

What drives the unemployment rate in Maldives? An Autoregressive Distributed Lag (ARDL) approach

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Abstract

Purpose – This paper examines factors that determine the unemployment rate in the Maldives.

Methods – This paper uses an Autoregressive Distributed Lag (ARDL) model in capturing long and short-run associations among the chosen variables. It uses some macroeconomic variables, namely unemployment rate, population, economic growth, foreign direct investment, external debts, inflation rate, and expatriate workers.

Findings – The empirical results suggest that except for expatriate workers, all the variables are significant determinants of unemployment rate in the long run. The study found that economic growth and inflation would negatively and significantly contribute to unemployment rate when they are combined. This explains the unemployment nexus which follows the Phillips curve and Okun's law relationship provides the presence of both these hypotheses in the Maldives in the short-run and long-run. In addition, an increase in population and external debts worsens the unemployment situation in the Maldives. Although expatriate workers are not significant in the long run, the results reveal that they have a significant positive effect on unemployment in the short run.

Implications – This result implies that the Maldivian government should encourage locals in the country to participate in the labor force and limit the participation of expatriate workers in an industry that has a shortage of skilled expertise.

Originality – This study expands our understanding of key determinants of the unemployment rate in Maldives. To the best of the authors' knowledge, this research is among the pioneer empirical study to assess the issue.

Keywords – Unemployment, long and short run, labor force, skilled workers

Introduction

For several decades, unemployment has been one of the most prominent issues faced by economies around the world (Alamro & Al-Dala'ien, 2016). The increase in the rate of unemployment can be translated as the underutilization of a nation's human capital and a waste of its indispensable resources. Unemployment is a negative global phenomenon that adversely affects economic growth and social structure. Several factors can be attributed to the incidence of unemployment. According to Gur (2015), the main factors that affect the rise in unemployment in BRIC (Brazil, Russia, India, and China) are inflation, population growth, total investment, trade volume, and

GDP. Al-Habees and Rumman (2012) highlighted the role of economic growth as the main factor that causes fluctuation in the unemployment rate in some Arab countries.

According to the United Nations Development Program report (2014), the main reason for the increase in the unemployment rate in the Maldives is the largely increasing number of school leavers and college graduates in the population. The high unemployment rate has remained a severe social stigma and a challenge to resolve for policymakers in the Maldives (ILO, 2006). Besides, the current government promised to create 94,000 jobs in their five-year terms during the presidential debate held by Television Maldives in collaboration with Maldives National University (MNU) on 2nd but this was not realized September 2013 (Moosa, 2008). Although government officials claimed that in 2015, they have created 70,000 jobs both the private and public sectors, there is not enough evidence to support the claim (Fathih, 2015). In fact, according to the official figure in the past few years, civil services jobs remained within the range of 24,000 and only 676 civil services jobs were created between 2013 and 2014 (National Bureau of Statistics, 2015). Despite all these efforts, unemployment continues to increase and has become a growing concern amongst policy makers and politicians.

There have been several existing studies conducted in understanding the factors that determine the unemployment rate in both developed countries (Bassanini & Duval, 2006). However, studies particularly, focusing on developing countries are limited, especially in the case of the Maldives where an empirical study is yet to be conducted in understanding unemployment determinants. The Maldives must address the problem of unemployment by employing various necessary measures and agendas through a joint effort with regional development banks, international financial institutions, and other non-governmental organizations. Yet, the efforts made by the government in resolving this issue have resulted in unsatisfactory outcomes. Hence, the problem of unemployment remains a social stigma and major challenge for the nation, especially for youths.

There are several studies conducted to examine the determinants of unemployment in various countries. Some studies focused on investigating the factors that influence unemployment from a macroeconomic point of view while others were dedicated to examining the determinants of unemployment for both developed and developing nations. Tercek (2014) found that public expenditure for social welfare has an impact on unemployment, and trade-off in unemployment is true for both European and USA regions in the short-run and long run. Bassanini and Duval (2006) revealed that different policy and institutional changes accounted for 66 percent of the fluctuation in non-cyclical unemployment. Ünal (2015) finds that fluctuation in fiscal policy such as tax, government spending on the labor market, and social security tax affects GDP, consumption, and unemployment rate in the Netherlands during the study period. The same view was shared by Franks (1996). Neumark and Wascher (2004) indicated that minimum wage negatively impacted the rate of employment for teenagers and youth in these countries. Quintini and Manfredi (2009) find that one factor that contributes to youth unemployment is the skills mismatch that arises from a lack of quality education. Zyra (2013) found that higher education contributes to reducing the unemployment rate. Ryan (2001) states that the school-to-work transition process is important and varies across different countries over time. Caroleo and Pastore (2007) added that youth who have less education and skills are more vulnerable to prolonged unemployment and are more prone to unsteady and inferior jobs compared to youths with higher education. Mauro and Carmeci (2003) mentioned that youths with higher educational qualifications should also need to acquire firm-specific skills and knowledge at their schools to become successful and productive employees.

