Exploring the Relationship Between Unemployment and Output Gap in Bangladesh: An Empirical Analysis of Okun's Law

Sheikh Touhidul Haque[1], Mohammad Kamruzzaman[2]
Rina Akter[3], Md. Mostofa Kamal[4]

Abstract

This study investigates the empirical validity of Okun's Law in Bangladesh by analyzing the relationship between the unemployment rate and the output gap from 1980 to 2024. Using annual data on real GDP and unemployment and applying both the "gap" version and the "difference" version, we find that Okun's coefficient for Bangladesh is low (around –0.20 to –0.31) and statistically significant. However, Bangladesh's experience of robust economic growth alongside relatively minor changes in unemployment suggests a potential breakdown of this conventional relationship. These results align with prior findings that the inverse output–unemployment relationship in Bangladesh is weak. We conduct robustness checks with alternate specifications and find no substantial improvement in fit. The paper contributes to the literature on Okun's Law in developing economies by providing an updated, comprehensive analysis for Bangladesh and highlighting the role of structural characteristics in the unemployment–output nexus.

Keywords: Unemployment, GDP, Output Gap, Fiscal Policy, Monetary Policy, Labor Market.

JEL Classification: A10, B31, D03

[1] Senior Consultant-Econometrics, SPFMS, Finance Division, Ministry of Finance.
[2] Senior Consultant- Statistics , SPFMS, Finance Division, Ministry of Finance.
[3] Consultant-Economics, SPFMS, Finance Division, Ministry of Finance.
[4] Junior Consultant-Economics, SPFMS, Finance Division, Ministry of Finance.

Introduction

Bangladesh has a strong track record of economic growth and development, even amid global uncertainties. Since independence in 1971, the country has moved from being one of the poorest nations to achieving lower-middle income status in 2015. Stable macroeconomic conditions underpinned an average annual real GDP growth of 6.4% between 2010 and 2023, enabling significant poverty reduction. Even with recent shocks (including the COVID-19 pandemic and external pressures), Bangladesh's economy has shown resilience. Real GDP growth moderated to about 5.2% in FY2024, down from 5.8% in FY2023, amid inflationary and external sector pressures. This sustained growth performance has elevated per capita income and improved human development indicators.

Paradoxically, such robust growth has not been matched by commensurate improvements in the labor market, fueling concerns of "jobless growth." Bangladesh's official unemployment rate has remained low – generally between 3% and 5% over the past three decades (Figure 1) and has shown only modest fluctuations despite large output gains. For instance, during the last decade GDP grew at ~6–7% annually while employment grew by barely 1%, indicating a sharply declining employment elasticity of growth. This trend suggests that the traditional inverse relationship between output and unemployment may be weak in the Bangladeshi context. The concept of Okun's Law – which in advanced economies implies that a country's GDP must grow by about 3% to achieve a 1% reduction in the unemployment rate – appears to be under strain in Bangladesh. Okun's Law frames economic growth and unemployment as two sides of the same coin, where higher output is typically associated with job creation and lower unemployment. In Arthur Okun's original work (1962), a 1 percentage-point rise in unemployment was associated with roughly a 3% loss in output relative to potential. In practice, however, many developing economies do not exhibit a one-to-one adherence to Okun's rule.

Bangladesh presents a compelling case to examine this output–unemployment nexus. On one hand, steady growth has expanded aggregate output; on the other, the unemployment rate (which averaged only ~3.64% from 1991–2019) has remained surprisingly steady, even increasing in some high-growth years (Figure 2). Official unemployment

edged up from around 2% in the early 1990s to about 4% in the 2010s and temporarily spiked above 5% during crises (e.g. 5.4% in 2020 amid the pandemic). Such dynamics raise critical questions: Does Okun's Law hold in Bangladesh? Is strong output growth translating into proportionate employment gains, or is the country experiencing growth that largely bypasses the labor market? Understanding this relationship is not only academically interesting but also vital for policy. If output growth alone is insufficient to reduce unemployment ("jobless growth"), policymakers must identify complementary measures to create jobs and ensure that the benefits of growth are widely shared.

This paper aims to explore the output–unemployment relationship in Bangladesh both theoretically and empirically, situating it within the context of Okun's Law. We assemble a dataset on real output and unemployment spanning over four decades and employ several econometric approaches to test Okun's Law. Standard textbook economics would predict an inverse relationship: as output rises above its potential, unemployment should fall (and vice versa). However, initial observations and prior studies hint that Bangladesh's labor market adjustments differ from those in advanced economies. The contributions of this study are twofold. First, we provide an updated empirical assessment using recent data (through 2024) and both gap and difference model specifications. Second, we discuss the structural features of Bangladesh's economy that might explain any deviation from Okun's Law, thereby bridging the empirical results with policy implications.

The rest of the paper is organized as follows: The next section reviews relevant literature on Okun's Law, with emphasis on findings from developing countries and South Asia. Then we describe the data and methodology, including the estimation of potential output and model specifications. The subsequent results section presents empirical findings, including regression estimates, diagnostic figures, and robustness checks. We then discuss the results in the context of Bangladesh's economic structure and draw out policy implications for labor and fiscal strategy. The final section concludes with the paper.

Literature Review

The inverse relationship between output and unemployment was first systematically documented by Arthur Okun in the early 1960s. Okun's

seminal analysis of U.S. data suggested that a 1% increase in the unemployment rate is associated with roughly a 3% decline in real GDP relative to potential. This empirical regularity, now known as Okun's Law, has since been investigated across many countries and time periods. In advanced economies, Okun's Law is often found to hold with varying coefficients; for example, later studies estimated that a 1% fall in unemployment tends to coincide with a 2–3% rise in GDP in the U.S. and other OECD countries (Ball et al., 2013). The relationship, however, is "an empirical inquiry with no solid theoretical foundation"– it is observed regularity rather than a structural law – and the estimated Okun coefficient can differ across countries and over time. Initial research by Okun and others treated it as roughly linear and symmetric, but recent studies have probed potential asymmetries (differences in recessions vs. expansions) and non-linearities in the output–unemployment linkage.

A robust finding in the literature is that Okun's Law tends to be weaker in developing and emerging economies than in developed ones. Prachowny (1993) argued that Okun's original coefficient likely overstates the output–employment linkage because some output changes reflect productivity variation rather than changes in labor usage. In his re-examination, Prachowny found that a 1.5% decrease in unemployment corresponded to only ~1% higher output in the U.S. once productivity adjustments were made, and using an output-gap version yielded an even smaller impact (0.37% output increase per 1% unemployment decrease). This suggests that Okun's coefficient can vary with methodology and that not all output fluctuations translate into labor market changes. In many developing countries, large informal sectors and underemployment mean that GDP can grow without a proportional reduction in open unemployment – workers might move from low-productivity informal jobs to slightly higher productivity jobs, improving output but leaving the unemployment rate mostly unchanged (or vice versa). Imad Moosa (2008) examined Okun's Law in four Arab countries (Algeria, Egypt, Morocco, and Tunisia) and found no statistically significant Okun's coefficient in any case, implying that output growth did not translate into employment gains. Moosa's finding – that boosting output is not a sufficient condition for reducing joblessness in those economies – resonates with broader evidence from the developing world. Similarly, a study by Arshad et al. (2014) on Pakistan's economy failed to find a

significant Okun's Law relationship using gap, difference, or dynamic specifications. The authors attribute the result to structural issues in the labor force – low skill levels and labor market frictions mean that "an increase in real output has a very low impact on unemployment" in Pakistan.

