Investigating the Relationships between Corporate Taxation and Unemployment Rate: An Empirical Research for Bangladesh

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Abstract

This paper investigates how changes in the corporate income tax affect unemployment in Bangladesh. The impact of corporate taxation on unemployment has been analyzed in this paper by applying an Autoregressive Distributed Lag Model (ARDL) bound testing approach covering a period from 1991 to 2021. The results show that the corporate tax rate has no significant effect on unemployment levels both in the short run and the long run. In contrast, the economic growth of the country, together with the global economic growth, has a favorable impact on the employment situation of Bangladesh. But this relationship holds only in the short run.

Keywords: Corporate tax rate, Unemployment rate, ARDL model, GDP

1. Introduction

According to the Bangladesh Bureau of Statistics (BBS), the gross domestic product (GDP) of Bangladesh grew by 6.83% on average over the last five years. This was much higher than the average growth of 6.04% between 2000 and 2016[1]. According to a research conducted by the Asian Development Bank (ADB) and the International Labour Organization (ILO) in 2016, a GDP growth of 6.5% is adequate for accommodating 1.81 million job market entrants annually in the country. But in reality, a faster average GDP growth rate was unable to keep the unemployment rate stable in Bangladesh[2]. In 2000, the unemployment rate was 4.3% and had not exceeded 4.5% in the last few decades. But in November 2022 Bangladesh's unemployment rate hit an all-time high of 6.91% [3]. According to experts and economists, the Covid-19 lockdown caused a sizable number of people, particularly those working in the non-formal sector, to lose their jobs. The situation has been worsened by the war between Ukraine and Russia[2].

Against this backdrop, employment creation and economic development have always been the priorities of the Government of Bangladesh. One of many policy options for reducing unemployment is by directly influencing businesses through the reduction in the corporate tax rate. But such a policy change could appear ill-advised when the government is saddled with budget deficits. Investing in human capital, infrastructure, and the provision of services for individuals and businesses through the collection of taxes and fees has a multiplier influence on the economy. Levying high taxes, on the other hand, has several detrimental consequences on the economy [4]. Due to this two-way effect, it is vital to look into the impact of company tax rates on employment growth at the national level.

Despite being vital for policy decisions, the impact of corporate tax on unemployment is scarcely studied. To the best of the authors' knowledge, only a small number of empirical studies have been conducted with the primary objective of examining the linkage between corporation taxes and unemployment. Most other research on the topic only indirectly examines the impact of changes in corporate tax on unemployment as a by-product of foreign direct investment (FDI). But these studies do not provide any conclusive results. In the context of Bangladesh, studies analyzing the direct linkage between GDP

growth and corporate tax are very rare. Hence, this paper aims to investigate how the unemployment rate is impacted by the changes in the corporate income tax rate in Bangladesh.

The study will begin with a thorough literature review of the works that directly and indirectly look into the issue at hand. Following this, the variables and the methodological issues will be described. Then the results of the regressions will be presented together with analysis. Lastly, certain limitations and potential policy-making implications will be discussed in the conclusions section.

2 Literature Review
2.1 Theoretical Background

The effect of corporation taxation on unemployment is unclear theoretically. Corporate taxation has both a promotion and a suppression effect on employment. On the one hand, the promotion effect implies that a low corporate income tax rate can boost a firm's profits and encourage investment, hence increasing labor demand[5]. On the other hand, according to the suppression effect, higher corporate taxes may lead to a lower return on capital, which may lead to the substitution of labor for capital, thus decreasing unemployment[6]. Another possibility for the positive linkage between corporation tax and the unemployment rate is that the government might undertake more labor-intensive activities than businesses with the additional revenues raised by increased corporate taxes. The relative impacts of the promotion effect and suppression effect are often influenced by the ownership types of firms, tax law enforcement, and enterprise asset structure[7, 8].

