



Economic Growth, Economic Freedom, and Corruption: Evidence from Panel Data

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Abstract

Economic Freedom is considered to be conducive to growth while corruption is mostly found to be anti-growth. A related question could be whether Economic Freedom reduces the possible adverse effect of corruption on economic growth. Moreover, how are corruption and growth possibly affected by the major components of Economic Freedom? For example, a major element of economic freedom is Size of the Government which consists of taxes, among others. Income tax is considered as a levy on agent's incentive to productive activity by reducing an agent's property right. However, if revenue collected from taxes is used by the government in productive sectors then the adverse effect of taxes might decrease. On the other hand, negative effect of taxes on growth might be accentuated by higher degree of corruption. This paper examines the effects of corruption, economic freedom and its major components and their possible cross effects with corruption on economic growth. By using cross-country data and a panel estimation procedure it turned out that economic freedom was generally positively associated while corruption was negatively associated with growth though the result for the later is not robust. The influence on corruption seemed to decline in the presence of high degree of Economic Freedom. However, the findings were not as robust when components of Economic Freedom were considered separately.

Keywords: Economic Freedom, Economic Growth, Corruption, Size of Government, Sound Money, Legal System and Property Right.

Introduction

Some Asian economies grew much faster than economies of Africa or Latin America over last two/ three decades. During the period 1980-2006, while Singapore, HongKong, China and Korea grew at average rates of above 7%, some African countries had negative growth rates. Hence it is an issue of long debate among economists as to why some countries grow so fast while for other countries, growth performance is somewhat lackluster.

According to the simple neo-classical growth model¹, a country's growth depends, besides on exogenous technical change, on the savings (investment) rate and growth in labor force. However, in endogenous growth model, institutions can play a crucial role through the effects on human and physical capital². There is no denying the fact that a minimal state exists to provide public goods such as national defense, property rights, rule of law and individual freedom. Economic freedom thus does not mean freedom from any state intervention. The economic freedom index emphasizes two fundamental goals for the government. The first is to provide infrastructure for the operation of a market economy which includes secure property rights, enforcement of contracts and stable monetary regimes among other things. Second, the government should provide a few selected goods which have characteristics that make them difficult for private business to provide such as, national defense, police, environment etc.

Many empirical studies have found a positive relation between economic freedom and growth^{3,4}. Some of these studies have used one or two indicators of economic freedom while others have used different economic freedom indices. Different indices show similar results. However, a highly aggregated index makes it difficult to draw policy conclusions. It is therefore important to investigate which components of economic freedom indices are important for growth, and the direction of these effects. It is also important to examine whether a high degree of some measure can accentuate effects of other measures. In this paper, I therefore examine the effects of major components and their possible cross effects with corruption, on growth. A survey of previous empirical research is followed by data, model specification and methodology. Concluding remarks follow the reports and analyses of results.

Literature Review: There is a vast literature on growth and economic freedom. The association between liberty and development was examined⁴ by using economic freedom ratings⁵. However, it was found that economic freedom does not have a positive effect on growth⁶.

Since the economic freedom index⁷ consists of several categories of economic freedom, the empirical findings on the effects of each of these have been discussed here:

The size of the government: A certain minimum government size is essential to protect economic agents and their property.

However effect is ambiguous beyond that level. A negative association was found between government size and growth^{2,3,8}. In some other studies, any significant effect of government size on growth was not observed^{9,10}. Some studies concluded that the relation is not robust¹¹.

Legal structure and security of Private Ownership: This component is found to be positive and significant in empirical studies^{2, 8, 11, 12, 13}. It is widely believed that peoples' perceptions of organized crimes and corruption often lead to increased anxiety, vulnerability and hence loss of faith in the existing social infrastructure¹⁴. The fact that legal aid can ensure access to justice as well as enhance economic and social power is also widely emphasized¹⁵. Based on that, some authors argue that government policies can induce a sense of security effectively and hence augment economic empowerment¹⁶.

Access to Sound Money: A negative but insignificant relation was observed between restrictions on foreign bank accounts and growth⁹. A negative and significant relation was found between a high black market premium and growth^{3,11,13}. However the relation is mostly non-robust.

Freedom to trade internationally: No significant relation was observed between trade restrictions and growth⁹. Some other studies concluded some positive and non robust relations¹³.

