

Metals or Management?
Explaining Africa's Recent Economic Growth Performance
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Between 1970 and 1997, economic growth in African countries declined 0.1 percent in per capita terms. However, this figure obscures the fact that many African countries, like many other developing countries, had instituted economic reforms during the 1990's. The reforms were broad ranging and varied across African countries. Generally speaking, they included trade and financial market liberalization and macroeconomic stabilization. Of course, not all African countries engaged in economic reforms, but a significant number of them did. Have the reforms been effective?

The effects of Africa's reform efforts arguably were not yet reflected in the aggregate data on African growth outcomes prior to the late 1990's. With the passage of more than a decade, however, newly available data extending through 2005 should reflect any positive effects of these reforms.¹ Indeed, at first glance, one may be tempted to conclude that the reforms of the prior decade have had a positive effect on Africa's recent aggregate growth performance. Real growth per capita in Africa increased to 2.1 percent between 2000 and 2005, after having declined in the two preceding decades. In addition, more than one third of Sub-Saharan African countries have grown at average rates greater than 5 percent per year.²

African growth resurgence, however, has also coincided with a boom in the international prices of oil, copper, and other primary commodities that constitute a significant fraction of Africa's exports (IMF 2006). Thus one may ask, did policy reforms or the increase in international commodity prices drive Africa's recent growth reversal? In other words, is the recent reversal in Africa's growth experience a result of "metals" or "management", or both?³

While existing data do not permit us to answer these questions directly, we examine them indirectly by incrementally adding various policy and trade measures to cross-country growth regressions. Our results suggest that both "metals" and "management" have contributed to Africa's recent reversal of fortune concerning economic growth. The article proceeds as follows. Part I provides a brief overview of related literature. Part II briefly describes our methodology and data. Part III presents the results. Finally, Part IV concludes.

I. Related Literature

Using a variety of econometric approaches, economists have analyzed the determinants of African economic growth since the 1960's. Some have extended earlier cross-country regression analysis of Barro (1991) and Hausmann, Hwang, and Rodrik (2007), for example. The results are generally mixed and sometimes inconsistent.

Two early studies of African economic growth include Sachs and Warner (1997) and Berthelemy and Soderling (2001). Sachs and Warner (1997) investigate the sources of slow growth for Sub-Saharan Africa between 1965 and 1990. Using a cross-country

¹ These data include the World Bank's African Development Indicators.

² *African Development Indicators* 2007.

³ We use the terms "metals" and "management" broadly. By "metals", we mean primary commodities, not literally only metals; by "management", we mean economic policy and institutions.

regression approach with an African dummy variable, they find that there is nothing “special” about Africa. Rather, poor policies—especially insufficient “openness”—explain much of Africa’s slow growth between 1965 and 1990, they argue.

Berthelemy and Soderling (2001) use growth accounting to determine the drivers of income and productivity growth during periods of extended growth for 27 African countries in two time periods: (1) from the 60s to the late 80s and (2) from the 80s to 1996. Their panel estimations reveal that in the first period growth was driven more by capital accumulation (investment) than by total factor productivity growth, while in the second period growth was driven more by total factor productivity growth than by capital accumulation (investment).⁴ The study has several shortcomings, however. First, the two time periods under investigation consist of different countries, so they do not track the same set of countries over time.⁵ In addition, their sample consists of only 27 countries and their data do not include institutional, governance or policy variables.

Three recent studies include Arbache and Page (2007), Ndulu and O’Connell (2007), and Arbache and Page (2008). Arbache and Page (2007) study the correlates of growth and income distribution using data on 44 sub-Saharan African countries from 1975 to 2005. They find low and volatile steady-state growth rates over the period, but they also find that this volatility does not have significant implications for economic growth. Unlike Sachs and Warner (1997), they find that growth is uncorrelated with geography, natural resources, and initial conditions. By contrast, Ndulu and O’Connell (2007) also use data through 2005 and find that growth rates in Africa between 1960 and 2005 are strongly correlated with initial income and demographic variables, such as life expectancy and dependency ratios, and less strongly correlated with policy measures or commodity price changes. Finally, Arbache and Page (2008) use growth-decomposition techniques and find that periods of growth acceleration between 1975 and 2005, including the latest one, are better explained by positive commodity shocks than by positive changes in economic fundamentals.

