

UNEMPLOYMENT PERSISTENCE AND INFLATION CONVERGENCE: EVIDENCE FROM REGIONS OF TURKEY

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Abstract

As an emerging economy, Turkey has suffered from high unemployment rate, as well as major discrepancies among regional unemployment rates, even in the periods of rapid economic growth. In this study, we mainly investigate the unemployment persistence at the regional level for Turkey, and we apply recent and powerful Panel-based Unit Root (PUR) tests, when the panels have small time series dimensions and cross-sections in highly persistent data. Results from the PUR tests clearly show that the existence of the unemployment persistence in most of the regional unemployment rates of Turkey. By using same PUR tests, we also test the possible divergence in regional inflation rates in same data for evaluating further monetary policy implications. Our findings show that national monetary policy can efficiently impacts on most of Turkish regions.

Key Words: Panel unit root tests, regional unemployment, unemployment persistence, regional inflation, monetary policy, Turkey, emerging economies.

JEL Codes: C23, J64, E31.

1. Introduction

In the mainstream macroeconomics literature, unemployment characteristics can be explained by two opposite theoretical views; namely, the non-accelerating inflation rate of unemployment (NAIRU) hypothesis and the hysteresis hypothesis.¹

The hysteresis hypothesis suggests that cyclical fluctuations in the labor market can significantly and permanently affect unemployment rate, and this can lead to a 'long-term persistence'. In other words, unemployment rates should follow a unit root process. On the basis of this view, if unemployment rates are a unit root process, the shocks that affecting the series will have permanent effects, and shocks will shift the 'unemployment equilibrium' from one level to another.² In this case, the policy-point of this view can be summarized as the policy action is certainly necessary to turn back 'first equilibrium level' of the unemployment rate.

On the other hand, inflation and unemployment dynamics are interrelated in the short-run through a Phillips Curve (PC).³ However, in the longer run these two variables are presumed to be independent of one another. This independence is well-documented in the 'classical view', whereby monetary policy has no long-run real effects, and unemployment converges towards the natural rate of unemployment (NRU) or the

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¹ Of course, there are alternative models. Please see Romer (2006: 437-489) for details.

² Blanchard and Summers (1986) were first to examine the hysteresis hypothesis, and they argued that a raise on the unemployment rate in a sufficient length of time was bound to affect the natural-rate of unemployment due to the 'bargaining power' of insiders.

³ It commonly describes as a New Keynesian Phillips Curve (NKPC) in the literature.

NAIRU. On this account, this view indicates that unemployment rates should follow a stationary process or a mean-reversion. The NAIRU hypothesis state that the equilibrium unemployment rate is independent from monetary policy variables particularly in the long-run and actual unemployment tends to converges towards its natural rate.⁴

As we can see above, it is important to assess the stochastic properties of unemployment rates and the realized inflation. As a matter of fact, it is particularly critical for policy-makers to understand the nature of unemployment and inflation not only at national level, but also at regional level.⁵

In the literature, less number of papers has investigated the stochastic properties of regional unemployment rates, when they compared with the number of papers that have examined the characteristics of national unemployment rates.

Song and Wu (1997, 1998) used PUR test by Levin et al. (2002, henceforth LLC) in 48 states of the United States (US) and they concluded that the hysteresis hypothesis was rejected. Leon-Ledesma (2002) used the data from 1985 quarter one to 1990 quarter four for 51 US states and he concluded that the rejection of the hysteresis hypothesis by Im et al. (2003, henceforth IPS) PUR test. On the contrary, Smyth (2003) both used LLC and IPS PUR tests for the states of Australia and he concluded that the hysteresis hypothesis was valid. Chang et al. (2007) used LLC, IPS and Taylor and Sarno (1998)'s PUR tests from July 1993 to September 2001 for 21 regions of Taiwan, and they concluded that the hysteresis hypothesis was rejected by all these PUR tests. Romero-Avila and Usabiaga (2008) tested the hysteresis hypothesis for the unemployment rate of Spanish regions over the period 1976-2004 by using Carrion-i-Silvestre et al. (2005)'s PUR test and they concluded that the persistent regional unemployment rates have observed in Spain. Gomes and Da Silva (2009) applied the Lee and Strazicich (2003)'s unit root test for the period from 1981 January to 2002 December for six major Brazilian metropolitan-areas and the results of unit root tests were showed that the hysteresis hypothesis was only rejected in one region. Lanzafame (2012) showed that the hysteresis hypothesis was only valid in 1 of 20 regions in Italy. Bakas and Papapetrou (2012) used the data from 1998 quarter one to 2011 quarter two for 13 regions of Greece, and they concluded that the validation of hysteresis hypothesis by using several different PUR tests.

