.

2. METHODOLOGY

This section outlines the econometric and statistical methods that are employed in this article. These methodologies include the augmented Dickey and Fuller (1979) and Phillips and Perron (1988) unit root tests, panel LM test (Im, Lee, and Tieslau, 2005), the Perron (1989) individual unit root test, the cross-sectional dependence (CD) test and the panel unit root

[4]We thank the referee for providing this idea.

[5]Please see Ng and Perron (2002) and Nusair (2006) for more details.

[6]Levin et al. (2002) introduce an alternative approach, cross section demeaning, to account for cross section dependence. This approach, however, assumes that it is caused by stationary common factors that influence all individuals with the same magnitude.

test that considers both structural breaks and cross-sectional dependence proposed by Bai and Carrion-i-Silvestre (2009).

2.1. ADF and PP test

Following Dickey and Fuller (1979), and the augmented version of the Dickey-Fuller test (ADF) can be presented as below:

$$\Delta y_t = \beta_0 + \delta y_{t-1} + \gamma_1 \Delta y_{t-1} + \cdots + \gamma_p \Delta y_{t-p} + u_t \tag{1}$$

where y_t is the job creation or (job destruction) rate, Δ is the different operator, and the u_t is the white-noise disturbance. The order of p could be chosen by minimizing the information criteria such as the Akaike information criterion (AIC) or the Bayesian information criterion (BIC). The series y_t has a unit root if $\delta = 0$. Testing the null hypothesis of non-stationarity, the presence of a unit root, $H_0 : \delta = 0$ against the alternative hypothesis of stationarity $H_1 : \delta < 0$. The Dickey-Fuller test statistic is arrived as $\frac{\delta}{\sigma_\delta}$, where is δ the coefficient estimate and σ_δ is the coefficient standard error

In contrast, Phillips and Perron (1988) introduced another testing procedure to test the null of nonstationarity. Whereas the ADF-test controls for serial correlation by adding higher order terms to the AR-scheme, Phillips and Perron (1988) start from the original DF-test equation ($\Delta y_t = \beta_0 + \delta y_{t-1} + u_t$), but they employed a non-parametric way so that the serial correlation does not affect the asymptotic distribution.[7] Moreover, the PP test has a distinct advantage that is robust with respect to autocorrelation and heteroscedasticity in the disturbance process of the test equation.

Much of the empirical literature on the analysis of the time series properties (for example the unemployment rate) has used the ADF and the PP tests. Both of the univariate unit root tests, however, are argued for lacking power to discriminate between a nonstationary and a near unit root process (Maddala and Kim, 1998). Moreover, since the pioneering work of Perron (1989), it is well known that ignoring existing structural breaks in the unit-root regression on an individual time series can cause it to have a significant loss of power. An avenue to tackle these two problems is the development of panel unit root tests which allows for structural changes.

2.2. Panel LM unit root tests with breaks

Following Lee and Strazicich (2003a, 2003b), the individual structural break Lagrange Multiplier (LM) test is considered as below:

$$y_t = \delta' Z_t + X_t, \quad X_t = \beta X_{t-1} + \varepsilon_t \tag{2}$$

[7]To save space, interested readers are referred to Phillips and Perron (1988) for technical details.

where y_t is the job creation or (job destruction; net employment growth) rate, Z_t consists of exogenous variables and ε_t is an error term that follows the classical properties. $Z_t = [1, t, D_{1t}, T_{1t}]$ in the case of a single structural break in the intercept and slope. $Z_t = [1, t, D_{1t}, D_{2t}, T_{1t}T_{2t}]$ in the two structural changes where $D_{jt} = 1$ for $t \geq T_{Bj} + 1$, and $j = 1, 2$ and 0 otherwise. T_{Bj} represents the breaks. D_{jt} denotes the indicator dummy variable for a mean shift occurring at time T_B. The LM unit test statistic is arrived as below:

$$\Delta y_t = \delta' \Delta Z_t + \phi \overline{S}_{t-1} + \mu_t \tag{3}$$

where $\overline{S}_t = y_t - \tilde{\Psi}_x - Z_t \tilde{\delta}_i$, $t = 1, 2, \ldots, T$, $\tilde{\delta}$ are the coefficients in the regression of Δy_t on ΔZ_t, $\tilde{\Psi}$ is given by $y_t - Z_t \delta$. The breaks T_{Bj} are determined endogenously by considering all points over the interval $[0.1T, 0.9T]$ by a minimum LM_τ statistic:

$$LM_\tau = \inf_{\lambda} \tilde{\tau}(\lambda) \tag{4}$$

where $\lambda_j = T_{Bj}/T$ represents the break fractions. The null hypothesis of a unit root is tested against the alternative hypothesis of the trend-stationarity.

Im et al. (2005) extend the study of Lee and Strazicich (2003a, 2003b) to the panel version structural break Lagrange Multiplier (LM) test. In a panel framework, the null hypothesis is given by H_0 : ($\rho_i = 0$ for all i (implying that all the individual series have a unit root), versus the alternative ($\rho_i < 0$ for $i = l, 2, \ldots, N_1$, and $\rho_i = 0$ for $i = N_1 + 1, N_1 + 2, \ldots, N$ (indicating that at least one of the series is stationary). The panel LM t-statistic is measured by averaging the minimum LM t-statistic for each panel member as follows:

$$\overline{LM}_{NT} = \frac{\sum_{i=1}^{N} LM_i^\tau}{N} \tag{5}$$

As in Im et al. (2005), a standardized panel LM unit root t-statistic can be constructed by letting $E(LM_i^\tau)$ and $V(LM_i^\tau)$ indicate the expected value and variance of LM_i^τ under the null as follows:

$$\Gamma_{LM} = \frac{\sqrt{N}(\overline{LM}_{NT} - E(LM_i^\tau))}{\sqrt{V(LM_i^\tau)}} \to N(0, 1) \tag{6}$$

Simulated values for $E\{LM_i^\tau\}$ and $V\{LM_i^\tau\}$ are given in Im et al. (2005), and are the same irrespective of the number of breaks identified in each panel member.

