

Turkish Economic Growth: (Non) Labour Creating? (2000-2018)

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Ekonomik Büyüme: Türkiye’de İstihdam Yaratmıyor Mu? (2000-2018)

Abstract

The study aims to analyse the long-term relationship between GDP and employment during 2000Q1-2018Q4. The relation is important for Turkey who has problems with employment creation capacity of growth. However, the high growth performance of Turkey during the 2000s employment ratios have well remained below OECD averages. Employment elasticity of growth is 0.15 for the 2004Q1-2018Q4 period with the Engle-Granger test. The elasticity for the entire period is much weaker, like 0.04. Johansen tests confirm the long-run cointegration between two variables, and an error-correction model (ECM) is built for detecting causality. Granger tests also reveal causality from GDP to employment.

Keywords : Growth, Employment Intensity of Growth, Employment, Cointegration, Error Correction (ECM), Granger Causality Test.

JEL Classification Codes : O47, J23, C22.

Öz

Bu çalışmanın amacı 2000Q1-2018Q4 döneminde GYİH ile istihdam arasındaki uzun dönemli ilişkinin araştırılmasıdır. Bu ilişki büyümenin istihdam yaratma kapasitesinde sorunlar bulunan Türkiye için önem taşımaktadır. Türkiye’de 2000’li yıllardaki yüksek büyüme performansına rağmen istihdam oranları OECD ortalamalarının oldukça altında seyretmiştir. 2004Q1-2018Q4 döneminde Engle-Granger testi ile büyümenin istihdam esnekliği 0.15’tir. Dönemin tamamında elastikiyet 0.04 ile çok daha düşüktür. Değişkenler arasında uzun dönemli koentegrasyon ilişkisi Johansen testi ile doğrulanmış ve bir ECM modeli kurularak nedensellik araştırılmıştır. Granger testi de gelir ve istihdam arasında gelirden istihdama doğru nedensellik bulunduğunu tespit etmiştir.

Anahtar Sözcükler : Büyüme, Büyümenin İstihdam Esnekliği, İstihdam, Koentegrasyon, Hata Düzeltme (ECM), Granger Nedensellik Testi.

1. Introduction

The low performance of Turkish employment rates has become a matter of dispute vis a vis the relatively stronger GDP growth since the 1990s. The problem has aggravated especially from 2002 on, which has led to considerably low employment rates compared with the EU countries. While the economy has contracted between 1999-2001, the average unemployment rate has stayed at 7.02%. During the 2002-2007 period of stronger growth with an annual average of 6.7%, unemployment has not shown a parallel decline, jumping to an annual 10.35% in 2002, moving towards high chronic unemployment. Having rocketed to 16,1% by March 2009, it has declined owing to the policy measures taken by the government, nevertheless remaining above 10%. Recently following the recession in the economy, unemployment rates have exceeded 13, shooting up to 14% levels by 2018.

What Turkey has gone through has been referred to as "jobless growth" which has also been observed in other economies during the era of globalization. The employment intensity or elasticity of growth is a quantitative indicator of a country's employment record, which is measured by the elasticity of employment with respect to real GDP (Khan, 2007: 4; Basnett & Sen, 2013: 7). Although high elasticity is desirable and indicates that the economy is reaching higher employment levels, it is negatively related to productivity. Especially an employment elasticity (intensity) of above one is inconvenient, for it will mean very low labour productivity.

Although economic growth is deemed most important factor in raising employment (Gordon, 2003: 53; Khemraj et al., 2006: 4; Onaran & Aydinler-Avşar, 2006: 19) it has been observed not having led to effective rises of employment alone in many cases. This has especially been an issue in the US and developing countries in the post-liberalization period upon which economists have analysed the relevant factors determining employment growth: Ghosh (2003), Heintz and Pollin (2003), Islam (2004), Osmani (2004), Heintz (2006) etc. Other factors have been identified as: *macroeconomic policies, strategies of growth, technological processes, backward and forward linkages between industries, the sectoral composition of production, size of public employment, informal labour market*.

Previously, many empirical studies have examined the relationship between employment and GDP, observing falls in employment intensity for most countries like Kapsos (2005) and Heintz (2006). Among other empirical studies measuring the elasticity of employment are Boltho and Glyn (1995), Padalino and Vivarelli (1997), Walterskirchen (1999), Khemraj et al. (2006), Seyfried (2005), Tezcek (2007) and Akçoraoğlu (2010), Murat and Yılmaz-Eser (2013) etc. for Turkey (see Section 4.1-4.2). Although the previous studies about Turkey have elaborated on employment creation of growth having calculated the employment elasticity, the studies date back to 1990s, 2000s with the newest reaching only 2011.

