6-1-2011

FDI, Education, and Economic Growth: Quality Matters!

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Accepted version.*Atlantic Economic Journal*, Vol. 39, No. 2 (June 2011): 103-115. DOI.

Atlantic Economic Journal, Vol. 39, No. 2 (June 2011): 103–115. DOI.

FDI, Education, and Economic Growth: Quality Matters

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Abstract

In this paper, we revisit the results from the influential study by Borensztein et al. (Journal of International Economics 45:115–135, 1998), which argues that inward foreign direct investment (FDI) promotes the economic growth in a less developed host country only when the host country obtains a threshold level of secondary schooling. Borensztein et al. (Journal of International Economics 45:115–135, 1998) only focus on the quantity of education. We take into consideration both the quantity and the quality of education. We adjust the original schooling data in Borensztein et al. (Journal of International Economics 45:115–135, 1998) by two quality of education indices and re-estimate their model. We find that the complementarity between inward FDI and schooling still exists, but the threshold level of schooling in our study is lower than the threshold calculated in Borensztein et al. (Journal of International Economics 45:115–135, 1998). Our results support the importance of education quality and suggest that with improved quality of education, it does not take as much quantity of schooling, as established in Borensztein

et al. (Journal of International Economics 45:115–135, 1998), for inward FDI to have a positive impact on economic growth in the host country.

Keywords

FDI Schooling Quality of education Economic growth, JEL, F20

Introduction

The past few decades have seen a dramatic increase in world foreign direct investment (FDI) by multinational corporations (MNCs), with an annual average growth rate of world FDI inflows over 20% in the 1980s, and nearly 40% by the late 1990s. Although the growth rate of FDI slowed down in the 2000s, it still maintained an annual average growth rate of 15% between 2001 and 2007 (United Nations, various issues).

Such a significant expansion of foreign capital flows has captured the attention of both policymakers and researchers. According to standard growth theories, physical capital accumulation and technology improvement are two engines promoting economic growth (Solow 1956; Romer 1990; Aghion and Howitt 1992). This provides an extremely promising prediction about the impact of FDI on the economic growth in host countries, as FDI is typically considered to transfer both physical capital and intangible assets, such as better product design and better managerial skills. As a result, governments of many host countries, especially less developed countries (LDCs), have been trying to attract more inward FDI by providing incentives, such as tax breaks and low-interest loans, to MNCs. The United Nations (various issues) record that between 1991 and 1999, 974 FDI regulatory changes have been made in over 100 countries to attract inward FDI.

Although it is a theoretical appealing concept, the empirical evidence on the relationship between FDI and economic growth remain, at best, mixed (Blomstrom et al. 1994; Choe 2003; Blonigen and Wang 2005; Carkovic and Levine 2005). Recent research turns its attention toward whether FDI promotes economic growth given certain social and/or economic conditions. An influential study done by Borensztein et al. (1998) (hereafter, BDL (1998)), captures the positive effect of inward FDI on economic growth, given a sufficient level of secondary education in the host country. Using data on inward FDI in 69 LDCs over the period of 1970–1989, BDL (1998) find that FDI promotes the host country's economic growth only if the host country reaches a threshold level of human capital, measured by the average years of secondary schooling. The average years of secondary schooling in BDL (1998) is calculated based on the percentage of male population over the age of 25 who enrolled in secondary school and who completed secondary school. According to their estimation, host LDCs need to achieve 0.88 years of secondary schooling so that FDI can have a positive impact on economic growth. Their results are intuitive since education can increase labor productivity, increase the innovative capacity of an economy, and promote the creation of new technologies. In addition, education can also help the diffusion of knowledge in the economy. The authors point out that "… the main channel through which FDI contributes to economic growth is by stimulating technological progress" (p118). BDL's (1998) finding that there exists a complementarity between inward FDI and the level of education has been echoed and recognized by many other recent studies (Xu 2000; Zhang 2001; Durham 2004; Chang et al. 2009; Wang and Wong 2009).