The theoretical studies analyzing the effects of corporate taxation on the labor market under a distinct set of assumptions are very few. Wang (1993) examined the impact of corporate income taxes on labor and capital using a two-sector general equilibrium model[9]. This model assumes that firm wages are higher than the market clearing price, thus causing unemployment. Examining the incidence of a corporate income tax, he demonstrates that capital bears more of the burden of the corporate tax than labor, thus leading to an unambiguous decline in the unemployment rate due to higher corporate tax through the contraction of the corporate sector.

With a search and bargaining model, Smith (1994) examines the effects of wage and profit taxation and finds that a profit tax lowers unemployment in the short run when there are a fixed number of jobs. But in the long run, it raises unemployment[10]. To analyze the impact of both a tariff and a corporate tax, Parai (1999) proposes a model of the international duopoly. He finds that the latter could reduce domestic output and employment[11].

Halko (2005) constructs a model in which monopolistic trade unions have substantial power over wage determination[12]. According to this model, as corporate taxes rise, the bargaining power of trade unions is somewhat reduced, leading to lower wages and lower unemployment.

While allowing for endogenous adjustment of working hours, Kilponen and Sinko (2005) explore the influence of centralized wage setting on the association among wages, taxation and employment. They find that a centralized union's optimal response to a rising profit tax is to set wages lower, which boosts employment when the increased profit tax is used to deliver public goods. In contrast, a profit tax's impact is neutral when wages are set in a decentralized way[13].

Using an applied general equilibrium model calibrated for the European Union, Bettendorf et al. (2009) find that corporate taxes increase unemployment. The effects are more pronounced in countries that host a significant number of multinational companies. The effect is lower when the substitution elasticity between labor and capital is large[14].

Keuschnigg (2009) examines the effects of both corporate taxation and social insurance on unemployment by using a model of search unemployment and discrete location choice. He shows that a corporate tax raises unemployment by discouraging domestic investment[15].

Our brief overview of theoretical studies indicates that the impacts of corporate taxation on the labor market are uncertain. Therefore, their direction and magnitude need to be resolved empirically.

2.2 Previous Empirical Studies

The empirical studies investigating the direct impact of corporate tax rates on unemployment are very scant. Much of the studies focus on corporate tax's impact on capital and growth, although the estimated magnitude of the effect varies across studies.

A meta-analysis of 31 empirical studies in this area conducted by the Organization for Economic Cooperation and Development finds that a 1 percentage point increase in the host country's tax rate reduces FDI in that country by approximately 3.7 percent[16]. Another study investigating the effect of various taxes on economic growth in OECD countries by Johansson et al. in 2009 concludes that lower corporate tax rates for small firms do not stimulate growth[17].

Romer and Romer (2010) conducted an exhaustive analysis of federal corporate tax using national time-series data, demonstrating that federal tax increases have a substantial, rapid and significant negative effect on the gross domestic product (GDP). The study also finds that higher federal taxes increase the nation's unemployment rate[18].

Clausing (2011) argues that labor market outcomes are shaped by a variety of factors, which makes modeling the situation extremely difficult. Therefore, the impact of the corporate tax on unemployment is not clear. Nonetheless, he discovers some evidence that a higher corporate tax rate may lower wages[19].

Lora and Fajardo (2012) conducted a study in Latin America and found that if corporate taxes are increased, capital can shift from the formal sector to the informal sector of the economy. Since workers' productivity and wages are closely linked to capital levels, more skilled workers in the formal sector might be negatively affected, while less skilled workers in the informal sector could benefit. The presence of a minimum wage can aggravate the situation and increase the unemployment rate[20].

A study by Zellner and Ngoie (2015) using Marshall's macroeconomic model found that a 5% reduction in personal and corporate tax rates would increase US GDP by 3%. However, this study does not directly address the corporate tax rate for unemployment. Rather draw an indirect linkage between GDP and unemployment[21].

The number of studies directly examining the relationship between corporate tax rates and unemployment rates is small. Mofidi and Stone (1990) do a micro-level study to analyze the effects of taxes on personal income, industrial employment, and private revenues using data from fifty states from 1962 to 1982. The results indicate that a higher tax rate has a significant negative impact on the employment situation[22].

Cerda and Larrain (2010), using data from Chilean manufacturing firms from 1981 to 1996, find that higher corporate taxes reduce the demand for both capital and labor due to their complementarities. The impact on labor demand is significantly higher in large corporations than in small ones[23].

