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Editor's Note

The *Bangladesh Journal of Political Economy* (BJPE) has long served as a critical forum where rigorous economic inquiry converges with the lived realities of our people. As Bangladesh navigates structural transitions and the complexities of impending LDC graduation, the scholarship assembled in *Volume 39, Number 2* arrives with remarkable foresight. These articles bridge a crucial analytical gap, moving the discourse beyond aggregate growth metrics to scrutinize institutional performance, labor rights, grassroots welfare, and macroeconomic dynamics.

This issue places the human and institutional dimensions of structural change at its core. Researchers explore organizational talent management to highlight the human capital underpinning economic performance, while another contribution maps contemporary female ceramic workers' labor rights back to the historic Haymarket legacy. At the grassroots level, empirical research on community-based health insurance in Gaibandha District demonstrates the vital need for accessible healthcare mechanisms to protect vulnerable populations.

To navigate broader economic stability, the volume balances these micro-level investigations with sophisticated macroeconomic assessments. Authors evaluate the trajectories of capital flows in Bangladesh and utilize a Factor-Augmented SVAR analysis to map the impacts of injection and leakage shocks on national output and employment.

On behalf of the Editorial Board, I extend my deepest gratitude to the dedicated researchers, reviewers, and the entire publication team whose collective rigor fortifies this journal's legacy. In an era demanding clear-eyed compassion, may these pages inspire the courageous, people-centered strategies that a resilient and prosperous Bangladesh deserves.



Professor Mahbub Ullah, Ph.D

Editor, Bangladesh Journal of Political Economy

Convener, Interim Committee, Bangladesh Economic Association

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Talent Management Practices: An Empirical Study on Employee Performance

Sujan Kanti Biswas*

Urmee Ghose**

Antik Debnath***

Abstract

The primary objective of this study is to examine the impact of talent management practices on employee performance in Bangladesh, specifically in selected private-sector organizations. A structured questionnaire with open- and closed-ended questions was used to collect primary data and gain a comprehensive understanding of the impact of talent management practices on employee performance. A study of 35 top- and mid-level executives from various firms was conducted using purposeful sampling. The investigation used a five-point Likert scale. The data were analyzed using the correlation coefficient, descriptive statistics, and a t-test. The study's conclusions indicate that talent management improves overall employee performance. The study suggests that the talent management idea be applied to all employee categories within the company who possess a particular talent, and that businesses separate their talent management strategy from the company's broader human resources management approach. The government should encourage private companies to adopt talent management practices to support their business development and employee satisfaction. The study's practical implications include the potential to develop a new skilled workforce, secure financial gains for businesses, and contribute to the positive outcomes of the national economy.

Keywords: Compensation · Employee Performance · Employee Retention · Selection & Recruitment · Talent Management · Talent Learning & Development

1. Introduction

In an increasingly competitive global business environment, organizations are recognizing that human capital is one of their most vital strategic resources for achieving sustainable growth and maintaining a competitive advantage. Talent management (TM), which encompasses the systematic attraction, development,

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and retention of high-performing employees, has therefore emerged as a central focus within modern human resource management. As organizational structures become more complex and performance expectations intensify, TM practices play a critical role in bridging skill gaps, enhancing employee capabilities, and ensuring that the right individuals occupy the right roles at the right time. Recent studies affirm this strategic value, noting that effective TM initiatives significantly contribute to improved employee productivity, organizational commitment, and long-term performance outcomes (Scullion & Collings, 2018; Tazin & Hakim, 2022).

In Bangladesh, the growing diversification of industries—ranging from banking and manufacturing to healthcare, education, and consumer goods—has heightened the need for robust TM systems. The rapid expansion of the private sector and the growing demand for skilled professionals have intensified competition for talent. Research indicates that Bangladeshi organizations adopting structured TM practices experience higher levels of employee engagement and operational efficiency, particularly in sectors facing high turnover or skill shortages (Islam et al., 2023). However, despite rising interest in TM, many organizations struggle to implement it effectively due to constraints such as limited resources, insufficient training opportunities, lack of strategic alignment, and inadequate HR planning. These challenges impede firms from fully leveraging TM as a driver of employee performance and organizational success.

Employee performance remains a crucial indicator of organizational effectiveness, influencing productivity, service quality, innovation, and overall competitiveness. Scholars argue that employees' capabilities, motivation, and developmental support significantly shape performance outcomes (Shaikh & Shah, 2017). TM practices—such as merit-based recruitment, structured coaching and mentoring, and performance-linked compensation—are widely recognized as essential mechanisms for improving these outcomes. Several international and local studies highlight a positive linkage between TM initiatives and employee performance, underscoring the importance of continuous development and effective retention strategies (Ndolo & Idua, 2017; Hossain & Islam, 2023). Nevertheless, empirical evidence on how these specific TM dimensions influence performance across diverse industries in Bangladesh remains limited.

Given this backdrop, this study aims to examine the influence of three critical TM dimensions—recruitment and selection, coaching and mentoring, and compensation—on employee performance in selected private organizations in Bangladesh. By analyzing primary data collected from experienced professionals across multiple sectors, the research seeks to address existing

gaps in scholarly understanding and offer practical insights for enhancing TM strategies. The findings of this study are expected to contribute to the theoretical discourse on TM within developing economies, support organizational leaders in designing more effective HR frameworks, and guide policymakers in fostering a more talent-driven national workforce.

2. Literature Review

2.1 Talent Management Practices

Talent Management (TM) refers to a strategic approach that involves attracting, developing, retaining, and effectively utilizing employees to achieve organizational objectives. Cappelli and Keller (2014) define talent management as a structured set of organizational processes that involve hiring, developing, deploying, and retaining employees, with a focus on aligning individual careers with future organizational needs. The central aim is to place the right person in the right role. Muriithi and Makau (2017) emphasize that businesses must develop effective talent management strategies as a key component of human resource development to remain competitive. Similarly, Gupta and Aggarwal (2012) view talent management as a strategic foundation of human resource management, essential for achieving corporate objectives through capable individuals. Stahl et al. (2017) further emphasize that effective recruitment, development, and retention practices are crucial for organizations to meet current and future talent demands and remain competitive in a rapidly evolving business landscape. Ultimately, hiring skilled and experienced personnel is a crucial factor in maintaining a competitive edge.

In Bangladesh, the adoption of TM practices is on the rise as organizations seek to boost employee performance and overall effectiveness. However, as noted by Islam et al. (2023), several challenges hinder successful implementation in the private sector, including high costs, limited government support, low awareness, and a shortage of qualified trainers. Despite these obstacles, organizations are increasingly recognizing TM's critical role in enhancing workforce performance.

2.2 Employee Performance

Employee performance reflects how efficiently and effectively individuals carry out their job responsibilities. The term "employee performance" refers to the outcomes that result from an individual's efforts over a specific period to complete assigned duties or achieve the organization's objectives (Shaikh & Shah, 2017). In their 2017 study, Ndolo and Ibua examined the impact of talent management practices on employee productivity. They concluded that programs such as talent development, career development, and work-life balance were highly effective in increasing workforce productivity. In the Bangladeshi context, research indicates a positive correlation between talent management (TM) practices and employee performance. For instance,

Tazin and Hakim (2022) found that TM strategies significantly enhanced performance within the country's banking sector. Likewise, Hossain and Islam (2023) reported that effective performance appraisal systems in private banks contributed to higher employee motivation and retention, ultimately driving improved performance outcomes.

2.3 Relationships between Talent Management and Employee Performance

The relationship between talent management (TM) practices and employee performance has been widely explored in the research literature. Dixit and Dean (2018) found that talent management practices not only enhance employee productivity but also improve job satisfaction. Similarly, Mangusho et al. (2015) reported a strong link between talent management strategies and increased employee productivity. In Bangladesh, several studies underscore the positive influence of TM on workforce outcomes. Tazin and Hakim (2022) found that initiatives like training and development significantly improved employee performance in the banking sector. Similarly, Hossain and Islam (2023) highlighted the effectiveness of performance appraisal systems in boosting motivation and enhancing performance in private banks.

This study is grounded in two key theoretical frameworks: Human Capital Theory and Maslow's Hierarchy of Needs, both of which underpin effective talent management.

2.3.1 Maslow's Hierarchy of Needs Theory

Maslow's hierarchy of needs outlines five categories of human desires: physiological, safety, belongingness, esteem, and self-actualization (Kaur, 2013). Among these, physiological needs such as food, water, and shelter take precedence and must be addressed first. Organizations can fulfill these needs by offering competitive salaries and benefits (Jiang, Qi, & Xiao, 2009). Employers also play a crucial role in supporting employees' personal and professional growth by helping them develop their skills and reach their full potential (Ibidunni et al., 2016; Taormina & Gao, 2018). Enhancing organizational support services can further motivate employees to pursue new opportunities for performance improvement (Jerome, 2013). To attract and retain skilled talent, companies must understand employee needs and implement effective competitive strategies (Haque et al., 2014). Neglecting these needs may lead to lower performance, dissatisfaction, frustration, and increased turnover intentions (Ibidunni et al., 2016). By aligning organizational resources and practices with employee needs, businesses can build, nurture, and retain a committed and productive workforce.

2.3.2 Human Capital Theory

Human capital plays a crucial role in enabling organizations to fulfill their

responsibilities, thereby enhancing overall productivity and performance (Paleri, 2018). In response to globalization and demographic changes, organizations must focus on identifying talented individuals, nurturing potential employees, and optimizing human capital performance to drive productivity and generate value (McCracken et al., 2017; Thomas & Diez, 2013). According to Oladapo (2014), effective talent management involves five key areas: recruitment, selection, engagement, development, and retention. To build a strong workforce, businesses must implement diverse talent management strategies that aim to attract, develop, and retain skilled employees (Buta, 2015). As a result, this framework has become fundamental in understanding the behavioral dimensions of human capital (Teixeira, 2014).

2. 4 Challenges in Implementing Talent Management Practices

The implementation of effective talent management (TM) practices in Bangladesh is hindered by several key challenges. According to Islam et al. (2023), major obstacles in private organizations include high costs, limited government support, low awareness, and a shortage of skilled trainers. Overcoming these barriers is essential to successfully adopting TM practices that can drive improvements in employee performance.

The literature indicates a positive relationship between TM practices and employee performance in the Bangladeshi context. While organizations face challenges in implementing effective TM practices, addressing these barriers can improve employee performance and organizational effectiveness. Further research is needed to identify the specific TM practices with the greatest impact on employee performance across industries in Bangladesh.

3. Statement of the Problem

While organizations in Bangladesh are investing in TM practices, the extent to which these practices translate into improved employee performance remains unclear. This research aims to investigate the relationship between TM practices and employee performance, providing empirical evidence to inform HR strategies in the Bangladeshi context. The study provides valuable insights for top management by identifying the aspects of talent management with the greatest impact on organizational success. By leveraging these findings, companies can reduce the need for additional research, saving both time and cost. While directly relevant to the sampled firms in Chattogram, the results also hold significance for businesses across Bangladesh, especially those operating within similar cultural, economic, and political contexts. Furthermore, the study provides a useful reference for potential investors evaluating business opportunities in the country. In a landscape marked by a scarcity of local data, it also serves as a valuable resource for researchers and academics, while contributing to the broader goal of addressing Bangladesh's leadership challenges and nurturing future leaders.

4. Significance of the Study

By highlighting the link between talent management and organizational success, the research encourages participating companies to better appreciate the strategic value of talent in today's dynamic business environment. The study's findings indirectly enable firms to assess the impact of personnel management on key performance indicators, including profitability, productivity, sales growth, return on investment, and overall competitiveness. Its relevance extends to a broad spectrum of stakeholders. Moreover, it offers practical insights into effective talent management practices, such as attracting and retaining top talent, fostering learning, and implementing coaching and mentoring initiatives, that can drive improved organizational performance. By providing insights into the impact of TM on employee performance in Bangladesh, this research makes a significant contribution to the current body of knowledge on Technology Management (TM). The findings will be valuable for HR practitioners, policymakers, and organizational leaders seeking to develop effective TM strategies that align with organizational goals and enhance employee performance.

5. Scope of the Study

The study focuses on selected industries in Bangladesh, including Banking, manufacturing (such as steel mills and consumer goods producers), Education (universities), Health, finance, and the Ready-made garment (RMG) sector, among others. These industries were chosen for their significant contributions to the national economy and for the varied nature of their operations, which provide a diverse perspective on TM practices and their impact on employee performance.

6. Research Objectives

The primary objectives of this study are:

- a. To assess the impact of TM practices on employee performance in selected industries in Bangladesh.
- b. To identify the specific TM practices that most significantly influence employee performance.
- c. To provide recommendations for enhancing TM strategies to improve employee performance.

7. Research Questions

This study seeks to answer the following research questions:

- a. What is the relationship between TM practices and employee performance in selected industries in Bangladesh?

- b. Which TM practices have the most significant impact on employee performance?
- c. How can organizations in Bangladesh optimize their TM practices to enhance employee performance?

8. Research Methodology

8.1 Research Design

This study employs a quantitative research design to investigate the impact of talent management (TM) practices on employee performance across selected industries in Bangladesh. Quantitative research is well-suited for examining relationships between variables through numerical data analysis, thereby enabling the generalization of findings to a larger population (Bryman, 1984).

8.2 Research Approach

A deductive approach is employed, where existing theories and literature on TM and employee performance inform the development of hypotheses. This approach facilitates testing these hypotheses by collecting and analyzing empirical data (Creswell & Creswell, 2017).

8.3 Population and Sampling

The target population comprises employees from various industries in Bangladesh, including banking, manufacturing, Education, RMG, Health, Finance, and retail sectors. To ensure that different levels and sectors of the organization are adequately represented, purposive sampling is used. To collect primary data, a questionnaire combining open- and closed-ended questions was created and used. In addition to being well-known in their respective fields, many of these CEOs were also successful business owners and former chief executives.

8.4 Data Collection

The data collection process for this study was designed to ensure reliability, relevance, and representation across multiple private-sector industries in Bangladesh. Primary data were gathered using a structured questionnaire comprising both open- and closed-ended items to capture diverse and nuanced insights into talent management practices and employee performance. The questionnaire was developed by adapting validated measurement scales, particularly those from Bibi (2018), to ensure conceptual clarity and alignment with established TM constructs. A five-point Likert scale ranging from “Strongly Disagree” to “Strongly Agree” was used to quantify responses and facilitate robust statistical analysis.

The survey was administered to senior-level executives—including CEOs, Directors, COOs, Managers, and other decision-making officers—across 35

prominent private organizations in sectors such as banking, manufacturing, healthcare, education, finance, and consumer goods. These respondents were deliberately selected through purposive sampling to ensure rich professional insights grounded in extensive industry experience. To increase accessibility and participation, questionnaires were distributed in both printed and digital formats.

Data were collected over four months, from January to April 2023. During this time, special measures were taken to maintain respondent anonymity and ensure unbiased responses. A total of 50 questionnaires were distributed, of which 35 were returned fully completed and deemed usable for analysis, representing a 70% effective response rate. Secondary data were also gathered from academic journals, organizational reports, websites, and previously published studies to complement the primary data. This mixed evidence base strengthened the overall interpretation of findings and ensured the study's validity and credibility.

8. 5 Variables and Measurement

8. 5. 1 Independent Variable: Talent Management Practices

TM practices are measured through dimensions such as recruitment and selection, coaching and mentoring, and compensation and rewards. These dimensions are adapted from established TM frameworks (Collings & Mellahi, 2009).

8. 5. 2 Dependent Variable: Employee Performance

Employee performance is evaluated based on individual productivity, work quality, and achievement of performance targets. These indicators are commonly used in performance appraisal systems (Aguinis, 2013).

8. 6 Data Analysis

A statistical program frequently used in social science research is the Statistical Package for the Social Sciences (SPSS) version 25.0. This program is used to analyze the data obtained. Calculating descriptive statistics, including means and standard deviations, enables summarising the data and gaining insights into respondents' responses. These statistics helped explore the sentiments expressed in comments on various topics. Inferential statistics, such as Pearson's correlation and multiple regression, are used to test hypotheses and determine relationships between TM practices and employee performance (Field, 2013).

9. Development of Research Hypotheses

9. 1 Attraction of Talent

Recruitment and selection form the cornerstone of effective skills management within an organization (Alruwaili, 2018). While there are multiple ways to

attract talented individuals, recruitment and selection remain among the most critical methods (Armstrong, 2016). Creating a talent pool and selecting the right candidate from it are crucial processes, as they significantly impact an organization's success or failure (Rabbi et al., 2015). A key element of talent management is attracting suitable candidates through recruitment to identify individuals best suited to meet organizational needs. According to Bratton and Gold (2017), selection involves choosing the most qualified individual based on their ability to perform job tasks effectively. Oaya, Ogbu, and Remilekun (2017) distinguish between the two by defining recruitment as the process of identifying potential candidates and selection as the act of choosing the most capable among them. Thus, recruiting and hiring the right person directly impacts both individual and organizational performance (Anosh & Batool, 2014). Paphos and Galanaki (2018) emphasize that effective recruitment and selection not only help attract high-potential individuals but also empower them to succeed, thereby enhancing overall employee performance. In addition, they found a positive association between the recruitment techniques (both selection and recruitment) and workers' performance. Rahmany (2018) employed deductive reasoning to evaluate the influence of hiring and selection processes on employee performance. The findings provide support for the hypothesis that factors such as recruitment, employee performance, and selection are positively associated with one another. The researchers Jolaosho, Olayink, Raji, and Akintan (2018) conducted a survey to investigate the impact of recruiting and selection decisions on workers' performance. They presented research that demonstrated the benefits of selecting and recruiting people based on their performance throughout their employment. In addition, they concluded that to select and employ the appropriate individuals, it is necessary to attract skilled workers who can ultimately achieve the organization's goals. As a result, this research is expected to test the following hypothesis:

H1: Attraction of talent through recruitment and selection positively influences employee performance

9. 2 Learning and Development of Talent

Employees are finding it increasingly difficult to sustain excellent performance in today's fiercely competitive workplace without continual learning and development. The development and progress of high-performing personnel are now essential to an organization's success. As a result, learning opportunities are crucial for workers to enhance their skills and adapt to changing work demands (Rabbi et al., 2015). Coaching and mentoring are two key approaches that significantly contribute to talent development (Mangusho et al., 2020). As noted by Khakwani et al. (2013), many organizations rely on mentoring and coaching to boost employee productivity. Employees who lack the necessary skills may underperform, but targeted mentoring and coaching help them

develop the competencies required to meet current and future performance expectations. Achi and Sleilati (2016) found that coaching, delivered through one-on-one, goal-driven sessions, is an effective strategy for enhancing employees' skills and capabilities. Similarly, Utrilla, Grande, and Lorenzo (2015) emphasize that coaching is a valuable method for enhancing workplace performance by fostering employees' talents and abilities.

Jyoti and Sharma (2015) argue that mentoring is an effective means of understanding and managing change within a firm, thereby enhancing employee performance and career advancement. It serves as an indicator that employees' effectiveness is significantly influenced by remuneration, organizational commitment, and career development, and it examines the impact of mentoring on workforce performance. In their research, they found that mentorship has a positive impact on employee performance. Because it provides guidance and facilitates knowledge transfer, mentoring is a crucial component in enhancing employee performance. In the same year, Raza et al. (2017) conducted research to evaluate the relationship between coaching and employees' overall performance. The study's findings revealed that coaching and mentoring are effective ways to enhance an employee's ability to perform their job as expected. As a consequence of this, the following hypothesis has been proposed:

H2: Employee performance is positively impacted by coaching and mentoring as a means of training and talent development

9. 3 Retention of Talent

In today's competitive business landscape, retaining talent has become more critical than ever. To discourage job-hopping and ensure long-term commitment, companies must implement effective compensation strategies (Chiekezie & Nwanneka, 2017; Nzewi & Chiekezie, 2016). However, retaining top talent remains a significant challenge for many organizations (Mabaso, 2016). Offering competitive pay is often considered a practical approach to retaining high-performing employees and supporting organizational growth. According to Dessler (2013), pay refers to the financial rewards employees receive for their work, while Sharma (2013) views it as a means for organizations to recognize and reward employee achievements. Osibanjo, Adeniji, Olubusayo, and Heirsmac (2014) argue that compensation serves as a strategic tool that not only enhances employee performance but also helps retain skilled personnel.

Their salary significantly influences a person's job performance for the organization. Hameed et al. (2014) investigated the relationship between employee performance and salary. They demonstrated that pay led to more optimistic employee performance. To investigate the impact of work effectiveness on employees' organizational commitment and career

paths, Sulaefi (2018) conducted a study. The study’s conclusions indicate that employees’ effectiveness is significantly influenced by remuneration, organizational commitment, and career development. In this regard, the following hypothesis is taken:

H3: There is a favorable correlation between remuneration and employee performance to maintain talent.

10. Theoretical Framework

The following theoretical framework, including each of the dimensions illustrated in the literature, is proposed for the current study.

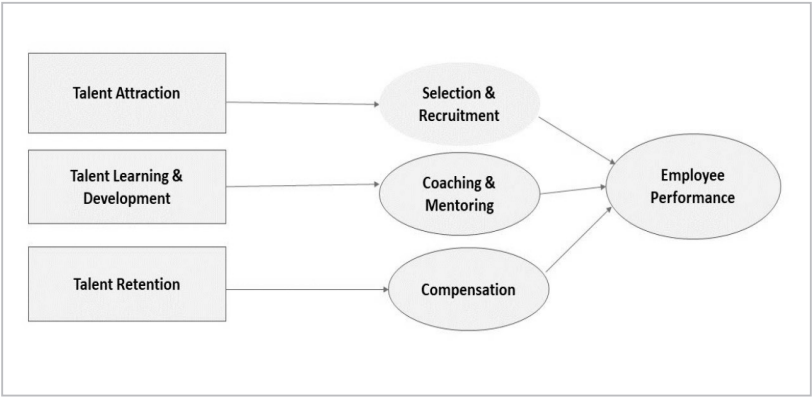


Figure 1. Model of Talent Management
Source: (Munaza, 2019)

11. Sample Enterprises at a Glance

In emerging and poor countries, the private sector’s route to growth and development is extremely crowded. Private-sector businesses play a crucial role in promoting and accelerating Bangladesh’s economic growth. The following categories are used to group the sample businesses:

Table 1. Categories of the Sample Organizations

Sample Organization	Name of the Private Enterprises	Category
1	Imperial Hospital Ltd.	Health
2	Max Hospital Ltd	
3	Epic Health Care	
4	Bangladesh Eye Hospital	
5	KB Fan Industry	Electrical
6	BSB Cable Ltd	
7	Bizli Cable	
8	Modhumati Bank PLC	
9	Prime Bank PLC	Banking sector Service
10	NRB Global Bank. PLC	
11	Peninsula	
12	Hotel Agrabad Ltd	
13	Guardian Life Insurance.	Insurance
14	Delta Life Insurance.	
15	Rankon Properties Ltd.	Real Estate
16	Equity Property Management Ltd.	
17	Bangladesh Steel Re-rolling Mill (BSRM)	Steel
18	RSRM	
19	GPH Ispat	
20	BGC Trust University Bangladesh	Education
21	Chittagong Independent University	
22	Premier University	
23	East Delta University	
24	Dainik Azadi	Media
25	Samoy TV	
26	Vintage Textile	Textile
27	KDS Textile	
28	City Group	Consumer Goods
29	Mostafa Group	
30	S. Alam Group	
31	Square Group	
32	Abul Khair Group	Non-banking (Financing Sector)
33	NGS Group	
34	Lanka Bangla Finance	
35	IDLC Finance	

Source. Field Study, 2024

12. Data Analysis and Findings

12. 1 Respondents’ Demographic Information

This section presents an analysis of the respondents’ feedback. To achieve the study’s objectives, a combination of closed-ended and open-ended questions was utilized. The responses were organized and explained through relevant tables. Demographic information—including age, gender, marital status, and academic background—was collected to better understand the sample profile. Table 2 below presents this demographic data along with corresponding descriptions. A total of 50 questionnaires were distributed to executives who have been employed at the institution for over 15 years. Of these, 70% were returned. After excluding incomplete responses, 35 fully completed questionnaires were available for analysis. Among the respondents, only three were female, while the remaining 32 were male. The demographic statistics of the sample are shown in Table 2.

Table 2. Demographic Data of Respondents and Type of Organization

Gender		Qualification		Experience		Type of Employment	
Male	Female	Graduate	Post-Graduation and Above	15-20 yrs	20 yrs +	Part-time	Full time
30	05	9	26	15	20	03	32
Business Type				No.			
Banking				3			
Non-banking				2			
Insurance				2			
Media				2			
Steel				3			
Textile				2			
Service				2			
Health				4			
Consumer Goods Producers				6			
Education				4			
Electrical				3			
Real Estate				2			
				Total = 35			

Source. Field Study, 2024

The age range of the 35 survey participants was 45 to 55 years of age or older. These responders were 85.7% male; 25.72% had a graduate degree, and 74.28 % had a postgraduate degree or higher, according to demographic data. Table 2 shows that 57.15% of respondents had worked for more than 20 years, and 42.85% had worked for more than 15 years. The data shows that the majority of respondents (91.42%) were employed full-time by the companies.

