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# Impact of Trade Openness and Human Capital on Economic Growth: A Case Study of China

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**Abstract**
This study examines the impact of trade openness and human capital on economic growth in China. The Autoregressive Distributed Lag cointegration model (ARDL) and CUSUM-of-squares test are used for data duration 1990-2023. Main results of the study show that trade openness and human capital are positively correlated with economic growth. Human capital is considered one of the most profitable assets in the country's economy, While, the country's economy does not directly affect by trade openness. To enhance economic growth, the following suggestions can be made 1) reduce Trade Barriers like Lower tariffs, quotas, and other trade restrictions to facilitate international trade. 2) Increase funding for primary, secondary, and tertiary education to raise the average years of schooling and literacy rates. 3) Implement policies that improve ease of doing business, such as reducing bureaucratic red tape and enhancing legal protections for investors.
**Keywords:** GDP, trade openness, human capital, labor force, inflation

## 1. Introduction

Trade among countries encourages creativity, competition, and specialism. Physical capital enhances a nations potential for creation, whereas human capital, which is promoted through training and educational initiatives, raises labor productivity and GDP per capita. The goal is to guarantee that all nations may profit from free trade while achieving demographic variety, equivalent economic growth, and poverty reduction. The use of this study is to determine the economic growth through the long term association of trade openness and human capital in china. There has already been a lot of research carried out regarding the relationship between trade openness and human capital. Though many researchers claim that the greater trade openness leads to increase in economic performances, and majority of economic researchers think that sovereignty might boost economic growth. Trade openness increases economic growth by optimizing resource allocation, improving efficiency through technological diffusion and knowledge spillovers, and easing access to a range of products and services (Barro & Sala-i-Martin, 1997).

However, does trade openness really a main factor in contribution to economic growth? Many controversial questions arises in history of economic growth. It is necessary to know the developing history of china, in order to analyze the trade openness and human capital. China realized that in order to stay competitive as it incorporated into the world economy, it had to invest in the development of its workforce. The Chinese government has invested heavily in education and skill development with the goal of providing its labor force with the know-how and skills required to prosper in a world economy that is changing quickly. The development of human capital has contributed to the improvement of skill levels in China's labor force. China has a long history of serving as a cross-cultural hub for trade and commerce, bridging multiple cultures and nations. For example, the old Silk Road was essential in enabling trade between China and other regions of Asia, Europe, and Africa.

China opens up and reform its economy in late 1978, to become a part of global trading system. In the year 2001, china became the part of world trade organization. Furthermore, china also holds free trade agreements with several nations, which include the ASEAN-China Free Trade Area, the China-South Korea Free Trade Agreement, the China-Australia Free Trade Agreement, Switzerland, and Pakistan.

In perspective of trade, china was placed the thirtieth largest trading nation in year 1977 and later china improved and ranked seventh largest trading nation in 2000. China became the second largest trading country in 2010 after crossing over the GDP of japan. China's also overtake the US as the greatest trading nation in 2013. China's trade openness has changed drastically in the last few decades. Under Chairman Mao Zedong's direction, the People's Republic of China developed a more restricted and independent economic model after its founding in 1949. But under Deng Xiaoping's direction, China started implementing monetary policies in the late 1970s and opened itself up to international trading and investment. China's currently doing the trade utmost 200 countries. Chinese trade was worth US$27.7 billion in 1979, which was only 0.7% of global trade but 6% of China's GNP. With its foreign commerce reaching US$70.8 billion in 1985, China ranked sixteenth in the world trade rankings and accounted for 20% of its GNP and 2% of global trade.

Human capital is considered as the main objective in economic growth. There is positive relationship found between trade openness and human capital. According to Chinese leader Xi Jinping, "talent is a strategic resource to achieve national revitalization and win the initiative in international competition. China gains a lot of advantage from its massive population as talent availability. In past few decades, mobilization of human capital attributed to enormous growth of economy. As, China transfers from agrestic to productive industry.

