ARE CORRUPTION, DEMOGRAPHIC PRESSURES AND BRAIN DRAIN DAMAGING THE QUALITY OF EDUCATION? EVIDENCE FROM ASIA

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Abstract. The importance of education cannot be denied in any region of the world because it is the aspect on which the future and growth of the country is based. There are many aspects that are found to have impacts on quality of education, however in this study; the author has used corruption, demographic pressure and brain drain along with control variables i.e. population and per capita income and the impacts of all the above mentioned variables on quality of education have been studied. The approaches such as unit root test, cointegration test and coefficient estimation test have been used by the author for the data analysis purpose. The author has found out the order of integration, cointegrated relationships presence as well as their measurement by using all these approaches. The data in this case was collected from eight countries of Asian region for 26 years and the above-mentioned tests were run on it. The results obtained indicate that corruption and brain drain have significant impact on quality of education along with the control variables, population and per capita income. The author has also discussed some theoretical, practical and policy making implications and some of the limitations of this study.

Keywords: corruption; demographic pressures; brain drain damaging; quality of education; Asia

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1. Introduction

Education is an important instrument used to reduce poverty as well as inequality in a country. In Asia, education is a key which can be used to enhance competitiveness of countries in the global economy. Hence, it is important to ensure access to quality education for all, specifically for poor and rural population (Jermstittiparsert & Sawasdee, 2012). The provision of quality education is important for economic as well as social development of Asian countries (Absalyamova, Absalyamov, Khusnullova, & Mukhametgalieva, 2016). As per Adeyemi, Joel, Ebenezer, and Attah (2018) a key role is played by education for developing young economies. When people are provided with education facilities, then this ultimately helps in driving GDP, because educated individuals have the capability of giving their input in innovation and new ideas. In order to ensure positive impact of education's quality on growth and development of a country, it is important to focus on various important factors which might have an impact on quality of education. There are some new growth models, which provide support to policy measures, like education subsidies, due to which number of skilled individuals gets increased, thereby enhancing R&D activity, generation of new ideas and long term growth rate (Buskens et al., 2019).

Over the last five decades, higher studies have been undertaken by a huge number of qualified young individuals from developing countries and they have got lucrative occupations in developed countries (Crosling, Nair, & Vaithilingam, 2015). Most of young individuals aspire to get settled in countries other than their home countries, in order to get better facilities as well as incentives. In most of developing countries, there is an issue of corruption and brain drain, which has a key impact on education provided to young individuals in those countries. The talents from developing countries get attracted to developed countries, due to better living standards, high salaries, advanced technology and high stability in political condition (Chadha, Rai, & Dugar, 2016). Hence, this issue needs to be addressed properly through carrying out the research. So, the current study has focused on analyzing the impact of corruption and brain drain on quality of education in Asian countries. As a result of availability of better facilities and quality of livelihood, the decision of students to remain in foreign countries gets stimulated. Students moved from developing countries of Asia take decision of pursuing their professional qualifications in other developed countries. Even though, there are some positive aspects linked with such movements, like remittances which come along with these movements, development of countries which are struggling in terms of growth despite abundance of inordinate rewards from remittances (Chan, 2016). Brain drain proves to be highly influencing for overall performance of an education sector. It is important for the management of education sector to focus on improving facilities, in order to retain young students and getting their assistance in enhancing the growth of country. Moreover, another issue which needs to be highlighted in corruption (Crosling et al., 2015). For supporting the growth of human capabilities, it is important achieve high transparency as well as accountability level in education agencies. There is a relevancy of studying corruption in education, because it might assist in increasing public awareness on its key impacts and can also provide political support for implementing anti-corruption initiatives in education sector (Chapman & Lindner, 2016). So, the focus of this study is on analyzing corruption as a key variable affecting quality of education. Besides this, another key issue which needs to be addressed in education sector of Asian countries is demographic pressures (Charron & Rothstein, 2016). There is a continuous change in demographics of people living in Asian countries and as a result of those demographic changes, the demand of people also gets changed. So, there is a need of studying the relationship between demographic pressures and quality of education. On the basis of these aspects, the current study is aimed at analyzing the key impact of brain drain, corruption and demographic pressures on quality of education. This research revolves around following key objectives;

- To examine the impact of brain, drain on quality of education in Asia.
- To study the key impact of corruption on quality of education in Asia.
- To analyze the effect of demographic pressures on quality of education in Asia.

