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The Effect of Economic Growth on Employment in GCC Countries

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Abstract

The objective of this research is to analyze the employment intensity of growth in six Gulf Cooperation Council countries between 1970 and 2017. To this end, a two-step econometric methodology is proposed. First, we estimate the time-varying employment intensity of growth using the time-varying parameters model based on the Kalman filter. Second, we identify the short and long-run determinants of the obtained employment intensity of growth using the Pooled Mean Group estimator. The analysis uncovers that elasticities range between 0.4 and 0.6 and has an increasing pattern over time. Findings reveal that in the long-run, the employment intensity is positively affected by trade liberalization, the share of services in GDP, the working-age population growth, and urbanization, while macroeconomic volatility has a negative impact. In the short-run, trade liberalization and natural resource rents exert adverse but weak effects on employment intensity. Based on these findings, some policy recommendations are drawn.

Keywords: economic growth; employment intensity of growth; time-varying parameters model; Gulf Cooperation Council.

JEL classification: J23; O47; C32; C23.

1. INTRODUCTION

The labor market dynamics has been an active area of research for many decades. The labor market outcomes of economic growth have been particularly controversial. According to Okun (1962), there has been a negative correlation between GDP growth and unemployment in the United States between 1948 and 1960. Afterward, an extensive literature has investigated the association between economic growth and unemployment and concluded that the relationship is far from being confirmed. The findings vary across countries, regions, periods, sectors, and gender (Zanin, 2014; Ben-Salha and Mrabet, 2019). Subsequently, several other studies have examined the effects of economic growth on employment rather

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than unemployment (Anderson, 2016; Ghazali *et al.*, 2018). Indeed, the literature on the impact of economic growth on employment has primarily targeted estimating the employment intensity of growth or the elasticity of employment[1], which measures the relative change in the number of employed compared with the relative change in output. The estimation of the impact of economic growth on employment instead of unemployment has gained popularity in recent years. According to R. Islam (2004) and Pattanaik and Nayak (2014) employment elasticity has at least two advantages over the Okun's law approach. First, the employment elasticity approach avoids problems of defining and measuring the unemployment rate. Indeed, several authors have reported a set of problems related to the definition and measurement of the unemployment rate (Shiskin and Stein, 1975; Sengupta, 2009; Card, 2011). Second, the elasticity approach allows estimating the employment intensity of growth for different labor force groups (by age, sex, education, region, sector), providing more specific findings needed to draw up recommendations.

Several studies explored the growth-employment relationship (Boltho and Glyn, 1995; Mourre, 2006; Crivelli *et al.*, 2012; Sassi and Goaied, 2016; Ghazali *et al.*, 2018). However, it should be noted that, although the literature on this subject is relatively abundant, few studies have concentrated on the Gulf Cooperation Council countries (hereafter GCC). This article aims to fill this gap and contributes to the current debate on the employment intensity of growth by shedding light on GCC countries between 1970 and 2017. More specifically, this study aims not only at estimating the employment intensity of growth in GCC but also at identifying its determinants. To this end, we propose a two-step econometric methodology. We first estimate the employment intensity of growth using a time-varying parameters model based on the Kalman filter. The estimated employment intensity of growth is then introduced as a dependent variable in a dynamic panel data model, namely the Autoregressive Distributed Lag (ARDL). The Pooled Mean Group (PMG) estimator is used to identify the different factors explaining the evolution of employment elasticity over time.

This research adds to the literature in several ways. First and foremost, it implements a time-varying parameters approach based on the Kalman filter to estimate the employment elasticity of growth. To the best of our knowledge, the current study is the first to employ the time-varying parameters approach to obtain employment elasticities that vary over time. It is worth noting that most previous studies measured employment elasticity using a simple arithmetic approach (arc-elasticity) and the econometric approach (point-elasticity, rolling window). While point-elasticity allows constant coefficients to be estimated, the other two approaches have significant disadvantages that will be addressed later and are not therefore preferred. Second, the present research is among the very few empirical ones to examine the impact of economic growth on employment in GCC countries. According to the International Labour Organization statistics, the unemployment rate in GCC countries has been relatively low, ranging between 0.09% and 5.9% in 2019. Therefore, the analysis allows checking the role of economic growth in creating more jobs and factors that may affect it. Conclusions to be drawn based on the empirical investigation would be useful in formulating policy recommendations that may help maximizing the benefits from economic growth in terms of job creation. Moreover, the analysis of employment elasticity determinants is crucial since it identifies factors that affect job creation. It is worth mentioning that GCC countries are experiencing a changing demographic composition during the last years. Indeed, the share of youth in the total population has risen and is expected to continue growing in the upcoming years (Shah, 2012). In Saudi Arabia, for example, youth people aged between 15 and 34 years accounted for 36.7% of the

total population in 2020 (General Authority for Statistics, 2020). In Oman and Kuwait, the youth bulge is about 50% and 40%, respectively. The rise of the youth population in the next decades is likely a challenge for policymakers in terms of job creation. It is also important to mention that GCC countries have adopted strategic plans to achieve several economic and social objectives in the medium and long term. Achieving high growth rates and creating more jobs are among the declared objectives of these plans. Given all issues discussed above, it is crucial to investigate the essence of the relationship between growth and employment in GCC economies. Third, this study aims not only to estimate the employment elasticity of growth but also to identify the different factors affecting the evolution of elasticity over time. To this end, a wide range of potential employment elasticity determinants, including macroeconomic factors, demographic factors, and labor market-related factors, has been introduced in the empirical investigation. The ARDL-PMG modeling approach is implemented to check the short and long-run determinants of employment elasticity.