12.2 Reliability Statistics

The reliability of the scales is measured using Cronbach's alpha, with values above 0.70 indicating acceptable reliability (Nunnally & Bernstein, 1994). In this paper, an internal consistency examination was conducted by analyzing the reliability of specific variables.

Table 3. Statistics of Reliability

Variables	Alpha Cronbach Value	Number of Objects
Recruitment & Selection	0.749	6
Compensation	0.909	5
Mentoring & Coaching	0.888	12
Employee Performance	0.850	8

Source. Field Study, 2024

Table 3's internal consistency analysis revealed that, with sample sizes of 12 and 6, the alpha values for mentoring and coaching, and for recruiting and selection, were 0.888 and 0.749, respectively. Cronbach's alpha was 0.850 for employee performance and 0.909 for remuneration, and $N = 5$. The alpha values for all variables were above the suitable cutoff point of 0.7, indicating the reliability of the research's questionnaires (Nunnally & Bernstein, 1994).

12. 3 Correlation Coefficient among Study Variables

Table 4. Pearson Correlation

Variables		Employee Performance	Recruitment & Selection	Coaching & Mentoring	Compensation
Employee Performance (N=34)	Pearson correlation	1	.789	.810	.854
	Sig. (2-tailed)		.000	.000	.000

Source: Field Study, 2024

Table 4 displays the correlation coefficient for each variable. The examination of correlations demonstrates a positive relationship between employee performance and recruiting and selection ($r = 0.810$, $p < 0.05$), as well as between coaching and mentoring ($r = 0.789$, $p = 0.05$). A favorable relationship was found between employee rewards and performance ($r = 0.854$, $p < 0.05$).

12. 4 Multiple Regression Analysis Table

Table 5. Multiple Regression Results Predicting Employee Performance

Predictor Variables	Unstandardized Coefficient (β)	Std. Error	Standardized Beta (β^*)	t	Sig.
	.402	.048	0.491	7.589	.000
Coaching and Mentoring	.168	.044	0.328	3.689	.000
Recruitment and Selection	.262	.053	0.364	4.702	.000

Model Summary: $R = 0.857$, $R^2 = 0.734$, Adjusted $R^2 = 0.719$, $F(3, 31) = 332.93$, $p < .001$ Dependent Variable: Employee Performance
Source: Field Survey, 2024

The multiple regression model was estimated to determine the combined and individual effects of the three dimensions of talent management—recruitment & selection, coaching & mentoring, and compensation—on employee performance. The overall model was statistically significant ($F = 332.93$, $p < .001$), indicating that talent management practices collectively exert a substantial influence on employee performance in the sampled organizations.

The coefficient of determination ($R^2 = 0.734$) shows that 73.4% of the variance in employee performance is explained by the three talent management dimensions included in the model. This represents a strong explanatory power, confirming the critical role of talent-related HR practices in shaping workplace outcomes.

Among the independent variables, compensation emerged as the strongest predictor of employee performance ($\beta = 0.402$, $\beta^* = 0.491$, $p < .001$). This suggests that attractive and competitive compensation packages directly enhance motivation, commitment, and overall performance. The result aligns with prior research indicating that reward systems significantly influence effort, productivity, and retention among skilled employees.

Recruitment and selection also demonstrated a significant positive impact on employee performance ($\beta = 0.262$, $\beta^* = 0.364$, $p < .001$). This implies that organizations that implement structured, merit-based, and competency-focused hiring practices tend to attract employees whose abilities and job fit contribute to better performance outcomes.

Similarly, coaching and mentoring showed a meaningful positive effect ($\beta = 0.168$, $\beta^* = 0.328$, $p < .001$). This finding highlights the importance of continuous development, capacity building, and supportive learning environments that help employees enhance their competencies, adapt to changing job requirements, and improve performance.

Overall, the results confirm that compensation, recruitment & selection, and coaching & mentoring significantly predict employee performance, supporting all three hypotheses (H1, H2, and H3). Organizations seeking sustainable performance improvement should therefore prioritize competitive reward systems, robust talent acquisition processes, and structured coaching and mentoring initiatives as integral components of their talent management strategies.

13. Discussion

The findings of this study provide strong empirical evidence that talent management practices significantly improve employee performance in private organizations in Bangladesh. All three hypotheses—recruitment and selection, coaching and mentoring, and compensation—were supported, indicating that each TM dimension plays a vital role in shaping workplace outcomes.

First, the positive and statistically significant relationship between recruitment and selection and employee performance demonstrates that investing in structured, merit-based hiring processes leads to improved job outcomes. This aligns with previous research suggesting that selecting competent, high-potential individuals enhances organizational capability and long-term productivity. When firms emphasize job-fit, competency evaluation, and transparent selection procedures, employees are more likely to perform effectively and contribute meaningfully to organizational success.

Second, coaching and mentoring were shown to significantly enhance employee performance. Organizations that provide structured developmental opportunities create an environment where employees acquire new skills, build confidence, and adapt to evolving job requirements. These findings are consistent with the international literature, which emphasizes the value of developmental support in promoting employee engagement, innovation, and career progression. The results highlight the need for organizations to view coaching and mentoring not merely as supportive tools, but as strategic investments that directly strengthen workforce performance.

Finally, compensation emerged as the strongest predictor of employee performance, indicating that competitive and equitable reward structures play a central role in motivating employees. When employees perceive compensation as fair and aligned with their contributions, they are more likely to demonstrate higher levels of commitment, productivity, and job satisfaction. This reinforces the importance of linking compensation strategies to organizational goals, employee achievements, and talent retention initiatives.

Overall, the findings reinforce the premise that talent management is a holistic and strategic framework. To maximize performance outcomes, organizations

must simultaneously attract competent individuals, develop them through continuous learning, and retain them through effective reward systems. For Bangladeshi private organizations, particularly those facing high turnover and skill shortages, prioritizing TM practices can serve as a catalyst for sustained growth, improved service quality, and increased competitiveness.

14. Recommendations

Based on the study's findings, several recommendations can be proposed for private organizations, government agencies, policymakers, banks, financial institutions, and potential investors. Private sector companies should prioritize effective talent management strategies to enhance employee performance and productivity. These strategies should include robust recruitment and selection processes, thorough training and mentorship programs, and competitive compensation packages in order to retain qualified individuals. Decision-makers must develop and implement sound talent management practices to retain current and future talent, ensuring sustained competitiveness and market strength. Additionally, policymakers and business leaders should offer both moral and structural support to promote talent management across all sectors.

15. Limitations and Prospective Research Pathways

This study is subject to several limitations. Identifying the factors influencing employee performance through talent management practices in Bangladesh, particularly in Chattogram City, requires the use of more specialized and context-appropriate methodologies. While various strategies and tools exist in Western countries for assessing these elements, their relevance and effectiveness in a developing country context, such as Bangladesh, remain uncertain. Moreover, limited access to reliable primary data and a general lack of awareness regarding the importance of talent management practices posed significant challenges in obtaining insights from Bangladeshi executives and investors in Chattogram City.

Future research should consider examining the factors affecting employee performance through talent management practices across Bangladesh more broadly. Expanding the sample size and incorporating a more diverse range of participants would enhance the generalizability of the findings. As this study did not include other cities, comparative research across multiple regions could yield deeper insights, offering policymakers more comprehensive guidance for developing and retaining skilled talent to support economic and industrial growth. Furthermore, future studies should investigate the sector-specific impact of talent management practices, particularly in critical industries such as information technology, healthcare, and education. Further investigation into the different dimensions of talent management could also help expand knowledge in this field.

16. Conclusion

This study examined the influence of key talent management practices—recruitment and selection, coaching and mentoring, and compensation—on employee performance across various private-sector organizations in Bangladesh. The findings demonstrate that all three TM dimensions significantly and positively affect employee performance, underscoring the importance of adopting a holistic TM strategy that integrates talent acquisition, development, and retention mechanisms.

Recruitment and selection were found to enhance employee effectiveness by ensuring capable, well-qualified individuals are placed in roles that match their skills and organizational needs. Coaching and mentoring were shown to contribute meaningfully to performance by equipping employees with continuous learning opportunities, guidance, and confidence to meet professional challenges. Compensation emerged as the most influential factor, emphasizing its critical role in motivating and retaining high-performing employees.

Overall, the study highlights that effective talent management is essential for strengthening organizational productivity, maintaining competitive advantage, and fostering long-term sustainability. Organizations that strategically invest in attracting, developing, and retaining skilled employees are better positioned to respond to future challenges and achieve superior performance outcomes. The findings offer practical insights for policymakers, HR professionals, and business leaders seeking to design and implement talent-driven HR strategies that align with organizational goals and support national economic development.

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Factors Affecting Willingness-to-join for Community-based Health Insurance among the Community People of Gaibandha District, Bangladesh

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Abstract

Amid the COVID-19 pandemic, Bangladesh has realized the need for health insurance once again. Changing disease patterns and global economic shocks, such as the Russia-Ukraine war, enhance the cost of living and healthcare expenses, thereby reducing access to healthcare services for many households. Low healthcare coverage from the public sector has resulted in a high burden of out-of-pocket (OOP) expenditures, which account for 68.5% of total healthcare expenditures in Bangladesh. In this context, Community-based health insurance (CBHI) has emerged as a potential alternative for improving financial protection and advancing progress toward Universal Health Coverage (UHC). The study examines the willingness-to-join (WTJ), a hypothetical CBHI scheme, and identifies the determinants influencing enrollment among rural households in the Gaibandha district of Bangladesh. A survey was conducted among 516 randomly sampled respondents. The study found higher acceptance: 90.1% agreed to join, and 86.2% were willing to pay the proposed premium for the hypothetical CBHI scheme, with a mean value of Bangladesh Taka (BDT) 97.34. The study identified several factors significantly associated with WTJ, the scheme, including family size, annual outpatient expenditure, distance from the hospital, choice scheme, and trust in the implementation committee. However, awareness of CBHI was extremely limited, with 97.1% of respondents reporting little or no prior knowledge of the scheme. Furthermore, a large majority (96.7%) expressed a preference for government involvement in managing the scheme. The findings suggest that awareness creation campaigns and institutional support are essential for the successful implementation of such a scheme.

Keywords: CBHI · WTJ · WTP · Gaibandha · Binary logistic regression · Benefit package

Background

Bangladesh has recognized the need for health insurance, even though it has successfully emerged from the COVID-19 pandemic. Moreover, the Russia-

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Ukraine war has disrupted the global supply chain and economic stability, which has driven up prices across the board, including healthcare costs worldwide, resulting in limited access to healthcare in the country. A wide range of economic instability has already been created by the war, both at the micro- and macro-levels. Besides, the types and patterns of disease have been increasing alongside rising healthcare costs and the cost of living.

In addition, low tax revenue, over-dependence on imports, a low export base, the effectiveness of the central bank's monetary policy, interest rate caps, overrun project costs, and the weakness of the banking sector are among the structural problems (The Daily Star, 2022). Those drained the central bank's reserves at an alarming rate, forcing the Bangladesh government to adopt harsh restrictions. Consequently, growth has slowed, the Bangladesh taka (BDT) has depreciated, and reserves have shrunk, prompting the government to approach international financial institutions to raise funds.

The persistent trade deficit and current account imbalances created a huge gap between US dollar (USD) inflows and outflows throughout the fiscal year (FY) 2021-2022, which resulted in an increased exchange rate of the US dollar against the Bangladeshi Taka and further depletion of foreign exchange reserves (Hossain, 2022). Even though depreciation of the BDT has proven an incentive for exporters, it has significantly increased pressure on import payments for medical equipment, pharmaceuticals, and healthcare services. As a result, increased healthcare expenditures create additional financial barriers to accessing healthcare services.

In the United Nations Assembly-2030 agenda, Bangladesh has committed to achieving Universal Health Coverage (UHC) by 2030 under the Sustainable Development Goals (SDGs), which implies that all individuals and communities will receive the health services they need without suffering financial hardship (SDGs, 2030; WHO, 2023). Moreover, a declining trend in budgetary allocations to the health sector was observed over the last decade in Bangladesh. However, the healthcare financing system in Bangladesh remains heavily dependent on OOP payments, which account for approximately 68.5% of total healthcare expenditures, imposing a significant financial pressure on households (Bangladesh National Health Accounts (BNHA), 1997-2020). These high levels of direct payments often lead to catastrophic health expenditures, affecting approximately 15.6% of households in the country (Ahmed et al., 2016).

Community-based Health Insurance (CBHI) has been widely recognized as a potential strategy to enhance financial protection and improve healthcare access in low- and middle-income countries. Evidence from several countries in Africa and Asia suggests that the utilization of healthcare services and health-seeking

behavior has increased through CBHI schemes (Spaan et al., 2012). Hence, CBHI schemes can help improve access to healthcare services and provide financial protection to individuals and families.

Several policy initiatives aimed at strengthening healthcare financing have been undertaken in Bangladesh. A National Health Policy (NHP) was formally approved by the Parliament of Bangladesh in 2000. With the 2011 revisions to NHP, new issues have been introduced, including a health insurance scheme for formal institutions with the provision of health cards for the ultra-poor and deprived parts of society (WHO, 2015). In addition, community clinics and maternal care vouchers provide limited health services under existing reforms (WHO, 2015). Despite those initiatives, the majority of the population, particularly working in the informal sector, have low access to health insurance and social protection (Rockefeller Foundation, 2013). However, limited attempts were made by non-governmental organizations, such as the Bangladesh Rural Advancement Committee (BRAC), through health microfinance schemes for the rural sector (Molla & Chi, 2017), based on individuals' economic capacity. A "pre-payment" national health insurance scheme has been initiated on a pilot basis, named "Shasthaya Shurokkha Karmoshuchi, SSK" on a limited scale to explore potential pathways toward broader health insurance coverage (Ahmed *et al.*, 2018; SSK, 2014).

Although a lack of relevant infrastructure and administrative challenges limits the successful implementation of health insurance schemes in Bangladesh, existing evidence suggests that CBHI initiatives can improve healthcare access, enhance health equity, and promote better health-seeking behavior among rural populations (Hamid, 2015). Moreover, investments in health yield positive outcomes by enhancing productivity, improving working conditions, and improving overall economic well-being (Uddin, n.d.).

Despite the potential benefits of CBHI schemes, empirical research examining community demand for such programs in rural Bangladesh remains limited. In particular, there is a lack of evidence on the willingness of rural populations in Gaibandha district to join CBHI schemes and the factors influencing their enrollment decisions. To address this research gap, the present study aims to assess the willingness to join (WTJ) a hypothetical CBHI scheme among rural households in Gaibandha district and to identify the key factors influencing the decision to participate. Understanding those factors is essential for designing effective CBHI policies and expanding health insurance coverage among underserved populations. The findings of this study are expected to provide policymakers and stakeholders with valuable insights for developing sustainable health financing strategies and leading the way towards achieving UHC in Bangladesh.

Methods

Research Approach

The study employed an exploratory research design that combined quantitative and qualitative approaches. The quantitative component consisted of a structured questionnaire survey to assess respondents' WTJ and willingness to pay (WTP) for a hypothetical CBHI scheme. Qualitative insights were collected through key informant interviews to better understand community perceptions of the scheme's feasibility and implementation.

Pre-survey Work

To determine WTJ and WTP for the proposed CBHI scheme, a questionnaire survey was conducted. Before designing the questionnaire, key informants were interviewed, including community leaders, teachers, health workers, and staff from village-level non-governmental organizations (NGOs). The aim was to identify the factors for implementing the scheme in the research area and the status of perceived healthcare services. Representatives of prospective healthcare providers for the scheme were interviewed to assess their attitudes towards the insured population. Moreover, a reasonable amount of time was spent mapping the locations of the districts and villages, where the survey would be conducted. Some representatives of reputable NGOs were interviewed to assess the WTP of the target population and the starting bid amount. As NGOs implemented many programs, including microcredit and health initiatives, the appropriate WTP for poor people in the study area was well known to them. Before the final survey, a pretest (survey) was carried out on 50 respondents in the rural areas of the district. The key informant interviews (KIIs) were also conducted to obtain supportive information on the scheme's functioning, problems, and prospects.

A Hypothetical CBHI Scheme Scenario

Assuming that people will be willing to pay a premium for a hypothetical CBHI scheme, would be contracted for one year to become a member. A portion of the insured population will fall ill during the period and require healthcare services, which were also assumed. Hence, insured people would have no financial barriers to getting treatment for illnesses. Therefore, access to healthcare services through the scheme would increase. Thus, the insured members do not need to search for credit or sell assets while they are ill. They do not need to delay seeking care; they will recover quickly from their illness and can return to work sooner. Generally, people living in rural areas rely mostly on their labor work for income generation (Jutting, 2003). However, the significant decline in income for insured members can be prevented by protecting productive resources. Income would be stabilized, and consumption would be more stable and sometimes even higher, resulting in positive impacts on health through the CBHI scheme. As a result, improved health will raise

households' gross income. Moreover, as income rises, demand for healthcare increases due to higher opportunity costs. Thus, it will encourage people to extend their membership, which will also induce others to join the scheme. Therefore, the demand for health insurance will increase as well. In this situation, people would be willing to spend more on overcoming barriers to accessing healthcare services than before, which will likely increase the utilization of health facilities and thereby increase the facility's financial resources. Hospitals or health facilities could use financial resources to improve the quality of healthcare, such as by increasing the availability of drugs and purchasing surplus essential medical equipment. Better healthcare quality will raise people's expectations of value from their expenses during illness, thereby increasing demand for health insurance. Risk pooling will therefore increase, and that, in turn, will increase the participation rate, thereby reducing the administrative cost of insurance per member. The premium would be reduced due to "Economies of scale." Lower premiums will once again increase demand for health insurance and population coverage.

Characteristics of the Proposed Benefit Package Included in the CBHI Scheme

A hypothetical scenario outlining the CBHI scheme's benefit package was presented to respondents in the study area to gauge their willingness to participate. The proposed benefit package included both curative and preventive services, with doctors providing consultations and playing an important role in controlling endemic diseases. At the primary stage of the scheme, a low-intensity hospital care component would be included. By raising the pooling fund, the intensity of hospital care will increase as well. Some basic primary healthcare services, such as outpatient care (only a consultation charge), inpatient care (limited at the primary stage), maternal and child health services, etc., as well as secondary care on a referral basis, would be offered at the primary stage of the scheme. A 15-25% discount off the retail price for 14 types of services was included in the benefit package, and a discount for drugs based on the medicine category was also included. The premium of BDT1200 annually or BDT100 monthly per household has been settled to obtain a membership card for the CBHI scheme. Similarities were found between the proposed benefit package and a concept paper for Bangladesh (SSK, 2014), which proposed BDT1000 annually per household. In addition, across population groups, the proposed CBHI scheme will operate on a cross-subsidization model.

Study Area, Study Time and Study Focus

A questionnaire survey was conducted in the rural areas of Gaibandha district. The survey was conducted from February 2019 to March 2019, during which the study focused on the rural people of Gaibandha district.

Sampling

To select the sample size, the Taro Yamane (1967) technique was used. In the study, a simple random sampling technique has been used in two ways. Firstly, a total of 4 (four) Upazilas were selected from 7 (seven) Upazilas in the Gaibandha district: Fulchhari, Gaibandha Sadar, Gobindaganj, and Sundarganj (BBS, 2011). Secondly, 2 (two) villages were selected randomly from each Upazila, and 560 respondents were considered to conduct the survey. Finally, 516 were selected as the study sample, and 44 were excluded because they had no income.

Sources of Data

Primary data were collected through a structured questionnaire survey administered to respondents. Secondary data were obtained from various sources, including government reports, academic journal articles, books, policy documents, and relevant online resources.

Statistical Analysis

Statistical Package for Social Science (SPSS) version 26 was used for the statistical analysis. To describe the data, descriptive statistics (i.e., frequencies, percentages, mean values with standard deviations) were used. To identify factors influencing WTJ in the CBHI scheme, binary logistic regression analysis was employed. Hence, respondents were categorized as willing to join or unwilling to join the CBHI scheme as “YES” or “No.” The results of logistic regression were reported as adjusted odds ratios (AOR), and a p-value less than 0.05 was considered significant (5% level of significance) at a 95% confidence interval (Khatiwada et al., 2017).

Results and Analysis

Demographic and Socioeconomic Characteristics

Of the 516 respondents (Table 1), 65.9% were male and 34.1% were female; any family member aged 18 or older, as well as a permanent resident, was eligible to participate in the interview. Among the sampled respondents, the mean age was 38 years (Mean $\pm$ S.D; 38 ± 12.567), and a total of 38.2% were from the age group lowest up to 30 years, and 38.4% were from 31-45 years, who were very close together in percentages, whereas 23.4% of them were 45 and above years old considered as elderly who need the care the most. On average, families had 5 members, with the majority (73.3%) having 3 or fewer. The largest group of respondents was employed in daily labor (37.8%), followed by service workers (22.7%), although many of them worked as salesmen, waiters, or other informal workers. A very small percentage worked in the formal sector, 21.3% in businesses, and 18.3% in agriculture. 42.8% of respondents had primary-level education, followed by 37.0% who lacked any formal education, 15.5% who had secondary or higher secondary education, and only 4.7% who had graduated or higher degrees. Among the

lowest incomes, the minimum was BDT 18000, and the maximum was BDT 650000. The mean annual income was BDT 112852 (Mean $\pm$ S.D; 112852 $\pm$ 85322.641), where the minimum income was BDT 18000, and the maximum income was BDT 650000 annually.

Table 1. Demographic and Socioeconomic Status of the Study Respondents among the Rural People in the Gaibandha District (n = 516)

Variables	Percentage	Mean	Minimum	Maximum
Gender				
Male	65.9			
Female	34.1	—	—	—
Age group				
Lowest up to 30	38.2			
31-45	38.4	38	18	80
45 above	23.4			
Family size				
Lowest up to 3	73.3	5	1	14
4 to 7 >7	25.8			
	1.0			
Education				
No education	37.0			
Primary	42.8			—
Secondary and Higher Secondary	15.5	—	—	
Graduation / Masters	4.7			
Occupation				
Service holder	22.7			
Business	21.3			
Farmer	18.2	—	—	—
Daily labor	37.8			
Annual income				
Lowest up to 100000	64.0			
100001-200000	26.9	112852	18000	650000
200000 above	9.1			

Note: The mean, minimum, and maximum values have been shown only for continuous variables

Knowledge of the CBHI Scheme

The level of knowledge regarding the CBHI scheme (Fig 1) was very poor, at 2.9% in the study area, among those who had heard of it from friends or relatives and the mass media. In contrast, 97.1% had no prior knowledge about the scheme.

WTJ and WTP for the CBHI Scheme

The findings indicated a strong willingness to participate in the CBHI scheme. Respondents with 90.1% were willing to join the hypothetical CBHI scheme (Fig 2 and Fig 3), whereas the WTP of interviewed respondents was 86.2%, and 13.8% refused to pay for such a program. The average WTP was BDT 97.34 (1.148 USD).

Households with Outpatient Care Expenditures

A very small percentage of sampled households (3.6%) incurred outpatient expenditures of BDT 5000 or more in the year preceding the survey (Fig 4). The majority of households (60.5%) had outpatient expenditures of BDT 1001-5000, and 35.9% had expenditures of BDT 1000 or less.

Distance from the Preferred Hospital (km)

Over half of the respondents (53.9%), who were the majority (Fig 5), lived 4-20 km from the hospital; 25% lived up to 3 km, and 21.1% lived over 20 km away.

Choice of the Scheme by Respondents

The majority of respondents (96.7%) preferred that the hypothetical CBHI scheme be managed by government initiatives, while 3.3% preferred private-sector management.

Trust in the Implementation Committee

In this study, 96.7% of respondents (Fig 7) stated they would trust the implementation committee to operate the hypothetical CBHI scheme. On the other hand, only 3.3% of respondents noticed that they would never trust the implementation committee.