## 2. Literature Review

Fatima et al. (2020) investigated the nexus between trade openness and gdp growth: analyzing the role of human capital accumulation 2020. This study defines HCA as an intermediate component that serves a significant part in assessing the economic performance of selected nations. It investigates whether a higher or lower level of HCA impacts the growth effect of trade by calculating its threshold among multiple nations. The generalized method of moments (GMM) estimator, which was designed for the dynamic

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panel data model, is used in this work.

Kong et al. (2020) investigated Trade openness and economic growth quality of China: Empirical analysis using ARDL model 2021.This research use the ARDL model to explore the relationship between trade openness and economic growth intensity under variations in exchange rates. The degree of trade openness and the quality of economic growth have a long-term, stable co-integration connection. The beneficial effect of trade openness on economic growth quality is highly significant, with notable geographical variation. There exists a "N-type" link between trade openness and economic growth quality.

Xu et al. (2020) investigated the relationship between innovative human capital and interprovincial economic growth based on panel data model and spatial econometrics This research used the OLS technique, SLM method, and SEM method to investigate the link between creative human capital and provincial economies. The relationship between the degree of creative human capital and economic growth has long-term implications. The examination of the impulse response function indicates that economic expansion has a considerable effect on the level of inventive human capital, which becomes more intense after the lag period. Han et al. (2020) investigated that demographic change, human capital, and economic growth in Korea. Continuous human capital expansion has significantly boosted Korea's GDP growth. Human capital expansion is linked to an increase in better-educated baby-boom eras. Boosting the elderly or female employment rate will boost labor quantity development. Improving the output of female or elderly workers is essential for human capital growth. Wang et al. (2023) investigated Revisiting the environmental kuznets curve hypothesis in 208 counties: The roles of trade openness, human capital, renewable energy and natural resource rent.

This paper examines at the environmental Kuznets curve (EKC) theory in 208 nations. At the global level, the link between income and carbon emissions is represented as a "inverted U-shaped" curve. Renewable resources and human resources exert varying effects on carbon emissions at pre- and post-EKC pivot points. Most nations see a rise in carbon emissions due to natural resource rentals. Adu-Gyamfi et al. (2020) investigated trade openness, inflation and gdp growth: panel data evidence from nine (9) West Africa Countries. This research examines the association between trade openness, inflation, and economic development in nine West African nations. In assessing the causes of economic growth (GDP) using the pooled OLS test, Inflation (INFLA), Trade Openness (OPEN), and Real Exchange Rate (REER) revealed a significant link with GDP across these nations, whereas investment had no major impact on GDP. The test findings demonstrated that inflation (INFLA) had a major negative impact on GDP growth. Shahbaz et al. (2014) investigated Causality between trade openness and energy consumption: What causes what in high, middle and low income countries. This research investigates the link between trade openness and energy consumption using data from 91 high, medium, and low-income countries. The path of causal link between trade openness is studied using homogenous non-causality, homogeneous causality, and heterogeneous causality tests. In wealthier nations, both variables exhibit an inverted U-shaped connection. Hye et al. (2016) investigated the impact of trade openness on economic growth in china: an empirical analysis. Study examines the relationship between trade openness and economic growth in China by using the endogenous economic expansion model. The autoregressive distributed lag (ARDL) cointegration approach and the rolling regression technique are employed. The empirical data show that trade openness has a favorable long-term and short-run relationship with economic growth. Ridha and Parwanto (2020) investigated the effect of foreign direct investment, human development and macroeconomic condition on economic growth: evidence from Indonesia. This research applies an Error Correction Model (ECM) to investigate the influence of long and short-term independent variables on the variable bound. Foreign direct investment has a negative long-term impact on economic growth, but has no substantial short-term impact. In contrast, human development has a positive long-term and short-term impact on economic growth. Rizki (2023) investigated that does trade openness and human resources affect the economic growth of ASEAN countries. This investigation used a panel data model to explore the connection among trade openness, human capital (HDI), and economic growth. Human capital is seen to be one of the most lucrative investments in the economy. Improved human capital and FDI will lead to greater economic growth. Amna Intisar et al. (2020) investigated that impact of trade openness and human capital on economic growth: a comparative investigation of Asian countries. Study examines how trade openness and human capital affect economic growth in 19 Asian nations between 1985 and 2017. It use the ordinary least square (FMOLS) and dynamic ordinary least square (DOLS) models to assess the extent of the long-run correlations between trade openness, human capital, and economic development. In Western Asia, trade openness and economic growth have a bilateral direct connections, but in Southern Asia, it is unidirectional.

