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An Empirical Approach to Understanding India's Emergence as a Global Powerhouse

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Abstract

Since the 1990s, globalization has played a central role in shaping the economic health of all countries, inter-linking them all through foreign labor markets and trade. Integration in today's globalized world is especially important for countries with large populations, and therefore, large labor and human capital potential that can be exploited to gain an economic edge; India is a prime example. The key research question that this empirical paper seeks to investigate is "*How has India's GDP share of imports influenced its economic development measured in GDP per capita?*". The empirical method employed to determine the causal relationship between India's GDP share of imports – a measure of its integration in the global economy – and its economic development is an Instrumental Variable (IV) analysis. Using data from the World Bank's World Development Indicators (WDI) and the World Integrated Trade Solution (WITS) databases, this research paper finds that an increase in India's GDP share of imports results in a corresponding increase in its GDP per capita over time. However, after controlling for population this evidence is not present and results indicate that an increase in India's GDP share of imports does not result in an increase in GDP per capita. These findings go against our hypothesis.

1. Introduction

Determining the impact of a country's integration in the global economy on its economic development is an intricate task. Over the last two decades, India has seen the GDP share of its imports rise sharply; which leads to questions on the effect of this specific trend on the country's GDP per capita over time. By examining the limitations and benefits of a country's increased integration in the globalized economy, we are better prepared to form a hypothesis about the existing relationship between globalization and GDP per capita. Precisely, our hypothesis is that an increase in India's GDP share of imports will result in a corresponding increase in its GDP per capita over time, as the country gains better access to foreign markets, investment, and technology. The following empirical paper will attempt to gain valuable insight into the complex relationship between economic development and globalization in order to gain more clarity on one of the most pressing questions which economists and policymakers face today.

Before diving into the specifics of the study, it is important to provide some context on India's economic development in recent years. Over the last two decades, India has seen a significant rise in its economic growth; with a particular surge in GDP per capita in the 1990s onwards; as exhibited in **Figure 1** in the appendix. A number of factors have contributed to this, including increased globalization and trade liberalization policies, as well as improvements in infrastructure, education, and technology. In addition, India's large and growing population provides a large market for goods and services and a vast source of labor for multiple industries within the nation. However, despite these positive elements, India still faces some significant challenges, including high levels of unemployment, income inequality, and poverty. Therefore, studying the relationship between India's GDP share of imports and its total product per capita is crucial in understanding the mechanics behind the country's development, and in formulating policies to tackle the numerous challenges it faces.

The empirical strategy used in this paper emphasizes the key objective of this paper. It consists of defining a causal effect of India's integration in the global economy on its own economic growth. To do so, we use an Instrumental Variable (IV) analysis whereby the GDP share of exports of India's top trade partners is used as the instrument. As intended for any IV analysis, the instrument is highly correlated with the independent variable – India's GDP share of imports – and is crucial in identifying the causal effect on the dependent variable: India's GDP per capita. This empirical investigation was carried out using two well-known datasets from the World Bank: The World Integrated Trade Solutions (WITS), as well as the World Development Indicator (WDI) databases. While the WITS database provides a variety of data on merchandise trade, net exports, tariff and non-tariff data, the WDI database presents information on global macroeconomic indicators such as economic growth, human development, and environmental metrics. As explained in the Data Section of this paper in greater detail, the WITS database was used to identify the countries which exported the most goods and services to India from 1988 to 2020. This database allowed us to use a yearly measure of these partners' GDP share of exports and utilize these values as our instrument for the aforementioned time period. Subsequent to identifying these top exporters, the WDI database provided us with critical macroeconomic indicators measured in yearly intervals from 1960 to 2021, including India's GDP per capita, GDP share of imports, population, as well as partners' share of exports. This database allowed us to complete our IV model by incorporating data on GDP per capita and determining the causal relationship.

Our first result is that the share of India's top five trade partners' GDP that is composed of exports has a significant impact on the share of India's GDP that is composed of imports. This is important because it supports the fact that an important assumption, the relevance assumption, for a chosen model is met. While this does not directly provide evidence for or against our hypothesis, or aid in answering our research question, it is significant to be able to produce estimates in the stages that follow. As depicted in **Figure 2** in the appendix, an increase of one percentage point in the share of exports for India's top five trade partners results in a statistically significant 0.1689 percentage point increase in India's import share. This portrays the importance of trade relationships and the extent to which the trade habits of countries who have a high level of interdependence and integration can impact each other.

The second result suggests that the share of India's GDP that is composed of imports has a positive impact on India's GDP per capita. As shown in **Figure 2**, a one percentage point increase in India's import share, as predicted by India's trade partner's export share, results in a statistically significant increase of 65.5381 ($US) in India's GDP per capita. This provides evidence for our hypothesis that India's import share will have an impact on India's GDP per capita. This is important because it helps to answer our research question and initially suggests that India's GDP share of imports has influenced GDP per capita. This is an important finding because it provides evidence for the significance of globalization in economic development.

The third and final result contradicts the previous result and suggests that when controlling for population, the share of India's GDP that is composed of imports has no impact on India's GDP per capita. **Figure 2** shows that in this case, a one percentage point increase in India's import share would result in an increase of 7.0079 ($US) in India's GDP per capita, but this is not statistically significant. In this case, we are unable to reject the null hypothesis that India's import share has no impact on its GDP per capita. This goes against our original hypothesis. Using these results, the answer to our research question would be that there is little evidence that India's GDP share of imports has an influence on economic development measured in GDP per capita.