2.3. Unit root test with given break points

Once obtained the most significant break points in LM statistics, for a robustness check, we employ the Perron (1989) unit test to further examine the individual the job creation rate, destruction and net employment change rates. Following Perron (1989), we consider three models: the first model permits an exogenous change in the level of the series (Model A), second one permits an exogenous change in the rate of growth of the series (Model B), and the last one allows both changes (Model C). Three regressions corresponding to the three models are listed as below.
MODEL A:

$$y_t = \hat{\mu}^A + \hat{\phi}^A DU_t + \hat{\beta}^A t + \hat{d}^A (TB)_t + \hat{\alpha}^A y_{t-1} + \sum_{i=1}^{k} \hat{c}_i \Delta y_{t-1} + \hat{e}_t \tag{7}$$

MODEL B:

$$y_t = \hat{\mu}^B + \hat{\phi}^B DU_t + \hat{\beta}^B t + \hat{\gamma}^B DT_t^* (TB)_t + \hat{\alpha}^B y_{t-1} + \sum_{i=1}^{k} \hat{c}_i \Delta y_{t-1} + \hat{e}_t \tag{8}$$

MODEL C:

$$y_t = \hat{\mu}^C + \hat{\phi}^C DU_t + \hat{\beta}^C t + \hat{\gamma}^C DT_t + \hat{d}^C (TB)_t + \hat{\alpha}^C y_{t-1} + \sum_{i=1}^{k} \hat{c}_i \Delta y_{t-1} + \hat{e}_t \tag{9}$$

From Perron (1989), the null hypothesis of a unit root imposes the following restriction on the true parameters of each model: Model A, the "crash hypothesis": $\hat{\alpha}^A = 1$, $\hat{\beta}^A = 0$, $\hat{\phi}^A = 0$; Model B, the "breaking slope with no crash". $\hat{\alpha}^B = 1$, $\hat{\gamma}^B = 0$, $\hat{\beta}^B = 0$; and Model C, where both effects are permitted: $\hat{\alpha}^C = 1$, $\hat{\gamma}^C = 0$, $\hat{\beta}^C = 0$. The break point $(TB)_t$ is treated as known and the critical values are from Perron (1989).

2.4. Cross-sectional dependence (CD) test

As with the Im, Pesaran, and Shin (2003) test, the panel LM unit root test follows asymptotically a standard normal distribution and assumes no cross-correlations in the error terms across panel members. This assumption, however, is that the time series that comprises the panel are cross-sectionally independent which is unlikely to hold in practice. As shown by O'Connell (1999), the panel unit root test allows for cross-sectional correlation in the error terms which is able to avoid severe size distortions. In this manner, we employ the recently developed cross-dependence (CD) test by Pesaran (2004) to check whether the job creation, destruction and net employment change rates are cross-sectionally independent.

Following Pesaran (2004), the Cross-sectional dependence (CD) test examines the null hypothesis of a cross-sectional independence among individuals in the panel is considered as

$$\bar{\hat{\rho}} = \left(\frac{2}{N(N-1)}\right)\sum_{i=1}^{N-1}\sum_{j=i+1}^{N}\rho\rho_{ij}, \text{ and } CD = \left[\frac{TN(N-1)}{2}\right]^{1/2}\bar{\hat{\rho}} \xrightarrow{d} N(0,1) \tag{10}$$

where $\hat{\rho}_{ij}$ is a pair-wise cross-sectional correlation coefficient of residuals from the conventional ADF regression. T and N are sample and panel sizes, respectively. The CD statistic tests the null of cross-sectional independence, and is distributed as a two-tailed standard normal distribution with good finite sample properties.

2.5. Panel unit root tests allow for breaks and cross-sectional dependence

After employing the Cross-sectional dependence (CD) test, it is curious to check whether the finding of the hysteresis hypothesis in job creation, destruction and net employment change rates is robust to by using the recently proposed panel unit test by Bai and Carrion-i-Silvestre (2009) that allows for both structural breaks and cross-sectional dependence. Following Bai and Carrion-i-Silvestre (2009), the panel unit root test is defined as below:

$$Y_{it} = \delta_i' D_{it} + \pi_i' F_t + e_{it} \tag{11}$$

$$(I-L)F_t = C(L)u_t \tag{12}$$

$$(1-\rho_i L)e_{it} = H_i(L)\varepsilon_{it} \tag{13}$$

where Y_{it} is the job creation (job destruction or net employment change) rate and the $D_{it} = (1, t, D_{l,it}, \ldots, DT_{l,it}, \ldots, DT_{mi,it})'$ with the corresponding coefficients is δ_i. The dummy variables are defined as $D_{j,it} = 1$ for $t > TB_j^i$, and zero otherwise. $DT_{k,it} = (t - TB_k^i)$ for $t > TB_k^i$, and zero otherwise, $j = 1, \ldots, l_i, k = 1, \ldots, m_i$. Moreover, F_t is an $(r \times 1)$ vector of common factors measuring the cross-sectional dependence and π_i is an $(r \times 1)$ vector of factor loadings and e_{it} is the error term. In addition, $C(L) = \sum_{j=0}^{\infty} C_j L^j$ and $H_i(L) = \sum_{j=0}^{\infty} H_{ij} L^j$. The disturbance terms $u_t \to i.i.d(0, \sum_u)$ and $\varepsilon_{it} \to i.i.d(0, \sum_\varepsilon)$. Based on the principal components technique, the differenced detrended model in the matrix format is presented as:

$$Y_i = F\pi_i + b_i\delta_i + w_i \tag{14}$$

where $Y_i = (\Delta Y_{i2}, \ldots, \Delta Y_{iT})'$, $F = (\Delta F_2, \ldots, \Delta F_T)'$, $b_i = (b_{i2}, \ldots, b_{iT})'$, $b_{it} = (1, D_{1,it}, \ldots, D_{mi,it})'$ and δ_i is the corresponding vector of parameters.

There are several steps to estimate the model. First, the difference of the data and the estimated number (m_i) and locations of structural breaks for each series $(\hat{m}_i, T\hat{B}^i_k)$, $k = 1, \ldots, m$. Secondly, we estimate the common factors (F_i), factor loadings (π_i), and the corresponding coefficients δ_i through an iteration procedure. Third, the residuals for each series is measured in step 2 $w_i = Y_i - \hat{F}\hat{\pi}_i - \hat{b}_i\hat{\delta}_i$ and then we obtain the cumulative sum of residuals $\hat{e}_{it} = \sum_{s=2}^{t} \hat{w}_{i,s}$. Fourth, each residual series can be tested by the univariate modified Sargan-Bhargava (1983, MSB) test which is defined as

$$MSB_i(\lambda_i) = \frac{T^{-2}\sum_{t=1}^{T} \hat{e}^2_{i,t-1}}{\hat{\sigma}^2_i} \tag{15}$$

where $\lambda_{i,j} = TB^i_j/T$ and $\hat{\sigma}^2_i$ is a consistent estimator of the long-run variance $e_{it} - \rho_i e_{i,t-1}$.

Fifth, Bai and Carrion-i-Silvestre (2009) proposed the panel MSB test statistics by pooling the individual ones. Bai and Carrion-i-Silvestre (2009) introduce standardization-based and p-value-based pooled test statistics. The first method is to use the average of individual statistics,

$$Z = \frac{\sqrt{N}(\overline{MSB(\lambda)} - \bar{\xi})}{\bar{\xi}} \to N(0,1) \tag{16}$$

with $\overline{MSB(\lambda)} = \sum_{i=1}^{N} MSB_i(\lambda_i)/N$, $\bar{\xi} = \sum_{i=1}^{N} \xi_i/N$. In addition, Bai and Carrion-i-Silvestre (2009) followed Maddala and Wu (1999) and Choi (2001) to pool the p-values associated with the individual tests and then calculated the Fisher-type test statistic,

$$P = -2\sum_{i=1}^{N} \ln(p_i) \to \chi^N_{2N} \tag{17}$$

and

$$P_m = \frac{-2\sum_{i=1}^{N} \ln(p_i) - 2N}{\sqrt{4N}} \to N(0,1) \tag{18}$$

where p_i are the p-values associated with the individual MSB_i tests.

3. DATA AND EMPIRICAL RESULTS

This section empirically investigates the hysteresis hypothesis in job creation, destruction and net employment change rates for the fifty United States plus the District of Columbia. The annual data are drawn from the new Business Dynamics Statistics (BDS) from 1977 to 2005 conducted by the Center for Economic Studies in the U.S. Census Bureau. A unique feature of the BDS is its longitudinal source data that permits tracking establishments and firms over time. The data covers U.S. private, non-agricultural businesses with breakouts by major sector, firm size and state.

We first employ two univariate Unit root tests (ADF and PP tests) to investigate the null of a unit root in each state job creation, job destruction and net employment change rates. The results in Table 1a indicate that the ADF and the PP tests all reject the null of a non-stationary job creation for most states except for Hawaii, Maine, Maryland, Massachusetts, New Jersey, New Mexico, North Dakota, Oregon and Wyoming. Moreover, the results from the individual ADF and the PP tests in Table 1b point to the rejection of the null hypothesis of a unit root in the job destruction of the twenty-eight states. In Table 1c, the result shows that the ADF and the PP tests all reject the null of a non-stationary net employment change for most states except Arkansas, Hawaii, Idaho, Maine, Massachusetts, Nevada, New Hampshire and New Jersey. Since we have a relatively small sample size, the univariate Unit root test may have low power to reject the null hypothesis of a unit root, as pointed out by Shiller and Perron (1985). Moreover, as emphasized by Perron (1989), the failure to permit for structural breaks may have favored the unit root hypothesis. To deal with these two issues, we further examine the stationarity of job creation, destruction and net employment change with the panel LM unit root tests allowing for up to two breaks.

