Managing Risk in Africa Through Institutional Reform

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Abstract African economies have experienced weak levels of growth in per capita income over the past decade. While standard models of growth suggest institutional governance as one key to success, thus far little attention has been given to the role of risk in institutional reform. In this paper, we use a nested panel regression model to estimate the economic value of institutional reform on economic growth, with data for 30 Sub-Saharan African countries from 1980–2004. Our findings provide a basis for measuring the economic value of institutional reform through its impact on reducing aggregate country risk.

Keywords Aggregate country risk · Economics of institutions · Africa

JEL Codes O10 · O50 · P00

Introduction

By almost any measure, African countries, thus far, have enjoyed limited benefits from the expansion of globalization in the last few decades.[1] With relatively open economies, many have undertaken major structural reforms that have shifted emphasis from public to private market forces. As they have done so, debt service ratios have fallen to among the lowest among developing country regions. Yet, despite these reforms, the results have been disappointing: real per capita gross

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domestic product (GDP) has grown at less than 1% per year and Africa's per capita GDP has fallen from just under a third to little over a fifth of the world average.[2] In this paper, we explore the role of aggregate risk as a major factor in shaping Africa's development prospects and how institutional innovation is a necessary step to achieve sustainable economic growth.

Institutional Models of Growth and Development

For some time, research on developing and newly emerging market economies has been driven by estimating required investment levels to achieve sustainable economic growth. If domestic rates of saving or trade have been insufficient, international aid would fill in the gap. However, while studies, such as Sachs (2005) and Burnside and Dollar (2000), suggest that aid can be effective, Easterly and colleagues (2001, 2002, 2003, 2006), Barro (1997), and Rajan and Subramanian (2006a, b) provide evidence that aid has been counterproductive. As the debate on international aid has unfolded (Kanbur 2000), it has led, in turn, to a more critical view of the role of traditional economic reform, be that international trade, foreign direct investment, or privatization.[3] Shirley (2005) finds that aid can redirect economic reform, but efforts thus far have produced limited results, in no small part, due to the neglect of property rights in crafting institutional design. In turn, Zagha et al. (2006) find that financial stability is a key ingredient in successful economic reform, thus highlighting the importance of governance in achieving economic efficiency.

If the efficiency of investment varies widely across countries and over time, governance is a key factor in explaining variations. Research on governance is broad, but embraces a number of themes, including the importance of political stability, corruption, democracy, and property rights. Bates (2001, 2004, 2005), and Herbst (2000) have examined the role of political stability in achieving economic growth and find a direct relationship. In turn, Olken (2005), Fisman and Gatti (2002), Mauro (1995), and Shleifer (1993) have examined the impact of corruption on economic efficiency. While corruption is difficult to measure, the Corruption Perceptions Index, which monitors perceptions through direct interviews, has made it possible to examine the effects of corruption in a variety of countries.[4] Moreover, as noted in Englebert (2001), corruption undermines the legitimacy of states to maintain even the most basic levels of security.

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[2] Using the World Development Indicators database of the World Bank, Sub-Saharan African countries were, on average for the 1990–2005 period, at least 30% more open to international trade and investment than for the world group of countries as a whole. The only areas with greater openness were the East Asia and Pacific countries, and countries in the Middle East and North Africa. Yet during the same time period, East Asian and Pacific countries grew at just under 7% per year. One result is that Sub-Saharan Africa's share of world exports has fallen, even as absolute export levels have grown.

[3] Some of this discussion has turned on the Washington Consensus of reform, in which privatization and free trade form the focus of reform efforts by the International Monetary Fund and the World Bank, among other institutions. Hausmann, Rodrik, and Velasco (2004) provide a critical evaluation of the Washington Consensus and suggest that the sequence of reforms counts as much as their magnitude.

[4] http://www.cpi.de

Democracy is yet another element in affecting economic growth. It informs not just the level and direction of many public international aid programs but also shapes standard programs of economic reform. Boko (2002), Collier and Gunning (1999a, b), Knack and Keefer (1997, 1995), and Deng and Lyons (1998) find evidence that democracy is associated with transparency and good governance. However, the economic impact is less clear, as Barro (1997) argued in his review of the determinants of economic growth. Our view is that once risk is taken into consideration, the role of democracy is positive, but not as strong as other determinants, particularly economic freedom.