Regulation of Credit, Labor, and Business: In certain contexts, the need for multinational companies being bound to participate in productive activities was asserted¹⁷. However, a significant negative relation was observed between this kind of restriction and growth^{9,18}.

There is a vast literature on the association between growth and corruption^{19, 20, 21, 22, 23}. Corruption is mostly found to be anti-growth, with a few exceptions. Some studies found a negative

relationship between corruption and real GDP per capita growth^{22,24}. These studies examine indirect relationships between corruption and growth such as how corruption lowers growth through investment. However, some studies concluded a positive direct relationship between growth and corruption²⁵. In countries with poor governance, it is observed that corruption helps to expand output²⁶.

Methodology

Data, Model and the Estimation Method: Data are mostly drawn from IFS CD-ROM²⁷. Data on Economic Freedom is drawn from Economic Freedom of the World: Annual Report⁷. Data for corruption index is drawn from Corruption Perception Index by Transparency International. The sample includes countries for the period, from 2007-2012 for 25 countries. Data definitions and sources have been elaborated in the Tables and figures section.

Model and Estimation Method: Based on neoclassical aggregate production and in line with recent development in the literature, the following basic model is considered:

$$GYPC_{it} = b_0 + b_1 (GPOP)_{it} + b_2 (I/Y)_{it} + b_3 \sum_j (FREE)_{jit} + b_4 (ED)_{it} + b_5 (LY_0)_{it} + C_{it} \quad (1)$$

where $GYPC_{it}$ is the growth rate of per capita GDP for i^{th} country in t^{th} year, $GPOP_{it}$ is the growth rate of population which is used as a proxy for the growth rate of the labor force. $(I/Y)_{it}$ is investment as a percentage of GDP. $(ED)_{it}$ is a proxy for human capital, $(LY_0)_{it}$ is the log of initial income and $(FREE)_{jit}$ is j th component of the freedom index. This model is common in literature and is usually estimated using cross-section data. Hence this is a good idea to start with this model to check whether most recent data conform the earlier findings.

Table-1
Data Definitions and Sources

Data	Definition	Source
Growth of per capita GDP GYPC	Annual Rate of growth of real GDP per capita from 2007 to 2012	IFS CD-ROM
Growth of Population GPOP	Annual rate of population growth from 2007 to 2012	IFS CD-ROM
Gross Investment I/Y	Gross domestic investment as percent of GDP from 2007 to 2012	IFS CD-ROM
Education* ED	Expected school life of population from 2007 to 2012	Education Statistics global country data, World Bank
Economic Freedom FREE	Summary rating for economic freedom from 2007 to 2012	Economic Freedom of the World: 2014: The Fraser Institute
Elements of Economic Freedom $FREE_i$ (Free1: Size of Govnment, Free2, Legal system and property right, Free3: Sound Money, Free:5: Regulation)	$FREE_i$ is the i th element of Economic Freedom from 2007 to 2012	Economic Freedom of the World: 2014: The Fraser Institute)
Corruption	Corruption Perception Index of the countries (index ranges from 10 to 0, 10 being least corrupt country and so on.	Transparency International

The key ingredients of economic freedom are personal choice, voluntary exchange coordinated by market, freedom to enter and compete in market, and protection of persons and their property from aggression by others. As mentioned earlier, taxes can be considered to reduce people's property right on their own earnings and also reduce productive incentives, I would like to examine whether the effects of taxes (here, the size of government, a component of EF) on growth is influenced by corruption apart from direct effect of corruption on growth. Hence, the following version of the model will be used:

$$GYPC_{it} = b_0 + b_1 (GPOP)_{it} + b_2 (I/Y)_{it} + b_{3j} \sum_j (FREE)_{jit} + b_5 CORR_{it} + b_6 (Gov)_{it} * CORR_{it} + b_7 (ED)_{it} + b_8 (LY_0)_{it} + \epsilon_{it} \quad (2)$$

Where $(Gov)_{it}$ is the size of government, a component of Economic Freedom which consists of, among others, different taxes and CORR is the corruption index. Model (2) allows us to examine the direct effects of corruption, and the influence of corruption on the effect of government on growth, while controlling for other relevant variables. As cross-section analysis is common in the literature, I would like to start with this model and estimate the association of the variables of interest.