Taylor and Sarno (1998) have shown that the panel-based unit root tests may lead to a rejection of the joint null hypothesis of nonstationary when there is a single stationary process in a system of unit root processes. Following Taylor and Sarno (1998), the ADF test or the PP test which failed to reject the unit root are included in the panel-based unit root tests. In the panel of job creation, we include the nine states regions of Hawaii, Maine, Maryland, Massachusetts, New Jersey, New Mexico, North Dakota, Oregon and Wyoming. Moreover, twenty-three states: Alabama, Alaska, Florida, Idaho, Illinois, Indiana, Kansas, Maryland, Massachusetts, Minnesota, Mississippi, Montana, Nevada, New Hampshire, New Jersey, New Mexico, North Carolina, North Dakota, Oklahoma, South Carolina, Utah, West Virginia and Wisconsin are considered in the panel of job destruction. In the panel of net employment change eight states: Arkansas, Hawaii, I-daho, Maine, Massachusetts, Nevada, New Hampshire and New Jersey are considered. As can be seen in Table 2, they both include and exclude those forty-two regions that reject the null hypothesis of the joint nul-l hypothesis of non-stationarity in job creation. Moreover, we find that the panel LM tests the statistics for job destruction and net employment change which are negative, large in absolute magnitude and smaller than the critical values (-2.326) at the one per cent level of significance. Thus far, the panel-based unit root test results are supportive of the structural-

TABLE 1a.

Univariate Unit-Root Tests for State Job Creation Rates (1977-2005)

State	ADF Test	PP Test	State	ADF Test	PP Test
Alabama	-4.241^{**}	-3.783^{**}	Montana	-5.618^{**}	-6.076^{**}
Arizona	-4.187^{**}	-5.197^{**}	Nebraska	-5.799^{**}	-9.166^{**}
Alaska	-3.617^{**}	-3.374^{*}	Nevada	-3.440^{*}	-3.441^{*}
Arkansas	-5.233^{**}	-8.947^{**}	New Hampshire	-3.508^{*}	-3.508^{*}
California	-4.029^{**}	-4.031^{**}	New Jersey	-3.348^{*}	-2.866
Colorado	-3.509^{*}	-4.040^{**}	New Mexico	-3.053	-3.785^{**}
Connecticut	-3.298^{*}	-3.880^{**}	New York	-3.563^{*}	-3.563^{*}
Delaware	-3.839^{**}	-5.006^{**}	North Carolina	-5.570^{**}	-4.296^{**}
District of Columbia	-5.526^{**}	-5.526^{**}	North Dakota	-2.965	-3.121
Florida	-3.700^{**}	-3.664^{**}	Ohio	-4.727^{**}	-3.722^{*}
Georgia	-5.090^{**}	-3.405^{*}	Oklahoma	-3.585^{*}	-3.640^{*}
Hawaii	-2.617	-2.617	Oregon	-3.163	-2.938
Idaho	-8.473^{**}	-8.094^{**}	Pennsylvania	-3.277^{*}	-3.579^{*}
Illinois	-4.885^{**}	-4.491^{**}	Rhode Island	-9.514^{**}	-9.983^{**}
Indiana	-6.793^{**}	-3.769^{**}	South Carolina	-5.295^{**}	-3.453^{*}
Iowa	-5.470^{**}	-5.544^{**}	South Dakota	-14.244^{**}	-18.799^{**}
Kansas	-5.622^{**}	-5.881^{**}	Tennessee	-4.470^{**}	-4.145^{**}
Kentucky	-4.521^{**}	-4.449^{**}	Texas	-5.650^{**}	-5.650^{**}
Louisiana	-3.989^{**}	-3.952^{**}	Utah	-5.452^{**}	-5.452^{*}
Maine	-4.171^{**}	-2.857	Vermont	-4.252^{**}	-3.400^{*}
Maryland	-3.833^{*}	-2.935	Virginia	-4.531^{**}	-4.488^{**}
Massachusetts	-2.908	-2.920	Washington	-3.243^{*}	-3.243^{*}
Michigan	-3.859^{**}	-3.469^{*}	West Virginia	-6.418^{**}	-6.365^{**}
Minnesota	-3.636^{**}	-3.642^{**}	Wisconsin	-4.576^{**}	-3.844^{**}
Mississippi	-3.904^{**}	-3.997^{**}	Wyoming	-3.058	-2.915
Missouri	-3.433^{*}	-5.235^{**}			

Note: * and ** denote statistical significance at the 10% and 5% levels, respectively.

ist paradigm and strongly reinforce the view that job creation, destruction and net employment change rates are regime-wise stationary.

Turning now to the analysis of the breaks in Table 3, we find that for the panel of the job creation two states exhibit two breaks and seven s-tates present one break; for the panel of the job destruction four states experience two mean shifts and nineteen states are characterized by one significant break; for the panel of the net employment growth five states have one break, and three states have two breaks. This evidence indicates the existence of only a few permanent changes in job flow rates in the United States. In particular, we can also observe some clustering of the break dates. Of the eleven breaks detected in the panel of job creation,

TABLE 1b.