The remainder of this article is structured as follows. The second section reviews the relevant literature on measures and determinants of employment intensity of growth, while the third section is reserved to estimate the time-varying employment intensity of growth in GCC countries. The fourth section begins by describing the econometric methodology and data and then discusses the empirical findings. Finally, the fifth section concludes the paper and draws some policy recommendations.

2. LITERATURE REVIEW

This section reviews previous studies on the economic growth outcomes on employment and then discusses the literature on employment intensity determinants.

2.1 Studies on employment elasticity measures

There is considerable literature on the impact of output on employment, which is measured via the employment intensity of growth. Few approaches for calculating employment intensity of growth have been suggested in the literature. The first approach is based on the arc-elasticity, computed as the relative variation between employment and output. The merit of this approach relies on its simplicity. However, this mathematical measure is unreliable and presents comparability problems across countries (Sassi and Goaied, 2016). I. Islam and Nazara (2000) and R. Islam (2004) have already criticized the arc-elasticity, indicating that the employment elasticity measured year-by-year tends to exhibit high instability. To overcome this weakness, Kapsos (2005) recommends using point-elasticity, obtained by estimating a log-linear model of employment as a function of output, usually by ordinary least squares (OLS). The econometric approach is, by far, the most popular approach to examine the relationship between economic growth and employment. There has been a boom in empirical studies using the econometric approach to estimate employment elasticity in recent years.

Boltho and Glyn (1995) investigate the relationship between employment and output in a sample of OECD countries and confirm a significant positive relationship between them. Moreover, employment elasticity ranges between 0.5 and 0.6. For their part, Padalino and Vivarelli (1997) report substantial variations in the magnitude of employment elasticity in a sample of developing countries. While elasticity was close to zero in Japan, France, Germany,

Italy, and the United Kingdom, it was approximately 0.5 in the United States and Canada. Perugini (2009) examines the relationship between employment and output growth for various Italian regions and sectors between 1970 and 2004. The empirical analysis indicates that the magnitude of elasticity differs by region and sector, while the average elasticity is about 0.2. I. Islam and Nazara (2000) estimate the employment intensity of growth in Indonesia using both arc-elasticity and point-elasticity obtained by OLS. The arc-elasticity is approximately 0.48, while the point-elasticity is 0.66. Furthermore, agriculture, services, and trade exhibit the highest point-elasticities. Sassi and Goaied (2016) analyze the long-term elasticity of employment in 15 Tunisian economic sectors over the period 1983-2010. The Mean Group estimator developed by Pesaran *et al.* (1999) suggests that services and manufacturing industries display the highest employment elasticity. Moreover, the elasticity of employment in agriculture is positive and relatively low, while it is negative in the mining sector and not significant in hotels, bars, and restaurants. For their part, El-Hamadi *et al.* (2017) investigate the impact of sectoral value-added on employment in Morocco during the period 1970-2012. The employment intensity of growth is measured using the point-elasticity obtained from estimating a log-linear model by OLS. The authors reveal the existence of a long-run relationship between employment and output. Furthermore, services and manufacturing recorded the highest employment elasticities. Finally, Zaki *et al.* (2018) examine the employment intensity of growth in Egypt, Jordan, and Tunisia between 1983 and 2010. In line with many previous studies, findings indicate that the highest employment elasticity is reported in the services sector in Jordan and Tunisia, while the manufacturing sector is the most significant in terms of job creation in Egypt.

2.2 Studies on the determinants of employment elasticity

Studies examining the determinants of employment elasticity usually start by measuring the employment intensity of growth and then estimating its determinants. In this context, Döpke (2001) suggests that a wide range of factors could drive employment elasticity, including the share of services in real GDP, real labor costs, and labor market institutions. Goaied and Sassi (2015) focus on the impact of trade liberalization on employment elasticity in 15 economic sectors in Tunisia during the period 1983-2010. The authors estimate employment elasticity before and after the Free Trade Agreement with the European Union and then compare elasticities. Results reveal that following trade liberalization, the elasticity of employment increased in some exporting manufacturing sectors. Ghazali *et al.* (2018) examine the employment intensity of growth and its determinants in Tunisia over 1980-2012 using a two-step empirical approach. The authors estimate employment elasticity using the OLS and the rolling window regression. The OLS show that employment elasticity declined over time from 0.61 in1980-1989 to 0.57 in 1991-1999 and 0.48 in 2000-2012. The rolling window regression with a window size of 14 years has also been implemented to estimate employment elasticity. Then, the study identifies the determinants of employment elasticity. Results show that trade openness, inflation rate, exchange rate, and the share of employment in services are the main factors explaining employment elasticity.