Economic freedom, in general, and property rights, in particular, play a critical role in institutional governance.[5] Acemoglu et al. (2001), Ensminger (1997), Fafchamps (1996), Bruce (1994), Place and Hazell (1993) provide evidence of the impact of property rights on economic growth, drawing on the institutional framework put forth in Williamson (1998, 1996) and North (1991). However, these studies do not measure how economic freedom and its determinants, such as property rights, reduce the level of risk and, in so doing, increase the level of per capita income. Indeed, it is precisely the absence of risk management institutions that lies at the center of such diverse critiques as those of Stiglitz (2003) and DeSoto (2000).

Factoring Risk in Economic Growth

Risk pervades all economic transactions. While financial markets work to incorporate risk in the pricing of contracts, for some types of risk, no contracting mechanism exists.[6] Moreover, even where financial markets do exist to incorporate risk, contract prices may be inefficient due to market imperfections. For many developing countries, the absence of a market or an imperfect market results in aggregate uncertainty, often with adverse effects on the levels and efficiency of investment, trade, and general economic performance. In our view, sustainable development thus depends not just on market institutions, but how institutional design permits a more efficient management of risk.

If risk is neglected in many studies, it is because it is not readily observable in the absence of efficient markets. Moreover, there are many kinds of risk that need to be considered, namely, economic risk, financial risk, political risk, and environmental risk.[7] In a fully functioning economic framework, these types of risk could be incorporated in various contracting mechanisms as a premium on transactions.

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[5] The index of economic freedom estimated by the Heritage Foundation and the *Wall Street Journal* provides a quantitative index that can be linked to democracy, risk, and other determinants of economic growth.

[6] At an aggregate level, country risk reflects not just financial risk, but also economic, political, and environmental risk. In this paper, we will focus on an aggregate country measure of risk to examine the role of institutional reform.

[7] Terrorism represents a variant of political risk and which has spawned a literature of its own. See, for example, Todd Sandler and Walter Enders (2005), *The Political Economy of Terrorism*. (New York: Cambridge University Press).

We consider first the extent to which risk has been addressed in the globalization and development literature and then offer our own formulation as to how it can be incorporated in a quantitative model. From this, we provide estimates of the impact of institutional reform on the level of aggregate country risk. In so doing, we provide a way of assessing the economic value of such reform, using a panel of 30 countries in Sub-Saharan Africa listed in "Appendix A".

Research on risk has focused largely on financial markets. Fafchamps et al. (1998) look at the precautionary motive as affecting livestock herds as a buffer against drought in West Africa. Grimard (1997) points to the role of ethnic ties in affecting household consumption smoothing patterns in Côte d'Ivoire and Ngassam (1992) examines monitoring costs on the selection of optimal financial contracts in that country as well.

Environmental risk arises when the air, soil, and water quality affects economic activity. In fully functioning markets, agents acquire insurance to protect against these risks. In some cases, institutions do not provide such coverage or the institutions do not exist. As such, we do not have a separable measure of the effects of environmental risk on economic growth, even though its presence may be significant.

Ideally, we would use complementary indices on political, economic, and environmental risk to estimate their respective effects on economic growth. Absent such data, we propose the use of a proxy measure, namely, an index of aggregate country risk prepared by the International Country Risk Group and as reported, periodically, by the World Bank.[8] To our knowledge, this index thus far has not been used in the context of institutional reform, but for which we derive useful findings in the context of Africa's economic growth prospects.

Estimating the Role of Risk in Growth

To examine the role of risk in economic growth, we use panel regression analysis. Panel regression models take the following general form:

$$Y_{it} = \alpha + \beta X_{it} + \varepsilon_{it}, \quad \text{for} \quad i = 1, 2, \ldots, N \quad \text{and} \quad t = 1, 2, \ldots, T \qquad (1)$$

where N is the number of cross-section units and T is the number of time periods.

Often, there are aggregation problems within panels, so we do not use a pooled regression model. Instead, we rely either on an ordinary panel regression estimate or on a fixed effects panel regression model. In a fixed effects model, dummy variables enable the intercept term to vary over time and over cross-section units. For a fixed effects model, we write:

$$Y_{it} = \alpha + \beta X_{it} + \gamma_2 W_{2t} + \gamma_3 W_{3t} + \ldots + \gamma_n W_{nt} + \delta_2 Z_{i2} + \delta_3 Z_{i3} + \ldots$$
$$+ \delta_T Z_{iT} + \varepsilon_{it.} \qquad (2)$$