This research has practical as well as academic implications. The study findings are beneficial for management of education sectors, as they can get to know about the impact of brain drain, corruption and demographic pressures on quality of education. Moreover, the study has filled the gap in literature. There are five main chapters of this dissertation, starting from Introduction, Literature Review, Methodology, Analysis and Conclusion.

2. Literature Review

Brain Drain and Quality of Education

The trend of brain drain has got significantly increased and this has a significant negative impacts on economy of the country (Deliversky, 2016). The word brain drain is used for describing the flow of high-level experts from developing countries to develop or industrialized countries. Brain drain actually refers to the loss of academic or skilled people through emigration for getting settled in another country. Brain drain is also defined as flight of human capital in the form of emigration of skilled people to other countries, because of having lack of enough opportunities, conflicts or due to some health hazards in countries where they are living (Fortunato & Panizza,

2015). Ho et al. (2017) found that there is a loss in investment in higher education, due to the movement of trained people to other countries, with having no return to their own country. As a result of brain drain, the overall quality of education gets affected. As a result of movement of people to other countries, the skills and talent from one country also gets shifted to other countries and this results in movement of high-level expertise required for accelerating the growth of education sector (A. Y. C. Hou, 2016). Due to the increased trend of brain drain in Asian countries, it is important to analyze the impact of brain drain on quality of education in Asian countries (Y.-C. Hou et al., 2015). On the basis of this, following hypothesis is developed;

H1: There is a significant impact of brain drain on quality of education.

Corruption and Quality of Education

Corruption in education refers to the capability of abusing the authority for individual and material gain. Education corruption is considered in light of its key impacts on economic success of a country. Those educational departments work in a better way in which leaders are selected on merit, in opposite to those that favor privilege (Klemencic & Fried, 2015). When a school system is untrustworthy, then this has a negative impact on social cohesion of a country. The definition of corruption in education sector has been extended to using public sector systematically for private benefit, which has significant influence on availability as well as quality of education. This also has an impact on equity in education. In their definition, there is a consideration of corruption, which completely represents the issue. As per this definition, a clear difference between ‘grand’ and ‘pretty’ corruption has been made. The focus of grand corruption is on high-level officials and the focus of pretty corruption is on public officers working at lower levels (Marinakou, Giousmpasoglou, & Paliktzoglou, 2016; Osipov, Glotov, Karepova, 2018). Generally, in countries where corruption level is high, less investment is spent on education because of having lesser opportunities for extracting bribes in education sector (Yang, 2015). In education sector, corruption might get attracted, which include low salaries of teachers as well as public officials and lack of accountability within the education sector. In education sector, people are provided incentives for paying bribe in order to get access to good schools or for receiving a passing grade (Martin, 2016). Mok and Han (2016) found that most influencing type of corruption on educational results is that which mainly includes students and teachers at primary education level. As a result of corruption at classroom level, the access to education can get prevented, specifically for disadvantaged groups and this has a severe influence on quality of education. Mudassar (2019) presented a simple model to analyze the causes as well as consequences of corruption in providing public services, in which the level of government services gets reduced due to the corruption. Through this model, it is assumed that a monopoly is exercised by government officials on the quantity of health care as well as education services and bribes are paid by consumers to officials for obtaining these services. Following hypothesis is developed on the basis of literature review;

H2: There is a significant impact of corruption on quality of education in Asia.

