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The Factors That Affect Unemployment In The Short Run And Long Run In India And China

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Unemployment is a complex economic phenomenon that varies in its causes and effects across different countries and time frames. Understanding the factors that affect unemployment in both the short run and long run is crucial, particularly in developing economies like China and India, which have distinct socio-economic structures and developmental paths. In the short run, fluctuations in economic activity, international trade, foreign direct investment (FDI), and inflation (CPI) play pivotal roles in shaping employment outcomes. On the other hand, long-term factors such as population growth, infrastructure development, domestic investment (DI), remittances, and the overall growth of the economy (GDP) contribute to the structural dynamics of unemployment. This comparative study examines the key drivers of unemployment in both China and India, highlighting the interplay between these factors and their respective impacts on the labor market.

Trade: In the short run, [1]Trade openness can affect unemployment levels, as fluctuations in global demand for exports can directly influence domestic job markets. China's export-led growth model has been crucial in absorbing labor, whereas India's service-driven economy faces different challenges in adjusting to trade disruptions.

Foreign Direct Investment (FDI): FDI inflows can stimulate job creation, especially in emerging sectors. In the short run, increased [2]FDI might help reduce unemployment by generating new industries and job opportunities. Both China and India have seen significant impacts from FDI, although China's more export-oriented FDI has historically led to quicker job creation compared to India.

Inflation and Consumer Price Index (CPI): Inflation can influence real wages, affecting employment levels. [3]A high CPI can lead to wage demands, reducing the competitiveness of certain sectors and possibly increasing unemployment in the short term, especially if inflation outpaces wage growth.

Infrastructure Development: [4]Long-term infrastructure development is crucial for creating sustainable employment opportunities. Both India and China have undertaken massive infrastructure projects, which in turn have created jobs and enhanced long-term productivity.

Domestic investment (DI): Increased domestic investment plays a significant role in [5]long-term job creation by expanding productive capacity and fostering industrialization. China's rapid industrial growth has

[1] Maiti, D. (2017). Trade, FDI, and Employment in India: An Empirical Analysis. *Economic and Political Weekly, 52*(10), 58-66.

[2] Chakraborty, C., & Nunnenkamp, P. (2008). Economic Reforms, FDI, and Economic Growth in China and India: A Comparative Analysis. *World Development, 36*(12), 1675-1691.

[3] Ghosh, J., & Ghosh, S. (2018). Inflation and Unemployment in Developing Countries: A Case Study of India. Asian Development Review, 35(2), 104-122.

[4] Meyer, A., & Sato, K. (2014). Infrastructure Development and Economic Growth in Asia. Asian Economic Policy Review, 9(1), 71-90.

been supported by high levels of domestic investment, which has resulted in significant employment generation. India, while benefiting from domestic investment, faces challenges in translating it into widespread job creation.

Remittances: Remittances, particularly in the case of India, have an impact on [6]reducing poverty and unemployment in the long run by supporting household consumption and enabling small-scale entrepreneurship. In China, remittances are relatively less significant due to the country's higher levels of internal migration.

Population Growth: Population dynamics significantly influence unemployment rates in the long run. [7]A growing population requires job creation to maintain stable employment levels. Both China and India face the challenge of creating enough jobs to accommodate their large and growing labor forces, with India's higher population growth rate posing a greater challenge in this regard.

Gross Domestic Product (GDP): Economic growth, as [8]measured by GDP, is a crucial determinant of unemployment. Both India and China have experienced rapid GDP growth, but structural unemployment remains a challenge, especially in India, where job growth has not kept pace with overall economic expansion.

The relationship between unemployment and various economic factors is intricate and varie significativement across the short and long run. In India and China, while both countries have experienced rapid economic growth, the factors affecting unemployment differ based on their unique economic structures. Understanding these nuances is essential for policymakers seeking to address the unemployment challenge and ensure inclusive economic development.

The objective of this paper is to investigate the factors that affect unemployment in the short run and long run in India and China.

A quantitative approach has been adopted to examine the relationship between key economic variables. The study utilises time series data collected from reliable sources, such as the World Development Indicators (WDI) published by the World Bank.

As a preliminary step, the linear growth rate (LGR) is computed through the ordinary least squares (OLS) technique. It is based on the following regression line.

$Y_t = \alpha_1 + \beta_1 T + U_t$ (1)

where α_1 and β_1 are regression parameters and U_t is the random disturbance term. T is the time trend. Y represents the variables considered for the study, viz., unemployment rate and real GDP. The linear growth rate (LGR) is computed using the following formula.

$LGR = \beta_1\hat{} / \bar{y} * 100$

where $\beta_1\hat{}$ is the estimated value of β_1 and $\bar{y}$ is the mean value of Y.

To analyse the data, appropriate statistical and econometric methods have been applied. Unit root tests, such as the Phillips-Perron (PP) test and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test, are used to check for stationarity. The Autoregressive Distributed Lag (ARDL) model is employed to examine both short-run and long-run relationships between variables. Additionally, the Robust Least Squares (RLS) method is used to ensure reliable estimations by minimising the impact of outliers. By following this structured methodology, the study ensures accurate and valid results, contributing to a minimising deeper understanding of the research problem.

I. Kwiatkowski-Phillips-Schmidt-Shin (KPSS) Test

The concept of stationarity is fundamental in time series analysis, as many econometric and statistical models require data to exhibit constant statistical properties over time. A stationary time series ensures reliable estimation, accurate forecasting, and meaningful interpretations. However, many real-world datasets, especially in economics and finance, tend to be non-stationary, which can lead to spurious relationships and misleading conclusions if not properly addressed.

[5] Lin, J. Y., & Wang, Y. (2008). China's Economic Growth: The Making of an Economic Superpower. Cambridge University Press.

[6] Ratha, D. (2013). The Impact of Remittances on Economic Development. Migration and Development, 2(2), 228-247.

[7] UNDP (2020). Human Development Report 2020: The Next Frontier: Human Development and the Anthropocene. United Nations Development Programme.

[8] Jha, R. (2009). The Economics of Development and Planning. Vikas Publishing House.

To determine whether a time series is stationary or non-stationary, various unit root tests are employed. Among these, the Phillips-Perron (PP) test and the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test are widely used. The PP test is an extension of the Dickey-Fuller test and examines the presence of a unit root in the data, where the null hypothesis suggests non-stationarity. In contrast, the KPSS test takes a different approach by assuming stationarity as the null hypothesis and checking for deviations from this assumption.

By applying both tests, researchers can make a more robust assessment of stationarity, helping to determine whether data transformations, such as differencing, are necessary before conducting further analysis. Understanding and addressing stationarity is crucial for the development of reliable econometric models, ensuring that statistical inferences and policy recommendations are based on sound data properties. Stationarity of the data series is tested with the help of Phillips-Perron (PP) and the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) unit root tests.

The Kwiatkowski-Phillips-Schmidt-Shin (KPSS) unit root test is to test stationarity and is based on linear regression, which breaks the time series into deterministic trend, random walk, and stationary error.

$$y_t = r_t + \beta t + \varepsilon_t.$$

where, r_t is random walk, βt is deterministic trend and, ε_t is stationary error with zero mean.

$$r_t = r_{t-1} + v_t$$

where v_t is iid $(0, \sigma^2)$.

If a random walk component is present, then the series is non-stationary. Hence, the null hypothesis implies that $\sigma^2 = 0$. This results in the time series, y_t being trend stationary. The KPSS then tests if there is a unit root in r_t when β is non-zero. The hypothesis for the test is then :

H_0: The time series is trend stationary.

H_1: The time series contains a unit root.

In case $\beta = 0$ the null hypothesis will change to the time series is level stationary.

II. Phillips-Perron (PP) test

The Phillips-Perron (PP) test is a statistical test used to detect the presence of a unit root in a time series. A unit root indicates that shocks to the series will have a permanent effect, driving non-stationarity. The simple formulation of an autoregressive process looks like this :

$Y_t = \rho y_{t-1} + \epsilon_t, y_t = \rho y_{t-1} + \epsilon_t$

where ϵ_t represents a white noise error term. If $\rho=1$, the series has a unit root and is thus non-stationary. The PP test aims to determine whether the null hypothesis of a unit root can be rejected.

III. Autoregressive Distributed Lag Model (ARDL) Approach

The Autoregressive Distributed Lag (ARDL) model is a widely used econometric technique for analyzing relationships between variables in both the short run and long run. Developed by According to Pesaran and Shin (1999), the ARDL approach is particularly useful when dealing with time series data that may have a mix of stationary (I(0)) and non-stationary (I(1)) variables. Unlike traditional cointegration methods, such as the Engle-Granger and Johansen approaches, the ARDL model does not require all variables to be of the same order of integration, making it a flexible and robust tool for empirical analysis.