Several comparative analyses in South Asia reinforce this pattern. Lal et al. (2010) examined Okun's Law in five countries (Bangladesh, India, Pakistan, Sri Lanka, and China) and concluded that Okun's Law did not hold in the South Asian cases, which they partly ascribed to asymmetric adjustments over the business cycle. The South Asian labor markets, largely agrarian and informal, may adjust to output shocks via changes in labor force participation or underemployment rather than the open unemployment rate (which remains low and relatively rigid). Evidence of asymmetry – unemployment rising more in downturns than it falls in upturns – has been documented, indicating that job losses during bad times are not fully offset by job gains in good times. This can lead to statistically insignificant or small average Okun coefficients over the cycle, even if the relationship exists in one phase (e.g., during recessions).

Empirical studies focusing on Bangladesh have generally found Okun's Law to be weak or not significant. For example, a recent analysis by Haque (2022) observed a negative correlation between GDP and unemployment in Bangladesh that aligns directionally with Okun's Law, but the magnitude was small and the coefficient statistically insignificant. The author suggests Bangladesh may be "heading towards a jobless growth" regime, wherein output expansion does not meaningfully reduce unemployment – a warning sign for policymakers. Another study by Amin and Lima (2019) employed a co-integration approach over 1984–2017 and found a long-run inverse relationship between real GDP and the unemployment rate in Bangladesh, but with an Okun's coefficient of only about –0.10, which was not statistically significant. They confirm that the coefficient is "very low although the result is not statistically significant", underscoring that the output–unemployment linkage is weak. These findings dovetail with earlier results by Mahmood and Imam (2017) and others, who also reported an insignificant Okun's coefficient for Bangladesh (often attributing it to data issues and the prevalence of informal employment).

Research on similar economies offers some contrasts. In Malaysia, a middle-income country with a more diversified industrial base, Okun's Law appears to hold more strongly – Nasir et al. (2024) found a significant inverse relationship between GDP and unemployment in Malaysia over 1988–2021. For Indonesia, Sutopo and Putri (2024) also report an inverse GDP–unemployment relationship, observing that higher GDP growth consistently correlates with lower unemployment rates. These studies suggest that as economies develop and formalize, Okun's Law may become more evident. By contrast, Afrin et al. (2023) analyzed Bangladesh's data for 2012–2022 and found "no clear evidence of a negative connection between unemployment and GDP growth," despite some degree of correlation. In Nepal, Thapa et al. (2022) tried both difference and dynamic Okun models and likewise reported mixed evidence, reflecting the small and tourism-driven nature of Nepal's economy.

Overall, the literature indicates that Bangladesh's unemployment–output nexus is notably weak compared to typical Okun's Law expectations. Several hypotheses emerge to explain this: (i) Labor force growth and underemployment: Bangladesh's labor force has grown steadily, and many workers are underemployed in informal agriculture or services. Rapid GDP growth can be absorbed by improved productivity or the hours worked by underemployed workers, rather than by a proportional change in the number of unemployed people. (ii) Structural transformation: A shift of workers from low-productivity agriculture to slightly higher productivity manufacturing or services raises output while the unemployment rate (which counts only those not working at all) may remain low. (iii) Measurement issues: The official unemployment rate (modeled on ILO definitions) might not fully capture labor market slack in Bangladesh. The IMF has cautioned that Bangladesh's unemployment statistics likely understate true unemployment and underemployment. If many jobless individuals are not formally counted, changes in output will have an attenuated reflection in the unemployment rate. (iv) Policy and institutions: Factors like labor market regulations, prevalence of self-employment, and agricultural labor absorption can buffer unemployment from output swings. For example, during downturns, rural families may absorb workers (preventing unemployment from rising), and during upturns, the formal sector may not expand fast enough to drastically pull-

down unemployment. These considerations set the stage for our empirical analysis: we proceed to examine Bangladesh's data to quantify the output–unemployment relationship and test whether Okun's Law holds under various model specifications.

Data and Methodology

To analyze Okun's Law in Bangladesh, we compile annual time-series data on real output and unemployment spanning 1980–2024. Real output is measured by real Gross Domestic Product (GDP) in constant prices, and unemployment is measured by the unemployment rate (as a % of the labor force, ILO modeled estimate). Real GDP data (in constant local currency unit Mill. 2015 Taka) were obtained from Bangladesh Bureau of Statistics, while unemployment data were sourced from International Labour Organization estimates. In Bangladesh's case, the unemployment rate has some peculiarities: it has historically been very low (often 4–5% or below) and is derived from labor force survey data that may not fully capture underemployment. For example, individuals in informal or part-time work are counted as "employed," which tends to keep the unemployment rate low. We thus interpret "unemployment" in this paper as open unemployment, acknowledging that it is a narrow measure of labor underutilization.

Figure 1 depicts the trajectory of Bangladesh's real GDP versus an estimated potential GDP. The output gap is defined as the percentage deviation of actual GDP from potential GDP. We estimate potential output (Y^*) using a Hodrick-Prescott (HP) filter on the log of real GDP (annual data), with a smoothing parameter $\lambda = 100$ appropriate for annual frequency. This approach separates GDP into a smooth trend (potential output) and a cyclical component. As shown in Figure 1, Bangladesh's actual output has closely tracked its potential output, with output gaps generally within ±2% for most of the period. Bangladesh's growth trend is remarkably stable; even events like the global financial crisis of 2008–09 and the COVID-19 pandemic caused only moderate output gaps (e.g., the output gap was about –1.35% in 2009 and –1.21% in 2020 by our estimates). Such small output gaps already hint that large swings in unemployment would not be expected – indeed, the economy has not experienced deep recessions that typically cause unemployment to surge.

