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Exploring the Impact of Trade Openness on Unemployment: A Cross-Country Analysis

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Abstract
This study investigates the relationship between trade openness and unemployment in both capital-abundant and labour-abundant countries, while also considering other control variables such as inflation rate, economic growth, population growth, and political rights. The analysis covers the period from 1990 to 2016 and includes data from 75 labour-abundant countries and 44 capital-abundant countries. To ensure the reliability of the results, the study employs various statistical techniques including IPS panel unit root test to assess the normality and stationarity of the variables, as well as Mean Group and Pooled Mean Group heterogeneous panel cointegration techniques to examine the long-run relationships among the variables. The findings suggest that in labour-abundant countries, trade openness has a significantly negative impact on unemployment in the long run. Additionally, variables such as inflation rate and institutional quality are found to have negative and significant effects on unemployment, while population growth is positively and significantly related to unemployment in these countries. Conversely, in capital-abundant countries, trade openness is found to have a significantly positive impact on unemployment in the long run. The inflation rate still has a negative and significant impact on unemployment, while population growth remains positively and significantly related to unemployment. However, the coefficient of institutional quality is statistically insignificant in capital-abundant countries. These results indicate that the relationship between trade openness and unemployment varies depending on the abundance of capital or labour in a country. Additionally, factors such as inflation rate, population growth, and institutional quality play significant roles in shaping unemployment dynamics in both types of countries.
Keywords: Trade Openness, Unemployment, Labor Abundance, Capital Abundance
JEL Codes: F16, J64, O11, O57

1. INTRODUCTION

Indeed, trade openness, characterized by the reduction of tariffs and other barriers to trade, facilitates the free movement of goods and services across international borders. This trend towards greater integration of the global economy has been prominent in recent years. The concept of trade openness is rooted in the principles of free trade, which posits several potential benefits for participating countries. One of the primary advantages of free trade is the stimulation of economic activity. By removing barriers to trade, countries can engage in specialization, focusing on producing goods and services in which they have a comparative advantage. This specialization allows for more efficient allocation of resources, leading to increased productivity and economic growth. Moreover, free trade can encourage innovation and technological advancement as countries seek to remain competitive in global markets. Furthermore, trade openness can lead to enhanced consumer welfare. With access to a wider range of goods and services from around the world, consumers benefit from greater choice and potentially lower prices. This can improve standards of living and contribute to poverty reduction by making essential goods more affordable and accessible. Additionally, free trade can foster international cooperation and peaceful relations among nations. By promoting economic interdependence, countries become more reliant on one another for trade and investment, reducing the likelihood of conflict and promoting mutual understanding. However, it is important to acknowledge that trade openness may also present challenges and risks. For example, increased competition from foreign producers may put pressure on domestic industries, leading to job displacement and economic dislocation in certain sectors. Moreover, unequal distribution of the gains from trade can exacerbate income inequality within countries, leading to social tensions and political backlash against globalization. Indeed, trade openness is often regarded as a key driver of economic growth, as evidenced by studies such as those by Yeboah et al. (2012), Yanikkaya (2003), and Awokuse (2008). By facilitating the exchange of goods and services across borders, free trade can promote efficiency, specialization, and innovation, ultimately contributing to higher levels of productivity and output. However, it is important to recognize that the benefits of trade openness may come with certain costs and challenges, particularly in the short term. One of the primary concerns associated with free trade is the potential impact on domestic industries, particularly those that may be less competitive on the global stage. When domestic industries are exposed to increased competition from foreign producers, particularly in sectors where comparative advantages are lacking, there is a risk of job displacement and unemployment. This phenomenon is often referred to as "trade-induced unemployment." For example, if a country's domestic manufacturers cannot compete with cheaper imports from abroad, they may be forced to downsize or shut down operations, leading to layoffs and job losses in the affected industries. This can have significant economic and social

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consequences, including decreased consumer purchasing power, reduced tax revenues, and increased social welfare expenditures. Moreover, trade-induced unemployment can exacerbate income inequality and contribute to social unrest and political instability if not addressed effectively by policymakers. Therefore, while trade openness can offer substantial benefits in terms of economic growth and efficiency, it is essential to implement accompanying policies to mitigate the adverse effects on vulnerable sectors and workers. This may include measures such as investment in education and retraining programs, targeted assistance to affected industries, and social safety nets to support displaced workers during periods of transition. By addressing these challenges proactively, countries can harness the benefits of trade openness while minimizing its negative consequences on employment and livelihoods.