One of the key advantages of the ARDL approach is its ability to estimate both short-run dynamics and long-run equilibrium relationships in a single equation framework. The model includes lagged values of the dependent and independent variables, allowing it to capture past effects on current outcomes. Additionally, the ARDL Bounds Test is used to determine whether a long-run relationship exists between the variables, even when they are integrated at different orders.

Due to its efficiency in small sample sizes and its ability to accommodate mixed integration orders, the ARDL model has been extensively applied in macroeconomic and financial research. It is particularly useful for policy analysis, demand estimation, and forecasting, where understanding both short-term adjustments and long-term equilibrium relationships is crucial.

The stationarity properties of the time-series variables are assessed by applying the Phillips-Perron (PP) and the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) unit root tests. Besides, the Autoregressive Distributed Lag (ARDL) model, proposed by Pesaran et al. (2001), is appropriate for the small sample size, and the order of integration of the variables is either zero, one, or both. The autoregressive distributed lag model (ARDL) bound testing approach was applied to investigate the long-run association between unemployment rate and economic growth in India and China. Regardless of whether the underlying variables are I(0), I(1), or

partially integrated, the bounds F-statistics are employed to test a null hypothesis of no cointegration among the variables. The ARDL bounds test is expressed in Equations (1) & (2):

$$\Delta GDP_t = \alpha_o + \sum_{i=1}^{n} \alpha_1 \Delta GDP_{t-1} + \sum_{i=1}^{n} \alpha_2 \Delta UNR_{t-1} + \beta_1 GDP_{t-1} + \beta_2 UNR_{t-1} + \varepsilon_{1t} \quad (1)$$

$$\Delta UNR_t = \alpha_o + \sum_{i=1}^{n} \alpha_1 \Delta UNR_{t-1} + \sum_{i=1}^{n} \alpha_2 \Delta GDP_{t-1} + \beta_1 UNR_{t-1} + \beta_2 GDP_{t-1} + \varepsilon_{1t} \quad (2)$$

where UNR is the unemployment rate and GDP is real Gross Domestic Product. To examine the short-run causal nexus between unemployment rate and economic growth in India and China, the ARDL specification of the error correction model is applied and formulated as follows:

$$\Delta GDP_t = \alpha_o + \sum_{i=1}^{n} \alpha_1 \Delta UNR_{t-1} + \sum_{i=1}^{n} \alpha_2 \Delta GDP_{t-1} + \gamma_1 Z_{t-1} + \varepsilon_{1t} \quad (3)$$

$$\Delta UNR_t = \alpha_o + \sum_{i=1}^{n} \alpha_1 \Delta UNR_{t-1} + \sum_{i=1}^{n} \alpha_2 \Delta GDP_{t-1} + \gamma_1 Z_{t-1} + \varepsilon_{1t} \quad (4)$$

γ_1 is the error correction term. The short-run effect is assessed based on the t-value and its level of significance of the coefficients of each lagged regressor.

The Breusch-Godfrey serial correlation LM test and ARCH-LM heteroscedasticity test were applied to examine the null hypothesis of the absence of autocorrelation and heteroscedasticity, respectively. The Jarque-Bera test is applied to examine the null hypothesis of normality of the models' residuals. Ramsey A RESET specification test is performed to examine the null hypothesis that the model is properly specified. Further, the cumulative sum (CUSUM) and square (CUSUMQ) of recursive residuals are applied to examine the stability of coefficients of the estimated ARDL models.

In order to investigate the determinants of the unemployment rate in India and China for both the short run and the long run, the Autoregressive Distributed Lag Model (ARDL) was applied. The autoregressive distributed lag model (ARDL) bound testing approach was employed to examine the long-run association between unemployment rate and economic growth in India and China. The ARDL bounds test is expressed in Equation.

$$UNR_t = \alpha_o + \beta_1 GDP_t + \beta_2 TRADE_t + \beta_3 REMIT_t + \beta_4 POP_t + \beta_5 INFRA_t + \beta_6 FDI_t + \beta_7 DI_t + \beta_8 DC_t + \beta_9 CPI_t + \varepsilon_{1t} \quad (5)$$

where UNR is the unemployment rate, GDP is the gross domestic product growth rate, TRADE is the foreign trade, REMIT is the remittances, POP is the population growth, INFRA is the infrastructure facilities, FDI is the foreign direct investment, DI is the domestic investment, DC is the domestic credit, and CPI represents the inflation. The long-run effect is assessed based on the t-value and its level of significance of the coefficients of each lagged regressor. To examine the short-run determinants of the unemployment rate in India and China, the ARDL specification of the error correction model is applied and formulated as follows:

$$\Delta UNR_t = \alpha_o + \sum_{i=1}^{n} \alpha_1 \Delta UNR_{t-1} + \sum_{i=1}^{n} \alpha_2 \Delta GDP_{t-1} + \sum_{i=1}^{n} \alpha_3 \Delta TRADE_{t-1} + \sum_{i=1}^{n} \alpha_4 \Delta REMIT_{t-1} + \sum_{i=1}^{n} \alpha_5 \Delta POP_{t-1} + \sum_{i=1}^{n} \alpha_6 \Delta INFRA_{t-1} + \sum_{i=1}^{n} \alpha_7 \Delta FDI_{t-1} + \sum_{i=1}^{n} \alpha_8 \Delta DI_{t-1} + \sum_{i=1}^{n} \alpha_9 \Delta DC_{t-1} + \sum_{i=1}^{n} \alpha_{10} \Delta CPI_{t-1} + \gamma_1 Z_{t-1} + \varepsilon_{1t} \quad (6)$$

γ_1 is the error correction term. is assessed based on the t-value and its level of significance of the coefficients of each lagged regressor.

Hypothesis: 1

H_0: Determinants viz., GDP growth rate, foreign trade, remittances, population growth, infrastructure facilities, FDI inflows, domestic investment, domestic credit and Inflation does not influence the unemployment rate in the long run

H_1: Determinants viz. GDP growth rate, foreign trade, remittances, population growth, infrastructure facilities, FDI inflows, domestic investment, domestic credit and Inflation does influence the unemployment rate in the long run

Hypothesis: 2

H_0: Determinants viz. GDP growth rate, foreign trade, remittances, population growth, infrastructure facilities, FDI inflows, domestic investment, domestic credit and Inflation does not influence the unemployment rate in the short run

H_1: Determinants viz. GDP growth rate, foreign trade, remittances, population growth, infrastructure facilities, FDI inflows, domestic investment, domestic credit and Inflation does influence the unemployment rate in the short run

The literature on the determinants of unemployment examines various economic factors such as GDP growth, population growth, inflation, foreign direct investment (FDI), and financial development. Several studies confirm the Phillips Curve relationship, indicating a tradeoff between inflation and unemployment. Additionally, industrial investment and job creation policies have been highlighted as effective measures to reduce unemployment. Many researchers have found that economic growth significantly lowers unemployment, while rapid population growth tends to increase it. Therefore, the existing literature emphasizes the importance of economic policies, financial sector development, technological advancement, and investment in education to address unemployment effectively.

Saidov Khabibulla Shavkat ogli's (2023) study on unemployment in China identifies that population growth and nominal GDP reduce unemployment, while remittances increase it, and inflation has no significant impact. Using data from 1991 to 2019 and an OLS regression model, it finds that GDP growth lowers unemployment and that remittances reduce labor participation. The study recommends lowering interest rates to boost investment and addressing the negative impact of remittances on the labor market.

Asma Riaz and Fareeha Zafar (2018) analyze the determinants of unemployment in Pakistan from 1990 to 2015, finding that GDP growth has a potential long-term impact on reducing unemployment, while population growth and technical/vocational education contribute to rising unemployment. University enrolment has a marginally significant negative relationship with unemployment. The study recommends expanding technical education and aligning it with labor market needs to address unemployment.

Betul Gur (2015) examines unemployment determinants in BRIC countries, finding that inflation and population growth increase unemployment, while GDP growth, trade volume, industrial production, and total investment reduce it. Economic growth and industrial investment are key factors in reducing unemployment. The study suggests policies promoting industrial investment and trade to address unemployment in emerging economies.