A shortcoming of this literature is that, while it is somewhat informative with respect to type of economic management that is correlated with Africa’s recent economic performance, it is less informative about the *type* of exports and international trade consistent with African economic growth. Our study extends these empirical studies by examining factors related to commodity booms in greater depth in addition to policy.

II. Evidence

Data on growth in output per capita for 239 countries, including 57 African countries, are available for the period 1960 to 2005 in the African and World Development Indicators (ADI, WDI). Other country-level data have been collected from the ADI and WDI and other sources and matched to the ADI/WDI growth data. Definitions and sources of data are given in the data appendix.

⁴ Berthelemy and Soderling (2001) find that diversification of exports (to OECD countries) has a positive impact on total factor productivity and growth. However, African countries had difficulty diversifying their exports and only a few countries (e.g., Mauritius, Botswana, Ghana, and to a lesser extent Uganda) (Berthelemy and Soderling (2001), p. 333) had managed to do so as of the time of their study.

⁵ They compare different countries because of the way they have defined growth episodes and the countries that experienced rapid growth in the earlier period are not the same countries that experienced rapid growth in the second more recent periods.

We investigate our central hypotheses—“metals” and “management”— by estimating OLS panel regression models. Our estimation strategy is three-pronged. First, we estimate a baseline regression model with and without fixed effects:

$$\Delta y_{it} = \alpha_i + \mathbf{X}_{it}\beta + \varepsilon_{it} \quad (1)$$

and

$$\Delta y_{it} = \alpha_{it} + \mathbf{X}_{it}\beta + \varepsilon_{it} \quad (2),$$

where Δy_{it} is the half-decadal moving average of change in GDP per capita for country i in year t . The elements of \mathbf{X} are controls for demand and supply of exports – export and trade-partner growth; demographic factors (or measures of labor productivity) – the dependency ratio, life expectancy, and labor force participation; and terms of trade. Equation (2) explicitly controls for factors varying across countries and over time, and in it \mathbf{X} also includes geographic dummies (Africa and latitude), year dummies, and initial income. There are sound reasons to doubt whether Africa is truly “exceptional”, e.g., Sachs and Warner (1997); thus, we initially execute the regressions in the full sample and then in the Africa subsample to discern whether the explanatory variables of interest have a differential significance for Africa. These results are reported in Tables 1a and 1b.

Next, to test our hypotheses, we incrementally add various policy and trade measures to \mathbf{X} in Equation (2). To test the “management” hypothesis, we use alternative measures of macroeconomic policy and institutions. Specifically, we include final government consumption as a fraction of GDP, the rate of inflation (GDP deflator), and the black market premium calculated from end-of-year official and black-market rates, from Reinhart and Rogoff (2005). Related to policy, we use an institutional variable to measure the general quality of economic management and institutions. This variable is the Property Rights Index from the *Index of Economic Freedom*, which measures the “ability of individuals to accumulate private property, secured by clear laws that are fully enforced by the state.”⁶ These results are reported Tables 2a and 2b. To test the “metals” hypothesis, we add measures of various exports – exports of goods and services, exports of agricultural raw materials, exports of minerals and ores, and exports of petroleum and related products, all expressed as a fraction of GDP, as well as the barter terms of trade. These results are reported in Tables 3a and 3b.

Third, it is possible to use the Africa and World Development Indicators to explore changes in growth performance in African countries before and after significant policy and commodity-export changes in the 1990’s. We consider changes in output per capita between 1960 and 2005 in half-decadal increments. We expect both good policy and luck to covary with higher rates of economic growth. In particular, we estimate difference-in-differences models of the form

$$\Delta y_{it} = \alpha_{it} + \gamma_1 Africa_{it} + \gamma_2 Year1995_{it} + \gamma_3 Africa \cdot Year1995_{it} + \mathbf{X}_{it}\beta + \varepsilon_{it}, \quad (3)$$

⁶ Heritage Foundation (2008).

where Δy_{it} is the half-decadal moving average of growth of GDP per capita for country i in year t .⁷ Year dummies are included (1960 is the excluded year) in estimation, as is a dummy for Africa. The *Year1995* and Africa dummies are also interacted with policy and trade variables. The coefficients of interest are those on the interaction terms, such as γ_3 , which measure the differential impact of “metals” and “management” on economic growth between African and non-African countries in more recent years. These models are estimated in the full sample, and results are reported in Tables 2a and 3a. Although we do not report constants in the tables presented below, all models are estimated with an intercept term.