I then consider the following model

$$GYPC_{it} = b_0 + b_1 (GPOP)_{it} + b_2 (I/Y)_{it} + b_{3j} \sum_j (FREE)_{jit} + b_5 CORR_{it} + b_6 (Gov)_{it} * CORR_{it} + b_7 (ED)_{it} + b_8 (LY_0)_{it} + \sum_i d_i D_i + \sum_t e_t PD_t + \epsilon_{it} \quad (3)$$

Model (3) is estimated from pooled data to study the effect of the variables of interest after time-specific and country-specific fixed effects have been accounted for.

Other variants of model (3) with interaction terms such as Legal Structure and Security of Property Right and corruption etc. will be estimated because the effect of Legal Structure and Security of Property Right on growth might be influenced by corruption in the economy.

A comparison between the results of Model (2) and (3) may be useful in order to appreciate whether a panel estimation method, which is a better estimation procedure, can change the results significantly in this case.

Results and Discussion

Regression Results: I start with descriptive statistics to see the basic characteristics of the data series and their relationship with each other.

Table II (illustrated in the Tables and Figures section) shows the basic descriptive statistics of the variables used in the regression analysis. Skewness, Kurtosis and Jarque-Bera statistics show some non-normality in the data. However our sample size is quite large, 125. So we can resort to large sample properties.

Table III (illustrated in the Tables, Notes and Calculations section) shows positive correlations of economic growth with investment-output ratio, population growth and education and negative correlation with economic freedom and correlation. However, in no case the correlation coefficient is high (absolute value is always less than 0.078).

Table-2
Central Tendency

	Growth	I/Y	POP_GROW	FREEDOM	ED	COR
Mean	0.042121	0.168558	0.021259	5.380952	8.100671	92.79365
Median	0.037749	0.165417	0.020575	5.500000	8.700000	93.00000
Maximum	0.594301	0.480524	0.047035	6.800000	12.29653	133.0000
Minimum	-0.178423	0.021888	-0.003257	2.900000	2.153875	43.00000
Std. Dev.	0.093939	0.080977	0.009076	0.790920	2.329781	14.21904
Skewness	2.071310	0.794882	-0.001724	-0.545765	-0.624265	-0.785055
Kurtosis	13.03345	4.501107	3.464146	3.271304	2.739732	5.540676
Jarque-Bera	613.7054	25.09852	1.131076	6.641490	8.471692	46.83148
Probability	0.000000	0.000004	0.568054	0.036126	0.014468	0.000000
Sum	5.265070	21.23831	2.678606	678.0000	1012.584	11692.00
Sum Sq. Dev.	1.094238	0.819659	0.010296	78.19429	673.0569	25272.63
Observations	125	125	125	125	125	125

Table-3
Correlation Matrix

	GROWTH	I/Y	POP_GROW	FREEDOM	ED	COR
GROWTH	1	0.058844509	0.075946155	-0.022428583	0.064477872	-0.05220295

Table-4
Dependent Variable: Growth Rate of GDP

Regressors	Coefficients (Model I)	(Model II)	(Model III)	(Model IV)	(Model V)
c	0.056 (0.0919)	0.053 (0.21)	-4.985** (2.163)	1.643* (0.811)	1.64** (0.73)
I/Y	0.107 (0.129)	-0.578 (0.358)	-0.529 (0.43)	-0.667** (0.397)	-0.667 (0.83)
GPOP	1.373 (1.03)	6.348** (2.651)	4.761** (1.761)	6.64** (2.75)	6.642* (2.31)
ED	0.004 (0.004)	0.006 (0.02)	-0.012 (0.018)	-0.001** (0.027)	-0.001 (0.022)
FREE	-0.01 (0.012)	0.006 (0.019)	0.077** (0.031)	-	-
FREE1	-	-	-	-0.058 (0.0708)	-0.057** (0.015)
FREE2	-	-	-	-0.07 (0.068)	-0.07* (0.03)
FREE3	-	-	-	0.025 (0.04)	0.03 ** (0.009)
FREE5	-	-	-	-0.21* (0.122)	-0.215** (0.08)
COR	-0.0003 (0.0006)	-0.0007 (0.0014)	-0.005** (0.002)	-0.019** (0.008)	-0.018** (0.007)
FREE*COR	-	-	-0.005** (0.0003)	-	-
FREE1*COR	-	-	-	0.001 (0.001)	0.0005** (0.0002)
FREE2*COR	-	-	-	0.001 (0.0008)	0.001** (0.0003)
FREE3*COR	-	-	-	-0.0004 (0.0005)	-0.000404** (0.0001)
FREE5*COR	-	-	-	0.0025* (0.0014)	0.0025** (0.0011)
Country fixed effect	NO	NO	YES	YES	YES
period fixed effects	NO	NO	YES	NO	YES
R ²	0.02	.28	0.42	0.31	0.33
F	0.63	1.21	2.12	1.96	2.88
Figures in parenthesis are standard errors on estimates, * indicates significant at 10% and ** indicates significant at 5%					