In this study, we revisit BDL (1998) and explore the role of education quality in affecting the impact of FDI on the host country's economic growth. BDL (1998) focus on the quantity of education and do not control for the differences in the quality of education across countries. Arguably, one year of education does not create the same amount of acquired knowledge in different countries. A caveat in prior research on education and economic growth is that most studies focus on years of schooling and ignore the qualitative differences in pursuing knowledge (Hanushek and Woessmann 2007). This neglect is more severe for cross-sectional studies. As Hanushek and Woessmann (2007) study the role of education on economic growth and find that quality of education (measured by cognitive skills of the population), rather than simple school attainment, is positively and robustly related to economic growth (See also Hanushek and Kimko 2000; Bosworth and Collins 2003).

Using the data from BDL (1998), we find that education quality does impose a significant impact on economic growth. We construct two education quality indices for each country in the sample, one based on country *i*'s teacher-pupil ratio relative to the U.S.' teacher-pupil ratio and the other one based on country *i*'s government spending on secondary education relative to the education spending in the U.S. We then multiply the years of schooling data in BDL (1998) by these education quality indices, which help to make the quality of education in a specific country comparable to the quality of education in the U.S. For example, two years of secondary education in a foreign country can be equivalent to one year of secondary education in the U.S. after adjusting for the difference in education quality. We find that in our study, a host country still needs to reach a threshold level of schooling for FDI to have a positive impact on economic growth. However, our threshold level of quality-adjusted-secondary-education is lower than the threshold level of schooling established by BDL (1998). Our results suggest that if the quality of education in LDCs can be improved, it will not take an average of 0.88 years of secondary education for the country to benefit from inward FDI. With improved quality, the necessary years of schooling needed are shorter, 0.58 years based on the teacher-pupil ratio adjusted schooling. Without controlling for the education quality, for host countries with an average years of secondary schooling of 0.9 (sample mean), a one percentage point increase in inward FDI as a share of GDP increases the economic growth rate by 0.07 percentage points. After adjusting the education quality based on teacher-pupil ratio, a one percentage point increase in inward FDI as a share of GDP will increase per capita GDP growth by 1.04 percentage points for a host country with an average years of secondary education of 0.9. Our findings provide strong support for LDCs to improve the quality of education, instead of just trying to increase the quantity of education.

The rest of our paper is organized as follows: the next section presents empirical specification and data, followed by a discussion of the econometric results. Conclusions are offered in the final section.

Empirical Specification and Data

We follow closely the empirical specification in BDL (1998) so that our results are comparable to previous studies. Data on variables in our study are all obtained from BDL (1998). BDL (1998) use the average years of secondary schooling in male population over the age of 25 as their measure of human capital. For example, suppose only 10% of the male population above 25 years of age attended secondary school. Out of this group, 80% of them completed 6 years of secondary school and the rest went through 3 years of secondary school. As a result, the average years of secondary schooling is calculated as: $0.1 * (6 * 0.8 + 3 * 0.2) + 0.9 * 0 = 0.54$.[1] We construct our education quality indices and calculate quality adjusted schooling based on these indices. Our sample includes 69 countries and all variables are averaged over two decades: 1970–1979 and 1980–1989, as in BDL (1998). A list of countries in our sample and the average years of schooling measures for each country can be found in the Appendix.

Education Quality Index

To be consistent with BDL (1998), which employs average years of secondary schooling, we focus on two main measures of quality of secondary education: average pupil-teacher ratio (*PTR*) in secondary schools and real government spending on secondary education per pupil (*GSE*). The *GSE* is measured in purchasing-power-parity-adjusted 1985 international dollars. Both our education quality measures are obtained from Lee and Barro (2001).