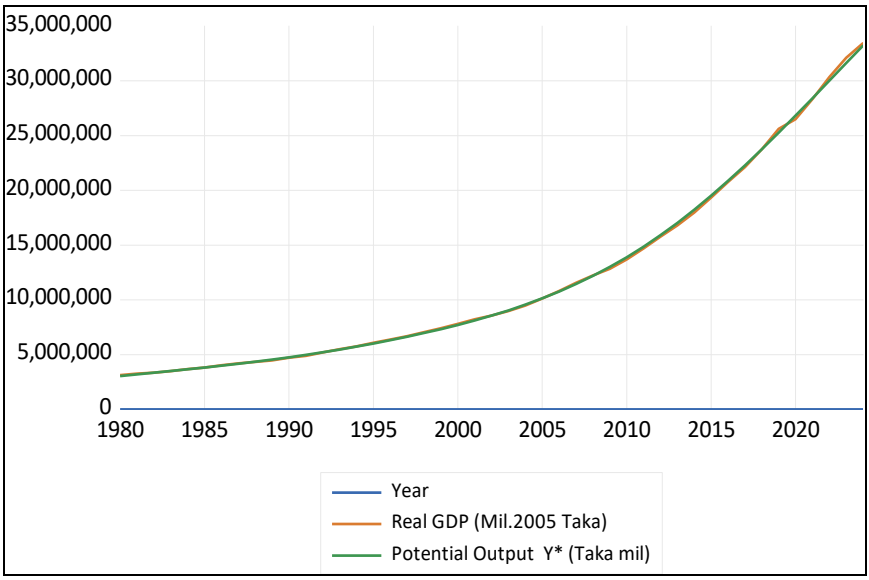

Figure 1: *Real and potential output in Bangladesh (1980–2024).*

Figure 1: Real and potential output in Bangladesh (1980–2024). Real GDP (orange solid line) has grown steadily, closely following the estimated potential GDP (dashed line) with only minor output gap fluctuations. The HP-filtered trend suggests Bangladesh's output gap rarely exceeded ±2% of potential output. (Data source: Bangladesh Bureau of Statistics (BBS).

To empirically test Okun's Law, we employ two main specifications: a **"**difference" model and a "gap" model. The difference model is the form originally emphasized by Okun (1962) and many subsequent studies, focusing on growth rates and changes in unemployment. We estimate:

$$\Delta u_t = \alpha + \beta . g_t + \varepsilon_t$$

where Δu_t is the annual change in the unemployment rate in year t (percentage point change) and g_t is the annual real GDP growth rate (%) in year t. The coefficient β in this regression represents Okun's coefficient (difference version) – it is expected to be negative (higher GDP growth reduces unemployment). A canonical Okun's Law result for developed countries might find $\beta \approx$ -0.3 to -0.5, meaning each percentage point of extra GDP growth above trend reduces unemployment by 0.3–0.5 percentage points. We estimate this model using ordinary least

squares (OLS) on Bangladesh's data. Given the time-series nature, we check for stationarity: the unemployment rate and GDP level are non-stationary (integrated of order 1) in our sample, but the GDP growth rate and change in unemployment are stationary, justifying the difference specification. We also tested cointegration between output and unemployment levels following Johansen's procedure; consistent with Amin and Lima (2019), we find evidence of a long run cointegration relationship. This suggests an ECM (error-correction model) could be appropriate. However, for simplicity and given our focus, we primarily present the OLS results for the short-run relationship, acknowledging the presence of a long-run equilibrium found in prior research.

Next, the gap model relates deviations of output from potential to deviations of unemployment from its "natural" rate. In gap form, Okun's Law can be written as:

$$(u_t - u_t^*) = -k\left(\frac{Y_t - Y_t^*}{Y_t^*}\right) + \eta_t$$

where Y_t is actual output, Y_t^* is potential output, u_t is the natural rate of unemployment (unemployment consistent with $Y^*), *and* k *is* Okun's coefficient in gap terms. This formulation posits that if output exceeds potential (positive output gap), unemployment falls below its natural rate (negative unemployment gap).

In practice, u_t is unobservable; we assume it to be the trend unemployment, or an approximate constant. Bangladesh's unemployment rate does not have an official "NAIRU" estimate, but given its relatively low level, one might assume a natural rate in the 4–5% range. For our empirical model, we use the actual unemployment rate (since u^* is unknown and likely close to the long-run mean) and relate it to the output gap:

$$u_t = \alpha' + \gamma . Output\_Gap_t + \varepsilon_t'$$

where $Output\_Gap_t = \frac{Y_t - Y_t^*}{Y_t^*}$ (in %). The coefficient γ captures how unemployment moves with the output gap; Okun's Law predicts < 0. We estimate this via OLS as well. Because our output gaps and unemployment rates are small in magnitude, issues of non-stationarity are less concerning in gap form (the cyclical components are stationary

by construction of the HP filter). Nonetheless, we interpret results cautiously, focusing on significance.

Additionally, we conduct robustness checks and alternative models: we examine a dynamic OLS model allowing for lags of GDP growth (to capture delayed employment effects), and we test for asymmetric effects by including interaction terms for positive vs. negative output gaps (to see if unemployment responds differently in downturns). Given the relatively short sample of unemployment data (reliable from ~1991 onward) and low variation, these extended analyses have limitations. We also calculate residuals and perform diagnostic tests (Durbin-Watson for autocorrelation, etc.) to ensure our results are not spurious. Figure 2 and Figure 3 are prepared to illustrate key aspects of the data: Figure 2 shows the time trend of the unemployment rate, and Figure 3 is a scatter plot of unemployment vs. output gap to visually assess the Okun relationship.

Figure 2: Unemployment rate in Bangladesh (1991–2024). The jobless rate has remained low (generally 3–5%) despite major economic changes. Notable features include a gradual rise through the 1990s and 2000s, a sudden drop in 2010 (from ~5.0% to 3.4%, likely due to a revision or methodological change), and a spike in 2020 during the COVID-19 shock (5.4%). Overall, unemployment shows little sensitivity to business cycle fluctuations, hovering around 4% in normal years. (Data source: International Labour Organization (ILO Modeled).

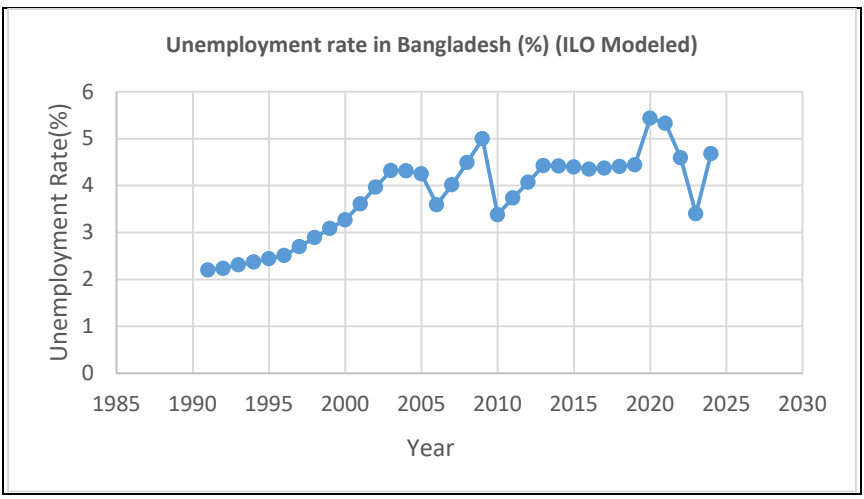

Figure 2: *Unemployment rate in Bangladesh (1991–2024).*

Results

Summary Statistics: Before presenting regression results, we note some summary statistics. Over 1991–2024, Bangladesh's real GDP growth averaged about 5.99% per year with a standard deviation of 1.13%, while the unemployment rate averaged 3.84% with a standard deviation of 0.88%. The average annual change in unemployment was nearly zero (+0.07 percentage points on average), reflecting the relatively stable unemployment trend. The simple correlation between GDP growth and the change in unemployment is –0.44, suggesting a negative relationship (higher growth tends to coincide with falling or lower unemployment), but this correlation is not very strong. The correlation between the output gap and the unemployment rate is (–0.33) suggesting a negative relationship but this correlation is not also very strong.