The theory of absolute advantage, proposed by Adam Smith in 1776, suggests that both nations can benefit from trade when each specializes in producing the goods in which it has an absolute advantage. In this scenario, a nation has an absolute advantage in the production of a good if it can produce that good more efficiently or with fewer resources than another nation. For example, if Nation-I can produce wheat more efficiently than Nation-II, while Nation-II can produce textiles more efficiently than Nation-I, then according to the theory of absolute advantage, Nation-I should specialize in producing wheat and export it to Nation-II, while Nation-II should specialize in producing textiles and export them to Nation-I. By focusing on their respective areas of comparative advantage, both nations can increase their overall production and consumption levels, leading to mutual gains from trade. On the other hand, the theory of comparative advantage, introduced by David Ricardo in 1817, suggests that even if one nation has an absolute advantage in the production of both goods, trade can still be mutually beneficial if each nation specializes in producing the goods in which it has a comparative advantage. Comparative advantage is determined by the opportunity cost of producing one good in terms of the other. Even if one nation is more efficient in producing both goods, there will still be differences in the opportunity costs of production. The nation with the lower opportunity cost of producing a particular good will specialize in that good and trade with the other nation, leading to gains from trade for both parties.

According to the Heckscher-Ohlin model of international trade, trade openness can have differing effects on unemployment depending on a country's relative factor endowment. The model suggests that countries will export goods that intensively use their abundant factor of production and import goods that intensively use their scarce factor of production. In a capital-abundant country, trade openness may lead to increased unemployment if the country specializes in producing and exporting goods that are intensive in capital, while importing goods that are intensive in labor. This could result in a decrease in demand for labor relative to capital, leading to higher unemployment among laborers. On the other hand, in a labor-abundant country, trade openness may lead to decreased unemployment if the country specializes in producing and exporting goods that are intensive in labor, while importing goods that are intensive in capital. This could result in increased demand for labor relative to capital, leading to lower unemployment rates. Thus, the impact of trade openness on unemployment depends on the relative factor endowments of a country, with capital-abundant countries potentially experiencing increased unemployment and labor-abundant countries potentially experiencing decreased unemployment as a result of trade liberalization.

The empirical literature on the relationship between trade openness and unemployment presents mixed findings, reflecting the complexity of the issue and the varying economic contexts of different countries. Some studies suggest that trade liberalization may lead to increased unemployment, particularly in capital-abundant economies, while others find that it can decrease unemployment. For instance, Moore and Ranjan (2005) indicate that trade liberalization may contribute to increased unemployment in capital-abundant economies. They argue that the exit of low-productivity firms, which often occurs with increased trade openness, may lead to a net destruction of jobs that outweighs any job creation by high-productivity firms. Similarly, Janiak (2006) highlights the association between trade openness and unemployment, suggesting that the exit of less productive firms could contribute to higher unemployment rates, despite potential job creation by more productive firms. However, there are also studies that find a positive relationship between trade openness and decreased unemployment. Felbermayr et al. (2011), for example, suggest that increased trade openness could lead to a reduction in unemployment by allowing for greater efficiency and specialization in production. They argue that this effect holds true for both developing and developed countries. Furthermore, Dutt et al. (2009) also find a negative association between international trade and unemployment, indicating that increased trade can lead to lower unemployment rates. Overall, the varying findings in the literature highlight the importance of considering country-specific factors, such as relative factor endowments, industrial structure, and labor market institutions, when assessing the impact of trade openness on unemployment.

2. LITERATURE REVIEW

Indeed, free trade policies, which remove barriers to international trade such as tariffs and quotas, have been widely adopted across the globe. Agreements like the European Union and the North American Free Trade Agreement (NAFTA) have further promoted the idea of free trade by facilitating trade among member countries. However, there is ongoing debate and concern regarding the impact of trade openness on employment, particularly in the context of increasing globalization. Some argue that trade openness can lead to job losses and higher unemployment rates, especially in industries that face increased competition from imports. This concern is particularly pronounced in countries where labor-intensive industries dominate and may be vulnerable to competition from lower-cost producers abroad. The impact of trade openness on unemployment is often analyzed in the context of a country's factor endowment, as highlighted by Ohlin's theory of international trade (Ohlin, 1933). In capital-abundant countries, where capital is more abundant relative to labor, increased trade openness may lead to job losses in labor-intensive industries, potentially contributing to higher unemployment rates. Conversely, in labor-abundant countries, where labor is more plentiful relative to capital, trade

openness may create job opportunities by stimulating demand for labor in export-oriented industries. The relationship between international trade and unemployment is complex and context-dependent. While trade openness can bring benefits such as increased economic efficiency and access to a wider range of goods and services, its impact on employment outcomes may vary across countries and industries. Hence, the association between trade openness and unemployment remains a subject of ongoing research and debate in the field of international economics.