Feldmann (2011) investigates the implication of corporate tax rates on unemployment with a two-stage least-squares estimate. He uses a variety of corporate tax measures and focuses primarily on control variables to reduce biases due to their omission. Using panel data from 19 industrialized countries for the period 1979–2005 and presenting corporate tax variables with lagged differences over the previous four years, he concludes that a 100% increase in corporate tax will reduce the unemployment rate by 21%. He justifies the outcome by the fact that higher taxes will replace capital with labor, force unions to lower their wage requirements, and encourage multinationals to stay in the country, thereby increasing employment [24].

Shuai and Chmura (2013) demonstrate that reducing corporate tax rates has a positive and significant impact on employment growth[4]. Again, Siegloch (2014) measures the effects of business taxes on unemployment by using data on 11,441 municipalities in Germany. He finds that a one-euro rise in the tax burden of the employer results in a reduction of 20 euro cents in their wage bills over two years. He justifies his results by the fact that an increase in local business taxes induces firms to shift to other municipalities, thus lowering employment. But this effect might only be valid within the country due to the relative mobility of the labor force domestically[25].

Zirgulis and Sarapovas (2017) investigate the influence of corporation taxation on unemployment over 11 years using a dynamic panel of 41 nations. Applying the system general method of moments (GMM),

the study finds a significant positive association between the effective average corporate tax rate and unemployment levels[26].

Mayer (2018) investigates the influence of lowering the corporate tax rate on unemployment levels in a country, employing an empirical analysis of 15 European Union member countries. Using ordinary least square regression method the study finds that the higher corporate tax rate raises the unemployment rate[27].

In the context of Bangladesh, studies exploring the impact of corporate tax on the unemployment rate are very scarce. Only one study on this issue, to the best of the knowledge of the author, has been found. Taking population growth rate, inflation, market size and market openness as control variables and constructing an ARDL model for time series data from 1991 to 2018, Rahman et al. (2020) reveal that the corporate tax imposed on listed companies of Bangladesh has a significant negative impact on employment growth in both the long and short run[28].

Both at the theoretical and empirical levels, current researchers struggle to reach a uniform conclusion on the effect of the corporate income tax rate on employment, which necessitates further investigation. Moreover, country-specific study, in particular, in the context of Bangladesh, is very rare. Therefore, there is a need to explore the relationship further in the context of Bangladesh. This study varies from the previous study conducted by Rahman et al. in terms of the time frame and control variables. As a proxy for the corporate tax rate, the previous study used the rate for the listed companies[28]. But the number of listed companies in Bangladesh is very limited; therefore, we use the corporate tax rate for the non-listed companies other than banks, insurance, and financial institutions, merchant's banks, mobile phone operating companies and cigarette manufacturing companies, as this is more representative of the country's overall corporate tax rate. Apart from the control variables, we use GDP growth rate, inflation, interest rate, FDI as a percentage of GDP and the global GDP growth rate. Moreover, the issue of model misspecification and omitted variable biasness has not been addressed in the previous study mentioned above, which has been taken into account in this study.

3   Empirical Methodology
3.1 Data and Variable Description
This study is based on secondary data containing annual observations on time series data covering the period from 1991 to 2021. The time frame is selected based on the availability of data. The data are collected from the World Bank and Tax Foundation. The variables used in this study are described in Table 1.

Table 1: Description of the Variables

Variables (Symbols)	Symbols	Description	Source
Dependent Variable			
Unemployment Rate	UR	The unemployment rate is the percentage of the labor force who are actively seeking employment and available for work. As national values are not available for the relevant years, ILO estimates are used here.	World Development Indicator
Independent Variable			
Corporate Tax Rate	CTR	In Bangladesh, different corporate sectors have different tax rates. To keep things simple, this study only considers the tax rate imposed on non-listed companies other than banks, insurance, and financial institutions, merchant's banks, mobile phone operating companies and cigarette manufacturing companies.	Tax Foundation