Univariate Unit-Root Tests for State Job Destruction Rates (1977-2005)

State	ADF Test	PP Test	State	ADF Test	PP Test
Alabama	−1.516	−3.650*	Montana	−2.850	−4.484**
Arizona	−4.156**	−4.282**	Nebraska	−3.375*	−3.375*
Alaska	−3.972*	−3.066	Nevada	−4.019**	−2.863
Arkansas	−4.119*	−4.008**	New Hampshire	−2.717	−2.162
California	−4.561**	−4.832**	New Jersey	−3.473*	−3.203
Colorado	−3.810**	−3.765**	New Mexico	−2.398	−4.130
Connecticut	−3.341**	−3.341*	New York	−4.767**	−6.594**
Delaware	−4.100*	−4.204**	North Carolina	−3.179	−4.722**
District of Columbia	−4.558**	−5.091**	North Dakota	−3.014	−3.996**
Florida	−2.242	−5.824**	Ohio	−3.663**	−3.790**
Georgia	−3.896**	−5.625**	Oklahoma	−2.909	−3.563*
Hawaii	−4.041**	−4.415**	Oregon	−3.459*	−3.352*
Idaho	−0.819	−6.266**	Pennsylvania	−4.712**	−4.799**
Illinois	−1.238	−4.377**	Rhode Island	−3.849**	−5.895**
Indiana	−1.762	−3.545*	South Carolina	−1.892	−3.903**
Iowa	−3.726*	−3.734*	South Dakota	−5.486**	−5.488**
Kansas	−2.165	−5.035**	Tennessee	−3.656*	−3.404*
Kentucky	−3.243*	−3.751**	Texas	−3.835**	−3.762**
Louisiana	−3.704**	−3.642**	Utah	−3.181	−3.096
Maine	−3.775**	−3.513*	Vermont	−4.338**	−5.219**
Maryland	−2.790	−3.934**	Virginia	−5.012**	−5.978**
Massachusetts	−3.099	−2.876	Washington	−5.006**	−5.638**
Michigan	−3.377*	−3.299*	West Virginia	−1.520	−7.618**
Minnesota	−1.753	−3.403*	Wisconsin	−2.405	−3.147
Mississippi	−0.904	−4.017*	Wyoming	−3.658**	−3.612**
Missouri	−4.735**	−4.846**			

Note: * and ** denote statistical significance at the 10% and 5% levels, respectively.

for example, seven structural changes took place between 1991 and 1993, three occurred between 1982 and 1983, and one is detected in 2001. These breaks coincide with crucial facts and economic episodes. The first break date is located between 1982 and 1983, which is associated with economic policies announced by President Reagan. Beginning in 1981, President Reagan implemented a series of economic policies including large tax cuts, high defense spending and high interest rates as anti-inflation measure. The second break is detected between 1991 and 1993, which is linked to the 1990s boom in the United States. Moreover, the third break is found in 2001, which might be linked to recession.

TABLE 1c.

Univariate Unit-Root Tests for State Net Employment change Rates (1977-2005)

State	ADF Test	PP Test	State	ADF Test	PP Test
Alabama	-3.920^{**}	-3.770^{**}	Montana	-5.819^{**}	-5.991^{**}
Arizona	-3.983^{**}	-4.776^{**}	Nebraska	-5.489^{**}	-5.454^{**}
Alaska	-3.920^{**}	-3.770^{**}	Nevada	-3.282^{*}	-2.942
Arkansas	-2.039	-7.093^{**}	New Hampshire	-3.109	-2.937
California	-4.391^{**}	-4.375^{**}	New Jersey	-3.164	-3.168
Colorado	-4.424^{**}	-4.411^{**}	New Mexico	-4.050^{**}	-4.022^{**}
Connecticut	-3.453^{*}	-3.453^{*}	New York	-3.532^{*}	-3.532^{*}
Delaware	-4.551^{**}	-4.522^{**}	North Carolina	-4.878^{**}	-5.930^{**}
District of Columbia	-5.668^{**}	-5.868^{**}	North Dakota	-3.492^{*}	-3.485^{*}
Florida	-4.426^{**}	-6.214^{**}	Ohio	-3.334^{*}	-3.423^{*}
Georgia	-3.596^{**}	-3.811^{**}	Oklahoma	-3.758^{**}	-3.719^{**}
Hawaii	-2.788	-2.762	Oregon	-3.277^{*}	-3.143^{**}
Idaho	-12.52	-11.166^{**}	Pennsylvania	-6.317^{**}	-4.672^{**}
Illinois	-3.924^{**}	-3.955^{**}	Rhode Island	-10.029^{**}	-8.438^{**}
Indiana	-3.653^{**}	-3.637^{**}	South Carolina	-4.257^{**}	-4.140^{*}
Iowa	-4.346^{**}	-4.346^{**}	South Dakota	-14.441^{**}	-11.131^{**}
Kansas	-6.003^{**}	-8.145^{**}	Tennessee	-3.959^{**}	-3.896^{**}
Kentucky	-4.105^{**}	-4.086^{**}	Texas	-4.493^{**}	-4.451^{**}
Louisiana	-3.578^{*}	-3.519^{*}	Utah	-3.554^{*}	-3.494^{*}
Maine	-3.168	-2.824	Vermont	-3.687^{**}	-3.655^{**}
Maryland	-3.380^{*}	-3.403^{*}	Virginia	-4.897^{**}	-4.883^{**}
Massachusetts	-2.95	-2.601	Washington	-4.393^{**}	-4.338^{**}
Michigan	-3.298^{*}	-3.264^{*}	West Virginia	-7.633^{**}	-7.480^{**}
Minnesota	-3.875^{**}	-5.427^{**}	Wisconsin	-3.646^{**}	-3.469^{*}
Mississippi	-3.922^{**}	-3.851^{**}	Wyoming	-3.610^{**}	-3.610^{**}
Missouri	-5.248^{**}	-5.268^{**}			

Note: * and ** denote statistical significance at the 10% and 5% levels, respectively.

