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## An International Empirical Look at a Few Possible Reasons for Brain Drain

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### Abstract

*Brain drain is a big issue for a lot of countries. Understanding the underlying causes of brain drain is the first step in trying to bring brain drain under control. The purpose of the paper is to use cross country regression analysis to empirically look at some of the factors that may determine brain drain. It finds that higher income per capita, greater country peace, enhanced work force educational quality, and better property rights are associated with reduced country brain drain.*

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### Key Words

*Brain Drain, Brain Drain Determinants, Cross Country Analysis.*

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### I. INTRODUCTION

Brain drain occurs when the educated, the skilled, and the highly productive leave a country. To say the least, brain drain is not a positive force for a country experiencing brain drain. Human capital is a key factor of production. What's further, it is becoming more important with the progression of time and increased technological sophistication. Brain drain is likely to reduce development and economic growth, because the very people that a country needs for dynamic economic activity, innovation, and business management are the very people who are exiting the country. Brain drain is a particularly acute problem for developing countries, as they are typically plagued and hampered by an acute shortage of human capital. Besides the potential reduction in productivity growth engendered by brain drain, an added negative consequence of brain drain is that it dampens the return on public investment. Any investment in education and

training by a government for people who subsequently leave the country is a waste of resources for the country that provided the education and training, resources that could have been used for other purposes.

Given the dire consequences of brain drain for countries that are subject to brain drain, it certainly would be nice to know some of the underlying causes of brain drain, so that effective future policy can be designed to mitigate the outward flow of talented people from a country. This paper hypothesizes that better quality economic and social attributes of a country lowers a country's brain drain. To test the hypothesis, it uses cross country regression analysis on a measure of brain drain to look at the effect of four country characteristics on brain drain. The four country characteristics are income, peace, workforce education quality, and property rights

The paper is divided in five parts. The first looks at some background literature. The second section provides a small working model of brain drain. The third discusses the variables and their sources. The fourth presents and discusses the results of the cross country regression analysis. The fifth section concludes.

## **II. SOME BACKGROUND LITERATURE**

In certain circumstances, such as political oppression, political factors can overwhelm economic as well as other factors, and become the dominant source of brain drain. Torbat identifies political reasons as the primary cause of brain drain from Iran during the Islamic Republic's regime under Khomeini (Torbat 2002).

Kaba discusses a number of potential reasons for emigration of highly skilled individuals from Africa (Kaba 2009). In addition to political instability, the reasons include low salaries, poor working conditions, frustrated career goals, and lack of job satisfaction.

In their literature review, among other factors, Gibson and McKenzie mention country size as a possible determinant of brain drain, with smaller countries having a bigger brain drain when brain drain is measured by brain drain to the population (Gibson and McKenzie 2011).

Kalipeni, Semu, and Mbilizi believe that low pay and poor working environment are major reasons for migration of health care professionals from impoverished Sub-Saharan Africa countries (Kalipeni, Semu, and Mbilizi 2012). The brain drain of health care professionals from these countries is very high, despite the existence of a shortage in health care professionals in these countries.

Semela employs logistic regression analysis on survey data he collects from 103 faculty members at Debub University in Ethiopia (Semela 2011). He finds that external brain drain of faculty seems to depend, not so much on socio-economic characteristics of the faculty, as on faculty attitudinal characteristics such as organizational commitment and faculty perceptions of institutional organizational behavior.

Docquier, Lohest and Marfouk find that brain drain increases with political instability and

religious fractionalization, and, that geographic proximity to OECD countries, especially among small poor countries, increases brain drain (Docquier, Lohest, and Marfouk 2007).

Tansel sees study abroad as a stepping stone for Turkish students to leave Turkey (Tansel 2003). He conducts an internet survey in early 2012 of Turkish students abroad to try to find out why. Among the reasons respondents express for not wanting to return to Turkey are better prospects for career advancement abroad, greater opportunity abroad for development of their specialization, economic instability and uncertainty in Turkey, and lower anticipated income in Turkey.

Docquier maintains that there is an optimal rate of brain drain from poor countries to rich countries beyond which the negative effect of brain drain in terms of loss of human capital and the associated beneficial effects on innovation overwhelm any positive effects such as remittances and easier technological transfer due to a larger Diaspora abroad, and that most developing countries exceed the optimal rate of brain drain (Docquier 2006).

### **III. THE MODEL**

The model is comprised of an equation and its associated partial derivatives. The equation, in tandem with its partial derivatives, is as follows.

$$B = f(Y, P, Q, S) \quad \delta B/\delta Y < 0, \delta B/\delta P < 0, \delta B/\delta Q < 0, \delta B/\delta S < 0$$

In the equation, B is brain drain, Y stands for income, P represents the extent of peace in the country, Q, the educational quality of the workforce, and S, the degree of security in possessions in terms of property rights.

The equation essentially postulates that brain drain depends on economic and social conditions, with more favorable conditions leading to reduced brain drain, and less favorable conditions leading to greater brain drain. Country conditions are characterized by the four variables, income, peace, the educational quality of the workforce, and security of property.

As indicated by the partial derivatives, each of the variables is expected to have a negative sign. Naturally, higher income, a higher standard of living, makes people more inclined to stay in a country resulting in less brain drain. The greater the peace within a country the less are the chances of physical harm, property damage, and social upheaval making it a more favorable place to locate. Educated workers generally desire to work in better jobs, and tend to have greater productivity when working with coworkers with high levels of education. They also prefer to work with educated workers that are like themselves and have things in common. Thus, greater educational workforce quality is favorable for the location of the more talented is likely to result in diminished brain drain. Finally, personal financial security is positive location feature. Personal security is enhanced by property rights. Stronger property rights makes property more secure and reduces the chances that hard earned property is confiscated by the government or undermined in some other fashion.