Typically, in a very crowded classroom, it can be quite difficult for students to follow the course and teachers are not able to dedicate adequate time to individual students for their personal needs. So a high number of students per teacher in a classroom may reduce the quality of education. Another important indicator of school resources, which can influence students' achievements, is government spending on education per pupil. Lee and Barro (2001, p469) point out, government spending on education is expected to have a positive impact on education quality as "educational expenditure provide(s) students with more plentiful school resources, notably instructional materials."

We construct two education quality indices by measuring each country *i*'s education quality relative to the quality of education in the U.S.: (1) Pupil-Teacher Ratio Index (*PTRI*), and (2) Government Education Spending Index (*GSEI*). To be more specific, we calculate two indices as follows:

$$PTRI_i = \frac{PTR_{US}}{PTR_i}$$

and:

$$GSEI_i = \frac{GSE_i}{GSE_{US}}$$

where PTR_{US} and GES_{US} represent the pupil-teacher ratio and government spending on secondary education per pupil in the U.S., respectively. Similarly, PTR_i and GSE_i represent these two measures in country i. Given the way these indices are constructed, an index larger than one suggests that country i has a better quality in secondary education than the U.S. For instance, country i can have a smaller pupil-teacher ratio than the U.S., or country i can have a larger real government spending per pupil than the U.S. to obtain an index larger than one. An index smaller than one suggests that the secondary education in country i is not as high of quality as in the U.S.

We then adjust the original quantity of schooling in BDL (1998) by our education quality indices to make the quality of secondary education in the 69 countries more comparable to each other and also more comparable to the quality of education in the U.S. We obtain a standardized measure of secondary schooling in country i ($StdSchool_i$) by multiplying the years of secondary schooling from BDL (1998) ($Schooling_i$) with the education quality index:

$$StdSchool_i^{index} = Schooling_i \times Index_i,$$

where $Index_i \in \{PTRI_i, GEEI_i\}$. For example, according to Lee and Barro (2001), Zimbabwe, in 1985 had a pupil-teacher ratio of 27.8 in secondary schools, or $PTR_{Zimbabwe} = 27.8$. The pupil-teacher ratio in the U.S. in 1985 was 13.4, which is 51.8% lower than that in Zimbabwe. The *pupil-teacher ratio* quality index for Zimbabwe in 1985 is: $PTRI_{Zimbabwe} = \frac{PTR_{US}}{PTR_{Zimbabwe}} = \frac{13.4}{27.8} = 0.48$. Lee and Barro (2001) record that Zimbabwe had an average male secondary schooling of 0.644 years in 1985, that is, $Schooling_{Zimbabwe} = 0.644$. As a result, the adjusted secondary schooling for Zimbabwe is $StdSchool_{Zimbabwe}^{PTRI} = Schooling_{Zimbabwe} \times PTRI_{Zimbabwe} = 0.644 \times 0.48 = 0.3$ years of U.S. standard secondary education. Based on the pupil-teacher ratio index, 0.644 years of secondary schooling in Zimbabwe is equivalent only to 0.3 years of secondary schooling in the U.S. in 1985, after taking into consideration education quality difference. Such a difference can be even more evident when we adopt the index based on government spending on secondary education per pupil (*GEEI*). The government spending per pupil index for Zimbabwe is $GEEI_{Zimbabwe} = 0.113$ in 1985. The government-spending adjusted schooling in Zimbabwe is even lower or $StdSchool_{Zimbabwe}^{GEEI} = 0.644 \times 0.113 = 0.07$ years of U.S. standard secondary schooling. In other words, 0.644 years of secondary schooling is only equivalent to 0.07 years of secondary schooling in the U.S.

Indices based on different quality measures create different adjusted years of schooling for the 69 LDCs in our sample. For robustness checks, we also estimate the model with three other education quality indices: one based on government expenditure per pupil relative to GDP per capita, one based on secondary school repetition rates, and the third one being an average of all four quality indices. Using different education quality indices does not change our main results qualitatively.[2] In addition, our main goal of this paper is to show the importance of considering education quality and recognize the distinction between the quantity and the quality of education. We will leave the task of finding which measure best represents the difference in quality of education across countries for future research.