Given that the most significant structural breaks in LM statistics, we further employ the Perron (1989) unit test to examine the job flow rates. We test each model (A, B and C) separately for each state. By choosing arbitrary break points and testing sequentially, Tables 4 reports the results of the Perron tests. Using model (A), for example, the unit root null can not be rejected for job creation rates in Massachusetts, New Jersey, New Mexico, Oregon and Wyoming. However, using model (C), the unit root null can be rejected in favor of the trend-break stationarity alternative for New Jersey, New Mexico and Wyoming. Note that the Perron (1989) unit test presents one main limitation: it only allows for a maximum of one break. In other words, the Perron (1989) unit test might not be robust for

TABLE 2.

Panel LM test with breaks

Variable		One break	Two breaks
Job creation (JC)	Full states[1]	-31.533^{***}	-63.293^{***}
	9 states[2]	-13.297^{***}	-25.576^{***}
Job Destruction (JD)	Full states[1]	-36.067^{***}	-62.507^{***}
	23 states[3]	-25.436^{***}	-40.496^{***}
Net Employment Growth (NET)	Full states	-11.3809^{***}	-13.9133^{***}
	8 states	-10.9470^{***}	-12.5137^{***}

Note: *** denote statistical significance at the 1% levels.
[1] Full states mean fifty U.S. states plus the District of Columbia.
[2] 9 states cover Hawaii, Maine, Maryland, Massachusetts, New Jersey, New Mexico, North Dakota, Oregon and Wyoming.
[3] 23 states include Alabama, Alaska, Florida, Idaho, Illinois, Indiana, Kansas, Maryland, Massachusetts, Minnesota, Mississippi, Montana, Nevada, New Hampshire, New Jersey, New Mexico, North Carolina, North Dakota, Oklahoma, South Carolina, Utah, West Virginia and Wisconsin.
[4] 8 states include Arkansas, Hawaii, Idaho, Maine, Massachusetts, Nevada, New Hampshire and New Jersey.

TABLE 3a.

Univariate LM Tests with breaks for State Job Creation Rates (1977-2005)

State	LM Statistics	Break 1	Break 2	State	LM Statistics	Break 1	Break 2
Hawaii	-8.288^{**}	1993		New Mexico	-3.536	1991	
Maine	-6.759^{**}	1991		North Dakota	-10.811^{**}	1983	
Maryland	-4.332^{*}	1991		Oregon	-6.121^{**}	1981	2001
Massachusetts	-8.945^{**}	1982	1991	Wyoming	-7.404^{**}	1983	
New Jersey	-7.722^{**}	1991					
Aggregate	-6.318^{**}	1991					

Note: * and ** denote statistical significance at the 10% and 5% levels, respectively. Critical values for the LM one-break and two-break unit root test statistic are tabulated in Lee and Strazicich (2003b).

the job creation rates with two breaks such as Massachusetts and Oregon. Based on the Perron (1989) unit test, we are able to reject the unit root null hypothesis at the 10 percent level or better for 7 out of 9 states in job creation rates; 19 out of 23 cases in job destruction rates; and 5 out of 8 series in the net employ change rates.

At the bottom of Tables 3 and 4, we present the individual LM unit root t-statistic and the Perron (1989) unit test for the aggregate job creation, destruction and net employment change rates. The LM t-statistic computed with up to two breaks rejects the null of nonstationarity at the 5 per cent level for all the aggregate series. Similar result is arrived from the

TABLE 3b.

Univariate LM Tests with breaks for State Job Destruction Rates (1977-2005)

State	LM Statistics	Break 1	Break 2	State	LM Statistics	Break 1	Break 2
Alabama	-10.329^{**}	1984		Nevada	-10.827^{**}	1984	1992
Alaska	-7.089^{**}	1991		New Hampshire	-9.073^{**}	1985	1991
Florida	-10.071^{**}	1992		New Jersey	-4.484^{*}	1991	
Idaho	-9.618^{**}	1982		New Mexico	-11.624^{**}	1992	
Illinois	-6.087^{**}	1984	2000	North Carolina	-7.631^{**}	1991	
Indiana	-9.357^{**}	1984		North Dakota	-9.542	1985	
Kansas	-4.378^{*}	1988		Oklahoma	-9.238^{**}	1985	
Maryland	-8.167^{**}	1984		South Carolina	-9.559^{**}	1992	
Massachusetts	-3.377	1991		Utah	-10.174^{**}	1992	2000
Minnesota	-9.599^{**}	1991		West Virginia	-6.468^{**}	1982	
Mississippi	-7.259^{**}	1982		Wisconsin	-9.521^{**}	1984	
Montana	-3.116	1988					
Aggregate	-8.334^{**}	1984					

Note: * and ** denote statistical significance at the 10% and 5% levels, respectively.

TABLE 3c.

Univariate LM Tests with breaks for State Net Employment Change Rates

State	LM Statistics	Break 1	Break 2	State	LM Statistics	Break 1	Break 2
Arkansas	-5.931^{**}	1984		Massachusetts	-4.266^{*}	1991	
Georgia	-10.716^{**}	1984	1991	Nevada	-10.27^{**}	1983	1992
Hawaii	-9.020^{**}	1983	1992	New Hampshire	-10.876^{**}	1991	
Maine	-10.922^{**}	1991		New Jersey	-7.807^{**}	1991	
Aggregate	-10.225^{**}	1991					

Note: * and ** denote statistical significance at the 10% and 5% levels, respectively.

