

EMPLOYMENT ELASTICITY OF OUTPUT GROWTH IN THE KAZAKHSTAN ECONOMY: RECENT EVIDENCE FROM A MACROECONOMIC PERSPECTIVE

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ABSTRACT

This study aims to understand the dynamics of aggregate and sectorial employment elasticity of output growth in the Kazakhstan economy from 1996 to 2019. To serve our purpose, a rolling regression method with a window of 6 years has been used to estimate aggregate and sectorial employment elasticity, and an ARDL bounds testing approach has been incorporated to assess the impact of various macroeconomics determinants. The results indicate the existence of a cointegration relationship, and the employment elasticity of output growth in Kazakhstan's economy has declined at aggregate and sectorial levels, thus indicating jobless growth. More specifically, the results reveal that inflation, trade openness and the exchange rate are negatively associated with employment elasticity. In contrast, a positive association is established between service sector employment share, the population growth rate and employment elasticity of output growth. The study recommends strengthening macroeconomic fundamentals such as inflation and exchange rate stabilization coupled with robust development of human capital.

Key Words: employment, intensity, Kazakhstan, economy, macroeconomic, determinants, rolling, regression

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INTRODUCTION

Economic measures related to employment, particularly those measuring the economic capacity to produce adequate employment opportunities, offer useful insights about an

economy's macroeconomic performance. The most commonly reported metrics are the unemployment rate, employment-to-population levels, and the labor force participation rate. Owing to their bidirectional causal dynamics,

volume and composition of real output and employment always remained at the center of discussion in developed and developing countries (Pattanaik & Nayak, 2014). Hence, the employment elasticity of output or the job intensity of output growth¹, which measures the responsiveness of proportionate change in employment as a result of some proportionate change in output, is a gauge to identify the employment growth rate corresponding to a given level of output growth (Pattanaik & Nayak, 2014). Though less widely debated than other primary labor market metrics, employment elasticity provides valuable labor-market statistics. Compared to the unemployment rate, the employment elasticity of output could be a vital labor market indicator to evaluate the job creation ability of various sectors and subsectors of an economy and how the creation of jobs differs in various sectors, together with the shifting of jobs over time. Further, the employment intensity of growth likewise gives useful information about the labor market paradigm and the general macroeconomic performance of an economy and allows us to elucidate the extent of the occurrence and pattern of structural transformation (Pattanaik & Nayak, 2014; Ghazali & Mouelhi, 2018).

In addition, employment acts as an essential link between economic growth and poverty reduction. Economic growth is likely to enhance employment growth in terms of new opportunities, which provide better and new sources of livelihood. Thus, employment elasticity of output growth acts as an essential instrument, with the help of which economic growth is imparted to the weaker sections of the society in the form of employment opportunities generated in the growth process. Therefore, to alleviate poverty and improve poor economic conditions on a sustainable basis, it is necessary to identify the critical determinants of job intensity of output growth and strengthen them to acquire the desired results in developed and developing countries. The employment elasticity of output growth has shown a decline (the phenomenon of jobless growth) in many developed and developing countries. Some of the studies investigating the global and local trends in employment elasticity appear somewhat

paradoxical, or in contrast with standard theoretical discourse².

With the wave of globalization, the dynamics of employment elasticity received considerable attention within the theoretical contours of the Stolper-Samuelson theorem. Thus, with trade liberalization, one would expect a rise in employment elasticity of output growth following a trend in less developed nations' industrial setup towards more labor-intensive technologies. Still, the case is different because there is a surge in capital intensity brought about by technological progress and innovations, leading to declining employment elasticity of output growth (Ghazali & Mouelhi, 2018).

Some studies, such as (Dopke, 2001 & Kapsos, 2006), believe a solid and conclusive link between economic growth and employment growth. Economic growth leads to the creation of jobs, but the intensity of job creation varies from time to time, nation to nation, and from sector to sector. Thus, divergent labor markets respond differently to the process of economic growth. Differences in employment elasticity of output have emerged due to numerous reasons. According to Schmid (2008), one such reason is the nature of economic growth (intensive or extensive) that elucidates job creation concerning the process of economic growth. Economic growth of a comprehensive nature increases the use of factor inputs such as labor and capital, resulting in increased employment and output. Employment elasticity tends to decline when economic growth is intensive, wherein the productivity of factors increases. Technological progress is the key to rapid economic growth in this era. However, this might lead to a reduction in employment opportunities even though some of the world's economies successfully kept the pace of technological progress without compromising the level of employment. Countries like Taiwan, Hong Kong and Korea have successfully maintained a sustained level of employment and technological advancement while encountering massive economic growth over the past two decades (Siddique et al., 2016).

Given this backdrop, the present study investigates the employment elasticity of output

¹ The terms employment elasticity of output, elasticity of employment and job intensity of output growth, are used synonymously.

² Periods of high output growth rate are commonly related to rising job opportunities and vice versa.

growth in one of the fastest-growing economies in the Central Asian region, namely, the Kazakhstan economy, and other important determinants from 1996 to 2018. This study will identify the driving forces for the expansion and contraction of employment elasticity of output growth at an aggregate and sectoral level. Our research is motivated by the existence of reported feeble and inconclusive evidence concerning determinants of employment elasticity. More specifically, we do not find any study in the case of the Kazakhstan economy examining the employment elasticity of output growth. In addition, we resorted to the important methodology of rolling regression and the Bounds ARDL cointegration procedure for our empirical exercise, due to their potential merits over the other conventional methods.

LITERATURE REVIEW

A survey of the available literature demonstrates that the presence and solidity of an association between economic growth and employment are frequently questioned in terms of causality. Is it the increase in per capita GDP that boosts job creation or the other way i.e., an increase in jobs that enhances GDP growth? Both job creation and GDP growth are influenced by additional aspects, so there is not straight and simple association aligning employment and GDP growth (Perugini & Signorelli, 2007; Pattanaik & Nayak, 2014). A group of researchers including Evangelista, Pianta and Perani (1996); Gabrisch & Buscher (2005); Kapsos (2006); Upende (2006); Sawtelle (2007); Hodge (2009); Yinusa & Ajilore (2011); and Mkhize (2019) have examined employment elasticity of output among various countries. Many of them hold that these economies face the challenge of employment growth. In some of the nations, growth which is traditionally viewed as the generator of employment could not produce sufficient employment opportunities for the increasing unemployed population.