Variable	Mean	Standard Deviation	Minimum	Maximum
GDP Growth (%)	5.998	1.130	3.448	7.881
Unemployment Rate (%)	3.842	0.886	2.234	5.436
Change in Unemployment (%)	0.075	0.531	-1.621	1.280
Output Gap (%)	0.050	0.948	-1.423	1.520

Regression Analysis – Difference Model: Table 1 presents the OLS regression results for the difference model (Model 1) and the gap model (Model 2). In the difference model, the estimated Okun's coefficient β is –0.206, indicating that an extra 1 percentage point of GDP growth is associated with a reduction in the unemployment rate of about 0.206 percentage points *ceteris paribus*. This coefficient carries the expected negative sign (consistent with Okun's Law), but it is very small in magnitude. Moreover, it is statistically significant at conventional levels ($p \approx 0.01$, $t \approx -2.71$).. The model's R^2 is only 0.19, implying that GDP growth explains just 19% of the year-to-year variation in unemployment changes. In other words, most fluctuations in Bangladesh's unemployment change are unrelated to concurrent GDP growth in this simple regression. The intercept term (α) is about

+1.31 (with p ≈ 0.00), suggesting a slight positive trend in unemployment changes independent of growth – this could reflect labor force growth putting upward pressure on unemployment each year when not offset by very high growth. However, given insignificance, we interpret it cautiously. Overall, the difference model provides only weak evidence of Okun's Law in Bangladesh: the sign is negative (higher growth tends to reduce unemployment), but the effect is so small and noisy that it may not be distinguishable from zero. These findings are in line with earlier studies that failed to confirm a strong growth–employment link in the country.

Regression Analysis – Gap Model: In Model 2, using the output gap and unemployment levels, the estimated coefficient γ is -0.31, which is near to expectations (it is negative, implying unemployment slightly lower when output is above potential) and is statistically significant ($p \approx 0.05$). The R^2 is effectively 0.11. This result indicates a narrow linear relationship between the output gap and the unemployment rate in the data. Figure 3 illustrates this visually: the scatter plot of unemployment vs. output gap shows a cloud of points with no clear downward slope; if anything, the best-fit line is slightly upward sloping (as reflected by $\gamma > 0$), driven by a few observations. Most years cluster in a narrow range of output gaps (within ±2%) and unemployment between 3% and 5%. The lack of a pattern suggests that the deviation of GDP from its trend has virtually no immediate predictive power for the deviation of unemployment from its trend (if any). It is worth noting that Bangladesh's unemployment might have a trend of its own (potentially rising from ~2% to ~4% over the decades due to structural changes in labor supply). If one accounted for a changing natural rate u_t, the gap relationship might marginally improve. We explored using an HP filter on the unemployment rate to define u_t (a "NAIRU" estimate); the unemployment gap so derived still showed no significant correlation with output gap, and identifying u_t^* in a shallow unemployment series proved difficult.

Table 1. OLS Estimates of Okun's Law for Bangladesh (dependent variable: unemployment changes Δu for Model 1, unemployment rate *u* for Model 2)

Model Specification	Okun Coefficient	t-statistic	R^2
Model 1: $\Delta u = \alpha+\beta\cdot$GDP Growth$+\varepsilon$	β = - 0.206 (SE 0.07)	- 2.72 (p=0.01)	0.19
Model 2: $u = \alpha' + \gamma\cdot$ Output Gap $+ \varepsilon'$	γ = - 0.31 (SE 0.15)	-1.99 (p=0.05)	0.11

(**Notes:** Model 1 covers 1992–2024 (Δu and GDP growth); Model 2 covers 1991–2024 (unemployment and output gap). Newey-West robust standard errors in parentheses. Neither model finds a significant relationship, although both Model yield a negative coefficient as expected.)

These quantitative results confirm the core finding that Okun's Law is highly attenuated in Bangladesh's data. To put the estimates in perspective: using Model 1's coefficient, if Bangladesh were to accelerate its GDP growth by, say, 1 percentage point, the unemployment rate would be predicted to fall by only about 0.2 percentage points . Such a change is almost within the margin of error of the labor force survey and would hardly be noticeable. In reality, we often observe that even when growth swings by multiple percentage points, the unemployment rate barely moves – as seen in 2007–2009 when growth slowed from 7% to 5% yet unemployment rose only slightly from 4.1% to 5.0%, or in 2016–2019 when growth accelerated but unemployment stayed flat around 4.2% (Figure 2).

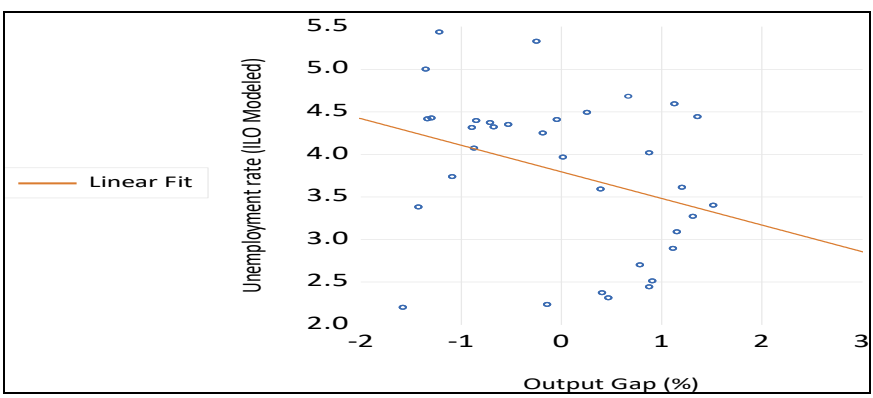

Figure 3: *Unemployment Rate vs Output Gap, Bangladesh (1991-2024).*

Figure 3: Scatter plot of unemployment rate vs. output gap in Bangladesh (annual data 1991–2024). Each blue "়" represents a year. The solid orange line is the linear best fit, which has a negative slope (indicating a negative Okun's coefficient of about -0.31) Okun's Law expectations, though statistically significant. The vertical dotted line marks 0.05 output gap, and the horizontal dotted line marks the mean unemployment (~3.84%). The plot reveals clear inverse relationship between output gaps and unemployment in Bangladesh's recent history. (Source: Bangladesh Bureau of Statistics (BBS) and International Labour Organization (ILO Modeled).