Perron (1989) unit test which indicates that the stabilization policy may be exerting no effect on job creation and destruction in the long run.[8]

The panel LM unit root test with breaks holds the assumption of cross-sectional independence of innovations, which is unlikely to hold in practice. To address this issue, we employ the CD statistic of Pesaran (2004) for the panel of U.S. job creation, job destruction and net employ change rates. Following Pesaran (2004), we measure the OLS residuals from ADF regressions in each variable of job creation, destruction or net employment

[8]As mentioned by the referee, rejecting null hypothesis of overall non-stationarity only indicates that at least job creation and destruction in one state is stationary. Following the suggestion from the referee, we also investigate the hysteresis hypothesis in the aggregate job creation, destruction and net employment change rates. We thank the referee for providing this insightful advice.

TABLE 4a.

Perron test for State Job Creation Rates (1977-2005)

State	Model A	Model B	Model C	State	Model A	Model B	Model C
Hawaii				New Mexico			
($T_B = 1993$)	-3.933^*	-0.338	2.349	($T_B = 1991$)	-1.578	-2.536	-3.995^*
Maine				North Dakota			
($T_B = 1991$)	-4.116^{**}	0.666	0.264	($T_B = 1993$)	-4.397^{**}	-1.191	0.690
Maryland				Oregon			
($T_B = 1991$)	-3.866^*	1.641	0.027	($T_B = 1981$)	-1.450	-1.478	-1.601
				($T_B = 2001$)	-0.612	-1.857	-2.013
Massachusetts				Wyoming			
($T_B = 1982$)	-1.144	-0.804	-1.322	($T_B = 1993$)	-0.538	-0.973	-4.137^{**}
($T_B = 1991$)	-4.206^{**}	-1.960	-0.210				
New Jersey							
($T_B = 1993$)	-1.879	-1.696	-4.069^{**}				
Aggregate							
($T_B = 1993$)	-0.158	-2.069	-4.198^{**}				

Note: * and ** denote statistical significance at the 10% and 5% levels, respectively.

change. As can be seen in Table 5, the null hypothesis of cross-section independence is overwhelmingly rejected for both the panel of job creation, destruction and net employ change rates. This result indicates a high degree of dependence across the United States, which might due to common economic shocks, which include interstate trade, communication and so on.

With the evidence of a high degree of dependence, we further employ the Bai and Carrion-i-Silvestres (2009) panel unit root tests, which consider not only multiple structural breaks but also cross-sectional correlation, to re-examine the hysteresis hypothesis of U.S. state-level job creation, destruction and net employ change. Table 6 reports the BC panel unit root test with a different number of common factors. In the Z statistics, for example, we find that the null hypothesis of the unit root can be rejected at the five per cent level of significance in the job creation panel of the nine states. Moreover, the Pm and the P statistics are all large in magnitude and statistically significant at the one per cent level, and strongly reject the joint null hypothesis of the unit root in both the panel of job creation and destruction. As a result, we find that the hysteresis hypothesis is rejected in U.S. job creation, destruction and net employ change rates and is consistent with those obtained by Song and Wu (1997), Romero-Ávila and Usabiaga (2007) and Sephton (2009) who reject the null of joint nonstationarity for a panel of U.S. state-level unemployment rate.

TABLE 4b.

Perron test for State Job Destruction Rates (1977-2005)

State	Model A	Model B	Model C	State	Model A	Model B	Model C
Alabama				Nevada			
($T_B = 1984$)	-4.159^{**}	-0.758	0.927	($T_B = 1984$)	-0.312	-0.216	0.300
				($T_B = 1992$)	-2.731	-2.131	-0.210
Alaska				New Hampshire			
($T_B = 1991$)	-0.090	3.596	4.865^{**}	($T_B = 1985$)	-0.237	-3.549	-4.452^{**}
				($T_B = 1991$)	-1.539	-2.167	-2.575
Florida				New Jersey			
($T_B = 1992$)	-3.991^{*}	1.079	0.192	($T_B = 1991$)	-4.137^{**}	-2.563	-1.040
Idaho				New Mexico			
($T_B = 1982$)	0.555	-1.522	-4.539^{**}	($T_B = 1992$)	-0.788	-0.788	-4.039^{**}
Illinois				North Carolina			
($T_B = 1984$)	-0.131	-2.566	-3.903^{*}	($T_B = 1991$)	-1.365	-1.206	-4.663^{**}
($T_B = 2000$)	-4.179^{**}	-1.588	0.596				
Indiana				North Dakota			
($T_B = 1984$)	-4.155^{**}	-0.973	-0.188	($T_B = 1985$)	-3.994^{*}	-0.972	-1.431
Kansas				Oklahoma			
($T_B = 1988$)	-3.834^{*}	-0.382	-0.127	($T_B = 1985$)	-4.006^{**}	-0.197	0.001
Maryland				South Carolina			
($T_B = 1984$)	0.232	-3.727	-4.788^{**}	($T_B = 1992$)	-4.973^{**}	-1.887	-1.172
Massachusetts				Utah			
($T_B = 1984$)	0.591	-1.441	-1.377	($T_B = 1992$)	-0.526	-2.001	-2.285
($T_B = 1991$)	-4.357^{**}	-1.013	0.685	($T_B = 2000$)	-4.189^{**}	-1.986	-0.062
Minnesota				West Virginia			
($T_B = 1991$)	-4.520^{**}	-2.917	1.180	($T_B = 1982$)	-3.667^{*}	0.380	0.542
Mississippi				Wisconsin			
($T_B = 1982$)	-0.210	-0.494	-3.914^{*}	($T_B = 1984$)	-4.066^{**}	-1.921	-1.148
Montana							
($T_B = 1988$)	-4.086^{**}	1.118	1.203				
Aggregate							
($T_B = 1984$)	-4.019^{**}	-2.107	0.100				

Note: * and ** denote statistical significance at the 10% and 5% levels, respectively.