Ayesha Siddiqa (2021) examines the determinants of unemployment in 10 developing countries, finding that GDP growth, inflation, remittances, exchange rates, and education expenditure reduce unemployment, while population growth and external debt increase it. The study emphasises policies to boost GDP, control population growth, reduce external debt, and invest in education. It concludes that managing these factors can help reduce unemployment and promote economic growth in developing nations.

Joel Hinaunye Eita and Johannes M. Ashipala (2010) analyse the determinants of unemployment in Namibia, finding that inflation reduces unemployment (Phillips Curve), while output gap, wages, and low investment increase it. They recommend policies to boost investment, manage inflation, and improve education and vocational training. The study emphasises improving the business environment and promoting sectors like agriculture, tourism, and technology to reduce unemployment.

Muhammad Shahid Maqbool, Tahir Mahmood, Abdul Sattar, M. N. Bhalli (2013) examine the determinants of unemployment in Pakistan, finding that GDP growth, FDI, and inflation reduce unemployment, while population growth increases it. The study confirms the Phillips Curve relationship, where higher inflation lowers unemployment. It recommends policies to boost GDP, attract FDI, control population growth, and improve debt utilisation to reduce unemployment.

Prof. Dr. Ali Mustafa Al-Qudah, Diya Mohammad Nsairat (2024). The study finds that higher per capita GDP reduces unemployment in Jordan, while population growth increases it, confirming a long-term relationship between these variables. Inflation has a negative but insignificant effect on unemployment due to its low levels during the study period. The authors recommend policies to sustain economic growth, control population growth, and regulate labor migration to reduce unemployment.

Chukwuebuka Bernard Azolibe, Stephen Kelechi Dimnwobi, Chidiebube Peace Uzochukwu-Obi (2022) find that the study finds that the banking system credit effectively reduces unemployment in South Africa but not in Nigeria due to inefficient loan utilization. Government expenditure lowers unemployment in both countries, while population growth and FDI have differing effects. The authors recommend improving financial regulation in Nigeria and implementing policies to enhance productive investment and financial access.

Muhammad Arslan & Rashid Zaman, (2014) find that higher foreign direct investment (FDI) and GDP growth reduce unemployment in Pakistan, while population growth increases it. The Phillips Curve tradeoff

between inflation and unemployment is confirmed. The authors recommend attracting more FDI, managing inflation, and controlling population growth to improve employment levels.

Unemployment in India and China presents significant social, moral, and economic challenges. A high unemployment rate can have lasting consequences for individuals and families, leading to a reduced standard of living and an increase in poverty. Morally, unemployment can contribute to the erosion of values and a rise in criminal activities, such as gambling, corruption, robberies, and gang violence, particularly among the youth. When people struggle to afford basic necessities, they may resort to violent and criminal behavior. Moreover, rising unemployment negatively impacts economic growth. As individuals deplete their savings to meet immediate needs, their future retirement funds become jeopardized. This scenario can diminish future earnings for retirees and place a heavier burden on government resources. Additionally, high unemployment adversely affects consumer spending on goods and services, further hindering economic progress. Given that unemployment poses a serious challenge for countries like India and China, it is crucial to investigate the factors contributing to unemployment in these nations. If the macroeconomic elements that influence job creation are not understood and addressed through effective policy frameworks, future employment prospects in these communities are likely to worsen. This study focuses on India and China to analyze the macroeconomic impact on the unemployment rate in the short run and long run. By examining the relationship between macroeconomic determinants and unemployment, we can gain valuable insights into strategies for reducing unemployment and expanding opportunities for the growing populations in these countries.

Table 1 shows the result of trend analysis for the determinants of the unemployment rate (UNR) in India and China. The determinants include, viz., gross domestic product (GDP) growth rate, trade (TRADE), remittances (REMIT), population (POP), infrastructure facilities (INFRA), foreign direct investment (FDI), domestic investment (DI), domestic credit (DC), and inflation (CPI). The unemployment rate in India has decreased annually by 0.043 percent and it has decreased by 0.021 percent for China. The linear growth rate implies that the unemployment rate in India decreased at a growth rate of 0.582 percent for India and 0.5245 percent for China for the period from 1991 to 2023. India performs relatively better in reducing the unemployment rate than China. This shows that India maintains a well-functioning labour market and more balanced economic conditions than the Chinese economy. The regression coefficients are significant at the one percent level. The value of R-square shows that it is more than 75 percent of the variation in the dependent variable, and it is explained by the independent variable for both India and China.

Table 1. Trend Analysis for the determinants of unemployment rate in India and China

Country	Variable	Parameter	Coefficient	t-Statistic	Prob.	R^2	Linear Growth Rate (%)
India	UNR	β_1	-0.043028	-3.349001	0.0021	0.765678	-0.58249
		α_1	93.74352	3.635430	0.0010		
China		β_1	-0.021267	-9.829964	0.0000	0.757107	-0.52456
		α_1	-138.9780	-9.551226	0.0000		
India	GDPR	β_1	0.018437	2.345158	0.0323	0.406430	0.296338
		α_1	-30.92887	-2.288504	0.0449		
China		β_1	0.206160	5.311204	0.0000	0.473428	2.230649
		α_1	415.5950	5.427980	0.0000		
India	TRADE	β_1	1.015832	7.394936	0.0000	0.628210	2.420414
		α_1	-2001.702	-7.260384	0.0000		
China		β_1	1.177939	8.064296	0.0000	0.639122	2.740078
		α_1	-314.7991	-2.150003	0.0308		
India	REMIT	β_1	0.053557	5.250937	0.0000	0.470740	1.910489
		α_1	-104.6864	-5.113936	0.0000		
China		β_1	0.001510	2.014970	0.0467	0.46295	0.844522
		α_1	-2.851120	-2.160967	0.0395		
India	POP	β_1	-0.032346	-48.83349	0.0000	0.987167	-2.74888
		α_1	86.52826	49.71809	0.0000		
China		β_1	-0.042054	-12.19005	0.0000	0.821824	-4.8679
		α_1	64.99169	12.31468	0.0000		
India	INFRA	β_1	1.303217	9.097482	0.0000	0.827506	11.97584
		α_1	-2604.675	-9.059530	0.0000		
China		β_1	2.732804	18.83419	0.0000	0.919632	12.06651
		α_1	-5457.591	-18.74075	0.0000		
India	FDI	β_1	0.052586	4.459543	0.0001	0.460813	3.084004
		α_1	-104.2530	-4.405086	0.0001		
China		β_1	0.105486	-5.444440	0.0000	0.488802	5.318402
		α_1	214.8891	5.526125	0.0000		

India	DI	β_1	0.261806	3.052136	0.0046	0.431066	0.821191
		α_1	-493.5626	-2.866916	0.0074		
China		β_1	0.269930	4.965196	0.0000	0.442979	0.858421
		α_1	-500.7520	-4.589405	0.0001		
India	DC	β_1	1.162125	13.56732	0.0000	0.855862	2.918037
		α_1	-2292.560	-13.33551	0.0000		
China		β_1	3.097048	15.51344	0.0000	0.885890	3.462714
		α_1	-6090.017	-15.19941	0.0000		
India	CPI	β_1	-0.124749	-2.364830	0.0245	0.652830	-1.76063
		α_1	257.4567	2.431728	0.0210		
China		β_1	-0.246970	-2.775145	0.0093	0.698996	-6.53437
		α_1	499.4480	2.796275	0.0088		

The GDP growth rate has increased annually by 0.018 percent and it is increased by 0.206 percent for China. The linear growth rate implies that the GDP growth rate in India increased at a growth rate of 0.296 percent for India and 2.23 percent for China for the period from 1991 to 2023. The Chinese economy outperformed India in terms of GDP growth rate. This shows that the Chinese economy underwent a dramatic transformation from planning to market. The regression coefficients are statistically significant, and the value of R-square shows that more than 40 percent of variation in the dependent variable is explained by the independent variable for both India and China.

In terms of trade openness, the Chinese trade performance with respect to economic activity was better than India's during the sample period. It has increased annually by 1.015 percent for India and increased by 1.177 percent for China. The linear growth rate implies that trade openness in India increased at a growth rate of 2.420 percent for India and 2.740 percent for China for the period from 1991 to 2023. China performs relatively better in terms of trade as a percentage of GDP than India. China has become a key link in an intensifying regional production network. For India, in contrast, trade expansion has not brought substantial structural changes, and commodities exports remain weak, while trade in services continues to play a dominant role. The regression coefficients are statistically significant, and the value of R-square shows that it is more than 62 percent of the variation in the dependent variable that is explained by the independent variable for both India and China.