The determinants of unemployment in developing countries were studied by several studies over the years. Subramaniam and Baharumshah (2011) showed that job vacancy rate, economic growth rate, government spending, and inflation are the main factors that determined the unemployment rate in the Philippines. Chowdhury and Mavrotas (2006) reveals that inflation, exchange rate, GDP growth rate, and unemployment are significant determinants of unemployment in Bangladesh. Arslan and Zaman (2014) investigated the determinant factors of unemployment in Pakistan using annual data from 1999 to 2010. The issue of unemployment in the Maldives is primarily caused by an increase in the working age population (between 15 and 64)

due to the high mortality rate, which has become a major hindrance to building necessary human resources in the country (World Bank, 2011).

The purpose of this study is to examine the factors that determine the unemployment rate in the Maldives. Unlike other countries, there are a few studies conducted on understanding the unemployment rate in the Maldives, but most of them focus on the theoretical ground such as (Salih, 2013). A lack of study in understanding the problem and magnitude of unemployment necessitates the need to produce an empirical study that would inform the public, government, and other relevant parties of the seriousness as well as the importance of addressing this issue.

Methods

The study used some macroeconomic variables sourced from the following organization IMF, United Nations Population Unit, and International Labor Organization (ILO) to examine the determinants of unemployment in the Maldivian economy. The time range of data is from 1991 to 2019. The specific variables used for the study are shown in Table 1.

Table 1. Data and Variables

Data and Variables	Proxy	Measurement	Period
Unemployment (lnUN)	Unemployment	Number of people	1991-2019
Working-age Population (lnPOP)	Population	Units	1991-2019
Gross Domestic Product (lnGDP)	Economic growth	USD (million)	1991-2019
Net inflow of investment (lnFDI)	Foreign direct investment	USD (million)	1991-2019
Total amount of debts (lnED)	External debts	USD (million)	1991-2019
Consumer Price Index (lnINF)	Inflation	(annual percentage)	1991-2019
Inflow of migrant employed (lnEXW)	Expatriates workers	Units	1991-2019

Notes: (1) The data are from World Development Indicator, World Bank, except the Consumer Price Index (from International Monetary Fund), and Inflow of migrant employed (from International Labor Migration)

For the purpose of exploring the properties of stationary in the data, the study used the Augmented Dickey-Fuller (ADF) as established by Dickey and Fuller (1979), and Phillips-Perron procedures by Phillips and Perron (1988). Engle and Granger (1987) preferred the ADF test as the best procedure to examine the existence of unit roots in the variables owing to the stability of the test's critical values despite the strength of its over and above various sampling experiments. According to Davidson and MacKinnon (2004), the augmented Dickey-Fuller test has an advantage over the Phillips-Perron test procedure as it performs better with finite samples. We provide both analyses. The assumption of a unit root for ADF assumed that the null hypothesis of variable Y is non-stationary while the alternative hypothesis shows that variable Y is stationary. However, the main concern is the most suitable estimation procedure for the ADF test. The following is the equation or model that involves intercept and trend.

$$\Delta Y_t = \alpha + \theta t + \lambda Y_{t-1} + \sum_{i=1}^k \phi_i \Delta Y_{t-i} + \mu_t \quad (1)$$

Y_t could be any variables chosen for the study: it could be Unemployment (lnUN), Gross Domestic Product (lnGDP), Inflation (lnINF) and Foreign Direct Investment (lnFDI). The lag number k is set by applying the Akaike Information Criterion (AIC), as suggested by Engle and Granger (1987), or Schwartz Criterion (SBC) to remove any form of serial correlation that may exist in the residuals and, at the same time, to make the error term white noise. Likewise, the μ_t is the error term with white noise which is presumed to be independently and identically distributed with zero mean. The $t=1$ and N refer to the trend variable.

The model used in this study was based on the co-integrating mechanism of bounds testing approach with the framework of the ARDL model proposed by Pesaran et al. (2001) to examine the determinants of unemployment in the Maldives for both the short-run and long-run. The Wald-F statistic is a unique mechanism of ARDL statistical procedure that estimates the generalized

Dicky-Fuller regression in order to examine the significance of variables under the conditional and unrestricted equilibrium correction model (ECM) which tests the presence of long-run relationship provided that upper and lower bound decision as proposed by the Pesaran et al. (2001) The ARDL procedure was chosen for this study over the other techniques and procedures such as the residual-based test for Error Correction methods developed by Engle and Granger (1987) and the Johansen maximum likelihood approach proposed by Johansen and Juselius (1990) because it has many advantages over these conventional approaches. In this regard, according to Duasa (2007), the ARDL approach allows an estimation of the co-integration relationship using the OLS technique when the lag order of ARDL is identified. The ARDL approach is much more adjustable as it does not require any unit root pre-testing for variables and is appropriate irrespective of the order of integration such as I (0) or I (1) or both at the same time (Budha, 2013). However, Narayan (2017) suggested that the technique may not produce a robust result and may even collapse if the variables happen to integrate at I(2).