Fig-2: Willingness-to-join to the CBHI scheme among respondents

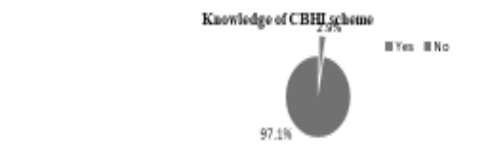


Fig-1: Knowledge of the CBHI scheme among respondents

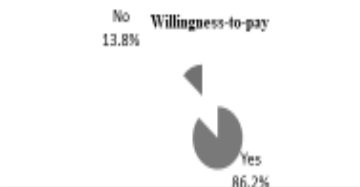


Fig-3: Willingness-to-pay for CBHI scheme among respondents

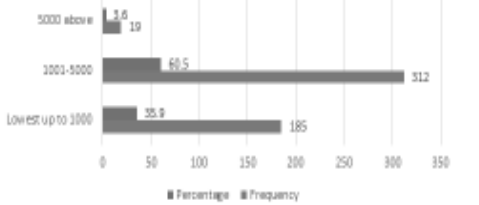


Fig-4: Households with outpatient care expenditures

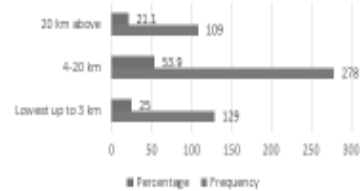


Fig-5: Distance from the preferred hospital (km)



Fig-6: Choice of the scheme by respondents

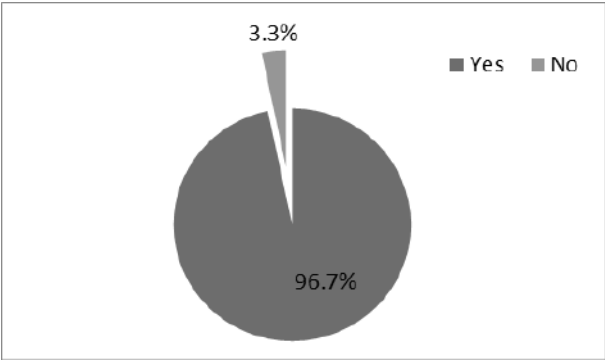


Figure 7. Trust in the Implementation Committee by Respondents

Results and Analysis of Binary Logistic Regression

Table 2. Regression Analysis of Factors Associated with WTJ

Variables	β (S.E.)	Sig.	AOR	95% CI	
				Upper Bound	Lower Bound
Gender					
Male	-.418 (.361)	.247	.659	.325	1.335
Female	Reference				
Age					
Lowest up to 30 years	-.718 (.483)	.137	.488	.189	1.257
31-45 years	-.293(.431)	.496	.746	.321	1.735
45 years above	Reference				
Education					
No education	.230(.381)	.546	1.259	.596	2.658
Primary	-1.137(.733)	.121	.321	.076	1.349
Secondary and Higher Secondary	-.341(.955)	.721	.711	.109	4.627
Graduation/Masters	Reference				
Occupation					
Service holder	-.384(.579)	.507	.681	.219	2.117
Businesses	.226(.423)	.593	1.253	.547	2.873
Farmer	-.557(.520)	.284	.573	.207	1.588
Daily labor	Reference				
Annual Income					
Lowest up to 100000	-.302(.777)	.698	.740	.161	3.393
100001-200000	-1.062(.811)	.190	.346	.071	1.694
200000 above	Reference				
Family size					
Lowest up to 3	2.567(1.133)	.023	13.025	1.414	119.990
4 – 7	1.651(1.087)	.129	5.212	.619	43.924
7 above	Reference				
Annual Outpatient expenditures					
Lowest up to 1000	-1.416(.637)	.026	.243	.070	.846
1001-5000	-1.462(.616)	.018	.232	.069	.776
5000 above	Reference				
Distance from the hospital					
Lowest up to 3	Reference				
4-20	-.827(.373)	.026	.437	.211	.908
20 above	-.058(.487)	.905	.944	.363	2.452
Choice scheme					
Public	-1.422(.707)	.044	.241	.060	.965
Private	Reference				
Trust in the implementation committee					
Yes	-1.705(.651)	.009	.182	.051	.651
No	Reference				

From the Table 2, the adjusted model confirmed that family size (OR = 13.025, 95% CI = 1.414 - 119.990, $p = .023$; when the family size was lowest up to 3 with the reference category was “7 above” numbers), annual outpatient

expenditures (OR = .243, 95% CI = .070 - .846, $p = 0.026$ when the expenditure level was from lowest up to 1000BDT, OR = .232, 95% CI = .069 - .776, $p = 0.018$ when the expenditure level was from 1001-5000BDT with the reference category was “5000 above BDT”), distance of residence from hospital (OR = .437, 95% CI = .211 - .908, $p = .026$; when the distance of residence was 4-20 km away from hospital with the reference category was “lowest up to 3 km”), choice scheme (OR = .241, 95% CI = .060 - .965, $p = .044$; when the respondents wanted to operate the scheme under government (public) initiative with the reference category was “private”) and trust in the implementation committee (OR = .182, 95% CI = .051 - .651, $p = .009$; when the respondents had trust on the implementation committee with the reference category was “no”) were all significantly associated with WTJ.

The Following Model was Run

Logit (WTJ) = f (Family size, annual outpatient expenditure, distance from hospital, choice scheme, trust in the implementation committee)

As shown in Table 2, five independent variables contributed significantly to the model. Binary logistic regression was used to assess the impact of several factors on the WTJ-to-CBHI scheme reported by respondents. The model contained five independent variables (Family size, annual outpatient expenditure, distance from hospital, choice scheme, and trust in the implementation committee). The full model, including all predictors, was statistically significant, with a chi-square value of 46.361 and a p -value of .000 ($<.001$), indicating that the model could distinguish between respondents who reported WTJ and those who did not for the CBHI scheme. The model as a whole explained between 8.6% (Cox and Snell R-square) and 18.1% (Nagelkerke R-square) of the variance in the WTJ-to-CBHI scheme and correctly classified 89.9% of cases. Hosmer and Lemeshow's test indicated that the model had a chi-square value of 9.803 with 8 degrees of freedom and a p -value of .279, indicating a good rather than a poor fit. Thus, the model adequately fits the data.

Results from Table 2 showed that education level was not statistically significant; however, the adjusted model in multivariate analysis (via odds ratios) indicated that respondents with no education were more likely to be willing to join the hypothetical CBHI scheme than those with a graduate or master's degree. Besides, respondents engaged in business were more willing to join the CBHI scheme than daily laborers, though the difference was statistically insignificant.

When the number of family members was lowest, up to 3 and 4-7, those households were significantly more likely to be willing to join the CBHI scheme, compared to the reference category, which was family members of 7 or more. Respondents with annual outpatient expenditures of up to 1000 BDT

and 1001-5000 BDT were significantly less likely to be willing to join the CBHI scheme than households with annual outpatient expenditures of 5000 BDT or above. Respondents living 4-20 km from the hospital were less likely to be willing to join the CBHI scheme than those living up to 3 km away. Respondents who wanted to operate the scheme under government initiatives were less willing to join the CBHI scheme than those who preferred private initiatives. Respondents who had trust in the implementation committee of the hypothetical CBHI scheme were significantly less likely to be willing to join the scheme than households that had never trusted.

Discussion

To facilitate respondents' understanding of the relatively new concept of CBHI in the Gaibandha district, a hypothetical CBHI scheme was presented during the survey. The results revealed that a large proportion of respondents (90.1%) expressed WTJ the scheme, while only 9.9% reported unwillingness to participate. This finding is higher than those reported in previous studies conducted in Ethiopia, where 77.8% of respondents expressed willingness to join the CBHI scheme (Haile et al., 2014), and in Nigeria, where approximately 60% were willing to participate, while 21.7% were unwilling to join (Oriakhi et al., 2012).

The survey also indicated that some poor households expressed interest in joining the scheme, but financial constraints prevented them from paying the required insurance premium. Thus, financial inability was identified as the main reason for non-participation in the scheme. In contrast, a study conducted in Ethiopia reported that some respondents were unwilling to join because they perceived no need for health insurance (Haile et al., 2014).

The study's adjusted estimates indicated that the WTJ-to-CBHI scheme was significantly influenced by family size, annual outpatient expenditure, distance from the hospital, scheme choice, and trust in the implementation committee.

Respondents with smaller family sizes were significantly more likely to join the CBHI scheme compared to those with larger family sizes. This indicates that smaller families are more concerned about health risks and can afford insurance premiums. However, some previous studies have shown the opposite results. A study in Ethiopia reported that WTJ increased with larger household sizes (Haile et al., 2014). Furthermore, a meta-analysis conducted by Dror et al. (2016) found mixed results: Asian studies reported a negative association between family size and CBHI enrollment, whereas studies from Sub-Saharan Africa showed a positive association.

The findings revealed that respondents with lower annual outpatient expenditures were less likely to join the CBHI scheme than those with higher

healthcare expenditures. This suggests that respondents with lower medical expenses may perceive health insurance as less necessary for managing healthcare costs independently.

Trust in the implementation committee was another significant factor in the scheme. Interestingly, the study respondents who reported trust in the implementation committee were less likely to express WTJ. This finding contrasts with previous studies, which identified trust in the management or implementation committee as an important factor in CBHI enrollment (Haile et al., 2014; Dror et al., 2016). In general, trust is considered an important element of social capital that encourages participation in CBHI schemes. Therefore, the unexpected relationship observed in this study may require further investigation.

Education level was not statistically significant in the adjusted model; however, respondents without formal education were more likely to express WTJ the CBHI scheme than those with higher educational levels. A similar finding was reported in Ethiopia (Haile et al., 2014). However, a meta-analysis by Dror et al. (2016) identified that higher education levels were associated with greater participation in CBHI schemes.

Respondents engaged in business activities were more likely to join the CBHI scheme than daily laborers. Daily laborers typically experience irregular income, which may limit their ability to consistently pay insurance premiums. Although business income may fluctuate, it provides relatively more stable cash flow compared to that of daily wage laborers in general. This may exhibit the higher WTJ among business respondents.

Distance from healthcare facilities was also found to influence participation decisions of the CBHI scheme. Respondents living farther from hospitals were less likely to express WTJ toward the CBHI scheme than those living closer. Respondents living closer to healthcare facilities may perceive greater benefits from insurance coverage, as they use healthcare services more frequently when needed.

Although a large majority of respondents (96.7%) preferred government involvement in operating the scheme rather than private initiatives, they were less likely to support the scheme. One possible explanation is that some respondents preferred to observe the scheme's performance and effectiveness before deciding to participate.

Recommendations

The banking sector in Bangladesh is still facing a high number of defaulted loans and scams. Hence, the government should take the initiative to restore

discipline in the macroeconomic zone, as this could affect every sector of the economy, including the health sector. A well-thought-out healthcare financing strategy is important to addressing the problems associated with healthcare utilization. Providing proper healthcare requires coordination between health policymakers and local healthcare providers.

Knowledge of the CBHI scheme was very poor, despite the study area being considered high in acceptance. Thus, marketing strategies are needed to stimulate awareness and knowledge regarding CBHI schemes at the community level. Therefore, the government of Bangladesh should take the initiative to raise awareness among low-income rural communities. Some major challenges in health service utilization in government health facilities include a lack of medicines, poor service delivery, limited diagnostic services, insufficient numbers of skilled health professionals, and a shortage of ambulances. Besides, in Bangladesh, as most of the rural population is informally employed, there is a significant challenge in paying a premium for these vast numbers. Flexible payment mechanisms and subsidized premiums for the low-income population may therefore be necessary to ensure broader participation in CBHI schemes. To address such issues, properly equipping healthcare facilities, developing monitoring systems, and training health personnel to build a skilled health workforce are prerequisites. Besides, exchanging best practices, resources, and expertise with international organizations, NGOs, and neighboring countries can be a great way to address health challenges.

Conclusion

Health insurance plays a significant role in providing financial protection against healthcare costs and reducing the economic burden of illness. The findings of this study indicate that overall acceptance of the hypothetical CBHI was relatively high, with 90.1% of respondents expressing their WTJ for the scheme. The study's findings will be useful to policymakers in identifying the factors influencing WTJ, including family size, annual outpatient expenditure, distance from the hospital, choice of scheme, and trust in the implementation committee. The results provide valuable insights for policymakers and health planners in designing and implementing CBHI schemes successfully in rural Bangladesh. Understanding the determinants of participation decisions can help policymakers develop targeted strategies to increase enrollment and improve the sustainability of CBHI schemes. However, weaknesses within the healthcare system must also be addressed to ensure the success of such initiatives. If these issues are not properly considered during the design and implementation of the scheme, utilization of healthcare services may decline, ultimately hindering progress toward UHC.

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Tracing the Haymarket Legacy: A Spotlight on Employment Relations and Labor Rights among Female Workers in the Ceramic Industry of Bangladesh

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Abstract

This study explores the contemporary landscape of the ceramic industry in Bangladesh, focusing on female workers' experiences with employment relations and labor rights. Inspired by the historic Haymarket affair, it examines the ongoing struggle for fair treatment and dignified working conditions within this sector. By highlighting the complexities and challenges faced by female workers, the research underscores the critical importance of sustained efforts to advance equitable labor practices and improve their welfare in Bangladesh's ceramic industry. Additionally, the study offers policy recommendations to foster better employment relations and labor rights within and beyond the industry.

Keywords: Haymarket massacre · employment relations, · labour rights · female ceramic workers · Bangladesh ceramic industry

Introduction

The Haymarket Affair, also known as the Haymarket Massacre or Haymarket Riot, was a significant event in labor history that occurred on May 4, 1886, in Chicago, Illinois, United States (Avrich, 1984). The incident occurred during a labor demonstration in Haymarket Square, organized to demand an eight-hour workday. The rally began peacefully, with speeches from labor leaders and activists. However, as the gathering was winding down, and only a few hundred people remained, police arrived to disperse the crowd. At that moment, a bomb was thrown into the police ranks, resulting in chaos and violence. During the ensuing confrontation, gunfire erupted, leading to casualties among both the police officers and civilians. The aftermath of the Haymarket Affair was marked by a wave of public outrage and government crackdowns on labor organizations and leftist movements. Several anarchist leaders were arrested

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and subsequently tried in a highly contentious legal proceeding known as the Haymarket trial. The trial resulted in convictions and harsh sentences, including death sentences for seven of the accused, despite a lack of conclusive evidence tying them to the bombing. Four defendants were executed, one committed suicide, and the remaining sentences were commuted (Green, 2007; Messer-Kruse, 2012). The Haymarket Affair had far-reaching implications for labor rights and civil liberties in the United States, sparking debates over the role of government, workers' rights, and the limits of free speech and assembly. It emerged amid industrialization and urbanization, as workers demanded better working conditions, particularly the eight-hour workday and labor welfare. Despite setbacks such as the controversial trial and executions, it galvanized global support for labor rights, influencing laws and fostering international solidarity. Its implications include empowering labor, shaping government regulation and legal precedents, fueling global labor movements, challenging anarchist ideologies, and enduring as a symbol in commemorations of workers' struggles for justice and dignity. This demonstration underscored the urgent need for worker rights, leading to their formal recognition. Since then, numerous international laws and regulations have been enacted to safeguard workers' rights worldwide.

In response to the Haymarket Massacre, May 1st was declared International Workers' Day in 1889, commemorating the events and serving as a global symbol of workers' solidarity and advocacy. May Day, recognized as International Workers' Day and a global symbol of solidarity, is celebrated worldwide every year in various ways, reflecting the diverse labor movements and cultural traditions of different countries. Some common ways in which the day is observed include:

1. Public Demonstrations and Protests

Many countries organize marches, rallies, and demonstrations where workers and labor unions advocate for workers' rights, fair wages, and improved working conditions.

2. Political and Cultural Events

May Day often includes political speeches, cultural performances, and festivals that highlight the achievements and struggles of workers throughout history.

3. Labor Union Activities Trade Unions And Labor

Organizations often hold meetings, conferences, and gatherings to discuss issues affecting workers and plan future actions.

4. Community Events

Communities may organize events such as picnics, parades, and street parties to

celebrate the contributions of workers and promote solidarity among different social groups.

5. Public Holidays

In many countries, May 1st is a public holiday, allowing workers to take the day off to participate in festivities or simply relax with their families.

Overall, May Day serves as a reminder of the ongoing struggle for workers' rights and social justice, while also providing an opportunity for people to come together in solidarity and celebration.

While May Day continues to be commemorated around the world, questions remain about its legacy in the context of contemporary labor movements and societal challenges. Its ongoing relevance depends on how effectively it adapts to changing circumstances and addresses the evolving needs of workers in the 21st century. In this context, this article commemorates the Haymarket massacre and sheds light on the contemporary landscape of the ceramic industry in Bangladesh, focusing on female workers' employment relations and well-being. A fundamental question arises: Do stakeholders in the ceramic industry leverage Haymarket's legacy to address ongoing challenges related to labor rights and well-being? We explore the situation of female workers in three ceramic factories and draw our conclusion.

Haymarket Legacy: Global Labour Rights and Regulations at Present

The Haymarket Affair had significant consequences for employment relations and labour rights, fundamentally influencing worker advocacy and industrial relations worldwide. Here are some of the major implications in the present-day global context:

1. Empowerment of Labour Movements

The Haymarket Affair served as a catalyst for the empowerment of labour movements worldwide. It brought attention to the struggles of workers and inspired solidarity among labour activists, leading to the formation of stronger unions and advocacy groups (Green, 2007; Montgomery, 1986).

2. Advocacy for Eight-Hour Workday

The Haymarket Affair amplified the demand for the eight-hour workday, which was a central issue for the labour movement at the time. The rallying cry for shorter work hours became emblematic of the broader fight for improved working conditions and fair treatment of workers (Foner, 1976).

3. Government Response and Regulation

In the aftermath of the Haymarket Affair, governments responded with increased regulation of labour organizations and demonstrations. This led

to the introduction of labour laws aimed at protecting workers' rights and ensuring safer working conditions (Green, 2007; Montgomery, 1986).

4. Legal Precedents

The legal proceedings following the Haymarket Affair set important precedents for the protection of labour rights and the right to organize. Despite the controversial trial and convictions, it underscored the importance of due process and fair legal treatment for workers accused of participating in labour activism. For example, the Haymarket trial highlighted the need for adequate legal representation and the right to a fair trial, reflecting fundamental principles of justice and fairness within the legal system (Avrich, 1984; Messer-Kruse, 2011).

5. Global Influence

The international reverberations of the Haymarket Affair inspired labour movements around the world. It contributed to the development of international labour standards and conventions aimed at promoting fair working conditions and protecting the rights of workers globally (Foner, 1976; Green, 2007).

6. Challenges to Anarchist Ideologies

The association of the Haymarket Affair with anarchist movements prompted scrutiny and challenges to radical ideologies within the labour movement. It led to debates about the most effective strategies for advancing workers' interests and the role of different political ideologies in achieving labour rights (Montgomery, 1986).

7. Symbolism and Commemoration

The Haymarket Affair remains a powerful symbol of workers' struggle for justice and dignity. It is commemorated annually as a reminder of the ongoing fight for labour rights and social justice, inspiring continued efforts to address inequities in employment relations and uphold the fundamental rights of workers worldwide (Foner, 1976; Avrich, 1984).

Since the Haymarket incident, numerous regulations have been implemented to safeguard and oversee manufacturing industries and the relationships within them (Galvin, 2019). The overarching principle has been adherence to the conventions and recommendations of the International Labour Organization (ILO), aimed at ensuring the rights and prosperity of both industrial actors and factors. Presently, many Labour Standards and Sustainable Development Goals (SDGs) concerning employment relations are in alignment with equitable labour standards, contributing to sustainable economic development. The United Nations' SDGs prioritize inclusive and sustainable economic growth, full employment, and decent work for all. By upholding labor standards such as fair wages, safe working conditions, and the eradication of child labor, these

goals can foster sustainable economic development while fulfilling social and environmental responsibilities (United Nations, 2015). However, challenges persist, particularly regarding the exploitation of workers by multinational corporations (MNCs) through minimal wage payments, especially in developing countries where labour is readily available at low rates. The Ready-Made Garments (RMG) industry serves as a prominent example of such practices. The literature highlights discrepancies in the enforcement of these regulations at both the national and international levels, indicating a gap between policy intent and practical application.

ILO Core Conventions and Bangladesh Labour Law 2006

The International Labour Organization (ILO) is dedicated to the pursuit of social justice and advocates for a fair globalization that provides opportunities for everyone. In 2008, the ILO adopted the 'Declaration on Social Justice for a Fair Globalization', which outlines four strategic objectives within its Decent Work Agenda. These objectives encompass promoting employment opportunities, extending social protection, facilitating social dialogue and tripartism, and preserving fundamental principles and rights at work. Utilizing conventions and recommendations as instruments, the ILO focuses on achieving these objectives by emphasizing fundamental principles and rights at work, as well as improving working conditions and benefits (ILO, 2008). This declaration marks a significant milestone for the organization since the Declaration of Philadelphia in 1944 and serves as the foundation for endeavors to promote and realize fair and equitable employment relations through the Decent Work Agenda (ILO, 1944; ILO, 2004).

Table 1. ILO Core Conventions on Labour Rights and Well-Being at Work

Area	ILO Conventions
Fundamental rights	
1. Freedom of association & collective bargaining	C087: Freedom of Association and Protection of the Right to Organize Convention, 1948 C098: Right to Organize & Collective Bargaining Convention, 1949
2. Non-discrimination & equal remuneration	C100: Equal Remuneration Convention, 1951 C111: Discrimination (Employment & Occupation) Convention, 1958
3. Free from child labour	C138: Minimum Age Convention, 1973 C182: Worst Forms of Child Labour Convention, 1999
4. Freedom from forced & compulsory labour	C029: Forced Labour Convention, 1930 C105: Abolition of Forced Labour Convention, 1957
Well-being rights at work	
1. Job security	C158: Termination of Employment Convention 1982
2. Minimum wage and regularity of payment	C131: Minimum Wage Fixing Convention 1970 C095: Protection of Wages Convention 1949
3. Working hours & leave	C 001: Hours of Work Convention 1919
4. Maternity & childcare benefits	C183: Maternity Protection Convention 2000
5. Social security (medical care, sickness, injury, old age)	C102: Social Security (Minimum Standard) Convention 1952
6. Health & safety at work	C 155: Occupational Safety and Health Convention 1981
7. Leisure & rest during work	C0 14: Weekly Rest (Industry) Convention 1921

The enactment of the ‘Bangladesh Labour Law 2006’ on October 11, 2006, marked a significant step in response to calls from various stakeholders for an improved regulatory framework for trade unions and the resolution of inconsistencies within existing labour laws. This legislation reflects many of the labour rights advocated by the International Labour Organization (ILO), encompassing entitlements such as the issuance of appointment letters, fair remuneration, regular leave and holidays, maternity and childcare benefits, access to healthcare services, workplace safety standards, transportation and meal allowances, bonuses, additional perks, pension schemes, and group insurance coverage. Notably, it formally recognized workers’ right to form trade unions. Section 176 of the law expressly guarantees each worker the right to establish or join a trade union and to align with an association of their choice. Furthermore, the legislation allows for the formation of trade union federations and permits affiliations with international organizations and workers’ confederations. Additionally, Section 195 explicitly prohibits employers or employer associations from terminating employees for their union involvement or from attempting to dissuade them, through incentives or threats, from engaging in or organizing workers’ associations.

Table 2. Key Features of Bangladesh Labour Law 2006

Areas	Provisions / Limitations
Fundamental rights	
1. Freedom of association & collective bargaining (Section 176)	• Minimum membership requirement of 30 percent workers of the total permanently employed workers for approval of unions • Restriction on temporary workers from joining a union. • Provision of joining only one trade union for each worker • Only one union in each factory
2. Non-discrimination & equal remuneration	• No discrimination at work in terms of wage and employment conditions (Equal treatment: Section 16) • Minimum age of employment is 18 years.
3. Free from child labour	• Prohibition of employment of children and adolescents (Section 34-44)
4. Freedom from forced and compulsory labor	• No specific provision or definitions are available in BLA, 2006 • Forced and compulsory labour is prohibited under Article 34 of the Bangladesh Constitution
Well-being rights at work	
1. Job security	• Provision for appointment letter and identity card (Section 5) • Absence of rationing facilities • Job termination laws for workers are weak (Section 22)
2. Minimum wage and regularity of payment	• Provision of Minimum Wage Board (Section 138) • Payment date is within seven days after the end of the last day of the wage period • Overtime works up to 10 pm
3. Working hours and leave (Section 100-119)	• Working hours 8 hours a day, 48 hours a week, in exceptional cases 60 hours. • One-day weekly holiday and one-day annual leave for every eighteen days of work
4. Maternity and childcare benefits (Section 45-50)	• Maternity leave for 16 weeks with full payment • No maternity benefits for the workers who already have two children
5. Social security (medical care, sickness, injury, old age)	• No clear provision for job protection and old age benefits • Provisions for First aid, Canteen, Daycare centers, and Housing facilities (Section 89-99)
6. Health and safety at work (Section 51-88)	• BLA 2006 covers OSH extensively and focuses on two areas of protection: • Occupational accidents, hazards, and diseases; and • Safety equipment and facilities
7. Leisure and rest during work	• BBangladesh's labour law includes provisions for rest intervals or meal breaks (BLA 2006, Section 101)

Source: BLA (2006)

The “Labour Law of 2006” encompasses mechanisms such as the arbitration council and labour court to address industrial disputes. Despite these provisions, there are specific deficiencies in this legislation, particularly regarding the implementation of the International Labour Organization (ILO) Convention on Freedom of Association and Protection of the Right to Organize, 1947 (No. 87). However, a recent amendment has introduced provisions pertaining to the right to collective bargaining and workers’ participation in the company’s profits.