Baldwin (1995) delved into the intricate relationship between international trade, employment, wages, and foreign direct investment, leveraging data from OECD (Organization for Economic Cooperation and Development) countries. Through his analysis, he sought to understand the short-run employment effects of shifts in investment and trade patterns. The findings unveiled that alterations in domestic goods demand and advancements in labor productivity exerted a more pronounced impact on domestic employment levels compared to changes in import demand. Specifically, the surge in imports acted as a significant contributor to unemployment, particularly within low-technology industries.

Messerlin's (1995) research shed light on the intricate relationship between foreign trade, capital outflows, and employment levels. By analyzing various labor market dynamics, macroeconomic variables, and policy measures, the study elucidated how the impact of trade on overall employment is subject to numerous contextual factors and structural considerations within an economy. Similarly, Greenaway et al. (1999) conducted an in-depth analysis of the effects of trade on employment levels across a wide spectrum of manufacturing industries in the United Kingdom. Utilizing a dynamic labor demand model and panel data spanning over a decade, their study provided valuable insights into how changes in trade patterns, including both imports and exports, influenced the demand for labor within specific industrial sectors. The findings underscored the nuanced dynamics of trade-induced employment shifts, highlighting the importance of considering industry-specific factors and temporal dynamics in understanding the labor market implications of trade openness.

Landesmann et al. (2002) conducted a comprehensive analysis of the impact of increasing North-South trade on wages and manufacturing employment in Northern economies. Drawing on data from seven industrialized economies spanning from 1980 to 1996, the study highlighted the differential effects of import growth from the Global South on various sectors, particularly labor-intensive and skill-intensive industries. The findings revealed a significant shift in comparative advantage, leading to increased outsourcing in skill-intensive sectors and a corresponding loss of comparative advantage in labor-intensive industries. Importantly, the study underscored the adverse impact of import growth from the South on employment levels, while highlighting the potential positive effects of export growth to Southern markets on employment in Northern economies.

On the other hand, Fedderke et al. (2003) delved into a product-price study, focusing specifically on South Africa. Their analysis elucidated the effects of trade openness on product prices, particularly in labor-intensive markets. The study revealed a notable increase in prices in labor-intensive sectors as a result of trade openness. Furthermore, the research highlighted the consequent rise in labor earnings alongside a decrease in the rate of return to capital, underscoring the intricate interplay between trade dynamics, factor prices, and income distribution within the South African economy.

Janiak (2006) conducted a detailed examination of the impact of trade liberalization on firm productivity and employment dynamics. Through empirical analysis, Janiak observed that non-exporting firms exhibited lower productivity levels compared to exporting firms. With the advent of trade liberalization, there was a discernible upward trend in intra-industry firm movements. Importantly, the study highlighted that welfare and productivity gains were achieved through labor reallocation from larger firms to smaller ones. By merging two models—one focusing on intra-industry dynamics and the other on large firms—Janiak found that extensive exposure to trade was associated with decreased employment levels and significant job destruction rather than creation. These findings shed light on the complexities of the relationship between trade openness and employment, revealing both benefits and challenges associated with globalization.

In a similar vein, Dutt et al. (2009) explored the intricate relationship between unemployment and trade liberalization using cross-country data. Employing both OLS estimates and panel estimators including fixed effects, differences GMM, and system GMM, the study investigated the impact of trade policy on unemployment while controlling for various other factors. The cross-sectional results supported the Ricardian prediction, indicating an inverse relationship between unemployment and trade openness. This empirical evidence contributes to our understanding of the nuanced dynamics between trade liberalization and labor market outcomes across different countries and regions.

Kien and Heo (2009) employed a system GMM model to analyze the impact of trade openness on employment levels in Vietnam over the period from 1999 to 2004. Their findings revealed that an increase in industrial output led to a rise in labor demand, while higher wage rates were associated with increased unemployment levels. Moreover, an increase in exports was found to boost derived labor demand, suggesting that higher levels of exports created job opportunities for labor within the Vietnamese economy.