In this paper we examine the empirical relationship between employment and economic growth in Turkey as per phenomena of "jobless growth" during the period 2000Q1

to 2018Q4. During the post-Fordist era of mass production, neo-liberal policies adopted have led to a new global production network with new countries like China replacing the old industrial hubs US and the UK. As discussed in the literature, section 2 examines this and the reasons leading to "job disappearance" despite high growth rates and trade volume. For Turkey, reasons have been specified as a demographic shift from agriculture to urban areas, rigid regulatory framework, rising productivity, and neo-liberal growth models adopted with liberal trade and capital accounts. Section 3 examines the theory behind growth and employment, namely Okun's Law, which has formed the basis of the supply curve of the economy together with the Phillips curve, despite all the critiques it has received. After the literature survey in Section 4, an econometric model is established in Section 5 where the long-run relation between the two variables is determined with an OLS estimation of employment overgrowth. The residual-based Engle-Granger standard ADF test proves that the estimation is non-spurious. Coefficients of the OLS equation give us employment elasticity (employment intensity) of growth of 0.04 for the entire period and 0.15 for the 2004-2018 sub-period. Long-run cointegration between the two variables is further investigated by Johansen method, which confirms the relationship. Having fulfilled the cointegration prerequisite dynamic, ECM is estimated in the next step decomposing *the long-run* and *short-run causality* between the two variables. ECM reveals long and short-run causality from employment to rate of growth. Finally, the simple Granger test is conducted to control the direction of causality between growth and employment, which confirms causality from growth to employment.

2. Jobless Growth: Global Phenomenon

Low employment vis a vis relatively higher growth rates have been of concern in economics since the 1980s. When Fordist Golden Age of mass manufacturing (1960-1973) has almost reached an end with *deregulated trade* and *capital account regimes* adopted (Telli et al., 2006: 2; Ghosh, 2003: 20-24). The new global economic structures have brought changes in the factor productivity and production processes (thereby dynamics of growth) during the demise of Bretton Woods corporate production era. This is when the production economies like UK and US have gradually lost sectors to China (so called the new atelier of the world), Asian economies, and emerging markets. The new economic network also comes with finance capital dominated, speculation driven structures, as noted in Ghosh (2003: 19, 24), Telli et al., (2006: 2), Chang (2011: 291-292, 300-303). Within the framework, economists have examined the relationship between *growth* and *factors of production* for different countries during different periods examining the effect of real shocks on unemployment and the factors that determine unemployment. Others have estimated output-employment elasticities as well as their determinants, as noted below.

In the work examining neo-liberal economies the phenomenon of low employment rates vis a vis production and export growth have been labelled as "*job disappearance*" (also Khemraj et al., 2006: 3, 5) and the reasons leading to this have been analysed in Ghosh (2003: 20-24) (for the developing countries) as the following: 1) Although manufactured exports from developing to the developed world have increased, imports in reverse direction

into the developing countries have caused some local sectors close down and lose the employed workforce; as a result of trade liberalization; 2) The developing world could not achieve the diversified manufacturing industrial structure instead ending up with mostly primary goods manufacturing¹; 3) Higher capital productivity from technological progress has come up as one dominant labour saving factor; 4) Large capital has crowded out more labour intensive small capital and has provoked labour cost-cutting by entrepreneurs; 5) The capital inflows, and the economic network therein have formed economic and/or political pressure over governments to refrain from intervening in the markets.

Several possible arguments have been brought into attention as possible causes of non-job creation for the specific case of Turkey, which has resulted in low rates of employment vis a vis the EU (Table 1). **The first** explanation is that the demographic shift from agriculture to urban areas might have caused insufficient job creation. Until 1950 agriculture has employed nearly 80% of the total labour force, which as per the import substitution policies of 1960 and 1970s had started to be gradually recruited in the industrial sector. The export-led growth model from 1980 on agricultural labour force has declined swiftly from 60 to 40 and 30% through the 1980s, 1990s, and post 2000s (Tezcek, 2007: 2; World Bank, 2006: 8). Lack of absorption of the unqualified labour force by the existing industry and services sectors mostly ended up with recruitment by the informal market (Ercan & Tansel, 2006; Murat & Yılmaz-Eser, 2013: 117-118).