N'Zue (2001), while examining the contemporary private sector of the Ivorian economy, found that economic growth and employment generation do not go collectively in the end; thus, an indication of jobless growth. Similarly, Sodipe & Ogunrinola (2011) found a negative association between economic growth and job creation for the Nigerian economy. A similar analysis on the relationship between

economic growth and the growth rate of employment was also conducted by Yogo (2008) in Sub-Saharan African nations. Three key findings were found from his study. First, the question of job creation in Sub-Saharan Africa is more about quality than quantity. Second, the causes of poor job creation outcomes were not on account of labor market rigidities. Third, an increment of the working weakness has been detected which was due to the fragility of growth and the declining demand for labor. Evangelista, Pianta & Perani (1996) uncovered the manifestation that reconstructing significant economic sectors significantly weakens the association aligning employment and economic growth. Similarly, another study was carried out by Herman (2011) for European Union countries for the period 2000-2010. The findings of that research advocated for the existence of weak employment intensity of output growth.

In contrast to the above, some studies on the European Union revealed a sturdy and constructive association between economic growth and employment, therefore indicating that new jobs are created in the process of economic growth. Nonetheless, intensity varies by country and by time (Dopke, 2001 & Kapsos, 2006).

According to the ILO's 1996 report, the impartiality of industrialized countries' GDP growth to employment growth has not deteriorated. A study among the G7 nations revealed that there was a significant and positive association between employment growth and GDP growth, primarily in the United States and Germany. On similar lines, Seyfried (2005) analyzed the association between employment growth and economic growth for ten premier states in the United States. The study employed a simple regression technique on Bureau of Economic Analysis data for the period 1990-2003. The outcome was additionally compared with those generated via pooled regression. The findings of the research revealed that economic growth positively affects job creation, but the results were statistically insignificant.

Islam (2004) concluded that gradual employment growth led to possible poverty reduction. Besides, an incremental employment growth was associated with a decrease in the employment intensity of output growth. Several studies (e.g., Dopke, 2001; Kapsos, 2005) on the European Union demonstrated that economic

growth and employment growth are strongly and positively related, thus signifying that economic growth is a prerequisite for job creation.

Doskeyeva et.al, (2019) discussed the regional and sectoral employment status of the Kazakhstan economy along with the dynamics of employment, unemployment, and youth employment. The study proposed measures such as training and retraining of rural youth, support, and development of rural entrepreneurship in the field of rural employment policy, along with the employment of women, the disabled and other socially vulnerable groups. Zhunussova & Dulambayeva (2019) attempted to investigate the growing significance of fiscal policy on the growth of the service sector in Kazakhstan with the help of an expository approach. The authors concluded that, due to the coordinated government initiatives, the output share of the service sector increased from 48.3 percent in 2000 to 57.5 percent in 2017, while the employment share increased dramatically from 43.3 percent in 2001 to 61.6 percent in 2017, above the global level. Thus, the execution of government policies led to an increase in the employment share of the services sector at a faster rate. In contrast to Russia, public investments continued to have a significant impact on the service sector, resulting in a 1.7 percent increase in GDP and a 2.3 percent increase in employment, with a growth of 90 percent in public investment in 2014. In areas where the government intervened, such as education, the rate of innovation was high, with 63 percent of innovative enterprises.

ANALYTICAL FRAMEWORK

Measurement of Growth-Employment Elasticity

The fundamental concept of employment elasticity is a transition in the proportion of workers working in an economy or an area consistent with a shift in economic production determined by the gross domestic product. There are two commonly used methods for computing elasticity. The first approach is an arithmetic technique that divides the percentage change in employment over a particular time from the corresponding percentage change in GDP, as given below:

$$E = \frac{\mathcal{L}_1 - \mathcal{L}_0 / \mathcal{L}_0}{Y_1 - Y_0 / Y_0} \quad (1)$$

This is the arc-elasticity of employment calculated between two time periods at the aggregate or sectoral level. While this approach appears straightforward, it produces highly fluctuating elasticity, making comparison and forecasting difficult. To make the analysis more comprehensive and rigorous and avoid wide fluctuations, an alternative approach measuring employment intensity of output growth or employment elasticity is the point elasticity acquired by a double-log regression analysis related to employment and economic growth. The following equation gives the basic form of this approach:

$$\ln \mathcal{L} = \alpha_0 + \alpha_1 \ln Y \quad (2)$$

While:

$$\alpha_1 = \frac{\partial \ln \mathcal{L}}{\partial \ln Y} = \frac{\partial \mathcal{L} / \mathcal{L}}{\partial Y / Y} \quad (3)$$

The regression coefficient α_1 Refers to the elasticity of employment concerning gross domestic product Y , \mathcal{L} represents total employment, and \ln is the natural logarithm of the variable. Thus, an elasticity of one indicates that every percentage point of GDP growth is associated with an equal percentage point of employment growth. The results of this equation are more stable, which is advantageous for economic policy. According to Islam and Nazara (2000), this form of estimation has another benefit. It helps to manipulate the 'parameter estimates' with other variables that may affect the employment growth relationship, as shown by the general form of the equation below:

$$\ln \mathcal{L} = f(\ln Y, Z) \quad (4)$$

The specified variables can take on several forms, such as dummy variables (e.g., differing levels of industrialization among various regions), policy-oriented variables, etc.

Sectoral Employment Elasticity

We can calculate employment elasticity for different sectors such as primary, secondary, and tertiary by altering equation (4) in the following form:

$$\ln \mathcal{L}_\rho = f(\ln Y_\rho, Z) \quad (5)$$

This analysis entails that sectoral GDP (Y) $_\rho$ and other variables influence jobs in the relevant industry ρ . Z can be considered the total GDP (Y), which also affects employment at the sectoral level. Consequently, employment changes may

be closely associated with changes in both Υ_p And Υ .