The bound testing procedure under the ARDL framework involves two steps to estimate the existence of cointegration. Initially, the F-statistic was employed to test the existence of long-run cointegration amongst the selected variables for this study. The null hypothesis of no cointegration is rejected depending on the two sets of critical values as suggested by Pesaran et al. (2001) namely the upper bound I(1) and the lower bound I(0). Hence, the cointegration using the dynamics of ARDL and lower bound testing approach for both long-run and short-run were estimated following the unrestricted error correction model (UECM) as follows:

$$U\Delta LUN_t = \alpha_0 + \alpha_z Q + \sum_{i=1}^0 \beta_i \Delta LUN_{t-i} + \sum_{i=0}^p \theta_i \Delta LPOP_{t-i} + \sum_{i=0}^q \pi_i \Delta LGDP_{t-i} + \sum_{i=0}^r \gamma_i \Delta LFDI_{t-i} + \sum_{i=0}^s \delta_i \Delta LED_{t-i} + \sum_{i=0}^m \varphi_i \Delta LINF_{t-i} + \sum_{i=0}^n \rho_i \Delta LEXW_{t-i} + \delta_1 LUN_{t-1} + \delta_2 LPOP_{t-1} + \delta_3 LGDP_{t-1} + \delta_4 LFDI_{t-1} + \delta_5 LED_{t-1} + \delta_6 LINF_{t-1} + \delta_7 LEXW_{t-1} + \mu_t \quad (2)$$

The first difference operator is denoted as Δ in the equation (2) and the maximum order of lag is given as (o, p, q, r, s, m and n) for the ARDL procedure, which is decided based on the Schwarz Bayesian criterion (SBC). According to Pesaran et al. (2001), the ARDL is more appropriate to use a maximum of two lag length if the selected criteria is Schwarz Bayesian. The short-run dynamic parameters are $\beta, \theta, \delta, \pi, \delta, \gamma, \varphi$ and ρ while all the δ 's capture the long-run relationship between the variables. The F- statistics is used for joint significance of the coefficient for the lagged variables to determine the existence of long-run cointegration. The null and alternative hypothesis of no cointegration was set as follows (Shahbaz, 2009):

$$H_0: \delta_1 = \delta_2 = \delta_3 = \delta_4 = \delta_5 = \delta_6 = \delta_7 = 0 \quad (3)$$

Test against the alternative hypothesis of cointegration exist i.e.

H_0 : At least one of the δ is not equal to zero

The existence of long-run cointegration between the variables was examined through comparison of Wald F-statistic and two critical values, namely the upper and lower bound. The first set of critical values is lower bound (LCB) and deduces the variables that consist in the ARDL are integrated at order I(0). The second set of critical values are upper bound (UCB) which considers the variables in the model as integrated at I(1). The rejection of null hypothesis for no cointegration is established for the existence of long-run cointegration between the variables if the F-statistic surpasses the set upper bound limits irrespective of the order of cointegration. On the other hand, if the F-statistics happen to fall behind the set lower bound, the null hypothesis cannot be rejected for no cointegration and must accept that there is no existence of long-run relationship amongst the variables. If the F-statistics fall between the upper and lower bounds the relationship is inconclusive and the order of integration must be calculated to move forward with the estimation.

According to the Duasa (2007) and Budha (2013) once the presence of cointegration is established amongst the variables, the next step is to find the optimum number of lags in the model through either Akaike information criterion (AIC) or Schwartz-Bayesian criteria (SBC) prior to the estimation of the model using Ordinary Least Squares (OLS). Pesaran et al. (2001) suggested that the model with an annual data maximum of two lag is more appropriate to use if the selected

criteria are Schwarz Bayesian. On the other hand, Saboori and Soleymani (2011) claimed that the AIC selects the maximum lag length for the model while SBC selects the minimum possible lag length. Therefore for this study, Schwarz Bayesian was selected instead of the Akaike information criterion.