Pattanaik and Nayak (2014) investigate the determinants of employment intensity of growth in 15 Indian economic sectors between 1993 and 2009. The estimation results confirm that human capital, labor supply, economic structure, and macroeconomic volatility significantly impact the employment intensity. Crivelli *et al.* (2012) first estimate the

employment elasticity for a sample of 167 countries over the period 1991-2009. The authors conclude that for most countries, the employment elasticity ranges between 0.3 and 0.8. The authors then examine the determinants of employment elasticity and conclude that structural and macroeconomic policies significantly affect employment elasticity. For their part, Richter and Witkowski (2014) analyze the employment response to output in a sample of Eastern Europe and Central Asia countries. It has been revealed that employment elasticity increased over time and doubled between 1995-2001 and 2002-2007. Moreover, the empirical analysis suggests the importance of some factors in boosting the employment elasticity, namely labor and product market reforms, good governance, economic performance, and globalization. Ben Slimane (2015) explores the determinants of employment elasticity in a sample of 90 developing countries for the period 1991-2011. The analysis suggests that employment elasticity is higher in countries with a large service sector, more urban population, and less macroeconomic volatility. Recently, Anderson (2016) investigates the determinants of employment intensity of growth by gender in a large sample covering 80 countries between 1990 and 2012. The analysis indicates that three types of variables could affect the elasticity of employment, namely macroeconomic variables (inflation, exchange rate, growth volatility, the share of public expenditure allocated to education), variables of economic structure (trade openness, the share of ore and mineral exports to total merchandise exports) and demographic variables (labor supply, human capital). It should be noted that no prior research has examined the drivers of employment intensity of growth in GCC countries. This research aims to fill this gap by providing fresh evidence on the subject.

3. MEASURING THE TIME-VARYING EMPLOYMENT ELASTICITY IN GCC

A relatively limited number of approaches to computing employment elasticity have been suggested in the literature. Point-elasticity and arc-elasticity are potentially the most popular approaches. Measuring elasticities based on these two approaches may raise several problems. The point-elasticity yields constant elasticity over time and thus could not be employed for analyzing its determinants. While the arc-elasticity is time-varying, it may suffer from high instability (I. Islam and Nazara, 2000; R. Islam, 2004). Some other studies, such as Knotek (2007) and Ghazali *et al.* (2018), use the rolling window regression to obtain the time-varying elasticity. However, the rolling window regression has some limitations. First, the choice of the window size is somewhat arbitrary. For instance, Knotek (2007) selects a window size of 13 years to compute time-varying coefficients, while Ghazali *et al.* (2018) employ a window size of 14 years. Second, the rolling window regression induces a loss of the first i periods (where i is the window size). Finally, Aghion and Marinescu (2008) highlight that the elasticity in year t depends on innovations that occurred in past years when using a rolling window approach. This research uses a different and novel approach that allows the limitations described above to be addressed when measuring employment elasticity. It specifically implements the time-varying parameters model based on the Kalman filter. Sögner and Stiassny (2002) stress the superiority of the time-varying parameter approach compared to the rolling window regression, as it allows using the full information in the data. Moreover, Aghion and Marinescu (2008) point out that one of the advantages of the time-varying parameters approach is that it allows elasticity in year *t* to be measured based on innovations occurring during the same year. Finally, Arisoy and Ozturk (2014) note that

the time-varying parameters approach does not require checking the order of integration as it may be implemented even in the presence of nonstationary variables[2].

Data used to estimate the time-varying employment elasticity comes from two different sources. Real GDP (in 2018 US$) is extracted from The Conference Board Total Economy Database, while employment is measured by the number of persons engaged and is obtained from Penn World Table, version 9.1 of Feenstra *et al.* (2015). The period ranges between 1970 and 2017. The estimated time-varying elasticity of employment using the Kalman filter is drawn in Figure no. 1. The horizontal axis shows the period, while the vertical axis represents the estimated employment elasticities. The elasticity increased over time for all countries except Kuwait, where there was a sharp drop in the early 1990s. In Bahrain, Oman, and Qatar, a smooth decline is observed in the 1990s. The employment elasticity ranged from a minimum of 0.445 in Qatar to a maximum of 0.578 in Saudi Arabia. Moreover, the mean elasticity during the full period for all countries was about 0.526.