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[8] The ICRG aggregate country risk index is scaled between 0 and 100, with higher values representing lower risk. We invert this scale to demonstrate the inverse relationship between the level of risk and per capita GDP. To distinguish our inverted scale we use RCCRISK rather than CCRISK.

where:

$$W_{it} = \begin{cases} 1 & \text{for the ith individual, } i = 2, \ldots, N \\ 0 & \text{otherwise} \end{cases}$$

$$Z_{it} = \begin{cases} 1 & \text{for the ith time period, } i = 2, \ldots, N \\ 0 & \text{otherwise} \end{cases}$$

As a first approximation, using a panel of 30 countries in Sub-Saharan Africa, we report simple growth regressions, including and excluding the International Country Risk Guide (ICRG) index of aggregate country risk for 1980–2004, in Table 1. The independent variables used are: the national saving rate (GNSGDP), the level of trade dependency (TRDEP), the market capitalization ratio (MKTCAPRATE), the foreign direct investment ratio (FDIGDP), and the index of aggregate country risk (RCCRISK). Definitions and sources used are listed in Appendix B Table 8.

Determinants of Aggregate Country Risk

As the estimates in Table 1 illustrate, per capita real GDP is higher when risk is taken into account, suggesting that how countries manage their level of risk can have significant consequences. If risk is a significant factor in per capita GDP, we now develop a model to examine its determinants. To do so, we use Development Indicators from the World Bank, along with data from the Heritage Foundation's Index of Economic Freedom, data on political rights and civil liberties from Freedom House, and cross-section information pertaining to contract formation from the World Bank's African Development Indicators.

Table 1 Sub-Saharan Africa Basic Growth Regressions

Dependent Variable:	PPP Real GDP Per Capita					
Constant	1608.842	1897.491	1612.915	1604.893	1607.098	1861.125
GNSGDP	7.656	4.951	7.363	7.310	6.863	5.244
	(10.758)	(6.269)	(10.430)	(10.050)	(9.328)	(6.739)
TRDEP	2.443	1.988	2.226	2.499	2.404	1.911
	(8.572)	(5.614)	(7.728)	(8.552)	(7.870)	(5.230)
MKTCAPRATE			1.080		0.736	0.855
			(1.761)		(1.182)	(1.3480)
FDIGDP				3.448	3.773	2.441
				(2.697)	(2.750)	(1.455)
RCCRISK		−4.923				−4.407
		(6.893)				(6.033)
Number of Observations	750	750	750	750	750	750
Adj. R-Sq.	0.9650	0.9702	0.9622	0.9643	0.9584	0.9702
F	667.85	764.32	597.21	632.62	524.41	718.01

Panel regression estimates are based fixed effects using cross-section weights. T-statistics are reported in parentheses

Table 2 Determinants of Aggregate Country Risk

Dependent Variable:	RCCRISK (Revised Country Composite Risk Index)				
Constant	43.873	33.116	40.470	44.597	50.609
AIDGNI	0.188	0.173	0.196	0.165	0.170
	(6.195)	(5.781)	(7.513)	(6.612)	(6.431)
CORRUPA		1.527	1.033	1.185	0.867
		(5.345)	(4.028)	(4.639)	(3.040)
DEMOC			−0.407	−0.348	−0.301
			(19.666)	(15.477)	(12.417)
ECFREE				−3.687	−3.064
				(5.532)	(4.188)
JUDIND					−1.143
					(4.710)
Number of Observations	750	750	750	750	750
Adj. R-Sq.	0.8691	0.8386	0.8916	0.8868	0.8389
F	4973.18	1947.34	2053.90	1468.00	781.15

Panel regression estimates are based on cross-section weights, no effects specified. T-statistics are reported in parentheses

When it comes to institutional variables, quantitative indices are inevitably synthetic ones. For this reason, we draw on a variety of sources for the ones we use in our present analysis.

As a first approximation, we derive panel estimates of the determinants of aggregate country risk, the results for which are presented in Table 2. As noted in our review, aid is seen as playing a negative role on per capita GDP. Our findings here point to aid as increasing risk, which in turn reduces per capita GDP.[9] Our purpose here is not to focus on the role of aid per se, but to note that in our expanded model, we focus on the negative impact that it has on aggregate country risk. This suggests that when aid is provided it often serves other purposes beyond those at the center of our study, namely its negative effect on real per capita GDP. This finding also is consistent with the notion that weakness in local financial institutions and the corresponding levels of risk that this weakness may produce are a central element in understanding Africa's growth dynamics and the importance of the choice of financial institutions in achieving sustainable economic growth. In contrast, we note from Table 2 that democracy, economic freedom, and judicial independence can reduce aggregate country risk, and these institutional variables form the focus of our nested panel model.