An Empirical Investigation: Employment Relations and Labour Rights Scenario of Female Workers in Three Ceramic Factories in Bangladesh

During the days of the Haymarket Square massacre in Chicago, women played a prominent role as labour union organizers. Additionally, women were active participants in the workforce, both in formal waged workplaces and in various household and community activities. The involvement of women in labor movements is significantly shaped by the life stories of Haymarket labor organizers, such as Lucy Parsons, an anarchist labor activist who devoted her adult life to pursuing social justice (Cravey & Cravey, 2008). This motivated the authors to conduct a project investigating the conditions of women workers in the ceramic industry. This research purposively selected three ceramic factories in Bangladesh representing three production types: floor tiles, sanitary ware, and tableware. The ceramic industry was chosen because it remains a relatively unexplored area in employment relations and women’s labor welfare. Most existing research in this area has focused on the apparel industry (Hossain et al., 2013; Hossain, 2013). The project, titled “Employment Relations and Wellbeing of Female Workers in the Ceramic Industries of Bangladesh,” employed international labor regulations, sociological perspectives, and labor-related theories to investigate the current state of employment relations and well-being among ceramic workers. Utilizing qualitative methods, the research collected in-depth data from 36 female workers employed in these ceramic factories.

Data and Methods

The research project employed various methods to collect data, facilitating a comprehensive understanding of the employment relations and well-being of female workers in three ceramic factories in Bangladesh. These methods included:

- Review of published documents.
- Direct observation
- In-depth face-to-face interviews.
- Focus group discussions.
- Home visits

1. Review of Published Documents

This involved gathering data from various sources, such as annual reports, brochures, and archival resources, as well as secondary data from websites like the Bangladesh Ceramic Manufacturers & Exporters Association (BCMEA), Bangladesh Bureau of Statistics, and Bangladesh Bank.

2. Direct Observation

The researcher observed interactions between workers and managers within the ceramic factory environment during the production process, utilizing an overt yet non-participant observation technique to gain initial insights into employment dynamics and worker well-being.

3. In-depth Interviews

Face-to-face interviews were conducted with female workers from the three ceramic factories to delve deeper into their experiences, perspectives, and understandings of employment relations and wellbeing.

4. Focus Group Discussions (FGDs)

Structured discussions were held with groups of workers and factory managers/administrative staff from each ceramic factory, allowing for dynamic interactions and the exploration of diverse perspectives.

5. Home Visits

Researchers visited the homes of interviewed respondents to observe their living conditions, social dynamics, and daily routines, as well as to engage in further discussions to gain insights into their circumstances.

Table 3: Distribution of Interview Respondents

Factory Types	Number of		
	Respondents	FGDs	Home visits
1. Floor tiles	15	2	15
2. Sanitary ware	11	2	11
3. Tableware	10	2	10
Total	36	6	36

Study Findings

The ceramic industry in Bangladesh represents an emerging source of employment for the working class. This sector offers a fresh avenue for those aspiring to secure employment and improve their livelihoods, as both domestic and international markets rely heavily on ceramic products for modern living standards. With approximately 600 operational ceramic factories in Bangladesh,

contributing significantly to export earnings, the industry plays a pivotal role in the country's economic landscape. Despite its importance, challenges persist, particularly concerning the workforce composition. Women constitute a significant portion of the workforce, especially in tableware factories, yet they often face barriers such as illiteracy, lack of awareness, and limited control over working conditions, resulting in unequal profit distribution. Women's labour market participation is influenced by various socio-economic factors, while industry-specific challenges and theoretical perspectives, such as Social Exchange Theory, shape employment dynamics. Enhancing relationships and fostering equitable exchanges between employers and workers can increase profitability and sustainability in the ceramic industry.

Employment Relations & Female Workers' Wellbeing in Three Ceramic Factories

To provide insight into the socioeconomic conditions of female workers in ceramic factories, we present quotes from in-depth interviews and focus group discussions.

One worker shared her living situation, stating,

"I have rented a small room with a corridor for Tk. 3000. I live in that room along with my three children and husband. My husband has some mental problems. We five people sleep in the small room, and the cow lives in the corridor. World Vision has provided my daughter with a cow, which they used to determine our poverty level. Although it's a gift, feeding the cow is another burden for us. With the scanty amount of wages, will we manage food for the cow or for us? Renting a slightly larger house is urgent, but unaffordable with the small income I earn from the factory. If we spend more money on accommodation, I wouldn't be able to manage other family expenses."

Another worker expressed deep grievance, saying,

"We are unable to meet our basic requirements with the income we earn. Commodity prices are skyrocketing, but our salaries remain fixed. When I joined here ten years ago, the wage was 8 taka per piece, and it is still 8 Taka now. After a month's work, I only earn 8000 Taka. Three or four years ago, we could afford meat or fish at least once a week, but now we can't even afford it once a month."

Referring to the constant decrease in wages, another worker lamented,

"Previously, we got 10 taka per piece of production, but after a change in ownership, we now get eight taka per piece. This is clearly unjust to the

workers. We can only afford rice with vegetables or potato dishes, but we can't even taste any protein. This has severe detrimental effects on individuals, leading to mental and physical health issues."

Another worker, who lives in a distant place, continues her job despite challenges. She shared,

"My husband is a mental patient, and I am the mother of five children. My children go to school because the government provides free education with extra funding. I walk for almost an hour to reach the factory, starting work at 7 am and continuing until 7 pm. I return home at 7 pm, so I work almost 12 hours a day."

These accounts shed light on the struggles faced by female workers in the ceramic industry, highlighting challenges such as low wages, high living expenses, and long working hours, which significantly impact their well-being.

Key Insights from the Study

When delving deeper, the study underscores that employment relations and workers' well-being within Bangladesh's ceramic industries fall significantly below both local and international standards, notably beneath women's expectations and capabilities. The principal findings are succinctly outlined as follows:

1. Female Workers' Rights in the Ceramic Industry: Systematic Denial of Labor Rights

The findings highlighted significant loopholes and challenges related to the implementation of labour standards and the protection of worker well-being. In the case of the right to work, the research revealed that female workers in the ceramic factory, particularly those on temporary contracts, face systematic denial of labour rights. Employment contracts, essential for job security, are often absent for lower-ranking workers, leaving them vulnerable to unjust dismissal. Moreover, the lack of awareness among female workers about their entitlements and management negligence contributes to their inability to access benefits like maternity leave and social security provisions, leading to financial insecurity and compromising their overall well-being.

Regarding workers' rights, the study highlighted challenging working conditions and inadequate safety standards in ceramic factories. Workers, especially women, are required to work long hours in extreme temperatures without adequate safety equipment and facilities. The prevalence of workplace discrimination persists, with female workers being disproportionately allocated to lower-paid manual tasks, while technical roles are predominantly

assigned to their male counterparts. This discriminatory practice denies female workers opportunities for permanent employment, further adding to their job dissatisfaction and well-being concerns, creating an environment of inequality and unfair treatment. Considering the rights through work, the research uncovered significant wage and benefit disparities between male and female workers. Female workers, often employed on temporary contracts, receive wages below subsistence levels, making it difficult for them to meet their basic needs and maintain a decent standard of living.

The absence of social security benefits, such as pensions, gratuities, and provident funds, further exacerbates their financial insecurity and job dissatisfaction, leaving them vulnerable to economic hardships and inadequate support during critical life events. Additionally, the limited opportunities for collective bargaining and the lack of significant trade unionism at the factory level leave female workers with little voice and representation in negotiating for better working conditions and fair treatment. This lack of social dialogue contributes to a sense of powerlessness and undermines their ability to advocate for their rights and well-being. Overall, the study highlights the urgent need to address the rights and well-being of female workers in the ceramic industry. Implementing and enforcing labour standards, providing equal opportunities for female workers, and ensuring fair wages and social security benefits can significantly enhance their job security, improve working conditions, and promote overall well-being. Empowering female workers through increased awareness of their entitlements and fostering a culture of gender equality and inclusivity can create a supportive work environment that values and respects all employees, ultimately leading to greater job satisfaction and productivity.

2. Organizational Justice in the Ceramic Industry: Some Positive Aspects Exist but Need Considerable Improvements

Organizational justice (OJ), comprising distributive, procedural, and interactive justice, is crucial for establishing a fair and equitable work environment. These dimensions have significant implications for employees' well-being, including job satisfaction, gender equality, skills development, empowerment, and organizational commitment. In terms of distributive justice, the ceramic industry in Bangladesh encounters challenges in achieving equity and equality for female workers. Often employed as temporary contract workers, female workers receive lower wages and fewer opportunities for career advancement than their male counterparts. Gender-based discrimination in wage and non-wage benefits undermines equality and hinders the overall well-being of female workers. However, positive aspects, such as the provision of essential resources and training based on individual needs, contribute to skills development and enhance the well-being of female workers.

Regarding procedural justice, decision control, and process control play critical roles in empowering employees and fostering organizational commitment. However, the temporary nature of female workers' positions limits their decision-making and their ability to voice concerns and advocate for improved well-being outcomes. The lack of representation and voice for female workers raises concerns about their job security and overall well-being, as they fear potential job loss if they raise objections or seek better treatment. In the ceramic industry, positive interpersonal relationships between female workers and employers foster unity, cooperation, and loyalty. Employers' efforts to treat female workers with dignity and respect contribute to a harmonious work environment and shared commitment to organizational goals. Furthermore, clear and transparent communication of decisions enhances employee satisfaction and organizational success.

The well-being consequences of organizational justice are multifaceted. While female workers in the industry express contentment with their jobs, this satisfaction often stems from a need to survive rather than a genuine passion for their work. Additionally, female workers' empowerment and willingness to raise their voices are limited by the temporary nature of their positions, hindering their ability to advocate for their rights. In summary, while the ceramic industry in Bangladesh demonstrates some positive aspects of organizational justice, there are clear areas that require attention and improvement. Addressing gender-based discrimination, expanding opportunities for female workers' career advancement, and ensuring their representation and voice in decision-making processes are crucial steps toward creating a truly fair and equitable work environment. By fostering a culture of inclusivity, transparency, and respect, the ceramic industry can enhance employee well-being, job satisfaction, and organizational commitment, ultimately leading to greater productivity and success for all stakeholders involved.

3. Women's Well-being in the Ceramic Factories of Bangladesh: Below Potential

The well-being of women workers in the intricate ceramic industry is influenced by a range of factors that shape their daily experiences. The physical environment and safety climate hold significance, with the tableware factory standing out for its comprehensive safety measures. Challenges such as the proper use of safety equipment persist due to adverse conditions. Ergonomic workplace design, lighting, ventilation, and noise control impact health and job satisfaction, while differing factory provisions highlight workers' adaptability.

Within workplace culture, regulations and surveillance mechanisms foster a harmonious atmosphere that resonates among management and workers. However, wage and benefit concerns, limited facilities, and the balance between

work and life underscore the complex landscape. In the context of health, work evaluations, and societal context, the well-being of women workers takes on intricate dimensions. Physical and mental health concerns pose multifaceted challenges, underscoring the industry's potential for improvement. Mental health emerges as significant, but financial concerns often eclipse it. Injuries, although less frequent, are relevant and require prompt intervention. Work evaluations encompass job satisfaction, the meaning of work, and emotional resilience. Home, community, and society also influence well-being, with various factors interconnected to shape experiences. This comprehensive exploration emphasizes the need for a holistic approach, from safety measures to fostering supportive cultures, in paving the way for an inclusive and thriving future.

In the ceramic industry, numerous positive factors contribute to the well-being of women workers. The implementation of safety measures and facilities, as observed in the tableware factory, underscores a commitment to safeguarding their physical health. Moreover, workers' acclimatization to their varied environments demonstrates their resilience and adaptability, indicating a level of contentment with their roles. The positive cultural atmosphere cultivated by clear regulations and surveillance mechanisms fosters a harmonious workplace, where both management and workers share a sense of mutual respect and commitment.

However, certain negative aspects cast shadows on the well-being of women workers in the ceramic industry. Inadequate compensation and financial challenges underscore the persistent struggle they face to achieve financial security. The absence of key facilities, such as daycare services and designated canteen areas, exacerbates the issue, while the challenges of achieving work-life balance due to financial constraints remain a significant concern. Mental health challenges, including stress and anxiety, pose hurdles to their overall well-being. Moreover, the presence of health risks, ranging from physical injuries to respiratory disorders, adds further complexity to their well-being landscape. Despite these challenges, women workers exhibit remarkable commitment, driven by financial necessity and a desire to support their families. This reveals the intricate balancing act they perform between their work and personal lives, highlighting the need for comprehensive solutions that address both the positive and negative aspects of their well-being.

4. Potential of Women Workers in (Re)Shaping the Employment Relations

The potential of women workers to play a transformative role in (re)shaping employment relations within the ceramic industry of Bangladesh is an awe-inspiring testament to their resilience, adaptability, and creativity. During home visits, I immersed myself in their lives and witnessed their remarkable

psychological, physical, and cognitive capabilities. Even in the face of the daunting challenges posed by poverty, these women exhibited a profound depth of thinking, understanding, and responsiveness that transcended their circumstances. Their fervent enthusiasm and whole-hearted engagement during interviews and focus group discussions illuminated a powerful desire to contribute significantly to the evolution of employment relations within their sector.

However, certain obstacles obstruct the realization of this potential. Evident violations of labour regulations and the absence of collective action underscore the challenges confronting women workers within the industry. To unlock their potential, structural shifts in employment relations and an empowered role of the state in safeguarding labour rights are indispensable prerequisites. The trajectory forward necessitates concerted efforts among workers, management, and state authorities to reshape the contours of employment relations, ensure adherence to labour regulations, and champion equitable practices. Recognizing and nurturing the untapped potential of women workers can pave the way for the ceramic industry to stride towards greater equity, productivity, and inclusivity. As these women become catalysts for reshaping employment dynamics, they are not only fueling the industry's growth but also paving the path towards a more progressive, gender-equitable society. Their journey symbolizes a triumphant fusion of determination and potential, standing as a beacon that illuminates a trajectory towards a brighter, more inclusive future for the ceramic industry and beyond. The above argument strongly supports the idea that stakeholders and policymakers should take proactive roles in establishing sound industrial relationships, protecting labour rights, and enhancing the well-being of ceramic workers, particularly female workers.

Conclusion and Policy Recommendation

In tracing the Haymarket Legacy and its reverberations in contemporary labour movements, our study delves into the specific context of employment relations and labour rights within the ceramic industry of Bangladesh. By examining the experiences of female workers in this sector, we uncover a complex landscape marked by challenges and opportunities. Drawing parallels between historical struggles for labor rights and present-day realities, we illuminate the enduring importance of fair labor practices and worker empowerment. Through our exploration, we emphasize the urgent need for policy interventions aimed at strengthening labour laws, promoting transparency and recognition for good practices, enhancing workplace education and awareness, and prioritizing health and safety measures. Our findings underscore the significance of engaging with the historical context of labour rights movements, such as the Haymarket Affair, to inform contemporary efforts aimed at reshaping employment relations and advancing worker rights. By recognizing and

honoring the legacy of past struggles, we can inspire collective action and solidarity in pursuit of a fairer, more just society. In the end, our study underscores the imperative for policymakers, stakeholders, and sociologists to collaborate to address the challenges faced by female workers in Bangladesh's ceramic industry. We propose the following policy recommendations:

A. Strengthen the Implementation of Labour Laws

Enhance enforcement mechanisms for existing labour laws, such as the Labour Law 2006, to ensure employers comply with provisions related to holidays, medical leave, festival leave, and maternity leave. Conduct regular factory inspections by dedicated labour law enforcement representatives to monitor and ensure adherence to legal requirements.

B. Transparency and Recognition for Good Practices

Implement mandatory reporting by factory management on their compliance with labour laws, and establish a system of recognition and rewards for employers who prioritize good working conditions and fair treatment for workers.

C. Workplace Education and Awareness

1. Introduce skill development programs within factories to raise awareness among both employers and workers about labour laws, workers' rights, and responsibilities.
2. Foster understanding about the significance of compliance with labour laws to ensure a fair and conducive working environment.

D. Strengthen Trade Union Activities

1. Facilitate the development of collective bargaining skills among factory workers.
2. Promote trade union activities and provide education about the role of trade unions in safeguarding workers' rights.

E. Prioritize Health and Safety

1. Implement and enforce proper health and safety standards within ceramic factories, ensuring the well-being and safety of workers.
2. Provide necessary training and resources to the workers to enable them to work in a safe and healthy environment.

The ongoing discourse on the implementation of national and international regulations in export-oriented industries underscores the need to reshape employment relations and raise the standards of employment practices in

Bangladesh. The focus should be on empowering employment relations that prioritize workers' well-being and rights. By addressing the outlined policy recommendations, the nation can move towards a more equitable and supportive work environment for all, fostering sustainable development and growth, and fulfilling the 2041 goal.

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Capital Flows in Bangladesh

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Abstract

This paper aims to estimate a sterilization coefficient to assess the extent to which the Central Bank of Bangladesh (Bangladesh Bank) sterilized capital inflows, and to estimate an offset coefficient to assess the extent to which the central bank's domestic-market activities spurred additional capital inflows. Monthly data from 2013M1 to 2023M12, available in various government publications, have been used in the analysis. The sterilization coefficient was estimated from the monetary policy reaction function, while the capital-flow equation was used to estimate the offset coefficient. Multiple regression was applied to estimate the effects of the explanatory variables. The control variables included are the index of industrial production (IIP), the money multiplier for broad money M2 (MM2), the spread between the central bank policy rate and the effective federal exchange rate (IF), the spread between the policy rate and the call money rate (DS), the nominal USD/BDT exchange rate (NER), and remittances (REM). The results from the two equations across all specifications show that sterilization coefficients are higher than offset coefficients, suggesting that the Central Bank of Bangladesh could mitigate the impact of foreign capital inflows.

Keywords: Central Bank · Capital flows · Sterilization Coefficients · offset coefficients

JEL Classification: E41 · E52

1. Introduction

The ability to run an efficient monetary policy in an open economy with a fixed exchange rate largely depends on how monetary policy instruments interact with capital inflows. Capital inflows create appreciation pressures that the central bank neutralizes through foreign-exchange interventions (i.e., purchases of foreign currency in the market) to maintain exchange-rate stability. However, these purchases increase international reserves and the money supply, which can build up inflationary pressures and run counter to the central bank's key objective. Therefore, central banks tend to conduct sterilization policies, estimating that the rise of inflationary pressures in the absence of sterilization would be detrimental to financial stability and the economy as a whole.

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Analysis of sterilization policy in the available literature is typically based on estimates of two coefficients. The first, called the sterilization coefficient, measures the intensity of sterilization, i.e., the share of money created by foreign-exchange interventions that the central bank neutralizes through other monetary policy measures. Second, the extent to which this policy type spurs additional capital inflows from abroad can be estimated by calculating the so-called offset coefficient. Bangladesh provides a pertinent case for examining these mechanisms. Growing trade openness, large remittance inflows, gradual financial liberalization, and recurring exchange-rate pressures have complicated the conduct of monetary policy. The Bangladesh Bank has actively intervened in the foreign-exchange market while pursuing domestic objectives related to inflation and growth.

This article estimates the sterilization and offset coefficients for Bangladesh to assess the effectiveness of monetary policy in managing domestic liquidity under external shocks. Using an open-economy empirical framework, the study contributes evidence on monetary constraints and policy effectiveness in a developing economy context.

2. Objectives

The study aims to investigate the following:

- a. The money market scenario and the extent of capital flow in the last ten years using monthly data from 2013M1 to 2022M12.
- b. To estimate the sterilization and offset coefficients and their implications.

3. Data and Methodology

The primary data sources have been the various publications of the Bangladesh Bank, including the Weekly Economic Indicator, the Fortnightly Economic Indicator, the Monthly Economic Indicator, the Monthly Economic Trend, and the Quarterly. In addition, online data from the IMF, the WB WDI, and CEIC have been used. Statistics from the Bangladesh Bureau of Statistics and the Ministry of Finance have also been used, particularly for macroeconomic variables. Data from the ADB, OECD, World Bank, and IMF have also been used. To examine levels and trends, charts, percentage distributions, growth rate formulae, and regression techniques have been applied.

All ratios are estimated by the author. The Pooled Ordinary Least Squares (OLS) has been used to estimate the effects of the explanatory variables. GLS random- and fixed-effects (group variable: Months) models for panel data have also been used to estimate the effects of the explanatory variables. The regression equations have been estimated using Stata 14.

4. Sterilization

4.1 Sterilization: Meaning

Sterilization involves actions taken by the central bank to offset the monetary expansion caused by increased foreign currency inflows. When foreign currency enters the country, it increases the central bank's foreign exchange reserves. This, in turn, increases the domestic money supply, since these reserves are typically exchanged for the local currency. While foreign currency inflows may strengthen the currency and provide liquidity to the economy, they can also lead to inflation if not managed properly. This is because an increase in the money supply can push up demand, potentially leading to an overheated economy. Sterilization helps ensure that the increase in foreign reserves does not lead to excessive domestic currency circulation or inflation.

4.2 Sterilization Methods of Bangladesh Bank

Bangladesh Bank has several tools and methods to sterilize the impact of foreign currency inflows. The main goal is to absorb the excess liquidity created by foreign exchange interventions, thereby preventing inflationary pressures. Here are the key mechanisms employed:

a. Open Market Operations (OMO)

The primary tool used by the Bangladesh Bank for sterilization is Open Market Operations (OMOs). OMOs involve buying and selling government securities (such as treasury bills or bonds) in the open market.

Selling Government Securities: When the Bangladesh Bank receives foreign currency inflows, it can sell government securities (bonds or treasury bills) in the domestic market. By selling these securities, the central bank effectively withdraws domestic currency from circulation. This reduces the money supply, neutralizing the inflationary effects of increased foreign reserves.

Example: Suppose Bangladesh receives a significant inflow of remittances. This increases foreign currency reserves, potentially leading to more local currency (BDT) in circulation. To counter this, Bangladesh Bank may sell government bonds or treasury bills in the market. When commercial banks or financial institutions purchase these bonds, they pay in local currency, which is then absorbed by the central bank, reducing the money supply.

b. Foreign Exchange Intervention

When foreign exchange inflows increase, Bangladesh Bank might directly intervene in the foreign exchange market to stabilize the currency or manage reserves. This can be done by buying or selling foreign exchange in the market.

Example of Buying Foreign Currency: If remittances flood the market and put upward pressure on the Bangladeshi Taka (BDT), the central bank can

intervene by buying US dollars or other foreign currencies. This removes local currency from circulation and prevents excessive Taka appreciation, maintaining balance in the foreign exchange market.

Example of Selling Foreign Currency: In another scenario, if the Bangladesh Bank wants to limit the appreciation of the Taka, it might sell US dollars from its reserves and exchange them for Bangladeshi Taka. This increases the local currency supply but will be offset by other sterilization measures.

c. Increase in Policy Interest Rates

Another indirect form of sterilization is adjusting interest rates (such as the repo rate or reverse repo rate). When the Bangladesh Bank perceives inflationary pressures from foreign currency inflows, it may raise interest rates to absorb excess liquidity. Higher interest rates make borrowing more expensive, helping curb domestic credit growth and easing inflationary pressures.

Example: Suppose remittance inflows increase significantly during a certain period, leading to more local currency circulating in the economy. In response, the Bangladesh Bank may raise interest rates, making borrowing less attractive. This reduces credit expansion, thereby absorbing some of the additional liquidity from the economy.

d. Utilizing the Bank's Foreign Exchange Reserves

Bangladesh Bank also manages its foreign exchange reserves to help sterilize the effects of inflows. When reserves rise, the central bank's ability to intervene in the foreign exchange market increases, but the central bank may also need to manage how these reserves are used.

For instance, if foreign reserves are too high, the Bangladesh Bank might decide to diversify reserves into assets that do not create inflationary pressure, such as gold, international bonds, or other foreign assets. While this does not sterilize liquidity in the traditional sense, it prevents too much of the foreign currency inflow from being directly exchanged for local currency.

Examples of Sterilization in Action

Example 1: Remittance Inflows

Remittances play a critical role in Bangladesh's economy, with billions of dollars flowing into the country each year. These inflows can increase foreign exchange reserves but can also create inflationary pressures if not sterilized. Let us look at an example:

Scenario: Assume that in a given year, Bangladesh receives \$10 billion in remittances. This increases Bangladesh Bank's foreign currency reserves. If the central bank does not act, the influx of dollars would increase the domestic money supply, putting upward pressure on inflation.

Sterilization Action: In response, Bangladesh Bank could sell Bangladesh Government bonds (or treasury bills) to commercial banks or investors in the local market. This would reduce the amount of local currency in circulation. By doing so, the central bank offsets the increase in the money supply caused by the remittance inflows.

Example 2: Foreign Direct Investment (FDI)

Suppose Bangladesh also experiences a surge in foreign direct investment (FDI), another form of capital inflow. This will increase foreign exchange reserves but can also affect the local money supply.

Scenario: FDI inflows of \$2 billion increase Bangladesh's foreign exchange reserves.

Sterilization Action: Bangladesh Bank may intervene in the foreign exchange market by selling some of its reserves to stabilize the Taka. It may also conduct open-market operations by selling government securities to absorb additional BDT into the system, thereby preventing inflation.

