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Short Note on the Unemployment Rate of the "French overseas regions"

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Abstract

This article analyzes the hysteresis hypothesis in the unemployment rates of the four "French overseas regions" (Guadeloupe, Martinique, Guyana, Reunion) [FORs] over the period 1993-2008. We use standard univariate and panel unit root tests, among them Choi (2006) and Lopez (2009) that account for cross-sectional dependence and have improved performance when the number of countries and the time dimension of the data are limited. Our results cannot reject the null hypothesis of a unit root and so find evidence supporting hysteresis in the unemployment rates for the FORs.

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1. Introduction

Determining whether unemployment rate can be characterized by a stationary process remains a major challenge for economists and policy makers. This problem is especially crucial for the French overseas regions [FORs] (Guadeloupe, Martinique, Guyana, and Reunion), which, according to the European Union [EU]'s statistics agency "Eurostat", had the highest unemployment rates in the 27-nation EU in 2007. This finding clearly emphasizes the great failure of different policies against unemployment implemented by the successive French governments of the last decades.

The determination of suitable policies for these non-continental regions relies on understanding the behavior of unemployment rates from a theoretical standing point. Camarero *et al.* (2006) mentions two commonly used descriptions. On one hand, the non-accelerating inflation rate of unemployment [NAIRU] hypothesis characterizes the unemployment rate as a stationary process, *i.e.* the unemployment rate tends to revert to its equilibrium in the long-run after a shock.[1] On the other hand, the hysteresis hypothesis states that the unemployment rate is an integrated process of order one, *i.e.* shocks have a permanent effect on unemployment.[2] The empirical validity of these hypotheses commonly relies on testing for the presence of a unit root. Clearly, the hysteresis hypothesis is associated with the presence of a unit root in the unemployment rate process while the NAIRU or natural-rate hypothesis is associated with its rejection.

Since the pioneer work of Blanchard and Summers (1986), many authors have used unit root tests to study the unemployment rate. Most of them, such as Mitchell (1993), Roed(1996), Song and Wu(1997) and (1998), Arestis and Mariscal (1999) Murray and Papell (2000), Leon-Ledesma (2002), Camarero *et al.*(2006), and Yilanci (2008) focus on developed countries. Yet, this vast literature does not reach any consensus on the debate NAIRU versus hysteresis for developed countries.[3] Furthermore, only few studies, among them Chang *et al.* (2007), Gomes and Gomes da Silva (2008) and Gomes and Gomes da Silva (2009) analyze developing countries.

This article contributes to this latter line of research by investigating whether hysteresis in unemployment characterizes the FORs' labor market. More precisely, we test for the presence of a unit root in the unemployment rate of Guadeloupe, Martinique, Guyana, and Reunion for the 1993-2008 period. First, our analysis relies on univariate and standard panel unit root tests. Then, the limited amount of data available being a concern, we use the more powerful tests of Choi (2006) and Lopez (2009). To our knowledge, this is the first time that the hysteresis paradigm is tested for a set of Small Island Developing Economies [SIDE].

The remainder of this article is organized as follows. Section 2 describes the panel unit root tests proposed by Choi (2006) and Lopez (2009) while Section 3 presents the data and the empirical results. Finally, Section 4 gives some concluding remarks and the policy implications of our findings.

2. Econometric methodology

Standard univariate unit root tests, such as the augmented Dickey Fuller [ADF] or Elliott, Rothenberg, and Stock [ERS] tests, are well-known for their inability to accurately reject the unit root null hypothesis when the span of the data is short. Hence, they often lead to evidence

[1] A special case of the NAIRU concept is when the unemployment rate can be defined as a stationary process around a small number of permanent structural breaks (Phelps, 1994). Most shocks to unemployment are still temporary but with occasional and permanent changes in the natural rate.
[2] See Roed (1997) for the theoretical aspects on the hysteresis concept.
[3] See Camarero *et al.* (2006) and Chang *et al.* (2007) for a recent survey of this literature.

of non stationary data when the data may be stationary. One way of dealing with this issue is to extend the cross-sectional dimension that is adding countries, moving from a univariate to a multivariate analysis. Combining the number of periods with the number of countries leads to significant improvements in the tests' ability to correctly reject the unit root null hypothesis. However, the first generation panel unit root tests, such as Levin *et al.* (2002) [LLC], Im *et al.* (2003) [IPS] and Maddala and Wu (1999) [MW], assume that there is no contemporaneous relation between the countries studied. If the data do not observe such a restrictive assumption, then these tests have the tendency of over rejecting the null hypothesis, leading to evidence of stationarity when the data may be non stationary.