Following the bound testing approach, the second step of the ARDL is to identify the short-run dynamics or cointegration by employing the error correction model (ECM) initially applied by Sargan (1974). The lagged error correction term (ECT) is included and the ARDL framework for the short-run dynamic was constructed by deriving the error correction model (ECM) expressed as follows:

$$\Delta UN_t = \alpha_0 + \sum_{j=1}^o \lambda_{1i} \Delta UN_{t-j} + \sum_{j=0}^p \lambda_{2i} \Delta POP_{t-j} + \sum_{j=0}^q \lambda_{3i} \Delta GDP_{t-j} + \sum_{j=0}^r \lambda_{4i} \Delta FDI_{t-j} + \sum_{j=0}^s \lambda_{5i} \Delta ED_{t-j} + \sum_{j=0}^r \lambda_{6i} \Delta INF_{t-j} + \sum_{j=0}^s \lambda_{7i} \Delta EXW_{t-j} + \eta_1 ECT_{t-1} + \vartheta_t \quad (4)$$

The term ECT_{t-1} in the equation (4) indicates the lagged error correction term and is the residual that is attained through the cointegrating equation while η_1 is the speed of adjustment parameter. ϑ_t is the error term in the model which is identically independently and normally distributed. The coefficient of lagged error correction indicates the speed of adjustment in the cointegration equation from the short run towards its long run. It also explains how the percentage of change in the dependent variable converges back to the long-run equilibrium provided that the percentage changes in the explanatory variables in the ARDL model. Hence, the coefficient of error correction ECT_{t-1} is anticipated to be statistically significant with a negative sign.

Results and Discussions

The unit root test was conducted by adopting the Augmented Dickey-Fuller (ADF) and Philips-Peron (PP) tests. The analysis of ADF and PP tests from Table 2 depicts that all variables, except for LNGDP, are stationary at the first difference. This implies that LNGDP is in order of integration zero (0) while other variables are in order of integration one (1). Based on the result, since none of the variables of this study is in order of integration (2), therefore ARDL model is appropriate for this research.

Table 2. Unit Root Analysis

Variables	ADF Test statistic		Phillips-Perron tests statistic		Order of integration
	Level	First Difference	Level	First Difference	
LNUN	-1.267	-4.120***	-1.295	-4.120***	1
LNED	-1.199	-5.914***	-1.170	-5.925***	1
LNEXW	-1.917	-5.414***	-1.975	-5.481***	1
LNFDI	-0.437	-4.357***	-0.340	-4.379***	1
LNGDP	-2.737**	-4.905***	-5.533**	-4.905***	0
LNINF	-1.242	-3.350***	-1.179	-3.350***	1
LNPOP	-0.764	-4.226***	-0.977	-4.543***	1

Note: ***, **, * denote rejection of the null hypothesis and variables significant at 1%, 5%.

Based on the ARDL model, the foremost phase is to investigate the presence of a long run relationship between the variables for this study. Narayan's (2017) method was used at a default maximum lag of two (2) and count on Schwarz-Bayesian Criteria to pick the optimal lag selection for the ARDL model, given its explanatory power and superiority. In addition, Pesaran et al. (2001) method of calculating the Wald F-statistic was adopted and matched with the upper and lower bound critical value.

The estimated F-statistics is 13.37161, which is significant at a 1 percent level and greater than the upper bound critical value of 3.99. Therefore, the null hypothesis of no long-run relationship was failed to be accepted, and can be concluded that there is a long-run relationship

between the variable of the study. The Autoregressive Distributive Lag (ARDL) model was computed and the findings of the estimated F-statistics with LNUN as an endogenous variable and composed with the upper and lower bound are reported in Table 3.

Table 3. Bound Testing for Long-run Relationship

Calculated F-statistic	Critical Values (Restricted intercept, no Trend)		Sig.
	LCB	UCB	
F_C (LNUN, LNED, LNEXW, LNFDI, LNGDP, LNINF, LNPOP)	2.88	3.99	1%
13.37161	2.55	3.61	2.5%
	2.27	3.28	5%
	1.99	2.94	10%

Note: This table shows the results for the bound testing in capturing long-run relationships. The annual time frame date used is from 1991 to 2019. The maximum lags were based on Schwarz-Bayesian Criteria

The confirmation of the long-run cointegration amongst the variables was reported in Table 3. The next step was to estimate the long-run model by normalizing the unemployment rate, which is illustrated in Table 4. The long-run analysis shows inflation, economic growth, as well as foreign direct investment, have a negative relationship with the unemployment rate, while population and expatriate workers have a positive relationship with the unemployment level. The coefficients of LINF and LGDP are negative and statistically significant at a one-percent level. Thus, using the ARDL framework, the test for the existence of the Phillips curve shows the trade-off between inflation and unemployment, and Okun's law hypothesis explains the relationship between unemployment and economic growth in the Maldives. From this conclusion, we can reject the hypothesis of Friedman (1968) and confirm the presence of Phillips curve effects on Maldives' economy in the long run. This conclusion agrees with the study by Sarwar, et al. (2020) who provided evidence of both the Phillips curve and Okun's law hypothesis.