Demographic Pressures and Quality of Education

Due to the demographic prospects, new dimensions are added into the known pressures on higher education. Even though, there are many new demographic prospects, but these have not been addressed properly in the literature. Higher education is becoming in common aspiration in all Asian countries (Muthanna & Sang, 2018). Over the last few decades, there has been a steady increase in number of students in almost all Asian countries and in accordance with some projections, the number of students will get doubled in near future (Ullah, Mohamad, Hassan, & Chatteraj, 2019). However, this trend will play out in a dissimilar manner provided the diverging demographic changes in various parts of the globe (Nadtochy et al., 2016). As per studies, it is predicted that there will be a significant change in demographics of people in Asia and this will have a significant impact on their demands, needs and preferences. There also some dramatic changes in life expectancy, through the prosperity of countries, but these changes are stagnant (Olutayo, 2016). There are far reaching implications of these demographic changes on

education sector and these changes create pressures for educational institutions. In Asia, there is a projected increase in population and it is also anticipated that the increase in population will bring significant improvement in socioeconomic conditions (Osipian, 2017). However, the increase in population will also rise demand for education and this will also create a need for additional facilities within the education sector. Some regions will have to struggle hard for providing education to young individuals, especially high quality education (Pucciarelli & Kaplan, 2016). Moreover, Sahnoun and Abdennadher (2019) found that there is a need of steady turnout of highly skilled employees in the new knowledge community and there is also a need of substantial pool of skilled producers of knowledge. For becoming capable of accomplishing these tasks, there is a need of intakes from students within a higher education system.

According to Schiff and Docquier (2016) in the demographic estimations of student population, there is a combination of actual birth rates with expected number of individuals who will get higher education. The further fine-tuning of these projections has been done through factoring in the projected movement of prospective young students. The education sector's performance gets influenced through number of life-long learners, who are more in number than the number of traditional students. In the institutional level, the competition for talented individuals between students can also be taken in to account in these projections. Stensaker and Maassen (2015) claimed that demographic trends can have a significant impact on transformation of higher education system. It is expected that pool of local students will be increased, due to the increase in population. Due to the lack of enough resources and funds, quality of education might get negatively influenced. On the basis of this, following hypothesis is developed; **H3:** There is a significant impact of demographic pressures on quality of education in Asia.

3. Methodology

Data

To conduct an effective research data collection process has its own importance. The author has collected data about corruption, demographic pressures, brain drain and quality of education from various Asian countries which include Japan, China, Indonesia, Vietnam, Hong Kong, Thailand, Singapore and Malaysia. The whole data collected covers the time period of 26 years. Apart from the above-mentioned variables, data about two control variables have also been collected by the author. These control variables include population and per capita income. The data has been effectively collected from authentic databases, World Bank and Global Economy.

Model Specification

The author has specified the measurement units for all the variables that have been included in this study. These variables include independent, dependent and control variables. The author has designed this study in accordance with the core purpose of finding out the impact of corruption, demographic pressure and brain drain on the quality of education in some of the selected countries of Asian region. In this regard, the dependent variable of this study, quality of education is measured in terms of satisfaction level of students and is denoted by EDU. Among independent variables, corruption is measured by using an index called as corruption perception index and is presented by COR. In the same fashion, demographic pressures are also measured through an index that ranges from 0 to 10 and it is represented by DP. The last independent variable, brain drain is measured through the number of people leaving the country and is represented by BD. Apart from these variables, the two control variables are also discussed in terms of their measurement units. The first control variable population POP is measured in terms of millions of people while the other control variable per capita income PCI is measured in terms of million US

dollars. After assigning the measurement units to all the variables, the author has made a regression equation that will be utilized in the research process. This regression equation is presented below:

$$EDU_{it} = \alpha + \beta_1 COR_{it} + \beta_2 DP_{it} + \beta_3 BD_{it} + \beta_4 POP_{it} + \beta_5 PCI_{it} + \varepsilon_{it}$$

In the above equation, education quality is represented through EDU, corruption is represented through COR, demographic pressure is represented through DP, brain drain is represented by BD, population has been represented by POP and finally per capita income is represented through PCI. In addition, ε_{it} is used to represent the error term.