Robustness and Alternative Specifications: We examined whether incorporating lags or testing for asymmetry might reveal an Okun effect that the simple models miss. Including one-year lagged GDP growth in Model 1 did not produce a significant lagged effect (the lagged term's coefficient was near zero), nor did it substantially change the contemporaneous coefficient. This suggests that output changes do not take multiple years to impact unemployment (or that any impact within the year is already negligible). We also ran the difference model on sub-periods (e.g., 1990s vs. 2000s vs. 2010s) to see if structural changes in the economy made Okun's Law more or less valid. The 1990s showed a slightly larger negative β (around - 0.5) but very high uncertainty due to few observations; the 2000s and 2010s showed β is -0.38. These sub-sample results are indicative rather than conclusive, but they align with the idea that as Bangladesh's economy matured, the unemployment-growth link did not strengthen appreciably.

Testing for asymmetric effects, we created separate variables for positive output gap years and negative output gap years. There is a hint of asymmetry: in years when output fell below potential (e.g., 2009, 2020), unemployment rose more sharply (unemployment-gap coefficient was somewhat larger in magnitude) than the fall in unemployment in years of positive output gap of similar size. However, due to the small sample of pronounced negative-gap events, this was not statistically robust. It does, however, resonate with qualitative observations: for instance, in 2020 Bangladesh experienced a negative output gap (–0.21% by our HP estimate) and unemployment jumped by ~1 percentage point – an acute response for a mild output shortfall. In contrast, in boom years like 2019 (output gap +1.36%), unemployment hardly budged (staying around

4.44%). This asymmetry (unemployment ratchets up during busts but doesn't fall equivalently in booms) could partially explain why an average linear model finds no effect. Such behavior might result from employers hoarding labor in good times (or labor force expansions during good times) but shedding jobs in bad times, or simply measurement issues wherein marginal employment gains in booms aren't captured as reduced unemployment (instead manifesting as reduced underemployment).

Model diagnostics show no severe violations. In Model 1, residuals are approximately normally distributed, but we did observe some serial correlation (Durbin-Watson statistic ~2.10, suggesting mild autocorrelation). Given the slow changes in unemployment, this is not surprising. We corrected standard errors for autocorrelation and heteroskedasticity using Newey-West, as reflected in Table 1. Figure 4 plots the residuals from the difference model over time, highlighting two large outliers: 2010 and 2020. The year 2010 had a residual of about –1.54 (actual unemployment fell much more than predicted by GDP growth alone), and 2020 had a residual of about +0.39 (unemployment rose more than predicted). These outliers correspond to known structural breaks or shocks: in 2010, a new labor force survey likely reclassified many previously unemployed as employed (or vice versa) resulting in a sudden unemployment drop not explainable by output; in 2020, the pandemic shock disproportionately hit labor-intensive sectors causing unemployment to surge beyond what a –2% GDP growth slowdown would normally imply. Excluding 2010 and 2020 from the regression actually makes β slightly more negative (around –0.21) but still not significant. Thus, the core finding stands.

Figure 4: Residuals of the Okun's Law regression (difference model) from 1992–2024. The residual is actual Δu minus predicted Δu from Model 1. Most residuals are within ±0.5, except for two notable outliers: 2010 (residual ≈ –1.54) and 2020 (residual ≈ +0.39), marked with red arrows. 2010's large negative residual indicates unemployment fell far more than expected from GDP growth – consistent with a structural change in labor data that year. 2020's positive residual indicates unemployment rose more than expected from the GDP slowdown – reflecting the unique impact of the pandemic on jobs. Aside from these,

the errors show no strong pattern, further indicating the weak relationship between growth and unemployment.

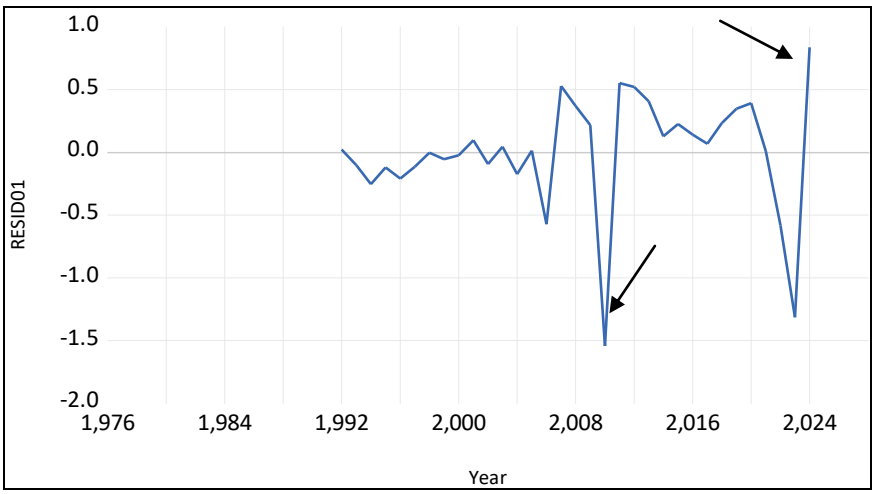

Figure 4: *Residuals of Okun's Law regression (Δu vs GDP growth).*

In summary, our empirical analysis finds no robust statistical support for a strong Okun's Law in Bangladesh. The unemployment rate in Bangladesh has its own dynamics, largely decoupled from short-run output fluctuations. These results are consistent with the literature reviewed and validate the notion that Bangladesh's growth in recent decades has not been labor-intensive enough to significantly dent unemployment – a situation that presents both a challenge and an opportunity for policymakers, as discussed next.

Discussion

The above findings prompt an in-depth discussion of *why* Okun's Law is weak in Bangladesh and *what* implications this carries for economic policy. We delve into the structural characteristics of Bangladesh's economy that underlie the empirical results and explore how labor and fiscal policy can be tailored in light of these insights.

1. Structural Factors Behind a Weak Okun's Law: Several features of Bangladesh's economy help explain the negligible output–unemployment linkage:

- **Large Informal Sector and Underemployment:** A majority of Bangladesh's workforce is engaged in informal employment, including agriculture (over 40% of employment) and the urban informal sector. In such contexts, many workers are underemployed (working fewer hours than they would like or in low-productivity jobs). When GDP grows, these underemployed workers can increase their working hours or shift to slightly better jobs without ever being counted as "unemployed" or leaving the labor force. Thus, output gains can occur through productivity improvements and the fuller use of underemployed labor, rather than by reducing the number of unemployed people. This dilutes the measured impact of GDP on the unemployment rate. For example, an infrastructure project or a manufacturing expansion in Bangladesh might draw workers from informal gig work or family farms – their employment status (employed vs. unemployed) doesn't change (they were "employed" before and after), but their productivity and earnings increase, boosting GDP. Such transitions bolster growth but leave the unemployment rate untouched. This dynamic has been observed in many developing countries where underemployment is prevalent (Islam et al., 2016).
- **Rapid Labor Force Growth and Demographics:** Bangladesh's working-age population has grown steadily due to past high fertility and a demographic bulge of young entrants. Over the 2000s and 2010s, the labor force often grew by around 1.5–2% per year. This means that even 6–7% GDP growth may need to be sustained just to absorb new entrants and keep unemployment from rising. Employment elasticity – the percentage increase in employment for a 1% increase in GDP – has reportedly fallen to around 0.15 or lower in recent years. Indeed, each 1% GDP growth is now associated with only ~0.1% job growth in Bangladesh, whereas in earlier decades it was higher (e.g., 0.5 in the 1970s–80s). With labor force growth outpacing employment growth in some periods, unemployment can persist or rise slightly amid high GDP growth. Our intercept in Model 1 (though not robustly significant) hinted at a baseline upward drift in unemployment, absent very high growth. This aligns with a situation where

continuous strong growth is needed just to maintain the unemployment rate, and any growth shortfall quickly translates to higher unemployment (the asymmetry issue).