⁴ Friedman (1968) and Phelps (1968) firstly proposed the NAIRU hypothesis and they suggested that unemployment rate is a stationary process or a mean-reversion. If unemployment rates are a mean-reverting process, the effect of the shocks will be transitory. As a result, the necessity for a policy action is subordinate, since the unemployment rate will 'naturally' return to its first equilibrium level.

⁵ For example, Elhorst (2003) proposed three main reasons that make studying the spatially uneven distribution of unemployment worthwhile. Firstly, the magnitude of regional unemployment disparities within a country is as large as the magnitude observed across countries. Therefore, policies that target regional welfare inequalities must take local labor markets more seriously. Secondly, wide unemployment differentials mean that inefficiency in the economy as a whole and this reduces growth. Finally, most macroeconomic studies are attempted to explain unemployment disparities between countries. However, within a country institutional factors are usually common and cannot be used as an explanation. Existing theories of 'spatial unemployment' indicate that the high unemployment in some regions must be compensated by other factors, such as real wages, trade and openness. Please see Gozgor and Piskin (2011) for an explanation for the main determinants of regional unemployment in Turkey.

The main objective of this paper is to test the possible presence of unemployment persistence in the regional unemployment rates in Turkey by using more powerful and recent Panel Unit Root (PUR) tests. We then investigate the stochastic properties of regional inflation rates as the NKPC suggests.

As an emerging economy, Turkey suffers from severe unemployment, as well as major regional discrepancies, even in the periods of rapid economic growth. We suggest that investigating the validation of the unemployment persistence hypothesis in regional unemployment and the dynamics of regional inflation is not only crucial for researchers, but also for policy-makers.

To the best of our knowledge, little work has so far emphasized that the unemployment persistence for the regions of Turkey. For instance, Filiztekin (2009) described the wide regional unemployment disparities in Turkey from 1980 to 2000 by using nonparametric statistical techniques. Gozgor (2012) investigated whether the nature of regional unemployment rates in Turkey were explained by the hysteresis hypothesis or the NAIRU hypothesis from 2004 to 2011. For this purpose, he employed PUR tests that proposed by Maddala and Wu (1999), Breitung (2000), Hadri (2000), Choi (2001), Levin et al. (2002), Im et al. (2003), Carrion-i-Silvestre et al. (2005), and Im et al. (2005). All results from these PUR tests clearly showed that the validation of the hysteresis hypothesis for the regional unemployment rates in Turkey.

However, given the short-time dimension of his panel, we can suggest that using of PUR tests allowing for structural breaks may not be a good idea.⁶ Actually, these tests usually search for breaks in a subset of the available observations, (e.g. by truncating the first and last 10% of the observations), and this is done to avoid a situation in which the detected structural-break reduces the pre-break or post-break period to a small number of observations.

On the other hand, following the PUR test by Choi (2006), Lopez (2009) developed a new PUR test that offering satisfying performances, particularly in cases of highly persistent series with limited span of data. She developed a new test procedure that combining the Generalized Least Square (GLS) transformation by Elliott et al. (1996) with a pooled panel Augmented Dickey Fuller (ADF) test allowing for heterogeneous serial and contemporaneous correlation. Using bootstrap critical values, PUR test by Lopez (2009) displayed a significantly better finite-sample power than mentioned PUR tests including that allowing for cross-sectional dependency. Moreover, her findings were particularly noticeable when the data were highly persistent and the panels had small time series dimensions and/or cross-sections.

Because of small time series dimensions, there are still no empirical results that examined the regional unemployment and regional inflation dynamics, particularly for each region of Turkey. We suggest that PUR tests by Choi (2006) and Lopez (2009) can provide further results about this issue. For this purpose, we apply PUR tests by Choi (2006), Lopez (2009) that they can be arranged in groups by cross-section dependence. Thus, this paper contributes to the related literature on the evaluation for stochastic properties of regional unemployment and regional inflation rates in Turkey by using 'more powerful and recent' PUR tests. Furthermore, these PUR tests enable to discuss further policy implications for each Turkish region. We suggest that investigating

⁶ We intend PUR tests by Carrion-i-Silvestre et al. (2005) and Im et al. (2005).

regional unemployment persistence can indicate more clear policy implications for each region of Turkey.