Table: 1
Employment Rates in Turkey vs European Union 2000-2018 (%)

	Average Employment Rates		
	Turkey	European Union	Eurozone 19
2000-2004 (jobless growth)	43.94	NA	NA
2005-2010 (Turkey low plateau)	41.32	64.48	64.57
2010-2018	45.22	65.56	64.80

Source: TÜİK, Eurostat Database.

The second explanation follows the *rigid regulations*' framework and excessive *non-wage labour costs* imposed upon entrepreneurs (Tunalı, 2003: 93-94). Social security premiums form a 22% of the labour cost over net wages, reaching 35% with the payroll taxes paid. New Labour Act of 2003 has been blamed for bringing high labour costs and being overprotective, thereby raising unemployment (Ercan & Tansel, 2006). The Act has rather invoked searching ways of refraining from regulations, instead of bringing flexible-time, flexible work conditions as aimed (Agenor et al., 2006: 12-13). During the time, trade unions have lost power, creating another factor contributing to the downward flexibility of wages (Onaran, 2002: 2).

The third explanation has noted the structural change during the 2000s curbing the job-creating capacity of the economy significantly. Apparently, the labour shedding has led to productivity increases of the existing labour force following the 2001 financial crises

¹ Many primary goods are with price volatility and low price and income elasticities.

(Tezcek, 2007: 4; Murat & Yılmaz-Eser, 2013: 108-109) when, unlike the pre-1980s, economic policy has emphasized raising productivity au lieu de raising employment and producers have reined on higher technology with less labour force (TÜSİAD, 2008: 127-128)². From 1997 to 2005, productivity has increased by 53% vis a vis declines of 17% in employment (Tezcek, 2007: 4). Low investment rates have also contributed to the process; as a result, suspended high rates of unemployment have emerged versus high growth rates (Table 2) (Murat & Yılmaz-Eser, 2013: 112, 116).

Table: 2
Turkish Jobless Growth Pattern 2000-2004

	GDP Growth (%)	Investment (% of GDP)	Labour Productivity	Labour Elasticity
2000	4.9	22.8	8.0	-0.31
2002	5.0	17.3	6.7	-0.13
2003	6.7	16.1	6.1	-0.18
2004	4.2	18.4	17.5	-0.77
2005	7.0	20.1	5.0	0.26

Source: TÜİK, Murat & Yılmaz-Eser (2013).

The fourth explanation has blamed the neo-liberal economic model and the *liberal trade and capital account* with finance capital domination. In the post-Washington Consensus environment of the 1990s, economies became increasingly dependent on speculative capital inflows with the financial funds dominating the real economy: the so-called *casino capitalism* (Strange, 2015). During the time Turkey has offered high real rates of interest to financial investors motivating inflows leading to appreciate TL, cheaper imports, and widening current account deficit. This has led to import substitution of domestic and traditional labour-intensive sectors such as textiles, clothing, food industry, and light manufactures etc. (Telli et al., 2006: 3; Onaran & Aydiner-Avşar, 2006: 20).

3. Theory on Growth and Employment

There is not much theoretical work on the relationship between employment and output in the economic literature. Notwithstanding Okun has examined the fluctuations of the *unemployment rate* and *output growth* in his seminal paper (1962), establishing a reverse statistical relationship between *output gap* and *unemployment (unemployment fluctuations around long-run (natural rate) levels)*. The later labelled "Okun's Law" has stated that there is less than one to one relationship between the two variables and that 1% growth rise above long-run trend would bring 0.3% unemployment decline. Accordingly, the economy has to grow at a potential rate to keep the unemployment rate constant. However, research and computations have proved Okun's coefficient to be unstably changing over different periods as well as with different data sets and methods (Khemraj et al., 2006: 5). Still, Okun's Law has established the link between unemployment and output, forming the basis of the supply curve of modern macroeconomics and the Phillips curve (Prachowny, 2003: 331).

² By 2002 average yearly unemployment rate has reached 10,35%.

Many writers have criticized the approach referring to its theoretical flaws' vis a vis its empirical power. Economists have been critical about the asymmetry between output and unemployment due to the output increase or decrease (the change in unemployment would be different during expansions and contractions) (Courtney, 1991: 283-290; Palley, 1993). Possible reasons for the asymmetry are factor substitution, multifactor productivity, labour participation rates, differences in sectoral growth rates, etc. Other analysts have been critical about the neglect of prices, institutional factors, as well as exchange rate volatility (Slimane, 2015: 682).