In a study focusing on South Africa, Chinembiri (2010) investigated the effects of trade on employment within a Labor Demand framework. Analyzing the impacts of exports, imports, output, and wages on employment levels across various sectors at aggregated levels, Chinembiri found significant lagged effects of tertiary employment on current tertiary employment. Moreover, an increase in imports was found to reduce labor demand in both the primary sector (e.g., fishery, forestry, mining, and agriculture) and the secondary sector (e.g., utilities, manufacturing, and construction). Interestingly, the study revealed that an increase in exports did not lead to a corresponding increase in derived labor demand across any of the sectors analyzed.

Helpman and Itskhoki (2010) elucidated that the reduction of trade barriers could potentially exacerbate unemployment. This outcome arises from the fact that a decrease in trade barriers tends to enhance trade and profitability for exporting firms. Consequently, if workers shift towards sectors producing export goods, unemployment may increase, particularly

if the exporting sector experiences higher levels of labor market frictions. This insight underscores the nuanced relationship between trade liberalization and labor market outcomes, highlighting potential trade-offs between increased trade and employment dynamics.

Kim (2010) conducted a comprehensive examination of the relationship between aggregate unemployment and international trade, particularly focusing on the role of labor market institutions. Utilizing data from 20 OECD countries spanning from 1961 to 2008, the study empirically investigated the impact of trade on the unemployment rate and further analyzed how trade affected unemployment in the context of varying labor market institutions. The findings suggested that an increase in trade tended to elevate aggregate unemployment, especially in conjunction with stringent labor market institutions. However, trade liberalization was found to reduce aggregate unemployment levels in economies characterized by labor market flexibility.

In a study by Felbermayr et al. (2011), the authors delineated the conditions under which trade could enhance labor market outcomes. Their analysis underscored that the labor market implications of trade liberalization hinged on its impact on aggregate productivity. The results demonstrated an inverse relationship between trade liberalization and unemployment, indicating that increased trade openness was associated with lower levels of unemployment. Groizard et al. (2011) elucidated the consequences of reduced trade costs within industries, highlighting a notable effect on job creation and destruction dynamics. The study revealed that a decrease in trade industry costs led to a significant increase in job destruction, outweighing the impact on job creation within affected industries.

Examining the relationship between trade liberalization and unemployment in India, Hassan et al. (2011) utilized state and industry-level data to delve into this complex relationship. The findings suggested that the effects of trade liberalization on unemployment varied depending on factors such as labor market flexibility and the composition of employment in net export industries. While there was no strong evidence to suggest an overall increase in unemployment with trade liberalization, the analysis at both state and industry levels revealed nuanced patterns, indicating differential impacts across regions and sectors. Specifically, in states with flexible labor markets and a higher share of employment in net export industries, urban unemployment tended to decline with trade liberalization. Additionally, industries experiencing trade protection exhibited lower levels of unemployment, particularly in sectors characterized by net exports. These findings underscored the multifaceted nature of the relationship between trade liberalization and unemployment, highlighting the importance of considering various contextual factors in analyzing their interplay.

Makioka (2011) delved into the nuanced effects of trade liberalization on unemployment, emphasizing the role of inter-sectoral and intra-sectoral labor reallocation. The study developed a model featuring two sectors and two countries, with one sector characterized by differentiated goods and a labor market afflicted by search frictions. The findings suggested that trade openness led to increased labor market rigidity and incomes in the differentiated goods sector due to reduced hiring costs. Consequently, job creation occurred in this sector, while there was a negative impact from labor inflows from outside the sector. These opposing effects had the potential to offset each other, highlighting the complex dynamics at play. The net effect of trade liberalization on unemployment was contingent upon the labor market characteristics of a country, as elucidated by the study.

In his research on the relationship between trade, employment, and gender in Egypt, Zaki (2011) examined trends in trade and employment through a gender lens and empirically analyzed the impact of trade on employment outcomes. Employing two distinct models, the study utilized time-series data of exports and employment spanning from 1960 to 2009. The first model explored the relationship between exports and employment, while the second model applied a human capital framework to investigate the effect of trade on wages and the probability of changes in employment status. The results revealed that the increase in exports over the specified period led to a rise in overall employment levels and male wages, while also increasing the probability of female participation in the workforce. This empirical evidence shed light on the gender-specific implications of trade on employment dynamics in Egypt, providing valuable insights into the intersection of trade policies and labor market outcomes.

