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AFRICA'S GROWTH TRAGEDY: POLICIES AND ETHNIC DIVISIONS*

WILLIAM EASTERLY AND ROSS LEVINE

Explaining cross-country differences in growth rates requires not only an understanding of the link between growth and public policies, but also an understanding of why countries choose different public policies. This paper shows that ethnic diversity helps explain cross-country differences in public policies and other economic indicators. In the case of Sub-Saharan Africa, economic growth is associated with low schooling, political instability, underdeveloped financial systems, distorted foreign exchange markets, high government deficits, and insufficient infrastructure. Africa's high ethnic fragmentation explains a significant part of most of these characteristics.

I. INTRODUCTION

Africa's economic history since 1960 fits the classical definition of tragedy: potential unfulfilled, with disastrous consequences. In the 1960s a leading development textbook ranked Africa's growth potential ahead of East Asia's, and the World Bank's chief economist listed seven African countries that "clearly have the potential to reach or surpass" a 7 percent growth rate.¹ Yet, these hopes went awry. On average, real per capita GDP did not grow in Africa over the 1965–1990 period, while, in East Asia and the Pacific, per capita GDP growth was over 5 percent and Latin America grew at almost 2 percent per year. Much of Africa has even suffered negative per capita growth since 1960, and the seven promising countries identified by the World Bank's chief economist were among those with negative growth (Figure I). Sub-Saharan Africa's growth tragedy is reflected in painful human scars. The typical African mother has

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1. References are to Enke [1963] and Kamarck [1967], respectively.

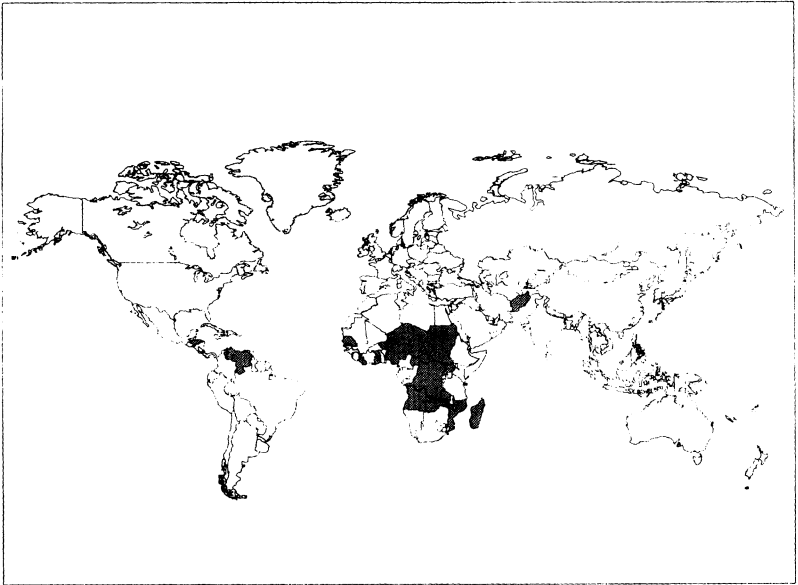


FIGURE I

Regional Distribution of Negative Growth

Countries that had negative per capita growth 1960–1988 are shaded gray.

only a 30 percent chance of having all of her children survive to age five. Average life expectancy for a person born in 1980 in Sub-Saharan Africa is only 48 years compared with 65 in Latin America, and daily calorie intake is only 70 percent of Latin America's and East Asia's.

Although an enormous literature points to a diverse set of potential causes of Sub-Saharan Africa's ills, ranging from bad policies, to poor education, to political instability, to inadequate infrastructure,² existing work does not explain why some countries choose growth-enhancing policies and others adopt growth-

2. See Bevan, Collier, and Gunning [1993], Collier and Gunning [1992], Soludo [1993], Husain and Faruquee [1994], Pack [1993], Lewis [1986], Wheeler [1984], Ndulu [1991], Elbadawi [1992], Elbadawi and Ndulu [1994], Helleiner [1986], Fosu [1992a, 1992b], Gyimah-Brempong [1991], Killick [1991], Berg [1993], Pickett [1990], Hadjimichael et al. [1994], and Rimmer [1991]. Chhibber and Fischer [1992] edited a book on economic reform in Sub-Saharan Africa that discusses changes in exchange rate, fiscal, financial sector, trade, educational, and regional integration policies that could potentially stimulate sustained growth in Africa. Other books include Blomstrom and Lundahl [1993], Borgin and Corbett [1982], Glickman [1988], Ravenhill [1986], Sadip Ali and Gupta [1987], and Turok

retarding ones. Why did so many public policies all go so badly wrong in Africa? This paper examines a simple hypothesis: cross-country differences in ethnic diversity explain a substantial part of the cross-country differences in public policies, political instability, and other economic factors associated with long-run growth. This paper seeks a better understanding of cross-country growth differences by examining the direct effect of ethnic diversity on economic growth and by evaluating the indirect effect of ethnic diversity on public policy choices that in turn influence long-run growth rates. Though motivated by Africa's growth tragedy and its considerable ethnic diversity, none of the results is particular to Africa since we conduct the analysis on a broad cross section of countries. Thus, this paper examines the general proposition that ethnic diversity influences economic performance, and most of this effect works indirectly through public policies, political stability, and other economic factors. We illustrate the economic importance of ethnic diversity by demonstrating that it helps account for Africa's growth tragedy.