Other Variables and Estimation Technique

Our model specification is as follows:

$$growth_{it} = \beta_0 + \beta_{FDI} FDI_{it} + \beta_{FDI \times StdSchool}(FDI \times StdSchool)_{it} + \beta_{StdSchool} + StdSchool_{it} + \delta_Z' Z + \varepsilon_{it},$$

where: i and t are country and time subscripts, respectively; *growth* represents the per capita real GDP growth; *FDI* measures inward FDI inflows as a share of the host country's GDP; and *StdSchool* is average years of secondary schooling in male population standardized by the education quality indices. **Z** is a vector

of other control variables with expected signs in parentheses: log value of initial GDP (−), government consumption (−), black market premium (−), inflation rate (−), financial depth (+), Political Rights (1 being best and 7 being worst) (−), number of assassinations during the sample period (−), and number of wars during the sample period (−). Geographical dummies are also included in the model. Summary Statistics of variables included in our regressions are provided in the Appendix.

Our variable of interest is the interaction between FDI and schooling ($FDI \times StdSchool$). The coefficient β_{FDI} represents the direct impact of FDI on economic growth. If there is any complementarity between FDI and schooling, the coefficient on the interaction, $\beta_{FDI \times StdSchool}$, should be positive and significant as shown in BDL (1998).

We follow BDL (1998) by estimating the model with seemingly unrelated regression (SUR) technique. Two regressions are estimated simultaneously (the first regression including variables over the period of 1970–1979 and the second regression including variables over the period of 1980–1989) and we constrain the coefficients in each regression to be equal across the two decades except the constant. The SUR technique allows unobserved factors to affect economic growth in both the 1970s and the 1980s. This technique is commonly used in the literature of economic growth (See also Barro and Lee 1993; Barro 1997).

Empirical Results

SUR Results

For the purpose of comparison, we first replicate the results in BDL (1998) and present the results in column one in Table 1. We then adopt our quality adjusted schooling data and present estimated results in columns two and three in Table 1. Column two presents SUR results with schooling adjusted by the pupil-teacher ratio quality index and column three reports the results, with schooling adjusted by government spending on secondary education per pupil index.

Table 1 The effects of FDI and education on economic growth

	Regression Number		
	1.1	**1.2**	**1.3**
	BDL (1998)	**Schooling adjusted by teacher to pupil ratio**	**Schooling adjusted by government education expenditure**
Log (Initial GDP)	−0.01072**	−0.00877*	−0.00095
	[0.00438]	[0.00463]	[0.00529]
Schooling	0.00397		
	[0.00428]		
StdSchool		0.00163	−0.01526
		[0.00425]	[0.01153]
Government consumption	−0.07295**	−0.07742**	−0.06685*
	[0.03468]	[0.03683]	[0.03908]
Log (1+Black Mkt Premium)	−0.00893*	−0.00779	−0.01102*
	[0.00523]	[0.00548]	[0.00616]
FDI	−3.54960***	−1.93557*	−3.83831***
	[1.34191]	[1.04462]	[1.16505]
FDI × Schooling	4.02470***	3.31406**	13.59800***
	[1.26062]	[1.29112]	[3.65839]
African dummy	−0.01487**	−0.01851**	−0.01464*
	[0.00717]	[0.00733]	[0.00819]