4. CONCLUSION

Understanding the behavior of job creation and destruction is fundamental to understanding the operation of the labor market. In this paper we investigate the hysteresis hypothesis in the U.S. from the demand side of the labor market - job creation and destruction. This work has significant

TABLE 4c.

Perron test for State Net Employment Change Rates

State	Model A	Model B	Model C	State	Model A	Model B	Model C
Arkansas				Massachusetts			
($T_B = 1984$)	-4.503^{**}	-1.313	-0.650	($T_B = 1991$)	-4.812^{**}	-2.465	-0.109
Georgia				Nevada			
($T_B = 1984$)	-0.511	-1.073	-1.121	($T_B = 1983$)	-2.316	-2.010	-0.507
($T_B = 1991$)	-3.434^{*}	-1.185	-0.199	($T_B = 1992$)	-1.587	-1.370	-1.654
Hawaii				New Hampshire			
($T_B = 1983$)	-0.447	-1.131	-3.300^{*}	($T_B = 1991$)	-1.500	-3.848^{*}	-4.171^{**}
($T_B = 1992$)	-0.320	-0.173	1.461				
Maine				New Jersey			
($T_B = 1991$)	-3.928^{*}	-1.045	-0.382	($T_B = 1991$)	-4.481^{**}	-2.110	-1.995
Aggregate							
($T_B = 1991$)	-0.408	-2.251	-4.195^{**}				

Note: * and ** denote statistical significance at the 10% and 5% levels, respectively.

TABLE 5.

Cross-Sectional Dependence Test[1]

Variable		CD Test	p-Value
Job creation (JC)	Full states	75.203^{***}	0.000
	9 states	9.428^{***}	0.000
Job Destruction (JD)	Full states	106.973^{***}	0.000
	23 states	53.030^{***}	0.000
Net Employment Growth (NET)	Full states	84.280^{***}	0.000
	8 states	11.711^{***}	0.000

Note: *** denote statistical significance at the 1% levels.
[1] The CD statistic or the null of cross-sectional independence is distribution as two-tailed standard distribution.

implications for policy making and enables the development of interesting insights about the demand side of the labor market. Although the conventional ADF and PP tests fail to reject the unit root for some of the states job creation and destruction rates in the U.S., the results based on the panel-based LM unit root test of Im et al. (2005) indicate that the hysteresis hypothesis can clearly be rejected when structural breaks are considered. The result is robust while we consider the aggregate data of job creation, destruction and net employment change rates. Finally, we find that that the hysteresis hypothesis in the U.S. job creation and destruction rates is also to be rejected when we employ a panel unit test of Bai and Carrion-i-Silvestre (2009), which considers not only multiple structural

TABLE 6.

Panel unit root tests allow for breaks and cross-sectional dependence

Variable	Job Creation			Job Destruction			Net Employment Growth		
	Z	Pm	P	Z	Pm	P	Z	Pm	P
Number of factors	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic
	Full states			Full states			Full states		
1	-4.806^a	12.775^a	284.462^a	-5.968^a	20.174^a	390.141^a	-6.358^a	36.572^a	331.453^a
2	-5.439^a	15.000^a	316.240^a	-5.952^a	20.378^a	393.055^a	-6.186^a	27.395^a	499.104^a
3	-5.285^a	14.296^a	306.186^a	-5.865^a	19.216^a	376.452^a	-5.585^a	19.774^a	389.186^a
4	-5.323^a	14.655^a	311.321^a	-5.654^a	17.047^a	345.476^a	-5.001^a	9.960^a	247.652^a
5	-4.978^a	12.789^a	284.670^a	-5.388^a	14.179^a	304.524^a	-4.624^a	6.283^a	194.615^a
	9 states			23 states			8 states		
1	-2.239^b	4.827^a	46.962^a	-4.111^a	16.035^a	199.802^a	-2.354^b	5.742^a	52.456^a
2	-2.058^b	3.510^a	39.058^a	-3.938^a	13.687^a	177.278^a	-2.336^b	6.002^a	54.012^a
3	-2.000^b	4.245^a	43.468^a	-3.764^a	10.267^a	144.479^a	-2.455^b	6.527^a	57.167^a
4	-2.257^b	5.352^a	50.115^a	-3.516^a	8.940^a	131.753^a	-2.221^b	4.734^a	46.408^a
5	-2.278^b	4.889^a	47.333^a	-3.263^a	7.158^a	114.658^a	-2.177^b	3.154^a	36.928^a

Note: ^{a} and ^{b} denote statistical significance at the 1% and 5% levels, respectively.

breaks but also cross-sectional dependence. Hence, these results indicate that the job creation and destruction process in the U.S. is in line with the structuralist paradigm. A major policy implication for our study is that a stabilization policy may not have permanent effects on the (natural) job creation and destruction rates. The demand side of the labor market is self-correcting and given sufficient time, job creation and destruction rates will return to their previous paths.

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