Example 3: Volatile Capital Flows

At times, capital inflows can be volatile, leading to temporary liquidity surges in the economy. If Bangladesh Bank anticipates such volatility—such as during a global financial crisis or shifts in global risk sentiment—it may adopt preemptive measures.

Scenario: Following a surge in capital inflows due to an international crisis or an improved global risk outlook, Bangladesh Bank might face increased pressure to manage excessive liquidity.

Sterilization Action: Bangladesh Bank can conduct open market operations, such as selling government bonds, and/or raise its policy interest rates to absorb excess liquidity and prevent the economy from overheating.

5. Findings and Analysis

5.1 Some Stylized Facts on Money Supply

Movements in various types of money supply, the Money multiplier of broad money, Net Domestic Assets (NDA), Net Foreign Assets (NFA), and the income velocity of money are depicted in charts 1-6.

5.1.1 Movement of M0 M1 M2 and M3

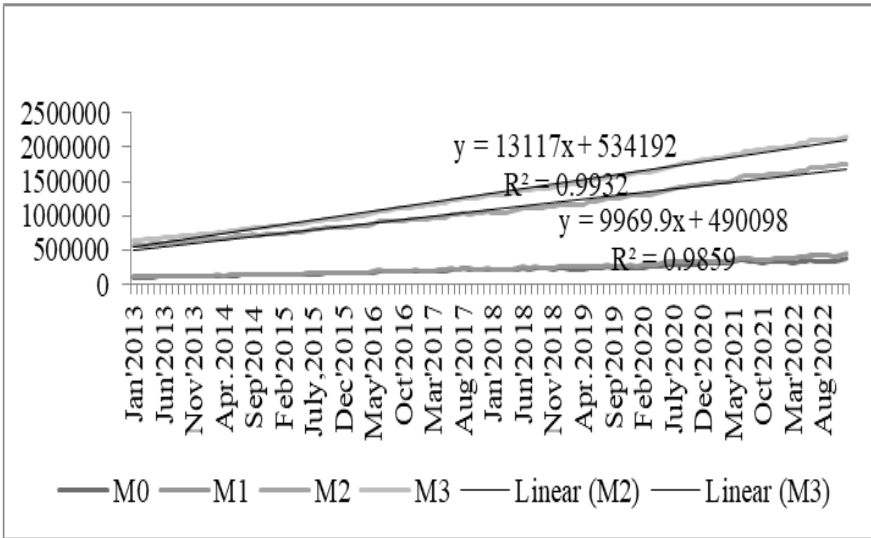


Chart 1. Movement of M0, M1, M2, and M3. BDT Crore

Source & Note: Bangladesh Bank, Author's Analysis

Chart 1 shows the movement of Bangladesh's money supply measures (M0, M1, M2, and M3) over time, from January 2013 to December 2022. From the chart, it appears that all money supply measures trend steadily upward, indicating overall growth in liquidity. The purple line (M3) is the highest and steepest, showing that the broad money supply expanded the most in absolute terms. M2 is slightly below M3 but shows a very similar upward trajectory, reflecting strong growth in savings and near-money assets. M1 rises gradually, with some acceleration after 2020. M0 grows the slowest and remains much smaller, reflecting limited growth in physical currency relative to bank-based money. The linear trend lines fitted to M2 and M3 show a very strong fit. The steeper slope of M3 indicates that it expanded faster than M2. The chart illustrates a long-term expansion of the money supply, especially in broader measures (M2 and M3), with particularly strong and consistent growth over the decade shown, highlighting increasing liquidity and monetary expansion in the Bangladesh economy.

5. 1. 2 Movement of Money Multiplier of M2 and M3

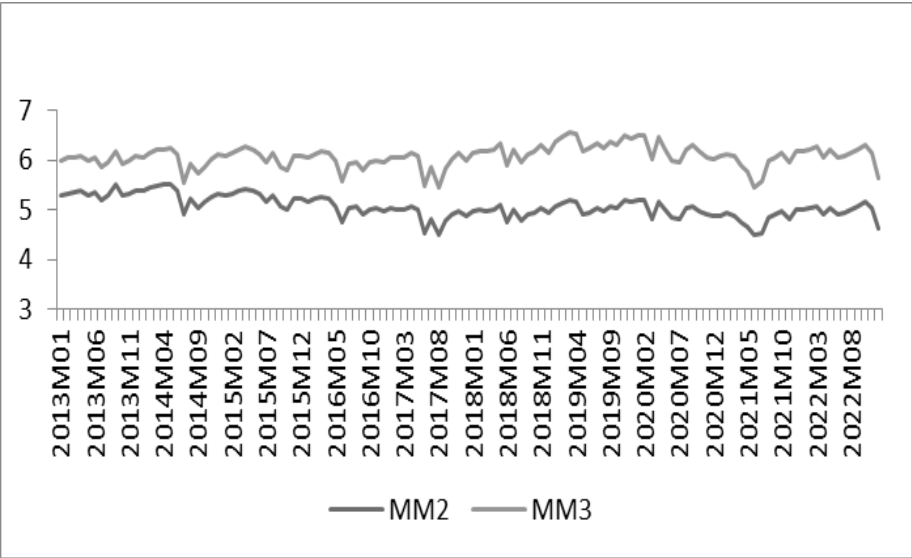


Chart 2. Movement of Money Multiplier of M2 and M3
Source and Note: Bangladesh Bank, Author’s Analysis

Chart 2 shows the movement of MM2 obtained as $M2/RM$ and MM3 obtained as $(M3/RM)$ over time, from January 2013 to December, 2022. Throughout the entire period, the red line (MM3) stays above the blue line (MM2), indicating that the broader money measure remains larger. Both series fluctuate within a narrow range. MM2 oscillates around 5.0, while MM3 fluctuates around 6.0, which is their respective monthly average. Both lines exhibit frequent ups and downs, suggesting short-term cash flow fluctuations rather than long-term growth. Noticeable dips occur around 2014–2015, 2017, and 2020–2021, with partial recoveries afterward. The blue line shows sharper drops and more pronounced swings than MM3, suggesting narrower money components react more quickly to economic or policy changes. There is no clear long-term upward or downward trend. This chart highlights the relative behavior and stability of modified money supply measures. While absolute money supply (M2 and M3) grows steadily over time, MM2 and MM3 move within bands, capturing short-term liquidity cycles and policy effects rather than long-term expansion.

5. 1. 3 Movement of NFA, NDA and RM

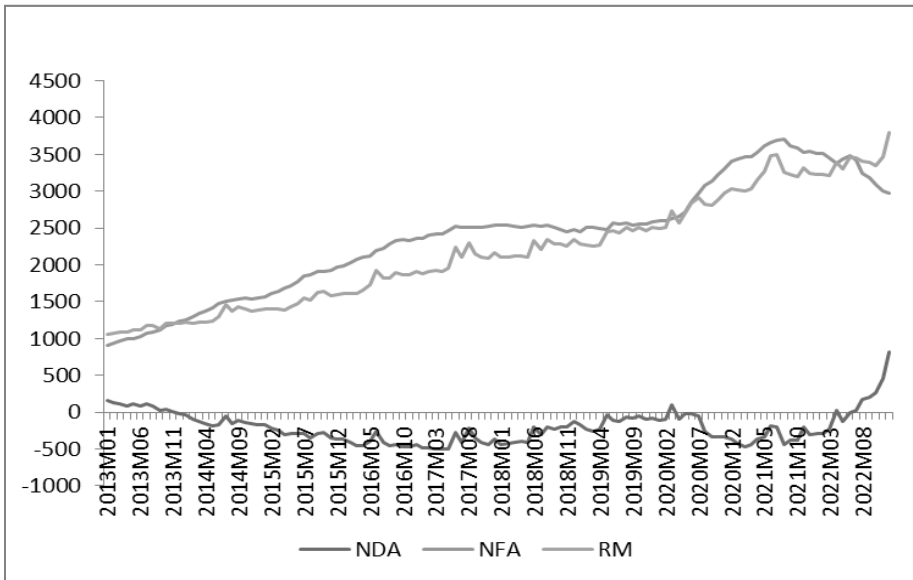


Chart 3. Movement of NFA, NDA & RM of Central Bank. BDT Billion

Source & Note: Bangladesh Bank, Author's Analysis

Chart 3 illustrates the changes in the Net Foreign Assets (NFA), Net Domestic Assets (NDA), and Reserve Money (RM) of the Bangladesh Bank, measured in billion Bangladesh Taka (BDT), over the period shown.

Net Foreign Assets (NFA): NFA reflects the central bank's holdings of foreign currency assets minus foreign liabilities. Movements in NFA indicate changes in foreign exchange reserves driven by balance-of-payments conditions, export–import dynamics, remittances, and foreign capital flows.

Net Domestic Assets (NDA): NDA represents the central bank's domestic assets, including credit to the government and financial sector, net of other domestic liabilities. Changes in NDA mainly capture the stance of domestic monetary and fiscal operations, such as government borrowing from the central bank.

Fluctuations in RM reflect the combined impact of movements in NFA and NDA. Periods of rising RM can be attributed to increases in NFA (e.g., reserve accumulation) and/or expansion in NDA (e.g., domestic credit growth). A decline in NFA accompanied by a rise in NDA suggests that domestic asset expansion may be offsetting external reserve losses to maintain liquidity.

5. 1. 4 Movement of Share (%) of NDA and NFA in RM

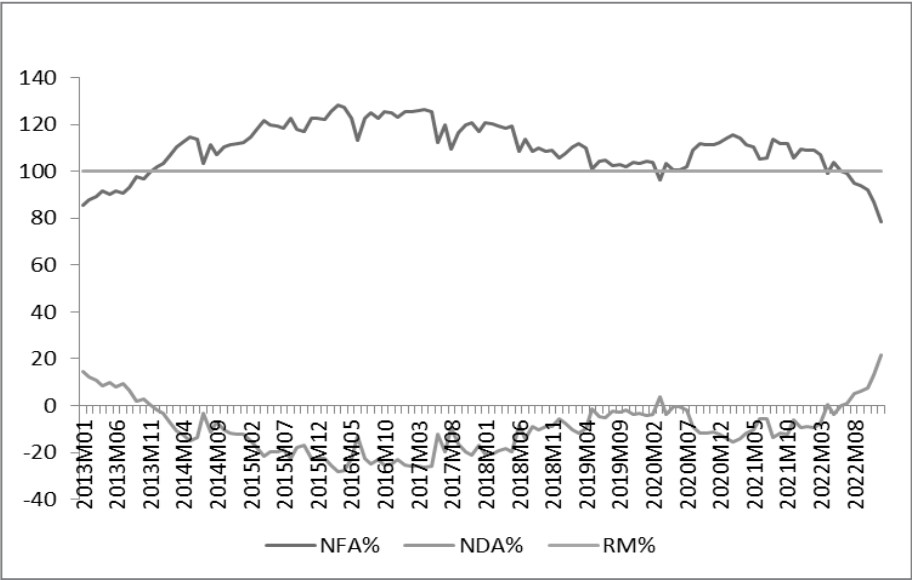


Chart 4. Movement of Share (%) of NDA and NFA in RM
Source & Note: Bangladesh Bank, Author’s Analysis

Chart 4 shows how Net Foreign Assets (NFA) and Net Domestic Assets (NDA) contribute, in percentage terms, to Reserve Money (RM) over the period 2013–2022. Here, RM% (green line): Fixed at 100%, since RM is the total composed of NFA and NDA. We find that NFA’s share of RM dominates. The blue line remains mostly above 100%, indicating that NFA has been the dominant source of reserve money. NFA’s share rises from below 100% in 2013 to a peak of around 120–130% during the mid-2010s, reflecting the strong accumulation of foreign reserves. On the other hand, the NDA’s contribution to RM is negative. The red line remains largely below zero, indicating that NDA often makes a negative contribution* to RM. This suggests contractionary domestic operations or central bank sterilization to offset excess liquidity generated by high NFA. There has been a recent deterioration in the NFA share. Towards 2021–2022, the NFA share declines sharply, falling close to or below 100%. At the same time, the NDA share turns positive, indicating increased reliance on domestic assets to support reserve money amid declining foreign reserves. While NFA was the main driver of RM for most of the period, recent years show weakening external buffers and a growing role for NDA. This shift has important implications for monetary stability, external vulnerability, and central bank policy choices.

5. 1. 5. Movement of Δ NDA and Δ NFA

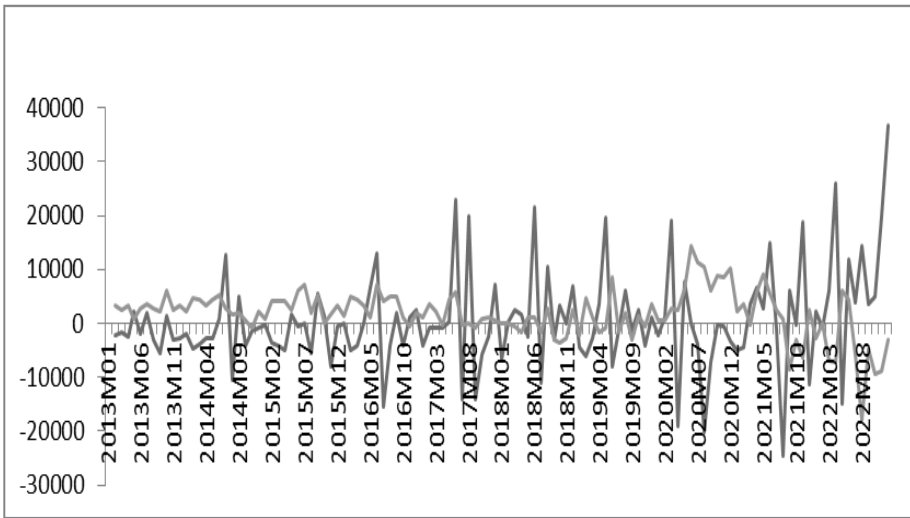


Chart 5. Movement of Δ NDA and Δ NFA

Source & Note: Bangladesh Bank, Author's Analysis;

Δ NDA means a change in NDA, also called the 1st difference of NDA. Similarly for Δ NFA.

Chart 5 presents the changes (first differences) in Net Domestic Assets (Δ NDA) and Net Foreign Assets (Δ NFA) of the central bank. The chart focuses on period-to-period changes, highlighting short-term dynamics. Δ NDA captures the incremental change in the central bank's domestic assets, reflecting variations in domestic credit—particularly credit to the government and the financial sector. Positive values indicate expansionary domestic operations, while negative values signal contraction. Δ NFA measures changes in foreign assets, mainly driven by movements in foreign exchange reserves due to trade balances, remittances, capital flows, and exchange rate interventions. Positive values imply reserve accumulation; negative values indicate reserve depletion. Both Δ NDA and Δ NFA exhibit high volatility, with frequent switches between positive and negative values, suggesting short-term monetary and external-sector adjustments. Periods of negative Δ NFA often coincide with positive Δ NDA, suggesting that domestic asset expansion may have been used to offset foreign reserve losses and stabilize reserve money. Conversely, a strong positive Δ NFA reduces the need for domestic asset expansion, sometimes accompanied by a lower or negative Δ NDA.

By focusing on first differences, the chart reveals policy responses and shocks affecting the central bank's balance sheet more clearly than level data, making it useful for analyzing the monetary policy stance, external pressures, and liquidity management.

5. 1. 6. Income Velocity of Money

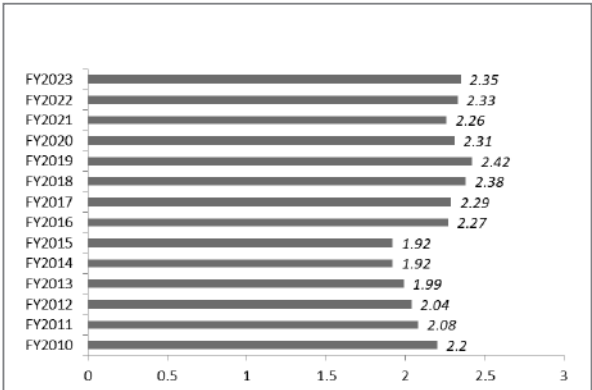


Chart 6. Income Velocity of Money (GDP/M2)
Source & Note: Bangladesh Bank, Author’s Analysis

Chart 6 depicts the income velocity of money, measured as the ratio of nominal GDP to M2, using data from the Bangladesh Bank. Income velocity indicates how frequently money circulates in the economy to generate income and output. A higher velocity implies that each unit of money is used more frequently in transactions, reflecting stronger economic activity or more efficient use of money. A lower velocity suggests that money is circulating more slowly, which may be associated with higher savings, increased liquidity preference, or weaker demand conditions. The velocity of money shows fluctuations over time, reflecting changes in economic activity, monetary expansion, and financial behavior. A declining trend during 2010-2015 indicates that M2 has been growing faster than GDP, implying rising liquidity but slower circulation of money. Periods of stabilization or mild recovery in velocity during 2016-2019 may correspond to improvements in economic activity or normalization after shocks. The income velocity of money is a crucial indicator linking monetary aggregates to real economic performance. Persistent declines in velocity can weaken the transmission of monetary policy, while stable or rising velocity enhances the effectiveness of changes in the money supply on GDP.

6. Capital Inflow
6. 1 Foreign Assistance

The two major sources of foreign capital inflow in Bangladesh are(a) assistance from the development partners of Bangladesh, bilateral and multilateral agencies, and (b) foreign direct investment(FDI). Bangladesh has been experiencing a massive inflow of foreign assistance, both grants and loans, since its independence in 1971. Most of this foreign assistance is negotiated by the Economic Relations Division of the Ministry of Finance. These are regularly published in their annual flagship publication in great detail. Bangladesh has so far received 122472 million US\$ as of June 2023.

Apart from this, there are some other channels through which external assistance is negotiated. These include IMF credits and some special borrowings by the Ministry of Food, Bangladesh Shipping Corporation, Bangladesh Biman, Bangladesh Petroleum Corporation, BPDB, BTCL, BTRC, assistance for Defense, NGOs, and the private sector. Foreign assistance made available through the NGO Affairs Bureau comprises grants and loans. A total of US\$ 14367.81 million has been received on this account from 1989/90 to 2022-2023. Since independence, total commitment and disbursement of Budget support were US\$11081.45 million and US\$ 10282.51 million, respectively. In FY 2022-23, commitments and disbursements of budget support were US\$1875.28 million and US\$1769.32 million, respectively. (ERD, 2023).

Table 1 and Chart 8 present the amounts of assistance negotiated through the ERD during FY2020 to FY2023, their relationship with GDP, and per capita assistance in US\$. At present, foreign assistance accounts for about 2.5% of GDP. During the period shown in the table, per capita assistance has increased from US\$ 15.07 in FY2010 to US\$ 58.11 in FY2023.

Table 1. Foreign Assistance Inflow (Disbursement)

Financial Year	Disbursement US\$ million	Disbursement as % of GDP	Per Capita Inflow
FY2010	2227.8	1.93	15.07
FY2011	1776.7	1.38	11.86
FY2012	2126.5	1.59	14.03
FY2013	2811.0	1.87	18.29
FY2014	3084.4	1.78	19.80
FY2015	3043.1	1.56	19.27
FY2016	3563.9	1.61	22.29
FY2017	3677.2	1.47	22.72
FY2018	6369.4	2.32	38.91
FY2019	6542.6	2.16	39.51
FY2020	7381.7	2.28	44.10
FY2021	7957.6	2.24	47.00
FY2022	10969.3	2.58	64.22
FY2023	10012.9	2.38	58.11

Source & Note: ERD, Bangladesh Bank and Author's Analysis

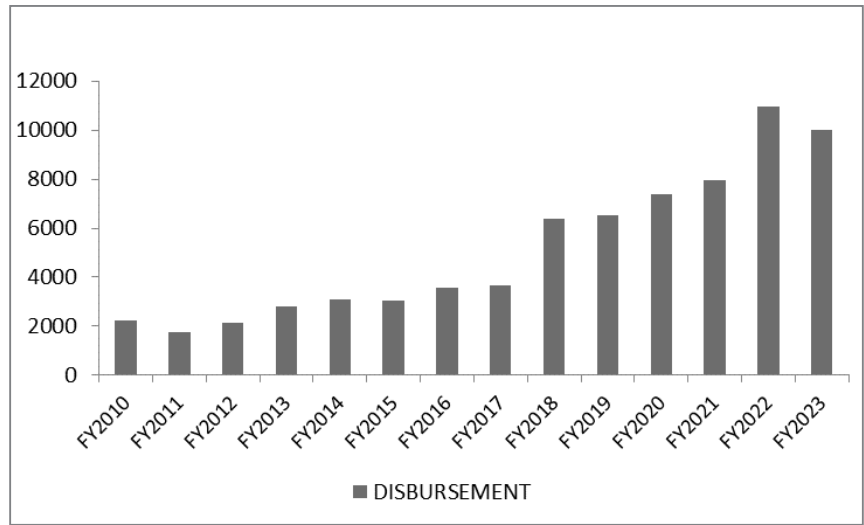


Chart 7. Disbursement of Foreign Assistance. US\$ million
Source & Note: ERD, Bangladesh Bank and Author’s Analysis

6.2 Foreign Direct Investment (FDI)

Compared to foreign assistance, foreign direct investment (FDI) is a relatively recent phenomenon in Bangladesh. Information on FDI is available from FY1997, when it received US\$ 366.85 million in net FDI inflows. However, the extent of FDI continued to rise steadily, reaching US\$ 3,249.68 million in FY2023. Table 2 and Charts 9 & 10 provide detailed information on net FDI inflows from FY2020 to FY2023. The net FDI inflow works through three distinct operational procedures: equity capital, reinvested earnings, and intra-company transfers. The total net FDI inflow was US\$ 911.07 in FY2010, which increased to US 3249.68 in 2023, depicting a CAGR of 10.27%. The share of FDI to GDP was 0.79% in FY2010, which, with slight variation in the mid-way, remained at about the same level in recent years. The per capita FDI inflow, which was US\$ 6.18 in FY2010, reached about US\$ 60 in recent years, about 10 times higher.

Table 2. Net FDI Inflow by Components, FY2010-FY2023

Financial Year	Equity Capital	Reinvested earnings	Intra-company Transfers	Total Net FDI Inflow	Share of Total Net FDI Inflow in DP%	Per capita Net FDI inflow	Gross FDI Inflows	Share of Gross FDI Inflow in GDP %
FY2010	515.14	331.10	66.78	913.02	0.79	6.18		
FY2011	249.95	445.19	83.9	779.04	0.60	5.20		
FY2012	454.1	542.35	198.43	1194.88	0.89	7.88		
FY2013	761.03	645.64	323.96	1730.63	1.15	11.26		
FY2014	233.84	795.78	450.72	1480.34	0.86	9.50		
FY2015	528.03	1141.34	164.5	1833.87	0.94	11.61		
FY2016	595.55	1154.45	343.53	2003.53	0.90	12.53		
FY2017	1006.74	1253.00	195.07	2454.81	0.98	15.17		
FY2018	614.76	1253.44	712.24	2580.44	0.94	15.76		
FY2019	1195.2	1363.46	1330.33	3888.99	1.29	23.48		
FY2020	727.93	1510.09	132.43	2370.45	0.73	14.14	3232.81	1.00
FY2021	816.17	1585.94	105.2	2507.31	0.71	14.80	3386.86	0.95
FY2022	346.94	2044.79	47.9	3439.63	0.80	20.13	4635.67	1.09
FY2023	795.94	2370.54	83.2	3249.68	0.77	18.86	4428.09	1.05

Source & Note: Bangladesh Bank, Author's Analysis. Blank Cell indicates non-availability of data.

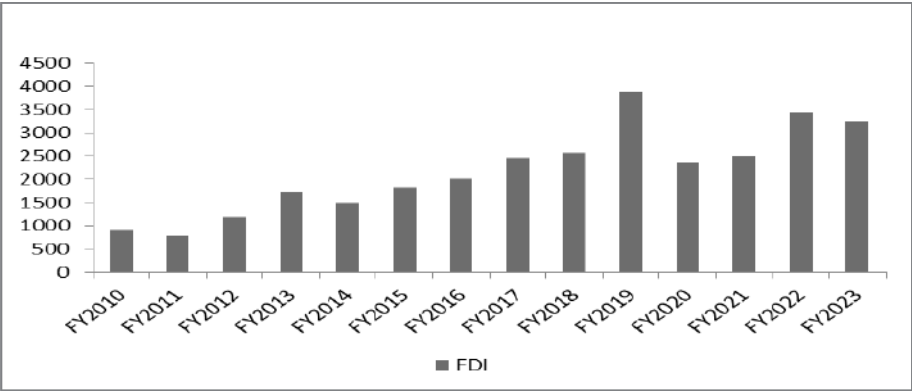


Chart 9: Net FDI Inflow. US\$ million
Source & Note: BB (2024), BB FDI-External Debt (Jan-June 2023) and Author’s Analysis.