A Nested Regression Model of Risk-Based Growth

To sort out the roles of the various institutional variables reported in Table 2, we apply Granger causality tests to establish a hierarchy that can be used in an expanded

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[9] In separate regressions not reported here, we find that aid has no statistically significant effects on political rights, a slight positive effect on civil liberties, a slight negative effect on corruption, and no statistically significant effects on either economic freedom or market capitalization.
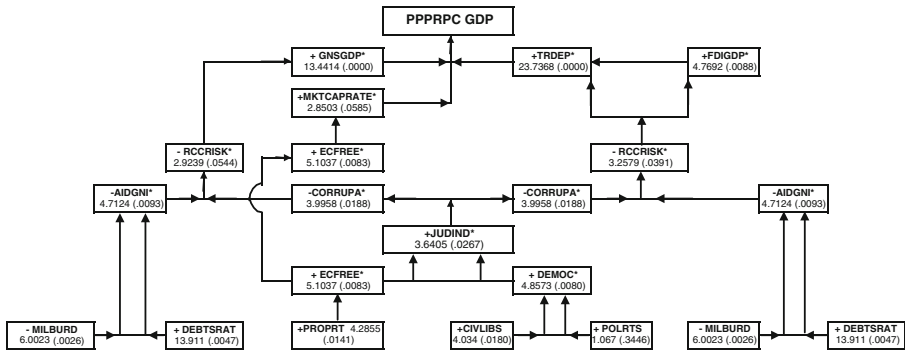
Fig. 1 Risk model structure

model of growth. A schematic of this hierarchy is shown in Fig. 1. For each variable, we list the Granger null and the associated probability. To capture the different ways that risk plays a role, we apply separate Granger tests on key variables used in Tables 1 and 2 and, in turn, note the hierarchy of determinants that shape the level of aggregate country risk.

Based on our Granger causality tests, we now generate predicted values, first for the level of democracy and then for economic freedom. In turn, we use these predicted values in a nested panel regression to estimate the level of judicial independence and the level of market capitalization. The predicted value of judicial independence is then used to derive an estimate of the level of corruption. This predicted level of corruption is then used along with the international aid ratio to derive the estimated level of aggregate country risk. The predicted level of risk is then used to derive predicted values for the saving ratio, the level of trade dependency, and the foreign direct investment ratio. Finally, these are used to derive the predicted level of per capita GDP.

Using the foregoing framework, our estimating equations can now be expressed as:

$$ECFREE = f(PROPRT) \tag{3}$$

$$DEMOC = f(CIVLIBS, \ POLRTS) \tag{4}$$

$$JUDIND = f(DEMOC^*, \ ECFREE^*) \tag{5}$$

$$CORRUPA = f(JUDIND^*) \tag{6}$$

$$AIDGNI = f(DEBTSRAT, \ MILBURD) \tag{7}$$

$$RCCRISK = f(AIDGNI^*, \ CORRUPA^*) \tag{8}$$

Table 3 Nested Regression Estimates

Dependent Variable:	DEMOC[b]	ECFREE[b]	JUDIND[c]	CORRUPA[c]	AIDGNI[d]
CONSTANT	−8.173	1.245	2.769	7.918	11.482
CIVLIBS	2.730				
	(42.534)				
POLRTS	3.737				
	(67.292)				
PROPRT		0.106			
		(7.142)			
DEMOC[a]			0.025		
			(10.675)		
ECFREE[a]			0.979		
			(15.225)		
JUDIND[a]				−0.138	
				(3.168)	
MILBURD					−1.124
					(6.134)
DEBTSRAT					0.114
					(6.137)
AIDGNI[a]					
CORRUPA[a]					
RCCRISK[a]					
GNSGDP[a]					
TRDEP[a]					
MKTCAPRATE[a]					
FDIGDP[a]					
Observations	750	750	750	750	750
Adj. R-Sq.	0.9830	0.9701	0.9336	0.9789	0.7229
F	1395.21	810.92	5267.19	34796.17	64.04

T-statistics are reported in parentheses

[a]Based on predicted values from a nested regression.

[b]Estimate based on fixed effects using cross-section weights.