Latin American dummy	−0.01789***	−0.02151***	−0.02197***
	[0.00691]	[0.00721]	[0.00733]
Assassinations	−0.00838	−0.00868	−0.022
	[0.01267]	[0.01307]	[0.01513]
Wars	−0.0042	−0.00385	0.00219
	[0.00591]	[0.00618]	[0.00630]
Political rights (1B,7 W)	−0.00330**	−0.00340**	−0.00186
	[0.00141]	[0.00150]	[0.00143]
Financial depth	0.0054	−0.00388	−0.00035
	[0.01261]	[0.01365]	[0.01286]
Inflation	−0.00941	−0.01582*	−0.01810**
	[0.00883]	[0.00961]	[0.00836]
Constant	0.14600***	0.13739***	0.07902*
	[0.03389]	[0.03636]	[0.04037]
Observations	61	58	48
R-squared	0.3954	0.3817	0.4481
Education Threshold	0.88195	0.58404	0.28227
No. Countries > Threshold	29	21	9

Standard errors in brackets *** $p<0.01$, ** $p<0.05$, * $p<0.1$

In general, we find that our estimated results are similar to the results in BDL (1998). The estimated coefficient on the stand-alone FDI variable has a negative and significant coefficient. The interaction between FDI and schooling (adjusted for quality of education) has a positive coefficient, which is significant in all regressions. The results suggest that there exists a complementarity between FDI and schooling in the host country. In other words, FDI itself may not necessarily promote economic growth in the host country. Instead, the host country needs to obtain a certain level of human capital to benefit from inward FDI. For instance, based on regression 1.2 specification, the total effect of FDI on the economic growth is $\beta_{FDI} + \beta_{FDI \times StdSchool} \times StdSchool$. The estimated coefficient on FDI is negative and significant (-1.936) and the estimated coefficient on the interaction is positive and significant at the 5% level (3.314). As a result, the threshold level of schooling for FDI to have a positive effect on economic growth is $\frac{1.936}{3.314} =$ 0.584 years.

We also find that in our study, the threshold level of schooling is lower than that calculated in BDL (1998). As mentioned previously, adjusting for the quality of education in LDCs in our sample by the pupil-teacher ratio index, the threshold level of secondary schooling is 0.58 years. In other words, FDI tends to promote economic growth in a host country if, on average, male population in the host country can obtain a 0.58 years of secondary education. Twenty-one countries in our sample satisfy this threshold in both 1970–1979 and 1980–1989. In contrast, the threshold level in BDL (1998) shown in regression 1.1, which is based only on the quantity of education, is 0.88 years of secondary schooling. After taking into consideration the education quality, our threshold level is 34% lower than the BDL threshold. Similarly, the threshold level of secondary schooling based on our results in regression 1.3 is 0.28 years (with 9 countries satisfying the threshold), again lower than BDL's estimate of 0.88 years.

Our results are consistent with prior research, which recognizes the significance of education quality in terms of the impact of education on economic growth (Hanushek and Kimko 2000; Bosworth and Collins 2003; Hanushek and Woessmann 2007). Hanushek and Kimko (2000) construct an education quality index based on scores of international tests of academic performance in mathematics and science over 1965–1991 for 38 countries and then extend the education quality measure to 87 countries. The authors find that the quality of education has a significantly positive effect on per capita GDP. Similar results on the relationship between quality of education and economic growth can also be found in

Bosworth and Collins (2003) and Hanushek and Woessmann (2007). Although our study does not directly show that the quality of education is more or less important than the quantity of education, it does show that quality is an important modifier of the impact of quantity on the contribution of FDI to economic growth. In other words, if LDCs can improve their quality of education to a level similar to the quality of education in the U.S., then it takes, for example, 0.58 years of secondary schooling for FDI to have a positive impact on economic growth instead of 0.88 years. Regression 1.1 indicates that a one percentage increase in inward FDI as a share of GDP increases per capita GDP growth by 0.07 percentage points for a country with 0.9 years of secondary schooling (sample mean over 1980–1989). However, after controlling for the quality of education, regression 1.2 suggests that if a host country still obtains 0.9 years of secondary schooling, a one percentage point increase in FDI will increase the economic growth rate by 1.04 percentage points, holding other things constant. Consequently, to benefit from inward FDI, LDCs should also improve the quality of education when possible, rather than focusing on mere school attainment.