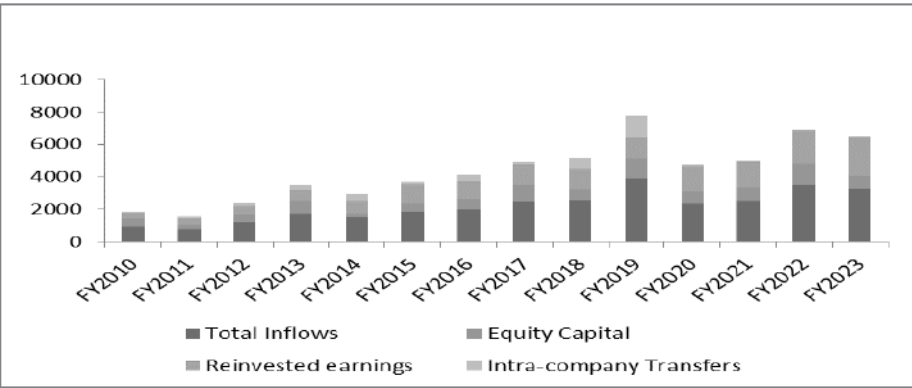


Chart 10: Net FDI Inflow By Types
Source & Note: BB (2023), BB FDI-External Debt (Jan-June 2023) and Author’s Analysis.

6.3 Remittance

International remittances increase the central bank’s Net Foreign Assets (NFA), which, in turn, affects the monetary base, the money supply, and, eventually, inflation. In the Kouri–Porter/Mundell–Fleming framework, remittances are a non-debt-creating foreign exchange inflow. For Bangladesh, they directly affect the balance of payments, influence net foreign assets (NFA) via central bank foreign exchange purchases, trigger sterilization operations that affect NDA, and affect liquidity and the money supply independent of capital market openness. Bangladesh Bank also tends to sterilize the effect of remittances on inflation. Given the growing importance of workers’ remittances as a stable source of foreign exchange in Bangladesh, remittance inflows are incorporated as an additional explanatory variable in both the sterilization and offset equations. Remittances, unlike interest-sensitive capital flows, represent

quasi-exogenous balance-of-payments inflows and therefore directly influence reserve accumulation and the central bank's liquidity management operations.

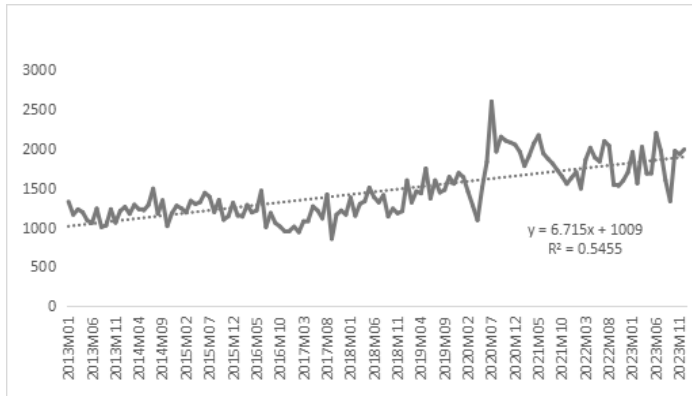


Chart 11. Monthly Remittance. US\$ million
Source & Note. BB. Monthly Economic Trends. Author's analysis

The chart shows monthly remittance inflows (million US\$) over the study period. The fitted trend line ($y = 6.715x + 1009$) indicates steady, positive growth in remittance inflows over time. The positive slope implies that, on average, monthly remittances have been increasing consistently. The ($R^2 = 0.5455$) suggests that about 55% of the variation in remittances is explained by the time trend alone. This indicates a strong underlying trend, but also substantial short-term fluctuations driven by other factors. Remittances fluctuate considerably around the trend, reflecting seasonality, migration cycles, global economic conditions, and exchange-rate incentives. Periods of relative stability are interspersed with sharp spikes and drops. A pronounced surge is visible around 2020–2021, with remittances peaking well above the historical average. The sharp rise during crisis periods (e.g., around 2020) suggests that remittances act as a counter-cyclical buffer, supporting domestic income and consumption when other external flows weaken. This period is followed by higher volatility, but at a new, higher level than in the pre-2020 period. After the peak, remittances decline somewhat but remain structurally higher than in earlier years, suggesting a lasting upward shift rather than a temporary shock. The sustained upward trend implies that remittances have become an increasingly reliable source of foreign exchange, helping to finance imports and support the balance of payments. While beneficial, growing reliance on remittances may increase vulnerability to external shocks in host countries, underscoring the importance of export diversification and domestic job creation. Overall, the chart indicates that remittances have evolved from a stable but modest flow into a key structural pillar of external financing, with important implications for macroeconomic management and long-term development strategy.

7. Capital Outflow

7.1 The net capital Outflow during the last five financial years is shown in Table 3. The net capital outflow was US\$25.97 million in FY2019, reached a high of US\$70.71 million in FY2022, and decreased again to US\$32.22 million in FY2023.

Table 3: Net FDI Outflow by Components. FY 2019-FY 2023

Financial Year	Equity Capital	Reinvested earnings	Intra-company Transfers	Total Net FDI outflows	Share of Total Net FDI outflow in GDP%	Per capita Net FDI outflow	Gross FDI Outflows	Share of Gross FDI Outflow in GDP%
FY2019	1.63	22.26	2.08	25.97	0.007	0.16	37.37	0.011
FY2020	14.94	19.59	-24.00	10.52	0.003	0.06	37.52	0.010
FY2021	4.13	27.79	27.42	59.34	0.014	0.35	65.17	0.016
FY2022	6.89	20.63	43.19	70.71	0.015	0.41	75.92	0.016
FT2023	11.68	41.42	-20.88	32.22	0.007	0.18	67.43	0.015

Source & Note: BB (2023), BB FDI-External Debt (Jan-June 2023), and BB earlier issues.

7.2 Capital Outflow: Capital Flight/Money Laundering

Apart from the ways mentioned above, there are other means, which are known as illicit money transfers, as labeled by Global Financial Integrity. According to a 2021 Global Financial Integrity (GFI) report, \$61.6 billion was smuggled out of Bangladesh from 2005 to 2014. Bangladesh loses \$8.27 billion annually to trade misinvoicing. By 2030, GFI predicts this could exceed \$14 billion annually. The glaring discrepancy between data from the Export Promotion Bureau and Bangladesh Bank is an eye-opener on direct capital flight—a \$12 billion gap between export shipments and actual receipts from abroad, usually attributed to exporters' delays in repatriating export earnings. Last September, customs authorities found 33 ready-made garment factories and buying houses laundered at least BDT 821 crore in the previous six years. The launderers resorted to two tactics – under-invoicing and using incorrect shipping codes. Experts fear this is only the tip of the iceberg of TMBL in Bangladesh. (GFI,2021)

8. Model Specification

There are two empirical approaches to assess the impact of a country's central bank's sterilization policy on the domestic monetary base. The first approach, based on Cumby and Obstfeld (1981), uses only the central bank's monetary policy reaction function to determine the sterilization coefficient.

On the contrary, the second approach, centered on Kouri and Porter (1974), argues that net domestic assets and net foreign assets mutually affect one

another. In other words, both variables are endogenous to the model. Therefore, according to them, the monetary policy reaction function can be converted into a capital flow equation by merely reversing it, as both variables, i.e., net domestic assets and net foreign assets, are endogenous to the model. Thus, sterilization and offset coefficients can be estimated from the same function/ equation by merely inverting one for the other.

Following Kouri and Porter (1974), we also assume net domestic assets (ΔNDA) and net foreign assets (ΔNFA) to be endogenous and estimate sterilization and offset coefficients for Bangladesh from the following empirical models, respectively:

$$\Delta NDA_t = \alpha_0 + \alpha_1 \Delta NFA_t + \alpha_2 \Delta MM_{2t} + \alpha_3 \Delta IIP_t + \alpha_4 \Delta IF_t + \alpha_5 \Delta DS_t + \alpha_6 \Delta NER_t + REM_t + U_t \quad (1)$$

$$\Delta NFA_t = \beta_0 + \beta_1 \Delta NDA_t + \beta_2 \Delta MM_{2t} + \beta_3 \Delta IIP_t + \beta_4 \Delta IF_t + \beta_5 \Delta DS_t + \beta_6 \Delta NER_t + REM_t + V_t \quad (2)$$

The first equation is the famous monetary policy reaction function, used to evaluate the effectiveness of the central bank's sterilization policy in neutralizing the impact of foreign capital inflows on domestic monetary conditions. The sterilization coefficient is estimated from this reaction function. The coefficient of net foreign assets (ΔNFA) in equation (1), i.e., is the sterilization coefficient whose value is expected to be negative and ranges between 0 and -1. First extreme value (i.e., 0) implies no sterilization at all, and the second extreme value (i.e., -1) means full sterilization of the effect of foreign assets on domestic assets (ΔNDA). Any value between these two extremes implies a partial impact of the central bank's sterilization policy on domestic monetary conditions. A higher sterilization coefficient value is consistent with a more effective sterilization policy and vice versa.

Equation (2) is merely a reverse of equation (1) and is termed the capital flow equation (Kouri & Porter, 1974). It measures how foreign capital or net foreign assets respond to changes in domestic monetary conditions. β_1 In equation (2), the offset coefficient estimates how the central bank's efforts to sterilize the impact of foreign exchange reserves on the domestic monetary base are neutralized by fresh capital inflows. Like α_1 the expected value of β_1 is between 0 and -1. Both extreme values represent the absence and the full offsetting effect of net foreign assets on sterilization interventions, respectively. Full offsetting effect i.e. $\beta_1 = -1$ implies that net domestic assets and net foreign assets are perfect substitutes of each other suggesting any change in one is reflected in equal and opposite changes in the other. Conversely $\beta_1 = 0$ suggests imperfect substitutability between net foreign and domestic assets, implying that the former do not respond to any changes in the latter. The

value of the offset coefficient between these two extremes indicates the partial neutralization, or offsetting, effect of the fresh inward capital movements on the sterilization policy.

Other variables used in equations (1) and (2) are quantum index of industrial production (ΔIIP), money multiplier of broad money M2 ($\Delta MM2$), difference of call money rate and US three months commercial paper rate (ΔIF), difference of policy rate and call money rate (ΔDS), and nominal US\$/BDT exchange rate (ΔNER). Used as a proxy of real gross domestic product/income, ΔIIP is expected to have a positive effect on domestic and foreign assets (Ljubaj et al, 2010). Hence, the expected values of α_3 and β_3 are positive. The interest rate differential (ΔIF) is calculated as the difference between the domestic and foreign interest rates. The coefficients of ΔIF , i.e., α_4 and β_4 in equations (1) and (2), respectively, are conditional on the comparative value of the domestic and foreign interest rate.

α_4 in equation (1) will be negative if the domestic rate of interest is higher than the foreign rate of interest because credit (net domestic assets) is inversely related to the interest rate. It will be positive in the opposite case, because a comparatively higher foreign interest rate will cause domestic capital to flow out in search of higher profits abroad. On the contrary, the β_4 in equation (2) will be positive if the domestic rate of interest is greater than its foreign counterpart, as foreign capital inflows are positively associated with the domestic interest rate. The coefficient of the nominal exchange rate, α_6 , in equation (1) is assumed to be positive because central banks raise domestic credit to offset the appreciating effect of foreign inflows on the local currency, aiming to improve the competitiveness of domestic goods in international markets. Conversely, β_6 in equation (2) is expected to have some negative value as foreign inflows are inversely related to the domestic real exchange rate (Cumby & Obstfeld, 1981; Ljubaj et al, 2010; RBI, 2018; Khushik et al, 2021). The following paragraph is a quote from the RBI analysis on the Indian economy.

‘Sterilization operations, if undertaken through the sale of domestic securities, can put upward pressure on Domestic interest rates, which, in turn, can widen interest rate differentials. In such a scenario, sterilization Operations can trigger higher capital inflows. Thus, the change in net domestic assets (NDA) can be offset by a change in net foreign assets (NFA). Empirically, the extent and effectiveness of a central bank’s sterilization operations can be measured by computing the sterilization and offset coefficients, which range from 0 to -1. The sterilization coefficient measures the extent to which the NDA of a central bank changes in response to a change in NFA, while the offset coefficient measures the extent to which a decrease/increase in NDA causes an increase/decrease in NFA. A value of -1 for the sterilization coefficient

suggests complete sterilization, i.e., no impact of capital flows on the reserve money; a value of 0 would imply that the central bank's forex intervention is fully sterilized. A value of -1 for the offset coefficient suggests the complete ineffectiveness of the central bank in sterilizing capital flows, i.e., complete attenuation of monetary control. An offset coefficient of -1 can also indicate perfect capital mobility, while a value of 0 implies no capital mobility (RBI, 2018).

8.1 Data and Variables used in Regression Analysis

To examine the relationship between the dependent variable and the explanatory variables, the standard regression model is used, and it could be defined as follows for observation month t

$$\text{where } \Delta Y_t = \alpha_0 + \beta X_{it} + \varepsilon_{it} \quad i = 1, \dots, N \quad (1)$$

ΔY_t is the change in the dependent variable (ΔNDA_t or ΔNFA_t) of the Central Bank in the month t

(α_0, β) is a vector of parameters

X_{it} is a vector of explanatory variables, ε_{it} is a stochastic error term

The description of variables and their measurements is given in Table 4.

Table 4: Description of the variables used in the regression models

Variable	Description
NDA _t	Net domestic assets of the Central Bank in month t . Crore BDT
NFA _t	Net foreign assets of the Central Bank in month t . Crore BDT
MM2 _t	Money Multiplier of broad money M2 obtained as M2/RM in month t
MM3 _t	Money Multiplier of broader money M3 obtained as M3/RM in month t
IIP _t	Index of Industrial Production used as a proxy for economic growth/GDP in month t
IF _t	Spread between the central bank's call money rate and the effective federal exchange rate (US three-month commercial paper rate) in month t
DS _t	Spread between the policy rate and the weighted average call rate of the Central Bank in month t .
NER _t	Nominal exchange rate USD/BDT in month t
REM _t	Remittance million US\$ in month t million US\$

Source & Note: In the regression analysis, all variables were used in first differences. Descriptive Statistics of the study variables used in the regression analysis are shown in Table 5

Table 5. Descriptive Statistics

Variable	Observation	Mean	Std dev	Minimum	Maximum
NDA _t	120	-20058.4	275796	462342.8	1442188
NFA _t	120	238319.9	78085.5	100134	387438.6
RM _t	120	218261.4	75019.37	106243.7	380011.7
M2 _t	120	1093243	349212.6	562476.8	1754176
M3 _t	120	1327767	457830.7	637746.2	2144175
MM2 _t	120	5.06	0.22	4.48	5.51
MM3	120	6.08	0.21	5.44	6.55
IIP _t	120	345.6	105.2	185.7	570.60
IF _t	120	3.97	2.19	0.26	10.14
DSt	120	1.50	1.52	-3.04	4.58
NER _t	120	82.21	4.63	77.40	8.86
REM _t	120	1418.45	334.93	56.87	2598.21

Source & Note: Author’s analysis.

The correlation matrix of the study variables used in the regression analysis is shown in Table 6.

Table 6: Correlation Matrix Of The Study Variables

	NDA _t	NFA _t	MM2 _t	IIP _t	IF _t	DSt	NER _t	REM _t
NDA _t	1							
NFA _t	-.2107	1						
MM2 _t	0.1481	-.7195	1					
IIP _t	-.0041	0.9311	-0.5883	1				
IF _t	0.3803	-.7936	0.6859	0.7179	1			
DSt	-.7838	0.4137	-0.4770	0.2320	-.7554	1		
NER _t	0.4033	0.7485	-0.4645	0.8389	-.5453	-0.0948	1	
REM _t	0.1365	0.6916	-0.4154	0.7149	-0.3605	-0.0156	0.6257	1

Source & Note: Author’s analysis. Any correlation coefficient higher than 0.2107 is statistically significant at the 5 percent level.

Regression Results.Table 7a. Regression Results of Sterilization (Δ NDA). Equation (1)

Independent Expected variables sign	Regression coefficient (standard error)		
	Pooled OLS	GLS Random Effects. Group variable (Months)	GLS Fixed effect. Group variable (Months)
Model	(1a)	(1b)	(1c)
Δ NFA -	-0.87*** (.06)	-0.91*** (.06)	-0.93*** (.07)
Δ MM2 -	-2602.04*** (2016.04)	-51074.76*** (1974.65)	-50103.02*** (2059.44)
Δ IIP +	2.44 (7.26)	-.73 (7.23)	-2.72 (7.57)
Δ IF -	-1121.69 (1609.75)	-724.93 (1546.75)	-531.61 (1589.52)
Δ DS -	-872.85 (1585.92)	-613.09 (1543.47)	-527.25 (1597.18)
Δ NER +	1456.76** (561.77)	1170.54** (537.17)	988.73* (552.20)
Δ REM -	.615 (1.51)	1.31 (1.48)	1.70 (1.54)
CONSTANT	1465.72*** (315.06)	1604.60*** (491.82)	1714.20*** (306.51)
R squared (Overall)	.9024	0.9009	.8984
Sigma_u		1364.75	1524.39
Sigma_e	.	2738.46	2738.46
rho		.1989	.23657
Wald Chi2		1122.45	
F	146.55		153.36
P value	.0000	.0000	.0000
Durbin's Chi2	2.20		
N	120	120	120

Source & Note: Author's analysis.

* statistically significant at the 10 percent level, ** statistically significant at 5 percent level, *** statistically significant at 1 percent level. The models were estimated using STATA 14. In the regression analysis, all variables were first-differenced.

Interpretation of Sterilization Regression Results

The coefficient of ΔNFA is negative and highly significant across all three models. This confirms partial sterilization, indicating that increases in net foreign assets are systematically offset by reductions in net domestic assets. $\Delta MM2$ exhibits a large and statistically significant negative coefficient, implying that monetary expansion is strongly countered through sterilization operations. The coefficient for ΔNER is positive and statistically significant, suggesting that exchange rate depreciation is associated with an expansion of NDA, reflecting central bank intervention. The quantum index of industrial production used as a proxy for GDP growth (IIP), Spread between the central bank's call money rate and the effective federal exchange rate-US three-month commercial paper rate (IF). Spread between the policy rate and the weighted average call rate of the Central Bank (DS). had no significant effect on ΔNDA . The effect of remittances (ΔREM) is positive, but the coefficient remains statistically insignificant across all models, implying a limited direct impact on NDA adjustments.

Model Performance

All models demonstrate excellent explanatory power with R^2 close to 0.90. The significant Wald χ^2 and F statistics confirm the overall model's validity.

The results indicate that the monetary authority actively sterilizes foreign exchange inflows, as evidenced by the negative and highly significant coefficient on changes in net foreign assets (ΔNFA) across all specifications. However, the coefficient remains below unity, implying partial sterilization and suggesting that external inflows continue to exert some expansionary pressure on domestic liquidity.

The strong negative effect of broad money growth ($\Delta MM2$) underscores the central bank's reliance on domestic monetary instruments to absorb excess liquidity. While effective in the short run, the magnitude of this response raises concerns regarding the fiscal and quasi-fiscal costs of sustained sterilization. The positive and significant association between changes in the nominal exchange rate (ΔNER) and net domestic assets indicates that exchange rate considerations influence liquidity management, highlighting a trade-off between exchange rate stabilization and monetary independence.

Other variables, including fiscal-related and remittance flows, are insignificant, suggesting that sterilization policy is primarily driven by external sector dynamics. Overall, the findings support the need for complementary policies, including greater exchange rate flexibility and deeper financial markets, to enhance the sustainability of monetary control.

Table 7b . Regression Results of Offset (Δ NFA) . Equation (2)

Independent Expected variables sign		Regression coefficient (standard error)		
		Pooled OLS	GLS Random Effects. Group variable(Months)	GLS Fixed effect. Group variable(Months)
Model		(2a)	(2b)	(2c)
Δ NDA	-	-0.71*** (.05)	-0.70*** (.06)	-0.70*** (.05)
Δ MM2	-	-39792.4*** (3064.63)	-39523.52*** (2875.25)	-36040.02 *** (3018.75)
Δ IIP	-	6.43 (6.64)	4.67 (6.48)	2.57 (6.57)
Δ IF	+	-42.73 (1457.29)	49.65 (1375.25)	733.76 (1378.31)
Δ DS	+	674.97 (1433.11)	815.28 (1325.78)	1097.015 (1382.54)
Δ NER	-	379.43 (521.37)	336..38 (420.75)	-24.00 (486.84)
Δ REM	+	0.1354 (1.36)	0.1267 (1.36)	1.324 (1.34)
CONSTANT		1819.81*** (258.76)	1843.61*** (285.75)	1954.41*** (233.86)
R squared		.6619	.6618	.6643
Sigma_u			335.54	1543.20
Sigma_e			2377.83	2376.60
rho			.0195	.2872
Wald Chi2			225.65	
F		31.05		34.68
P value		.0000	.0000	.0000
Durbin's Chi2		1.956		
N		120	120	120

Source & Note: Author's analysis.

* statistically significant at 10 percent level, ** statistically significant at 5 percent level, *** statistically significant at 1 percent level. The models were estimated using STATA 14. In the regression analysis, all variables were first-differenced.

Interpretation of Offset Regression Results (ΔNFA)

Table 7b reports the estimation results for the offset equation, in which changes in net foreign assets (ΔNFA) are regressed on changes in net domestic assets (ΔNDA) and other control variables. Across pooled OLS, GLS random effects, and GLS fixed effects models, the coefficient on ΔNDA is negative and highly statistically significant. This provides strong evidence of an offset effect, indicating that expansionary domestic monetary policy is associated with a reduction in foreign reserves. The magnitude of the coefficient (around -0.70) suggests a strong but incomplete offset, implying that roughly 70 percent of changes in domestic assets are offset by capital flows.

The coefficient on the broad money multiplier ($\Delta MM2$) is also large, negative, and highly significant across all models. This indicates that increases in domestic liquidity lead to substantial reserve outflows, further reinforcing the existence of strong external adjustment mechanisms that constrain monetary policy effectiveness.

Other explanatory variables—including the quantum index of industrial production used as a proxy for GDP growth (IIP), the Spread between the central bank's call money rate and the effective federal exchange rate-US three-month commercial paper rate (IF). Spread between the policy rate and the weighted average call rate of the Central Bank (DS). Remittance (REMIT) had no significant effect on ΔNFA . Overall, the models explain about two-thirds of the variation in ΔNFA , and the diagnostic statistics confirm a good overall fit. The results imply limited monetary policy autonomy, as domestic policy actions are largely offset by external sector responses.

This study evaluates the effectiveness of monetary policy in an open economy by jointly examining sterilization and offset mechanisms. The results from Tables 7a and 7b provide consistent evidence that the monetary authority faces significant constraints in managing domestic liquidity amid external and internal shocks. The sterilization estimates show that the central bank actively adjusts net domestic assets in response to changes in net foreign assets, confirming the presence of a sterilization policy. However, the magnitude of the coefficients indicates that sterilization is only partial, allowing foreign reserve movements to continue affecting domestic liquidity. Exchange rate movements also play a significant role, highlighting the close interaction between monetary policy operations and exchange rate management.

The offset results reveal a strong counteracting response from the external sector, with expansionary domestic monetary actions triggering capital outflows and reserve losses. This high degree of offset substantially weakens the effectiveness of discretionary monetary policy and limits monetary autonomy. Overall, the coexistence of partial sterilization and strong offset

effects suggests structural limits to monetary policy effectiveness, underscoring the need for complementary policies such as greater exchange rate flexibility, improved policy coordination, and deeper financial markets.

9. Cross Country Comparison

Tables 8 and 9 provide information on sterilization and offset coefficients obtained from research conducted in peer countries.

Table 8. Cross-country comparison of sterilization coefficient

Countries	Sterilization Coefficient	Sample Period	Frequency
Bangladesh/a	-0.87 to-0.93	2013M01-2022M12	Monthly
India/b	-0.83	1994-03	Monthly
Pakistan/b	-0.87	Jul 00-Dec 03	Monthly
Korea/b	-0.90	1980-89	Monthly
Brazil/b	-1.76	1955-71	Yearly
Chile/b	-1.22	1955-71	Yearly
Hungary/b	-1.00	1992-97	Monthly

Source & Note. a/ equation (1) and table 7 (a) of author's analysis.
b/Jan, Elahi and Zaid (2005)

Table 8 presents a cross-country comparison of sterilization coefficients, showing how actively different central banks offset changes in foreign assets through domestic monetary operations in some emerging developing economies. The table shows that many emerging economies practice strong sterilization policies, often close to or exceeding full offset. This reflects efforts to maintain monetary control and price stability amid volatile capital flows and external shocks. Brazil, with a sterilization coefficient of -1.76, and Chile, with a sterilization coefficient of 1.22, suggested more than full sterilization, possibly due to aggressive domestic tightening during 1955-71. Our estimates compare well with findings from other countries.