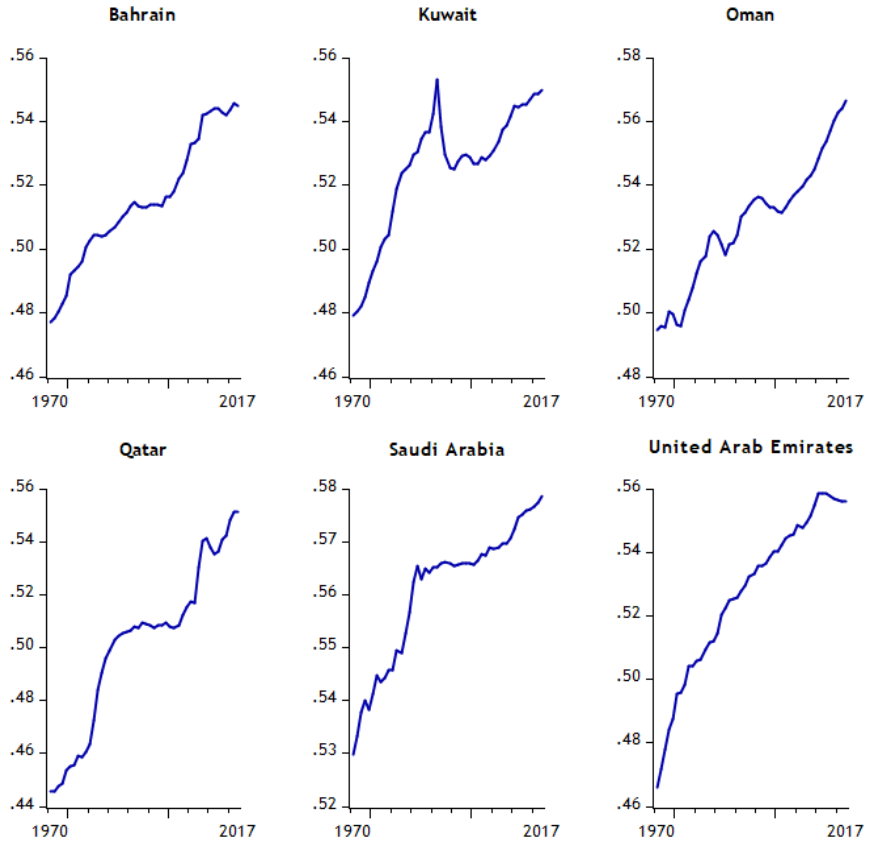

Figure no. 1 – The estimated time-varying employment intensity of growth in GCC countries

4. EMPIRICAL ANALYSIS OF THE DETERMINANTS OF EMPLOYMENT ELASTICITY

4.1 Econometric modeling

Before examining the short- and long-run determinants of the employment intensity of growth, one should check the presence of cross-sectional dependence and stationarity of variables. This study implements the Pesaran (2020) cross-sectional dependence test (CD test). In the presence of cross-sectional dependence, first-generation panel unit root tests are no longer suitable. Consequently, the cross-sectionally augmented Im-Pesaran-Shin (CIPS) panel unit root test developed by Pesaran (2007) may be implemented. To deal with cross-sectional dependence, Pesaran (2007) augments the ADF regression with cross-section averages of lagged levels and first differences of each panel series.

Moving to the impact of the set of factors on employment intensity of growth, the panel Autoregressive Distributed Lag (ARDL) model is estimated. Following Pesaran *et al.* (1999), the panel ARDL $(p, q_1, \dots, q_k)$ model is as follows:

$$y_{it} = \sum_{j=1}^{p} \lambda_{ij}\, y_{i,t-j} + \sum_{j=0}^{q} \delta'_{ij}\, x_{i,t-j} + \mu_i + \varepsilon_{it} \tag{1}$$

where y_{it} is the dependent variable, x_{it} is a $(k \times 1)$ vector of explanatory variables, λ_{ij} are scalars, δ_{it} are the $(k \times 1)$ coefficient vectors that will be estimated. i, t and μ_i represent countries, years, and fixed effects, respectively. In the presence of a long-run cointegrating relationship between the dependent and explanatory variables, we move to the estimation of the error correction model written as follows:

$$\Delta y_{it} = \phi_i\left(y_{i,t-1} - \theta'_i x_{it}\right) + \sum_{j=1}^{p-1} \lambda^*_{ij}\, \Delta y_{i,t-j} + \sum_{j=0}^{q-1} \delta'^*_{ij}\, \Delta x_{i,t-j} + \mu_i + \varepsilon_{it} \tag{2}$$

where $\phi_i = -(1 - \sum_{j=1}^{p} \lambda_{ij})$, $\theta_i = \sum_{j=0}^{q} \delta_{ij} / (1 - \sum_k \lambda_{ik})$; $\lambda^*_{ij} = -\sum_{m=j+1}^{p} \lambda_{im}$ $(j = 1, 2, \dots, p-1)$ and $\delta^*_{ij} = -\sum_{m=j+1}^{q} \delta_{im}$ $(j = 1, 2, \dots, q-1)$. In Equation 2, ϕ_i represents the error correction term. It should be negative and statistically significant to confirm the presence of a long-run cointegrating relationship between x and y.

The panel ARDL $(p, q_1, \dots, q_k)$ model in Equation 1 and error correction model in Equation 2 are performed using three different estimators, namely Mean Group (MG) estimator proposed by Pesaran and Smith (1995), Dynamic Fixed Effects (DFE) estimator developed by Weinhold (1999) and the Pooled Mean Group (PMG) estimator proposed by Pesaran *et al.* (1999). The appropriate estimator may be selected based on a Hausman test. We also test for the presence of cross-sectional dependence in the error term using the CD test of Pesaran (2020).