Variables (Symbols)	Symbols	Description	Source
GDP growth rate	GDP	The annual percentage growth rate of GDP at market prices based on constant local currency.	World Development Indicator
Global GDP growth rate	GDP*	The annual percentage growth rate of the world's GDP at market prices based on constant 2015 prices, expressed in U.S. dollars.	World Development Indicator
Inflation	Inf	Inflation is measured as the change in the consumer price index.	World Development Indicator
Real Interest Rate	**Int**	The lending interest rate adjusted for inflation measured by the GDP deflator.	World Development Indicator
FDI	**FDI**	Foreign direct investment is the net inflows of investment by an investor in a foreign country expressed as a percentage of GDP.	World Development Indicator

3.2 Model Specification

The model used in the study is as follows:

$$UR = a_0 + a_1 CTR_t + a_2 GDP_t + a_3 GDP^*_t + a_4 Inf_t + a_5 Int_t + a_6 FDI_t + \varepsilon_t$$

(1)

Where ε denotes random error and a_1, a_2, a_3, a_4, a_5 and a_6 are the coefficients of the regression equation. Companies recruit more employees during economic booms to meet the increased demand from consumers for various goods and services[29]. Similarly, a boost in the global GDP increases the global demand for goods and services, leading to increased exports and demand for labor. So a negative sign of a_2 and a_3 is expected. On the other hand, as inflation accelerates, workers may supply labor in the short run because of higher wages which would result in a drop in the unemployment rate. However, over time, as workers become completely aware of the decline in their purchasing power caused by inflation, their willingness to work lessens, and the unemployment rate eventually increases to its natural level. So a negative association between UR and Inf is expected in the short run, whereas in the long run, a positive relationship is expected[30]. On the other hand, higher borrowing costs result in lower profits and lower investment hence requiring fewer workers[31]. Therefore a positive sign for a_5 is expected. Similarly with increased FDI a decline in the unemployment rate is expected ($a_6<0$)[32]. Our concern variable CTR may have both-way effects on unemployment rate depending upon the relative strength of suppression and promotion effect.

3.3 Test for multi-collinearity

When independent variables are highly correlated multi-collinearity occurs. It weakens the statistical significance of independent variables. In this research the Variance Influence Factor (VIF) is used to determine the existence of multi-collinearity. Since the VIF values for the variables of this study are within a range of 1.29 to 3.57 (Table 2), the model does not exhibit severe multi-collinearity.

Table 2: Variance Influence Factor (VIF)

Variables	CTR	GDP	GDP*	Inf	Int	FDI
VIF	3.57	2.78	1.77	1.29	1.29	2.56

3.4 Test for unit roots

This study uses both the Augmented Dickey-Fuller (ADF) test and the Phillips-Perron (PP) test to determine whether a unit root exists. Both ADF and PP unit root tests yield the same results. Both tests

suggest that variables UR, CTR, and FDI are stationary at the order of I(1) and other variables are stationary at the order of I(0) at 1% significance level. None of the variables is I(2).

Table 3: ADF and PP results for Checking the Stationarity of Variables

Variables	ADF test statistic		PP test statistics	
	Level	First Difference	Level	First Difference
UR	-2.991	-6.092***	-2.892	-6.349***
CTR	-0.936	-3.839***	-0.980	-3.839***
GDP	-3.786***	-	-5.451***	-
GDP*	-5.892***	-	-5.988***	-
Inf	-3.953***	-	-3.929***	-
Int	-4.997***	-	-4.986***	-
FDI	-0.964	-6.345***	-0.861	-6.421***

Note: Lags, drift and time trends were chosen based on their significance at 5% level. *, ** and *** indicate significance at 10%, 5% and 1% levels respectively.
Source: Author's calculations.