Table 9. Estimates of Sterilization and Offset Coefficients

Author	Time period	Method	Sterilization Coefficient	Offset coefficients
Matin (2024)/a	2013M01-2022M12	OLS, GLS	-0.87 to -0.93	-0.70 to -0.71
Pattanaik (1997)/b	1993M04-1997M03	OLS	-	-0.30
Pattanaik (2004)/b	1993M04-2003M12	ECM	-0.82	-
RBI (2004)/b	1994M04-2003M09 & 1995M10-2003M09	OLS	-0.92 & -0.65	-
RBI (2005)/b	1995M10-2004M03	OLS	-0.63	-
Ouyang & Rajan (2008)/b	1990Q01-2004Q04	2SLS	-1.10	-0.79 to -0.84
Sen Gupta & Sengupta (2013)/b	1990M01-2010M08	OLS	-0.21 to -0.61	-
RBI (2018)/b	1997M07-2017M10	2SLS	-1.03	-0.83
RBI (2021)/b	2006M01-2016M06 & 2016M07-2019M12	OLS	-0.04 & -0.42	-0.21 & -0.31

Source & Note: A. Author’s analysis equation (1) and (2); B. Grewal & Trivedi (2022).

Table 9 presents the findings on sterilization and offset coefficients as obtained in various analysis. Most of the findings are based on data on Indian economy. The estimated sterilization coefficients in Bangladesh are negative and close to unity (−0.87 to −0.93), indicating near-complete offsetting of foreign reserve flows through domestic operations during 2013–2022. This suggests that foreign exchange interventions were systematically sterilized, limiting the impact of reserve accumulation on domestic liquidity and placing the recent period at the upper end of estimates reported in the literature. The offset coefficients are also negative and sizeable (−0.70 to −0.71), implying substantial but incomplete capital-flow responses to domestic monetary actions. While increased capital mobility has strengthened offset effects, they remain well below unity, allowing the monetary authority to retain some degree of policy autonomy. Taken together, the results describe a regime of active foreign exchange intervention supported by sustained sterilization under conditions of partial capital mobility, consistent with a managed exchange rate framework.

10. Conclusion

This study jointly examines the sterilization and offset mechanisms to assess the effectiveness of monetary policy in an open economy. We explored the extent to which the Central Bank of Bangladesh, Bangladesh Bank, sterilized capital inflows by estimating a sterilization coefficient, and the extent to which the central bank's domestic-market activities spurred additional capital inflows by estimating an offset coefficient. Monthly data from 2013M01 to 2023M12, available in various government publications, have been used in the analysis. The sterilization coefficient was estimated from the monetary policy reaction function, while the capital-flow equation was used to estimate the offset coefficient. The multiple regression technique has been applied to estimate the effects of the explanatory variables. The control variables included are the quantum index of industrial production(IIP), money multiplier of broad money M2(MM2), spread between central bank policy rate and effective federal exchange rate(IF), spread between policy rate and call money rate (DS), and the nominal BDT/US\$ exchange rate (NER). The results from the two equations across all specifications show that sterilization coefficients are higher than offset coefficients, suggesting that the Bangladesh central bank could mitigate the impact of foreign capital inflows on the domestic money base. Taken together, the coexistence of partial sterilization and a strong offset effect suggests that monetary policy faces structural constraints under conditions of capital mobility and exchange rate considerations. These findings underscore the need for complementary policy measures, including greater exchange rate flexibility, improved policy coordination, and deeper financial markets, to enhance the sustainability and effectiveness of monetary control.

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Injection and Leakage Shocks in the Macroeconomy: A Factor-Augmented SVAR Analysis of Output and Employment in Bangladesh

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Abstract

This paper examines the output and employment effects of two aggregate demand shocks, namely injections and leakage shocks, in Bangladesh. Motivated by the Keynesian injections–leakages framework in the circular flow of national income, the study estimates injection and leakage factors using Principal Component Analysis and identifies shocks in a sign-restricted structural vector autoregression over the period 1980–2023. The impulse response functions show that injection shocks raise output and employment, while leakage shocks have larger and more persistent effects over the 10-year horizon. For both shocks, the effects tend to revert to the steady-state lines over the periods, although a dominant medium-term trend is evident. Additionally, forecast error variance decomposition consistently supports the findings from impulse responses, showing that leakage shocks explain a larger portion of fluctuations in both GDP growth and employment than injection shocks. In aggregate demand-side policy management, the findings suggest that the primary drivers of macroeconomic fluctuations in Bangladesh are leakage factors. In contrast, the effectiveness of expanding aggregate demand through injections and the fiscal multiplier is subject to structural adjustments.

Keywords: Aggregate Demand Shocks · Injections and Leakages · Output and Employment Dynamics · Structural VAR · Bangladesh Economy

JEL Classification Codes: E12 · E32 · C32 · O11 · J23

Introduction

This paper focuses on an aggregate demand-side issue: how GDP growth and employment are affected by fluctuations in the injection and leakage factors,

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with investment, government spending, and exports on the injection side, and savings, taxes, and imports on the leakage side. The primary motivation comes from Keynesian macroeconomic theory, where the circular flow of national income framework shows how an economy's output and employment can change with changes in injections and leakage forces (Keynes, 1936; Mankiw, 2019). The aggregate demand-centered macroeconomic policy of the injections-leakages framework is widely discussed in theoretical macroeconomics, but empirical studies of developing economies such as Bangladesh remain limited. In Bangladesh, we observed that rapid economic growth, accelerated by expansionary fiscal policies, has also been accompanied by adverse macroeconomic shocks arising from leakage factors. We focus on the dynamics and interaction between injection and leakage factors and ask to what extent changes in injection-driven expansion versus leakage-induced constraints drive growth fluctuations.

In this study, we aim to address this question by constructing composite indicators for injection and leakage factors. We employ PCA for dimensionality reduction and examine the macroeconomic effects of these factors using a sign-restricted structural VAR (SVAR). The SVAR approach allows us to identify and compare the dynamic effects of injection and leakage shocks on output and employment.

Building upon the traditional Keynesian circular flow model, this study enhances the injections-leakages framework by integrating contemporary macroeconomic variables. On the injections side, factors such as financial development, remittance inflows, and the accumulation of human capital increase the usefulness of investments and imports, thereby enhancing aggregate demand. On the leakage side, exchange rate volatility and macroeconomic uncertainty increase income withdrawals by augmenting imports, boosting precautionary savings, and increasing fiscal burdens.

The significance of this work is that it centers around the composition and quality of aggregate demand rather than individual macroeconomic drivers. Most of the existing empirical studies focus on growth and treat them as separate variables, such as capital formation, trade openness, or inflation, but do not distinguish explicitly whether they are expansionary or contractionary forces within a unified framework. Although structural vector autoregression (VAR) models (Sims, 1980) are now standard tools for analyzing macroeconomic dynamics and sign-restriction approaches have allowed for obtaining much more informative structural identification (Uhlig, 2005; Mountford & Uhlig, 2009), all of this literature misses a direct connection to the Keynesian injections-leakages mechanism. Consequently, the balance of power between expansionary versus contractionary demand-side forces has been less discussed, especially in developing country settings.

This study offers three main contributions to fill this gap. First, it operationalizes the Keynesian injections–leakages framework by creating composite indices of injection and leakage factors through principal component analysis (PCA), which allows for summarizing the joint dynamics of several macroeconomic variables without imposing arbitrary weights (Stock & Watson, 2002). Second, it inserts these into a sign-restricted VAR framework, such that shocks with the correct signs are consistent with injection and leakage shocks under the theory. Third, it provides new empirical findings on the dynamic impact and relative significance of such shocks in Bangladesh during 1980–2023, thus contributing to both empirical macroeconomics and development policy analysis.

We use principal component analysis (PCA) to derive two latent factors, injections and leakages, based on the underlying variables (investment, government expenditure, exports, remittances as injections; savings, taxes, and imports variables as leakages). These variables are then included in a sign-restricted structural VAR model to examine the dynamic effects. The factor-augmented methodology allows us to condense high-dimensional macroeconomic information, and the sign-restriction approach permits a theoretically founded way to identify structural shocks without imposing many restrictive contemporaneous ordering assumptions (Bernanke et al., 2005; Uhlig, 2005).

We summarize our key findings as follows. For the 10-year horizon, our estimated impulse response functions (IRFs) show that injection shocks lead to positive, instantaneous changes in output and employment, consistent with the Keynesian multiplier process. However, the effects are temporary, although persistent, and return to equilibrium over time as aggregate demand and supply adjust towards their equilibrium levels. Leakage shocks, in contrast, have negative persistence and a greater effect in magnitudes as they dominate the macroeconomic dynamics. Consistent with the IRFs, the forecast error variance decomposition also shows that shocks originating from the leakage explain a significantly larger fraction of variation in both GDP growth and employment than do injection shocks. We relate our results to the structural asymmetry in the Bangladesh economy, where contractionary leakage forces dominate medium-term macroeconomic dynamics.

Consistent with Keynesian theory, our results are significant: IRFs show that aggregate demand shocks produce temporary expansions that eventually return to equilibrium. However, the persistent impact of leakage shocks also signals that macroeconomic frictions, including taxes, external imbalances, and savings behavior, act to undermine the effectiveness of aggregate demand expansion on national output (Fischer, 1993; Aghion et al., 2009). For the Bangladesh economy, our findings suggest that structural adjustments and a balanced approach to injections and leakages should complement

macroeconomic demand stabilization through consumption, investment, or external inflows. In the empirical literature, we find that responses to demand shocks are consistent with the VAR literature by Galí (1999) and Uhlig (2005), showing that the effects of demand shocks tend to be temporary and converge towards the steady state.

Literature Review

Our study related to three strands of literature. In the group of growth and productive drivers, we relate our study to the Neoclassical and endogenous growth models that emphasize capital accumulation, human capital, and openness as key drivers (Solow, 1956; Romer, 1990; Lucas, 1988; Mankiw et al., 1992). However, a major shortcoming of both neo-classical and endogenous growth models is that they neglect short-run demand-oriented fluctuations and macroeconomic imbalances. While the classical view emphasizes the role of supply-side factors in determining output, Keynesian macroeconomic theory treats demand as a critical driver of output and employment, especially in the short term. The circular flow of income model identifies injections that increase aggregate demand, such as investment, government spending, and exports, and leakages that decrease aggregate demand, including savings, taxation, and imports.

Our paper also focuses on macroeconomic instability, where the literature examines the drivers of inflation, exchange rate volatility, and fiscal imbalances, all of which reduce growth by increasing uncertainty and distorting incentives (Fischer, 1993; Aghion et al., 2009). On the demand side, many of these instability factors are potential leakages from the economy. Such factors include inflationary pressures that erode real purchasing power and distort consumption and investment decisions, as well as exchange rate volatility, which disrupts both trade flows and external balances. Again, high levels of imports are a direct leakage from domestic demand, reducing the multiplier effect of expansionary policies. Fiscal shortfalls, such as high taxes or poor public expenditure, can further stifle aggregate demand.

From a methodological perspective, our study relates to the structural VAR (Sims, 1980), which is widely used in the macroeconomic literature, and we chose Uhlig's (2005) sign restriction to identify the shock. Sign-restricted VAR approaches allow identification based on theoretical restrictions aligned with the Keynesian expansion rather than strict ordering assumptions (Uhlig, 2005; Mountford & Uhlig, 2009). The parallel growth of factor-based approaches, especially those employing principal component analysis (PCA), has become widespread to capture large amounts of information from datasets (Stock & Watson, 2002). The factor-augmented VAR (FAVAR) models extend standard VAR models with latent factors that account for the covariation across a large number of macroeconomic variables (Bernanke, Boivin, & Elias, 2005).

Those techniques remedy the dimensionality problem and offer a more optimal picture of the macroeconomy.

However, we observed that the literature integrating factor-based methods with the Keynesian injections–leakages framework is relatively limited. Also, SVAR models have been widely applied to demand shock studies, but generally do not distinguish between expansionary injection shocks and contractionary leakage shocks, particularly in the context of the Bangladesh economy. We find a lack of empirical studies that bridge theory and empirical applications in the Bangladesh economy, and our study focuses on the empirical applications of the factor-augmented SVAR approach. We attempt to fill this gap in the literature using data on the Bangladesh economy.

Conceptual Framework

The investigation of injections and leakages shocks and their effects on output and employment is theoretically grounded in the Keynesian circular flow framework (Keynes, 1936), where the equilibrium level of output Y is maintained in identity with the aggregate demand as follows:

$$Y = C + I + G + (X - M)$$

In the IS-LM framework, the equilibrium is achieved when:

$$I + G + X = S + T + M$$

In an open economy setting with consumption, investment, taxes, and government, the expenditure multiplier can be expressed as¹:

$$k = \frac{1}{MPS + MPM + MPT}$$

Where MPS (marginal propensity to save), MPT (tax rate), and MPM (marginal propensity to import) denote leakages from the circular flow. Keynesian theory suggests that an increase in injections is associated with higher output through the expenditure multiplier. There is an inverse relationship between the size of the expenditure multiplier and the size of leakages: high leakages weaken the multiplier effect, which in turn lowers the overall impact on GDP and employment (Keynes, 1936).

This framework of injection leakages is deeply rooted in and expands on various branches of macroeconomic theory. The multiplier mechanism, through which injections increase output and employment via aggregate demand, provides the basic logic for expecting that injection shocks should have expansionary effects and leakage contractionary effects (Keynes, 1936). Accordingly, we set out to test whether injection shocks have stronger expansionary effects than leakage effects. This view complements neoclassical and endogenous growth

¹ We refer interested readers to Appendix 3 (A3) for the detailed derivation of the expenditure multiplier.

models, such as those of Lucas (1988) and Romer (1990), which suggest that productive capacity increases through investment and human capital accumulation, supporting the long-term effects of injections. At the micro level, Jorgenson (1963) argues that investment decisions are most sensitive to expectations and uncertainty, suggesting that increased uncertainty weakens the channels of injection and reinforces contractionary forces. Likewise, Tobin (1965) identifies inflation as a source of distortion that reduces real income and unsettles saving and investment behavior, thereby constituting a leakage from the circular flow. Finally, in a small-open-economy framework, Obstfeld & Rogoff (1998) show that exchange rate fluctuations and trade deficits affect the extent of leakages from exports and imports, which, in turn, deepen leakages, especially in developing countries.

Research Questions and Hypotheses

We address our first objective by asking how injections and leakages can be empirically measured using macroeconomic data. Second, we focus on the relative impacts of demand-side shocks in the Bangladesh economy, examining the dynamic effects of injection shocks on output, prices, and employment. How do leakage shocks differ in magnitude and persistence? We naturally ask which has a greater impact, expansionary injection effects or contractionary leakage effects.

Based on our research questions and theoretical motivation, we hypothesize that injection shocks have a positive impact, whereas leakage shocks negatively affect output and employment. We next examine whether injection shocks have stronger real effects than leakage shocks on impact and in the short term, but leakage shocks could become more dominant in the medium term. However, due to the recent dominance of aggregate supply-side factors in the Bangladesh economy, such as energy supply shocks from the Russia-Ukraine war, pressure on the USA dollar's currency reserves, and upward trends in cost-push inflationary pressures, leakage shocks could have significant and lasting effects.

Data

We construct an annual time-series dataset for Bangladesh covering the period 1980–2023. The availability of several series drives the choice of the time horizon, and we find that this time span allows us to capture both structural changes and cyclical dynamics in the Bangladesh economy. In particular, capturing this dynamic is important when examining the interplay between injection and leakage forces, and using an annual frequency helps our estimation by reducing short-term volatility that could mask underlying trends.

We compiled all the series from multiple sources. Real output and employment variables are obtained from the Penn World Table (PWT), and the remaining

injections and leakages variables used to construct injection and leakage factors are collected from the World Development Indicators (WDI) and the Bangladesh Bank databases. The Penn World Table (PWT) “employment” variable is not designed to explicitly measure informality, yet it does include informal workers to the extent they are captured in national accounts and labor force statistics. According to the data construction, PWT does not distinguish between formal and informal employment. It simply reports an aggregate employment level. In line with the empirical macroeconomic literature, we assume this construction includes both formal and informal workers, as informal workers remain “employed” if they produce goods and services. To capture the expansionary side of the Bangladesh economy, we include investment (*INV*), government expenditure (*GOV*), exports (*EXP*), and remittances (*REM*) variables as our injections into the circular flow of income. In the leakage side, we include imports (*IMP*), savings rate (*SAV*), and tax revenue (*TAXREV*).

Real output is measured using GDP at constant prices. To ensure stationarity and consistency with the literature in interpreting the responses to a shock, output is transformed into a growth rate using log differences:

$$gdp_growth_t = \Delta \ln (GDP_t) = \ln (GDP_t) - \ln (GDP_{t-1})$$

We measure employment as the employment-to-population ratio, expressed as a percentage. Because this variable is already in rate form, we transform this series using first differences, which measure changes in employment in percentage points.

$$emp_change_t = EMP_t - EMP_{t-1}$$

Table 1. Summary Statistics

	n	mean	sd	min	max	skew	kurtosis
Investment	44	0.687	57.253	-182.989	138.814	-0.319	1.512
GOV	45	11.315	4.698	3.396	20.162	0.149	-1.028
EXP	45	5.042	0.626	4.031	6.238	0.096	-0.996
REM	45	4.982	2.535	1.867	10.592	0.791	-0.652
IMP	45	17.712	4.479	11.698	27.949	0.719	-0.464
SAV	45	18.817	5.501	2.051	27.27	-0.571	0.36
Tax Revenue	44	11.998	6.595	-11.968	24.672	-1.007	2.646
GDP growth	43	5.556	1.823	1.223	8.678	-0.137	-0.803
EMP-POP ratio	44	35.812	3.01	30.97	43.11	0.701	0.01

Summary statistics of the variables are reported in Table 1. GDP growth averages 5.56% with moderate volatility, while the employment–population ratio is relatively stable at 35.8%. Investment exhibits higher variability than other injection variables, whereas government expenditure and exports appear more stable. Among leakages, imports, and savings, the latter show moderate dispersion, while tax revenue shows greater volatility. Overall, most variables display near-symmetric distributions with mild skewness.

We employ the Augmented Dickey–Fuller test, and the results indicate that the variables are non-stationary at levels. To ensure stationarity and align with standard practice in VAR-based studies, we first-differenced $\log(\text{GDP})$ and the employment–population ratio; the injection and leakage factors are also first-differenced before estimation.

Methodology

Construction of Injection and Leakage Factors

We examine the Keynesian distinction between injections and leakages using a factor-based, sign-restricted vector autoregression (SVAR) framework. In this framework, we construct two composite indices using principal component analysis (PCA). The use of composite factors is motivated by the need to reduce dimensionality in the injections and leakages variables (Belviso & Milani, 2005; Bernanke, Boivin, & Elias, 2005; Mumtaz & Surico, 2009; Alam, 2024). The PCA approach captures the joint behavior of several macroeconomic variables rather than any single indicator. Following the standard factor-augmented approach, we define the full set of our variables as:

$$X_t = \{INV_t, GOV_t, EXP_t, REM_t, IMP_t, SAV_t, TAXREV_t\}$$

The first group $(INV_t, GOV_t, EXP_t, REM_t)$ represents injection-related variables, and the second group $(IMP_t, SAV_t, TAXREV_t)$ captures leakage-related variables. The selection of variables is motivated by the standard macroeconomic theory of the Keynesian circular flow framework, in which injections consist of investment, government expenditure, and exports. Our selected factors directly add to aggregate demand (AD) in the Bangladesh economy (Keynes, 1936; Mankiw, 2019), including remittances, which are also included as a key injection variable given their substantial contribution to AD components (World Bank, 2023; Rahman, 2012).

Injection Factor

The injection vector is defined as $Z_t^{(I)} = [INV_t, GOV_t, EXP_t, REM_t]$. These variables capture the transmission channels through which demand is injected into the economy. For example, our private investment reflects capital formation and the expansion of productive capacity, and government expenditure represents fiscal stimulus and public demand. We notice that all

of our chosen variables are measured in different units and on different scales. We standardized each series as:

$$\tilde{Z}_{it} = \frac{Z_{it} - \mu_i}{\sigma_i}$$

where μ_i and σ_i denote the mean and standard deviation of the variable i , respectively. Standardization ensures comparability across variables and, methodologically, helps prevent any single series from dominating the index due to differences in scale (Stock & Watson, 2002).

Principal component analysis is then applied to the standardized variables. The justification for selecting PCA in our study is several reasons. First, our literature review suggests using a data-driven method to extract common variation among correlated variables without imposing arbitrary weights. Second, PCA reduces dimensionality while preserving as much information as possible, making it particularly suitable for estimating a single series of shock factors to examine our expansionary and contractionary effects on the Bangladesh economy, where variables often move together (Jolliffe, 2002). The first principal component, which mostly captures the largest share of common variation across the series, is used to construct the injection factor:

$$IF_t = w_1 \tilde{INV}_t + w_2 \tilde{GOV}_t + w_3 \tilde{EXP}_t + w_4 \tilde{REM}_t$$

where the weights w_i are the factor loadings associated with the first principal component. In a similar manner, we also define the leakage vector and standardize it using the same transformation, $Z_t^{(L)} = [IMP_t, SAV_t, TAXREV_t]$ and the first principal component is extracted as the leakage factor:

$$LF_t = v_1 \tilde{IMP}_t + v_2 \tilde{SAV}_t + v_3 \tilde{TAXREV}_t$$

here v_i are the corresponding factor loadings.

Based on our PCA construction of IF_t and LF_t , we assume that an increase in the injection factor (IF_t) is therefore interpreted as an expansionary impulse. In contrast, the leakage factor (LF_t) indicates a rise in income withdrawals from the circular flow through channels such as imports, savings, and tax revenues, and we interpret it as a contractionary shock. From a Keynesian perspective, such changes in aggregate demand, transmitted through the multiplier mechanism, lead to responses in output and employment (Keynes, 1936; Solow, 1956; Romer, 1990).

In the context of Bangladesh, our distinction between injection and leakage shocks is particularly relevant, as the economy has experienced strong growth driven by investment, exports, and remittance inflows, while also facing

increasing pressures from imports, fiscal constraints, and savings dynamics. By summarizing these forces into two composite factors, our analysis captures the balance between expansionary and contractionary forces in aggregate demand management more integratively.

Sign-Restricted VAR Framework

We employ a sign-restricted structural VAR (SVAR) approach to identify structural shocks. We justified our chosen approach as suitable for our data set and theoretical settings where theoretical priors are more specific and clearer, but contemporaneous relationships are complex (Uhlig, 2005; Mountford & Uhlig, 2009). We let the reduced form VAR be expressed as:

$$Y_t = A(L)Y_{t-1} + u_t$$

where u_t is the reduced-form residuals with the covariance matrix Σ_u . The structural representation is given by:

$$Y_t = A(L)Y_{t-1} + B\varepsilon_t$$

where ε_t is a vector of orthogonal structural shocks and B matrix shows the contemporaneous impact such that:

$$\Sigma_u = BB'$$

Since B is not always uniquely identified, additional restrictions are required. Following Uhlig (2005), we identify using sign restrictions on impulse responses over a short horizon. As we mentioned, the identification strategy is motivated by and originated in the theoretical interpretation of injections and leakages within the circular flow framework. Table 2 shows that an injection shock represents an expansion in demand-side drivers, while a leakage shock reflects an increase in income withdrawals and macroeconomic frictions.

Table 2. Sign Restrictions for Injection and Leakage Shocks

Variable	Injection Shock (+1 SD in IF_t)	Leakage Shock (+1 SD in LF_t)
Output growth (gdp_growth_t)	≥ 0 (positive response)	≤ 0 (negative response)
Employment change (emp_change_t)	≥ 0 (positive response)	≤ 0 (negative response)
Injection factor (IF_t)	≥ 0 (positive shock)	Unrestricted
Leakage factor (LF_t)	Unrestricted	≥ 0 (positive shock)

Notes: The table reports the sign restrictions used to identify structural shocks in the sign-restricted SVAR framework. A positive injection shock corresponds to a one-standard-deviation increase in the injection factor and is assumed to

generate expansionary effects on output and employment. In contrast, a positive leakage shock represents an increase in leakage-related factors and is expected to produce contractionary effects. The responses of non-target factors are left unrestricted to allow endogenous adjustments within the system, consistent with standard practice in sign-restricted VAR identification (Uhlig, 2005; Mountford & Uhlig, 2009).

A positive injection shock is expected to increase output and employment growth, as shown in Table 2, reflecting the direct effects of higher investment, government spending, exports, and remittance inflows. We expect this effect to be strongest in the short run, consistent with the Keynesian multiplier mechanism (Keynes, 1936). In contrast, a positive leakage shock is expected to reduce output growth and employment. In Bangladesh, recent episodes of rising import costs due to pressure on U.S. dollar currency reserves, oil supply shocks, exchange rate pressures, and inflationary trends suggest that leakage shocks could have significant and lasting effects.