The second generation panel unit root tests suggest several alternatives to relax this assumption.[4] We focus on two of these newer tests: Choi (2006) and Lopez (2009) which both propose a panel version of the ERS (1996) univariate unit root tests, but differ in the treatment of the contemporaneous correlation as well as in the hypotheses tested. Choi (2006) uses a unique common factor structure approach and cross-sectionally demeans the data, while Lopez (2009) advocates the estimation of the residual covariance matrix. Furthermore, Choi (2006)'s alternative hypothesis allows for some stationary processes while Lopez (2009) considers that all the series are stationary. Yet, as Breitung and Pesaran (2008) pointed out, in both cases the rejection of the null hypothesis means that "a significant fraction of the cross-section units are stationary".

Both estimation procedures rely on the GLS-transformation of the data such that:

- Step 1: For each series y_{jt} with deterministic component z_{jt}, the quasi-differences $\tilde{y}_{jt} = \left(\tilde{y}_{j1}, (\tilde{y}_{j2} - a\tilde{y}_{j1}), \dots, (\tilde{y}_{jT} - a\tilde{y}_{jT-1})\right)'$ and $\tilde{z}_{jt} = \left(1, (1-a), \dots, (1-a)\right)'$ are calculated using the local alternative $a = 1 + \frac{-7}{T}$ for Choi (2006) and $a = 1 + \frac{-7}{\sqrt{N}T}$ for Lopez (2009). The locally demeaned data are then constructed as $y_{jt}^{d} = y_{jt} - \beta_j{}' z_{jt}$, where β_j is the least-squares estimate of the regression of $\tilde{z}_{jt}$ on $\tilde{y}_{jt}$.

Then Choi (2006) combines the p-values of the univariate unit root tests while Lopez (2009) uses the pooled data.

Choi (2006)'s testing procedure follows:

- Step 2: The data is cross-sectionally demeaned:

$$z_{jt} = y_{jt}^{d} - \frac{1}{N}\sum_{j=1}^{N} y_{jt}^{d}$$

- Step 3 : Estimation of the DF-GLS$^{\mu}$ regressions for the series j=1, …N,

$$\Delta z_{jt} = \rho_j z_{jt} + \sum_{i=1}^{k_j} \phi_{ji} \Delta z_{j,t-i} + u_{jt} \; with \; t = 1, \dots T$$

Where k_j, the number of lagged first difference terms allowing for serial correlation, is selected using the Modified Akaike Information Criterion [MAIC].

The t-statistic is calculated for $H_0: \rho_j = 0$ and the corresponding p-values are generated. Finally, the following statistics are calculated:

[4] Breitung and Pesaran (2008) provide a survey of the literature.

$$Pm = -\frac{1}{\sqrt{N}}\sum_{j=1}^{N}(\ln(p_j)+1)$$

$$Z = \frac{1}{\sqrt{N}}\sum_{j=1}^{N}\Phi^{-1}(p_j)$$

$$L^{*} = \frac{1}{\sqrt{\pi^2 N/3}}\sum_{j=1}^{N}\ln\left(\frac{p_j}{1-p_j}\right)$$

The unit root null hypothesis is rejected if $P_m > c_{p\alpha}$, $Z < c_{z\alpha}$ and $L^{*} < c_{l\alpha}$, where $c_{p\alpha}$ is from the upper tail of the standard normal distribution while $c_{z\alpha}$, and $c_{l\alpha}$ from the lower tail.