[c]Estimate based on no effects with cross-section weights.

[d]Estimate based on fixed cross-section specification with period GLS weights.

[e]Estimate based on two-stage least squares with rccrisk instrument, fixed cross-section specification with cross-section GLS weights.

[f]Estimate based on two-stage least squares, with fixed effects and cross-section weights, d(RCCRISK) as instrument.

[g]Estimate based on two-stage least squares with ecfree(−1) as instrument, fixed cross-section and cross-section GLS weights.

RCCRISK[c]	GNSGDP[e]	TRDEP[b]	MKTCAPRATE[g]	FDIGDP[f]	PPPRPCGDP[c]
21.701	577.806	133.203	11.262	171.300	−1662.856
			0.448 (3.480)		
0.314 (8.041) 2.903 (8.465)					
	−12.234 (3.225)	−1.670 (2.818)		−3.675 (5.474)	
					141.747 (15.120) 16.021 (14.388) 52.745 (53.057)
		3.209 (6.842)			
750	750	750	750	750	750
0.8402	0.4769	0.8020	0.8932	0.8130	0.8998
196.24		98.89	357.25		2243.20

$$FDIGDP = f(RCCRISK^*) \tag{9}$$

$$TRDEP = f(RCCRISK^*) \tag{10}$$

$$GNSGDP = f(RCCRISK^*) \tag{11}$$

$$MKTCAPRATE = f(ECFREE^*) \tag{12}$$

$$PPPRPCGDP = f(GNSGDP^*, \ TRDEP^*, \ MKTCAPRATE^*, \ FDIGDP^*) \tag{13}$$

where estimated variable values are marked by an asterisk.

Results for these estimating equations are shown in Table 3. As predicted, institutional variables have a significant influence on the level of per capita GDP. Strengthening democracy through greater civil liberties and political rights has a positive effect on judicial independence. In turn, greater judicial independence reduces the level of corruption and sequent lower corruption reduces the level of aggregate country risk. At the same time, strengthening property rights expands the level of economic freedom. Greater economic freedom also increases judicial independence in the same direction of the effects of democracy.

Economic freedom also has a positive effect on the level of market capitalization. Reduced aggregate country risk has a positive effect on a country's saving rate and trade dependence, which together increase the level of per capita GDP. However, we note that economic freedom has a stronger effect than democracy on increasing the level of judicial independence. This finding is consistent with research by Barro (1997) and Zakaria (2003). While democracy has a positive effect on per capita income, strengthening the institutions that expand economic freedom may have an even stronger effect.

Estimating the Economic Value of Institutional Reform

If institutions are important to the determination of per capita income, it is useful to ask what effect occurs from an increase in their role. Here we examine the separate and joint effects of one-point changes in institutional variables on per capita GDP. We do so by a re-estimation of each of the determinants in the regression estimates listed in Table 3. We summarize these impacts below in Table 4.

When we examine the separate and joint effects of changes in policy variables, we can determine the absolute and relative one-year changes in real per capita GDP. In addition, by using the sample mean and sample median real interest rate, we can compute the present value of the changes in real per capita GDP. In turn, the present value estimates provide a framework for deciding how much a country should consider in investing in strengthening various institutional variables relative to the impact on real per capita GDP.

Table 4 Effects of One-Unit Changes in Policy Variables on PPPRPCGDP ($n=30$)

Policy Variable Change Base Case	PPP RPCGDP $1,617.17	Annual Difference	Percent Change	Present Value at: 4.65%	Present Value at: 8.55%
AIGDNI+1	$1,005.19	−$611.98	−37.84%	−$13,164.67	−$7,161.05
DEBTSRAT+1	$1,547.47	−$69.70	−4.31%	−$1,499.42	−$815.62
TRDEP+1	$1,633.19	$16.02	0.99%	$344.54	$187.42
DEMOC+1	$1,636.54	$19.37	1.20%	$416.61	$226.62
FDIGDP+1	$1,668.59	$51.42	3.18%	$1,106.05	$601.65
MKTCAPRATE+1	$1,669.92	$52.75	3.26%	$1,134.66	$617.21
CIVLIBS+1	$1,670.05	$52.88	3.27%	$1,137.46	$618.73
DEBTSRAT−1	$1,686.88	$69.71	4.31%	$1,499.49	$815.66
POLRTS+1	$1,689.56	$72.39	4.48%	$1,557.15	$847.02
PROPRT+1	$1,700.55	$83.38	5.16%	$1,793.56	$975.62
GNSGDP+1	$1,758.92	$141.75	8.77%	$3,049.18	$1,658.63
JUDIND+1	$2,399.64	$782.47	48.38%	$16,832.02	$9,155.94
ECFREE+1	$2,406.96	$789.79	48.84%	$16,989.48	$9,241.59
RCCRISK−1	$3,567.05	$1,949.88	120.57%	$41,944.74	$22,816.25
CORRUPA−1	$7,278.24	$5,661.07	350.06%	$121,777.94	$66,242.30

Present Value effects are computed using, respectively, mean and median levels of sample real interest rates.