Employment rates are important, and countries are concerned about raising employment along with GDP growth. The "jobless growth" has emerged as a problem during the post-1990s when many economies have adopted neo-liberal regimes. Various research has examined the relation between *employment* and *economic growth* with different periods and techniques (see Section: 4), estimating *growth's employment elasticity* (*employment intensity*) and analysing its determinants. Elasticity describes the percentage change in employment resulting from one percentage change in the real GDP growth, implying a causal direction between the variables³. Changes in GDP may stem from supply-side, productivity/technology issues, as well as from demand-side fluctuations due to the policy decisions. Notwithstanding this, some studies view the relation between employment and growth as correlating how the two variables vary together rather than a causal relationship (Kapsos, 2005: 5; Slimane, 2015: 682).

4. Employment Intensity Record: Empirical Studies

A comprehensive study by Kapsos (2005: 11) for 139 countries has shown that there are declines in employment intensity in the US and North America (0.23)⁴, whereas there is a slight rise in Western Europe (to 0.42) during the period 1999-2003 compared with 1991-1999. The study has also revealed that employment elasticities are positively related to the share of services and negatively to inflation and labour taxes.

Similarly, Heintz (2006) has observed declining employment elasticities in two-thirds of 51 developed and developing countries' manufacturing sectors during 1980-2000 except Europe. Considering the two structural subperiods 1960-1973 and 1980-1994, Padalino and Vivarelli (1997: 191) infer that high technology has weakened, even eliminated employment, creating growth capacity in the post-Fordist Age production.

³ Arc elasticity of employment gives different values depending on the selected beginning and end points and proves unstable, which is why most empirical studies adopt the log-linear regression and calculate the point elasticity like in our study.

⁴ The elasticity of 0.67 during 1991-1995 has declined to 0.44 during 1995-1999 and further to 0.23 during 1999-2003.

Table: 3
Empirical Research on Employment Elasticity

AUTHORS	MODEL	PERIOD	COUNTRIES	FINDINGS
Padalino & Vivarelli (1997)	Regressions, Elasticity Formula Computations	1960-1973	US, Canada	0.50
		1980-1994	Japan, France, Germany, Italy, UK	Jobless growth
Walterskirchen (1999)	Regression	1988-1998	EU US	0.65 (Range between 0.24 for Austria-0.76 for Spain) 0.53
Kapsos (2005)	Log Linear Regression with dummies etc.	1991-1999 1999-2003	(139 countries) US, N. America W. Europe	Fall in many 0.23(fall) 0.42(slight rise)
Heintz (2006)	OLS Regression	1960-1970 1980-2000	(51 countries) US, Ireland, Developing Countries W. Europe	Fall (in 34 countries) Rises
Khemraj et al. (2006)	OLS Regression	1961-2000	US	0.37 (fall from 90s on)
			UK	0.31(rise)
			Germany	0.22(rise)
			France	0.17(rise)
Seyfried & College (2008)	OLS Regression	1990-2006	US	0.16
			UK	0.33
			Germany	0.08
			France	0.23

Khemraj et al. (2006: 6-8) have found the US Okun coefficient declining since the 1990s, implying jobless growth due to: 1) Productivity increases; and 2) Structural change, whereas the coefficient has risen for the UK, France, and Germany⁵. The post-dot-com bubble burst period of 2001 had had some industries losing, others gaining jobs where the losing sectors were gone, and gaining sectors stayed in the industry permanently. Possible reasons for the disappearance of some sectors and the following structural change have been discussed as 1) Highly importing the US and rising current account deficit; 2) Falling FDI inflows into the US; 3) Hiring of temporary, part-time workers as well as overtime use of the existing labour. Writers have reckoned that Okun's coefficient may not have been very stable over periods, changing by the methods of measurement and data used.

It is observed from Table 4 that US employment elasticity has fallen from 1990 onwards from 0.50s to 0.20s. For many countries, including the developing world, elasticity shows a falling trend during the post-1980s. The situation is reversed in Western Europe, for there is a rising trend during 1980-2000 (Kapsos, 2005: 11; Heintz, 2006: 8, 9; Khemraj et al., 2006: 5).