Ranjan (2012) conducted a comprehensive analysis of the impact of trade openness on unemployment, highlighting nuanced effects across different sectors. The study found that job creation and destruction increased in the importing sector, while both decreased in the export-competing sector. This led to ambiguity regarding the overall impact of trade openness on unemployment. Import-competing sectors experienced greater job destruction, leading to short-run spikes in unemployment in response to international trade. Additionally, trade openness was found to exacerbate international income inequality, with an increase observed in export-competing sectors while a decline was noted in import-competing sectors.

Benedik (2013) delved into the dynamics of trade liberalization in developing countries and its implications for the informal sector. The study overlooked equilibrium phenomena and the varying levels of trade integration among individual countries, instead focusing on evaluating welfare effects using standard models. Drawing on data from 15 Latin American and Caribbean countries, the study estimated a structural model of informality, international trade, and unemployment. The analysis revealed a negative impact of trade openness on the informal sector, indicating potential challenges for informal labor markets in transitioning economies.

Gozgor (2014) empirically investigated the influence of globalization and trade liberalization on the unemployment rate in developed countries, with a focus on the G7 nations. Utilizing panel data analysis, the study examined four measures of trade openness and globalization, including nominal openness, economic globalization index, real openness, and KOF globalization index. The empirical findings demonstrated a significant and negative relationship between the unemployment rate and trade liberalization across the G7 countries. Moreover, factors such as real GDP per capita,

inflation rate, productivity change, and population were found to also impact unemployment levels, suggesting a complex interplay of economic variables in determining labor market outcomes.

Celine et al. (2014) conducted a detailed examination of the relationship between trade liberalization and unemployment, particularly focusing on the potential effects of trade agreements such as the Transatlantic Trade and Investment Partnership (TTIP) between the European Union and the United States. Using panel data and sector-specific labor market frictions, the study aimed to assess the welfare and employment impacts of TTIP. The findings revealed that countries operating in sectors with high labor market frictions and a comparative advantage experienced an increase in unemployment, despite an overall improvement in welfare. This suggests that while trade openness may enhance welfare, it could also lead to higher unemployment rates in sectors characterized by weak labor market frictions.

3. THEORETICAL FRAMEWORK

Trade openness can indeed have significant implications for various economic and socio-economic indicators, including employment. The Phillips curve, introduced by Phillips in 1958, illustrates the inverse relationship between inflation and unemployment. However, some studies have also documented a positive relationship between inflation and unemployment, including works by Cooley and Hansen (1989), Mortensen and Pissarides (1994), Shi (1997), Beyer and Farmer (2007), Kumar (2008), and Berentsen et al. (2008). Additionally, economic growth has been identified as a factor that can help reduce unemployment. Studies by Oladeji (1994), Rama (1998), and Stephen (2012) have highlighted the potential of economic growth to mitigate unemployment rates. Therefore, when examining the impact of trade openness on employment, it is essential to consider its interactions with these other economic variables. The relationship between population growth rate and unemployment is indeed complex. Hollister and Goldstein (1994) suggest that a higher population growth rate can lead to an increase in the labor supply, potentially resulting in excess labor supply and higher unemployment rates. However, the impact of population growth rate on unemployment may vary depending on the specific characteristics of a country. In countries with low population growth rates, the effects on unemployment may differ. Moreover, the quality of institutions plays a crucial role in shaping unemployment outcomes. Institutions can influence various aspects of the economy, including labor market dynamics. High-quality institutions may foster economic growth, which can contribute to the reduction of unemployment rates within a country. Studies by McDonald and Yao (2003) and Baker et al. (2004) emphasize the importance of institutions in promoting economic growth and, consequently, reducing unemployment. In order to study the effect of trade openness on unemployment, it is necessary to develop a comprehensive model that incorporates variables such as population growth rate, institutional quality, economic growth, and trade openness itself. This model would allow researchers to assess the multifaceted relationships between these factors and their impact on unemployment outcomes.

$$UN_{it} = f(TO_{it}, INF_{it}, GR_{it}, POP_{it}, IQ_{it})$$

where,

UN_{it} = Unemployment rate for country i at time t measured as unemployed labour % of total labour force

TO_{it} = Trade openness for country i at time t measured as the sum of imports and export as a share of GDP

INF_{it} = Inflation rate for country i at time t measured as Consumer prices Index

GR_{it} = Growth rate of GDP for country i at time t

POP_{it} = Population Growth Rate for country i at time t

IQ_{it} = Institutional quality as measured by an index of Political Rights for country i at time t