III. Results

Tables 1a and 1b present the results of our baseline panel regressions in equations (1) and (2) above. These results are generally consistent with economic theory and prior empirical work.

In the full sample, the results from estimation of OLS models with fixed effects (columns 1-4) and without fixed effects (columns 5-8) are similar. The coefficient on the dependency ratio is negative, as expected—growth theory predicts a negative correlation between a country’s ratio of dependents to total population—although its statistical significance is sensitive to the regression specification. Also consistent with growth theory, the coefficient on trading partner growth is positive and significant in all but two of the regression specifications for the full sample. Growth of a country’s trading partners should increase the demand for its exports, other things equal. The coefficient on export growth is always positive and significant in the full sample regressions. This result, too, is consistent with growth theory. As anticipated, initial income is negatively and significantly correlated with output growth. Finally, the coefficient on the Africa dummy is consistently negative in the full sample regressions, but it is never significant. This is consistent with Sachs and Warner (1997), who doubt the existence of a special “Africa effect”.

Such doubt notwithstanding, Table 1b reports the same baseline regressions (i.e., equations (1) and (2) above) for the Africa-only sample as reported in Table 1a for the full sample. The two variables that stand out in the Africa-only specifications are growth of exports and the terms of trade. The coefficient on annual export growth is positive and significant in every regression specification in which it appears in Table 1b and the coefficient on the terms of trade is negative and significant both times it appears in Table 1b. By contrast, the coefficient on trading partner growth is never significant in the Africa-only regressions. Together, these results suggest that, for Africa, openness and export-competitiveness are critical to economic growth. Prior theoretical and empirical work has greatly emphasized this point (see, e.g., Sachs and Warner, 1997; Ndulu and O’Connell, 2007) and the regressions here provide confirmatory evidence.

“Management” Hypothesis

Table 2a presents results for the full sample, while Table 2b presents OLS estimates for the Africa-only sample.

⁷ See Wooldridge (2002) for an extensive treatment of difference-in-differences estimation.

Again, we first focus on the full sample results, reported in Table 2a. Columns 1-4 present OLS estimates and columns 5-9 present difference-in-differences estimates. Consistent with the results reported in Table 1, the coefficient on export growth is positive and significant in all the specifications where it appears. In columns 1 and 2, respectively, the coefficients on government consumption and inflation are negative and significant. In contrast, the coefficients on the property rights index and the black market premium are insignificant in columns 3 and 4, respectively.

Turning to the difference-in-differences results in columns 5-9, several interesting findings emerge. In column 5, the coefficient on the interaction between the Africa and 1995 dummies is positive and suggests that after the mid-1990's Africa fared relatively better than the rest of the world, other things equal. The coefficient is statistically insignificant, however. In column 6, the coefficient on the interaction of government consumption and the Africa and 1995 dummies is positive and significant. This result implies that, after 1995, government spending in Africa aided in increasing living standards relative both to prior years and to other countries. This likely reflects relatively more productive spending by African governments, e.g., on health and infrastructure, which are correlated with productivity and economic growth (see also Sachs and Warner, 1997). In column 7, the positive and significant coefficient on the interaction among inflation and the Africa and 1995 dummies likely reflects the fact that higher rates of inflation were correlated with economic growth in African countries. In other words, a greater part of price increases in Africa after 1995 may have been the "good" inflation that accompanies economic growth. Similarly, the result in column 8 implies that the impact of the black-market premium was more benign in Africa after 1995 relative to other countries.