Furthermore, it is important to recognize and review the existing literature that has been produced in describing the relationship between a country's integration in our globalized world and its economic growth. Namely, **"Growth and Volatility in an Era of Globalization**", written by M. Ahyan Kose and published in 2005 is a paper that conducts thorough analysis of the cross-sectional relationship that exists between growth, macroeconomic volatility, and globalization over the past four decades (Ayhan Kose et al., 2005). To explore this relationship, the author's empirical strategy consists of conducting an event-study analysis to examine how growth and volatility before and after measures of trade liberalization among MFI economies, which are countries that received financial aid from international organizations such as the International Monetary Fund (IMF). While this paper properly conducts analysis to conclude that trade liberalization among MFI countries plays an important role in growth and volatility, it fails to show that the relationship is causal. This is because an event-study analysis, although it is able to sometimes infer causality, is not an intrinsically causal technique. Therefore, our contribution to this topic is the development and use of an empirical strategy (a two-stage IV analysis) to generate a causal relationship.

A second relevant piece of literature which highlights the importance of globalization from an Indian perspective is Suadat Hussain Wani's "**Globalization and Economic Growth In India: An ARDL Approach**". In this paper, the authors aim to depict the existing relationship between India's integration in the global economy – measured in FDI, net exports, and foreign remittances – on its growth (Wani & Mir, 2021). The paper finds that while imports and foreign remittances positively impact economic growth in India, exports and foreign remittances show a negative and significant relationship. Although this paper does a good job at explaining how each component of globalization is related to growth, it fails to provide a deep analysis of why the independent variable behaves the way it does. Indeed, by exploring multiple components of globalization (imports, exports, FDI, foreign remittances) the authors do not go in detail into one component. In addition, while their empirical strategy – which includes an ARDL model – is useful for the depiction of short run and long run relationships between the treatment variable and the outcome, it fails to show a causal relationship. Therefore, our main contribution is that this paper goes into detail into and focuses on only one component of globalization – India's GDP share of imports – and uses an empirical strategy that aims to provide a causal relationship.

2. Context & Background

When most people think of the word globalization, they tend to think about all the links and connections between individuals and corporations around the world. However, it is important to realize that this revolutionary and modern phenomenon goes beyond these merely. Indeed, globalization is a critical aspect of any country's market economy, and has become indispensable for a nation's economic health to remain stable. Whether we are measuring globalization using Foreign Direct Investment (FDI), foreign remittances, or net exports, there is no doubt that it has opened up countries to a wider range of goods and services, fosters cultural exchange, and promotes economic growth. The primary benefit from an increased integration in today's globalized economy is an increase in the countries' competitiveness through access to larger markets and attraction of foreign investment. Furthermore, consumers are also provided with a greater variety of goods and services to which they did not have access before, which improved their standards of living.

Historically, India has been involved in both cultural exchange and global trade. In the time of the ancient world, India was considered to be a major trading partner, having traders from across many continents – including Africa, Europe, and Asia – all travel to India to sell their textile, spices, precious stones, and other kinds of merchandise (Szczepanski, 2019). Recently, in the mid-1900s, India decided to become an important player across numerous foreign markets by embracing globalization. Since then, its economic growth has seen a rapid increase because of its participation in global trade, and has become an unavoidable hub for information technology, as exhibited in **Figure 1** of the appendix. This has attracted considerable foreign investment and created employment opportunities for millions of Indians.

For the purpose of this paper, it is important to understand why globalization matters in the context of economic development. To that end, we need to understand its economic benefits on India's economic growth. One of the main benefits of globalization from India's perspective has been the

increased foreign demand for its products and thereby the rising access to foreign markets. As a consequence, Indian businesses saw the size of their market widen and are now able to sell their goods and services to customers all over the globe. This has played a major role in boosting the country's economy. Additionally, the Indian exports of technology goods have also fueled the country's economic growth. **Figure 3** in the appendix shows a trend that exhibits the evolution of technology goods exports (in USD) over the years. With firms such as Infosys, Wipro, and Tata Consultancy, India has become a global leader in the information technology industry and software services. This new role for India has not only boosted its economic growth, but has also given the country a very positive reputation as a new innovative hub. It is also worth knowing that as India has become increasingly integrated into the global economy, the demand for air transport – as shown in **Figure 4** of the appendix – has risen considerably. This has led to an increase in carrier departures, which facilitated trade, foreign investment, and cultural exchange through tourism. Indeed, the construction of new and modern airport infrastructure has helped in improving India's connectivity and openness towards the rest of the world.

Moreover, in today's era of globalization, imports have become an essential part of India's economic strategy. **Figure 5** in the appendix exhibits two relevant trend series and shows that the evolution of net imports and GDP have been very well related in the past sixty years. Indian citizens have seen their standard of living ameliorate since their country's integration in the global markets has allowed for the importation of goods that were previously not available domestically. For example, the internet and smartphones – both of which were not available in India before globalization – have immensely improved the daily lives of the citizens. It is also worth saying that the nature of Indian imports has evolved over time. By the early stages of the liberalization of trade, most of Indian imports consisted of raw materials and capital goods for industries. However, as the country grew economically, its import profile has diversified and has started to include a greater range of consumer products, electronics, textile, and automobiles. Lastly, given India's high dependence on oil imports to meet its energy needs, imports have become crucial for the country's energy sector.

The context mentioned above provides us with arguments that suggest that an increase in India's integration in the global economy may lead to further economic growth. But how can we be sure that the relationship between globalization and economic development is not merely a correlation? The answer to this question lies within our empirical approach. Indeed, as mentioned in the empirical strategy section in greater detail, the statistical method used in this paper will allow us to look for a causal relationship. In other words, we will be able to determine whether or not globalization truly plays a role in determining the economic fate of a country whose population – as illustrated by **Figure 6** – is a heavy factor in understanding the nature of this relationship.