**3. Methodology**

Many interesting investigations on time series variables utilize multivariate approaches. These strategies attempt to describe the information included in the temporal and cross-sectional dependency of these variables. In most situations, the purpose of the analysis is to offer a better understanding of the shifting relationship among variables. The research we require to do in this article should demonstrate the relationship between trade openness and human capital for the China. The research is based on time series data of China from time period of 1990-2023, and we take the data from appropriate database for this purpose. The dependent variable is log of trade and all the other variables are independent. Following Ali (2011), Ali & Naeem (2017), Sun & Chang (2020), Andreou (2021), and Cizakca (2024), the model of study become as:

$$GDP = F\ (TO, HC, FDI, LF, INF)$$

Its econometric model is

$GDP_{it} = \beta 0 + \beta 1\ TO_{it} + \beta 2\ HC_{it} + \beta 3\ FDI_{it} + \beta 4\ LF_{it} + \beta 5\ Inf_{it} + \epsilon$

Where:

GDP= Gross Domestic Product

TO= Trade Openness

FDI= Foreign Direct Investment

INF= Inflation
LF= Labor Force
The overall F-test statistic is used to test for long-term relationships between variables. Δ is the difference operator, $\rho$ refers to the optimum lag and Ψ indicates error term. If the F-statistics show a single long-run connection and the sample size is modest, the ARDL error correction representation is more efficient. If the F-statistics indicate several long-run relationships, the ARDL technique cannot be used. The ARDL technique distinguishes between dependent and explanatory factors for a single long-run relationship. The ARDL technique implies a single reduced form equation relationship between the dependent and exogenous variables (Pesaran et al., 2001).

## 4. Results and Discussions

**Table 1: Ordinary Least Square Method Analysis**

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| TO | 0.01778 | 0.005354 | -3.3207 | 0.0028 |
| HC | 0.019542 | 0.009007 | 2.169693 | 0.0397 |
| FDI | 0.006583 | 0.030185 | 0.218083 | 0.0291 |
| LF | 2.159025 | 1.114646 | 1.93696 | 0.0641 |
| INF | 0.085929 | 0.028612 | 3.003247 | 0.006 |
| R-squared | 0.936813 | Durbin-Watson statistic | | 1.560794 |
| Adjusted R-squared | 0.921649 | F-statistic | | 61.77562 |
| | | Prob(F-statistic) | | 0 |

**Table 2: Auto-Correlation Analysis**

| | | | |
|---|---|---|---|
| F-statistic | 0.96509 | Prob. F(2,23) | 0.3958 |
| Obs*R-squared | 2.47755 | Prob. Chi-Square(2) | 0.2897 |

**Table 3: Multicollinearity**

| Variable | Centered VIF |
|---|---|
| TO | 5.826929 |
| HC | 6.186874 |
| FDI | 6.603332 |
| LF | 6.189806 |
| INF | 4.556623 |

**Table 4: ARDL Long Run Coefficient Analysis**

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| TO | 0.0017 | 0.002767 | -0.61343 | 0.0469 |
| HC | 0.019904 | 0.007482 | 2.660185 | 0.0155 |
| FDI | 0.091609 | 0.018463 | 4.961758 | 0.0001 |
| LF | 0.455193 | 0.318244 | 21.85491 | 0 |
| INF | 0.051306 | 0.012151 | 4.222328 | 0.0005 |