A wide range of potential employment elasticity determinants has been selected in the empirical analysis. As macroeconomic factors, we introduce the KOF trade globalization index developed by Dreher (2006) and extended by Gygli *et al.* (2019) and the KOF Swiss Economic Institute, while GDP growth volatility, measured as the standard deviation of the

five-year rolling window of GDP growth, serves as a proxy of macroeconomic volatility. Data on GDP growth is obtained from the World Development Indicators. The demographic factors are represented by the working-age population growth as an indicator of labor supply and urbanization as an indicator of demographic transition. As proposed by Döpke (2001), the share of services in real GDP is introduced in the analysis to depict the structure of the economy. Given the importance of natural resources of GCC economies, we also include a variable measuring the share of natural resource rents in GDP. The five variables mentioned above come from the World Development Indicators. Finally, the degree of labor market flexibility is assessed using the labor market regulations index obtained from the Economic Freedom of the World 2019 dataset developed by the Fraser Institute. Table no. 1 presents some descriptive statistics.

Table no. 1 – Descriptive statistics

	Mean	Maximum	Minimum
Employment intensity	0.526	0.578	0.445
KOF trade openness index	69.926	92.105	50.187
GDP growth volatility	0.576	3.934	0.012
Share of services in real GDP	41.751	60.710	15.920
Natural resources rent	34.456	89.004	3.227
Working-age population growth	66.368	86.398	50.527
Urbanization	82.567	100	29.665
Labor market regulations	7.627	8.907	5.421

4.2 Empirical findings

4.2.1 Preliminary analysis

The Panel A of Table no. 2 summarizes the results of Pesaran (2020) CD test for cross-sectional dependence, while those of the CIPS panel unit root test are reported in Panel B. Based on the Pesaran (2020) CD test, one cannot accept the null hypothesis of cross-sectional independence for all variables. The findings represent an argument on the strength of linkages and connectedness between GCC countries, which are observed for all categories of variables, macroeconomic, demographic, and those related to the labor market. Given these results, we implement the CIPS panel unit root test. As shown, some variables are found to be stationary at levels, namely employment intensity of growth, growth volatility, natural resources rents, and the working-age population growth, while the KOF trade openness index, the share of services in real GDP, urbanization, and labor market regulations are not. When taking their first differences, these variables become stationary. Overall, the preliminary analysis suggests that all variables are integrated of order zero or one, and thus the panel ARDL model may be implemented.

Table no. 2 – Tests for cross-sectional dependence and unit root

Panel A. Pesaran (2020) CD test	Test statistic	p-value	corr	Abs(corr)
Employment intensity	25.26***	0.000	0.941	0.941
Trade openness	17.98***	0.000	0.676	0.676
GDP growth volatility	6.38***	0.000	0.238	0.238

Share of services in real GDP	12.94***	0.000	0.493	0.493
Natural resources rent	19.69***	0.000	0.753	0.753
Working-age population growth	5.04***	0.000	0.190	0.260
Urbanization	20.94***	0.000	0.780	0.780
Labor market regulations	7.91***	0.000	0.295	0.411
Panel B. CIPS panel unit root test	**level**		**1st. difference**	
	statistics	**p-value**	**statistics**	**p-value**
Employment intensity	-1.796**	0.036	-7.339***	0.000
Trade openness	-0.985	0.162	-7.826***	0.000
GDP growth volatility	-5.139***	0.000	-7.055***	0.000
Share of services in real GDP	-1.196	0.116	-8.493***	0.000
Natural resources rent	-2.460***	0.007	-9.462***	0.000
Working-age population growth	-2.508***	0.006	-6.339***	0.000
Urbanization	-1.134	0.128	-1.602*	0.055
Labor market regulations	0.525	0.700	-8.352***	0.000

Notes: ***, ** and * denote the rejection of the null hypothesis at the 1%, 5%, and 10% levels, respectively

4.2.2 Long-run determinants of employment elasticity

The dynamic panel ARDL $(p, q_1, \dots, q_k)$ model in Equation 1 is estimated. Panel A of Table no. 3 reports the long-run determinants of employment intensity of growth in the full sample. The table indicates that the error correction term is negative and statistically significant regardless of the estimator (PMG, MG, DFE), and consequently, the null hypothesis of no cointegration is rejected at the 1% level. Although the error correction speed is low, there is clear evidence that a significant long-run relationship exists between employment elasticity its determinants. Once the long-run relationship is confirmed, the long-run effects of the various factors on employment elasticity are estimated. The three estimations techniques yield different results regarding the sign, significance, and magnitude of coefficients. The Hausman test results are reported at the bottom of Table no. 3 to select the most suitable estimator. The test indicates that the DFE estimator results are more consistent than those of the MG estimator. Moreover, the same test suggests the superiority of the PMG compared to the MG estimator. The CD test findings show the absence of cross-sectional dependence in residuals when the PMG estimator is used, which is not the case with the DFE estimator. To summarize, the Hausman test reveals the superiority of DFE and PMG estimators, while the CD test indicates that only residuals of the DFE estimator have cross-sectional dependence. Together, these findings suggest the superiority of the PMG estimator compared to DFE and MG. Consequently, we will only concentrate on analyzing the results of the PMG estimator.