ECONOMETRIC METHODOLOGY

Rolling Regression

A time-series data set of employment elasticity of output growth is needed to run the Autoregressive Distributed Lag (ARDL) model to examine the relationship between the macroeconomic determinants of economic growth and employment elasticity of output growth. The said data set is not available in an exact form, and to obtain the same, the method of rolling regression is employed. In this method of rolling regression analysis, a linear multivariate, rolling window regression model is introduced. The analysis aims to model the relationship between the dependent and one or more explanatory series, as with standard regression. The difference is that a window of some size is defined and continuously maintained in the measurement process in the roll regression. The analysis returns to the findings in the window and repeats the observation in time and process. Several regressions will be made as the window rolls out

(Macrobond Help, 2018).

Employment Elasticity of Output Growth Estimation for Kazakhstan Economy

This section summarizes the results of various employment growth elasticity estimation methods. First, we present arc elasticity estimates at the aggregate and sectoral levels. The results of two econometric approaches follow this: first, a multivariate log-linear model is estimated using the Ordinary Least Squares (OLS) method, and then the estimation of a rolling window model using the rolling window method.

The Arc Employment Elasticity of Output Growth

Figure 1 depicts the evolution of the annual arc employment elasticity of output growth over time for different sectors and the economy as a whole. The analysis has been performed while following equation (1). As can be seen, arc elasticity exhibits significant year-wise fluctuations, precluding the depiction of a clear trend.

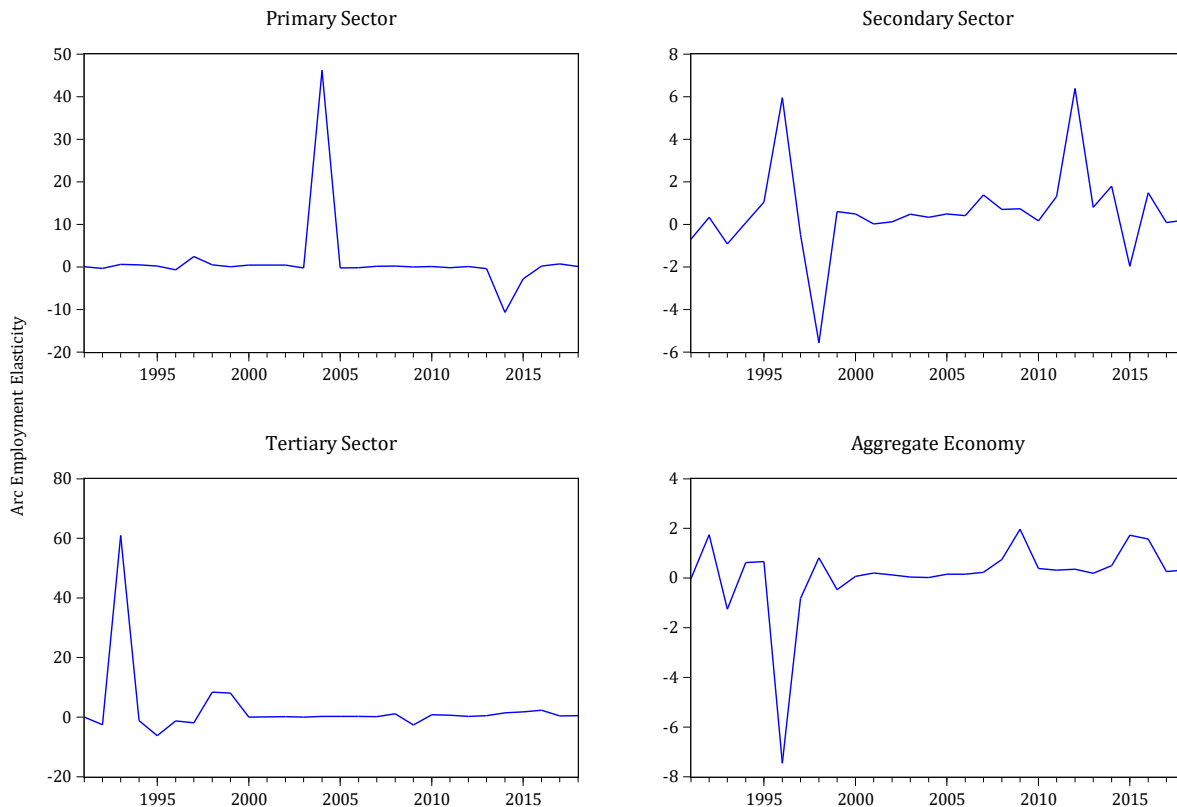


Figure 1: Arc Employment Elasticity

Econometric Estimates of Employment Elasticity Using Ordinary Least Squares (OLS)

We have taken recourse to a multivariate log-linear regression model according to equations

(2) and (5) to achieve a steadier series of aggregate and sectoral elasticity of employment. The results are reported in Table 1.

Table 1: Employment Elasticity of Output Growth Ordinary Least Squares Results

Sector	Time Period							
	1991-2000		2001-2010		2011-2019		1991-2019	
	<i>Coeff.</i>	<i>P-value</i>	<i>Coeff.</i>	<i>P-value</i>	<i>Coeff.</i>	<i>P-value</i>	<i>Coeff.</i>	<i>P-value</i>
Primary	0.30	0.000	-0.12	0.009	-1.62	0.002	-1.54	0.002
Secondary	0.30	0.000	0.44	0.000	0.37	0.031	0.40	0.000
Tertiary	-0.80	0.000	0.33	0.000	0.56	0.000	0.34	0.000
Aggregate	0.52	0.000	0.24	0.000	0.09	0.038	0.18	0.000