3. Data

For this research project, all data was obtained from the World Bank, an international financial institution that offers funding and knowledge to developing countries (World Bank, 2023). The World Bank is a valuable source of information due to its extensive collection of detailed data, which is sourced from the statistical systems of member countries. These statistical systems include census reports and survey data. This repository provides an accessible and comprehensive source of information that can easily be utilized for research. Given the World Bank's established reputation and global recognition, we believe that this institution is the most reliable and accurate option for our research.

The first database utilized from the World Bank website is the World Integrated Trade Solution (WITS) database (WITS, 2023). WITS is a collaboration between various international organizations that provides detailed information on trade and tariffs. By using the export indicator from this database, we obtained information on the amount that all countries exported to India, measured in $US thousand. This dataset recorded the total amount that each member country exported to India in a given year. This dataset had yearly entries from 1988 to 2020, allowing for an analysis over a long period within our time range of interest. This data enabled us to analyze the trade relationships that India has with other countries and identify the most prominent partners. We identified India's top five partners as those who exported the most in total to India from 1988 to 2020.

The second database we used was the World Development Indicators DataBank (WDI), also from the World Bank website (World Bank, 2023). This is a comprehensive dataset that provides detailed information on a wide range of topics such as environment, health, and economic growth indicators. It draws data from a variety of sources and statistical institutions and is easily accessible to the public. From this database we used data on indicators for GDP per capita, population, import share of GDP, and export share of GDP. The dataset for GDP that we used contained yearly entries of India's total GDP per capita from 1960 to 2021 in current US$. The dataset for population was used to control for population growth and recorded India's population each year from 1960 to 2021. This was a yearly estimate of the sum of all residents of India, regardless of their legal status or how long they are residing there. The next dataset recorded information on the percentage of India's total GDP that was composed of imports in yearly intervals from 1960 to 2021. Imports included all recorded imports to all countries and measurements used were the proportion of the total GDP that these accounted for. The last dataset utilized recorded the percentage of every country's GDP that was composed of exports. This too was recorded in yearly intervals from 1960 to 2021. This included all recorded exports to all countries and was measured in the percentage of that country's total GDP that was composed of these exports.

All work with the chosen datasets was conducted in R. The only alterations to the data involved removing any missing observations. Missing observations were more common in earlier years and developing nations, which was not relevant to our research and had a very minimal impact. The only other manipulation that took place was condensing the datasets used to only include India and its prominent trade partners. In an ideal world with unlimited resources, having measurements in smaller time intervals would be beneficial. Using monthly or quarterly estimates of our indicators of interest would have resulted in a much larger sample size for our analysis. Outside the scope of this class, going into a deeper

dive on data collection methods of the World Bank and ensuring the quality of collection would have benefited our research.

4. Empirical Strategy

We are interested in building a model to show the causal relationship between the share of India's GDP that is composed of imports and India's GDP per capita. A simple linear regression for this relationship would be as follows, $GDP_t = \beta_0 + \beta_1 IndiaImport_t + \epsilon_t$, where GDP_t is India's GDP per capita in year t, $IndiaImport_t$ is the percentage of India's GDP that is imports in year t, and ϵ_t is the error term at time t. GDP per capita is commonly used as an indicator of economic development and measures the value of all goods and services produced in a country. For this reason, GDP per capita is an appropriate outcome variable for our model. Imports reflect a country's engagement with the global economy. This integration and interdependence with the rest of the world is one way to measure globalization. Thus, using the share of India's GDP that it imports is an appropriate exogenous variable for this model. However, there are a number of potential issues in this model that would prevent us from identifying a causal relationship. There is no way to determine the direction of the relationship and whether India's import share impacts its GDP per capita or if GDP per capita is impacting India's import share. There is also the potential for some unobserved variable that is impacting both GDP per capita and the import share. To make causal estimates and achieve the goal of answering our research question we must use another model.

As a solution we use an instrumental variable approach, which involves two stages. The first stage uses the instrumental variable to create estimates for the exogenous variable. Using a well chosen instrumental variable can resolve the previously mentioned concerns in an OLS model. In our case, the chosen instrumental variable is the percentage of GDP that is composed of exports for India's most prominent trade partners. We identified India's top trade partners by looking at the total amount that every country exported to India from 1988 to 2020. This was done by summing the total amount that each country exported to India in $US thousand. The five countries with the largest total amounts were identified as India's top trade partners and were used in our model. The amount that a country exports to India is a good measure of trade relationships because it reflects the interdependence of the two countries. The top five trade partners are China, USA, UAE, Saudi Arabia, and Switzerland. To predict India's import share, which is the endogenous explanatory variable, we used the the percentage of these countries GDP that was exports to all countries as the exogenous variable in the following equation, $\widehat{IndiaImport}_{c,t} = \alpha_0 + \alpha_1 PartnerExport_{c,t} + \epsilon_{c,t}$. There were a total of 310 observations with one for each trade partner country in every year t. $PartnerExport_{c,t}$ is the percentage share of exports for partner country c in year t and $\widehat{IndiaImport}_{c,t}$ is the predicted explanatory endogenous variable for partner country c, in year t.

The second stage of the instrumental variable approach uses the predicted values of the endogenous explanatory variable from the first stage to estimate the outcome variable. We used two versions of this stage, one without any controls and one where we controlled for population. First the following formula was used, $GDP_{c,t} = \gamma_0 + \gamma_1 \widehat{IndiaImport}_{c,t} + \epsilon_{c,t}$. $GDP_{c,t}$ is India's GDP per capita in year t predicted using exports from country c and is the outcome variable that we are estimating. $\widehat{IndiaImport}_{c,t}$represents the endogenous explanatory variable which is predicted values of India's import share in year t using country c from the previous stage. Again, there are 310 observations, one for each of the five trade partners from 1960 to 2021. Because we are looking at GDP per capita, we knew population would have an impact on this and chose to create a second model which controlled for population. This new model is uses the following formula, $GDP_{c,t} = \zeta_0 + \zeta_1 \widehat{IndiaImport}_{c,t} + \zeta_2 log(IndiaPop_t) + \epsilon_{c,t}$. This model is the same as the previously discussed one but with the addition of the variable $IndiaPop_t$ which is India's total population in year t. We used the estimates from these two models to aid in answering our research question.