Furthermore, the result also shows that when the inflation rate increases by one percent, unemployment reduces by 55 percent. This finding is in line with Cheema (2014) who found a strong negative relationship between inflation and unemployment in Pakistan between 1975 -2009. This also shows that when the inflation rate is higher in the Maldives, the unemployment rate decreases as business cycles expand more job opportunities due to the excess demand of labor compared to labor supply. At the same time, the wage rate is adjusted according to the labor market demand, resulting in more employment.

Similarly, the significant and negative sign of the coefficient of economic growth shows that more investment into the economy would negatively correlate with the unemployment rate in the long run, meaning that a one-percent increase in GDP or economic growth would reduce the unemployment rate to 33 percent. The findings are consistent with Noor, et al. (2007) who found the validity of Okun's law. This implies that economic growth enables an increase in the productivity of a country by reducing unemployment to relatively lower levels in the long run. Also, the ARDL long-run result shows that the relationship between economic growth and unemployment exhibits a trade-off between both variables and this ratifies the existence of Okun's law in the Maldives.

Although there is no current empirical study on the Maldives, the results of this study support the theoretical assumption made by Ghosh (1998) and some of the empirical assumptions made by Salih (2013), as they studied the determinants of intention to work in Maldivian resorts in 2012. The findings of this study also revealed that external debts are significant and have a positive long-run relationship with the unemployment rate. This implies that a one-percent increase in external debts will lead to a 1.82 percent increase in the unemployment rate. The findings of this study are validated by Sarwar et al. (2020) who found a positive but insignificant relationship between unemployment and external debts. Moreover, this indicates that loans obtained by the government of Maldives from the World Bank and other financial institutions are not appropriately utilized. The external debts of the Maldives stand at approximately USD 693.7 million in 2014, meaning that 27.7 percent of the GDP is allocated for debt servicing (World Bank, 2014). Due to

the few allocations of resources for the development projects of the country, there is an increase in the unemployment rate.

However, there is a positive but insignificant long-run relationship between expatriate workers and unemployment. This could be due to the labor market adjustment where the local labor force must enhance their education and technical skills to meet the excess demand of the labor market and private sectors are unwilling to hire foreign workers in the long-run. Hence, expatriate workers are not considered a significant factor that affects unemployment in the long run. However, they are found to be statistically significant in the short run and have a positive relationship with unemployment. This outcome is consistent with the study by Islam (2007) on the relationship between unemployment and immigration in Canada from 1961 to 2002 which found no evidence of a significant effect of expatriate workers on unemployment in the long run although it was found significant in the short-run using Vector Error Correction Method (VECM). This implies that when expatriate workers increase by one percent, unemployment in the Maldives is expected to increase by 67 percent. This confirms the earlier hypothesis and is inconsistent with the findings of Gorry, et al. (2020) and Salih (2013) as well.

The finding also shows a negative relationship between FDI and unemployment in the long-run and short run. It indicates that a 1 percent increase in FDI will lead to a 35.9 percent decrease in unemployment in the long run and a 14 percent decrease in the short run. The Maldives being a country that heavily depends on the tourism sector has a steady increase of foreign companies established in Maldives. This would enhance private investment, increase job opportunities for the locals, bring in new knowledge, incorporate technology into the labor force and have a positive impact on economic growth. This finding is consistent with Eksi and Onur Tas (2022) and Jayaraman and Singh (2007).

Lastly, the results also indicate a nexus between unemployment and population size, exhibiting a positive long-run, and this concludes our hypothesis for the Maldives. An increase in the population size of the country by one percent will increase unemployment by 24 percent in long run. This finding is in line with the results of Arslan and Zaman (2014) whom they advocate growth in the increasingly unemployed working-age population in Pakistan. Likewise, developing countries such as the Maldives, which is also among the fastest-growing population in the region, have comparatively slow economic growth, limiting labor demand and preventing youths from seeking appropriate employment. However, this could be effectively reversed through stable economic growth.

Table 4. Long-run and Error Correction Estimates, 1991-2019

Panel A: Long-run Analysis						
Dependent Variable	Independent Variables					
Δ LNUN	LNED	LNEXW	LNFDI	LNGDP	LNINF	LNPOP
	0.182***	0.0243***	-3.595**	-0.331***	-0.551***	2.241***
	(8.297)	(0.489)	(-6.968)	(-9.015)	(-30.804)	(20.894)

Note: ***, **, * denotes rejection of the null hypothesis. For robustness of the reliability of the analysis, a diagnostic test was examined by adopting a number of tests such as Ramsey's RESET test and serial correlation, heteroscedasticity, and normality test. To certify estimates of the error correction term, the residual was subjected to a serial correlation test by adopting Busch-Godfrey Serial Correlation LM Test. The alternate hypothesis of no serial correlation failed to reject since the p-value of the F-statistics (0.9719) was greater at a 5 percent level of significance and, as such, no heteroscedasticity (F-Stat = 0.4922) was found. In addition to this, the Ramsey RESET (F-Stat = 1.1237) test certified that the model for this study was correctly specified and the Jarque-Bera (JB) (0.0602) of normality indicated that the error term was normally distributed.