Table: 4
Empirical Research on Turkey: Employment Elasticity

AUTHORS	MODEL	PERIOD	FINDINGS
Heintz (2006)	OLS Regression	1968-1979	0.93
		1980-1997	0.26
Onaran & Avşar (2006)	SUR Model	1973-2002	0.10 to 0.34 for 22 sectors
Akçoraoğlu (2010)	Engle-Granger, Cointegration, ECM, Granger causality	1995-2007	0.20
Murat & Yılmaz-Eser (2013)	(Yearly) Computations by Employment Elasticity Formula	1971-2011	Volatile annual elasticities
Slimane (2015)	OLS Regression	1991-2011	0.28
Baştav (2019) (current study)	OLS, Engle-Granger, Cointegration, ECM, Granger causality	2000-2018	0.04
		2004-2018	0.15
		2006-2018	0.26

⁵ Falling after unification with the East, only rising from mid 1990s on in Germany.

In Turkey, the high elasticity of 0.93 of the Fordist Production eras of the 1960-1970s has fallen to 0.26 during post-1980 as Heintz (2005: 8-9). After 1990 it seems to have fallen further to 0.20 by Akçoraoğlu (2010: 108). This study also reveals 0.15 and 0.26 figures by subperiods, far from the higher levels during the import substitution period of 1960-1970s. The contribution of our study is not only having updated the labour elasticity measurements but also having used cointegration, ECM, and Granger causality tests in addition to the OLS estimation to specify long-run, short-run dynamics and causality.

Murat and Yılmaz-Eser (2013: 116) have labelled 2000, 2002, 2003, and 2004 as jobless growth years, for the economy has grown high, vis a vis the negative elasticities of employment, with no employment creation. They reckon that the main reason for jobless growth has been the high rise in total productivity despite declining employment. The low investment rates during the years in question reveal another source of the problem. Very unstable annual elasticities fall during the 2000s but jump to a higher platform from 2005 on (Table 2)⁶.

5. Data and the Model

5.1. 2000Q1-2018Q4 Entire Period

Real GDP and employment rate are obtained from the Turkish Institute of Statistics (TÜİK) database. Real GDP (LGDP) is measured in constant 1998 prices; the employment rate (LNRAT) contains the 15+ year population. Series are quarterly covering 2000Q1-2018Q4 period and are seasonally adjusted by the Tramo-Seats method.

Three different unit root tests examine the stationarity of the series, namely Augmented Dickey-Fuller (ADF), Phillips Perron (PP), and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) using Eviews 9. Results in Table 5 show instability revealed by nonstationary in the form of a unit root in both series; however, the first differences are integrated of order one I(1).

Table: 5
Unit Root Tests

	Test Statistic Values					
	ADF-GLS		PP		KPSS	
	cst	est&trnd	cst	est&trnd	cst	est&trnd
	First Order Integrated Variables I(1) ⁽¹⁾					
LGDP	1.25	-2.84	-0.70	-2.28	1.15	0.12
LNRAT	-1.02	-1.17	-1.12	-2.04	0.46	0.26
D(LGDP)	-4.66	-5.89	-6.65	-6.60	0.07	0.06
D(LNRAT)	-2.81	-2.75 ⁽²⁾	-6.96	-6.98	0.39	0.13

(1) Variables are stationary of first order I(1) at 5% level of significance.

(2) Nonstationary variable.

⁶ Five-year averages follow like, 0.37, 0.37, 0.26, 0.39, 0.76, 0.18, 0.20, 0.30 for 1971-75, 1976-80, 1981-85, 1986-90, 1991-95, 1996-00, 2001-05, 2006-10 (disregarding outliers) respectively. Along the higher plateau of 2000s from 2005 on elasticities are 0.26, 0.26, 0.33, 3.34, 0.68, 0.79 in 2005, 2006, 2007, 2008, 2010 and 2011 respectively.

The long-run relationship between LGDP and employment LNRAT is observed by cointegration. Following the methodology in Akçoraoğlu (2010: 108), we run an OLS of employment over the growth rate although the two-time series are not stationary at levels. The Engle-Granger residual-based cointegration test (using standard ADF test) proves that estimated OLS is not spurious. The estimation has yielded an employment elasticity of 0.04, revealing that employment is positively and significantly related to income growth in the long-run but that the elasticity is low as 0.04 during the entire 2000Q1-2018Q4 period examined. Time dummy D1 for 2004Q1 to 2009Q4 has been adopted to cover when employment rates have reached record low levels⁷. The dummy has raised the R bar squared of the equation considerably⁸. Effects of employment policy measures have begun to be felt from 2010 on, leading to higher employment rates.