Source: Author’s Calculation

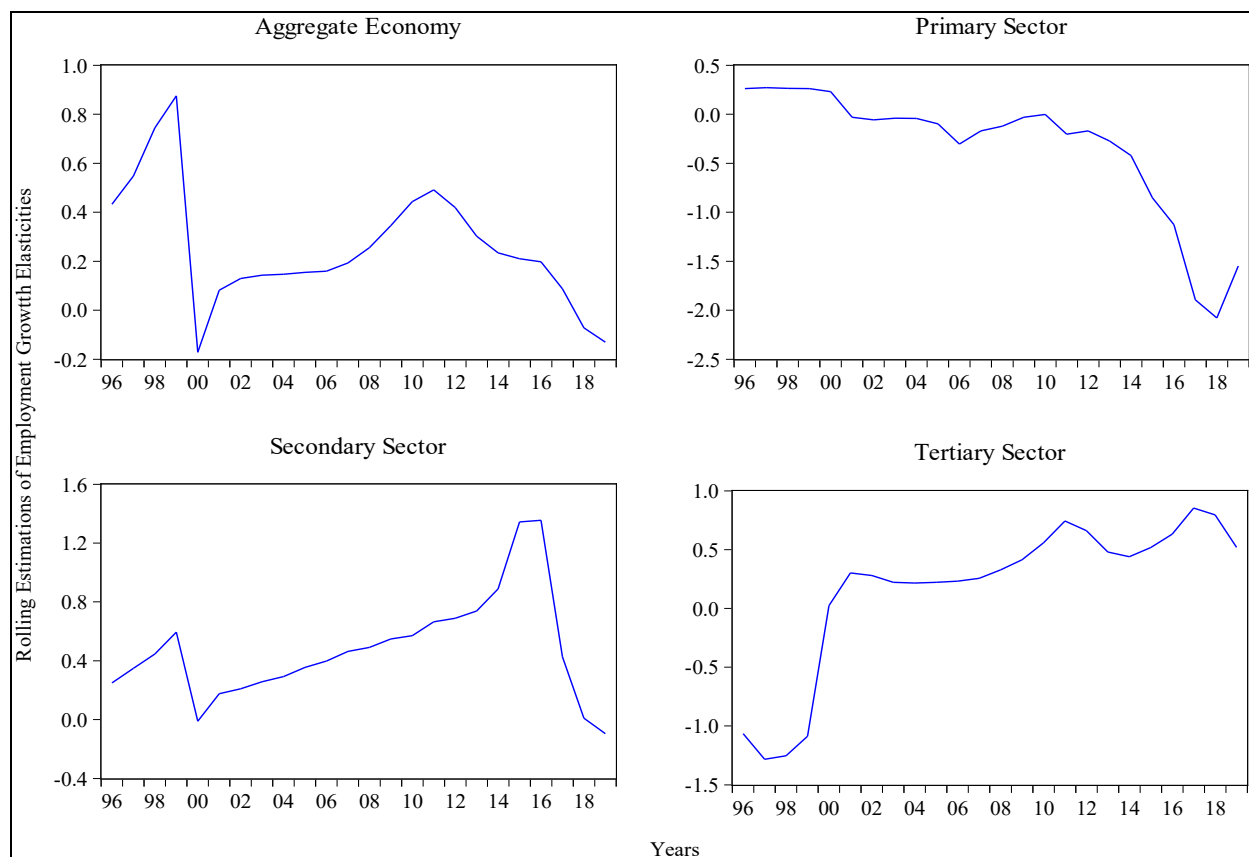


Figure 2: Employment Growth Elasticity Rolling Estimation

Unit Root Test

The assumption that a data set is stationary is established in time series analysis. The dependent and independent variables must be stationary for the classical regression model to

work. If not, the issue of spurious regression becomes apparent (Granger and Newbold 1974). However, one of the fundamental benefits of ARDL is that it can be used regardless of whether the variables are strictly I (0), I (1), or a mixture

of the two. Moreover, an analysis of the unit root properties of the data series is important because the computed F statistics for the bounds test given by Pesaran, Shin, & Smith (2001) would be invalid if variables are integrated of I (2). We used the classical Augmented Dicky Fuller Test to determine the stationarity of the variables. The ADF test compares the null hypothesis of unit root to the alternative hypothesis of a stationary data set.

Cointegration Methodology

Having detected the order of integration, we examined the possibility of a long-run association among variables under investigation. Several approaches have been developed for cointegration testing. Engle & Granger (1987) and Philips & Hansen (1990) developed residual-based single equation approaches usually preferable for bivariate analysis, and Johansen (1988), Johansen-Juselius (1990) and Johansen (2000) developed a system of cointegration procedures for multivariate analysis. Similarly, Pesaran & Shin (1998) and Pesaran, Shin & Smith (2001) modified the earlier single equation approaches and developed what is popularly known in the literature as the "autoregressive distributed lag model" (ARDL) or "Bounds test" to check for the possibility of long-run co-movements. From the various approaches mentioned above, we applied the ARDL approach due to its prospective distinction over the traditional procedures.

The conventional cointegration techniques developed till 1990 require that the order of integration of the variables be the same. However, if the integration order is different for various variables and we have a mix of I (0), I (1) & fractional integration, these cointegration procedures lead to estimate inefficiency and thereby decrease the forecasting power of estimated models (Kim et al. 2011). To overcome this rigidity, the ARDL model can be applied even when there is a mixture of stationary and non-

stationary variables, provided that no variable is integrated of order two. A single equation is appropriate and easily interpretable, as it combines a dynamic error correction specification with the long-run cointegration regression. The Model ensures flexibility regarding selecting lag length for different variables by following the appropriate lag selection criteria like AIC or SBC. Similarly, it uses specific instruments of endogenous variables and thereby avoids the potential bias in the estimated coefficients that could arise due to potential endogeneity. Finally, the ARDL model works better in small samples (Narayan, 2004), and unlike the conventional error correction models, the coefficients of lagged level variables are not restricted in the modified error correction model.