The results in Table 2b for the all-Africa sample again demonstrate the predominance of export growth as a determinant of economic growth in Africa, which is consistent with the empirical literature. In addition, in contrast to the results in Table 2a for the entire sample, the property rights index is positively and significantly correlated with economic growth (see column 4).⁸ Finally, in the full sample, the results for the Africa-only sample suggest that the rate of inflation was not as detrimental in Africa as in the rest of the world over the period.

"Metals" Hypothesis

Tables 3a and 3b introduce several commodity and trade variables to test our "metals" (commodities-boom) hypothesis. Table 3a presents results for the full sample. In Table 3a, columns 1-5 present OLS estimates and columns 6-10 present difference-in-differences estimates. Table 3b presents OLS estimates for the Africa-only sample.

There are several noteworthy results here. In column 4, the coefficient on exports of petroleum and related products relative to GDP is negative and significant. However, in the same regression, the coefficient on the interaction of this measure with exports of goods and services as a fraction of GDP is positive and significant. This result suggests that while exporting petroleum (and related products) alone is negatively correlated with economic growth (i.e., evidence of "Dutch disease"), exporting these products in

⁸ This result should be interpreted with caution, however, because of the relatively small number of observations in this regression.

conjunction with goods and services (i.e., export diversification) is positively correlated with economic growth (see, e.g., Ndulu and O’Connell, 2007; IMF 2006). The negative and significant coefficient on ore and mineral exports relative to GDP in column 8 is also consistent with the “Dutch disease”. Finally, the regression in column 10 broadly supports our commodities boom hypothesis in that the coefficient on the interaction among 1995, Africa and agricultural exports as a fraction of GDP is positive and significant. The recent commodities boom in Africa affected both petroleum/mineral and non-petroleum/non-mineral primary commodity exports (IMF 2006), so this result is unsurprising.

The results in Table 3b for the all-Africa sample yet again demonstrate the predominance of export growth as a determinant of economic growth in Africa (Sachs and Warner, 1997). None of the specific export measures is significant in Table 3b, however, most likely due to significantly fewer observations than the full sample regressions reported in Table 3a.

IV. Conclusion and Future Research

We have exploited recently available data on African economic growth to examine its correlates. Our results suggest that both “metals” and “management” have contributed to Africa’s recent reversal of fortune concerning economic growth. These findings are broadly consistent with those in the related empirical literature.

While we have been careful to minimize problems associated with using country-level data, we are aware of the limitations of cross-country regression analysis. Among them are reverse causation, the validity of instrumental variables, and heterogeneity.⁹ Given the related problems of interpretation of results, in future research, we anticipate adding country case studies to circumvent such problems.

⁹ See Mankiw (1995) and Temple (1999) for a rich discussion of problems arising in cross-country regressions related to instrumental variables and heterogeneity.

References

- Arbache, Jorge Saba and John Page, "Patterns of Long-Term Growth in Sub-Saharan Africa," World Bank, 2007.
- Arbache, Jorge Saba and John Page, "Is Africa's Recent Growth Robust?" World Bank, Africa Region Working Paper Series, No. 111, January 2008.
- Arora, Vivek and Athanasios Vamvakidis, "The Implications of South African Economic Growth for the Rest of Africa, South African Journal of Economics, Volume 73, Number 2 (June 2005).
- Barro, Robert J., "Economic Growth in a Cross Section of Countries." *Quarterly Journal of Economics*, May 1991, 106(2), pp. 407–43.
- Berthelemy, Jean-Claude and Ludvig Soderling, "The Role of Capital Accumulation, Adjustment and Structural Change for Economic Take-Off: Empirical Evidence from African Growth Episodes," *World Development*, Vol. 29, No. 2, pp. 323-343, 2001.
- Centre D'Etudes Prospectives et D'Informations Internationales (CEPII), Geographic distances database, <http://www.cepii.fr/anglaisgraph/bdd/distances.htm>, last accessed December 2008.
- Hausmann, Ricardo, Jason Hwang, and Dani Rodrik, "What you export matters," *Journal of Economic Growth*, Springer, vol. 12(1), pages 1-25, March 2007.
- Heritage Foundation, *Index of Economic Freedom*, various issues, 1995-2005, <http://www.heritage.org/Index/>, last accessed December 2008.
- International Monetary Fund, *Regional Economic Outlook, Sub-Saharan Africa*, 2006.
- Mankiw, N. Gregory, "The Growth of Nations," *Brookings Papers on Economic Activity*, 1995, (1), pp. 275–310.
- Ndulu, Benno J. and Stephen A. O'Connell, "Policy Plus: African Growth Performance, 1960 to 2000," in *Challenges of African Growth: Opportunities, Constraints, and Strategic Decisions*, World Bank, 2007.
- Reinhart, Carmen and Kenneth Rogoff, "The Modern History of Exchange Rate Arrangements: A Reinterpretation," *Quarterly Journal of Economics*, Vol. CXIX No. 1, February 2004, 1-48.
- Sachs, Jeffrey D. and Andrew Warner, "Sources of Slow Growth in African Economies," *Journal of African Economies*, Volume 6, Number 3, pp 335-76, 1997.