Table no. 3 – Long- and short-run determinants of employment intensity

	MG	**DFE**	**PMG**
Panel A. Long-run estimates			
KOF trade openness index	-0.872	0.096*	0.316***
	(0.906)	(0.058)	(0.073)
GDP growth volatility	-0.080	-0.032***	-0.030*
	(0.080)	(0.013)	(0.018)
Share of services in real GDP	-3.593	0.074*	0.186***
	(3.621)	(0.045)	(0.064)

	MG	DFE	PMG
Panel A. Long-run estimates			
Natural resources rent	0.195	0.005	0.016
	(0.185)	(0.025)	(0.032)
Working-age population growth	-0.450	0.031***	0.049***
	(0.464)	(0.009)	(0.012)
Urbanization	7.996	0.084	0.223**
	(7.001)	(0.096)	(0.111)
Labor market regulations	-8.413	-0.005	-0.016
	(8.428)	(0.073)	(0.085)
Panel B. Short-run estimates			
Error correction term	-0.091***	-0.054***	-0.041***
	(0.020)	(0.012)	(0.012)
Δ KOF trade openness index	-0.011***	-0.017**	-0.018***
	(0.002)	(0.007)	(0.006)
Δ GDP growth volatility	0.002	-0.0001	0.002
	(0.002)	(0.001)	(0.002)
Δ Share of services in real GDP	-0.002	-0.005*	-0.002
	(0.005)	(0.003)	(0.005)
Δ Natural resources rent	-0.004**	-0.007***	-0.004**
	(0.002)	(0.001)	(0.002)
Δ Working-age population growth	-0.001	-0.001***	-0.001
	(0.001)	(0.0005)	(0.001)
Δ Urbanization	0.478**	0.156**	0.480
	(0.234)	(0.064)	(0.293)
Δ Labor market regulations	-0.018	-0.007	-0.008
	(0.011)	(0.006)	(0.005)
constant	-0.495**	-0.091**	-0.154***
	(0.238)	(0.036)	(0.040)
Hausman test	-	1.67 (0.976)	7.48 (0.380)
Residual-based cross-sectional dependence CD test	0.761 (0.447)	12.050*** (0.000)	-0.224 (0.822)

Notes: ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Regarding the long-run determinants of employment intensity, Panel A of Table no. 3 suggests that coefficients of both trade openness, the share of services in real GDP, the working-age population growth, and urbanization are positive and statistically significant. Indeed, there has been an intensified debate on the impact of trade openness on employment elasticity. The impact may depend on the liberalized sector and the liberalization process. Goaied and Sassi (2015) conclude that Tunisia's trade liberalization process enhanced the employment intensity only in some exporting manufacturing sectors. On the contrary, Bruno *et al.* (2004) argue that trade openness may negatively affect the growth-employment relationship by facilitating firms' access to capital equipment from abroad. From their part, Ghazali *et al.* (2018) point out that import penetration may be responsible for the negative impact of trade openness on employment elasticity. Our findings partially corroborate those of Goaied and Sassi (2015), as trade openness positively affects employment elasticity in the long-run. It is worth noting that the trade openness proxy employed in this study considers both de jure and de facto trade policy measures and is more relevant than those used in

previous studies. For instance, Goaied and Sassi (2015) estimate the employment intensity of growth before and after the signature of the Free Trade Agreement between Tunisia and the European Union and then compare elasticities. When carrying out such an analysis, one should be cautious, as the difference in elasticities before and after the Free Trade Agreement signature may be due to factors other than the agreement. Following many prior studies, the share of services in GDP has a positive effect on employment intensity. Results show that a rise of the share of services in real GDP by 10% is associated with an increase in employment elasticity by 1.86%, all else equal. Therefore, as the economy is transforming into a more service-based economy, the employment intensity of growth is rising. These results corroborate those of Perugini (2009), who conclude that employment elasticity is relatively low in agriculture and manufacturing compared to services in Italy.

Panel A of Table no. 3 also shows that the working-age population growth is associated with higher employment intensity of growth. Indeed, when the working-age population rises, so does the labor supply, which puts pressure on wages to fall and labor demand to increase (Kapsos, 2005). The coefficient associated with urbanization is also positive and statistically significant at 5% level, which suggests that the share of the population living in urban areas is positively linked to employment intensity. These results are in line with Crivelli *et al.* (2012), who outline that urbanization is associated with higher employment intensity in 167 countries between 1991 and 2009. Indeed, urbanization may be considered a sign of agglomeration, and there could be more job prospects in urban areas for new migrants (Furceri *et al.*, 2020). Employment opportunities are particularly created in the non-agricultural sector, mainly services and manufacturing. As expected, the macroeconomic volatility harms employment elasticity. Indeed, a 10% increase in GDP growth volatility in the GCC region is associated with a 0.3% decrease in employment elasticity. Sharp macroeconomic volatility is often seen as a sign of uncertainty, preventing policymakers from carrying out what was intended to build jobs. Volatile oil and natural gas prices in international markets may mainly be sources of GDP growth volatility in GCC countries. Finally, coefficients associated with labor market regulations and natural resources rents are not statistically significant in the long-run. These results suggest that the flexibility of labor market regulations does not affect the employment-growth relationship. These results are not in line with Döpke (2001), who concludes that the impact of labor market flexibility on the employment intensity of growth is positive in a sample of developed countries. However, the author highlights that the effect is far from being robust. Results significantly depend upon the proxy of labor market flexibility used in the analysis. Döpke (2001) emphasizes that labor market regulations are a complex concept that can be measured in various ways. The coefficient of natural resource rents is not statistically significant in all specifications. It is useful to mention that the expected sign of natural resource rents is negative since resource extraction activities are not considered employment-intensive industries (Anderson, 2016).