Lopez (2009)'s testing procedure follows:

Step 2: For each series, k_j is selected using the MAIC

Step 3: Estimation of the following system equations:

$$\Delta y_{jt}^{d} = \rho y_{jt}^{d} + \sum_{i=1}^{k_j}\phi_{ji}\Delta y_{j,t-i}^{d} + u_{jt} \qquad with\ j = 1, \dots, N\ and\ t = 1, \dots T \quad (1)$$

Clearly, the residual covariance matrix is estimated. Then, it is used in the estimation of (1) with the SUR/FGLS method while constraining the values of ρ to be equal across equations. The estimated ρ and its corresponding standard deviation are obtained and the t-statistic is calculated for $H_0: \rho = 0$. Finally, since the statistic depends on the estimated residual covariance matrix, the critical values are bootstrapped with 10000 iterations, to avoid size distortion. [5,6]

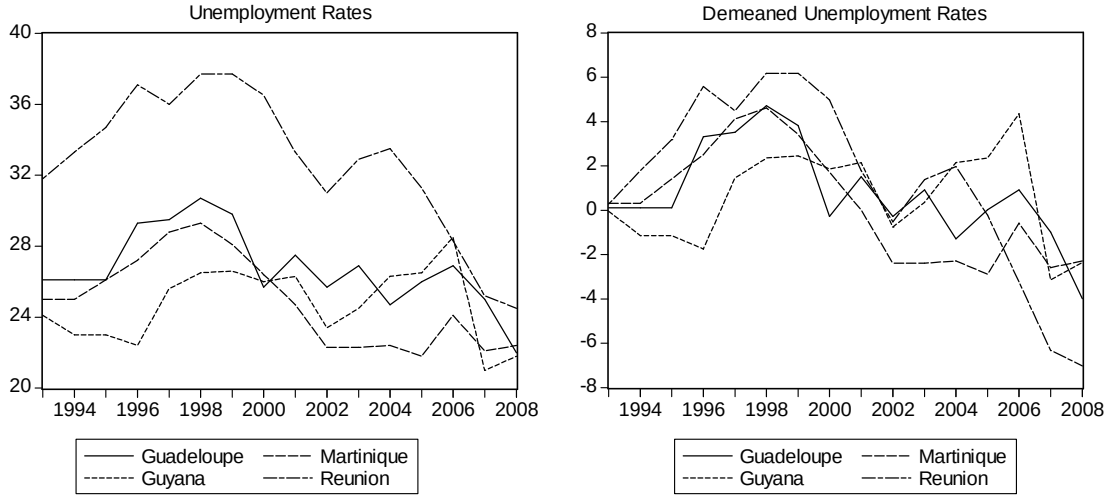
3. Data and empirical results

We use the definition of the International Labor Organization for the annual rates of unemployment, and consider for 4 specific French regions (Guadeloupe, Martinique, Guyana, and Reunion) for the period from 1993 to 2008. The data are from the "demographic indicators and economic account" database of the French National Institute of Statistical and Economic Information. For each country, the data and its GLS-demeaned version are presented in Figure 1.

[5] See Lopez (2009) for more details.

[6] The SUR estimation requires that T>N.

Figure 1: Unemployment Rates



We first analyze the data via commonly used univariate unit root tests, namely the ADF test, the DF-GLS test of ERS and the M-GLS tests (MZ_t and MZ_a) of Ng and Perron (2001). The results are reported in Table I, with k, the appropriate number of lags selected using MAIC. The use of asymptotic critical values leads to the rejection of the unit root hypothesis for Guyana when using DF-GLS, MZ_a and MZ_t . Yet, these results disappear when the critical values are simulated to account for the very small span of our data sets (16 years). This discrepancy is expected as using asymptotic critical values when dealing with a small sample may lead to significant size distortions. The overall lack of rejections is still not very informative as the univariate unit root tests are also well-known for their lack of power when applied to very short data.

Table I: Univariate unit root tests for the FORs, 1993-2008

Regions	ADF	DF-GLS	MZ_a	MZ_t	k
Guadeloupe	-1.1695	-1.279	-4.1862	-1.1453	0
Guyana	-2.3614	-2.528**(a)	-6.5618*(a)	-1.7043*(a)	0
Martinique	-0.7717	-0.880	-1.7077	-0.8238	0
Reunion	0.3128	-0.016	-0.0295	-0.0140	0

Notes: * and ** indicate significance at the 10% and the 5% levels, respectively. The 5% (10%) critical values for the ADF, DF-GLS, MZ_a and MZ_t tests are -3.08 (-2.68), -1.96 (-1.61), -8.10 (-5.10) and -1.98 (-1.62), respectively.
(a): These rejections disappears with bootstrapped critical values.