#### **IV. SOURCES FOR VARIABLES**

The measure used to try to capture brain drain is the 2010 human flight indicator of the Fund for Peace (Fund for Peace 2010). The Fund for Peace human flight indicator varies between one and ten with higher values indicating greater human flight. The indicator takes into account the percentage of highly educated people leaving the country, the degree of professional flight, the amount of overseas remittances, and emigration of economically productive components of the middle class such as businessmen, entrepreneurs, and traders, in its construction.

Gross domestic product per capita for 2005 in real 2000 dollars is used as a measure of the standard of living for the country. The data for the variable comes from the World Bank (World Bank 2011).

The gauge used to measure peace is a modification of the 2010 Global Peace Index of the Institute for Economics & Peace (Institute for Economics & Peace 2011). Because the Global Peace Index ranges between one and five with lower values indicating greater peace, to avoid confusion, five minus the Global Peace Index is used as a gauge of peace so that higher values of the gauge indicate greater peace.

The index of quality of the workforce is the average secondary education of the workforce from the Legatum Institute (Legatum Institute 2012). The data for different countries comes from the year 2010 when available, and nearby years when it is not available for a country for that particular year.

The property rights gauge is the property rights index for 2009-2010 of the World Economic Forum's Global Competitiveness Report for 2010-2011 (World Economic Forum 2011). The index ranges from a low value of one to a high value of seven with higher values designating stronger property rights.

#### **V. THE EMPIRICAL FINDINGS**

Table I shows the results of cross country regressions of Brain Drain on GDP per capita (GDPPC), peace (PEACE), the educational quality of the workforce (EDUCATION), and property rights (PROPERTY).

The table is organized with the first column listing the potential explanatory variables and each of the four remaining columns showing the results of an individual regression run. The equations are numbered in the first row. The last two rows provide the r-squared value (RSQ) for each equation, and the sample size (N), the number of countries entering the equation. The estimated coefficient for a given variable and for a given equation is the top value in the appropriate row and column in the body of the table. The individual t-statistics are underneath the estimated coefficients in parenthesis. Asterisks under the estimated coefficients indicate level of significance of a variable in an equation, with three asterisks indicating significance at the ten percent level or better, two asterisks at the five percent level of significance or better, and one asterisk at the one percent level of significance or better.

TABLE I: CROSS COUNTRY REGRESSIONS OF BRAIN DRAIN ON PER CAPITA GDP AND OTHER VARIABLES

	(1)	(2)	(3)	(4)
CONSTANT	6.554 (42.11) *	10.598 (11.49) *	10.600 (11.84) *	11.297 (11.15) *
GDPPC	-.00016 (-14.09) *	-.00013 (-9.78) *	.00011 (-8.09) *	-.000097 (-5.87) *
PEACE		-1.423 (-4.43) *	-1.228 (-3.84) *	-1.060 (-2.99) *
EDUCATION			-.3462 (-2.70) *	-.3378 (-2.60) **
PROPERTY				-.3045 (-1.80) ***
RSQ	.650	.711	.731	.738
N	109	106	106	101

The table contains four equations. The first is a regression of brain drain on the GDP per capita alone. The next three regressions cumulatively add, in succession, peace, workforce educational quality, and the extent of property rights.

The results are consistent with the hypothesis that better economic and social conditions leads to reduced brain drain. As expected, GDP per capita (GDPPC) has a negative estimated sign in all four equations indicating that a higher standard of living is associated with reduced brain drain. The variable is significant at the one percent level of significance or better in each of the four equations.

Similarly, Peace works very well. In the three equations in which PEACE appears (equations 2, 3, &4), it has the theoretically anticipated negative sign and is significant at the one percent level of significance or better.

Looking at the results for third explanatory variable, EDUCATION, the educational quality of the workforce, suggests, just as anticipated, that higher quality human capital lowers the emigration of high quality workers from the country. EDUCATION is negative in both equations that it enters (equations 3 & 4) and is significant at the one percent level or better in equation 3 and at the five percent level or better in equation 4.

Finally, the estimated coefficient on property rights is negative, indicating that better protection of property through enhanced property rights in a country leads to reduced emigration of highly skilled people from the country. Although property is less significant than the other variables in the lone equation that it appears (equation 4), never the less, it is still significant at the ten percent level or better.

The r-squared values for the four regressions are, especially for a cross sectional analysis, fairly high. Focusing on equation four, show, the four variables together, in a sample of a 101 countries, explain close to seventy four percent of the cross country variation in brain drain.

## VI. CONCLUSION

The results support the hypothesis that better socio-economic conditions lead to reduced brain drain. The cross country regressions indicate that either improvement in the standard of living of a country, or increases in the quality of the work force through better education, or greater social stability of society in the form of higher levels of peace, or better property conditions that protect citizens from arbitrary confiscation of their wealth, results in reduced brain drain.

Policies favoring reduced brain drain through these means is also favorable to economic development. To develop, one needs to promote economic growth, enhance human capital through better education, and give human beings an incentive to accumulate wealth through assurances it will not be destroyed by war or readily taken away once it is amassed.

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