4.2.3 Short-run determinants of employment elasticity

We move to short-run determinants of employment elasticity provided in Panel B of Table no. 3. As already stated, the analysis is based on the PMG estimator results, given its relative superiority. First, it is worth recalling the negative and statistically significant coefficient of the error correction term. Then, findings show that non-significant coefficients are associated with most of the variables in the short-run. Indeed, from the seven considered

factors, only trade openness and natural resource rents are statistically significant. Moreover, the associated coefficients are negative. As discussed earlier, the negative impact of natural resource rents on employment elasticity is in line with what is expected, but only in the short-run. Higher natural resource rents can be detrimental to employment intensity in the short-run since they are based on capital-intensive extractive industries. However, the impact becomes non-significant in the long-run. Moreover, the PMG estimates show that trade openness shrinks employment elasticity in the short-run, which contradicts the long-run effects estimated earlier. It has been particularly stressed in the literature that trade openness may exert adverse effects on labor markets in the short-run due to the increased competition. Ben Ayed Mouelhi (2007) mentioned that the competition to which domestic firms are confronted leads to eliminating the inefficient ones. These adverse effects are mainly occurring during the first stage of the trade liberalization process and will be much more evident in the presence of non-competitive domestic firms. As much as domestic firms become more competitive due to the transfer of knowledge and the adoption of technological innovations from abroad, the impact of trade liberalization is improved. The adverse short-run effects of trade openness on employment elasticity are temporary and become positive in the long run.

4.2.4 Country-specific short-run determinants of employment elasticity

The final step of the empirical investigation consists of estimating the short-run country-specific coefficients[3]. This is possible since the PMG estimator allows obtaining individual short-run coefficients, including the error correction term. The corresponding results are reported in Table no. 4.

Table no. 4 – PMG-based individual short-run determinants of employment intensity

Dep. variable: Employment intensity	**Bahrain**	**Kuwait**	**Oman**	**Qatar**	**Saudi Arabia**	**United Arab Emirates**
Error correction term	-0.045***	-0.036*	-0.052***	-0.085***	-0.025**	-0.006
	(0.013)	(0.018)	(0.018)	(0.022)	(0.010)	(0.007)
Δ KOF trade openness index	-0.006	-0.050**	-0.011	-0.002	-0.012	-0.007
	(0.010)	(0.022)	(0.012)	(0.022)	(0.009)	(0.012)
Δ GDP growth volatility	0.006***	-0.001	-0.006**	0.008**	0.003	0.004**
	(0.002)	(0.001)	(0.002)	(0.003)	(0.003)	(0.002)
Δ Share of services in real GDP	-0.020**	-0.009	-0.006	0.017	0.002	0.004
	(0.010)	(0.009)	(0.004)	(0.014)	(0.003)	(0.006)
Δ Natural resources rent	-0.0009	-0.013***	-0.003	-0.010**	-0.0001	-0.001
	(0.002)	(0.001)	(0.003)	(0.004)	(0.002)	(0.002)
Δ Working-age population growth	-0.002**	0.002	-0.001	-0.005***	0.0006	-0.0006
	(0.0008)	(0.001)	(0.001)	(0.000)	(0.001)	(0.0006)
Δ Urbanization	0.473	0.340*	0.350***	1.826***	0.237***	-0.345*
	(0.568)	(0.186)	(0.091)	(0.661)	(0.061)	(0.181)
Δ Labor market regulations	-0.018**	-0.019**	-0.003	-0.0008	-0.020	0.013
	(0.007)	(0.009)	(0.013)	(0.023)	(0.026)	(0.008)
constant	-0.168***	-0.135*	-0.192***	-0.316***	-0.092***	-0.021
	(0.053)	(0.072)	(0.055)	(0.088)	(0.035)	(0.029)

Note: ***, ** and * represent the statistical significance at 1%, 5% and 10%, respectively.

First, the table shows that the error correction term is negative and statistically significant in all countries except the United Arab Emirates. Therefore, the long-run relationship between employment intensity and its determinants is confirmed in five out of six GCC countries. It is useful to recall that the error correction model results presented in Panel B of Table no. 3 suggested that the overall error correction model is negative and significant. Based on the findings of Table no. 4, one may argue that the long-run relationship is not confirmed for all countries and that the employment elasticity of growth in the United Arab Emirates has no long-run relationship with its determinants. The error correction terms associated with the five countries are relatively weak and close to those obtained in Table no. 3.

As for the other variables, mixed results are obtained. Among the different determinants, urbanization is found to have positive and statistically significant effects in four countries. The coefficient of trade openness is negative and statistically significant only in Kuwait, while the share of services in real GDP is negative and weakly significant only in Bahrain. The coefficient associated with natural resource rents is negative and statistically significant in Kuwait and Qatar. In these two countries, the rise of rents from natural resources may negatively affect the employment intensity of growth in the short-run. Finally, labor market regulations also exert adverse short-run effects on the employment intensity of growth in Bahrain and Kuwait. More flexible labor market institutions in these countries are associated with less employment elasticity.

