Impact of Economic Growth on International Student Enrollment: A Comparative Analysis of Chinese Mainland and Taiwan

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Abstract. This study conducts a comparative analysis of the impact of economic growth on international student enrollment in Chinese mainland and Taiwan. Through regression analysis, this study discovered a counterintuitive negative relationship between GDP growth rate and international student numbers in China, suggesting additional factors beyond economic indicators influence student attractiveness. Potential variables such as tuition costs, visa regulations, and perceptions of higher education quality warrant further exploration. In Taiwan, the absence of a significant correlation emphasizes the prominence of cultural, educational, and policy-related influences. These findings highlight the need for comprehensive policymaking encompassing economic indicators, academic quality, cultural inclusivity, and support structures. By understanding these complex factors, both Chinese mainland and Taiwan can shape their international education strategies effectively, creating nurturing environments that cater to diverse student cohorts. This research contributes to a deeper understanding of international student mobility dynamics and informs strategies to enhance the attractiveness of higher education destinations.

Keywords: International Education, International Student Mobility, China, Taiwan.

1. Introduction

In the realm of international education, economic growth plays a pivotal role in shaping the attractiveness of a nation as a study destination. This is particularly evident in the cases of the Chinese Mainland (hereinafter referred to as China) and Taiwan (the Taiwan Region, China, hereinafter referred to as Taiwan), where the interplay between economic development and international student enrollment has profound implications in the Greater China Area as increasingly popular international education destinations [1-3]. By examining the relationship between economic growth rates and international student enrollment, this study aims to provide valuable insights into how China and Taiwan leverage their economic prosperity to enhance their appeal to global learners.

In essence, both China and Taiwan have experienced remarkable economic growth over the past few decades, transforming them into regional economic powerhouses. This growth has enabled substantial investments in their higher education sectors, including infrastructure development, research facilities, and academic programs. The burgeoning economic prosperity has not only broadened the scope of educational offerings but has also bolstered the overall quality and prestige of universities in these regions. Furthermore, economic growth invariably translates to augmented educational funding, leading to the provision of scholarships and financial incentives aimed at both domestic and international students. Analytical data on scholarship allocation demonstrates a clear positive correlation between higher GDP growth rates and the availability of financial support designated for international students [4]. Consequently, this dynamic has significantly contributed to the upward trajectory in enrollment figures observed in both China and Taiwan, as scholarships serve to alleviate financial barriers and facilitate smoother access to international study opportunities.

It is noteworthy that the interaction between economic growth and international education wields a notable influence on a nation's geopolitical reputation and its cultivation of soft power. The economic ascent of China and Taiwan has amplified their global prominence, subsequently piquing international interest in their educational offerings. As a region's economic standing gains traction, so does its allure as a preferred study destination. An empirical analysis of international student
enrollment patterns underscores this correlation, revealing that phases of robust economic growth often correspond with surges in international student interest. This empirical reality underscores the mutually reinforcing relationship between economic vitality and the magnetic pull of these regions as academic destinations [5].

In summary, the nexus between economic growth rates and international student enrollment stands as a pivotal determinant in comprehending the success of China and Taiwan as prospering study destinations in the Asia-Pacific region. Through quantitative analysis, this study attempts to elucidate how economic affluence fuels investments in education, amplifies global reputation and diversifies academic portfolios. By delving into this symbiotic connection, a profound comprehension emerges regarding how economic growth fundamentally molds the international education landscape across the Taiwan Straits, provided the status quo [6].

2. Literature Review

2.1. Overview of China's International Education

Navigating the intricate tapestry of China's international education history presents a complex endeavor, laden with potential challenges. The panorama spans over more than 4 decades since China’s ‘Open up’ in the 1980s, marked by a mosaic of socio-political shifts, cultural dynamics, and economic revolutions. The evolving political landscape has led to varying degrees of openness and cooperation in international education. Engaging the entirety of China's history may lead to misrepresentation or lack of context within shifting international relationships. While acknowledging the significance of the entire trajectory, the contours of this study are drawn to converge on the 21st century. Notably, the year 2001 marked a watershed event as China entered the World Trade Organization (WTO), signifying its commitment to broader economic ties and international collaboration, with further implications on China’s international education.