To make causal assumptions using the instrumental variable approach three assumptions must be met. The first assumption is the exogeneity assumption. This tells us that the exogenous variable needs to be independent of the outcome variable. In our case, this means that the share of another country's GDP that is composed of exports to all countries, $PartnerExport_{c,t}$, is independent of India's GDP per capita. In the original OLS model this would be an unrealistic assumption to make because it is very unlikely that India's import share is exogenous from India's GDP per capita. Our chosen instrumental variable helps fix this violation. It is much less likely that another country's export share in a year is dependent on India's GDP per capita. This is because we are looking at the share of exports, not total exports, and that country would have trade relationships with countries other than India. While there is the possibility of this being violated, for example if India's GDP per capita increases there may be higher demand for foreign goods, it is much less likely than it was in a simple linear regression.

The next assumption is the relevance assumption. This means that the instrumental variable needs to be robustly associated with the endogenous explanatory variable. It is important that the instrumental variable that we are using has a meaningful relationship with India's import share. If this is violated, results would be biased as it does not accurately generate predictions for the endogenous explanatory variable. To make sure that this assumption is met we need to ensure that there is a relationship between India's import share, $IndiaImport_{c,t}$, and India's top trade partners export share, $PartnerExport_{c,t}$. To ensure that there was a relationship we ran a simple linear regression between these two variables. In other words, we need to make sure that the results from the first stage are meaningful and statistically significant. For this to be true the coefficient for the instrumental variable needs to be statistically significant. To do this we conducted a hypothesis test using a 0.05 significance level. If the p-value from this test is smaller than 0.05 we know that the coefficient is significant and it is likely that this assumption is met.

The final assumption is the exclusion restriction assumption. This assumption means that the chosen instrumental variable can only impact the outcome variable through the endogenous explanatory

variable. In this model we need to be able to assume that another country's export share, $PartnerExport_{c,t}$, only impacts India's GDP per capita, $GDP_{c,t}$, through India's import share, $IndiaImport_{c,t}$. This is a reasonable assumption to make because it is not likely that changes in another country's exports impacts India's GDP per capita through any variable other than what India imports. However, it is still possible that this assumption could be violated. For this to be true there would need to be some way that the share of another country's GDP that is composed of exports is impacting India's GDP per capita through some unobserved variable other than India's imports. However, this is unlikely and would be minimal.

5. Results

Our first result suggests strong evidence for the relationship between India's import share and its trade partners' export shares. These results are based on the first stage of our model and can help us to make important conclusions that are necessary for the second stage. 310 observations were used, one for each of the five trade partners every year from 1960 to 2021. The results of the first stage of our model, using the formula, $\widehat{IndiaImport}_{c,t} = \alpha_0 + \alpha_1 PartnerExport_{c,t} + \epsilon_{c,t}$, are presented in **Figure 2.** As depicted in the table, $PartnerExport$ ($\alpha = 0.1689, p < 0.05$) is a significant predictor of $IndiaImport$. The p-value is almost zero, meaning that at a significance level of 0.05 we can reject the null hypothesis that the percentage of India's top five trade partners' GDP that is composed of imports has no relationship with the share of India's total GDP that is imports. The coefficient indicates that a one percentage point increase in the export share of India's trade top trade partners results in a 0.1689 increase in India's import share. This is an important finding as it demonstrates that the relevance assumption of the instrumental variable is met. This assumption being met is necessary to draw causal conclusions from our model. Furthermore, these results provide evidence for how important trade relationships are and how countries with a high level of interdependence can have a significant impact on each other. This means that the trade habits and practices of India's top trade partners can have an impact on the trade practices of India itself.

Our second result provides evidence for our hypothesis that an increase in India's GDP share of imports will result in a corresponding increase in its GDP per capita over time. As previously stated, 310 observations were used to generate predictions. In the second stage of our model using the following formula, $GDP_{c,t} = \gamma_0 + \gamma_1 \widehat{IndiaImport}_{c,t} + \epsilon_{c,t}$, our goal was to see whether an increase in India's import share, as predicted by the export share of India's trade partners, has an impact on India's GDP per capita. The findings for the second stage of our model can again be found in Figure 2 of the appendix. The results depicted in the table show that $\widehat{IndiaImport}$ ($\gamma = 65.5381, p < 0.05$) is a significant predictor of GDP. With a p-value of almost 0, these results are statistically significant at a 0.05 significance level and the null hypothesis that the share of India's GDP that is composed of imports has no impact on India's GDP per capita. The coefficient indicates that a one percentage point increase in India's import share results in a 65.5381 ($US) increase in India's GDP per capita. These results would support the importance of globalization for economic development. In relation to our research question,

which aims to investigate how India's GDP share of imports has influenced its economic development measured in GDP per capita, our instrumental variable model without controlling for population would suggest that an increase in India's import share had a positive impact on its economic development. It should be noted that the p-value is exceptionally small and nearly zero. This could be because our sample size was too small to detect a meaningful treatment effect. We must keep in mind that a statistically significant result does not imply that it has a practical implication.