3.5 Co-integration test:

After the unit root test, the next step in the study is to explore the long-term relationship among the variables. The Autoregressive Distributed Lag Model (ARDL) Bounds testing method is used here as it is the most suitable method for finding the level relationships when the model includes both I(0) and I(1) variables. This method can also estimate the long-run and short-run parameters of the model simultaneously. The model used for the ARDL bounds test can be expressed as Equation (2).

$$\Delta UR_t = \alpha_0 + \sum_{i=1}^{k} \alpha_i \Delta UR_{t-i} + \sum_{i=0}^{k} \beta_i \Delta CTR_{t-i} + \sum_{i=0}^{k} \gamma_i \Delta GDP_{t-i} + \sum_{i=0}^{k} \delta_i \Delta GDP^*_{t-i} + \sum_{i=0}^{k} \mu_i \Delta Int_{t-i}$$
$$+ \sum_{i=0}^{k} b_i \Delta Inf_{t-i} + \sum_{i=0}^{k} c_i \Delta FDI_{t-i} + a_1 CTR_{t-1} + a_2 GDP_{t-1} + a_3 GDP^*_{t-1} + a_4 Inf_{t-1} + a_5 Int_{t-1} + a_6 FDI_{t-1} + \varepsilon_t$$
(2)

where α_0 represents drift component, Δ shows the first difference, α_i, β_i, γ_i, δ_i, μ_i, b_i and c_i are the short-run coefficients, a_1-a_6 are the long-run coefficients, ε_t is the white noise, and k represent the number of lags for each one of the variables included in the model.

Before applying the ARDL bound test, it is crucial to find the appropriate lag length. Otherwise, the results may be biased and unsuitable for policy analysis. We use the Bayesian information criterion (BIC) to determine the appropriate lag length[33,34]. The model used in this paper for the bound test is an ARDL (1 0 2 1 0 0 1), i.e., the dependent variable (UR), the independent variables, GDP*, and FDI have one lag; CTR, Inf and Int have zero lag and GDP has two lags. There are two critical values in the cointegration test. If the measured F-statistic exceeds the upper bound critical value, the variables in the model are cointegrated. On the other hand, if the F-statistic is less than the lower bound critical value, the variables are not cointegrated. When the measured F-statistic (Wald-test) falls between the lower and upper bounds the findings are inconclusive[34]. Table 4 represents the computed value of the F statistic (0.716) which is less than the lower bound value of 3.15, 2.45 and 2.12 at 1%, 5% and 10% significance levels. It indicates the non-rejection of the null hypothesis of no long-run relationship among the variables. It indicates that variables have no long-run relationship.

Table 4: F-statistic for Testing the Existence of Long-Run Relationship

F statistics	Critical value at 1% level	Critical value at 5% level	Critical value at 10% level
0.716	3.15	2.45	2.12

Source: Author's calculations.

The estimated results for the short-run ARDL models are shown in Table 5. The model is significant having high explanatory power given $R^2 = 0.922$, indicating that the 92.2% variations in the

unemployment rate in Bangladesh can be explained by the chosen independent variables in the short run. The short-run coefficients are consistent with the expected signs.

Table 5: The Results of the Short-run ARDL model

Variable	Coefficient	Standard Error	t-Statistic	Probability
Short-run				
C	1.65	1.98	0.83	0.417
D(UR(-1))	0.797***	0.193	4.13	0.001
D(CTR)	-.0271	0.033	-0.83	0.417
D(GDP)	0.037	0.105	0.35	0.727
D(GDP(-1))	-0.209*	0.104	2.02	0.060
D(GDP(-2))	-0.236**	0.090	-2.61	0.018
D(GDP*)	-0.153**	0.064	-2.39	0.029
D(GDP*(-1))	-0.174**	0.062	2.81	0.012
D(Inf)	0.029	0.031	0.96	0.352
D(Int)	0.003	0.014	-0.23	0.819
D(FDI)	0.227	0.243	0.93	0.363
D(FDI(-1))	-0.432*	0.245	-1.76	0.096
R^2	0.922			
Adjusted R^2	0.871			

*, **,*** denote the significance of the coefficients at 10%, 5% and 1% levels respectively.

The short-run estimates of the ARDL Model show that the unemployment rate is significantly influenced by its recent past values, concurrent global GDP and its last year's value, and the value of GDP growth rate lagged by 2 years at 5% significance level. The impacts of all the significant variables except the past value of UR are negative, which is as per our expectation. The corporate tax rate, our concern variable, does not influence the unemployment rate.