In recent decades, China has undergone a remarkable transformation in its higher education landscape, emerging as a global hub for international students and garnering increasing recognition for the rapid rise of its universities. This evolution has not only positioned China as an economic powerhouse but also as an attractive destination for students seeking quality higher education experiences. One of the most striking developments within China's international education landscape is the rapid ascent of its universities in global rankings. Chinese academic institutions, once overshadowed by their Western counterparts, have made significant strides in terms of academic reputation, research output, and innovation. From 2004 to 2023, the number of QS top 200 world universities in mainland China has doubled (from 4 to 8), and the number of QS top 50 world universities has changed from only one (Peking University) to 4 (Peking University, Tsinghua University, Zhejiang University, Fudan University) [7], shown by Figure 1, which evidence the significant progress in its international education competence.

In 2010, the "Study in China" initiative was launched, which aimed to attract international students to Chinese universities through scholarships and enhanced academic offerings [8]. This initiative, coupled with the "Double First-Class" (Shuang Yi-Liu) program introduced in 2017, underscored the government's commitment to elevating the quality of higher education institutions in China to a global standard [9]. Nevertheless, the outbreak of the Covid-19 pandemic necessitated rapid adaptations within China's international education landscape. In response, the Chinese government swiftly implemented measures to ensure the continuity of international education while prioritizing the safety of students and academic staff. Virtual exchange programs, online courses, and digital collaboration platforms gained prominence, offering a glimpse into the resilience and flexibility of China's international education sector [10].
Additionally, integral to China's approach to international education is its alignment with the Belt and Road Initiative (BRI). This ambitious economic and infrastructure project has facilitated cross-border collaborations in education through the establishment of Confucius Institutes, cultural exchange programs, and educational partnerships with countries participating in the BRI [11]. These endeavors have fostered people-to-people connections and mutual understanding, contributing to the broader goals of the initiative. China's international education policies are not solely centered on economic or academic objectives. They also play a crucial role in projecting soft power on the global stage. By welcoming students from diverse cultural backgrounds, China seeks to position itself as a destination for intercultural learning and exchange. The provision of scholarships to foreign students, along with investments in language education and cultural programs, enhances China's reputation as a culturally rich and academically vibrant nation.

By and large, China's international education policies and initiatives have undergone a transformative journey, influenced by both pre-existing ambitions and the exigencies posed by the Covid-19 pandemic. Balancing academic rigor and soft power projection, China's multifaceted approach underscores its pursuit of becoming an influential player in the global education landscape.

2.2. Overview of Taiwan's International Education System

Taiwan's higher education system has undergone significant transformations in its pursuit of internationalization and academic excellence. To some degree resembling the mainland, Taiwan has undergone tremendous social changes so that this research excludes Taiwan’s international practice in the 20th century. In 1986, the Democratic Progressive Party (DPP) was established as the first native political party in Taiwan. Through painful efforts of social movement and democratization, the year 2000 witnessed the DPP taking office, which marked an end to 55-year-long government of Kuomintang, a party that came from the mainland and dominated Taiwan's society since 1949. According to the Polity Data Series, Taiwan had a score of -7 before the Martial Law was lifted in 1986, and was classified as a "dictatorship" (-10 to -6); while the score jumped to 7 points after the completion of the general election of Congress in 1992, and was classified as a "democracy" (6 to 9 points); after a series of political reforms, the score reached a perfect 10 points in 2004, and was classified for "complete democracy" (10 points) [12]. Thereupon, there is a relatively stable social context of Taiwan since the early 21st century in which the international education is studied in this research.

During the 2000s, Taiwan's higher education system embarked on a significant journey towards internationalization, characterized by key initiatives aimed at elevating its universities' global reputation and engagement. The "Project to Achieve World-Class Universities" played a pivotal role in this transformation by providing a comprehensive blueprint for universities to gain international recognition and standing. This initiative, launched in [year], underscored the need for universities to meet specific criteria that aligned with top international institutions. These criteria included the presence of renowned scholars capable of producing high-impact research and publishing in...
prestigious international journals, fostering an environment that attracted international talents and students, and adhering to high-quality and universally recognized accreditation standards.