4. EMPIRICAL RESULTS

Table 1 presents the results of the unit root test conducted for a labour-abundant country's panel data. The purpose of this test is to assess whether the variables under consideration exhibit stationarity or non-stationarity, which is crucial for time series analysis. Each variable is tested both at its level and after taking the first difference. The test results are presented for four different scenarios: with intercept, with intercept and trend, with intercept, and with intercept and trend. For the variable "UNit," the test statistics are presented as -1.141 and -1.142 for the scenarios with intercept and with intercept and trend, respectively, when tested at the level. Similarly, for the scenario with the first difference, the test statistics are -21.931 and -17.4824 for the same respective scenarios. The p-values are given in parentheses. Similarly, test statistics and p-values are provided for other variables including "TOit," "INFit," "GRit," "POPit," and "IQit," under various scenarios. The critical values for determining the significance of the test statistics are not explicitly provided in the table, but typically, significance is assessed based on predetermined critical values corresponding to the desired level of confidence (e.g., 5% or 1%). Overall, the unit root test results help in understanding the stationarity properties of the variables in the panel dataset, which is essential for conducting reliable time series analysis and making accurate forecasts.

Table 2 presents the results of the unit root test conducted for a capital-abundant country's panel data. Similar to Table 1, this test is aimed at assessing the stationarity properties of the variables included in the analysis, but for a different country profile. Each variable is tested at its level and after taking the first difference, under various scenarios such as with intercept, with intercept and trend, etc. For instance, for the variable "UNit," when tested at the level, the test statistics are presented as -0.9215 and -1.26775 for scenarios with intercept and with intercept and trend, respectively. The p-values associated with these test statistics are provided in parentheses. Similarly, for other variables including "TOit," "INFit,"

"GRit," "POPit," and "IQit," the test statistics and p-values are reported under different scenarios. As with Table 1, the critical values for determining the significance of the test statistics are not explicitly provided in the table. However, the p-values can be compared to predetermined critical values corresponding to the desired level of confidence to assess statistical significance. These results are crucial for understanding the characteristics of the variables in the panel dataset specific to a capital-abundant country, aiding in making informed decisions for time series analysis and forecasting in such contexts.

Table 1: Unit Root Test for Labour-abundant Country's Panel

Variables	At level		At 1st difference	
	With Intercept	With intercept and trend	With Intercept	With intercept and trend
UN_{it}	-1.141(0.112)	-1.142(0.125)	-21.931(0.00)	-17.4824(0.0000)
TO_{it}	-1.2982(0.097)	-2.62544(0.0043)	-22.969(0.000)	-19.0438(0.0000)
INF_{it}	-15.199(0.000)	-11.6056(0.0000)	-30.017(0.000)	-25.581(0.0000)
GR_{it}	-11.217(0.000)	-9.19477(0.0000)	-31.665(0.000)	-26.8327(0.0000)
POP_{it}	-23.550(0.000)	-34.4837(0.0000)	-32.855(0.000)	-38.2822(0.0000)
IQ_{it}	-6.562(0.000)	-5.565(0.0000)	-18.038(0.000)	-14.68(0.000)

Table 2: Unit Root Test for Capital-abundant Country's Panel

Variables	At level		At 1st difference	
	With Intercept	With intercept and trend	With intercept	With intercept and trend
UN_{it}	-0.9215(0.237)	-1.26775(0.1024)	-12.613(0.000)	-9.6136(0.0000)
TO_{it}	-2.0101(0.022)	-6.39482(0.0000)	-16.724(0.000)	-12.756(0.0000)
INF_{it}	-11.86(0.00)	-7.31335(0.0000)	-20.998(0.000)	-18.2525(0.0000)
GR_{it}	-11.040(0.000)	-8.58696(0.0000)	-22.361(0.000)	-18.6647(0.0000)
POP_{it}	-5.2983(0.000)	-7.93429(0.0000)	-17.500(0.000)	-15.7847(0.0000)
IQ_{it}	-1.9E+1(0.00)	-1.7E+14(0.0000)	-8.6998(0.000)	-7.80341(0.0000)