As can be seen in Table 4, increases in international aid and a country's debt service ratio reduce real per capita GDP. In contrast, measures to increase a country's saving rate and trade dependency produce positive effects, but these measures produce smaller gains than increasing a country's level of economic freedom and the level of judicial independence, and in reducing the level of aggregate country risk and corruption.

Within the context of our model, it also is useful to examine the separate effects of individual determinants. While an increase in civil liberties and political rights produce gains in per capita income, when subsumed within our democracy variable, the net effect is more modest. In contrast, property rights, which are an important determinant of economic freedom, produce a larger effect than democracy as a whole, which suggests that the gains in per capita income from economic freedom are larger than those for democracy as a whole.[10] While the largest gains in real per capita GDP are found through reductions in RCCRISK and in the level of corruption (CORRUPA), what our nested model provides is a sequential set of reforms that could bring about these gains, notably, changes in such measures as the level civil liberties, political rights, judicial independence, which, in turn, provide gains in democracy and economic freedom that result in reductions in risk and corruption.

Our model points to the negative effect of international aid on real per capita GDP. While we see it as contributing to aggregate country risk, we have not pursued a more detailed analysis of its separate effects on the various determinants of income, since some (e.g. Sachs 2005) have argued for an increase in international aid to help the lowest income countries in Africa in such strategic areas as health, we do

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[10] As noted earlier, this is not an argument against the expansion of civil liberties, political rights, or democracy, but rather that these institutions produce smaller gains in per capita income than an expansion of economic freedom.

Table 5 Effects of Economic and Institutional Reforms on Regional Groupings

	Africa Global	French Africa	English Africa	COMESA Africa	ECOWAS Africa	SADC Africa	UDEAC Africa
AID Gross National Income Ratio +	−$612	−$31	−$12	−$53	−$30	−$118	−$277
Debt Service Ratio+	−$70	−$5	−$1	−$5	−$2	−$35	−$36
Trade Dependence to GDP Ratio+1	$16	$26	$2	$36	$26	$24	$16
Democracy+1	$19	$3	$11	$21	$4	$15	$11
FDI Ratio+1	$51	$30	$15	$37	$441	$40	$12
Market Capitalization Ratio+1	$53	$249	$13	$18	$249	$42	$53
Civil Liberties+1	$53	$6	$34	$46	$13	$45	$23
Political Rights+1	$72	$9	$43	$69	$17	$57	$35
GNS GDP Ratio+1	$142	$90	$46	$35	$90	$311	$142
Judicial Independence+1	$782	$117	$350	$475	$228	$565	$560
Economic Freedom+1	$790	$480	$359	$534	$439	$2,129	$3,074
RCCRisk−1	$1,950	$101	$44	$70	$124	$364	$254
Corruption−1	$5,661	$170	$874	$3,496	$383	$1,569	$7,844
Number of Countries	30	17	13	11	10	9	5
Base Level PPP RPCGDP	$1,617	$1,297	$2,453	$1,368	$1,316	$3,040	$1,587

not rule out the possibility that aid could play such a role. However, as long as international aid continues to serve larger political objectives, we remain skeptical as to its constructive role in raising levels of per capita income.