Control for Endogeneity

Another concern typically associated with FDI and economic growth studies is the potential problem of endogeneity. In general, inward FDI may promote faster economic growth in the host country. At the same time, a country with a good growth performance can also attract more investments by MNCs. BDL (1998) adopt three-stage least squares (3SLS) to control for the potential endogeneity problem in the SUR system. We use the same instruments as in BDL (1998), which are lagged values of FDI, the log value of GDP, log value of land area, geographical dummies for East Asia and South Asia, measures of political stability and quality of institutions, and other control variables in the regression. The 3SLS results can be found in Table 2. For the purpose of brevity, we only report the 3SLS estimated coefficients on *StdSchool*, *FDI*, and *FDI* × *StdSchool*, with the estimated coefficients on other variables available upon request.

Table 2 The effects of FDI and education quality on economic growth (3SLS)

	2.1	**2.2**
	Schooling adjusted by teacher to pupil ratio	**Schooling adjusted by government education expenditure**
StdSchool	0.00175	−0.01613
	[0.00424]	[0.01177]
FDI	−1.94438*	−3.89041***
	[1.03935]	[1.16031]
FDI × StdSchool	3.29817**	13.79941***
	[1.28067]	[3.66105]
Standardized Education Threshold	0.5895	0.28193
No. Countries > Threshold	21	9

Standard errors in brackets *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

The 3SLS results are qualitatively similar to regular SUR results. The threshold level of schooling is similar under 3SLS to the threshold estimation under regular SUR. Under 3SLS, our estimated threshold level of secondary schooling is 0.59 (schooling adjusted by pupil–teacher ratio) and 0.28 (schooling adjusted by government spending ratio). BDL (1998) obtain a higher threshold level of schooling after controlling for the potential endogeneity problem. Their threshold level of schooling is 1.43 years under 3SLS, compared to 0.88 years under regular SUR. But again, after controlling for endogeneity, our threshold estimates are lower than those in BDL (1998) under 3SLS.

Conclusions

In this paper, we further explore the complementarity between inward FDI and schooling in the host country. An influential study by BDL (1998) argues that inward FDI can promote the host country's economic growth only when the country obtains a sufficient level (or a threshold level) of average years of secondary schooling, calculated based on percentage of male population over the age of 25 enrolled in and

completed secondary school. Their estimated threshold of schooling is 0.88 years, with 29 countries in their sample exceeding the threshold. In our study, we focus on the distinction between the quantity of education and the quality of education and adjust the quantity of schooling by different education quality indices, which makes the education quality in LDCs more comparable to each other and more comparable to the education quality in the U.S.

Using quality of education data from Lee and Barro (2001), we construct two education quality indices, one based on pupil–teacher ratio in secondary schools and the other one based on government spending on secondary education per pupil. Adjusting the quantity of schooling data from BDL (1998) by these education quality indices, we find that the threshold level of schooling needed for FDI to have a positive impact on the host country's economic growth is lower in our estimation than that in BDL (1998). For example, our estimated threshold level of schooling is 0.58 years controlling for the pupil–teacher ratio. In our sample, 21 economies obtain a human capital measure exceeding this threshold. The results suggest that if LDCs can improve the quality of education, then it does not take as long as an average of 0.88 years of schooling (BDL's threshold) for FDI to have a positive impact on growth. With an improved quality, the necessary years of schooling needed are 0.58 years. In addition, with an improved quality of education, the total impact of FDI on host country's economic growth is stronger in our study than in BDL (1998) when the host country reaches the threshold level of human capital.

Our results help to extend the current understanding of the relationship between FDI, human capital, and economic growth. However, our study does not necessarily provide comparison between different measures of quality of education. More needs to be done in the future to explore which measure best represents the difference in quality of education across countries.

Footnotes

1. In BDL (1998), a complete cycle of secondary school takes 6 years.
2. Regression results using other education quality indices are not reported, but available upon request.