In comparison to the previous result, the third and final result provides evidence against our hypothesis. This result was again found using the second stage of our model, except this time controlling for population. The formula used was $GDP_{c,t} = \zeta_0 + \zeta_1 \widehat{IndiaImport}_{c,t} + \zeta_2 log(IndiaPop_t) + \epsilon_{c,t}$ and the results are depicted in **Figure 2** in the appendix. These estimates suggest that $\widehat{IndiaImport}$ ($\zeta = 7.0079,\ p > 0.1$) does not have a statistically significant impact on GDP. The coefficients show that a one percentage point increase in India's import share results in a 7.0079 ($US) increase in India's GDP per capita. However, with a p-value of 0.1859 these results are not statistically significant at a 0.05 significance level and we can not reject the null hypothesis that India's import share has no impact on India's GDP per capita. The variable for India's population, $IndiaPop$ ($\zeta = 1362.4087,\ p < 0.05$), does appear to have a meaningful impact on GDP. The coefficient for India's population in a given year suggests that an increase of one $log(IndiaPop)$ translates into an increase of 1362.4087 ($US) in India's GDP per capita. With a p-value of almost zero we can reject the null hypothesis that India's population in a given year has no impact on GDP per capita at a 0.05 significance level. In relation to our research question, this would suggest that the answer is that the share of India's GDP that is imports has no impact on India's GDP per capita. Similarly to the previous result, the p-value for the population variable is very low. As we only had population observation once a year from 1960 to 2021, it is very possible that the sample size is too small to predict a meaningful effect size on GDP per capita. We would hopefully be able to resolve this given more data, for example if we had monthly measurements of all variables of interest.

Using the regression statistics presented in **Figure 7**, we can analyze the fit of our models. The fit of our models is an important consideration to make because it determines how well it is able to estimate the outcome variable, which in our case is GDP per capita. The second stage of our model prior to controlling for population had a multiple R-squared value of 0.2328 and an adjusted R-squared value of 0.2303. In comparison, the model after controlling for population had a multiple R-squared of 0.6731 and an adjusted R-squared of 0.6709. These statistics are important when assessing the fit of our models as they describe the amount of variation in the outcome variable, GDP per capita, that can be explained by the GDP share of imports and population. A higher multiple R-squared and adjusted R-squared indicate a better fit. As depicted in **Figure 7**, these values are significantly larger in the model that controlled for population. This implies that controlling for population more accurately captures the relationship between our variables of interest. Given this information, the model that provides little evidence for our hypothesis is a better fit, and as a result would provide better predictions of GDP per capita. This places more emphasis on our third result which indicates that when controlling for population, India's import share has no impact on India's GDP per capita.

Overall, it initially appears that we were moving towards our hypothesis that India's GDP share of imports has a positive impact on its own GDP per capita. However, after controlling for population, we had little evidence of this. When looking at indicators such as GDP per capita, population was an important variable to control for. Moreover, controlling for it significantly reduced the coefficient for India's import share and made the results not statistically significant, which meant that we were unable to reject the null hypothesis. The higher multiple R-squared and adjusted R-squared indicate that the model which controls for population is a better fit and provides further evidence in support of the results from this model. Given all of these results, the answer to the question "*How has India's GDP share of imports influenced its economic development measured in GDP per capita?*" would be that when controlling for population, there is little evidence that India's GDP share of imports influenced economic development measured in GDP per capita.

6. Conclusion/Discussion

This paper has provided an empirical approach to understanding the importance for a country to be economically integrated in our modern globalized world on its economic development. The IV analysis that we have conducted shows important results given our initial hypothesis. In the absence of population control, our model suggests that India's GDP share of imports positively impacts its economic development measured in GDP per capita. On the other hand, the results that we have obtained after controlling for population suggest that the GDP share of imports is not statistically significant. This is represented by a p-value that is larger than the significance level of 0.05, indicating that we fail to reject the null hypothesis that there is no correlation between the endogenous variable and the outcome variable. In addition, it is important to recognize that our IV model satisfies all of the three relevant assumptions for this particular empirical strategy. The exogeneity assumption is satisfied by ensuring that our model uses an instrument that is independent of the outcome variable. In other words, the choice of instrument – India's partners' GDP share of exports is not influenced by India's GDP per capita. Secondly, the relevance assumption is also satisfied, as India's GDP share of imports – the endogenous variable – and India's partners' share of exports – the instrument – are correlated to each other. Last but not least, the fact that the import share of the trade partners' GDP can only impact India's GDP through trade – more specifically by impacting India's GDP share of imports – means that the exclusion-restriction assumption is also satisfied.

The contribution that our research makes to the previously discussed existing literature; **"Growth and Volatility in an Era of Globalization**" (2005) and "**Globalization and Economic Growth In India: An ARDL Approach**" (2021), is providing an empirical model that can make causal assumptions about a specific measure of globalization. This is truly important because it is necessary to ensure that the relationship between economic growth and globalization is not merely a correlation, but more a causation. Lastly, our research also provides another perspective and different conclusion than these papers. While both of the pieces of existing literature provide evidence that globalization has a positive impact on economic growth, our research provides little evidence given our chosen measurements of these factors.

Nevertheless, there are some limitations from our IV analysis that still need to be addressed. For example, while our IV assumes that our instrument is correlated with our endogenous variable, it does not take into consideration other small confounding factors that are also correlated with the instrument. For

example, global economic conditions may impact both the import share of India's trade partners as well as India's share of exports. For instance, a global recession is likely to cause a decline in both of these values as well as India's GDP per capita. Our model does not take into account such exogenous situations, and this could lead to a "fake" correlation between the explanatory variable and the response variable. Another element that can disturb the dynamics of our model is the exchange rate. Indeed, fluctuations in exchange rates are likely to alter the cost of imports, which in turn can impact the quantity of India's imports, thereby influencing the country's GDP share of imports. Again, this would not be captured by our model; a big limitation. Another shortcoming of this empirical paper is the sample size. An instrumental analysis requires a very big sample size to be effective because it involves a two-stage regression. However, our study only contains 310 observations. This may be problematic because it can impact both the reliability and the accuracy of the results of the model. Additionally, a smaller sample size means an increase in the variability, which also leads to less precise estimates. Overall, this indicates higher bias and a weaker relationship between the explanatory variable and the outcome.