India's remittances have hovered around 0.053 percent of GDP since 1991, while in the case of China, the ratio has remained 0.0015 percent. The linear growth rate shows that remittances as a percent of GDP in India increased at a growth rate of 1.910 percent for India and 0.844 percent for China. India performs relatively better in terms of personal remittances as a percent of GDP than China. India's remittances provided a stable source of external financing, and the interlinking of cross-border fast payment systems increased the ease and efficiency of such transactions. China's rising economic prosperity and ageing population, which have slowed the pace of emigration of less-skilled workers and thereby remittances into the country. The regression coefficients are statistically significant, and the value of R-square shows that it is more than 46 percent of variation in the dependent variable, and it is explained by the independent variable for both India and China.

The population growth rate has decreased annually by 0.032 percent and it is decreased by 0.042 percent for China. The linear growth rate implies that the population growth rate in India decreased at a growth rate of 2.74 percent for India and 4.86 percent for China for the period from 1991 to 2023. China performs relatively better in terms of controlling population growth than India. China remains the world's most populous country. India's population growth rate continues to decline in parallel with China's during the study period. The regression coefficients are statistically significant, and the value of R-square shows that more than 80 percent of the variation in the dependent variable is explained by the independent variable for both India and China.

The infrastructure facilities represented by individuals using the internet (% of population). The growth rate has increased annually by 1.303 percent and it is decreased by 2.732 percent for China. The linear growth rate implies that infrastructure facilities in India increased at a growth rate of 11.975 percent for India and 12.066 percent for China for the period. China performs relatively better in terms of providing basic infrastructure facilities than India. China has a more developed and pervasive internet ecosystem than India, with higher internet penetration rates and more widespread access. The regression coefficients are statistically significant, and the value of R-square shows that more than 80 percent of the variation in the dependent variable is explained by the independent variable for both India and China.

The FDI inflows as percent of GDP have increased annually by 0.0525 percent and they have increased by 0.1054 percent for China. The linear growth rate implies that the GDP growth rate in India increased at a growth rate of 3.084 percent for India and 5.318 percent for China for the period from 1991 to 2023. The Chinese economy outperformed India in terms of attracting the FDI inflows into the country. This shows that FDI plays a crucial role in enhancing the level of economic growth. The regression coefficients are

statistically significant, and the value of R-square shows that it is more than 46 percent of variation in the dependent variable, and it is explained by the independent variable for both India and China.

The domestic investment as percent of GDP has increased annually by 0.2618 percent and it is increased by 0.2699 percent for China. The linear growth rate implies that domestic investment in India increased at growth rate of 0.821 percent for India and 0.858 percent for China during the sample period. China performs relatively better in terms of gross capital formation as percent of GDP than India. The manufacturing sector is dominant in China, and shifting synchronising government policy with the investment decisions of manufacturing executives led to increased domestic investment than India. The regression coefficients are statistically significant, and the value of R-square shows that it is more than 43 percent of variation in the dependent variable, and it is explained by the independent variable for both India and China.

The domestic credit to the private sector by banks (% of GDP) in China is better than in India. The GDP growth rate has increased annually by 1.162 percent and it is increased by 3.097 percent for China. The linear growth rate implies that the GDP growth rate in India increased at a growth rate of 2.918 percent for India and 3,462 percent for China for the study period. China has broadened the possibilities and addressability of the credit market and accelerated credit delivery to better meet the burgeoning requirement and bolster economic growth rates. The regression coefficients are statistically significant, and the value of R-square shows that it is more than 85 percent of variation in the dependent variable, and it is explained by the independent variable for both India and China.

China has taken measures such as tightening monetary policy and controlling credit in response to its inflation incidents from 1991 to 2023. The inflation growth rate has decreased annually by 0.124 percent and it is decreased by 0.246 percent for China. The linear growth rate implies that the inflation growth rate in India decreased at the rate of 1.760 percent for India and 6.534 percent for China for the sample period. China performs relatively better in terms of controlling inflation than India. The regression coefficients are statistically significant, and the value of R-square shows that more than 65 percent of the variation in the dependent variable, and it is explained by the independent variable for both India and China.

Table 2 provides the summary statistics of the determinants of the unemployment rate for India and China. Since the post-liberalization period, the Indian average unemployment rate and economic growth rate are 7.3868 percent and 6.0731 percent, respectively. For China, the average unemployment rate and economic growth rate are 4.0542 percent and 8.9455 percent, respectively. The unemployment rate is relatively low for China, and the GDP growth rate of China is higher compared to India.

Table 2. Summary statistics

India										
	UR	**GDP**	**TRADE**	**REMIT**	**POP**	**INFRA**	**FDI**	**DI**	**DC**	**CPI**
Mean	7.386848	6.073195	37.07310	2.803314	1.540483	36.53967	1.287609	31.88127	39.93697	7.085595
Median	7.631000	6.795383	40.08249	2.938775	1.505991	19.63702	1.312935	30.98217	45.62776	6.372881
Maximum	7.859000	9.689592	55.79372	4.168611	2.167777	86.31709	3.620523	41.95080	54.50529	13.87025
Minimum	4.172000	-5.777725	16.98773	1.005324	0.790201	0.000000	0.027226	22.71641	22.51077	3.328173
Std. Dev.	0.807192	2.881243	12.29550	0.754805	0.412116	36.99443	0.813380	5.266440	12.26147	3.085591
China										
	UR	**GDP**	**TRADE**	**REMIT**	**POP**	**INFRA**	**FDI**	**DI**	**DC**	**CPI**
Mean	4.054242	8.945543	42.32469	0.178799	0.658477	52.35760	3.178819	40.99659	125.7575	3.779555
Median	4.490000	9.133631	38.35148	0.163589	0.605245	41.41510	3.483642	42.07895	118.5519	2.074790
Maximum	5.000000	14.23086	64.47919	0.477224	1.364434	128.2168	6.186882	46.66012	194.6740	24.25699
Minimum	2.370000	2.238638	25.94972	0.033429	-0.103795	0.004061	0.240114	33.57303	83.09731	-1.401473
Std. Dev.	0.791979	2.838436	10.08243	0.090022	0.340752	47.38942	1.458928	3.921614	31.81734	5.353373
Observations	33	33	33	33	33	33	33	33	33	33

Tables 3 and 4 show the correlation matrix for all variables considered for India and China. The existence of high correlation between certain variables may lead to the issue of multicollinearity. Gujarati, Porter and Gunasekar (2012) stated that multicollinearity occurs if two variables have a correlation coefficient that exceeds the 0.80 benchmark. The findings show no evidence of multicollinearity among the independent variables that are included in the empirical model.

Table 3. Correlation Matrix of determinants of the Indian economy

	GDP	UR	TRADE	REMIT	POP	INFRA	FDI	DI	DC	CPI
GDP	1									

UR	-0.2137	1								
TRADE	0.1909	-0.2658	1							
REMIT	0.0759	-0.1868	0.7386	1						
POP	-0.0618	0.5498	-0.7862	-0.6522	1					
INFRA	0.0118	-0.3996	0.7365	0.5340	-0.7263	1				
FDI	-0.1165	0.0177	0.7550	0.7517	-0.6263	0.5614	1			
DI	0.3044	-0.0700	0.7401	0.6950	-0.4668	0.3701	0.6543	1		
DC	0.0374	-0.3351	0.7259	0.7553	-0.9230	0.8006	0.7621	0.6836	1	
CPI	-0.1205	0.1694	-0.1408	-0.2704	0.3607	-0.1892	-0.1288	-0.0648	-0.2232	1

Table 4. Correlation Matrix of determinants of the Chinese economy

	GDP	UR	TRADE	REMIT	POP	INFRA	FDI	DI	DC	CPI
GDP	1									
UR	-0.5045	1								
TRADE	0.3352	0.5459	1							
REMIT	0.0263	0.3064	0.2933	1						
POP	0.5822	-0.7769	-0.3289	-0.0854	1					
INFRA	-0.6878	0.7769	0.0387	0.1405	-0.8271	1				
FDI	0.7261	-0.4505	0.2722	-0.0059	0.5665	-0.7466	1			
DI	-0.1782	0.6540	0.3272	0.3126	-0.5103	0.7129	-0.2830	1		
DC	-0.7881	0.7453	-0.0564	0.0839	-0.7742	0.7330	-0.7720	0.5117	1	
CPI	0.5004	-0.4861	-0.1408	-0.0826	0.4775	-0.3489	0.5513	0.0450	-0.4686	1