The results of the short-run dynamic are revealed in Table 5, which shows that in the short-run, the unemployment rate has a significantly negative relationship with the inflation rate and economic growth represented by GDP. However, the impact of inflation is much stronger than the impact of economic growth on the unemployment rate. The significance of these two variables in the short run also implies that the Phillips curve and Okun's law hypothesis are maintained in

the short run as well. The FDI also shows a negative and significant relationship with unemployment while long-run population size and external debts have maintained a positive and significant impact in the long-run and short run. There is no change in the sign of the coefficient of the variables between the long-run and short-run except expatriate workers. Although the sign of expatriate workers is positive and insignificant in the long run, the sign is negative and significant in the short run.

The error correction model, as represented by ECMt-1, measures the speed of adjustment from disequilibrium to the equilibrium level. From Table 5 coefficient of the ECMt-1 is -0.8138 which is significant at a one percent level and fulfills the condition of trending back to equilibrium since the coefficient has a negative sign. Therefore, this denotes that short-run deviance from the long-run equilibrium level of unemployment is normalized at an adjustment speed of 81.38% over the period.

Table 5. Short run Analysis and Error Correction Model, 1991-2019

Dependent Variable: Δ LNUN coefficients t-statistics		
Δ LNED _t	-7.640***	(-22.671)
Δ LNEXW _t	6.770***	(10.616)
Δ LNFDI _t	-1.047***	(-13.327)
Δ LNNGDP _t	-0.002***	(-25.772)
Δ LNINF _t	-0.262***	(-25.838)
Δ LNPOP _t	0.000***	(14.770)
ECMt _{t-1}	-0.814***	(-12.815)
$R^2 = 0.9985$	F-stat = 159.91	DW-stat = 1.827
	Prob (F-stat = 0.0007)	

Note: ***, **, * indicates significance at 1%, 5%, and 10% levels, respectively. For robustness of the reliability of the analysis, a diagnostic test was examined by adopting a number of tests such as Ramsey's RESET test and serial correlation, heteroscedasticity, and normality test. To certify estimates of the error correction term, the residual was subjected to a serial correlation test by adopting Busch-Godfrey Serial Correlation LM Test. The alternate hypothesis of no serial correlation failed to reject since the p-value of the F-statistics (0.9719) was greater at a 5 percent level of significance and, as such, no heteroscedasticity (F-Stat = 0.4922) was found. In addition to this, the Ramsey RESET (F-Stat = 1.1237) test certified that the model for this study was correctly specified and the Jarque-Bera (JB) (0.0602) of normality indicated that the error term was normally distributed.

The VAR model was estimated to compute the variance decomposition and impulse response function to examine the short-run dynamic relationship and robustness of the causal interaction between the variables in the model. The outcomes of both the variance decomposition and impulse response function are reported in Figure 1 (Appendix) clearly shows that IRF can generate the time path (i.e. the variable can rise and fall, though not in regular intervals) of dependent variables in the VAR model in response. However, based on the estimated results most of the shock from the explanatory variables tends to be zero. This confirms the stability of the vector error correction method of the system equation. Besides, Figure 1 also indicates that, in most cases, the direction of the variables' response to innovation in the system is quite reasonable. Unemployment significantly responds to the GDP, population, FDI, inflation, expatriate workers, and external debts but also reacts negatively to some of these variables, including FDI, GDP, and inflation. However, unemployment contributes to the GDP, population, Foreign direct investment, inflation, expatriate workers, and external debts.

Conclusion

This paper finds that GDP, inflation, and FDI are important determinants of unemployment. It also finds that Expatriates workers also contribute to FDI and GDP growth. This implies that the government of Maldives should increase economic growth by bringing in FDI and imposing

proper measures to keep the inflation rate at a moderate level in order to reduce unemployment. Hence, it is important for the Maldives to become a higher-income country as this will reduce the unemployment rate and create a buoyant economy for business ventures to thrive for the greater well-being of the country. The government of Maldives can take several important measures to reduce the level of unemployment such as increasing economic growth by bringing more foreign direct investment. This will improve employment and physical capital in the country. With regard to labor, it is important for the government to consider the quantity and quality of the labor force. Likewise, human capital development is imperative to improve the quality of labor force which aims to provide new technical skills to enable the for unemployed to find jobs that meets all requirements. Another important step is that the government should encourage skilled and unskilled local labor and professionals to participate in the labor force using certain working incentives such as life pension schemes. A large amount of idle labor force may create more concerns such as an increase in several expatriate workers. In order to reduce the increasing number of expatriate workers the government should limit their participation to only industries and occupations in which there is a shortage of skills. Besides, an amendment to the current recruitment policy in the tourism sector which favors expatriate workers is imperative to attract local labors to the industry (Salih, 2013). However, the government should also conduct an awareness program in collaboration with NGOs and other institutions to break the reluctant behavior among locals (such as having the illusion of a wealthy country and categorising some jobs as odd and dirty).