2.2.1 Early Global Outreach and Regional Cooperation

Taiwan's pursuit of internationalization extended well beyond its borders, with a multifaceted approach that encompassed global outreach and regional cooperation. One pivotal initiative that played a crucial role in this endeavor was the establishment of the "Foundation for International Cooperation in Higher Education of Taiwan (FICHET)." Initiated in 2006, FICHET was dedicated to promoting Taiwanese higher education on the global stage [13]. It served as a catalyst for fostering collaborations between Taiwanese universities and their international counterparts, leading to the establishment of education centers across Asia. These centers not only facilitated academic exchanges but also served as platforms for cross-cultural learning and collaboration in diverse fields of study.

![Fig. 2 2004-2010 Number of Taiwan’s QS Top 200 Universities](image)

![Fig.3 2004-2010 QS Ranking of National Taiwan University](image)

With regard to the international appraisal of Taiwan’s universities, as shown by Figures 2 & 3 it is evident that the institutions are gaining a global reputation demonstrated by their rising ranks. The year 2009 witnessed that, for the first time in history did National Taiwan University list the top 100 world universities, and the next year marked a historical milestone for National Tsing Hua University which was listed top 200.

2.2.2 Initiatives and Global Engagement in the Recent Decade

On one hand, according to Figure 4, Taiwanese Universities are not always progressing in their global reputation, evidenced by the dwindling number of prestigious universities on the list of QS ranking. On the other hand, particularly compared with China, demonstrated by Figure 5, the best university in Taiwan (National Taiwan University) is not advancing as fast as Fudan, not enough to be a counterpart since Fudan usually ranks No.3 or 4 in China [7], which may imply a further disadvantage in Taiwan’s competence in international education across the Asia Pacific.
In 2016, Taiwan introduced the New Southbound Policy (NSP), a pivotal initiative that exemplified Taiwan's dedication to fostering deeper regional cooperation, nurturing talent, and positioning itself as a hub for higher education excellence in East Asia [14]. At the core of the NSP was the goal of enhancing collaborations and partnerships with countries in Southeast Asia, South Asia, and Oceania. By actively engaging with these regions, Taiwan aimed to facilitate the exchange of knowledge, expertise, and resources in various fields of academia. This policy not only showcased Taiwan's commitment to contributing to the development of its neighboring nations but also established pathways for the mutual enrichment of education systems.

While the NSP indicates Taiwan's holistic dimension of internationalization, there are the following initiatives that focus on the internationalization of tertiary education. The “Higher Education Sprout Project (HESP)”, proposed in 2018, aimed to foster a culture of innovation in teaching, promote research excellence and encourage a sense of social responsibility among universities [15]. By integrating local strengths, collaborating with international partners, and nurturing global talent, this project aimed to elevate Taiwan's universities to world-class standards. Through HESP, Taiwan aimed not only to enhance its global competitiveness but also to contribute meaningfully to addressing global challenges through research and education. Currently, the second phase of HESP (2023-2027), continues the structure of the first phase (2018-2022). The framework of the second phase underscores an internationalized administrative support system. The Ministry of Education explains that performance indicators are as follows: Study Support for Overseas Students, Counseling for Overseas Students Staying in Taiwan After Graduation, Internationalization of
Human and Administrative Resources, Work Support for Foreign Teaching and Research Personnel [16].

In conclusion, Taiwan's higher education journey reflects its commitment to internationalization, academic excellence, and regional engagement. Taiwan has strategically crafted policies to attract international students, collaborate with neighboring countries, and enhance its global standing in higher education. Through a blend of expansion, quality enhancement, and international outreach, Taiwan has positioned itself as an active player in the international education landscape.

3. Methodology

Based on the backdrop and pertinent analysis, it is reasonable to arrive at the assumption that there is a correlation between the macroeconomic level of development and the attractiveness as a destination of international education. Thereupon, this section seeks to further validate and quantify the specific relationship.