Figure 1. Time-Series Plot of Unemployment rate and its determinants of India

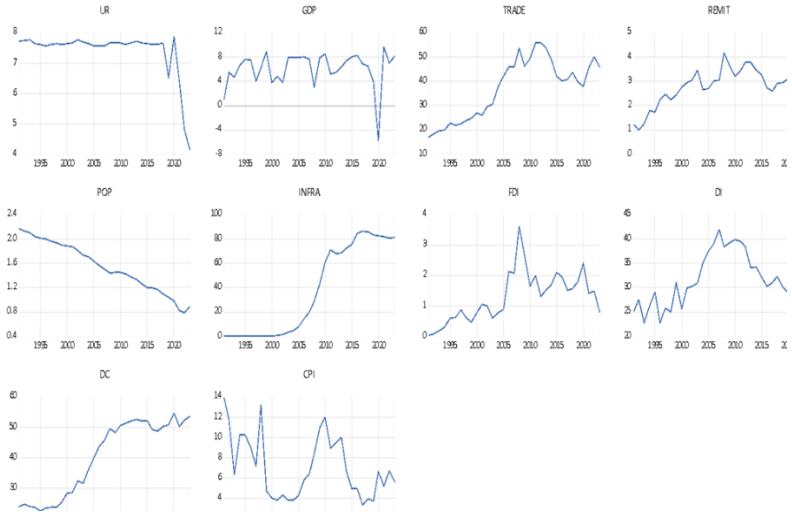


Figure 2. Time-Series Plot of Unemployment rate and its determinants of China

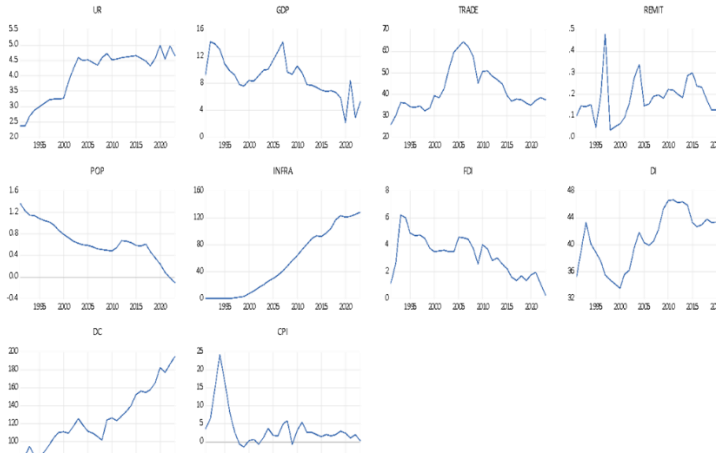


Figure 3. Time-Series Plot of differenced Unemployment rate and it determinants of India

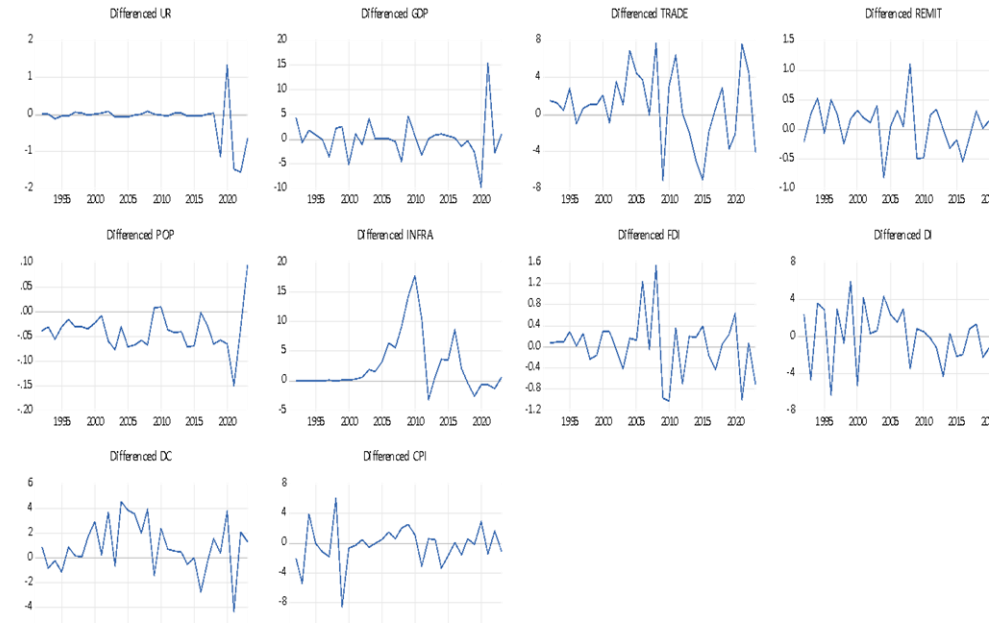


Figure 4. Time-Series Plot of differenced Unemployment rate and it determinants of China

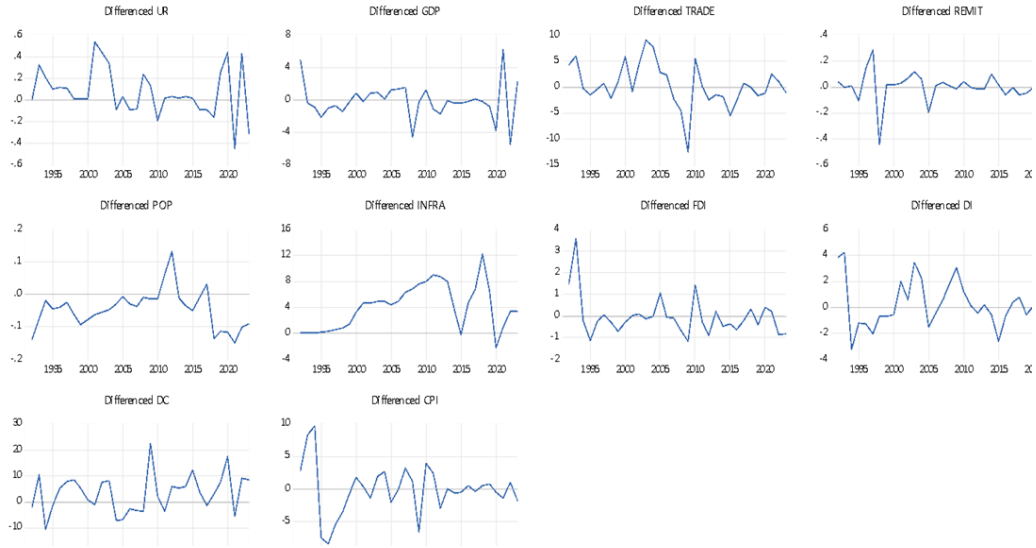


Table 5. Unit root test results

Phillips-Perron (PP) test				
Country	**Variables**	**Level**	**First Difference**	**Order of Integration**
India	UNR	1.941646 (0.9997)	-5.710145* (0.0000)	I(1)
	GDP	-6.570285* (0.0000)	--	I(0)
	TRADE	-1.526333 (0.5077)	-4.902425* (0.0004)	I(1)
	REMIT	-2.244746 (0.1953)	-6.349545* (0.0000)	I(1)
	POP	0.085605 (0.9596)	-2.141976** (0.0330)	I(1)
	INFRA	-0.346938 (0.9067)	-1.868218*** (0.0597)	I(1)
	FDI	-2.276705 (0.1852)	-6.679974* (0.0000)	I(1)
	DI	-1.780455	-7.759131*	I(1)

		(0.3830)	(0.0000)	
	DC	-0.772707 (0.8133)	-5.750732* (0.0000)	I(1)
	CPI	-3.252713** (0.0260)	--	I(0)
	Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test			
	UNR	0.450771***	0.316767	I(1)
	GDP	0.161250	--	I(0)
	TRADE	0.577200**	0.184379	I(1)
	REMIT	0.513164**	0.245792	I(1)
	POP	0.767599*	0.118191	I(1)
	INFRA	0.590514**	0.170349	I(1)
	FDI	0.489290**	0.298490	I(1)
	DI	0.322245	0.173420	I(1)
	DC	0.592058**	0.159738	I(1)
	CPI	0.214619	--	I(0)
Phillips-Perron (PP) test				
China	UNR	-2.536663 (0.1166)	-5.764398* (0.0000)	I(1)
	GDP	-1.994661 (0.2876)	-9.408997* (0.0000)	I(1)
	TRADE	-1.911181 (0.3232)	-3.889021* (0.0057)	I(1)
	REMIT	-4.300991* (0.0019)	--	I(0)
	POP	-0.497812 (0.8790)	-2.994580** (0.0465)	I(1)
	INFRA	1.014018 (0.9957)	-1.677531*** (0.0964)	I(1)
	FDI	-1.779833 (0.3833)	-4.919490* (0.0004)	I(1)
	DI	-1.899050 (0.3286)	-4.107452* (0.0033)	I(1)
	DC	1.335318 (0.9983)	-5.604303* (0.0001)	I(1)
	CPI	-2.304364 (0.1768)	-4.000416* (0.0043)	I(1)
	Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test			
	UNR	0.652594**	0.314371	I(1)
	GDP	0.508038**	0.136956	I(1)
	TRADE	0.187369	--	I(0)
	REMIT	0.173456	--	I(0)
	POP	0.693400**	0.163650	I(1)
	INFRA	0.634583**	0.307516	I(1)
	FDI	0.568830**	0.308587	I(1)
	DI	0.474561**	0.148000	I(1)
	DC	0.717959**	0.263936	I(1)
	CPI	0.302700	--	I(0)