Besides, the government and other private companies must take proactive measures to control external debts taken from international organizations and other private sectors through some restrictive measures. Without proper controlling measures, the effort of the government to induce additional demand to reduce unemployment would be fruitless. This is largely because external debts reduce GDP due to a large amount of money flowing out of the country. In turn, this reduces the funds available to invest in enhancing public services and other development projects. External debt should be used to create more capital stock such as roads, hospitals schools and so on so as to generate more employment and future income for the economy. The increase in aggregate demand is considered as the most appropriate and effective approach of attempting to reduce the unemployment rate. Furthermore, the country is suffering from employment trap because private establishment are no longer employing. Therefore, government create enabling environment through tax incentives and long term relieves to boost private investments in order to spur growth and employment.

References

- Al-Habees, M. A., & Rumman, M. A. (2012). The relationship between unemployment and economic growth in Jordan and some Arab countries. *World Applied Sciences Journal*, 18(5), 673–680. <https://doi.org/10.5829/idosi.wasj.2012.18.05.16712>
- Alamro, H., & Al-Dala'ien, Q. (2016). Validity of Okun's Law: Empirical Evidence from Jordan. *Administrative Sciences*, 43(1), 2016–2315.
- Arslan, M., & Zaman, R. (2014). Unemployment and Its Determinants: A Study of Pakistan Economy (1999-2010). *Journal of Economics and Sustainable Development*, 5, 20–24. <https://doi.org/10.2139/ssrn.2515075>
- Bassanini, A., & Duval, R. (2006). Employment Patterns in OECD Countries, (35). <https://doi.org/https://doi.org/https://doi.org/10.1787/702031136412>
- Budha, B. B. (2013). Demand for Money in Nepal : An ARDL Bounds Testing Approach. *NRB Economic Review*, 25(1).
- Caroleo, F., & Pastore, F. (2007). *The youth experience gap: Explaining differences across EU countries*. Retrieved from <https://econpapers.repec.org/RePEc:pia:wpaper:41/2007>
- Cheema, A. A. (2014). Economic determinants of unemployment in Pakistan: Co-integration analysis. *International Journal of Business and Social Science*, 5(3), 209–222.

- Chowdhury, A., & Mavrotas, G. (2006). FDI and growth: What causes what? *The World Economy*, 29(1), 9–19. <https://doi.org/10.1111/j.1467-9701.2006.00755.x>
- David A. Dickey, W. A. F. (1979). Distribution of the estimators for Autoregressive time series with a unit. *Journal of the American Statistical Association*, 74(427–431).
- Davidson, R., & MacKinnon, J. G. (2004). *Instructor's Manual to Accompany Econometric Theory and Methods*. Oxford University Press. New York: Oxford University Press.
- Duasa, J. (2007). Determinants of Malaysian trade balance: An ARDL bound testing approach. *Global Economic Review*, 36(1), 89–102. <https://doi.org/10.1080/12265080701217405>
- Eksi, O., & Onur Tas, B. K. (2022). Time-varying effect of uncertainty shocks on unemployment. *Economic Modelling*, 110, 105810. <https://doi.org/10.1016/j.econmod.2022.105810>
- Engle, R. F., & Granger, C. W. J. (1987). Co-integration and error correction: representation, estimation, and testing. *Econometrica: Journal of the Econometric Society*, 55(2), 251–276. <https://doi.org/10.2307/1913236>
- Fathih, M. S. (2015). Government claim of adding 70,000 jobs ridiculed. Retrieved March 1, 2022, from <https://maldivesindependent.com/politics/government-claim-of-adding-70000-jobs-ridiculed-119938>
- Franks, J. (1996). Labor market policies and unemployment dynamics in Spain. In S. G. B. Henry (Ed.), *Economic Policies and Unemployment Dynamics in Europe*. United States: International Monetary Fund.
- Friedman, M. (1968). The role of monetary policy. *The American Economic Review*, 58, 269–295.
- Ghosh, R. A. (1998). Cooking pot markets: An economic model for the trade in free goods and services on the Internet. *Brazilian Electronic Journal of Economics*, 1(1), 19–31.
- Gorry, A., Munro, D., & vom Lehn, C. (2020). Experience, skill composition, and the persistence of unemployment fluctuations. *Labour Economics*, 63, 101793. <https://doi.org/https://doi.org/10.1016/j.labeco.2019.101793>
- Gur, B. (2015). An analysis of unemployment determinants in BRIC countries. *International Journal of Business and Social Science*, 6(1), 192–198.
- Islam, A. (2007). Immigration unemployment relationship: The evidence from Canada. *Australian Economic Papers*, 46(1), 52–66. <https://doi.org/10.1111/j.1467-8454.2007.00305.x>
- Jayaraman, T., & Singh, B. (2007). *Foreign direct investment and employment creation in pacific island countries: An empirical study of Fiji* (Working Papers No. 3507).
- Johansen, S., & Juselius, K. (1990). Maximum likelihood estimation and inference on cointegration with applications to the demand for money. *Oxford Bulletin of Economics and Statistics*. <https://doi.org/10.1111/j.1468-0084.1990.mp52002003.x>
- Mauro, L., & Carmeci, G. (2003). Long run growth and investment in education: Does unemployment matter? *Journal of Macroeconomics*, 25(1), 123–137. [https://doi.org/10.1016/S0164-0704\(03\)00010-7](https://doi.org/10.1016/S0164-0704(03)00010-7)
- Moosa, I. (2008). Economic growth and unemployment in Arab countries: Is Okun's law valid? *Journal of Development and Economics Policies*, 10(2), 20–32.
- Narayan, P. K. (2017). Reformulating critical values for the bounds F- statistics approach to cointegration: An application to the tourism demand model for Fiji. <https://doi.org/10.4225/03/5938abda7b4ab>
- National Bureau of Statistics. (2015). *Statistical Pocketbook 2015*. United States.
- Neumark, D., & Wascher, W. (2004). Minimum wages, labor market institutions, and youth employment: A cross-national analysis. *Industrial and Labor Relations Review*, 57(2), 223–248.