The panel unit root tests are a logical next step as these four French regions present several similarities. Some of these common characteristics are *(i)* a geographical isolation due to the distance from the European continent, reinforced by insularity or enclave status; *(ii)* a limited local market, linked to the size of the population; *(iii)* geographical and climatic conditions limiting the endogenous development of primary and secondary industries (lack of natural resources, active volcanic areas, …); and *(iv)* an economic dependence on a small number of products. As a result, these regions have important structural and permanent handicaps when compared to the rest of France or the EU. The EU has recognized this specific situation by grouping them into the "Ultra Peripheral Regions" [UPR] area.[7,8]

[7] The concept of UPR was officially recognized in 1997 by the Treaty of Amsterdam (Article 299§2).
[8] The UPR group also includes the Azores, the Canaries and Madeira.

The top panel of Table II presents the results of several first-generation panel unit root tests, namely the Levin *et al.* (2002) [LLC], Im *et al.* (2003) [IPS] and Maddala and Wu (1999) [MW] tests. The MAIC procedure is used to determine the optimal number of lags. None of the tests are able to reject the unit root null, providing evidence of hysteresis in unemployment rates. Interestingly, while these first generation tests are well-known for their tendency of over-rejecting the null hypothesis, this does not seem to be an issue here.

Table II: Panel data unit root tests for the FORs, 1993-2008

	Statistics	**p-value**
First-generation tests		
LLC	1.7081	0.9562
IPS	1.0752	0.8589
MW	4.9217	0.7659
Second-generation tests		
P_m	0.0201	0.4919
Z	0.1483	0.5590
L^*	0.1521	0.5608
DF-GLS-SUR (bootstrapped)	-2.1998	0.2120

However, these tests may have very low power due to the small size of the panel (16 years for 4 countries). Choi (2006) and Lopez (2009) rely the GLS-transformation and provide a more powerful alternative to IPS and LLC, respectively. Furthermore, they account for contemporaneous correlation, minimizing the risk of size distortion. The results are reported in the lower panel of Table II.

We are still not able to reject of the non-stationarity null, providing evidence of hysteresis in the unemployment rates for the FORs during the period 1993-2008.[9] As a result, the unemployment rate will not revert to its long-run equilibrium level given by the NAIRU for this period.

4. Conclusion and policy implications

This article studies the behavior of the unemployment rates of four French regions, namely Guadeloupe, Martinique, Guyana and Reunion over the period 1993-2008. We analyze the behavior of these series using univariate and multivariate unit root tests, especially the more powerful Choi (2006) and Lopez (2009). The results are in favor of the hypothesis of unemployment hysteresis for the FORs' unemployment rates.

Moreover, this study has some major policy implications. On the one hand, the presence of hysteresis invalidates the well-stated view that Keynesian demand-driven policies are inefficient in the long-run. The long-run rate is dependent of the past behavior of unemployment (path-dependent), hence all measures reducing the current unemployment rate is likely to be effective. This follows Roed (1997)'s suggestion that "a macroeconomic policy that prevents unemployment from rising in the first place may be worthwhile, even though it is viewed as too expensive in the short run" (Roed, 1997, p. 412-413). On the other hand, in the context of hysteresis, the effectiveness of demand-driven policies does not mean that supply-driven policies are inappropriate in fighting unemployment. In fact, the latter will remain the most efficient if nominal wage rigidity, *i.e.* the indexation of the nominal wage on the price level, is weak in the short run.

[9] The conclusions are robust to a change in data that considers all the combinations of three regions.

Furthermore, it is essential to understand the hysteretic factors when designing the policy. Roed (1997) isolates several sources of hysteresis. Among them, the theories of the "Insider-outsider" effects and the "human capital depreciation" seem to be the best explanations for the FORs' case. Based on the "Insider-outsider" theory, demand-driven policies are effective if they are not anticipated by the employed workers. In contrast, the "human capital depreciation" theory suggests that targeted structural measures should supplement the conventional macroeconomic employment policies. McCausland and Theodossiu (2004) support this idea and show that supply-side policies should encourage opportunities for training instead of focusing on reducing employee protection. All in all, it would be important to clearly identify the underlying reasons for unemployment. However, this is beyond the scope of this work, but should be investigated in a future study.

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