5. CONCLUSIONS AND POLICY RECOMMENDATIONS

This study contributes to the existing research flow by analyzing the employment-growth relationship in Gulf Cooperation Council countries between 1970 and 2017. To this end, a two-stage procedure has been adopted. First, we estimate the time-varying employment intensity of growth based on the Kalman filter. Then, we identify the short- and long-run factors that could explain the evolution of employment elasticity over time. A large set of macroeconomic, demographic, and institutional determinants has been considered. The estimation of the time-varying employment elasticity indicates that the elasticity ranges between 0.4 and 0.6 in GCC countries. Furthermore, employment elasticity increased over time for all countries except Kuwait, where a sharp fall is observed at the beginning of the 1990s. Once employment elasticity is estimated, we move to the second stage of the analysis, consisting of identifying the determinants of elasticity. The Hausman and CD tests suggest the dominance of the PMG estimator compared to the MG and DFE. Findings indicate the existence of a long-run relationship between employment elasticity and the various determinants. Moreover, the analysis suggests a significant difference between short- and long-run determinants of employment elasticity. In the long-run, trade openness, the share of services in real GDP, the working-age population growth, and urbanization positively affect employment elasticity. Furthermore, trade openness has the highest positive impact, while the macroeconomic volatility exerts detrimental effects. Finally, natural resource rents and labor market regulations have no significant effects in the long-run. The estimation of the error correction model reveals that most variables have no significant impact in the short-run. Only trade openness and natural resource rents have adverse and weak outcomes on the employment intensity.

The findings of this paper may have important implications for the design of both long- and short-run policies. Results suggest that trade openness, the share of services in GDP, and urbanization positively affect employment elasticity in the long-run. Accordingly, trade

policy reforms should continue to be implemented in GCC countries, and their markets should be more liberalized since such measures could increase the response of employment to economic growth. Second, the service sector must be given greater attention by reducing obstacles to national and foreign investors, developing modern service industries, and providing a sound business climate, infrastructure, and human capital. Indeed, some GCC countries are playing a growing role in the worldwide provision of financial services. Third, policymakers in GCC countries should strengthen policies and active programs to support the urbanization policy by improving the infrastructure, building new cities, and creating new economic activities. These efforts will be accompanied by more private and public investments, economic activity, and job creation in the long-run. Fourth, the empirical analysis also shows that the macroeconomic volatility, represented by GDP growth volatility, exerts an adverse and significant long-run impact on employment elasticity. We think that macroeconomic volatility is mainly due to the volatility of oil and natural gas prices in international markets. Policymakers in GCC countries should reduce their dependence on natural resources and diversify their economies by developing other economic sectors such as the financial sector, real estate, technology, telecommunication… The liberalization of some protected sectors to foreign investors may also be helpful in terms of economic diversification. Fifth, it has been revealed that labor market regulations have no significant impact on employment elasticity. We suggest that some actions aiming to introduce some flexibility on labor market institutions, such as easing the hiring and firing process, introducing fixed-term temporary contracts for both national and foreign workers, liberalizing wage determination, and reducing dismissal costs, would be beneficial in terms of job creation. In the short-run, trade openness is found to impact employment elasticity negatively, and thus, the governments should support the private sector during the first stage of the trade liberalization process via fiscal and financial incentives. Such actions may help firms become more competitive and, therefore, create more jobs. The effect of trade openness on the employment-growth relationship is strengthened as domestic firms become more competitive. Government support is mandatory in the short-run, as the adverse impacts of trade openness on employment elasticity are temporary and become positive in the long-run.

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ANNEX

Table no. A1 – Definitions and sources of data

Variable	Definition	Source
Employment intensity of growth	See Section 3	Authors' own calculations
Employment	Number of persons engaged	Penn World Table, version 9.1
Output	Real GDP expressed in 2018 US$	The Conference Board Total Economy Database
Trade openness	KOF trade openness index	Dreher (2006) and Gygli *et al.* (2019)
GDP growth volatility	Standard deviation of the five-year rolling window of GDP growth	Authors' own calculations
Share of services in GDP	Service value-added as a share of GDP	World Development Indicators
Natural resource rents	Sum of oil rents, natural gas rents, coal rents, mineral rents, and forest rents as a share of GDP	World Development Indicators
Working-age population growth	Working-age population is the total population between 15 and 64.	World Development Indicators
Urbanization	Urban population as a share of the total population	World Development Indicators
Labor market regulations	Composite indicator based on i) hiring regulations and minimum wage, ii) hiring and firing regulations, iii) centralized collective bargaining, iv) hours regulations, v) mandated cost of worker dismissal, and vi) conscription	Economic Freedom of the World

Note: All variables included in the empirical analysis are expressed in the natural logarithm.

Notes

[1] These two terms are used interchangeably throughout the entire paper **.**

[2] See Arisoy and Ozturk (2014) and Ozturk and Arisoy (2016) for a detailed presentation of the time-varying parameters approach within the state-space model.

[3] We are thankful to a reviewer for suggesting the country-specific analysis.