The estimation procedure of the ARDL approach involves the following two steps. In the first step, possible cointegration is tested, and if cointegration is detected, estimation of short-run and long-run coefficients along the error correction term is done in the second step. The following equation represents the general form of an ARDL (p,q) model:

$$Y_t = \alpha_0 + \sum_{i=1}^p \varphi_i Y_{t-i} + \sum_{j=0}^q \beta_j X_{t-j} + \varepsilon_t \tag{6}$$

Where Y_t constitutes the dependent variable, Y_{t-i} denotes the AR terms with φ_i as the associated AR coefficients. X_{t-i} represents the set of explanatory variables and β_j are associated partial slope coefficients. Lags of dependent variable range from 1 to p and explanatory variables from 0 to q, where the appropriate values of p and q are chosen based on lag selection criteria like AIC and SBC. Finally, ε_t is a white noise error term, assumed to be independently and identically distributed. So far as the variables incorporated into the study are concerned, the corresponding ARDL model is given by:

$$\begin{aligned} \Delta EEOG_t = & \theta_0 + \theta_1 EEOG_{t-1} + \theta_2 LCPI_{t-1} + \theta_3 LSES_{t-1} + \theta_4 LEXR_{t-1} + \theta_5 LTO_{t-1} + \theta_6 POP_{t-1} + \\ & \sum_{i=1}^p \omega_i \Delta EEOG_{t-i} + \sum_{j=0}^q \rho_j \Delta LCPI_{t-j} + \sum_{j=0}^q \sigma_j \Delta LSES_{t-j} + \sum_{j=0}^q \vartheta_j \Delta LEXR_{t-j} + \\ & \sum_{j=0}^q \varphi_j \Delta LTO_{t-j} + \sum_{j=0}^q \delta_j \Delta POP_{t-j} + \varepsilon_t \end{aligned} \tag{7}$$

Where *EEOG* represents the employment elasticity of output, *LCPI*, *LSES*, *LEXR*, *LTO* and *POP* represent inflation, service sector employment share, the exchange rate, the openness of the economy and population growth. All the variables are expressed in a natural logarithm except *EEOG* and *POP*. Moreover, θ_0 is the intercept term, θ_1 is the AR coefficient, θ_2 to θ_6 denote the long-run elasticity coefficients and ω_j , ρ_j , σ_j , ϑ_j , ϕ_j and δ_j constitute the short-run estimators. Finally, $\epsilon_t \sim iid(0, \sigma^2)$. For the bounds test, the null of joint insignificance of lagged level coefficients or no-cointegration is tested against an alternative of joint significance or the presence of cointegration, i.e.:

$$H_0; \theta_1 = \theta_2 = \theta_3 = \theta_4 = \theta_5 = \theta_6 = 0$$

$$H_A; \theta_1 \neq \theta_2 \neq \theta_3 \neq \theta_4 \neq \theta_5 \neq \theta_6 \neq 0$$

Pesaran et al. (2001) have provided the critical

$$EEOG_t = C_0 + \sum_{i=1}^p \theta_i EEOG_{t-i} + \sum_{j=0}^{q1} \theta_j LCPI_{t-j} + \sum_{j=0}^{q2} \theta_j LSES_{t-j} + \sum_{j=0}^{q3} \theta_j LEXR_{t-j} + \sum_{j=0}^{q4} \theta_j LTO_{t-j} + \sum_{j=0}^{q5} \theta_j POP_{t-j} + \epsilon_t \tag{8}$$

To account for the dynamic nature of the relationship and because errors are assumed to be uncorrelated, we select the appropriate lags of various variables based on AIC or SBC. Finally, the short-run coefficients and error correction term,

$$\Delta EEOG_t = \pi + \sum_{i=1}^p \omega_i \Delta EEOG_{t-i} + \sum_{j=0}^{q1} \rho_j \Delta LCPI_{t-j} + \sum_{j=0}^{q2} \sigma_j \Delta LSES_{t-j} + \sum_{j=0}^{q3} \vartheta_j \Delta LEXR_{t-j} + \sum_{j=0}^{q4} \phi_j \Delta LTO_{t-j} + \sum_{j=0}^{q5} \delta_j \Delta POP_{t-j} + \zeta ec_{t-1} + \epsilon_t \tag{9}$$

Here the ω_j , ρ_j , σ_j , ϑ_j , ϕ_j and δ_j are short-run coefficients, and ζ is the speed of adjustment. In addition, necessary model diagnostic tests are also calculated to ensure efficiency, unbiasedness and models stability.

Data Description

The variables for the empirical study are chosen following the common theoretical propositions and available empirical evidence. The data collection is yearly and spans the years

values and the lower & upper bounds for different model specifications with different independent variables for hypothesis testing. The lower bound value assumes that all variables are stationary and the upper bound assumes the variables incorporated in the model are non-stationary. Suppose the F-statistic, calculated from the estimated Model, is smaller than the lower bound value. In that case, we may accept the null of no-cointegration. If the F-statistic lies above the upper bound value, it establishes the evidence favoring a long-run association among variables. However, if the calculated test statistic lies between the lower and upper bounds, we are inconclusive about the existence or otherwise of cointegration.

If cointegration is detected in the first step, then the long run ARDL ($p, q1, q2, q3, \dots, qk$) is estimated as:

measuring the speed of adjustment towards the long-run equilibrium following any short-run disturbance, are estimated by the following error correction model:

1996 to 2019. The variables include the Consumer Price index (CPI), the Service Sector Employment Share (SES), the Exchange Rate (EXR), Trade Openness (TO), the Import Propensity Ratio (IPR), the Population Growth Rate (POP) and Employment Elasticity of Output Growth (EEOG). Table 2 provides the necessary details concerning various variables incorporated in the study.

Table 2: Data Description

Variables	Symbol	Source
Consumer Price Index	CPI	IFS-IMF
Service Sector Employment Share	SES	WDI Data Bank
Exchange Rate	EXR	IFS-IMF
Trade Openness	TO	WDI Data Bank
Import Propensity Ratio	IPR	WDI Data Bank
Population	POP	WDI Data Bank
Employment Elasticity of Output Growth	EEOG	Own Calculation

Notes: WDI Data Bank = World Development Indicators Data Bank of World Bank; IFS-IMF = International Financial Statistics, International Monetary Fund.