Table 3: PMG Results for Labour-abundant Panel
Dependent Variable UN_{it}

Variables	Coefficient	Std. Err.	z-value	P>|z|
TO_{it}	-0.0045546	0.0011321	-4.02	0.000
INF_{it}	-0.0014111	0.0005482	-2.57	0.010
GR_{it}	-0.0728656	0.0055574	-13.11	0.000
POP_{it}	0.385859	0.0511266	7.55	0.000
IQ_{it}	-0.1577466	0.0271822	-5.8	0.000
	Short Run Results			
ECM	-.345963	.0387624	-8.93	0.000
dTO_{it}	-.0082792	.0058133	-1.42	0.154
$dINF_{it}$	.0054298	.0192084	0.28	0.777
dGR_{it}	.0105258	.0115151	0.91	0.361
$dPOP_{it}$	.213818	1.544243	0.14	0.890
dIQ_{it}	-.0582104	.1008494	-0.58	0.564
Intercept	3.001274	.3953818	7.59	0.000
Hausman Test 1.098 (0.873)				

Table 3 presents a comprehensive overview of the Panel Mean Group (PMG) estimation results for a panel dataset characterized by labor abundance. The PMG model employed here is particularly useful for dynamic panel data analysis as it accommodates heterogeneous coefficients across the cross-sectional units. This allows for a nuanced understanding of how various factors influence the dependent variable, UNit, in the context of labor abundance. The table begins by detailing the coefficients, standard errors, z-values, and corresponding p-values for each independent variable, namely TOit, INFit, GRit, POPit, and IQit, concerning their impact on the dependent variable UNit. These coefficients essentially represent the estimated effect of each independent variable on the dependent variable, accounting for potential cross-sectional variations. For instance, examining TOit, we observe a coefficient of -0.0045546, indicating the estimated change in UNit per unit change in TOit. Accompanied by a standard error of 0.0011321, the associated z-value of -4.02 signifies the number of standard deviations the coefficient estimate deviates from zero. The remarkably low p-value of 0.000 suggests statistical significance, underscoring the importance of TOit in explaining variations in UNit. Similar interpretations can be made for the coefficients of other independent variables, such as INFit, GRit, POPit, and IQit, all of which are presented with their respective standard errors, z-values, and p-values. These insights collectively contribute

to a deeper understanding of the dynamics within the labor-abundant panel dataset. In addition to the long-run results, Table 3 also provides short-run insights, including the error correction term (ECM) and the coefficients for the first differences of the independent variables (dTOit, dINFit, dGRit, dPOPit, and dIQit). These coefficients illuminate the immediate effects of changes in the independent variables on UNit, offering valuable insights into short-term dynamics and adjustment processes within the panel data context. For instance, the coefficient for ECM (-0.345963) represents the speed of adjustment towards the long-run equilibrium following a deviation from it. Understanding such short-run dynamics is crucial for formulating effective policy interventions and strategic decisions. Furthermore, the table includes results from the Hausman Test, a statistical diagnostic tool used to assess the most appropriate model specification – fixed effects or random effects – for the given dataset. In this case, the Hausman Test statistic is 1.098, with a corresponding p-value of 0.873. Since the p-value exceeds the conventional significance threshold of 0.05, we fail to reject the null hypothesis, indicating that the random effects model is preferred over the fixed effects model for this dataset. In summary, Table 3 offers a comprehensive analysis of the labor-abundant panel dataset, shedding light on both long-run and short-run dynamics, as well as guiding model selection to ensure robust and reliable findings. These insights are invaluable for policymakers, researchers, and stakeholders seeking to understand and address challenges related to labor abundance and its implications for economic outcomes.

Table 4: **PMG Results for Capital-abundant Panel**
Dependent Variable UN_{it}

Variables	Coefficient	Std. Err.	z-value	P>|z|
TO_{it}	0.009878	0.0038171	2.59	0.010
INF_{it}	-0.14708	0.0302316	-4.87	0.000
GR_{it}	-0.0912	0.0153	-5.97	0.000
POP_{it}	0.935736	0.2018981	4.63	0.000
IQ_{it}	-0.04835	0.1925784	-0.25	0.802
	Short Run Results			
ECM	-.1941774	.034415	-5.64	0.000
dTO_{it}	.0313751	.0129369	2.43	0.015
$dINF_{it}$	-.0772099	.0285851	-2.70	0.007
dGR_{it}	-.0437654	.0170287	-2.57	0.010
$dPOP_{it}$	-1.337155	.6593613	-2.03	0.043
dIQ_{it}	-.2266492	.155958	-1.45	0.146
Intercept	2.383632	.422469	5.64	0.000
Hausman Statistic 1.987 (0.452)				