Application of the Risk Model to Africa Sub-Group Configurations

Beyond the application of the risk model to our initial sample of 30 African countries, we also undertook separate estimates of the various effects on regional community groupings. We first did separate regression estimates for sub-samples of Francophone and Anglophone African countries. We then did further estimates for four regional economic groupings, namely, the Common Market for Eastern and Southern Africa (COMESA), for the West African Economic Community (ECO-WAS), for the Southern Africa Development community (SADC), and for the Central African Economic Union (UDEAC). We note that since we have used membership only for our sample of countries rather than resampling for complete membership in these configurations, our estimates should be interpreted as indicative rather than comprehensive.[11]

Results of our regional configurations are shown in Table 5. Findings for these sub-samples are consistent with the all-Africa sample, but the absolute and relative

[11] Data limitations restricted our country sample. COMESA countries not included in our estimates are: Angola, Burundi, Camoros, Dijibouti, Egypt, Eritrea, Namibia, Rwanda, Seychelles, and Swaziland. ECOWAS countries not included are: Cape Verde, Gambia, Guinea-Bissau, Liberia, Nigeria, and Sierra Leone. SADC countries not included are: Angola, Lesotho, Namibia, Seychelles, and Swaziland. The only UDEAC country not included is Equatorial Guinea.

changes differ. For Francophone Africa, the greatest gain is found through a one-point increase in economic freedom, while for Anglophone Africa, the greatest gain is through a one-point decrease in the level of corruption. These differences undoubtedly reflect a combination of geography, historical experience, and institutional strengths and weaknesses among the various countries. As to the various economic community groupings, the largest gains in a reduction in corruption are in the UDEAC group and the COMESA group. The largest losses for an increase in international aid are in UDEAC and SADC.

Conclusion

Our risk-based model provides a methodology for examining the impact of institutional reform on levels of per capita income. We find that risk plays a major role in explaining differences in income and does so through differences in institutions. Chief among these institutions are a country's level of judicial independence, the level of property rights, along with the level of civil liberties and political rights. However, while civil liberties and political rights affect the level of democracy in a country, property rights and judicial independence have a larger impact through their effect on economic freedom. A country's level of economic freedom has a greater impact than democracy on the level of corruption and, in turn, on the level of aggregate country risk. In this sense, when countries engage in globalization, it is essential that the institutions of governance be capable of handling the underlying level of risk.

Standard models of economic reform generally point to measures to increase a country's rate of saving, its level of trade dependence, and efforts to increase the level of market capitalization and foreign direct investment. While these variables explain significant variations in per capita income, they depend in turn on the larger effects produced by the level of risk. Thus, policy reforms designed to raise per capita incomes in Africa should first and foremost focus on measures to reduce aggregate country risk. Since many countries in Sub-Saharan Africa do not have sovereign debt ratings and other measures of risk, measures that create greater transparency in the operation of economic and financial institutions represent an important first step in creating the conditions for sustainable economic growth in the region. In short, governance matters.

Appendix A

African Country Sample

Table 6 African Country Sample

	PPP PC GDP	Life Expectancy	Principal International Language	COMESA	ECOWAS	SADC	UDEAC
Benin	$1,053	53.0	F		1		
Botswana	$8,234	38.0	E			1	
Burkina Faso	$1,109	42.8	F		1		
C. Af. Republic	$1,028	41.8	F				1
Cameroon	$2,001	48.0	F				1
Chad	$1,143	48.3	F				1
Congo DR	$658	45.2	F	1		1	
Congo R	$911	51.7	F				1
Côte d'Ivoire	$1,395	45.1	F		1		
Ethiopia	$672	42.0	E	1			
Gabon	$6,045	53.0	F				1
Ghana	$2,114	54.4	E		1		
Guinea	$1,981	46.2	F		1		
Kenya	$980	45.4	E	1			
Madagascar	$764	55.7	F	1			
Malawi	$571	37.5	E	1		1	
Mali	$939	40.6	F		1		
Mauritania	$1,668	51.0	F		1		
Mauritius	$10,664	72.3	E	1		1	
Mozambique	$1,055	40.7	P			1	
Niger	$789	46.4	F		1		
Nigeria	$992	44.9	E		1		
Senegal	$1,557	52.3	F		1		
South Africa	$9,774	45.7	E			1	
Sudan	$1,805	58.6	E	1			
Tanzania	$587	42.7	E	1		1	
Togo	$1,603	49.7	F		1		
Uganda	$1,376	43.2	E	1			
Zambia	$828	36.5	E	1		1	
Zimbabwe	$840	38.5	E	1		1	
Africa Sample	$1,722	47.0					
SS Africa	$1,613	41.0					
EM Union	$22,996	69.7					
Eas & Pacific	$4,085	52.2					
Latin Am Carib	$6,397	57.2					
M East N Africa	$2,525	47.9					
S. Asia	$2,319	45.0					
World	$7,162	54.7					