Appendix

Tables 3 and 4

Table 3 Countries included and average years of schooling

Country	Secondary Schooling (BDL, 1998)		Secondary Schooling (adjusted by Pupil–Teacher Ratio)		Secondary Schooling (adjusted by Govt Spending Index)	
	1970–1979	1980–1989	1970–1979	1980–1989	1970–1979	1980–1989
Algeria	0.22	0.41	0.18	0.23	0.17	0.07
Argentina	0.89	1.09	2.25	1.94	0.39	0.16
Bangladesh	0.41	0.76	0.32	0.40		0.03
Barbados	3.68	2.16	3.58	1.35	2.47	
Benin	0.11	0.16	0.07	0.06	0.06	0.02
Bolivia	1.51	1.48	1.70	0.86	0.62	0.14
Botswana	0.16	0.25	0.19	0.17	0.09	0.08
Brazil	0.71	0.74	0.97	0.69	0.36	0.11
Cameroon	0.39	0.41	0.28	0.19	0.15	0.04
Central African Republic	0.16	0.19	0.10	0.04	0.07	0.01
Chile	1.03	1.58	1.35	1.18	0.32	0.23
Colombia	0.70	1.18	0.72	0.78	0.07	0.08
Congo, Dem. Rep.(Zaire)	0.08	0.21	0.07	0.14	0.01	0.00
Congo, Rep.	0.66	0.85	0.33	0.32	0.31	0.06
Costa Rica	0.46	0.86	0.45	0.65	0.23	0.16
Cyprus	1.64	2.27	1.51	1.99	0.73	0.83

Dominican Republic	0.51	0.64	0.38	0.23	0.07	0.02
Ecuador	0.51	1.24	0.64	1.03	0.19	0.13
El Salvador	0.31	0.45	0.27	0.26	0.06	
Gambia, The	0.28	0.36	0.27	0.26	0.05	0.02
Ghana	1.31	1.13	1.27	0.73	0.56	0.03
Greece	0.89	1.73	0.53	1.34	0.22	0.36
Guatemala	0.21	0.41	0.26	0.35	0.05	0.02
Guyana	0.44	0.78	0.36	0.42	0.07	0.06
Haiti	0.28	0.48	0.31	0.31	0.02	0.01
Honduras	0.26	0.44	0.31	0.22	0.05	0.02
Hong Kong, China	2.21	2.84	1.81	1.44	0.61	0.72
India	0.38	1.08	0.35	0.77	0.05	0.04
Indonesia	0.37	0.67	0.43	0.60	0.0	
Iran, Islamic Rep.	0.42	1.02	0.26	0.92	0.18	
Israel	1.69	2.20	3.25	4.57	1.88	1.49
Jamaica	0.47	0.71	0.30	0.31	0.16	0.07
Jordan	0.82	1.38	0.70	0.98	0.17	0.11
Kenya	0.25	0.62	0.21	0.37	0.09	0.05
Korea, Rep.	1.92	2.92	0.99	1.07	0.18	0.27
Lesotho	0.09	0.22	0.08	0.15	0.05	0.05
Malawi	0.03	0.16	0.03	0.10	0.02	0.03
Malaysia	0.88	1.76	0.63	1.06	0.30	0.39
Mali	0.01	0.06	0.01	0.06	0.01	0.01
Malta	0.99	1.17	1.35	1.32	0.36	0.29
Mauritius	0.57	1.04	0.39	0.61	0.13	0.19
Mexico	0.79	0.78	0.94	0.60	0.32	0.09
Mozambique	0.01	0.06	0.01	0.02		
Myanmar	0.44	0.62	0.24	0.31	0.05	
Niger	0.08	0.08	0.07	0.04	0.07	
Pakistan	1.06	1.15	1.06	0.86		
Papua New Guinea	0.13	0.27	0.11	0.16	0.11	
Paraguay	0.70	0.97	1.33	0.07		
Peru	0.90	1.60	0.83	0.95	0.25	0.08
Philippines	0.90	1.23	0.53	0.50	0.02	0.02
Rwanda	0.14	0.14	0.18	0.13	0.09	0.02
Senegal	0.16	0.36	0.11	0.20	0.12	0.07
Sierra Leone	0.33	0.56	0.31	0.28	0.11	
Singapore	1.48	1.08	1.30	0.70	0.51	0.31
Sri Lanka	2.09	1.93	2.16		0.21	
Swaziland	0.13	0.22	0.12	0.16	0.09	0.04
Syrian Arab Republic	0.43	1.18	0.39	0.92	0.11	0.13
Taiwan, China	1.58	2.09	1.17	1.22	0.31	0.30
Thailand	0.35	0.57	0.31	0.35	0.07	0.04
Togo	0.08	0.76	0.05	0.39	0.01	0.05
Trinidad and Tobago	0.89	1.50	0.51	1.00	0.85	0.76
Tunisia	0.37	0.78	0.28	0.55	0.29	0.17
Turkey	0.55	0.85	0.40	0.56	0.37	0.06
Uganda	0.08	0.10	0.07	0.06		
Uruguay	0.88	1.31	1.30			0.18
Venezuela	0.62	1.24	0.64	0.96	0.58	0.32