In sum, we can say the variables of our model have no long-run relationships among themselves. Only in the short run, the previous unemployment rate, the country's GDP growth rate, and the global GDP growth rate have a significant impact on the unemployment situation. Corporate tax rate, inflation, or interest rate does not influence the unemployment situation of the country both in the short run and long run.

3.6 Robustness Tests

The diagnostic tests (Table 6) suggest that the model possesses a good fit, there is no violation of Gauss Markov assumption of 'no autocorrelation', heteroskedasticity, residual normality, or linearity.

In this study, the Shapiro–Wilk test has been used to test the normality of the data, as for small sample sizes (<50 samples) it is more appropriate than some other methods. As per the Shapiro-Wilk test, residuals are normally distributed. The probability for the Shapiro-Wilk test is 0.154; therefore, the null hypothesis of the residuals in the model being normally distributed cannot be rejected.

On the other hand, the probability value of the chi-square statistic of the Breusch–Pagan–Godfrey test is 0.274, which is greater than 0.05. Therefore the null hypothesis of constant variance cannot be rejected at a 5% level of significance, implying no presence of heteroscedasticity in the residuals. White test also suggests homoscedasticity in the errors. Breusch-Godfrey serial correlation LM test results also indicate that the model has no autocorrelation problem at the 5% significance level. Ramsey Reset test also suggests that the model is properly specified and there are no omitted variable biases.

Table 6: ARDL Diagnostic Test

Test Statistic	Result	Probability
Normality using the Shapiro-Wilk test (W-statistics)	0.947	0.154
Serial correlation LM using Breusch–Godfrey (χ^2) (lag 4)	7.096	0.131
Serial correlation LM using Breusch–Godfrey (χ^2) (lag 3)	7.041	0.071
Serial correlation LM using Breusch–Godfrey (χ^2) (lag 2)	3.069	0.216
Serial correlation LM using Breusch–Godfrey (χ^2) (lag 1)	0.033	0.856
Heteroscedasticity using Breusch–Pagan–Godfrey (χ^2)	1.20	0.274
Heteroscedasticity using White test (χ^2)	29	0.413
Linearity test (Ramsey's Reset test)	0.48	0.700

4   Conclusion, Recommendation and Limitation

This research paper tries to contribute to the existing literature by applying ARDL approaches to establish the link between a cut in corporate income taxes and the unemployment situation of Bangladesh both in the short run and long run using time series data from 1991 to 2021. Apart from the corporate tax rate, we use other five variables-GDP growth rate, inflation rate, interest rate, FDI inflow to the country, and the GDP growth rate of the world as explanatory variables of the unemployment rate of Bangladesh. The results show that the corporate tax rate has no long-run as well as short-run influence on the employment situation of the country, which is opposite to the findings of the study by Rahman et al. (2020)[28]. Only the country's GDP growth rate, and the global GDP growth have a significant positive influence on the employment situation of the country. But this influence exists only in the short run. Other variables have no significant impact on the unemployment rate either in the short run or in the long run. These results may provide some support for policymakers who are against reducing corporate tax rates in the country. Based on the findings of the study, it is suggested that for improving the employment situation of the country the Government needs to use instruments that can boost the country's economic growth. Other tools like controlling inflation, interest rate, and reducing corporate tax rates are not recommended for employment generation in the country.

Though the results of the study are robust, the study suffers from limitations in determining the corporate tax rate due to its multiplicity across the categories and status of the companies. The pervasive presence of tax exemption policy makes it difficult to estimate effective corporate tax rates. Due to this complexity, this study considers the tax rate imposed on non-listed companies other than banks, insurance, and financial institutions, merchant's banks, mobile phone operating companies and cigarette manufacturing companies. A comprehensive study using a composite or effective corporate tax rate is expected from future researchers. Moreover, the non-linear relationship, if any, can be explored between these two variables. Finally, looking at more specific variables, like the inclusion of labor unions, is also recommended. Since the country-specific study in this area is very scant, further studies are highly

encouraged.

Author's Biography

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