As we have already mentioned, we also attempt to assess the stochastic properties of regional inflation for each region by using same PUR tests. The stochastic properties of inflation rates at the regional level are also important, because significant differences in inflation rates among regions of a country may lead to disparities in regional real interest rates, given a common national monetary policy. Secondly, in the common national exchange rate, inflation differentials may work as an adjustment mechanism, namely, regions with higher productivity or lower (real) wage growth than others would experience a depreciation of the real exchange rate, thus a gain in trade competitiveness (Yilmazkuday, 2013).⁷ Thus, we also aim to evaluate the effectiveness of national monetary policy by considering regional inflation rates of Turkey.

In the following section, the methodology, data used in this study, the empirical findings are defined and elaborated. The final section is the conclusion.

2. Methodology and empirical findings

In this study, we use unemployment rates of 26 regions in Turkey for the period from 2004 to 2011. The frequency of data is yearly. Unemployment rates of the regions are defined as the ‘regional-level’, namely, Nomenclature of Territorial Units for Statistics (NUTS) II. We obtained the data from Turkish Statistical Institute (TSI).

Inflation rates of 26 regions are defined as the first log difference of yearly Consumer Price Index (CPI) and they are obtained from the Central Bank of the Republic of Turkey (CBRT).

As we have already mentioned, the classical unit root tests, such as that proposed by Dickey and Fuller (1979) are subject to some criticism that is occurred from the low-power of these tests, particularly in small samples, in order to define a unit root process. Consequently, PUR tests have begun to be widely used in the literature.

In this study, we employ PUR tests that they can be arranged in groups by cross-section dependence which are proposed by Choi (2006) and Lopez (2009). They both propose a panel version of the Elliot et al. (1996)’s univariate unit root tests, and their estimation procedures are relied on the GLS-transformation of the data. These PUR tests can be simply defined as follows:

Firstly, for each series y_{jt} , with deterministic component (z_{jt}) , $\tilde{y}_{jt} = ((\tilde{y}_{j1}, (\tilde{y}_{j2} - \alpha \tilde{y}_{j1}), \dots, (\tilde{y}_{jT} - \alpha \tilde{y}_{jT-1})))$ is the quasi difference and $\tilde{z}_{jt} = ((1, (1 - \alpha), \dots, (1 - \alpha)))'$ are calculated by using the local alternative $\alpha = 1 + \frac{-7}{T}$ in PUR test by Choi (2006), and $\alpha = 1 + \frac{-7}{\sqrt{NT}}$ in PUR test by Lopez (2009). Then, the locally-

⁷ Beck et al. (2006) and Busetti et al. (2007) concluded that the inflation convergence in regional inflation rates of the Euro-area. However, Romero-Avila and Usabiaga (2012) recently found that the inflation divergence in regions of Spain.

demeaned data are constructed as $y_{jt}^d = y_{jt} - \beta_j' z_{jt}$ where β_j is the ordinary least square parameter of the regression $\tilde{z}_{jt}$ on $\tilde{y}_{jt}$. In this case, Choi (2006) combines the p-values of the univariate unit root tests, while Lopez (2009) uses the pooled data.

Choi (2006) defines the following testing procedure that the data are cross-sectionally demeaned can be written as $z_{jt} = y_{jt}^d - \frac{1}{N} \sum_{j=1}^N y_{jt}^d$ and then applying estimation of the DF-GLS^u for the series $j=1, \dots, N$ and this is defined as follows:

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

In this equation, k_j is the number of lagged first difference terms allowing for serial correlation, and it is selected by using Modified Akaike Information Criterion (MAIC). T-statistic is calculated under the null hypothesis of $\rho_j = 0$, and related p-values are obtained. Finally, following three statistics are calculated:

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

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

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

The null hypothesis of no unit root is rejected if $p_m > c_{p\alpha}$, $Z < c_{z\alpha}$ and $L^* < c_{l\alpha}$, where $c_{p\alpha}$ is calculated from the upper tail of the standard normal distribution and $c_{z\alpha}$ and $c_{l\alpha}$ from the lower tail.