Table 4 provides a detailed overview of the Panel Mean Group (PMG) estimation results for a panel dataset characterized by capital abundance. Similar to the analysis conducted for the labor-abundant panel, the PMG model allows for the investigation of heterogeneous coefficients across cross-sectional units, offering insights into the dynamics of the dependent variable, UNit, in the context of capital abundance. The table starts by presenting the coefficients, standard errors, z-values, and corresponding p-values for each independent variable, namely TOit, INFit, GRit, POPit, and IQit, regarding their impact on the dependent variable UNit. These coefficients represent the estimated effect of each independent variable on UNit, considering potential variations across different cross-sectional units. For instance, examining TOit, we observe a coefficient of 0.009878, indicating the estimated change in UNit per unit change in TOit. Accompanied by a standard error of 0.0038171, the associated z-value of 2.59 suggests the number of standard deviations the coefficient estimate deviates from zero. The low p-value of 0.010 indicates statistical significance, emphasizing the importance of TOit in explaining variations in UNit within capital-abundant panels. Similar interpretations can be made for the coefficients of other independent variables, such as INFit, GRit, POPit, and IQit, all of which are presented with their respective standard errors, z-values, and p-values. These insights collectively contribute to a nuanced understanding of the dynamics within capital-abundant panels. In addition to the long-run results, Table 4 also provides short-run insights, including the error correction term (ECM) and the coefficients for the first differences of the independent variables (dTOit, dINFit, dGRit, dPOPit, and dIQit). These coefficients illuminate the immediate effects of changes in the independent variables on UNit, offering valuable insights into short-term dynamics and adjustment processes within capital-abundant panels. For instance, the coefficient for ECM (-0.1941774) represents the speed of adjustment towards the long-run equilibrium following a deviation from it. Understanding such short-run dynamics is crucial for formulating effective policy interventions and strategic decisions. Furthermore, the table includes results from the Hausman Test, a statistical diagnostic tool used to assess the most appropriate model specification – fixed effects or random effects – for the given dataset. In this case, the Hausman Test statistic is 1.987, with a corresponding p-value of 0.452. Since the p-value exceeds the conventional significance threshold of 0.05, we fail to reject the null hypothesis, indicating that the random effects model is preferred over the fixed effects model for this dataset. In short, Table 4 offers a comprehensive analysis of the capital-abundant panel dataset, providing insights into both long-run and short-run dynamics and guiding model selection to ensure robust and reliable findings. These insights are invaluable for policymakers, researchers, and stakeholders seeking to understand and address challenges related to capital abundance and its implications for economic outcomes.

5. CONCLUSIONS

The study investigates the intricate relationship between trade openness and unemployment, considering the context of both capital-abundant and labour-abundant countries. By controlling for various factors such as inflation rate, economic growth, population growth, and political rights, the research provides a comprehensive analysis of the impacts of trade openness on unemployment dynamics. Using extensive data spanning from 1990 to 2016 and encompassing 75 labour-abundant countries and 44 capital-abundant countries, the study employs robust methodologies including unit root tests and cointegration analysis. The findings indicate nuanced relationships between trade openness and unemployment across different country types. In labour-abundant countries, trade openness is found to have a significantly negative impact on unemployment in the long run. This suggests that increased trade may lead to higher job opportunities and reduced unemployment rates in economies where labor is abundant relative to capital. Conversely, in capital-abundant countries, trade openness is found to positively impact unemployment in the long run, consistent with the predictions of Ohlin theory. This implies that increased trade may lead to higher unemployment rates in economies where capital is relatively more abundant compared to labor. However, the study also reveals that these relationships may not hold uniformly in the short run, as the associations between trade openness and unemployment tend to be insignificant during shorter time frames. Further analysis highlights additional factors influencing unemployment dynamics. For instance, inflation rate is found to negatively impact unemployment in both labour-abundant and capital-abundant countries, indicating a potential tradeoff between inflation and unemployment. Population growth is identified as a positive influencer of unemployment, suggesting the need for policies aimed at population control to mitigate unemployment pressures. Moreover, economic growth exhibits a negative relationship with unemployment, underscoring the importance of fostering economic growth as a means to reduce unemployment rates. Overall, the study underscores the importance of considering the complex economic implications of trade openness and its differential effects on skilled and unskilled labor. Policymakers are urged to conduct thorough analyses before formulating trade policies to ensure they benefit all sectors of the economy and contribute to overall welfare and employment stability.

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