Note: *, ** and *** denotes significance at 1%, 5% and 10% level, respectively. The PP unit root test statistics test the null hypothesis of a return series has a unit-root against the series is stationary, and the lag length was chosen on the basis of the Schwarz Information Criterion (SIC). The KPSS test statistics test the null hypothesis that a return series is stationary against the series contains a unit-root. Asymptotic critical values for KPSS test for model with the drift are 0.7390 (1%), 0.4630 (5%) and 0.3470 (10%).

Figure 1 and Figure 2 show the time-series plot of unemployment and its determinants in India and China. The visual inspection shows that variables are non-stationary, as observed by the upward and downward trend. This implies that the mean and variance of the variables are time-invariant. Hence the variables are converted to the first difference form. Figure 3 and 4 show the time-series plot of the differenced form of the determinants of unemployment in India and China. The differenced variables fluctuate around the mean and are said to be stationary.

The PP and KPSS unit root tests are employed to determine the appropriate order of integration and to avoid spurious results, as depicted in Table 5. The PP unit root test statistics test the null hypothesis of a return series having a unit root against the series is stationary. The KPSS test statistics test the null hypothesis that a series is stationary against the series containing a unit root (non-stationary). The PP and KPSS for India and China results show that the determinants of the unemployment rate are found to be stationary either at its level or first differences, indicating the mixed order of integration. The variables had a different order of integration with respect to the PP test and the KPSS test.

Table 6. ARDL bounds testing approach to cointegration for India and China

Panel A: India			
F-Statistic	K	99% Lower bound	99% Upper bound
17.00570*	9	2.50	3.68
Panel B: China			
F-Statistic	K	99% Lower bound	99% Upper bound
9.371211*	9	2.50	3.68
Note: * and ** denotes significance at 1% and 5% level, respectively. The critical values are determined from Pesaran et al. (2001) and Shin et al. (2014). K is the number of regressors in the equation.			

The ARDL Bounds test is used to assess the long-run equilibrium relationship between the unemployment and its determinants since the stationary order is I(0) and I(1). The results of cointegration for the Indian and Chinese economies are shown in Table 6. As evident from the table results, the calculated F-statistics are higher than the upper bound critical values; there is a stable long-run relationship between the unemployment rate and its determinants in India and China.

Table 7 depicts the ARDL estimates on the determinants of the unemployment rate in India. For the long run, the empirical results reveal that the Gross Domestic Product (GDP) growth rate has a negative and significant impact on unemployment. Keeping other factor remains same, one unit increase in economic activity would lead to a 0.2086 unit decrease in unemployment. The foreign trade is found to be negative and statistically significant. The results suggest that a one-unit increase in the trade activities is associated with 0.2515 unit decrease in the unemployment rate in India. The remittances inflow for the country is associated with the 1.3588 unit decrease in the rate of unemployment. The population growth possesses a positive significant relationship with the unemployment rate. A one-unit increase in population growth would increase the unemployment rate by 4.8549 units. Infrastructure facilities have a negative and significant relation to unemployment. The coefficient shows that unemployment decreases by 0.0598 units if infrastructure facilities increase by one unit. The foreign direct investment exhibits a negative and significant relationship with the unemployment rate in India, as the coefficient shows that a one- unit increase in FDI inflows led to 1.2983 unit decline in the unemployment rate. The insignificant relationship shows that the domestic investment does not influence the unemployment rate in India. The negative and significant coefficient value of domestic credit implies that a one-unit increase in bank credit led to a decrease in the unemployment rate by 0.3902, holding other variables constant. The inflation (CPI) coefficient shows that there is a 0.3629 unit decrease in unemployment if inflation increases by one unit. The negative association between unemployment and inflation in India is in support of the Phillips curve in the long run.

Table 7. ARDL estimates on the Determinants of Unemployment rate in India

Dependent Variable: Unemployment rate				
Panel A: Long-run estimates				
Variables	Coefficient	Std. Error	t-Statistic	Prob.
GDP	-0.208641**	0.046600	-4.477236	0.0208
TRADE	-0.251587***	0.108313	-2.322781	0.0958
REMIT	-1.358873***	0.572765	-2.372479	0.0923
POP	4.854928***	1.904654	2.548982	0.0840
INFRA	-0.059878***	0.021981	-2.724037	0.0723
FDI	-1.298354***	0.598453	-2.169516	0.0985
DI	0.176856	0.090784	1.948105	0.1465
DC	-0.390241***	0.154779	-2.521287	0.0861
CPI	-0.362920***	0.127956	-2.836294	0.0658
C	2.793535	3.380546	0.826356	0.4692
Panel B: Short-run estimates				
Variables	Coefficient	Std. Error	t-Statistic	Prob.
ΔUR_{t-1}	-1.664924*	0.077450	-21.49678	0.0002
ΔGDP_t	-0.105658*	0.008543	-12.36801	0.0011
ΔGDP_{t-1}	-0.208641*	0.009896	-21.08442	0.0002
$\Delta TRADE_t$	0.090619*	0.005945	15.24303	0.0006
$\Delta TRADE_{t-1}$	-0.073280*	0.006591	-11.11878	0.0016
$\Delta REMIT_t$	-1.597550*	0.067443	-23.68734	0.0002
ΔPOP_t	18.31790*	0.743059	24.65203	0.0001
ΔPOP_{t-1}	9.010675*	0.802396	11.22971	0.0015
$\Delta INFRA_t$	0.156837*	0.007616	20.59278	0.0003
$\Delta INFRA_{t-1}$	-0.077926***	0.005779	-13.48541	0.0009
ΔFDI_t	-0.104501***	0.036222	-2.885012	0.0633
ΔFDI_{t-1}	-0.841821*	0.053527	-15.72710	0.0006
ΔDI_t	0.014585	0.006463	2.256529	0.1093
ΔDI_{t-1}	-0.020798***	0.006636	-3.133973	0.0519

ΔDC_t	-0.239852*	0.014337	-16.72989	0.0005
ΔDC_{t-1}	-0.158536*	0.013636	-11.62649	0.0014
ΔCPI_t	-0.288192*	0.011166	-25.80989	0.0001
ECT_{t-1}	-1.009884*	0.035470	-28.47113	0.0001
Note: * and *** denote significance at 1% and 10% level, respectively.				

For the short run, the evidence shows that the Gross Domestic Product (GDP) growth rate has a negative and significant impact on unemployment. Keeping other factors the same, a one percent increase in economic activity would lead to 0.0732 percent decrease in unemployment. The foreign trade is found to be negative and statistically significant. The results suggest that a one percent increase in the trade activities is associated with 0.0732 percent decrease in the unemployment rate in India. The remittance inflow for the country is associated with the 1.5975 percent decrease in the rate of unemployment. The population growth possesses a positive significant relationship with the unemployment rate. A one percent increase in population growth would increase the unemployment rate by 9.0106 percent. Infrastructure facilities have a negative and significant relation to unemployment. The coefficient shows that unemployment decreases by 0.0779 percent if infrastructure facilities increase by one percent. The foreign direct investment exhibits a negative and significant relationship with the unemployment rate in India, as the coefficient shows that a one percent increase in FDI inflows led to 0.8418 percent decline in unemployment rate. The negative and significant relationship shows that one percent increase domestic investment would increase the unemployment rate in India by 0.0207 percent. The negative and significant coefficient value of domestic credit implies that a one percent increase in bank credit led to a decrease in the unemployment rate by 0.1585 percent, holding other variables constant. The inflation (CPI) coefficient shows that there is a 0.2881 unit decrease in unemployment if inflation increases by one unit. The negative association between unemployment and inflation in India.