3.1. Variables and Data Sources

As for the indicator of economic growth, given the huge dissimilarity in the size of the economy of China and Taiwan, it would be better to use the GDP growth rates of the two bodies, which are also accessible in a relatively convenient manner, as available from governmental reports and databases of credible international organizations. The GDP growth rates of China are accessed from the database of the World Bank [17]. Since Taiwan is not a member of the World Bank, United Nations and other major international organizations, this research uses data released by a governmental agency in Taipei, Taiwan [18].

To represent and evaluate the abstract ‘attractiveness’ of the two bodies as study destinations, this research looks into the annual number of international students in the two regions. The data of China is compiled from the reports of the Ministry of Education of China, but the latest update was in 2018, which excludes the pandemic time [19-21]. Taiwan does not publish a specific number of international students, so the research resorts to the third-party database, which offers the data updated to 2021 [22].

3.2. Model and Equation

To investigate the empirical relationship between GDP growth rates and international student enrollment within the contexts of China and Taiwan's international higher education sectors, this research employs an Ordinary Least Squares (OLS) regression model. This model is encapsulated by the mathematical equation 1:

\[ Y = \beta_0 + \beta_1 X + \epsilon \]  

Where: \( Y \) signifies the international student enrollment. \( X \) denotes the GDP growth rate. \( \beta_0 \) represents the intercept, signifying the expected international student enrollment when the GDP growth rate is zero. \( \beta_1 \) stands as the slope coefficient, articulating the extent of change in international student enrollment associated with a unitary change in GDP growth rate. \( \epsilon \) signifies the error term, encompassing unobserved influences on the dependent variable.

The objective of this model is to quantitatively ascertain the impact of GDP growth rates on international student enrollment dynamics. The intercept will capture the baseline level of international student enrollment in the absence of economic growth, while the slope coefficient is expected to unveil the directional nature and magnitude of the linkage between GDP growth rates and international student enrollment. In adherence to the assumptions inherent to linear regression analyses, encompassing assumptions of linearity, independence, normality, and homoscedasticity, the integrity and validity of the obtained results are ensured. These assumptions collectively underpin the robustness of the analysis and the reliability of its outcomes.
The interpretation of the estimated slope coefficient will furnish a comprehensive understanding of how fluctuations in GDP growth rates correspond with alterations in international student enrollment patterns. A positive coefficient could suggest that higher GDP growth rates engender heightened international student enrollment, while a negative coefficient may posit an inverse relationship. The forthcoming analytical discourse will discern the statistical significance of these findings and their consequential implications for the evolving landscape of international higher education.

3.3. Results and Analyses

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The model equation for China is:
\[ \text{ISNUMBER} = 890157 - 65640 \times \text{GDPRATE}. \]

The coefficient corresponding to GDP growth rate, as denoted by the p-value of 0.00612, attains a level of statistical significance below the conventional threshold of 0.05. This outcome substantiates the capacity of the GDP growth rate to serve as a statistically meaningful predictor of the quantity of international students within China. The Adjusted R-squared coefficient, registering at 0.6968, implies that approximately 69.68% of the variance in the international student count can be elucidated by fluctuations in China's GDP growth rate. Concurrently, the p-value of 0.00612 attributed to the F-statistic accentuates the statistical significance of the overall model.

The model equation for Taiwan is:
\[ \text{ISNUMBER} = 108699 - 2975 \times \text{GDPRATE}. \]

The p-value for the GDPRATE coefficient is 0.618087, which is greater than 0.05. This suggests that the GDP growth rate is not statistically significant in predicting the number of international students in Taiwan. The Adjusted R-squared value is -0.07915, which is negative. This indicates that the model may not be well-fitted to the data in Taiwan and could potentially be overfitting or not capturing the underlying relationships. The F-statistic has a p-value of 0.6181, further supporting the lack of significance for the model in Taiwan.

In China, the GDP growth rate appears to be a statistically significant predictor of the number of international students. As the GDP growth rate increases by 1 unit, the number of international students is expected to decrease by 65640 units (assuming all other factors are constant). The model explains about 69.68% of the variability in the number of students. While in Taiwan, the GDP growth rate does not appear to be a statistically significant predictor of the number of international students. The model has a very low Adjusted R-squared value, indicating poor fit.