Estimation Techniques

Panel Unit Root Test

The first task to be performed by the author in order to analyze the collected data is to investigate the order of integration of all the variables that are involved in the study. This is necessary as the variables having particular order of integration must only enter the next phase of the research process (Levin, Lin, & Chu, 2002). In addition to order of integration, the stochastic properties of the variables are also needed to be explored. For these two purposes, panel unit root tests are the best available option. The unit root tests that are most commonly used include LLC and IPS (Levin Lin Chu and Im Pesaran Shin). These tests are obtained from the augmented Dickey Fuller ADF tests to overcome the problems of size and power of the traditional tests. In addition, these tests also provide normal standard distribution of the gathered data. There are two hypotheses that are involved in these tests i.e. null and alternate hypothesis. The null hypothesis is based on the assumption that unit root is present, and the data is nonstationary. Alternatively, the alternate hypothesis is based on the assumption of absence of unit root and stationary state of the data. Based on the above mentioned two hypotheses, the results of unit root tests are evaluated and analyzed. The author has used IPS unit root test for this particular study for which he has used the following general equation:

$$\Delta y_{i,t} = a_i + \rho y_{i,t} - 1 + \sum_{j=1}^{pi} a_j \Delta y_{i,t-j} + \varepsilon_{i,t}$$

Here $\Delta y_{i,t}$ is the difference that $\Delta y_{i,t}$ shows for i^{th} country for the specific time period of t .

Panel Cointegration Test

The next step in the research process is to explore and examine the cointegrated relationships that occur among the variables of the study. The long run equilibrium relationships are also needed to be examined in context of the collected data. For the above mentioned purposes, the panel cointegration tests are used (Im, Pesaran, & Shin, 2003). There may be two kinds of cointegration tests i.e. Kao and Pedroni cointegration tests. These are further examined on the basis of two distinct approaches that include within dimension approach and between dimension approach. Both these approaches have different sets of test statistic values that are studied and used to evaluate the results of these tests. These results are actually assessed on the basis of two hypotheses which include null and alternate hypothesis. The null hypothesis is based on the perception that there is no cointegration among the variables while the alternate hypothesis is based on the perception that cointegration exists between the variables that are under study. The long run relationships along with cointegrated relationships are estimated through this test. The author has employed Pedroni cointegration test for this study and has used the following equation for this purpose:

$$y_{i,t} = \alpha_i + \delta_{i,t} + \beta_1 X_{1,i,t} + \beta_2 X_{2,i,t} + \dots + \beta_n X_{n,i,t} + \varepsilon_{i,t}$$

Coefficient Estimation Test

After both the integration order as well as the cointegrated relationships has been studied in context of the collected data, the author will now move towards the measurement of the relationship that exists among the variables (Pedroni, 2001). For this particular purpose, coefficient estimation test or approach is generally used by the researchers. These approaches include FMOLS and DOLS that are actually the modified forms of simple OLS test. The reason behind this modification is that the OLS test caused some issues such as serial correlation issue and endogenous variable issue. In order to solve these issues, FMOLS and DOLS were introduced. The coefficient of each variable represents the actual value by which the independent variable has impact on dependent variable. The author has applied FMOLS test in this study by using the following equation:

$$\hat{\beta}_{FM} = \left(\sum_{i=1}^N \sum_{t=1}^T (x_{i,t} - \bar{x}_i)^2 \right)^{-1} \sum_{i=1}^N \left(\sum_{t=1}^T (x_{i,t} - \bar{x}_i) \widehat{EDU}_{i,t} - T \hat{\delta}_{\varepsilon u} \right)$$

In this equation, $\widehat{EDU}_{i,t}$ is the transformed variable of quality of education due to endogeneity correction while $\hat{\delta}_{\varepsilon u}$ represents the serial correlation correction by FMOLS.