It is also important to know that while this study makes contributions in understanding the nature of the relationship between globalization and economic growth, some gaps in the literature do remain and there are still some relevant issues that were not addressed by this analysis. For example, our measure of globalization – in which imports plays a central role – is only one measure among many others (including FDI, foreign remittances, exports, etc…) and therefore cannot be used to draw conclusions on globalization as a whole. Similarly, the use of GDP per capita as the outcome is not the sole measure of economic development. Perhaps in the future, other measures such as human development index (HDI), human capital index (HCI), consumption, or investment can be used to index economic development. Last but not least, one issue that can be looked into more deeply is how globalization impacts economic growth and economic development as separate concepts with in mind the notion that growth refers to GDP and output production while development focuses on human and social welfare (HDI and HCI).

7. Appendix

Figure 1 (Data Commons, 2023)

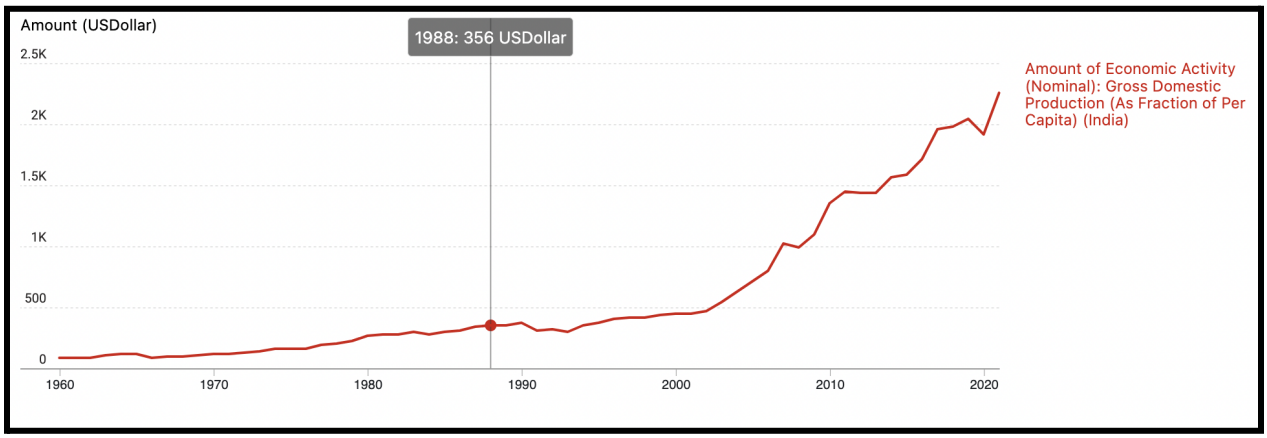

Figure 2: 2SLS Results

Variable	Coefficient	Std. Error	p-value
First Stage			
Intercept	8.7237	0.5339	0
PartnerExport	0.1689	0.0147	0
Second Stage			
Intercept	-248.1396	92.7038	0.0078
IndiaImport	65.5381	6.7797	0
Second Stage w/ Control			
Intercept	-27500.1059	1341.6032	0
IndiaImport	7.0079	5.2854	0.1859
IndiaPop	1362.4087	67.0023	0

Figure 3 (World Bank, 2023)