In PUR test procedure by Lopez (2009), firstly, each series k_j is selected by using MAIC, and then following system equations are estimated:

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

Furthermore, the residual covariance matrix is estimated. Then, it is used in the SUR-FGLS method estimation with the constraining values of ρ to be equal across equations. Estimated ρ value and its corresponding standard deviation are obtained, and the t-statistic of PUR test is calculated under the null hypothesis of $\rho_j = 0$.

Finally, since this t-statistic depends on the estimated residual covariance matrix, to avoid size distortion, the critical values are bootstrapped with 10000 iterations.

We apply PUR tests, which are proposed by Choi (2006) and Lopez (2009) into the regional unemployment and regional inflation rates in Turkey. We use these PUR tests on the level of related variables and trend is also accompanied in our empirical analysis. Thus, we employed these PUR tests including constant and trend.

All results of related PUR tests can be seen in Table 1 as follows:

Table 1: Results of PUR Tests for Regional Unemployment and Regional Inflation

Regional Unemployment		
Choi (2006)	Pm	0.028 (0.462)
	Z	0.127 (0.611)
	L*	0.131 (0.588)
Lopez (2009)	DF-GLS-SUR	-2.056 (0.244)
Regional Inflation		
Choi (2006)	Pm	-0.067 (0.016)
	Z	-0.151 (0.003)
	L*	-0.156 (0.008)
Lopez (2009)	DF-GLS-SUR	-0.632 (0.011)

Empirical findings from related PUR tests clearly show that existence of hysteresis effect in regional unemployment rates in Turkey. These findings are similar with recent studies such as that examined by Filiztekin (2009) and Gozgor (2012). Furthermore, results from PUR tests indicate that the inflation convergence in the regions of Turkey. These findings are parallel with the findings of inflation convergence by Yilmazkuday (2013).

Details of these PUR tests for unemployment and inflation rates for each region can be found in Appendix I. We also report the some macroeconomic variables of regions in Appendix II.

3. Conclusion

In this paper, we investigate whether regional unemployment and regional inflation rates in Turkey are explained by a stationary or a unit root process. For this purpose, we employ the PUR tests by Choi (2006) and Lopez (2009). All these PUR tests clearly show that the validation of the hysteresis hypothesis for regional unemployment rates in Turkey. In other words, empirical findings from these PUR tests indicate that the hysteresis hypothesis is valid for 24 of 26 regional unemployment rates in Turkey. Furthermore, these PUR tests suggest that the results of inflation convergence for regional inflation rates in Turkey. Thus, the main policy implication is induced from this study, a fiscal or a monetary stabilization policy will have permanent effects upon the regional unemployment rates in Turkey. Also, findings of inflation convergence mean that national monetary policy can efficiently impacts on half of Turkish regions.

The important implication of our findings comes from the fact that temporary shocks into the regional unemployment rates will have permanent effects. Thus, the demand-side policies will be substantially effective in reducing the regional unemployment rates in the long-run. However, temporary shocks into the regional inflation rates will have transitory effects. This indicates a possible trade-off between inflation and unemployment for regions of Turkey as the NKPC suggests. On the other hand, this study can also shed a light on policy implications that focus on the possible

different minimum wage conditions of regions and central government incitement for each region.