Results and Discussion

Before we present our results, we need to address a few methodological concerns, even though our sign restrictions in Table 2 are theoretically consistent. We note that our shocks are constructed from PCA-based factors, and we then impose sign restrictions on them. Given that the first step is data-driven via PCA and the second is structural via SVAR, we acknowledge that we are implicitly examining “double-identified” shocks. Identifying a double shock, which is also common in the SVAR literature, requires that the shocks be mutually orthogonal. The next concern is whether the constructed IF and LF are truly exogenous and structural shocks. To address concerns about exogenous shocks, we use a decomposition approach: the leakage factor is orthogonalized with respect to the injection factor, and the leakage shock is defined as the residual from a linear projection of the leakage factor onto the injection factor.

While principal component analysis (PCA) is used to summarize the common variation in injection and leakage variables, it, by itself, does not yield structural shocks. Rather, PCA provides a reduced-form representation that may still reflect endogenous responses within the system. To address this concern, we impose structural identification through a sign-restricted SVAR framework, where economically motivated restrictions distinguish injection and leakage shocks based on their theoretical effects on output and related variables.

In addition, to mitigate potential simultaneity between the constructed factors, we orthogonalize the leakage factor with respect to the injection factor. Specifically, the leakage shock is defined as the residual from projecting the leakage factor onto the injection factor. This procedure ensures that the

identified leakage shock captures innovations that are not contemporaneously explained by injection dynamics. Therefore, the identification of structural shocks relies on the combination of (i) dimensionality reduction via PCA, (ii) orthogonalization to reduce contemporaneous dependence, and (iii) theory-consistent sign restrictions within the SVAR framework.

In Table 3, the PCA results indicate that the first principal component captures a substantial share of the variation in both factors, explaining approximately 47.5% of the variation in the Injection Factor (IF) and 44.5% in the Leakage Factor (LF). For the IF, remittances and government spending exhibit the highest positive loadings, suggesting they are the primary drivers of injection dynamics, while investment and exports contribute to a lesser extent. In contrast, the LF is mainly driven by imports (positive loading) and savings (negative loading). The leakage factor shows an opposing influence within the leakage structure, with tax revenue playing a relatively minor role. We present our results to support the validity of the constructed factors for summarizing key macroeconomic components.

Table 3. Factor Loadings and Principal Component Analysis (PCA)

VARIABLE	LOADING	VARIANCE EXPLAINED BY PC1 OF INJECTIONS	VARIABLE	LOADING	VARIANCE EXPLAINED BY PC1 OF LEAKAGES
INVESTMENT	0.375	0.475	Imports	0.675	0.445
GOVERNMENT SPENDING	0.603	0.475	Savings	-0.713	0.445
EXPORTS	0.315	0.475	Tax Revenue	0.189	0.445
REMITTANCES	0.630	0.475			

Notes: Loadings correspond to the first principal component (PC1) derived from standardized growth rates of the respective variables. The reported variance explained indicates the proportion of total variation captured by PC1. Positive (negative) loadings imply that the variable moves in the same (opposite) direction as the constructed factor.

In Figure 1, we present our key findings for the four IRFs. The shock is measured as one std. dev and we consider a 10-year horizon for the impacts of shocks. The IRFs in the upper panel show that an injection shock produces an immediate and positive response in both output and employment. At impact (horizon 0), GDP growth increases by approximately 0.5 percentage points, while employment rises by about 0.6 units. For both the GDP and employment, although they show a decline in the next periods, a rise is also evident in year 3 for GDP and in year 1 for employment. In subsequent periods, responses gradually decline, and GDP growth changes from roughly 0.5 to 0.4, then to 0.3, and finally to 0.2. For the 10-year horizons, the IRF of employment shows a similar downward path. We observe that although the response magnitude

diminishes, it remains positive throughout the horizon. Consistent with the Keynesian expansion, this pattern indicates that the IF shock has a transitory but persistent expansionary effect, supporting our first hypothesis. The declining trend suggests that a gradual adjustment in the AD, short-run aggregate supply, moves toward equilibrium rather than a reversal of the initial impact.

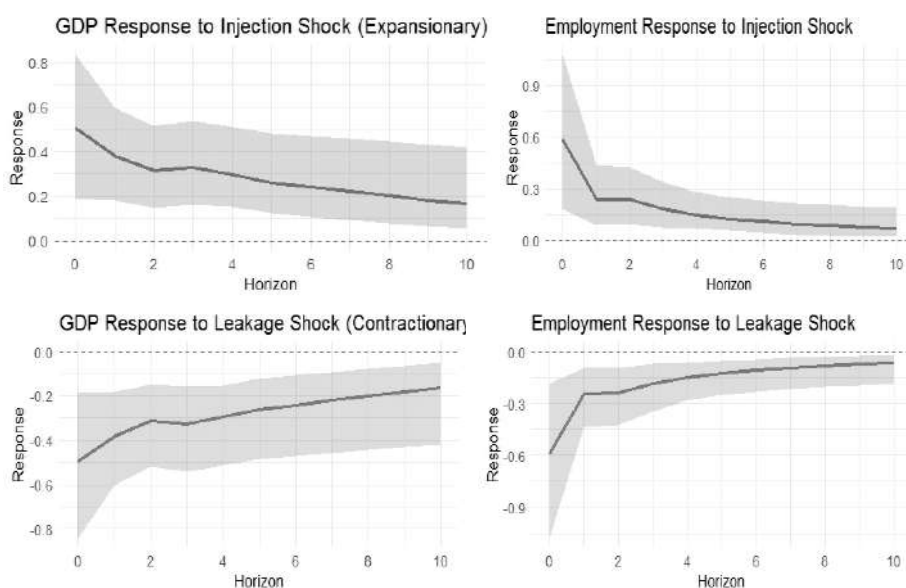


Figure 1. Impulse Response Functions

Figure 1: Impulse Response Functions (IRFs). For 10-year horizons, the impulse response functions (IRFs) in the upper panel show a positive but transitory increase in output and employment to a one std. dev injection shocks, and the lower panel shows leakage shocks generate a negative but gradually dissipating contraction.

The lower panel of Figure 1 shows that the leakage shock exhibits a contractionary pattern. At impact, GDP falls by approximately -0.5 , while employment declines by around -0.6 . These negative responses on impact for both key variables suggest that the identified leakage factor drives a withdrawal demand from the system, such as savings, taxation, or import leakages. Similar to our injection shock, the response magnitude diminishes over time, and the IRFs tend to return to the steady-state line. The IRF of GDP evolves from about -0.5 to -0.3 in year 2, and then, from year 3 onward, the responses change from -0.2 to -0.1 , while employment shows a similar trajectory over the 10-year horizon. The responses of both GDP growth and employment remain below zero but move steadily toward the equilibrium path, indicating that the contraction from the aggregate demand shock is temporary and gradually dissipates.

We compare our findings and the consistency of observed dynamics with empirical work on demand-driven fluctuations. For example, Blanchard and Perotti (2002) show that positive fiscal shocks lead to immediate increases in output that gradually diminish and go back to the steady state. Similarly, Jordi Galí (1999) finds that demand-side fluctuations cause short-run expansions in output and employment through the AD-AS transmission channels, with fading effects over the horizons. Our findings are also consistent with those of Faust (1998) and Uhlig (2005), who employ sign-restricted VARs focusing on demand shocks and find that the shocks display strong effects on GDP and employment, followed by gradual reversion towards the steady state. Our results for both shocks are also consistent with structural features of Bangladesh's economy, because demand-side shocks in our SVAR estimation tend to generate short- to medium-run fluctuations that diminish as the AD-AS friction-adjustment drives the economy to the steady state. We find that the Bangladesh economy regularly exhibits limited absorptive capacity and adjustment frictions in response to aggregate demand and supply shocks, and that external balances play a very limited role in adjusting to these shocks. So, our results support the view that macroeconomic policy adjustments in the Bangladesh economy are not intended to achieve a permanent shift in the full-employment level of output.

Forecast Error Variance Decomposition

Table 4 and Figure 2 show the contributions of both injection and leakage shocks to the forecast-error variances of GDP growth and employment over a 10-period horizon. We find that two patterns emerge in Table 3.

First, our leakage shocks dominate the variance of both output and employment across the 10-year horizons. For GDP, leakage shocks account for approximately 22–26 percent of forecast error variance, compared to a much smaller 5.7–6.3 percent contribution from injection shocks. A similar pattern holds for employment, where leakage shocks explain around 17–21 percent, while injection shocks contribute only about 4–5 percent. Second, it is observed that the contribution of leakage shocks increases gradually, whereas the share of injection shocks remains relatively stable. For example, the share of leakage shocks in GDP variance rises from 22.4 percent at impact to over 26 percent by horizon 10, suggesting that contractionary forces rooted in leakage factors have a more persistent effect on the transmission of shocks to GDP and labor markets. In contrast, the fractions of injection shocks remain modest and only marginally increase over 10-year horizons.

Table 4: Forecast Error Variance Decomposition (FEVD)

Horizon	GDP_Injection	GDP_Leakage	EMP_Injection	EMP_Leakage
0	5.80	22.43	3.81	16.99
1	5.74	23.81	4.28	17.69
2	5.81	24.23	4.59	18.96
3	6.03	24.61	4.71	19.52
4	6.08	24.97	4.86	20.03
5	6.12	25.22	4.94	20.43
6	6.18	25.54	5.05	20.76
7	6.22	25.83	5.10	21.03
8	6.28	25.96	5.17	21.25
9	6.28	26.07	5.20	21.41
10	6.29	26.15	5.21	21.53

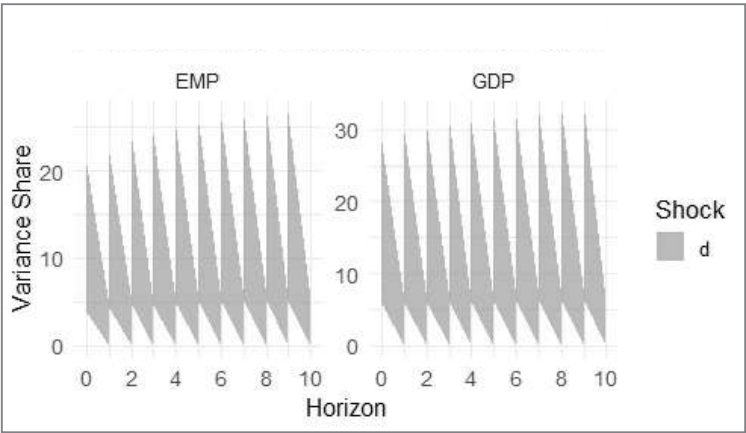


Figure 2. Forecast Error Variance Decomposition (FEVD)

Figure 2. Forecast Error Variance Decomposition for both GDP and Employment. The FEVD shows the variance decomposition for the 10-year horizon. The figure shows how much of the variation in GDP and employment is explained by injection (IF) and leakage (LF) shocks over a 10-period horizon. It highlights the relative importance of these shocks over time. Leakage shocks account for a larger share of fluctuations than injection shocks, particularly at longer horizons.

We also present the historical decomposition (HD) in Table A1 (appendix) and Figure 3 to assess how IF and LF shocks have contributed to fluctuations in GDP growth and employment over time. We find that leakage shocks persistently reduce GDP, particularly during periods of economic stress. As observed, the early 1990s show pronounced negative effects, with GDP leakage contributions as low as -0.06 , indicating substantial contractionary

pressure. For injection shocks, we find a moderate effect, generally smaller in magnitude, but with stronger leading impacts in certain periods. This leading trend is observed in the mid-2010s, when positive contributions to GDP (e.g., around 0.04 in 2015) suggest phases of demand expansion driven by increased investment and remittance inflows. For both infection and leakage shocks, we find that the patterns are somewhat more volatile but broadly consistent across employment.

Our findings in FEVD (Table 3), the historical decomposition (Table A1, appendix), and Figure 3 support the IRF results. We find that injection shocks generate positive, immediate effects, but the IF shock's contribution to overall variability is limited. Leakage shocks emerge as the major source of macroeconomic variation in the Bangladesh economy over the medium horizon. The asymmetry in our IRFs, HD, and FEVD suggests that leakage shocks, driven by negative demand pressures and factors such as savings, taxation, and imports, play a more dominant role in shaping the responses of GDP and job creation than expansionary shocks.

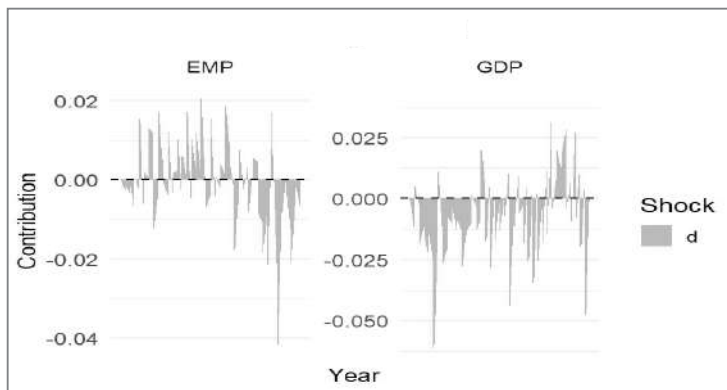


Figure 3. Historical Decomposition

The figure of historical decomposition shows how the IF and LF shocks emerge over time. The figure shows the time-varying contributions of injection (IF) and leakage (LF) shocks to fluctuations in GDP growth and employment. The decomposition shows how demand-side disturbances evolve. Injection shocks contribute intermittently to expansions, whereas leakage shocks are more frequently associated with contractionary episodes.

Conclusion

In this paper, we empirically examine the Keynesian injections–leakages framework by combining PCA-based factor construction with a sign-restricted SVAR approach. Using annual data for Bangladesh from 1980 to 2023, we derive latent injection and leakage factors and investigate their dynamic effects

on GDP growth and employment. A methodological contribution of this study is the combination of factor-augmented techniques with theory-consistent identification, which captures high-dimensional macroeconomic interactions while allowing a clear structural interpretation of demand-side shocks.

We show that injection shocks have a positive but transitory effect on output and employment, supporting Keynesian demand theory and consistent with previous SVAR evidence. In contrast, leakage shocks reduce output and employment and exert a larger, dominant effect on medium-run macroeconomic fluctuations in Bangladesh than injection shocks. The relatively stronger leakage effects suggest that structural leakages, such as imports, taxes, and savings, act as a countercyclical force in the transmission mechanism of expansionary policies, affecting economic growth and employment in the short run. We argue that sustainable macroeconomic stabilization policies in Bangladesh should be balanced by incentivizing injections and systematically reducing leakages.

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Appendix

Table A 1. Historical Decomposition

Year	GDP_Injection	GDP_Leakage	EMP_Injection	EMP_Leakage
1985	0	0	0	0
1986	-0.01408	0.005597	-0.00285	-0.00127
1987	-0.00187	-0.01937	-0.00347	-0.00135
1988	-0.01162	-0.01539	-0.0083	0.00019
1989	-0.02384	-0.01462	-0.00292	0.015353
1990	-0.02761	-0.06167	-0.01263	0.002266
1991	-0.01006	0.012382	0.000421	0.013309
1992	-0.01677	-0.02685	0.011481	-0.01269
1993	-0.01949	-0.00712	-0.00312	0.017869
1994	-0.01066	-0.00304	0.00224	-0.00091
1995	-0.01532	-0.00889	-0.00435	0.012883
1996	-0.01355	-0.02841	-0.00338	0.001568
1997	-0.01163	-0.0131	0.002348	0.010964
1998	-0.01031	0.001943	-0.00685	0.006095
1999	-0.00339	-0.01327	0.000211	0.017288
2000	-0.00752	0.020294	-0.01162	0.010819
2001	0.00348	-0.01746	0.001378	0.012513
2002	0.011662	-0.02966	0.000485	0.02178
2003	0.006294	-0.01796	-0.00388	-0.0072
2004	0.001433	-0.01359	-0.00361	0.016672
2005	0.002657	-0.00783	-0.00894	0.00108
2006	0.014501	-0.04564	-0.0028	0.004167
2007	-0.00269	-0.01254	0.001449	0.019076
2008	0.00945	-0.00633	0.009638	0.003389
2009	-0.0025	-0.0196	-0.00241	-0.01769
2010	0.012292	-0.02553	-0.00265	0.007902
2011	0.010354	-0.03436	-0.00487	-0.0028
2012	0.013568	-0.02675	0.004678	-0.00846
2013	0.000928	-0.01954	0.002941	0.005605
2014	0.018953	-0.01682	0.004723	-0.00811
2015	0.042873	-0.00442	-0.01133	-0.019
2016	0.010239	0.020206	-0.00668	-0.02312
2017	0.010837	0.018078	0.017403	0.007632
2018	0.030962	-0.00438	-0.02117	-0.0429
2019	0.007031	-0.01095	-0.01039	-0.00848
2020	0.02723	-0.00857	0.001499	-0.00387
2021	0.015836	-0.02003	-0.015	-0.02188
2022	0.010781	-0.04766	-0.00294	-0.00158
2023	0.01351	-0.01795	-0.00758	0.002343

A 2. Identification Algorithm

Following the approach of Uhlig (2005) and consistent with the economically meaningful identification, our estimation follows a simulation-based procedure and algorithm below:

- I. Estimate the reduced-form VAR and obtain residuals and Σ_u .
- II. Compute the Cholesky decomposition of Σ_u as an initial factorization.
- III. Generate candidate structural matrices by applying random orthonormal rotations.
- IV. For each candidate draw, compute impulse response functions (IRFs).
- V. Retain only those draws that satisfy the imposed sign restrictions over a specified horizon (e.g., 4–6 periods).
- VI. Construct median IRFs and confidence bands from the accepted draws.

A 3. We start from the income identity:

$$Y = C + I + G + (X - M)$$

Now specify behavioral functions:

$$\text{Consumption: } C = C_0 + c(Y - T)$$

$$\text{Taxes (proportional): } T = tY$$

$$\text{Imports: } M = mY$$

Where: c = MPC; t = marginal tax rate (MPT); m = marginal propensity to import (MPM)

$$\text{Plug everything into } Y: Y = C_0 + c(Y - tY) + I + G + X - mY$$

Expand consumption:

$$Y = C_0 + c(1 - t)Y + I + G + X - mY$$

Now collect terms in Y :

$$Y - c(1 - t)Y + mY = C_0 + I + G + X$$

Factor out Y :

$$Y[1 - c(1 - t) + m] = C_0 + I + G + X$$

We solve for equilibrium income

$$Y = \frac{1}{1 - c(1 - t) + m} \cdot (C_0 + I + G + X)$$

We express in leakage form and rewrite using: $MPS = 1 - c$; $MPT = t$;

$$MPM = m$$

Expand denominator:

$$1 - c(1 - t) + m = 1 - c + ct + m$$

Substitute:

$$= (1 - c) + t + m = MPS + MPT + MPM$$

Now the multiplier becomes:

$$k = \frac{1}{MPS + MPT + MPM}$$

Footnoting and Writing Style Guidelines

Bangladesh Journal of Political Economy

I. General Submission Information

1. **Publication Schedule:** The *Bangladesh Journal of Political Economy* (BJPE) is published biannually in June and December.
2. **Submission Address:** Manuscripts (research articles, notes, reviews) in English or Bangla should be submitted electronically (preferred) or in triplicate to:

The Editor, BJPE, Bangladesh Economic Association, 4/C Eskaton Garden Road, Dhaka-1000, Bangladesh.
3. **Abstract:** Include an abstract not exceeding 150 words.
4. **Formatting Basics:**
 - Double-spaced throughout (including references)
 - 12-point Times New Roman font
 - 1-inch margins on all sides
 - Page numbers in bottom right corner
 - Line numbers included for peer review
5. **Blind Review:** Author identification must not appear on the manuscript. Submit a separate title page containing full name(s), mailing address, telephone number, and paper title.
6. **Title:** Article titles should be concise. Brief, descriptive subheadings may be used. The Editorial Board reserves the right to modify titles for clarity or consistency.
7. **Duplicate Submission:** If a submitted manuscript is accepted elsewhere, the author must notify the Editor immediately. The author bears full responsibility for any resulting conflicts.
8. **Visual Elements:** Tables, graphs, and maps may be included. Each must have a clear title and source attribution.

II. Manuscript Structure and Section Numbering

9. **Standard Article Sequence:**
 - Introduction (background and problem statement)
 - Objectives and hypotheses
 - Methodological framework
 - Findings/Results

- Policy implications
- Limitations (if applicable)
- Conclusion(s)
Empirical papers may adapt the IMRaD structure (Introduction, Methods, Results, Discussion, Conclusion) where appropriate.

10. Hierarchical Section Numbering:

- **Main sections: 1, 2, 3...** (bold)
- *Subsections: 1.1, 1.2, 1.3...* (italics)
- Sub-subsections: 1.1.1, 1.1.2... (underlined)
- Avoid numbering beyond three levels to preserve readability. A fourth level is discouraged.

III. Tables and Figures

11. Tables:

- Number consecutively (Table 1, Table 2...).
- Place titles *above* the table, centred.
- Use minimal horizontal lines (above/below column headers and at table bottom); avoid vertical lines.
- Ensure legibility in black-and-white printing; use patterns, textures, or line styles instead of color.
- Submit as editable text (not images) with minimum 9-point font.

12. Figures:

- Number consecutively (Figure 1, Figure 2...).
- Place captions *under* the figure, centred.
- Design for grayscale: use distinct symbols (circles, squares, triangles), hatching, or line styles rather than color.
- Ensure high resolution (300+ DPI) and legible fonts when scaled to column width.

IV. Citations and References (APA Style with BJPE Conventions)

13. In-text citations follow the author–date format: (*Author, Year*) or *Author (Year)*.

- Example: (*Wilmore, 2000*) or *Wilmore (2000)* argues that...
- For two authors: (*Bosworth & Yang, 2000*)
- For three or more authors: (*Hoque et al., 2023*)

14. Reference list requirements:

- Appear at the end of the article, arranged alphabetically by first author's surname.
- Use hanging indents for all entries.
- Follow APA 7th edition conventions, adapted to BJPE's traditional formatting:

a) Book (single or multiple authors)

Format: SURNAME, Initial(s). (Year). *Title of book*. Place of publication: Publisher.
Example: WILMORE, G.T.D. (2000). *Alien plants of Yorkshire*. Kendall: Yorkshire Naturalists' Union.

b) Chapter in an edited book

Format: SURNAME, Initial(s). (Year). Title of chapter. In Initial(s). SURNAME (Ed./Eds.), *Title of book* (chap. X, pp. xx–xx). Place: Publisher.

Example: NICHOLLS, G. (2002). Mentoring: the art of teaching and learning. In P. JARVIS (Ed.), *The theory and practice of teaching* (chap. 12, pp. 245–260). London: Kogan Page.

c) Journal article

Format: SURNAME, Initial(s). and Initial(s). SURNAME (Year). Title of article. *Title of Journal*, vol. X, no. Y, pp. XX–YY.

Example: BOSWORTH, D. and D. YANG (2000). Intellectual property law, technology flow and licensing opportunities in China. *International Business Review*, vol. 9, no. 4, pp. 453–477.

Note: Abbreviations *vol.*, *no.*, and *pp.* may be omitted if consistency is maintained throughout. When multiple journals share the same title, include the place of publication in parentheses (e.g., *International Affairs* (London)).

d) Electronic source

Format: ORGANIZATION/AUTHOR. (Year). *Title of document*. [Accessed online from Database/URL, Access Date].

Example: DIXONS GROUP PLC (2004). *Company report: profile*. [Accessed online from Financial Analysis Made Easy (FAME) database at <http://www.bvdep.com/en/FAME.html>, 13 Dec. 2005].

15. Footnotes and Endnotes:

- Footnotes are discouraged; integrate explanatory or supplementary content directly into the main text.
- If essential endnotes are required (e.g., for methodological clarifications or ancillary data), number them consecutively throughout the manuscript and place them *after* the main text but *before* the Reference list.

- Endnote citations in text should appear as superscript numerals: ...*as demonstrated previously.*¹

V. Additional Guidelines

16. Language and Style:

- Define all abbreviations at first use.
- Use italics for emphasis only; avoid bold or underlining in body text.
- Maintain formal, precise academic English (or Bangla, where applicable).

17. File Submission:

- Submit manuscripts in editable Word format (.doc or .docx).
- Provide separate, clearly labeled files for tables, figures, and supplementary materials.
- Ensure all embedded objects are editable and not flattened images.

18. Editorial Process:

- The Editorial Board may request revisions, condensation, or rephrasing prior to publication. All proposed changes will be shared with the author for approval.
- Authors are responsible for securing permissions for any reproduced tables, figures, or lengthy quotations.

19. Disclaimer and Responsibility:

- The Bangladesh Economic Association disclaims responsibility for views expressed in published contributions. Authors bear full responsibility for the accuracy of data, originality of content, and ethical compliance of their work.

20. Post-Acceptance:

- Unaccepted manuscripts are not returned.
- Upon publication, each author receives one complimentary journal copy and five off-prints.

Consistency in punctuation, capitalization, and italicization across all reference entries is mandatory. Authors are advised to verify all URLs and access dates for electronic sources prior to submission.

— Editorial Office, Bangladesh Journal of Political Economy

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