RESULTS AND DISCUSSION

Unit Root Analysis

The ARDL model works even in the case of a mix of I(0) and I(1) variables, however, none of the variables should be I(2). It is therefore pertinent to check the unit root of all the variables. Table 3 reports the results of the ADF test, and it can be observed that we have a

mixture of I(0) and I(1) variables, and that none of the variables is I(2). Hence the application of ARDL stands vindicated.

The test results presented in Table 3 reveal that LCPI, LSES, LEXR, LTO, IPR, and POP are non-stationary at level and stationary at the first difference, whereas EEOG is stationary at level.

Table 3: Unit Root Analysis

Variable	Level		Variable	First Difference	
	Intercept	Int & Trend		Intercept	Int & Trend
	<i>ADF Test</i>	<i>ADF Test</i>		<i>ADF Test</i>	<i>ADF Test</i>
EEOG	-4.02 (0.00)	-3.94 (0.02)			
LCPI	-1.05 (0.71)	-2.13 (0.50)	D(LCPI)	-4.51 (0.00)	-4.49 (0.00)
LSES	1.09 (0.99)	-1.50 (0.79)	D(LSES)	-3.41 (0.02)	-3.57 (0.05)
LEXR	-0.50 (0.87)	-1.27 (0.86)	D(LEXR)	-3.56 (0.01)	-3.49 (0.06)
LTO	-0.97 (0.74)	-3.03 (0.14)	D(LTO)	-5.48 (0.00)	-5.35 (0.00)
IPR	-1.24 (0.63)	-3.30 (0.09)	D(IPR)	-6.04 (0.00)	-5.94 (0.00)
POP	-1.85 (0.34)	-1.48 (0.80)	D(POP)	-4.63 (0.00)	-5.14 (0.00)

Source: Authors own calculation

Cointegration Analysis

Having established the order of integration of variables and that none of them is I(2), we checked for the existence of cointegration by using the ARDL Bounds F test. ARDL estimation of equation 10 is reported in Table 4. With EEOG as the dependent variable and LCPI, LSES, LEXR, LTO

& POP as explanatory variables, we estimated an ARDL (1,0,1,1,1) Model by selecting the appropriate lag structure using automatic criteria. In Model A of Table 5, the value of the F-statistic is 7.687, and it is found to be higher than the upper bounds critical value of 4.68 at a 1% significance level. This result establishes the evidence favoring a long-run association

between employment elasticity of output growth (EEOG) in Kazakhstan and its various determinants. Moreover, to check the robustness of Model A, we took cognizance of Model B, in which the import propensity ratio (IPR) is used

as a proxy for openness (LTO). The results of Model B are reported in Table 4, in which the value of the F-statistic is 4.156 and is found to be higher than the upper bounds critical value of 3.79 at a 5% significance level.

Table 4: Cointegration Results

Null Hypothesis: No long-run relationship exists.					
Model	F-stat	k	Cointegration	Lags	Selection Criteria
A	7.687	5	YES	(1,0,1,1,1,1)	Automatic
B	4.156	5	YES	(1,0,1,0,1,1)	Automatic
Critical Value Bounds					
Significance		I0 Bound		I1 Bound	
10%		2.26		3.35	
5%		2.62		3.79	
2.50%		2.96		4.18	
1%		3.41		4.68	

Source: Authors own calculation

Table 5 documents the necessary diagnostic tests needed for the stability and appropriateness of the model. The residual series of the estimated model accepts the null of no serial correlation in the case of LM test and accepts the null of homoscedasticity in the case of the BGP test. The Ramsey RESET test accepts

the null of no model misspecification. Finally, the goodness of fit is also reported to be satisfactory according to adjusted R^2 criteria, and the stability of estimated coefficients over the sample period is documented by CUSUM (cumulative sum) and CUSUMSQ (cumulative sum of squares) tests represented in Figure 3.

Table 5: Diagnostic Tests

Diagnostic Tests when openness is used (Model A)		
Test	F-Statistics	P-Value
Ramsey RESET Test	4.733	0.05
LM Test	0.604	0.45
BPG	2.525	0.06
Diagnostic Tests when import propensity is used (Model B)		
Test	F-Statistics	P-Value
Ramsey RESET Test	2.008	0.06
LM Test	0.138	0.71
BPG	6.29	0.00