Investment-GDP ratio variable has expected positive sign in the pooled model (model-I). However the coefficient is not statistically significant. However, the variable turns out to be negative while both cross section and period fixed effects are considered (model II). The coefficient is marginally insignificant at 10% level. The coefficient retains its negative sign when interaction term between freedom and corruption is considered (model III). However, it is now not significant at any reasonable level. The variable retains its perverted negative sign when the components of economic freedom and their interaction

with corruption are considered (when both with ordinary and White's heteroscedasticity consistent standard errors are considered) (model IV and V).

Growth rate of Population variable has positive but insignificant influence on growth in pooled model. However, it becomes positive and significant in model II (with both fixed effects). The variable remains positive and significant in all other model with fixed effect and with interaction term. The variable is also economically significant. For example, 1 percentage point

increase in population growth raises growth rate of GDP by 6.34 percentage point in model III.

Education variable has positive sign in both pooled regression (model I) and panel estimation (model II). However, it is not statistically significant. The sign becomes negative in model III (with corruption and freedom interaction term and fixed effects). However, it is not significant. The variable is negative and insignificant in rest of the models too. One reason could be the possibility of reverse causality. As the variable is defined as expected school life, there is a chance that growth may affect this right hand variable.

Economic Freedom variable has negative sign in both pooled regression (model I) and panel estimation (model II). However, it is not statistically significant. The sign becomes positive in model III (with corruption and freedom interaction term and fixed effects). The coefficient is both statistically and economically significant. 1 percent increase in economic freedom index increases growth rate by 7 percentage point.

Corruption variable is negative in all models. However, the coefficient is insignificant in all models except for model III (where corruption and freedom interaction term, and fixed effects are considered).

Discussion

Corruption and Freedom Interaction Term is negative and statistically significant which implies that the positive effect of economic freedom on economic growth reduces with corruption.

Corruption and Freedom Component1 has a positive sign, though not significant in model IV (where ordinary standard error is considered). However, it becomes positive and statistically significant in model V (where White's heteroscedasticity consistent standard errors are considered) which is contrary to our expectation. Interaction terms of corruption and economic freedom components 2 and 5 also have the same positive sign and statistically significant in model V. So the same explanation applies. However, one alternative explanation of the interaction term might be that with same level of corruption, higher economic freedom may reduce the negative effect of corruption on growth. However, Corruption and Freedom Component3 has a negative sign, though not significant in model IV (where ordinary standard error is considered). It becomes positive and statistically significant in model V (where White's heteroscedasticity consistent standard errors are considered) which conforms or expectation that higher corruption reduces the positive influence of freedom on economic growth.

Conclusion

A panel estimation procedure shows. that investment variable fails to show any robust effect on growth, growth rate of

population (labor force) exerts a positive association with economic growth. The association is mostly robust. Education variable shows mostly perverted negative sign which might be due to reverse causality.

Economic Freedom variable seems to be positively associated with economic growth.

Corruption variable seems to be negatively associated with economic growth, though not robust which is in line with literature where the findings regarding the influence of corruption on economic growth is mixed.

Corruption and economic freedom interaction terms show negative influences on growth. Hence, there is an indication that economic freedom might reduce the negative effect of corruption on economic growth.

Implications: The interaction terms between corruption and components of economic freedom show mixed results. The components of the Economic Freedom might be correlated with each other that may lead to insignificant coefficient and imprecise estimates. There might be feedback from growth to the right hand variables. So the result should be interpreted with caution. There might be omitted variable problem. At least one crucial variable (initial income) is omitted due to lack of variability in the variable. Hence the results should be interpreted with caution.

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