References

- Beck, G.W., Hubrich, K., and Marcelliono, M. (2006). "Regional inflation dynamics within and across Euro area countries and a comparison with the US", *European Central Bank Working Paper*, No: 681.
- Bakas, D. and Papapetrou, E. (2012). "Unemployment in Greece: Evidence from Greek regions", *Bank of Greece Working Paper*, No: 146
- Blanchard, O.J. and Summers, L.H. (1986). "Hysteresis and the European unemployment problem", *NBER Macroeconomics Annual*, **1**, Cambridge: MIT Press, 15-90.
- Breitung, J. (2000). "The local power of some unit root tests for panel data", *Advances in Econometrics*, **15**, *Nonstationary Panels, Panel Cointegration, and Dynamic Panels*, Amsterdam: JAI Press, 161-178.
- Buseti, F., Forni, L., Harvey, A. and Venditti, F. (2007). "Inflation convergence and divergence with the European Monetary Union", *International Journal of Central Banking*, **3**, 95-121.
- Carrion-i-Silvestre, J.L., Barrio-Castro, T.D. and Lopez-Bazo, E. (2005). "Breaking the panels: An application to the GDP per capita", *Econometrics Journal*, **8**, 159-175.
- Chang, T., Yang, M.J., Liao, H.C. and Lee, C.H. (2007). "Hysteresis in unemployment: Empirical evidence from Taiwan's region data based on panel unit root tests", *Applied Economics*, **39**, 1335-1340.
- Choi, I. (2001). "Unit root tests for panel data", *Journal of International Money and Finance*, **20**, 249-272.
- Choi, I. (2006). "Combination unit root tests for cross sectionally correlated panels", *Econometric Theory and Practice: Frontiers of analysis and Applied Research: Essays in Honor of Peter C.B. Phillips*, Cambridge: Cambridge University Press, 311-333.
- Dickey, D.A. and Fuller, W.A. (1979). "Distribution of the estimators for autoregressive time series with a unit root", *Journal of the American Statistical Association*, **74**, 427-431.
- Elhorst, P. (2003). "The mystery of regional unemployment differentials: Theoretical and empirical explanations", *Journal of Economic Surveys*, **17**, 709-748.
- Elliott, G., Rothenberg, T. and Stock, J.H. (1996). "Efficient tests for an autoregressive unit root", *Econometrica* **127**, 421-441.
- Filiztekin, A. (2009). "Regional unemployment in Turkey", *Papers in Regional Science*, **88**, 863-878.
- Friedman, M. (1968). "The role of monetary policy", *American Economic Review*, **58**, 1-17.
- Gomes, F.A.R. and Da Silva, C.G. (2009). "Hysteresis versus NAIRU and convergence versus divergence: The behavior of regional unemployment rates in Brazil", *Quarterly Review of Economics and Finance*, **49**, 308-322.
- Gozgor, G. (2012). "Hysteresis in regional unemployment rates in Turkey", *International Journal of Economics and Finance*, **4**, 175-181.

- Gozgor, G. and Piskin, A. (2011). "Unemployment and trade: Generalized method of moments-dynamic panel data approach for regions of Turkey" (In Turkish), *Business and Economics Research Journal*, **2**, 121-138.
- Hadri, K. (2000). "Testing for stationarity in heterogeneous panel data", *Econometrics Journal*, **3**, 148-161.
- Im, K.S., Lee, J. and Tieslau, M. (2005). "Panel LM unit-root tests with level shifts", *Oxford Bulletin of Economics and Statistics*, **67**, 393-419.
- Im, K.S., Pesaran, M.H. and Shin, Y. (2003). "Testing for unit roots in heterogeneous panels", *Journal of Econometrics*, **115**, 53-74.
- Lanzafame, M. (2012). "Hysteresis and the regional NAIRU's in Italy", *Bulletin of Economic Research*, **64**, 415-429.
- Lee, J. and Strazicich, M.C. (2003). "Minimum Lagrange multiplier unit root test with two structural breaks", *Review of Economics and Statistics*, **85**, 1082-1089.
- Leon-Ledesma, M.A. (2002). "Unemployment hysteresis in the US and the EU: A panel data approach", *Bulletin of Economic Research*, **54**, 95-105.
- Levin, A., Lin, C.F. and Chu, C. (2002). "Unit root tests in panel data: Asymptotic and finite-sample properties", *Journal of Econometrics*, **108**, 1-24.
- Lopez, C. (2009). "A panel unit root test with good power in small samples", *Econometrics Review*, **28**, 295-313.
- Maddala, G.S. and Wu, S. (1999). "A comparative study of unit root tests with panel data and a new simple test", *Oxford Bulletin of Economics and Statistics*, **61**, 631-652.
- Phelps, E. (1968). "Money-wage dynamics and labor-market equilibrium", *Journal of Political Economy*, **76**, 678-711.
- Romer, D. (2006). *Advanced Macroeconomics*, Third edition, New York: McGraw-Hill/Irwin.
- Romero-Avila, D. and Usabiaga, C. (2008). "On the persistence of Spanish unemployment rates", *Empirical Economics*, **35**, 77-99.
- Romero-Avila, D. and Usabiaga, C. (2012). "Disaggregate evidence on Spanish inflation persistence", *Applied Economics*, **44**, 3029-3046.
- Smyth, R. (2003). "Unemployment hysteresis in Australian states and territories: Evidence from panel data unit root tests", *Australian Economic Review*, **36**, 181-192.
- Song, F.M. and Wu, Y. (1997). "Hysteresis in unemployment: Evidence from 48 U.S. states", *Economic Inquiry*, **35**, 235-243.
- Song, F.M. and Wu, Y. (1998). "Hysteresis unemployment: Evidence from OECD countries", *Quarterly Review of Economics and Finance*, **38**, 181-192.
- Taylor, M. and Sarno, L. (1998). "The behavior of real exchanges during the post-Bretton Woods period", *Journal of International Economics*, **46**, 281-312.
- Yilmazkuday, H. (2013). "Inflation targeting, flexible exchange rates and inflation convergence", *Applied Economics*, **45**, 594-603.