The paper first quantifies the empirical relationship between economic growth and a wide array of factors using data over the last 30 years. We include standard variables such as initial income to capture convergence effects, schooling, political stability, and indicators of fiscal, trade, exchange rate, financial sector policies, and infrastructure. We find that low school attainment, political instability, poorly developed financial systems, large black market exchange rate premiums, large government deficits, and inadequate infrastructure are significantly correlated with economic growth and enter the growth regressions with economically large coefficients. These variables account for about two-fifths of the growth differential between the countries of Sub-Saharan Africa and fast growing East Asia.

Next, the paper turns to its main focus: do higher levels of ethnic diversity encourage poor policies, poor education, political instability, inadequate infrastructure, and other factors associated with slow growth? While debate persists, an assortment of political economy models suggest that polarized societies will be both prone to competitive rent-seeking by the different groups and have difficulty agreeing on public goods like infrastructure,

[1987]. From the World Bank, see World Bank [1981, 1989, 1994a]. A recent and thorough World Bank study on Sub-Saharan Africa is *Adjustment in Africa: Reforms, Results, and the Road Ahead* [World Bank 1994a], with an update in Bouton, Jones, and Kiguel [1994].

education, and good policies [Alesina and Tabellini 1989; Alesina and Drazen 1991; Shleifer and Vishny 1993; Alesina and Rodrik 1994; Alesina and Spoloare 1997]. Alesina [1994, p. 38] recently argued that "society's polarization and degree of social conflict" are key factors underlying policy decisions. Ethnic diversity may increase polarization and thereby impede agreement about the provision of public goods and create positive incentives for growth-reducing policies, such as financial repression and overvalued exchange rates, that create rents for the groups in power at the expense of society at large.

To assess the hypothesis that ethnic divisions influence economic growth and public policies, we assemble a diverse set of measures of ethnic diversity. We focus most of our attention on a measure of ethnolinguistic diversity, *ETHNIC*, that measures the probability that two randomly selected individuals in a country belong to different ethnolinguistic groups. *ETHNIC* is derived from Soviet data collected in the early 1960s. Mauro [1995] brought *ETHNIC* to the attention of economists by using it as an instrumental variable for corruption while arguing that corruption causes slower growth and investment. We examine the relationship between *ETHNIC* and school attainment, political stability, financial development, black market premiums, fiscal surpluses, and infrastructure development. Furthermore, we collect and redo our analysis using four alternative measures of ethnolinguistic diversity. These alternative measures confirm the *ETHNIC* results. We highlight the results from the Soviet measure because of its country coverage, ethnic group coverage, and because the linguistic and sociology literatures heavily favor the Soviet measure. We also show that *ETHNIC* is highly correlated with nonlinguistic measures of social polarization such as (a) whether minority groups are at risk of official discrimination, (b) violence against minority groups, and (c) separatist movements. Given that *ETHNIC* is closely associated with these measures of social fragmentation and conflict, we study the direct impact of *ETHNIC* on growth and the effect of *ETHNIC* on policies that influence long-run growth.

The data indicate that high levels of ethnic diversity are strongly linked to high black market premiums, poor financial development, low provision of infrastructure, and low levels of education. Although ethnic diversity is not significantly correlated with every economic indicator, the evidence is consistent with the hypothesis that ethnic diversity adversely affects many

public policies associated with economic growth. The evidence regarding the direct link between ethnic diversity and growth is more ambiguous. While some indicators of ethnic diversity remain significantly negatively correlated with growth after controlling for a diverse set of factors, other ethnic diversity measures are so strongly correlated with the other factors included in the regression that they lose their significance when entered jointly in cross-country growth regressions. The indirect link between ethnic diversity and public policies, however, is robust to alternative measures of ethnolinguistic diversity. While not fully accounting for Africa's growth performance, the extraordinarily high levels of ethnic diversity in Africa importantly contribute to our understanding of Africa's growth tragedy. Indeed, after accounting for the effects of ethnic diversity on education, political stability, financial depth, black market premiums, fiscal policy, and infrastructure development, ethnic diversity alone accounts for about 28 percent of the growth differential between the countries of Africa and East Asia.