Table: 6
Long-Run Relation Between Employment and Real Income Growth
(LNRAT dependent variable) (2000-2018)

	Coefficient	Stand Error	P-Value
LGDP	0.04	0.02	0.047
D1=1: 04Q1 to 09Q4	-0.003	3.0E-4	0.00
Time dummy			
Constant	3.37	0.22	0.00
R squared = 0.75	Adjusted R ² = 0.74	F-statistic = 110.22	Prob (F-stat) = 0.00
The ADF test statistic on residuals = -2.65			
Critical values: -3.53 (1%) -2.90 (5%) -2.59 (10%)			

Long-run cointegration relationship is further examined by Johansen test. The null hypothesis of no cointegration between real GDP and employment is rejected at 5% level of significance. The results for the number of cointegrating vectors by the Johansen method are reported in Table 7 presenting the trace and max-eigen statistics and the corresponding 5% critical values. Johansen cointegration is a prerequisite for developing dynamic error-correction model (ECM) which will provide information on both the *short-run and long-run dynamics* of the series. Since Johansen test has confirmed existence of a long run cointegrating vector, we estimate the ECM of which the results are provided in Table 8. Lag length is picked as 4 by the fact that income affects employment only after 4 lags in Turkey⁹. The same lag length is adopted in Johansen cointegration as well as the ECM in the paper. The coefficient of the error correction term in the ECM is negative as expected, which is statistically significant at 5%. This provides evidence for the long-run relationship and that each quarter the system corrects 18% of the shocks that move it away from equilibrium.

⁷ This is a period when employment rates in the country have descended to record low levels like 38.8% (2006Q1), 38.5% (2009Q1). After 2009, measures taken in labour markets got to pull the employment levels back to above 40s close to 50%.

⁸ R bar squared of estimation without and with the dummy are 0.11 and 0.74 respectively.

⁹ The optimal lag length criterion with EVIEWS is 1 or 2 by minimum Akaike, Schwartz etc criterion, however it makes no sense macroeconomically.

Table: 7
Johansen Tests for Cointegration ⁽¹⁾

Hypothesized No of CE(s)	Eigenvalue	Trace Statistics	Critical Value (5%)	P-Values ⁽³⁾
None ⁽²⁾	0.27	24.08	15.49	0.002
At most 1	0.02	1.78	3.84	0.18
Hypothesized No of CE(s)	Eigenvalue	Max-Eigen Statistic	Critical Value (5%)	P-Values
None ⁽²⁾	0.27	22.30	14.26	0.002
At most 1	0.02	1.78	3.84	0.19

⁽¹⁾ The optimal lag interval is selected by macroeconomic trends as (1,4); D1 04Q1-09Q4 exogenous series.

⁽²⁾ Rejection of no cointegration hypothesis.

⁽³⁾ MacKinnon-Haug-Michelis p-values.

The joint significance Wald test for one to four lagged LGDP variables cannot reject the null hypothesis that the coefficients equal zero. However, individually one period lagged GDP affects the employment rate positively by a significant coefficient. *LGDP is causally related to LNRAT both in short and in the long run. The employment intensity of growth is 0.04% in the long run during the entire period 2000Q1 to 2018Q4.*

Table: 8
Error Correction Model Results (LNRAT is the Dependent Variable)

	Coefficients	t-statistics	Probability
Error Correction Term	-0.18	-4.48	0.00
DLGDP _{t-1}	0.11	1.88	0.06
DLGDP _{t-2}	-0.05	-0.75	0.46
DLGDP _{t-3}	0.05	0.61	0.54
DLGDP _{t-4}	-0.08	-1.50	0.14
DLNRAT _{t-1}	0.02	0.23	0.82
DLNRAT _{t-2}	0.12	1.11	0.27
DLNRAT _{t-3}	-0.25	-2.46	0.02
DLNRAT _{t-4}	-0.34	-2.37	0.02
D1=1: 04Q1 to 09Q4 Time dummy	-0.01	-3.70	5.0E-4
R-squared = 0.49	AIC = -6.38	SC = -6.03	DW stat. = 2.01
Adjusted R ² = 0.41	F-stat = 5.84	Prob(F)=0.00	Log Lik=237.66

Short-run causality between variables is further investigated by Granger test. Since LNRAT and LGDP are integrated, of first-order Granger test is carried out on the first differences of the series. At the specified lag length, column four provides the Wald-F statistics, and column five reports the related probabilities. Results point at presence of one-way causality from real GDP to employment in Table 9.