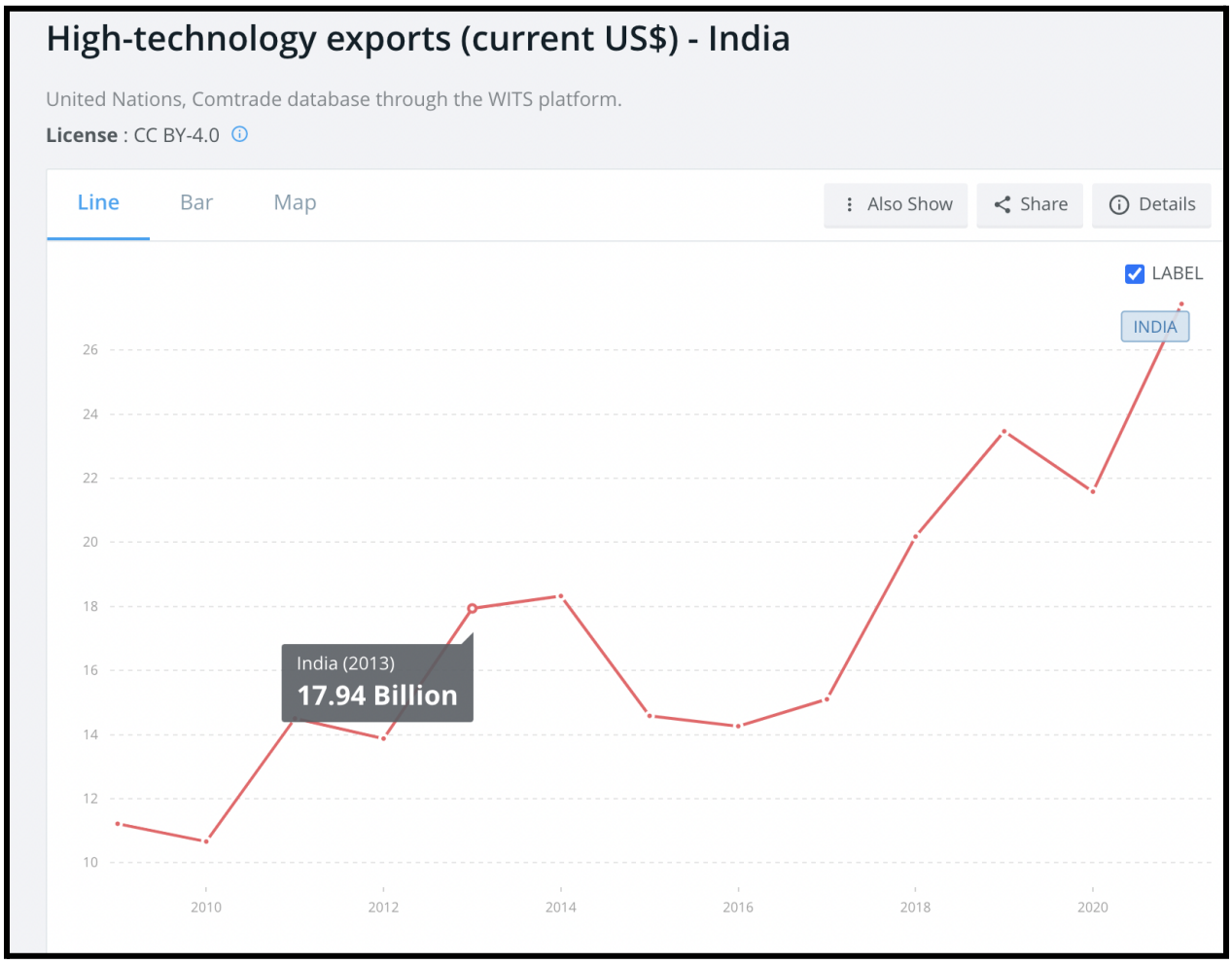

Figure 4 (World Bank, 2023)

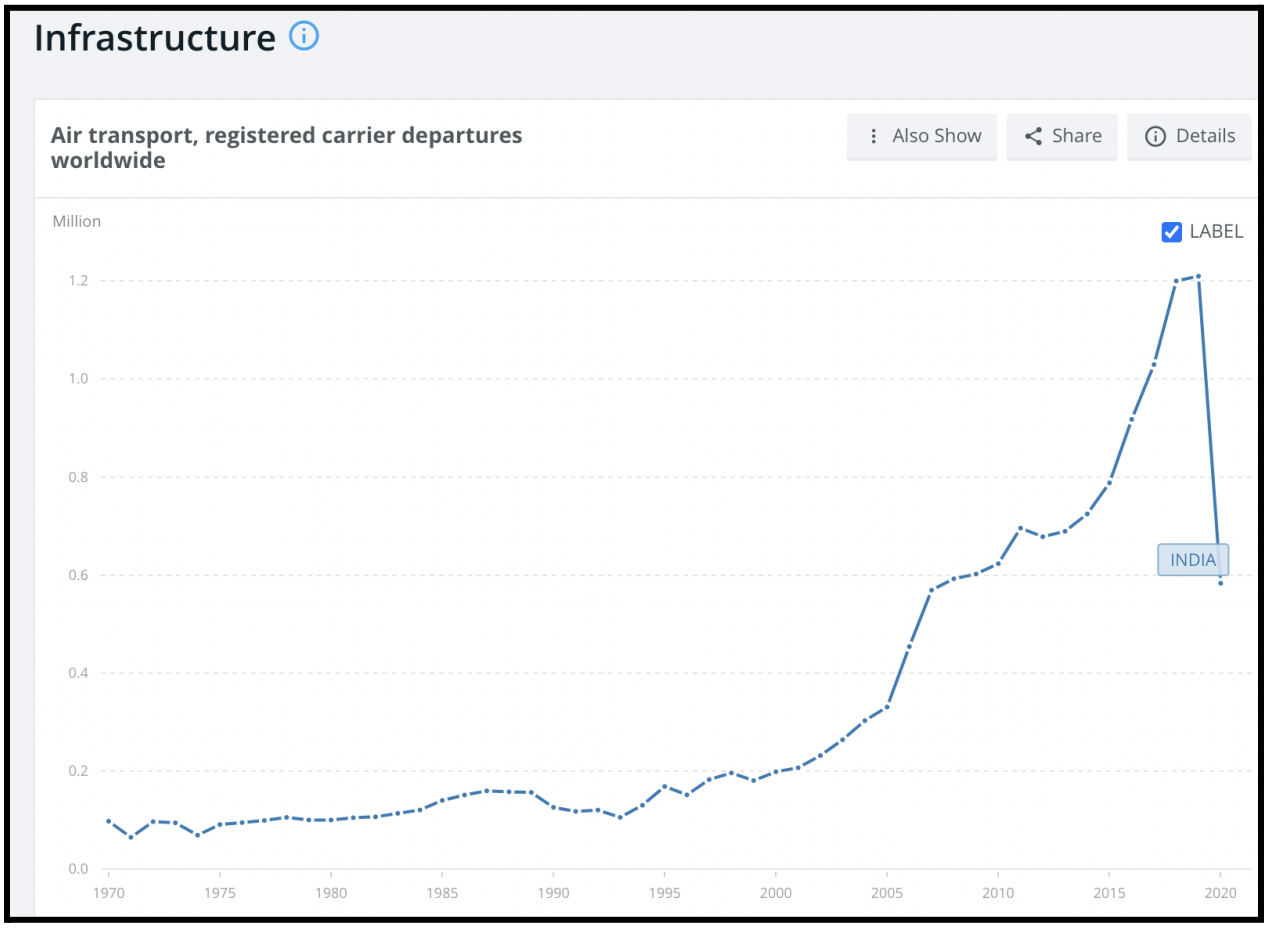

Figure 5 (Trading Economics, 2023)