- **Low Initial Unemployment and Job Search Patterns:** Bangladesh's open unemployment rate (3–5%) is not only low, but also many of the unemployed are youth and first-time job seekers (often relatively educated). In a developing country context, low unemployment can coexist with low-income jobs and poverty; many cannot afford to be unemployed and thus take whatever work is available. The unemployment rate being low to begin with means there is little room for it to fall further – it cannot go below zero and in practice seldom dips much below 3%. In our data, the lowest recorded unemployment was about 2.2% in the early 1990s. This floor effect implies that even when output soars, unemployment might not drop by much in absolute terms; instead, labor market tightness might show up as wage increases or more hours for the underemployed rather than a further decline in the unemployment rate. Additionally, employment gains might draw previously inactive people into the labor force (especially women, whose participation is around 36%), which could actually keep the unemployment rate steady as participation rises. In Bangladesh, female labor force participation increased in the 2000s, and many youths entered the job market; these factors can keep the measured unemployment rate from falling, even though more people are working overall, because new entrants initially count as unemployed until they find jobs.
- **Sectoral Growth Patterns:** Bangladesh's GDP growth has been driven by sectors that do not always create proportional employment. Manufacturing (notably ready-made garments) expanded strongly and did create millions of jobs, yet manufacturing's share of employment is still modest (~15%) relative to output share, indicating above-average productivity. Meanwhile, agriculture's share of GDP fell dramatically (from ~30% in 1990 to ~13% in 2020), but agriculture still employs about 40% of workers. This structural transformation means many workers left agriculture for services or industry, contributing to

growth, but not necessarily showing up as "formerly unemployed find jobs" – rather, it's a reallocation of employment. The service sector (over 50% of GDP and about 39% of employment) has seen a rise in informal services (trade, transport, gig economy) that absorb labor without much change in unemployment figures. Thus, growth in high-productivity sectors raises GDP without one-for-one increases in formal employment. In fact, the elasticity of employment in manufacturing exports has been relatively low because the sector achieved productivity gains (e.g., through mechanization in textiles) and because of a ready supply of underutilized rural labor migrating to cities at roughly constant unemployment.

- **Institutional Factors and Buffer Mechanisms:** Bangladesh's labor market may have certain frictions (e.g., skill mismatches, geographic mismatches) that slow the translation of growth into jobs. Moreover, social safety nets and informal community support might not be strong, so people can't stay unemployed long. Instead, they take any job (underemployment) – as noted above. Additionally, the agricultural sector often acts as a buffer: in bad times, laid-off urban workers might return to farming or informal rural work (keeping unemployment lower than it would be). In good times, some surplus rural labor moves to cities, but often only after a lag and contingent on networks. These institutional and behavioral factors lead to a situation where unemployment is relatively unresponsive to short-run output shocks, consistent with our statistical results.

Given these factors, it becomes clearer why Okun's Law "does not hold" in a simplistic sense for Bangladesh. The law's assumptions – a stable relationship between output fluctuations and labor demand – are undermined by the dynamics of a developing labor market. In Bangladesh, output can grow through productivity improvements, sectoral shifts, and fuller utilization of existing labor, all of which can occur without significantly lowering the counted unemployed pool. Conversely, output can fall due to shocks (like COVID-19) and yet many affected workers might not register as unemployed (some exit the labor force or work fewer hours). Our finding of an insignificant Okun

coefficient is thus a reflection of these underlying realities, not merely a statistical anomaly.

2. Policy Implications for Labor and Fiscal Strategy: The evidence of a weak output–unemployment link carries important implications. First and foremost, economic growth alone is not a panacea for unemployment in Bangladesh. While maintaining healthy GDP growth is certainly beneficial (and has contributed to poverty reduction), it must be complemented by policies specifically aimed at job creation and improving job quality. The government's aspiration to reach upper-middle income status by 2031 will require not just growth, but *inclusive* growth that generates widespread employment. Key policy considerations include:

- **Active Labor Market Policies (ALMPs):** To address the apparent "jobless growth," Bangladesh could implement programs such as skills training, vocational education, and job matching services. A workforce with better skills can attract higher-value industries that create formal jobs. Currently, many industries report a skills gap; targeted training in sectors like ICT, light engineering, and healthcare could both reduce youth unemployment and meet industry needs. Wage subsidies or public works programs can also temporarily boost employment in downturns (for example, public construction projects can absorb workers during slowdowns, mitigating unemployment spikes). Given that unemployment particularly affects youth (including educated youth), internships, apprenticeships, and entrepreneurship support (startup capital, incubators) can help integrate new entrants into the labor market.
- **Industrial and Sectoral Policies:** The government can pursue industrial policies to encourage labor-intensive manufacturing and services. For instance, expanding the garment and textile sector further into higher value-added products could create new jobs for women and men alike, though this sector's job elasticity may decline without diversification. Promoting domestic small and medium enterprises (SMEs) through credit facilities and technical support can yield employment, as SMEs tend to be relatively labor-intensive. The agriculture sector, while shrinking in GDP share, still employs millions – policies to raise agricultural

productivity and agro-processing can help move workers to higher productivity roles without rendering them unemployed. Moreover, sectors like construction, retail trade, tourism, and information technology hold potential for job creation if supported by conducive policies (e.g., infrastructure investments, ease of doing business, digital skills development). The goal should be to increase the employment intensity of growth, meaning more jobs per unit of GDP. Bangladesh's policymakers are indeed cognizant of this – the latest development plans emphasize manufacturing diversification and skills development to ensure growth translates into employment (Government of Bangladesh, Perspective Plan 2041).