4. Discussion

Drawing upon the results of the regression analysis, it can be deduced that a statistically noteworthy correlation exists between the growth rate of the Gross Domestic Product (GDP) and the quantity of foreign students in China (p < 0.05). The observed adverse coefficient pertaining to the GDP growth rate (-65640) intimates that a rise in the GDP growth rate is linked to a reduction in the count of international students. This discovery potentially signifies that with the expansion of the economy, the determinants shaping the appeal of China to international students could potentially be impacted by latent variables not encompassed within the confines of this analytical framework.

It's possible that as China's economy grows, other factors such as tuition costs, visa regulations, or perceptions of the country's higher education system might impact international student decisions. Policymakers may need to explore ways to make their education system more appealing to
international students beyond economic indicators. This could involve enhancing academic programs, improving student support services, and addressing cultural integration challenges.

The results of the regression analysis for Taiwan do not show a statistically significant relationship between the GDP growth rate and the number of international students (p > 0.05). The coefficient for the GDP growth rate is not statistically different from zero, suggesting that changes in the GDP growth rate do not predict changes in the number of international students in Taiwan. This outcome implies that other factors, such as cultural, educational, or policy-related influences, might play a more significant role in attracting international students to Taiwan.

Taiwan's education policies may already be effective in attracting international students through means other than economic factors. The focus could shift to promoting the quality of education, research opportunities, and unique cultural experiences. In recent years, Taiwan has been promoting Chinese language programs [23], prioritizing the education of traditional Chinese, which distinguishes Taiwan from mainland China (simplified Chinese), Hong Kong and Macau (Cantonese, a dialect of Chinese), a treasured cultural legacy thriving thousands of years of linguistic evolution. The Huayu Enrichment Scholarship provided by the government extends financial assistance to international students desiring to pursue the study of Mandarin in Taiwan. [24,25]. Plus, the authorities might explore strategies that capitalize on Taiwan's strengths, such as its technological innovation and strong academic reputation, to attract a diverse range of international students.

5. Conclusion

This study amalgamates statistical insights with a comprehensive overview of the international education landscapes in Chinese mainland and Taiwan, yielding a holistic perspective that enriches the comprehension of factors influencing these nations' attractiveness as higher education hubs.

The exploration of China's international education landscape unveils a dynamic narrative that goes beyond the immediate implications of the statistical results. The intricate interplay of China's surging economic growth, educational offerings, and global reputation underscores the multifaceted nature of international student decisions. While the statistical relationship between GDP growth rate and international student numbers presents a counterintuitive perspective with its negative coefficient, it's clear that an in-depth view reveals an amalgamation of economic, academic, and cultural considerations. Policymakers must recognize that a comprehensive approach encompassing diverse elements like academic quality, support services, and cultural inclusivity is vital in maintaining China's appeal as an international education hub.

In Taiwan's case, the lack of a significant correlation between economic growth and international student numbers unveils a captivating paradox. Taiwan's strengths in technological innovation and cultural heritage are potent attractors. The fusion of these elements amplifies the narrative, showcasing the multifaceted nature of attraction. By capitalizing on these strengths, Taiwan's international education policies can pave a distinct path toward global appeal.

These intertwined narratives underline the importance of a holistic approach in international education policymaking. The complexities of global student mobility demand an appreciation of the multifarious elements that contribute to decision-making. As both China and Taiwan chart their paths in international education, policymakers must recognize the interconnectedness of economic growth, academic quality, cultural inclusivity, and support structures. This approach ensures that higher education destinations continue to evolve as inviting and nurturing environments for international students.

In a global educational landscape characterized by increasing mobility, the synthesis of statistical findings and qualitative overviews positions this study as a significant step towards fostering a richer understanding of what draws international students to these distinct educational destinations. Through informed and holistic strategies, both the Chinese mainland and the Taiwan region can continue to shine as beacons of international education, embodying the multifaceted essence of educational attraction.
References