4. Empirical Analysis

Results of Panel Unit Root Test

As discusses earlier, the author has used IPS unit root test in order to find out the order of integration as well as the stochastic properties of the collected data, the results of this test have been presented in the table 1. It can be clearly seen in the table that two different series have been displayed i.e. level and first difference. Both of these series have been studied separately by applying unit root test. All the variable in level series of the table except demographic pressure and population have not rejected the null hypothesis which results into the fact that unit root is present in this series making it nonstationary in nature. As soon as the first difference is applied to the variables, the result obtained shows that all of the variables have now rejected the null hypothesis. This result gives that idea that there is absence of unit root in this particular series and the data is stationary. This suggests that the data has been shifted from non-stationary to stationary state. It must be noted here that some of the variables have rejected the null hypothesis by one percent significant level, some have done so through five percent significance level and some through ten percent significance level. In this way, the table can be interpreted, and results can be described.

Table 1. Panel Unit Root Test – Im, Pesaran and Shin (IPS)

Variable	Level	1 st Difference
EDU	-1.5648 (0.368)	-4.0578*** (0.005)
COR	-2.6435 (0.379)	-6.7543** (0.076)
DP	-3.5878** (0.054)	-11.657*** (0.002)
BD	-1.0277 (0.854)	-10.546*** (0.000)

POP	-4.7544 (0.356)	-12.754** (0.003)
PCI	-3.3657** (0.043)	-13.743*** (0.000)

In this table, * represents that the rejection is one percent significant, ** shows that rejection is five percent significant, *** shows that rejection is ten percent significant

Results of Panel Cointegration Test

After unit root test, the author has interpreted the cointegration test results. As described in the previous section that the cointegration test can be used in order to explore the cointegrated as well as long run relationship between the variables that are included in the study, the results of these variables have been shown in the table 2. In this table, it is evident that two approaches named as within dimension and between dimension approach have been used. In this context, it can be noted that all the test statistics of the within approach have rejected the null hypothesis of no cointegration. In the similar fashion, two test statistics of between dimension approach have rejected the null hypothesis. Collectively, six out of seven test statistics have rejected the null hypothesis of no cointegration which shows that there is a strong cointegrated relationship between the variables of this study. In addition, the long run relationships have also found to be present in these variables as shown by the table. The significance levels of the rejection are important to be considered in this case. The detailed results can be viewed in the table 2 given below:

Table 2. The Pedroni Panel Cointegration Test

Alternative hypothesis: common AR coefs. (within-dimension)				
	<u>Statistic</u>	<u>Prob.</u>	Weighted <u>Statistic</u>	<u>Prob.</u>
Panel v-Statistic	-2.754634*	0.7435	-2.054761	0.0000
Panel rho-Statistic	1.648698**	0.6458	7.076764	0.9747
Panel PP-Statistic	-13.46685***	0.0000	-3.564574	0.0000
Panel ADF-Statistic	-2.967543*	0.0005	-5.233565	0.0003
Alternative hypothesis: individual AR coefs. (between-dimension)				
	<u>Statistic</u>	<u>Prob.</u>		
Group rho-Statistic	4.875436*	0.0000		
Group PP-Statistic	-23.34645	0.0000		
Group ADF-Statistic	-4.754377**	0.0565		

In this table, * represents that the rejection is one percent significant, ** shows that rejection is five percent significant

Results of Coefficient Estimation Test

As discussed in the earlier section that coefficient estimation tests can be effectively used in order to measure the impact of independent variables on dependent variables, the results of FMOLS coefficient estimation test have been presented in the table 3. From the table it can be inferred that corruption has significant impact on quality of education. In other words, with one unit increase in corruption, quality of education will decrease by 23.8%

according to the table. The impact of demographic pressure has been found insignificant in the study. Brain drain has also been found to have a significant impact on quality of education in the sense that with increase in one unit of brain drain, the quality of education will decrease by 26.4%. Apart from these independent variables, the impact of population, a control variable is also significant, and it will change the quality of education by 4.7% with one-unit increase. In the last, per capita income will increase quality of education by 19.6% with one unit increase and shows significant impact. All the above-mentioned results can be concluded by stating that corruption, brain drain, population and per capita income have significant impacts on quality of education.