Temple, Jonathan, "The New Growth Evidence," *Journal of Economic Literature*, March 1999, 37(1), pp. 112–56.

United Nations, Commodity Trade Statistics Database, <http://comtrade.un.org/>, last accessed December 2008.

Wooldridge, Jeffrey. *Econometric Analysis of Cross Section and Panel Data*. Cambridge, MA: MIT Press, 2002.

World Bank, *Africa Development Indicators*, 2007.

_____, *World Development Indicators*, 2007.

Table 1a. Baseline OLS Regressions, Full Sample

Regressor	Dependent Variable: GDP growth, per capita, 1960-2005							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependency ratio	-2.266 (1.738)		-1.563 (2.838)	-2.264 (1.738)	-4.398*** (1.468)		-6.256*** (1.515)	-3.949*** (1.532)
Trade-partner growth, annual %	0.554*** (0.124)	0.541*** (0.196)	0.492** (0.249)	0.550*** (0.125)	-0.139 (0.214)	0.666*** (0.201)	0.611*** (0.236)	-0.145 (0.213)
Export growth, annual %	0.184*** (0.032)	0.171*** (0.044)		0.184*** (0.032)	0.180*** (0.030)	0.195*** (0.027)		0.180*** (0.030)
Life expectancy		0.092 (0.065)				0.027 (0.036)		
Labor force participation		-0.179** (0.089)				0.033 (0.024)		
Terms of trade			-0.011*** (0.004)				-0.011** (0.005)	
Latitude, degrees				0.143*** (0.052)				0.019 (0.013)
GDP per capita in 1960, (current USD)					-0.001** (0.000)	-0.000 (0.000)	-0.001*** (0.000)	-0.001*** (0.000)
Africa dummy					-1.065 (0.680)	-1.397 (0.864)	-0.331 (0.654)	-1.087 (0.688)
Year = 1995					-1.356** (0.599)	-0.217 (0.436)	-0.263 (0.496)	-1.299** (0.601)
R ²	0.309	0.289	0.079	0.310				
Number of observations	720	470	363	720	513	302	270	513

Note: *** p<0.01, ** p<0.05, * p<0.1

Standard errors robust to clustering on country are reported below estimated coefficients.

All models are estimated in the full sample. Year dummies are included in estimation but, besides 1995, not reported.

Models in Columns (1) to (4) are estimated with fixed effects.

Variable definitions and sources are given in the data appendix.

Table 1b. Baseline OLS Regressions, Africa Subsample

Regressor	Dependent Variable: GDP growth, per capita, 1960-2005							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependency ratio	-1.718 (2.941)		-5.743 (4.323)	-1.685 (2.960)	-5.099 (3.233)		-4.794* (2.864)	-5.041 (3.370)
Trade-partner growth, annual %	0.419** (0.184)	0.533* (0.299)	0.322 (0.376)	0.413** (0.187)	-0.648 (0.594)	0.481 (0.726)	0.065 (0.659)	-0.655 (0.594)
Export growth, annual %	0.189*** (0.041)	0.107** (0.046)		0.189*** (0.042)	0.213*** (0.036)	0.150*** (0.049)		0.212*** (0.036)
Life expectancy		0.009 (0.061)				0.044 (0.053)		
Labor force participation		-0.348** (0.152)				-0.003 (0.029)		
Terms of trade			-0.019** (0.009)				-0.011** (0.005)	
Latitude, degrees				-0.305 (0.281)				0.008 (0.029)
GDP per capita in 1960, (current USD)					-0.003 (0.005)	-0.012** (0.005)	-0.011 (0.007)	-0.003 (0.004)
Year = 1995					-0.219 (1.535)	1.321* (0.706)	1.282* (0.728)	-0.212 (1.538)
R ²	0.381	0.207	0.122	0.382				
Number of observations	210	132	124	210	158	89	93	158