- **Labor Market Reforms:** Improving labor market flexibility and conditions can indirectly affect the output–unemployment relationship. If companies are more confident in hiring (due to better regulations, social protections, etc.), they may respond more to output increases by adding workers rather than just increasing overtime of existing workers. Strengthening labor rights and safety (as partly done after the Rana Plaza disaster in the garment sector) can lead to a more stable labor market, though these do not directly change Okun's coefficient, they improve the quality of employment. Additionally, expanding the formal sector coverage (through incentives to formalize enterprises) would make employment more responsive to economic fluctuations in the data (since formal firms hiring/firing is recorded, whereas informal adjustments often go unmeasured).
- **Fiscal and Monetary Policies:** Even though our results suggest traditional demand-management (fiscal/monetary) policies have a limited effect on unemployment relative to output, they are still relevant. Fiscal policy, for example, can be oriented toward labor-intensive public investments. Public works programs (building roads, climate-resilient infrastructure, etc.) can directly create jobs and have multiplier effects on output – this is one way to break the disconnect by simultaneously boosting GDP and employment. During economic downturns, instead of assuming a given output stimulus will lower unemployment by Okun's Law, the

government might need to directly target employment, for instance by subsidizing industries to retain workers (as done during COVID-19 with stimulus to businesses to avert layoffs). On the monetary side, the central bank's accommodative policies can support overall growth and thereby help employment indirectly, but given low unemployment, the focus might also be on ensuring credit to SME sectors that are job-rich. It is also noteworthy that a weak Okun's Law implies inflation may not immediately spike from low unemployment (since unemployment is not falling much even when output is high). This could give monetary policy some leeway: Bangladesh Bank might not need to tighten policy pre-emptively on fears of "overheating" via the Phillips curve, because the labor market slack is absorbed in ways not captured by unemployment. However, this must be balanced against other inflation drivers (commodity prices, etc.).

- **Data and Measurement Improvements:** The findings highlight potential issues with labor statistics. Policymakers should invest in better labor market data, including measures of underemployment, hours worked, and labor force participation. If the unemployment rate is an inadequate barometer, tracking these additional indicators will give a fuller picture. For example, the underemployment rate (share of workers working less than full-time who want more work) is likely higher and more sensitive to GDP changes. Including such metrics could provide a clearer link between economic performance and labor market health. The IMF's skepticism about unemployment data reliability suggests room for methodological refinement in surveys. If unemployment remains structurally low, the government may also shift focus to underemployment and informal employment as key targets when formulating policy (e.g., aim to reduce the underemployment rate by X% through skill programs).

3. Toward Inclusive, Job-Rich Growth: Ultimately, the weak Okun's Law in Bangladesh underscores the need for an economic model that deliberately spreads the gains of growth through employment. Simply put, growth that doesn't create ample jobs risks social discontent and missed developmental opportunities. The concept of "jobless growth"

has become part of the policy discourse in Bangladesh, especially as the country's youth population seeks gainful employment. The unrest alluded to in recent analyses is a reminder that unemployment (especially youth unemployment) carries political and social ramifications beyond the economic loss of output. The government's plans, such as establishing 100 Special Economic Zones (SEZs) and investing in human capital, aim to create 10 million new jobs in the coming decade. Our findings suggest that without such deliberate measures, high GDP growth alone would not automatically solve unemployment.

Moreover, from a fiscal perspective, the government should consider the role of redistributive policies. If output growth is not reducing unemployment significantly, it may also fail to improve income distribution for the bottom segments (many of whom are underemployed rather than unemployed). Fiscal policies like progressive taxation and social safety nets (e.g., unemployment insurance, though largely absent currently) could help ensure that those not immediately benefiting from growth are supported. Investing in education and healthcare can also enhance labor productivity and future employability, tackling structural unemployment in the long run.

Another angle is encouraging female labor force participation. At around 36%, it is relatively low in Bangladesh, meaning there is a large pool of potential workers who are not currently employed or counted in unemployment. As social norms evolve and more women seek paid work, GDP could grow without a drop in unemployment because these new entrants might initially be unemployed until they find jobs. Policies such as childcare support, safe transportation, and flexible work options can facilitate women joining the workforce, which in turn can boost growth and household incomes. While this might, in the short run, keep the unemployment rate from falling (because of more entrants competing for jobs), in the long run it expands the productive capacity of the economy. The key is that job creation needs to outpace labor force growth to see unemployment decline.

The COVID-19 pandemic in 2020 was an illustrative episode. The shock caused the first contraction of GDP in decades (or a large slowdown), and unemployment jumped to its highest recorded level (~5.43%). This shows that in extreme negative conditions, the unemployment rate will

respond (Okun's Law in recession). However, as the economy recovered in 2021–2022 (GDP growth rebounded above 6%), the unemployment rate fell back only modestly (to ~4.6% in 2022), indicating a hysteresis or slow recovery in the labor market. This pattern reinforces the notion of asymmetry: raising output is not as effective in reducing unemployment as a drop in output is in raising it. Policymakers should therefore prepare to address unemployment specifically during recoveries – for instance, through targeted hiring incentives or public employment programs to more rapidly re-absorb workers who lost jobs.

In conclusion, the policy message is clear: Bangladesh cannot rely on the "trickle-down" effect of GDP growth on unemployment, because the trickle is very weak. Instead, it must pursue direct and structural interventions to make growth more inclusive. This is well-aligned with the country's national development frameworks, which emphasize employment generation as a key goal. Our empirical results, by highlighting the weak coupling of output and unemployment, provide an added impetus for such policies. Ensuring that the young, growing labor force finds productive employment is critical for reaping the demographic dividend and maintaining social stability. Otherwise, the frustrations of educated but jobless youth can mount, as warned by observers of Bangladesh's socio-political landscape.

International comparisons suggest that as economies develop, the Okun's Law relationship can strengthen – typically because more of the workforce enters formal wage employment and labor market data capture more of the slack. For Bangladesh to reach that stage, it will need to continue structural transformation, but with a focus on job-rich sectors. Lessons from countries like Vietnam or Malaysia (which achieved higher employment elasticities at certain stages) could be instructive. For example, Vietnam's emphasis on labor-intensive manufacturing in the 1990s–2000s led to significant job creation accompanying growth (though later automation reduced elasticity). Bangladesh's garment sector is analogous, but needs diversification (e.g., into footwear, electronics assembly) to sustain job growth. The government's role in facilitating investment, improving infrastructure, and maintaining macroeconomic stability remains fundamental to enable the private sector to create jobs. Additionally, tackling barriers to employment – such as improving the quality of education to reduce skill mismatches,

and providing microcredit to support self-employment – can help convert growth into jobs.

Finally, it is worth noting that our analysis has focused on the quantity of jobs (employment/unemployment), but job quality is another crucial dimension. Even if unemployment is low, underemployment and informal low-wage work are widespread challenges. Policymakers should also aim to improve job quality, which may initially not change the unemployment rate but will improve living standards and productivity. In the long run, as the workforce becomes more skilled and productive, the economy could transition to a pattern where Okun's Law holds more strongly – because firms would create (or cut) formal jobs in response to business cycles, and labor market statistics would capture those movements more clearly. At Bangladesh's current juncture, the immediate need is to address the "jobless growth" concern by making growth more labor inclusive.

Conclusion

This paper set out to empirically examine the relationship between output and unemployment in Bangladesh – essentially testing Okun's Law in the context of a developing economy. Using data from 1980–2024 and employing both the gap and difference versions of Okun's Law, we found that the classic inverse relationship is statistically significant in Bangladesh's case, and the implied Okun's coefficient is very small (on the order of –0.21 or less in absolute value). In plain terms, Bangladesh's impressive output growth over the past decades has not been accompanied by equally impressive reductions in unemployment. The official unemployment rate remained in a low band (roughly 3–5%) throughout, even as real GDP grew multiple-fold. Our analysis showed that variations in GDP growth explain only a minor fraction of year-to-year changes in unemployment. Furthermore, deviations of output from potential (output gaps) bear little correspondence with fluctuations in the unemployment rate. These findings confirm the hypothesis of a "weak Okun's Law" for Bangladesh, consistent with prior studies and regional comparisons.