Table 3. FMOLS Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
COR	0.238548**	0.7546	3.785389	0.0000
DP	0.175437	0.5768	2.576895	0.0008
BD	0.264834**	0.4685	4.465694	0.0004
POP	0.047891*	0.0047	2.326684	0.2753
PCI	0.196467**	0.4687	1.468743	0.0003
Constant	0.854789	0.5768	6.346685	0.0005
R-squared	0.865469			
Adjusted R-squared	0.243468			
F-statistic	32.86543			
Prob(F-statistic)	0.000000			
Durbin-Watson stat	2.285646			

In this table, * represents one percent significance level, ** shows five percent significance level

5. Discussion and Conclusion

Discussion

This study is designed to study and investigate the impact of corruption, brain drain and demographics pressure on the quality of education in some Asian countries. For this purpose, the author has generated some hypotheses in the second section of the study i.e. literature review. The first hypothesis was that corruption has significant impact on quality of educations. With the help of several results this hypothesis was accepted in this study. The same result was presented by another study in the past (Shleifer & Vishny, 1993). The second hypothesis that demographic pressures have significant impact on quality of education was rejected due to insignificant results. This is in accordance with the results of a previous study (Giampietro, 1997). The last hypothesis of brain drain having significant impact on quality of education was also accepted, which is in concordance with a past study (Stark, Helmenstein, & Prskawetz, 1997). In the last, the impacts of two control variables have also been accepted in context of quality of education. This result is same as presented by a past study (Sachs, 2003).

Conclusion

Corruption, demographic pressure and brain drain are very important aspects and this study involves the impact of these particular aspects on quality of education in Asian countries. To study and explore this impact, data was collected from particular Asian countries for the period of 26 years about the above-mentioned aspects. This data was examined and analyzed by using several tests and approaches such as unit root test, cointegration test and coefficient estimation test. The results that have been presented by using these tests suggest that the impact of corruption, brain drain, population and per capita income has been found significant on quality of education while the impact of demographic pressures has been rejected in this regard. Several implications and limitations have been discussed by the author in the last section of the study.

Implications

Several benefits of this study can be identified in different contexts such as theoretical, practical and policy making. This study will provide literature and knowledge about the aspects of corruption, demographics pressures and brain drain for other researchers for usage for different academic proposes. In addition, it will also guide the education related departments of Asian countries to increase the quality of education by controlling the impacts of corruption, demographic pressures and brain drain. It will also provide assistance to the policy making departments or officials of governments so that they may devise policies that are effective and are in favor of improvement in quality of education in these countries. All these implications and benefits have one common goal and that is to improve the quality of education that is the backbone of any country's growth and development.

Limitations and Future Research Indications

The author has discussed some of the limitations of this study in this section along with recommendations and suggestions to improve them in the future researches. Basically, these limitations and suggestions are for other researchers or those who want to research in future about something. The first point in this regard is that this study is only consisting of some Asian countries and is limited to them. In addition, the sample size of the data is also very limited in the study. The variables are limited to those that have been discussed in the study. Some of the tests have only been used by the author in this study. The future researchers may increase the quality of their researches by involving some other set of countries, increasing the sample size of data, involving more and other variables in the study and by using some other kind of tests that are suitable for the data collected in that particular study. By following all these recommendations, other researchers may get benefitted in context on increase in quality and scope of their researches and studies.

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