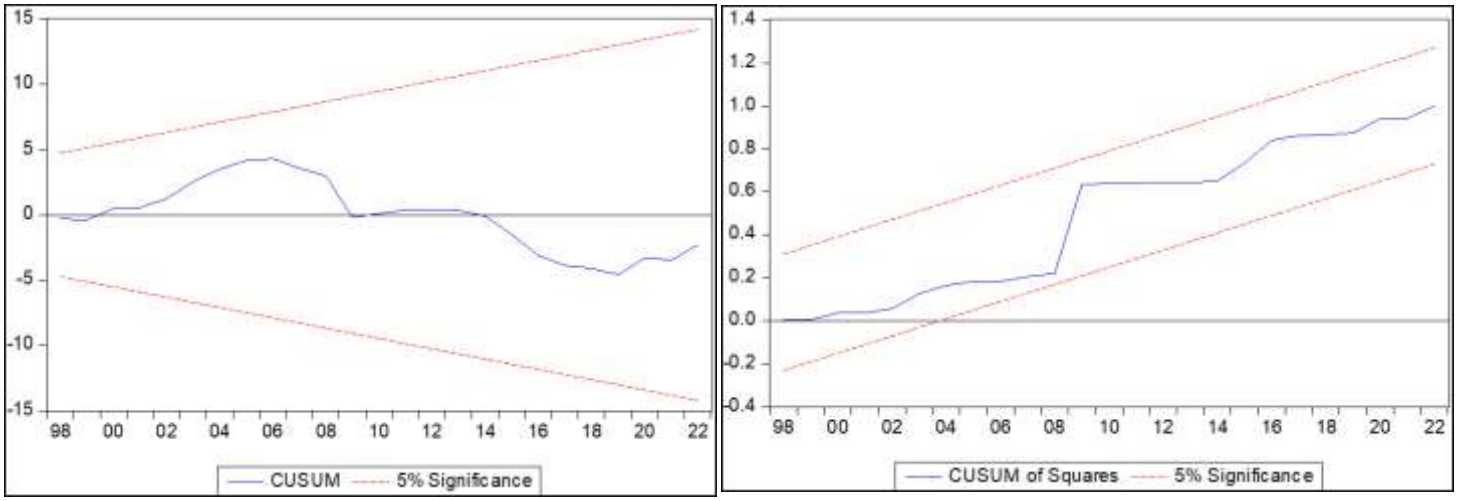
The ARDL approach reduces endogeneity by using a single equation for each underlying variable, eliminating residual correlation (Uko & Nkoro, 2012). Additionally, it allows us to assess the reference model. Also, ARDL technique identifies many co-integrating vectors, as there is many multiple co-integrating variables. The Error Correction Model (ECM) may be generated from the ARDL model using a simple linear transformation that combines short-run corrections with long-run equilibrium while preserving long-run data. The accompanying ECM model requires a sufficient number of delays to reflect the data generation process in general and specialized modeling frameworks.
The CUSUM-of-squares test is favored because it is particularly effective in detecting changes in the conditional model parameters, whether or not the variance of the regression error is included in the set of parameters shifting, especially at the end of the sample.

## 5. Conclusion

This study examines the impact of trade openness and human capital on economic growth in China. This study shows that trade openness and human capital are positively correlated with economic growth. Human capital is considered one of the most profitable assets in the country's economy, While, the country's economy does not directly affected by trade openness. The Autoregressive Distributed Lag cointegration model (ARDL) and CUSUM-of-squares test are used. To enhance economic growth, the following

suggestions can be made 1) reduce Trade Barriers like Lower tariffs, quotas, and other trade restrictions to facilitate international trade. 2) Increase funding for primary, secondary, and tertiary education to raise the average years of schooling and literacy rates. 3) Implement policies that improve ease of doing business, such as reducing bureaucratic red tape and enhancing legal protections for investors.

**cusum and cusum square test**

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