Note: *** p<0.01, ** p<0.05, * p<0.1

Standard errors robust to clustering on country are reported below estimated coefficients.

All models are estimated in the Africa subsample. Models in Columns (1) to (4) are estimated with fixed effects.

Models in Columns (1) to (4) include year dummies in estimation, but, besides 1995, these are not reported.

Variable definitions and sources are given in the data appendix.

Table 2a. Policy Tests: OLS and Difference-in-Differences Regressions, Full Sample

Regressor	Dependent Variable: GDP growth, per capita, 1960-2005								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dependency ratio	-3.745*** (1.424)	-3.847** (1.518)	-4.401*** (1.004)	-2.252 (1.714)	-4.714*** (1.378)	-4.796*** (1.280)	-4.379*** (1.436)	-5.227*** (1.007)	-2.706 (1.808)
Trade-partner growth, annual %	-0.048 (0.202)	-0.164 (0.212)	0.091 (0.227)	0.082 (0.219)	-0.151 (0.215)	-0.065 (0.205)	-0.171 (0.214)	0.103 (0.234)	-0.032 (0.230)
Export growth, annual %	0.176*** (0.030)	0.179*** (0.030)	0.222*** (0.033)	0.142*** (0.034)	0.181*** (0.030)	0.179*** (0.030)	0.179*** (0.030)	0.226*** (0.034)	0.157*** (0.036)
Africa dummy	-0.999 (0.632)	-1.192* (0.684)	-0.329 (0.533)	-0.577 (0.526)	-1.060* (0.610)	-0.967* (0.552)	-1.208* (0.661)	-0.316 (0.604)	-0.784 (0.591)
Latitude, degrees	0.024** (0.011)	0.016 (0.013)	0.018** (0.008)	0.023* (0.013)					
GDP per capita in 1960, (current USD)	-0.001** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001 (0.000)	-0.001** (0.000)	-0.000 (0.000)	-0.001** (0.000)	-0.001*** (0.000)	-0.000 (0.000)
Year = 1995	-0.659 (0.589)	-1.281** (0.599)	-1.318* (0.693)	0.485* (0.272)	-1.385** (0.600)	-0.841 (0.588)	-1.366** (0.598)	-1.476** (0.692)	0.685** (0.313)
Government spending	-0.114*** (0.037)					-0.095*** (0.036)			
Inflation rate		-0.002*** (0.000)					-0.002*** (0.000)		
Black market premium			-0.000 (0.002)					-0.001 (0.002)	
Property rights				-0.005 (0.018)					0.000 (0.017)
Africa dummy*1995					0.930 (0.580)				
Africa dummy*1995*government spending						0.089** (0.038)			
Africa dummy*1995*inflation rate							0.116*** (0.038)		
Africa dummy*1995*black market premium								0.033*** (0.011)	
Africa dummy*1995*property rights									0.016 (0.012)
Number of observations	511	513	353	117	513	511	513	353	117

Note: *** p<0.01, ** p<0.05, * p<0.1

Standard errors robust to clustering are reported below estimated coefficients.

All models are estimated as OLS. Models in Columns 5 to 9 are estimated as differences-in-differences OLS models.

Variable definitions and sources are given in the data appendix.