Appendix I: PUR Tests for Unemployment and Inflation Rates for Each Region

	Unempl.		Inflation	
	Univariate	Pooled Data	Univariate	Pooled Data
Cross Section	Probabilit y	Probability	Probabilit y	Probabilit y
Istanbul	0.5654	0.5761	0.2088	0.2048
Tekirdag, Edirne, Kirlareli	0.8319	0.7823	0.0133	0.0005
Balikesir, Canakkale	0.8572	0.7885	0.0113	0.0003
Izmir	0.6152	0.6152	0.2033	0.1357
Aydin, Denizli, Mugla	0.9252	0.8740	0.0401	0.0006
Manisa, Afyon, Kutahya, Usak	0.8836	0.8282	0.0651	0.0046
Bursa, Eskisehir, Bilecik	0.8088	0.7484	0.0492	0.0025
Kocaeli, Sakarya, Duzce, Bolu, Yalova	0.3485	0.3509	0.2938	0.2913
Ankara	0.7323	0.7103	0.0504	0.0072
Konya, Karaman	0.9186	0.9497	0.0465	0.0010
Antalya, Isparta, Burdur	0.6501	0.6502	0.1053	0.0059
Adana, Mersin	0.8383	0.7977	0.5077	0.5806
Hatay, Kahramanmaras, Osmaniye	0.6844	0.6482	0.3521	0.3064
Kirikkale, Aksaray, Nigde, Nevsehir, Kirsehir	0.6381	0.6460	0.2763	0.2763
Kayseri, Sivas, Yozgat	0.6396	0.7911	0.3425	0.3844
Zonguldak, Karabuk, Bartin	0.0891	0.0285	0.1758	0.0287
Kastamonu, Cankiri, Sinop	0.6406	0.6266	0.1949	0.0633
Samsun, Tokat, Corum, Amasya	0.8962	0.9194	0.2669	0.2455
Trabzon, Ordu, Giresun, Rize, Artvin, Gumushane	0.0506	0.0253	0.2547	0.2547
Erzurum, Erzinan, Bayburt	0.8291	0.8325	0.2646	0.0751
Agri, Kars, Igdirdir, Ardahan	0.2822	0.2820	0.0769	0.0077
Malatya, Elazig Bingol, Tunceli	0.6105	0.6071	0.5014	0.5014
Van, Mus, Bitlis, Hakkari	0.7434	0.7221	0.6700	0.6955
Gaziantep, Adiyaman, Kilis	0.5781	0.5775	0.6173	0.6182
Sanliurfa, Diyarbakir	0.9221	0.9244	0.5094	0.4948
Mardin, Batman, Sirnak, Siirt	0.6538	0.6522	0.8861	0.9699

Appendix II: Macroeconomic Outlook of Regions

2004	Population 15 years and over (th)	Labo ur Force (th)	Unemplo yment Rate (%)	Employ ment Rate (%)	Inflation Rate(%)
Istanbul	8893	4017	12.4	39.6	9.9
Tekirdag, Edirne, Kirlareli	1012	550	6.6	50.8	10.0
Balikesir, Canakkale	1223	578	6.5	44.2	10.2
Izmir	2715	1240	15.7	38.5	10.4
Aydin, Denizli, Mugla	1850	1024	7.7	51.1	10.3
Manisa, Afyon, Kutahya, Usak	2273	1087	7.6	44.2	8.0
Bursa, Eskisehir, Bilecik	2264	1159	9.3	46.4	9.3
Kocaeli, Sakarya, Duzce, Bolu, Yalova	2046	843	12.7	36.0	9.6
Ankara	3113	1364	15.3	37.1	7.7