Appendix B

Model Variable Statistics, Definitions, and Sources

Table 7 Variable Descriptive Statistics

	AIDGNI	CIVLIBS	CORRUPA	DEBTSRAT	DEMOC	ECFREE	FDIGDP	GNSGDP	JUDIND	MILBURD	MKTCAPRATE	POLRTS	PPPRPCGDP	PROPRT	RCCRISK	REALINRATE	TRDEP
Mean	11.08	3.11	7.25	17.77	11.43	1.52	1.42	12.43	4.45	2.41	11.77	2.97	1,852.01	2.60	46.20	4.65	60.57
Median	9.59	3.00	7.35	15.55	6.00	1.60	0.58	11.30	4.45	2.10	4.24	2.00	1,039.41	2.96	46.00	8.55	53.17
Maximum	99.92	7.00	9.41	81.38	49.00	2.50	51.28	48.84	7.15	11.45	199.91	7.00	10,995.54	4.00	77.00	57.43	148.92
Minimum	-0.29	1.00	2.30	0.28	1.00	0.20	-8.52	-23.75	1.15	0.20	0.05	1.00	438.61	1.00	16.50	-98.15	6.32
Std. Dev.	10.01	1.42	0.92	12.22	11.27	0.43	3.37	9.63	1.19	1.63	26.90	1.78	2,094.89	0.65	10.44	17.44	27.54
Skewness	2.77	0.42	-0.86	1.26	1.31	-0.37	7.26	0.69	-0.21	1.90	4.44	0.77	2.46	0.11	0.07	-2.08	0.91
Kurtosis	18.45	2.44	5.31	5.45	3.70	2.67	85.80	5.10	2.74	8.06	23.43	2.41	8.30	2.62	3.10	9.61	3.25
Jarque-Bera	8,421.89	31.41	258.56	385.39	231.03	20.82	220,830.00	197.05	7.77	1,250.89	15,503.63	85.37	1,636.62	6.01	0.91	1,907.82	105.84
Probability	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.05	0.63	0.00	0.00
Sum	8,307.22	2,336.11	5,434.03	13,328.53	8,572.05	1,139.55	1,065.17	9,322.07	3,334.03	1,809.50	8,830.68	2,227.64	1,389,007.00	1,946.49	34,648.91	3,486.51	45,429.85
Sum Sq. Dev.	75,101.54	1,509.24	640.77	111,881.00	95,215.88	136.60	8,492.30	69,398.26	1,056.80	1,978.37	542,183.60	2,360.37	3,290,000.00	312.79	81,621.47	227,907.70	568,168.70
Observations	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750

Table 8 Variable Definitions and Sources

Variable Definitions and Sources		Scale		Source
AIDGNI	International Aid to Gross National Income Ratio	0.00	100.00	World Development Indicators, the World Bank
CIVLIBS	Index of Civil Liberties	1.00	7.00	Freedom House
CORRUPA[a]	Revised Corruption Perceptions Index	0.00	10.00	Corruption Perceptions International
DEBTSRAT	Debt Service Ratio	0.00	[c]	World Development Indicators, the World Bank
DEMOC[b]	Index of Democracy	1.00	49.00	Freedom House
ECFREE	Index of Economic Freedom	1.00	5.00	Heritage Foundation
FDIGDP	Foreign Direct Investment to GDP Ratio	0.00	[c]	World Development Indicators, the World Bank
GNSGDP	Gross National Saving to GDP Ratio	0.00	[c]	World Development Indicators, the World Bank
JUDIND	Index of Judicial Independence	1.00	10.00	Heritage Foundation
MILBURD	Military Expenditures to GDP Ratio	0.00[c]		World Development Indicators, the World Bank
MKTCAPRATE	Market Capitalization to GDP Ratio	0.00[c]		World Development Indicators, the World Bank
POLRTS	Index of Political Rights	1.00	7.00	Freedom House
PPPRPCGDP	Purchasing Power Parity Real Per Capita GDP	0.00[c]		World Development Indicators, the World Bank
PROPRT	Index of Property Rights	1.00	5.00	Heritage Foundation
RCCRISK	Revised International Country Aggregate Risk Index	1.00	100.00	ICRG, the World Bank
REALINRATE	Real Interest Rate	–[c]	[c]	World Development Indicators, the World Bank
TRDEP	Trade Dependency to GDP Ratio	0.00	[c]	World Development Indicators, the World Bank

[a] Computed as the inverse of the original CPI
[b] Derived as the product of civil liberties and political rights
[c] Unbounded

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