Table 8. ARDL estimates on the Determinants of Unemployment rate in China

Dependent Variable: Unemployment rate				
Panel A: Long-run estimates				
Variables	Coefficient	Std. Error	t-Statistic	Prob.
GDP	-1.563123**	0.533194	2.931622	0.0326
TRADE	-0.045072	0.029972	-1.503808	0.1930
REMIT	-9.390489***	3.680272	-2.551575	0.0512
POP	6.837980**	2.390317	2.860700	0.0354
INFRA	-0.064287**	0.022469	-2.861130	0.0354
FDI	-0.364415***	0.206968	-1.760736	0.0986
DI	-0.495940**	0.149180	-3.324434	0.0209
DC	-0.228966**	0.073812	-3.101993	0.0268
CPI	-0.494581**	0.159180	-3.107066	0.0266
C	-56.23774**	18.49329	-3.040980	0.0287
Panel B: Short-run estimates				
Variables	Coefficient	Std. Error	t-Statistic	Prob.
ΔGDP_t	-0.136274*	0.007640	-17.83676	0.0000
ΔGDP_{t-1}	-0.496109*	0.028643	-17.32037	0.0000
$\Delta TRADE_t$	0.011968*	0.002871	4.169066	0.0087
$\Delta TRADE_{t-1}$	-0.025086*	0.002781	-9.020820	0.0003
$\Delta REMIT_t$	1.002685*	0.083926	11.94730	0.0001
$\Delta REMIT_{t-1}$	-3.636459*	0.219560	-16.56247	0.0000
ΔPOP_t	2.788060*	0.240699	11.58316	0.0001
ΔPOP_{t-1}	0.953718*	0.206640	4.615348	0.0058
$\Delta INFRA_t$	0.034120*	0.004219	8.086332	0.0005
$\Delta INFRA_{t-1}$	-0.028183*	0.004215	-6.686251	0.0011
ΔFDI_t	-0.079304*	0.015009	-5.283679	0.0032
ΔDI_t	-0.150065*	0.011332	-13.24317	0.0000
ΔDI_{t-1}	0.105986*	0.008498	12.47150	0.0001
ΔDC_t	0.000448	0.001553	0.288432	0.7846
ΔDC_{t-1}	-0.014529*	0.001803	-8.058890	0.0005
ΔCPI_t	-0.387880***	0.187970	-2.063525	0.0511
ECT_{t-1}	-0.771445*	0.043868	17.58550	0.0000
Note: * and *** denote significance at 1% and 10% levels, respectively.				

Table 8 depicts the ARDL estimates on the determinants of the unemployment rate in China. For the long run, the empirical results reveal that the Gross Domestic Product (GDP) growth rate has a negative and significant impact on unemployment. Keeping other factors the same, one unit increase in economic activity would lead to a 1.5631 unit decrease in unemployment. The foreign trade is found to be negative and statistically significant. The results suggest that one unit increase in the trade flows is associated with a 0.0450

unit decrease in the unemployment rate. The remittance inflows for the country are associated with the 9.3904-unit decrease in the rate of unemployment. The population growth possesses a positive significant relationship with the unemployment rate. A one-unit increase in population growth would increase the unemployment rate by 6.8379 units. Infrastructure facilities have a negative and significant relation to unemployment. The coefficient shows that unemployment decreases by 0.0642 units if infrastructure facilities increase by one unit. The foreign direct investment exhibits a negative and significant relationship with unemployment rate in India as the coefficient shows that a one unit increase in FDI inflows led to a 0.3644 unit decline in the unemployment rate. The negative and significant relationship shows that the one-unit increase in domestic investment led to a reduction in the unemployment rate by 0.4959 units. The negative and significant coefficient value of domestic credit implies that a one-unit increase in bank credit led to a decrease in the unemployment rate by 0.2289, holding other variables constant. The inflation (CPI) coefficient shows that there is a 0.4945 unit decrease in unemployment if inflation increases by one unit. The negative association between unemployment and inflation in China in the long run is in support of the Phillips curve.

For the short run, the evidence shows that the Gross Domestic Product (GDP) growth rate has a negative and significant impact on unemployment. Keeping other factors the same, a one percent increase in economic activity would leads to 0.4961 percent decrease in unemployment. The foreign trade is found to be negative and statistically significant. The results suggest that one percent increase in the trade activities is associated with a 0.0250 percent decrease in the unemployment rate in China. The remittances inflow for the country is associated with the 3.6364 percent decrease in the rate of unemployment. The population growth possesses a significant positive relationship with the unemployment rate. A one percent increase in population growth would increase the unemployment rate by 0.9537 percent. Infrastructure facilities have a negative and significant relation to unemployment. The coefficient shows that unemployment decreases by 0.0281 percent if infrastructure facilities increase by one percent. The foreign direct investment exhibits a negative and significant relationship with the unemployment rate in India, as the coefficient shows that a one percent increase in FDI inflows led to a 0.0793 percent decline in the unemployment rate. The negative and significant relationship shows that a one percent increase in domestic investment would increase the unemployment rate in China by 0.1059 percent. The negative and significant coefficient value of domestic credit implies that a one percent increase in bank credit led to a decrease in the unemployment rate by 0.0145 percent, holding other variables constant. The inflation (CPI) coefficient shows that there is a 0.3878 percent decrease in unemployment if inflation increases by one unit. The negative association between unemployment and inflation in China.

Table 9. ARDL Diagnostic tests

Panel A: India		
	test statistic	Prob. value
Breusch-Godfrey Serial Correlation LM test	3.997650	0.3334
Jarque-Bera Normality test	0.960375	0.6186
ARCH-LM Heteroscedasticity test	0.008052	0.9192
Ramsey RESET Specification test	1.083571	0.3918
Panel B: China		
	test statistic	Prob. value
Breusch-Godfrey Serial Correlation LM test	22.09787	0.1581
Jarque-Bera Normality test	2.745657	0.2533
ARCH-LM Heteroscedasticity test	1.632925	0.2118
Ramsey RESET Specification test	2.831729	0.1677

Table 9 presents the ARDL diagnostic tests on the determinants of unemployment for the Indian and the Chinese economy. The residuals are normally distributed in the model, as evidenced by the non-rejection of the null hypothesis using the Jarque-Bera test. The Ljung–Box Q statistic also reports that there is no autocorrelation in the models. The Lagrange Multiplier serial correlation test also confirms that there is no serial correlation in the models. The models also appears to be heteroscedastic, as it passes all the heteroscedasticity tests. The Ramsey RESET test results suggest that the models are correctly specified.

Figures 5 & 6 present the CUSUM and CUSUMSQ graphs for the ARDL estimates of India and China. The plots are confined inside the five percent critical boundaries of parameter stability, implying that the ARDL estimates are stable.