Konya, Karaman	1511	635	8.9	38.3	8.8
Antalya, Isparta, Burdur	1669	859	7.0	47.9	8.2
Adana, Mersin	2417	1035	14.9	36.5	8.0
Hatay, Kahramanmaraş, Osmaniye	1724	707	17.4	33.8	8.8
Kırkkale, Aksaray, Niğde, Nevşehir, Kırşehir	1009	448	10.2	39.8	7.3
Kayseri, Sivas, Yozgat	1575	596	9.9	34.1	7.1
Zonguldak, Karabük, Bartın	755	352	12.2	40.9	8.8
Kastamonu, Çankırı, Sinop	536	205	10.7	34.1	8.6
Samsun, Tokat, Çorum, Amasya	2014	1110	6.2	51.7	7.7
Trabzon, Ordu, Giresun, Rize, Artvin, Gümüşhane	1788	1177	6.9	61.3	7.5
Erzurum, Erzincan, Bayburt	704	408	3.6	55.9	7.9
Agri, Kars, Iğdır, Ardahan	688	304	1.8	43.4	9.1
Malatya, Elazığ, Bingöl, Tunceli	1016	451	19.2	35.9	6.9
Van, Mus, Bitlis, Hakkari	983	397	10.6	36.1	7.7
Gaziantep, Adıyaman, Kilis	1340	557	15.1	35.3	7.4
Sanlıurfa, Diyarbakır	1488	550	11.8	32.6	8.1
Mardin, Batman, Sırnak, Siirt	936	364	6.1	36.5	5.4
2011	Population 15 years and over	Labour Force	Unemployment Rate (%)	Employment Rate (%)	Inflation Rate (%)
Istanbul	9773	4773	11.8	43.1	5.5
Tekirdağ, Edirne, Kırklareli	1252	693	8.8	50.5	6.9
Balıkesir, Çanakkale	1289	607	5.3	44.6	6.6
İzmir	3099	1653	14.7	45.5	6.7
Aydın, Denizli, Muğla	2188	1190	8.5	49.8	7.2
Manisa, Afyon, Kütahya, Uşak	2123	1119	4.7	50.2	7.3
Bursa, Eskişehir, Bilecik	2753	1339	7.6	44.9	6.4
Kocaeli, Sakarya, Düzce, Bolu, Yalova	2511	1373	11.9	48.2	6.2
Ankara	3590	1706	9.4	43.0	6.5
Konya, Karaman	1608	796	6.8	46.1	7.1
Antalya, Isparta, Burdur	1964	1138	9.3	52.6	6.7
Adana, Mersin	2675	1390	10.7	46.4	6.8
Hatay, Kahramanmaraş, Osmaniye	2050	1010	12.0	43.4	7.5
Kırkkale, Aksaray, Niğde, Nevşehir, Kırşehir	1110	515	8.0	42.7	7.4
Kayseri, Sivas, Yozgat	1661	832	10.7	44.7	6.7
Zonguldak, Karabük, Bartın	793	431	7.6	52.6	7.0
Kastamonu, Çankırı, Sinop	579	344	5.7	56.0	7.4
Samsun, Tokat, Çorum, Amasya	2004	1052	5.3	49.7	6.6
Trabzon, Ordu, Giresun, Rize, Artvin, Gümüşhane	1930	1107	6.4	53.7	7.3
Erzurum, Erzincan, Bayburt	689	348	6.3	47.3	8.4
Agri, Kars, Iğdır, Ardahan	704	383	10.2	48.8	7.7
Malatya, Elazığ, Bingöl, Tunceli	1203	578	10.2	43.2	7.4
Van, Mus, Bitlis, Hakkari	1197	566	12.3	41.5	7.5
Gaziantep, Adıyaman, Kilis	1592	679	14.4	36.5	7.5
Sanlıurfa, Diyarbakır	2022	663	8.4	30.1	7.4
Mardin, Batman, Sırnak, Siirt	1234	419	12.7	29.6	7.2

Note: Population and Labour Force: Thousands.

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