<https://doi.org/10.2307/4126618>

- Noor, Z. M., Nor, N. M., & Ghani, J. A. (2007). The relationship between output and unemployment in Malaysia: Does Okun's Law exist? *International Journal of Economics and Management*, 1(3), 337–344.
- Pesaran, M. H., & Shin, Y. (1998). An autoregressive distributed-lag modelling approach to cointegration analysis. *Econometric Society Monographs*, 31, 371–413.
- Pesaran, M. Hashem, Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, 16(3), 289–326.
<https://doi.org/10.1002/jae.616>
- Phillips, P. C. B., & Perron, P. (1988). Testing for a unit root in time series regression. *Biometrika*, 75(2), 335–346. <https://doi.org/10.2307/2336182>
- Quintini, G., & Manfredi, T. (2009). *Going separate ways? School-to-work transitions in the United States and Europe* (OECD Social, Employment and Migration Working Papers No. 90). Paris.
<https://doi.org/10.1787/221717700447>
- Ryan, P. (2001). The school-to-work transition: A cross-national perspective. *Journal of Economic Literature*, 39(1), 34–92.
- Saboori, B., & Soleymani, A. (2011). CO₂ emissions, economic growth and energy consumption in Iran: A co-integration approach. *International Journal of Environmental Sciences*, 2(1), 44–53. <https://doi.org/10.6088/ijes.00202010005>
- Salih, A. (2013). *The determinants of intention to work in resorts in the Maldives*. The Hong Kong Polytechnic University.
- Sargan, J. D. (1974). Some discrete approximation to continuous time stochastic models. *Journal of the Royal Statistic Society*, 36, 74–90.
- Sarwar, M. N., Hussain, H., & Maqbool, M. B. (2020). Pass through effects of oil price on food and non-food prices in Pakistan: A nonlinear ARDL approach. *Resources Policy*, 69, 101876. <https://doi.org/10.1016/j.resourpol.2020.101876>
- Shahbaz, M. (2009). Nominal and real devaluations relation: An econometric evidence for Pakistan. *International Journal of Applied Econometrics and Quantitative Studies*, 9(1), 85–108.
- Subramaniam, T., & Baharumshah, A. Z. (2011). Determinants of unemployment in the Philippines. *The Empirical Economics Letters*, 10(12), 31–51.
- Tercek, D. (2014). *Determinants of European and United States unemployment determinants of European and United States unemployment* (Senior Honors Project No. 33). Retrieved from <http://collected.jcu.edu/honorspapers/33>
- Ünal, U. (2015). The unemployment effects of fiscal policy in Netherlands. *The Journal of Faculty of Economics and Administrative Sciences*, 20(1), 143–153.
- World Bank. (2011). *World development indicators*. Washington, D. C.
- World Bank. (2014). Maldives: Country snapshot. Washington, D. C.: World Bank. Retrieved from <https://www.worldbank.org/en/country/maldives/overview>
- Zyra, J. (2013). Econometric models and data processing framework for monitoring of youth labor market in Poland. *Information Systems in Management*, 2(4), 323–334.

Appendix

Figure 1. Impulse Response Function

Response to Cholesky One S.D. Innovations ± 2 S.E.