Table 2b. Policy Tests: OLS Regressions, Africa Subsample
 Dependent Variable: GDP growth, per capita, 1960-2005

Regressor	(1)	(2)	(3)	(4)
Dependency ratio	-3.935 (3.318)	-4.551 (3.482)	-4.062 (3.829)	3.419 (2.880)
Trade-partner growth, annual %	-0.643 (0.570)	-0.612 (0.601)	-1.610 (0.982)	-0.015 (0.505)
Export growth, annual %	0.213*** (0.036)	0.215*** (0.036)	0.276*** (0.048)	0.137*** (0.038)
Africa dummy				
Latitude, degrees	0.020 (0.027)	0.009 (0.029)	0.078** (0.038)	0.090*** (0.029)
GDP per capita in 1960, (current USD)	-0.001 (0.004)	-0.002 (0.005)	-0.028** (0.012)	-0.002 (0.006)
Year = 1995	0.105 (1.575)	-0.365 (1.564)	-0.387 (3.091)	-0.101 (0.537)
Government spending	-0.121 (0.076)			
Inflation rate, annual %		0.017* (0.009)		
Black market premium			0.004 (0.006)	
Property rights				0.044* (0.024)
Number of observations	157	158	65	32

Note: *** p<0.01, ** p<0.05, * p<0.1

Standard errors robust to clustering on country are reported below estimated coefficients.

OLS models are estimated in the Africa subsample.

Variable definitions and sources are given in the data appendix.

Table 3a. OLS and Difference-in-Differences Regressions, Full Sample

Regressor	Dependent Variable: GDP growth, per capita, 1960-2005									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Dependency ratio	-4.543*** (1.085)	-3.585*** (0.942)	-3.419*** (0.974)	-3.329*** (0.968)	-2.940** (1.482)	-4.714*** (1.378)	-4.157*** (0.961)	-4.191*** (0.934)	-4.356*** (1.345)	-5.476*** (1.081)
Trade-partner growth, annual %	0.053 (0.190)	0.124 (0.179)	0.379** (0.183)	0.338* (0.179)	0.766*** (0.215)	-0.151 (0.215)	0.366* (0.188)	0.101 (0.184)	0.657*** (0.218)	0.005 (0.197)
Export growth, annual %	0.180*** (0.029)	0.199*** (0.025)	0.243*** (0.042)	0.247*** (0.041)	0.231*** (0.038)	0.181*** (0.030)	0.248*** (0.043)	0.201*** (0.025)	0.201*** (0.032)	0.183*** (0.030)
Africa dummy	-0.799** (0.362)	-0.991*** (0.351)	-0.908** (0.357)	-0.841** (0.352)	-0.693 (0.655)	-1.060* (0.610)	-0.854** (0.392)	-1.028*** (0.388)	-0.239 (0.624)	-0.786** (0.400)
Latitude, degrees	0.023*** (0.006)	0.023*** (0.007)	0.023*** (0.007)	0.022*** (0.007)	0.027** (0.013)					
GDP per capita in 1960, (current USD)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001** (0.000)	-0.001** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001** (0.000)	-0.001*** (0.000)
Year = 1995	-1.246** (0.565)	-1.110** (0.549)	-0.229 (0.573)	-0.264 (0.563)	-0.603 (0.517)	-1.385** (0.600)	-0.322 (0.566)	-1.294** (0.546)	0.151 (0.362)	-1.485*** (0.562)
Exports, agricultural raw materials, % GDP	0.005 (0.011)									0.003 (0.012)
Exports, ores and minerals, % GDP		-0.008 (0.008)						-0.018** (0.008)		
Exports, petroleum and petroleum products, % GDP			-0.050 (0.042)	-0.465** (0.215)				-0.055 (0.045)		
Terms of trade, 2000=100						-0.007* (0.004)				-0.008* (0.005)
Petroleum exports*exports of goods and services, % GDP				0.009** (0.004)						
Petroleum exports*terms of trade					0.000 (0.000)					
Africa dummy*1995						0.930 (0.580)				
Africa dummy*1995*petroleum exports, % GDP								-0.045 (0.124)		
Africa dummy*1995*ore exports, % GDP								0.036* (0.022)		
Africa dummy*1995*terms of trade										-0.001 (0.006)
Africa dummy*1995*agricultural exports, % GDP										0.035*** (0.014)
Number of observations	473	472	395	395	216	513	395	472	250	473

Note: *** p<0.01, ** p<0.05, * p<0.1

Standard errors robust to clustering are reported below estimated coefficients.