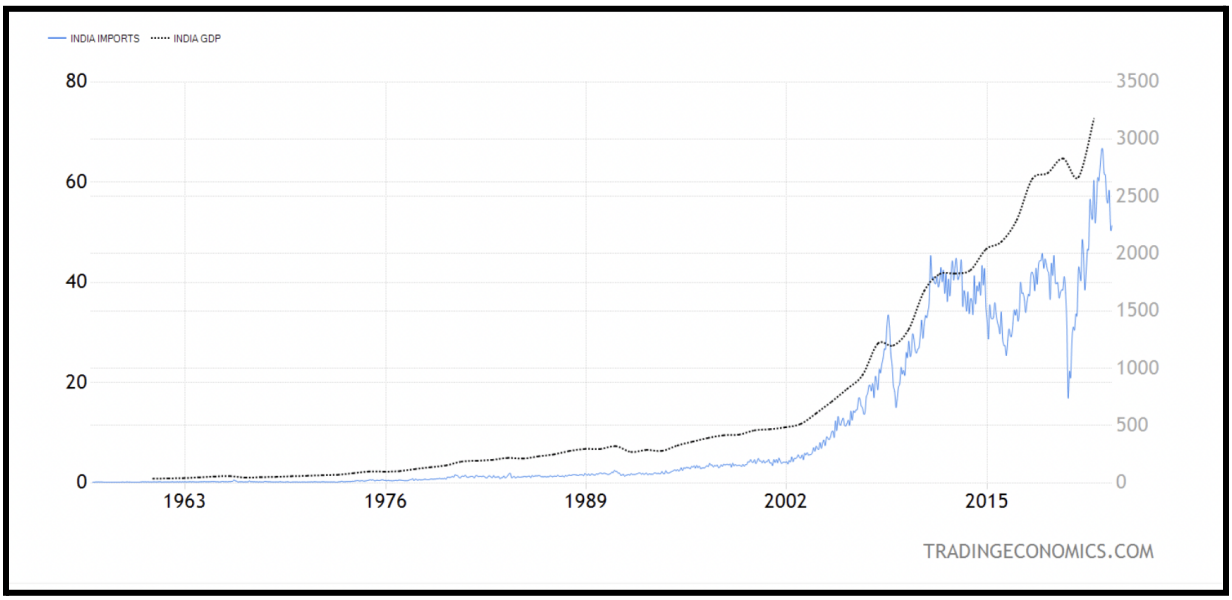

Figure 6 (Worldometer, 2023)

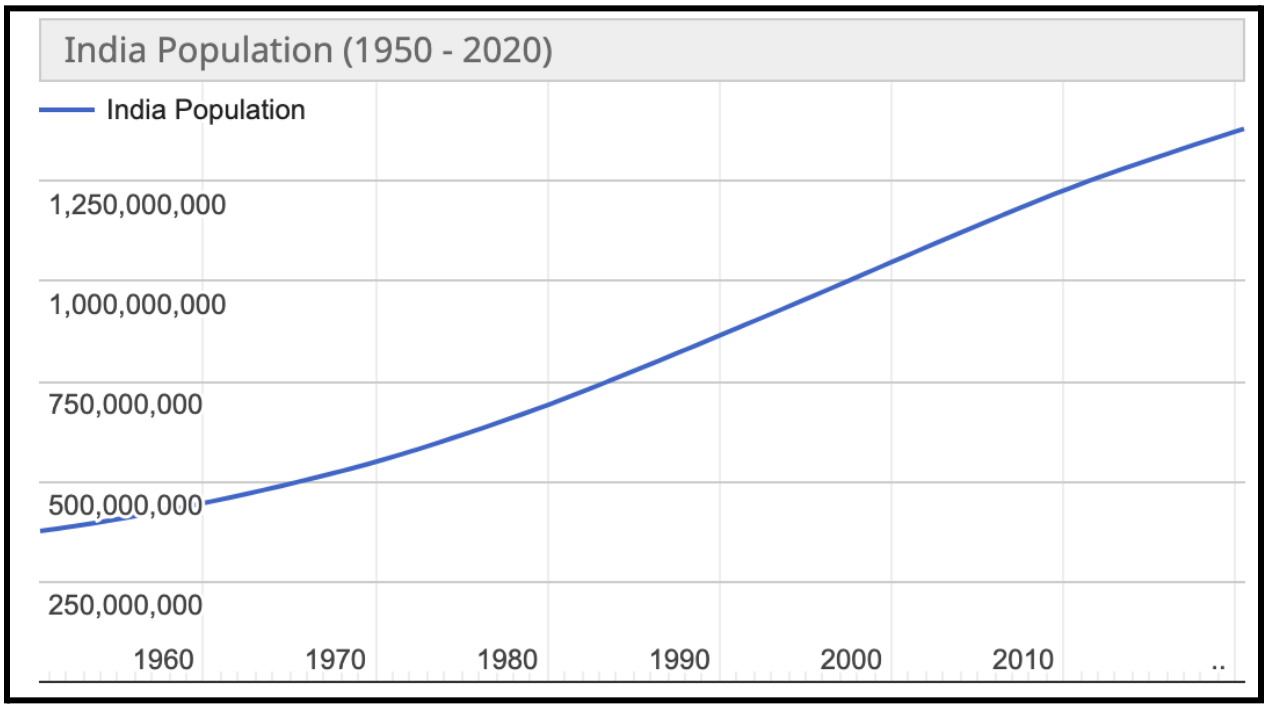

Figure 7: Regression Results

Regression Statistics	
First Stage	
Multiple R Square	0.2995
Adjusted R Square	0.2972
Residual Standard Error	6.839
Observations	310
Second Stage	
Multiple R Square	0.2328
Adjusted R Square	0.2303
Residual Standard Error	532.1
Observations	310
Second Stage w/ Control	
Multiple R Square	0.6731
Adjusted R Square	0.6709
Residual Standard error	347.9
Observations	310

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