Table: 9
Granger Causality Tests

Null Hypothesis	Obs	Lag length	F-Statistic	Probability
D(LGDP) does not Granger cause D(LNRAT)	72	4	3.75	0.01
D(LNRAT) does not Granger cause D(LGDP)	72	4	1.63	0.18

5.2. 2004Q1-2018Q4 Subperiod

The long-run relationship between LGDP and employment LNRAT is further investigated by examining the 2004Q1-2018Q4 period of low and stable inflation. Engle-Granger residual-based cointegration test by ADF method provides that residuals of the

equation are stationary, proving that OLS equation estimated is not spurious and there is long-run equilibrium relationship between the variables. Results of OLS estimation of GDP over employment rate have revealed higher employment elasticity of 0.15. The employment intensity of growth is higher, almost four-fold of the entire period since 1% of GDP growth would bring a 0.15% increase in employment, meaning higher job-creating capacity during the subperiod.

Table: 10
Long-Run Relationship Between Employment and Real Income Growth
(LNRAT dependent variable) (2004-2018)

	Coefficient	Stand Error	P-Value
LGDP	0.15	0.06	0.02
D1=1 04Q1 to 09Q4			
Time dummy	-0.002	0.001	0.001
Constant	2.30	0.61	0.00
R squared = 0.87	Adjusted R ² = 0.87	F-statistic = 195.27	Prob (F-stat) = 0.00
The ADF test statistic on residuals = -6.08 Critical values: -3.55 (1%) -2.91 (5%) -2.59 (10%)			

Johansen tests also confirm the long-run cointegrating relationship between the two-time series over the subperiod. The null hypothesis of no cointegration between real GDP and employment is rejected at the 5% significance level. Results of the Johansen test for the existence of cointegration are reported in Table 11 which presents the relevant statistics and the corresponding 5% critical values.

Table: 11
Johansen Tests for Cointegration ⁽¹⁾

Hypothesized No of CE(s)	Eigenvalue	Trace Statistics	Critical Value (5%)	P-Values ⁽³⁾
None ⁽²⁾	0.22	24.71	15.49	0.002
At most 1	0.15	9.91	3.84	0.002
Hypothesized No of CE(s)	Eigenvalue	Max-Eigen Statistic	Critical Value (5%)	P-Values
None ⁽²⁾	0.22	14.81	14.26	0.04
At most 1	0.15	9.91	3.84	2.0E-3

⁽¹⁾ The optimal lag interval selected by macroeconomic facts as (1,4); D1 04Q1-09Q4 exogenous series.

⁽²⁾ Rejection of no cointegration hypothesis.

⁽³⁾ MacKinnon-Haug-Michelis p-values.

The joint significance Wald test for one to four lagged LGDP variables rejects the null hypothesis that coefficients equal zero, meaning that one to four lagged LGDP have joint effects on LNRAT. Individually one period lagged GDP affects the employment rate positively by a (significant) coefficient. The ECM results are provided in Table 12 below. The negative and significant coefficient of the error correction term in the ECM reveals the long-run relationship: each quarter, the system corrects 15% of the shocks, which move it out of equilibrium. Also, in the short-run one period lagged GDP affects the employment rate positively. *LGDP is causally related to LNRAT both in short and in the long run. The employment intensity of growth is 0.15% in the long run during the subperiod 2004Q1 to 2018Q4.*

Table: 12
Error Correction Model Results (LNRAT is the Dependent Variable)

	Coefficients		t-statistics	Probability
Error Correction Term	-0.15		-3.39	1.0E-3
LGDP _{t-1}	0.16		3.45	1.0E-3
DLGDP _{t-2}	-0.06		-0.84	0.40
DLGDP _{t-3}	-0.03		-0.60	0.55
DLGDP _{t-4}	-0.10		-1.48	0.14
LNRAT _{t-1}	0.03		0.25	0.81
DLNRAT _{t-2}	0.15		1.68	0.10
DLNRAT _{t-3}	-0.23		-2.15	0.04
DLNRAT _{t-4}	0.25		-1.88	0.07
D1=1 04Q1 to 09Q4 Time dummy	-0.02		-3.96	2.0E-4
R-squared = 0.51	AIC = -6.43	SC = -6.58	DW stat. = 1.95	
Adjusted R ² = 0.41	F-stat = 5.03	Prob(F) = 5.0E-05	Log Lik=208.28	

Simple Granger causality test results are provided in Table 13 below. Since LNRAT and LGDP are integrated, the first order Granger causality test is carried out on the first differences. It is known from macroeconomic experience that income will affect employment with around one year lag, which is why a lag length of four is chosen. Using the specified lag length, column four provides the Wald-F statistics, and column five reports the related probabilities. The model rejects the null hypothesis of no causality from GDP to employment, whereas there is no causality from employment to GDP. Results point at the presence of *one-way causality from real GDP to employment*.