Yemen, Rep.	0.06	0.08	0.05	0.06	0.05	0.07
Zambia	0.33	0.59	0.30	0.36	0.18	0.07
Zimbabwe	0.19	0.26	0.19	0.15	0.19	0.07
Average	0.65	0.91	0.64	0.64	0.26	0.17
Maximum	3.68	2.92	3.58	4.57	2.47	1.49
Minimum	0.01	0.06	0.01	0.02	0.01	0.00
Standard Deviation	0.64	0.67	0.72	0.68	0.40	0.26

Table 4 Summary of statistics

Variable	**Years 1970–1979**					**Years 1980–1989**				
	Obs	**Mean**	**Std Dev.**	**Min.**	**Max.**	**Obs**	**Mean**	**Std Dev.**	**Min.**	**Max**
Growth Rate	69	0.026	0.030	−0.049	0.086	69	0.003	0.028	−0.056	0.076
Log (Initial GDP)	69	7.335	0.728	5.958	8.937	69	7.596	0.811	6.107	9.327
Government Consumption	69	0.174	0.077	0.060	0.365	69	0.183	0.069	0.057	0.344
Log (1 + Black Mkt Premium)	69	0.253	0.367	−0.004	1.673	69	0.340	0.481	−0.006	2.709
FDI	69	0.003	0.004	−0.002	0.026	69	0.002	0.005	−0.004	0.039
Assassinations	69	0.046	0.112	0.000	0.654	69	0.060	0.223	0.000	1.351
Wars	69	0.246	0.434	0.000	1.000	69	0.319	0.469	0.000	1.000
Political Rights	69	4.610	1.815	1.000	7.000	69	4.106	1.830	1.000	7.000
Financial Depth	69	0.319	0.220	0.104	1.586	69	0.394	0.256	0.124	1.327
Inflation	69	0.155	0.141	0.057	0.834	69	0.237	0.339	0.021	1.682
pt-ratio index	69	0.964	0.339	0.503	2.527	66	0.677	0.280	0.213	2.077
govt index	64	0.420	0.265	0.027	1.114	56	0.160	0.150	0.014	0.821
Secondary Schooling	69	0.647	0.644	0.010	3.680	69	0.905	0.671	0.060	2.920
Secondary Schooling(adjusted by pupil–teacher-ratio index)	64	0.644	0.719	0.011	3.576	66	0.635	0.675	0.023	4.569
Secondary Schooling (adjusted by government spending index)	64	0.261	0.399	0.006	2.475	56	0.165	0.255	0.005	1.495

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