On the theoretical side, this outcome underscores that Okun's Law is not a universal, structural truth but a relationship contingent on an economy's structure and labor market institutions. Bangladesh's labor

market, characterized by high informality, underemployment, and ongoing structural transformation, does not transmit output changes into unemployment changes in the same way as a mature industrialized economy might. We discussed how factors such as an elastic labor supply, labor force growth, and measurement issues contribute to this decoupling. The phenomenon of "jobless growth" – where GDP grows without commensurate growth in formal employment – is evidently present in Bangladesh and potentially worsening given recent trends in employment elasticity. This poses a policy challenge: without intervention, economic growth alone may not solve unemployment or underemployment, limiting the inclusiveness of growth.

Policy implications from our study are clear: Bangladesh should adopt targeted strategies to ensure that growth translates into jobs. Relying solely on high GDP growth and assuming unemployment will naturally decline (as Okun's Law might suggest) would be a mistake in this context. Instead, policies must actively foster job creation – for example, through support for labor-intensive industries, skills development, and SME promotion – and remove impediments that prevent people from gaining employment (such as skills mismatches and inadequate infrastructure). The government's development plans already recognize this, emphasizing the creation of millions of jobs to leverage the demographic dividend. Our findings provide empirical backing for such proactive labor market policies. Additionally, we recommend improving labor statistics (especially tracking underemployment and participation) to get a more nuanced understanding of the labor market beyond the headline unemployment rate.

From a macroeconomic management perspective, the weak link between output and unemployment means that traditional stabilization policies (which often target the output gap to also stabilize employment) might need re-calibration. For instance, in a downturn, fiscal stimulus should possibly be larger or more employment-direct if the goal is to prevent unemployment from rising, since a given boost to GDP has a smaller effect on unemployment in Bangladesh. Conversely, during booms, policymakers might not see a tight labor market (in terms of unemployment) even if the economy is overheating, which shifts focus to inflation or other indicators for macroeconomic tightening. This delinks,

to an extent, the Phillips curve trade-off as well – a benefit in terms of inflation control, but a concern in that low unemployment doesn't necessarily indicate optimal labor utilization.

Our study contributes to the literature by providing an updated and detailed analysis of Okun's Law in Bangladesh, using recent data and multiple approaches. It also situates the results within the structural context, offering a narrative for why the empirical results diverge from textbook expectations. However, it also has limitations that point to areas for future research. One limitation is data quality and availability: Bangladesh's unemployment data is annual and potentially suffers from measurement issues. Future work could use quarterly data (if available or by proxy) to see if higher-frequency analysis yields any different insights or perhaps use alternative labor market indicators (such as employment-to-population ratio, hours worked, or underemployment rate) for a more comprehensive view. Another area is exploring regional or sectoral Okun's Law within Bangladesh – for example, does the output–employment relationship differ in urban vs. rural areas, or manufacturing vs. agriculture? Such granular analysis could reveal pockets where Okun's Law holds more strongly and others where it doesn't, masked in the aggregate data.

Furthermore, given hints of asymmetry, future studies could formally test nonlinear models (e.g., threshold regressions or state-dependent parameters) to confirm if unemployment responds more to negative output shocks than to positive shocks. Our analysis of 2010 and 2020 as outliers suggests structural breaks or nonlinear effects that a more advanced time-series approach (such as a regime-switching model) might capture. Additionally, exploring the role of labor force participation (especially female participation) in the output–unemployment relationship would be valuable – perhaps modeling a tri-variate relationship between output, unemployment, and participation.

In conclusion, Okun's Law in Bangladesh is, at best, a weak rule of thumb rather than a reliable guide. Economic policymakers should not be complacent that high GDP growth will automatically cure unemployment or that low unemployment means the economy is at full capacity. The onus is on policymakers to actively convert growth into employment – through structural reforms, education and skill investments, and focused

labor market interventions. As Bangladesh aims for its next stage of development, ensuring that growth is employment-rich and inclusive will be crucial for sustaining social and economic progress. Our findings reinforce that achieving a high-growth trajectory, while commendable, is not enough; the quality and inclusiveness of that growth – measured in jobs and livelihoods – is the true test of development.

References

Amin, S. & Lima, M. (2019). "Testing Okun's Law in Bangladesh Economy: A Co-Integration Approach." *Journal of Business Studies,* XL(1), 91–108.

Haque, R.U. (2022). "The Validity of Okun's Law in Bangladesh Economy: Is Bangladesh Heading towards a Jobless Growth?" *International Journal of Humanities Arts and Business,* 1(1), 37–46.

Imam, M. O. & Zaman, K. (2016). "Trading off between inflation and unemployment: Okun's law revisited for Bangladesh." *Asia-Pacific Development Journal,* 22(2), 85–104.

International Monetary Fund (IMF). (2023). *Bangladesh: Staff Report for the 2023 Article IV Consultation*. IMF Country Report No. 23/123. (Noting concerns about labor statistics reliability).

Moosa, I.A. (2008). "Economic Growth and Unemployment in Arab Countries: Is Okun's Law Valid?" *Journal of Development and Economic Policies,* 10(2), 7–24.

Okun, A.M. (1962). "Potential GNP: Its Measurement and Significance." *American Statistical Association, Proceedings of the Business and Economic Statistics Section,* 98–104.

Prachowny, M.F.J. (1993). "Okun's Law: Theoretical Foundations and Revised Estimates." *The Review of Economics and Statistics,* 75(2), 331–336.

Rahman, M., Bhattacharya, D., & Moazzem, K.G. (2008). "Bangladesh's Employment Generation under the Economic Recovery Package." *CPD Occasional Paper,* Centre for Policy Dialogue, Dhaka.

World Bank. (2025). *"Bangladesh Development Update: Resilience to Shocks."* World Bank, Washington, DC.

World Bank. (2025). *Bangladesh Overview – Context.* Retrieved from World Bank official website.

Xinhua News. (2023). *"Bangladesh's GDP growth hits 7.1%, unemployment remains low."* (News article summarizing BBS data).

Nasir, S., et al. (2024). *"Revisiting Okun's Law: Evidence from Malaysia."* (Working Paper).

Sutopo, B. & Putri, C. (2024). "Output Growth and Unemployment in Indonesia: A Dynamic Analysis of Okun's Law." *International Review of Business and Economics,* 4(1), 50–66.

Afrin, K.H. *et al.* (2023). "Exploring Economic Growth–Unemployment Dynamic Interplay in the Context of Bangladesh." *Economics Letters* (Working Paper).

Government of Bangladesh. (2020). Eighth Five Year Plan (2020–2025): Promoting Prosperity and Fostering Inclusiveness. *General Economics Division (GED),* Dhaka. (Emphasizes employment-focused growth strategies).