Models in Columns 1 to 5 are estimated as OLS. Models in Columns 6 to 10 are estimated as difference-in-differences OLS models.

Variable definitions and sources are given in the data appendix.

Table 3b. OLS Regressions, Africa Sample

Regressor	Dependent Variable: GDP growth, per capita, 1960-2005					
	(1)	(2)	(3)	(4)	(5)	(6)
Dependency ratio	-3.241 (3.074)	-3.711 (3.389)	-4.574 (3.484)	-2.767 (3.730)	-4.572 (3.498)	0.146 (5.024)
Trade-partner growth, annual %	-0.236 (0.640)	-0.164 (0.626)	0.130 (0.735)	0.341 (0.714)	0.172 (0.760)	0.467 (0.931)
Export growth, annual %	0.207*** (0.035)	0.205*** (0.035)	0.296*** (0.077)	0.166*** (0.050)	0.296*** (0.077)	0.182** (0.073)
Africa dummy						
Latitude, degrees	0.038 (0.026)	0.039 (0.027)	0.032 (0.027)	0.010 (0.043)	0.032 (0.027)	0.019 (0.073)
GDP per capita in 1960, (current USD)	0.003 (0.005)	0.002 (0.005)	-0.000 (0.006)	-0.011* (0.006)	-0.000 (0.006)	-0.015* (0.009)
Year = 1995	-0.231 (1.627)	-0.162 (1.583)	1.011 (1.990)	1.232** (0.624)	1.108 (2.039)	1.858** (0.940)
Exports, agricultural raw materials, % GDP	0.015 (0.013)					
Exports, ores and minerals, % GDP		-0.003 (0.015)				
Exports, petroleum and petroleum products, % GDP			-0.089 (0.095)			
Terms of trade, 2000=100				-0.004 (0.006)		-0.002 (0.009)
Petroleum exports*exports of goods and services, % GDP					-0.001 (0.002)	
Petroleum exports*terms of trade						-0.000 (0.000)
Number of observations	133	133	102	86	102	58

Note: *** p<0.01, ** p<0.05, * p<0.1

Standard errors robust to clustering on country are reported below estimated coefficients.

OLS models are estimated in the Africa subsample.

Variable definitions and sources are given in the data appendix.

Data Appendix

Variables	Definition	Source
<i>Economic Growth</i>		
gdp_cap_grw	GDP growth, per capita (%)	World Development Indicators
<i>Government Policy, Institutions</i>		
gov	General government final consumption expenditure (% of GDP)	World Development Indicators
inf_def	Inflation, GDP deflator (annual %)	World Development Indicators
prem	Black-market exchange rate - official exchange rate, end of year	Reinhart and Rogoff (2004), authors' calculations
ief_prt	Property rights index, score	<i>Index of Economic Freedom 1995-2005</i>
<i>Trade</i>		
exp	Exports of goods and services (% of GDP)	World Development Indicators
exp_ore	Ores and metals exports (% of merchandise exports)	World Development Indicators
exp_grw	Exports of goods and services (annual % growth)	World Development Indicators
exp_agr	Agricultural raw materials exports (% of merchandise exports)	World Development Indicators
petexp_gdp	USD exports value, petroleum and petroleum products, SITC 33	UN Comtrade Database
trd_prt_grw	Trade-partner GDP growth	Arora and Vamvakidis (2005)
trm_trd00	Net barter terms of trade (2000 = 100)	World Development Indicators
<i>Controls</i>		
lfe_exp	Life expectancy at birth, total (years)	World Development Indicators
lbr_frc_prt	Labor force participation rate, total (% of total population ages 15-64)	World Development Indicators
dep	Age dependency ratio (dependents to working-age population)	World Development Indicators
gdp_cap_int_usd	Real GDP per capita, 1960, current international \$	World Development Indicators
d_year	Half-decadal year dummies	
d_afr	Africa country dummy	United Nations
lat	Latitude in degrees	CEPII

Note: Continuous and non-constant dummy variables are transformed into five-year moving averages in estimation.