Figure 5. CUSUM and CUSUMSQ of ARDL approach for India

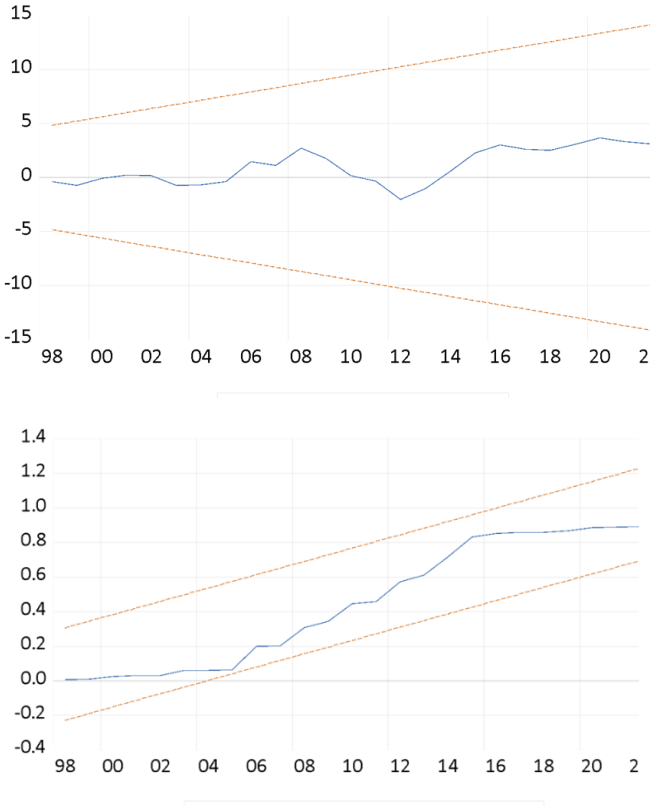
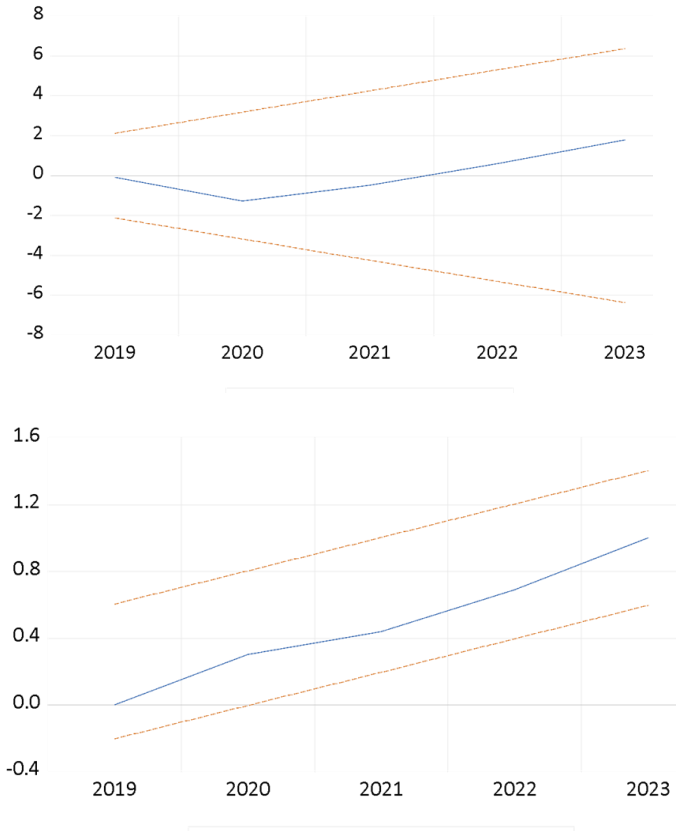


Figure 6. CUSUM and CUSUMQ of ARDL approach for China



IV. Findings And Suggestions

For the long run, the findings reject the null hypothesis and show that the GDP growth rate has a negative and significant impact on unemployment for both India and China. An increase in economic activity results in a fall in the unemployment rate in China that is greater than that of the Indian economy. The findings reject the null hypothesis and show that trade openness has a negative and significant impact on unemployment for both India and China. An increase in trade flows results in a fall in the unemployment rate in India that is greater than that of the Chinese economy in the long run.

The increase in remittance inflow for the Chinese economy had a greater impact than that of India in reducing the unemployment rate in the long run. The population growth possesses a positive significant relationship with the unemployment rate in both economies. The increase in population growth would increase the unemployment rate in China, which is greater than the Indian economy.

Infrastructure facilities have a negative and significant relation to unemployment in both economies. The unemployment decrease due to an increase in infrastructure facilities is greater than the Indian economy. The foreign direct investment exhibits a negative and significant relationship with the unemployment rate in India and China. The reduction in unemployment due to FDI inflow in India is greater than the Chinese economy.

The significant relationship shows that the domestic investment influences the unemployment rate in India and China. The decline in unemployment due to an increase in domestic investment in China is greater than the Indian economy. The domestic credit facilities exhibit a negative and significant relationship with the unemployment rate in India and China. The fall in unemployment due to an increase in domestic credit in India is greater than the Chinese economy. The control measure of inflation implemented by the Chinese economy effectively reduces the unemployment rate compared to India.

On the long-run determinants of the unemployment rate in India and China, the findings show that the Gross Domestic Product (GDP), Trade (TRADE), Remittances (REMIT), Population (POP), Infrastructure Facilities (INFRA), Foreign Direct Investment (FDI), Domestic Investment (DI), Domestic Credit (DC) and Inflation (CPI) play significant roles.

For the short run, the findings reject the null hypothesis and show that the GDP growth rate has a negative and significant impact on unemployment for both India and China. An increase in economic activity results in a fall in the unemployment rate in China that is greater than that of the Indian economy. Findings reject the null hypothesis and show that trade openness has a negative and significant impact on unemployment for both India and China. An increase in trade flows results in a fall in the unemployment rate in India that is greater than that of the Chinese economy in the short run.

The increase in remittance inflow for the Chinese economy had a greater impact than that of India in reducing the unemployment rate in the short run. The population growth possesses a positive significant relationship with the unemployment rate in both economies. The increase in population growth would increase the unemployment rate in India is greater than the Indian economy. Infrastructure facilities have a negative and significant relation to unemployment in both economies. The unemployment decrease due to an increase in infrastructure facilities in India is greater than the Chinese economy.

The foreign direct investment exhibits a negative and significant relationship with the unemployment rate in India and China. The reduction in unemployment due to FDI inflow in India is greater than the Chinese economy. The significant relationship shows that the domestic investment influences the unemployment rate in India and China. The decline in unemployment due to an increase in domestic investment in China is greater than in the Indian economy. The domestic credit facilities exhibit a negative and significant relationship with the unemployment rate in India and China. The fall in unemployment due to an increase in domestic credit in India is greater than the Chinese economy. The control measure of inflation implemented by the Chinese economy effectively reduces the unemployment rate compared to India.

On the short-run determinants of the unemployment rate in India and China, the findings show that the Gross Domestic Product (GDP), Trade (TRADE), Remittances (REMIT), Population (POP), Infrastructure Facilities (INFRA), Foreign Direct Investment (FDI), Domestic Investment (DI), Domestic Credit (DC) and Inflation (CPI) play significant roles.

Macroeconomic determinants are the subject of great importance for India and China to maintain low unemployment rates in the short run and long run, and policymakers should consider and contribute to the establishment of policies regarding the development of the unemployment indicator.

Growth in real gross domestic product (GDP), foreign trade (TRADE), remittance flows (REMIT), infrastructure facilities (INFRA), foreign direct investment (FDI), domestic investment (DI), domestic credit (DC) and inflation (CPI) significantly reduces the unemployment rates in India and China.

For India and China, the increase in GDP creates employment opportunities and reduces unemployment in both the short run and the long run. The recommendation for the policymakers to attribute to

the low unemployment rate in the country would be to increase the productivity in order to expand the employment opportunities.

The negative relationship between trade flows and unemployment rates suggests that India and China should encourage higher trade openness through effective liberal trade policies to enhance the global competitiveness of domestic businesses to create more jobs.

For remittances to reduce unemployment rates in the long run and short run, the government and policymakers should offer attractive interest rates for deposits of remittances in the commercial banks. This might encourage the saving and investment of remittances into productive ventures. Consequently, this might spur economic growth and reduce unemployment in India and China in the long run and short run.

Infrastructure facilities reduce unemployment in the countries, suggesting that infrastructure investment, including ICT, generates new jobs in the capital sector. The new technologies create new investments, thereby opening new opportunities for the unemployed people. China is famous for its rapid infrastructure development; India is also making significant efforts, and both countries, especially the Indian economy, should significantly increase its infrastructure spending with a strong focus on scaling up and modernising its physical assets to reduce the unemployment rate.

FDI has a negative relationship with the unemployment rate in the short run and long run. Higher inflows of FDI complement domestic investment that creates more jobs in the Indian and the Chinese economy. Thus, much more liberal FDI policies should be implemented in the economy to decrease the unemployment rate.

The negative relation between domestic investment and unemployment for India and China suggests that the government should invest more in numerous capital projects, viz., the establishment of hospitals, educational institutions, road constructions, power projects, sea ports, airports, etc. This creates more jobs that will invariably decrease the unemployment rate in the short run and long run. Besides, it stimulates aggregate demand, leading to decreased high unemployment rates.

Adequate domestic credit to the productive sectors should be encouraged in India and China. This reduces the unemployment rates in the short run and long run. The agricultural and manufacturing sectors provide the large-scale employment opportunities in an economy and thus, increased bank loan will encourage output that will absorb a good number of unemployed persons in India and China.

The positive relationship between population growth and unemployment rate validates the Malthus (1798) theory of population. It suggests that population growth will cause higher unemployment rates. The labour force in India and China should be equipped with the creativity and entrepreneurial skills that provide them the opportunity to become self-employed and hence job creators rather than being job seekers who rely heavily on the government to create more jobs for them. Thus, an increase in population will lead to the emergence of job creators that will in turn reduce the rate of unemployment.

India and China confirmed the proposition of the Phillips curve of a negative relationship between unemployment and inflation. Governments should concentrate on investment in productive sectors that expand production and reduce the unemployment rates, both in the short run and long run.

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