Source: Authors calculation

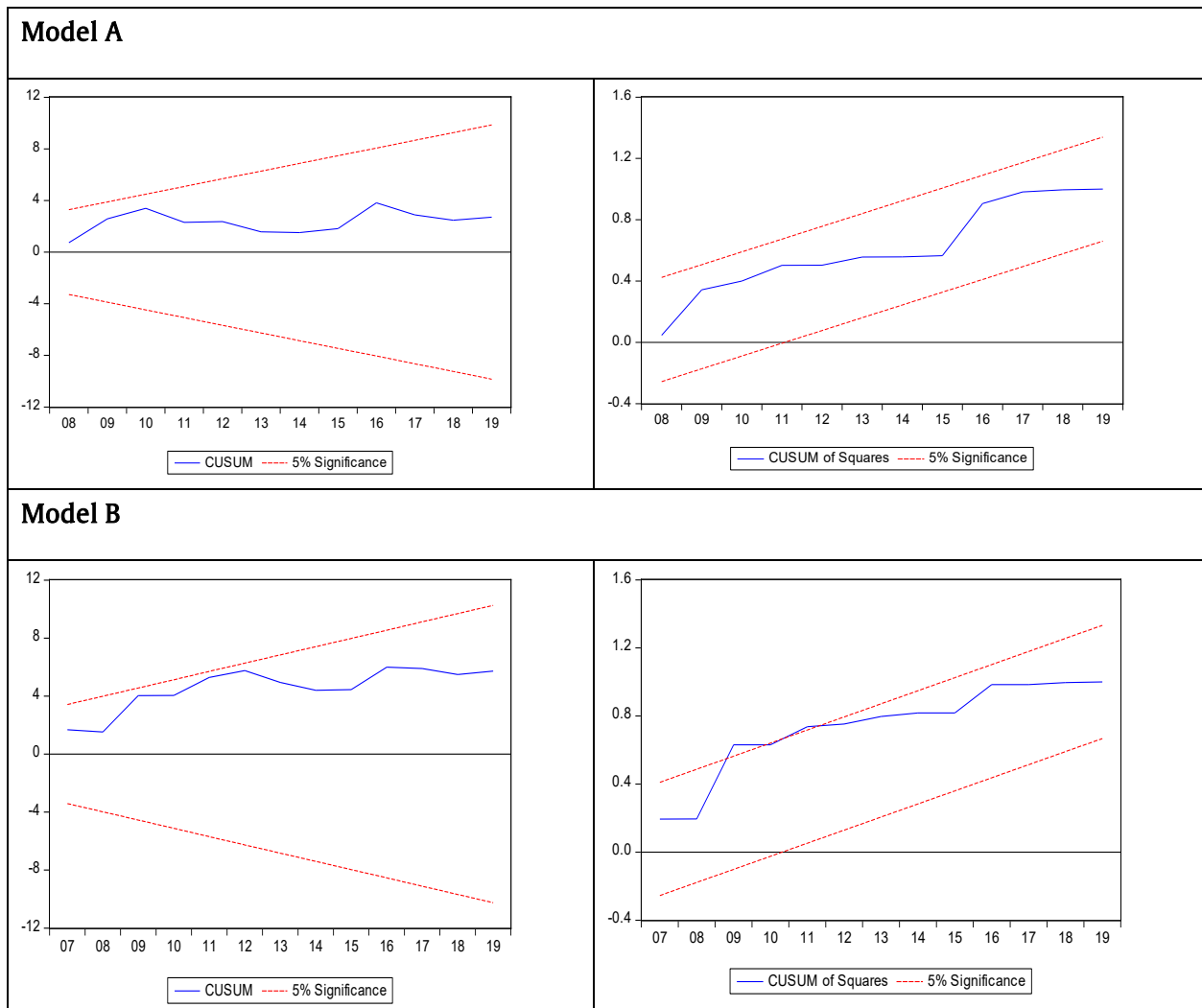


Figure 3: CUSUM and CUSUMSQ

Long-Run and Short-Run Coefficients

The estimated long-run coefficients using the ARDL approach are reported in Table 6. The results indicate that LCPI is negatively associated with employment elasticity and is statistically significant at a 5 percent significance level. The coefficient value ascertains that a 1 percent increase in the inflation rate leads to a decline of 1.17 percent in employment elasticity. The results are in line with those of Kapsos (2006); Pattanaik & Nayak (2014); and Ghazali & Mouelhi (2018). Moreover, the negative association between these two variables is thereby supporting the ‘sand effect’ (Friedman, 1977) and can be explained by way of cost-push inflation and inflation uncertainty. Inflation of a cost-push

nature results in a rising cost of production, which in turn results in declining output production on the part of producers. The declining output production leads to lowering demand for factors of production, especially that of labor, which ultimately leads to a lower level of employment in the economy, and a lower level of employment leads to a decline in the employment elasticity of output. This also indicates that the negative impact of inflation is larger on employment relative to output levels. This argument is supported by the famous Okun’s law³, which states an inverse relationship between the output and unemployment growth rates. Second, the risk-averse nature of producers due to inflation uncertainty makes producers reluctant towards higher production activities

³ Okun’s law is a statistical relationship between economic growth and unemployment.

that affect timely output production in the economy by way of downsizing firms, which leads to the creation of lower employment opportunities and curtailment in the economy's existing level of employment. Furthermore, it can be argued that there is no evidence of the Philip's curve in the economy of Kazakhstan. The inverse of the Philips curve has been reported in the present study for the said economy.

Coming to the impact of openness, the results indicate that LTO is negatively associated with employment elasticity and is statistically significant at a 5 percent level of significance. The

coefficient value ascertains that a 1 percent increase in openness leads to a decline of 1.07 percent in employment elasticity. There are different channels like import penetration, export orientation, and capital displacement through which the long-run negative association between openness and employment elasticity can be explained. Import penetration in the first place creates domestic competitiveness by acting as a competitor for domestic producers, leading to the disappearance of the firms which cannot survive in the market due to their high cost of production against low-cost foreign producers.

Table 6: Long Run and Short Run Coefficients

Model A					
Dependent Variable EEOG					
Long Run Coefficients			Short-Run Dynamics		
Variable	Coefficient	P-Value	Variable	Coefficient	P-Value
LCPI	-1.17	0.016	D(LCPI)	-1.99	0.024
LTO	-1.07	0.007	D(LTO)	-3.67	0.000
LEXR	-1.11	0.000	D(LEXR)	-2.52	0.007
LSES	7.50	0.012	D(LSES)	-2.73	0.582
POP	0.14	0.094	D(POP)	0.05	0.393
C	15.7	0.002	ECM(-1)	-1.70	0.000
Model B					
Dependent Variable EEOG					
Long Run Coefficients			Short-Run Dynamics		
Variable	Coefficient	P-Value	Variable	Coefficient	P-Value
LCPI	-1.05	0.017	D(LCPI)	-1.85	0.049
IPR	-1.72	0.069	D(LTO)	-6.48	0.000
LEXR	-1.13	0.000	D(LEXR)	-1.99	0.007
LSES	7.44	0.021	D(LSES)	-2.29	0.582
POP	0.14	0.078	D(POP)	-0.00	0.393
C	16.13	0.002	ECM(-1)	-1.75	0.000

Source: Author's Calculation

This process leads to a decline in the level of employment in the economy, thereby resulting in lower employment elasticity. Second, less developed countries more often import more capital to compete with foreign producers

domestically and internationally. This nature of capital intensiveness in the processes of production leaves less room for employment generation by way of increased labor productivity on one side, and lack of skilled labor

on the other, thereby leading to jobless growth in the economy; this jobless growth is itself an important indicator of lower employment elasticity of output.