If we further constrain the subperiod to 2006Q1-2018Q4, the year of explicit inflation targeting policy, the OLS regression yields income elasticity of employment even higher as 0.26¹⁰. Change in the coefficient shows the importance of macroeconomic policy measures in the employment creating capacity of the economy. Although elasticity rises with the subperiods in question, it is far from the high levels of the pre-1980s revealing the structural change.

Table: 13
Granger Causality Tests

Null Hypothesis	Obs	Lag length	F-Statistic	Probability
D(LGDP) does not Granger cause D(LNRAT)	60	4	3.09	0.02
D(LNRAT) does not Granger cause D(LGDP)	60	4	0.89	0.48

6. Findings and Conclusions

Low employment growth rates have been a matter of dispute from the 1990s on in the Turkish economy. Possible reasons for fall in job creation are discussed in Section 2. As per one argument, demographic shifts from rural to urban areas are to blame when people have added up to the informal labour force rather than being absorbed by the industry. Although partly responsible for low employment rates, this new workforce could not blame the growing economy for not creating employment as one main reason. Besides, a reverse

¹⁰ The OLS and cointegration results can be provided for the interested reader upon demand.

migration from urban to rural areas has occurred following the 2008 financial crisis (Akçora, 2010: 106).

The argument about the rigidity of labour markets are two sides of a coin: 1) The labour act is overprotective in social security rights, also imposing too high non-wage costs, and presence of disorganized labour matching systems add to the problem, 2) On the other side, practicalities in the market are far from being tied up by rigidities with only partial unionization, with the unions already having lost much power, high wage differences and employers recruiting heavily from the informal market (see Section: 2). With the clashing rigid and flexible factors, the system has more or less shown the same traits over the pre-and post-globalization period, and this could not have caused the structural break of the post-1980s.

The change of economic model from (*inward-looking*) *import substitution* to *export-led growth* seems to have brought in a *structural break*, which is well observed in the falling values of employment elasticity (see Table 4). From the 1990s on, elasticity figures have navigated around 0.20 levels. Within the *liberal trade and capital account* framework, Turkey has offered high real interest rates, leading to capital inflows appreciating the TL, making imports cheaper, widening the external deficit. Vanishing traditional labour-intensive manufacturing sectors (textiles, food, etc.) by import substitution has led to unemployment. Post-2001 crisis has marked a *new structural break* with the layoffs and low investment levels (16-19%) aggravating the problem. Despite insufficient investments, entrepreneurs have replaced fixed capital with machinery and equipment of higher technology at the expense of less labour. This has brought in higher work hours and technology together (slightly), raising the total productivity. Although rising productivity is good for the economy's total income, it may prove detrimental for higher recruitment in the short run.

The OLS estimation has yielded an employment elasticity of 0.04 for the entire period 2000Q1-2018Q4, proving that employment is positive and significantly related to income growth in the long-run, supported by the cointegration test. As stated in Section 4.2; 2000, 2002, 2003, and 2004 have been labelled jobless growth years; for which *rise in labour productivity* and *low investment rates* are the reasons to blame. Jobless growth of the period reflects in the very low elasticity figure of 0.04. Long-run employment elasticity is computed as 0.15 for the subperiod 2004Q1-2018Q4 with an almost four-fold rise in its magnitude. ECM also confirms the presence of short-term relation between variables with a significant t-test, further supported by simple Granger causality. As we change the first year with 2004 and 2006, elasticity shows considerable rise to 0.15 and 0.26¹¹. Employers' premium, tax, and wage incentives have had important effects, especially with the 2008 labour market

¹¹ As per yearly employment elasticity computations of Murat and Eser (2013) elasticity jumps to a higher platform from 2005 on. During 2005 there is 7% high growth rate and relatively higher investment.

package. In fact, labour market measures have been adopted during 2008 May and July 2009 February and 2011 February and have effectively raised employment.

As followed in empirical results, although economic *growth* is the important factor to raise employment, it may not be sufficient for job creation under certain circumstances. *Macroeconomic policies, growth strategies, the sectoral composition of production, technology, backward and forward linkages between industries, public employment, labour market measures, informal market* etc. should also be considered for employment creation. Last but not least, savings and investments should be envisaged, for insufficient savings and lack of effective investment plans and strategies have recently been the severe bottleneck in the Turkish economy.

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