The results indicate a negative relationship between LEXR and employment elasticity and are statistically significant at a 1 percent level. Further, the coefficient value signifies that a 1 percent increase in the exchange rate instigates a decline of 1.11 percent in employment elasticity. These results are supported by Ghazali & Mouelhi (2018). The exchange rate influences a labor market depending on currency appreciation and depreciation channels (Nucci & Pozzolo, 2010). The exchange rate in Kazakhstan has continuously increased over the years, from 67.30 Tenge in 1996 to 382.74 in 2019, comparing to the US dollar, resulting in huge currency depreciation. Campa, (2005) opined those changes in the exchange rate impact employment growth via three possible channels. First, the growing penetration of imports generates high competitiveness in the local market, resulting in the closure of companies that cannot decrease their average production costs, leading to a drop in overall economic employment. Second, an export orientation results in competitiveness shocks by increasing sector-focused exports. Finally, the use of imported inputs also occurs when input costs change leads to cost and price modifications (costs of factors of production rises due to depreciation of the domestic currency). Another element to be considered is the degree to which industry in a nation is exposed to foreign competition, affecting how changes in the real exchange rate affect employment or create new jobs (Klein Schuh & Triest, 2003). According to a study conducted by Belke & Kaas (2004), extreme volatility in a country's exchange rate probably demoralizes businesses from expanding their workforce. The cost of reversing an employee decision is prohibitively expensive in the long run because of its high degree of irreversibility in the face of rigid corporate structures (Erdal, 2001). In addition, the research shows that shifts in the real exchange rate and open-market and non-tariff trade barriers influence the creation of jobs (Klein et al., 2003).

With regard to the service sector employment share, a 1 percent increase in LSES is found to enhance the employment elasticity of output growth by 7.5 percent. The results are

statistically significant at a 5 percent level of significance and correlates with other research (Padalino and Vivarelli, 1997; Dopke, 2001; Kapoos, 2006; Mourre, 2006; Pattanaik and Nayak, 2014 and Ghazali and Mouelhi, 2018). Average labor productivity in the services sector is often lower than in the industrial sector of the economy. Therefore, the percentage of services in real GDP is generally believed to impact the employment intensity of growth. Padalino & Vivarelli (1997) suggested that while the G-7 nations usually have a negative employment elasticity in the manufacturing process, it is nevertheless favorable for the services sector. According to Dopke (2001), a high employment elasticity of output growth is in harmony with a more important role for the services sector. While highlighting the role of the services sector in the employment growth of the Euro area in the late 1990s, Mourre (2006) found that market-related services have experienced rapid employment growth, which can be attributed in large part to the high rate of value-added growth in the sector. Løbbe (1998) also suggest an increased employment intensity due to a major role of the service sector.

Similarly, the impact of population growth (POP), with a size elasticity of 0.14 and statistically significant at a 5 percent level of significance, indicates that a 1 percent increase in population growth is associated with a 0.14 percent increase in employment elasticity. This positive impact of population growth on employment elasticity is in line with the expected theoretical channels, wherein the macroeconomic linkage can be explained along these lines: as the labor supply increases there is a rightward shift of labor supply curve, which leads to a downward shift of real wage rate in the labor market. As a result, demand for labor increases and more people are employed at a lower real wage. On the other hand, from the firm's perspective, as the scale of production changes in the long run along with capital input, the intent is for the firm to increase labor employment and ensure the same capital labor ratio needed for the firm's production technology. So, along with increased capital employment, labor also gets employed more in the long run. Further the results are supported by other studies like (Kapsos, 2006; Pattanaik & Nayak, 2014; and Ghazali & Mouelhi, 2018).

Robustness Check

We used an alternate Model B in which the import propensity ratio (IPR) is used as a proxy for openness (LTO), to check the robustness of our Model A. The results of Model B are in line with the results of Model A. Further, the results indicate that IPR is negatively associated with employment elasticity of output growth (EEOG) and is statistically significant at a 10 percent significance level. In addition, the coefficient value of -1.72 implies that a 1 percent increase in the import propensity ratio leads to a decline of 1.72 units in employment elasticity.

Finally, a synoptic view of the short-run dynamics highlights that the impact of various explanatory variables on the employment elasticity of output growth is in line with long-run effects except for LSES wherein the estimated coefficient is negatively associated and statistically insignificant with a coefficient value of -2.732. In addition, the statistically significant negative error correction term corroborates the finding of the Bounds F-test in favour of cointegration among the selected variables.

CONCLUSION

The economy of Kazakhstan started its transition to a market economy soon after its independence in 1991. This study aims to analyze the aggregate and sectoral employment intensity of output growth in Kazakhstan during 1991-2019. At the outset, we used the arc employment elasticity method followed by an econometric method of rolling regression and a multivariate log-linear model to estimate the required times series for elasticity scores. To evaluate macroeconomic determinants of employment elasticity, the ARDL model was used.

The results indicate a cointegration relationship, and the employment elasticity of output growth in Kazakhstan's economy has declined at aggregate and sectoral levels during the study period, thus indicating jobless growth. This coincides with Kapsos (2006), which highlighted a decrease in global employment elasticity of output growth since 1999 due to a weak employment performance succeeding the world economic slowdown. Over the past few decades, labor productivity has grown at a faster rate than overall production growth. The main cause is thought to be skill-based technological change, which is "a shift in the production

technology that favors skilled labor by increasing its relative productivity and, thus, its relative demand".

More specifically, the results reveal that inflation, trade openness and the exchange rate are negatively associated with employment elasticity. At the same time, a positive association is established between the service sector employment share, the population growth rate and employment elasticity of output growth. The study recommends the strengthening of macroeconomic fundamentals by undertaking comprehensive structural adjustment programs along with sound macroeconomic stabilization measures to control volatility in inflation and exchange rate fluctuations. In line with the empirical results of our study it is recommended that the government must formulate policies for enhancing capacity building to improve the quality of human capital.

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