This paper's results are robust to many sensitivity checks. Although ETHNIC has important advantages over alternative measures of ethnic diversity in terms of country coverage and accuracy, we reestimated all of the regressions using four other measures of linguistic diversity. Further, we recognize that ethnic diversity may be measured with error and use instrumental variables—using the other ethnic diversity measures as instruments—to control for measurement error. These reexaminations tend to strengthen the original findings. Furthermore, controlling for war does not alter the basic findings that ethnic diversity hinders the adoption of sound policies. Finally, we also find a strong negative relationship between ETHNIC on the *level* of income per worker in the cross section of countries. This paper's findings support the view that ethnic diversity (a) encourages the adoption of growth-retarding policies that foster rent-seeking behavior and (b) makes it more difficult to form a consensus for growth-promoting public goods. Africa's high level of ethnic diversity, therefore, helps explain its tragic growth performance.

II. USING CROSS-COUNTRY REGRESSIONS TO EXPLAIN GROWTH

We begin by quantifying the empirical association between long-run economic growth and a wide variety of indicators. The goal here is not to establish that any particular economic or polit-

ical indicator has an empirical relationship with long-run growth that is independent of other indicators. That is, the goal is not to establish 'robustness' as defined by Levine and Renelt [1992]. Instead, this section shows that many indicators have a close association with growth and these indicators account for a substantial amount of the cross-country variation in growth rates over the last 30 years. This section sets the stage for the remainder of the paper, where we ask: why do countries select growth-retarding policy-packages?

A. Regression Framework

Since we are focusing on long-run growth, we attempt to abstract from business cycle fluctuations by studying economic performance over decades. Specifically, the explanatory variable in our regressions is the average annual growth rate of GDP per capita in the 1960s, 1970s, and 1980s for all countries with data (excluding Gulf Oil States). Thus, each country has three observations, data permitting. The equations are estimated using the technique of seemingly unrelated regressions, where each decade forms one-third of the system. This procedure allows for country random effects that are correlated across decades. It should be noted that the AR(1) coefficient across decades is typically smaller than 0.25, and the simple ordinary least squares results are virtually identical to those reported below.

To account for cross-country growth differences, we use an array of right-hand-side variables. Besides different intercept terms for each decade, we include dummy variables for Sub-Saharan Africa and Latin America and the Caribbean called AFRICA and LATINCA that Barro [1991] and many others have found to be significant and negative.

We include two variables to control for initial income (at the start of each decade) and thereby capture the convergence effect highlighted by Barro and Sala-i-Martin [1992]. This convergence result, however, is nonlinear, first rising and then falling with per capita income [Baumol, Blackman, and Wolff 1992; Easterly 1994]. Consequently, we include two terms: the logarithm of GDP per capita at the start of the decade and the square of the logarithm of initial income at the start of each decade.

The cross-country growth regressions also include the logarithm of the average educational attainment variable constructed by Barro and Lee [1993], which is measured at the beginning of each decade. Also, we control for political instability by including

a measure of political assassinations, which Barro [1991] found to be negatively associated with growth. We used other indicators of political instability, such as measures of civil liberties, the number of revolutions and coups, and the number of casualties from war, but these did not alter the results.

We include three economic indicators that have been linked to economic growth in past studies. First, we include a measure of the black market exchange rate premium, averaged over each decade. The black market exchange rate premium is frequently used as a general indicator of trade, exchange rate, and price distortions.³ Second, we measure the fiscal stance of the country by including the central government surplus to GDP ratio, averaged over each decade.⁴ Finally, we include a measure of financial depth that equals liquid liabilities of the financial system divided by GDP, averaged over each decade.⁵ Unlike the black market premium and the fiscal surplus, financial depth is not directly linked to a policy lever. Collier and Mayer [1989] and Levine [1997], however, show that financial depth is closely linked with measures of financial sector policies and measures of the legal treatment of outside creditors developed by La Porta, López-de-Silanes; Shleifer, and Vishny [1996]. With the caveat that financial depth is not a policy lever, we sometimes refer to these three variables as policy indicators.⁶

B. Growth Regression Results

Regressions (1)–(3) in Table I present the results using these traditional measures of initial income, schooling, political stability, and policies. All of the variables are significant at the 0.05 significance level and of the anticipated sign. Countries with greater financial depth, larger fiscal surpluses, and lower black

3. See Easterly [1994], Fischer [1993], and Levine and Zervos [1993].

4. Fischer [1993] and Easterly and Rebelo [1993] find a negative relationship between government deficits and economic growth.

5. King and Levine [1993a, 1993b] show that financial depth is closely associated with long-run growth. Furthermore, alternative measures of financial development, such as (1) the fraction of credit banks allocate to enterprises relative to the fraction of credit provided to central, state, and local governments and (2) the fraction of credit intermediated by commercial banks relative to credit intermediated by the central bank, produced similar results.

6. We experimented with including measures of inflation and other variables frequently included in cross-country regressions, but these other variables did not enter significantly, nor did they alter this paper's conclusions. Trade or export shares are not significant as explanatory variables in cross-country growth studies. Helleiner [1986] has previously pointed out the lack of explanatory power of export shares for Africa specifically.

TABLE I
GROWTH REGRESSIONS: POOLED DECADES (1960s, 1970s, 1980s)
 (DEPENDENT VARIABLE: REAL PER CAPITA GDP GROWTH)

Variable	(1)	(2)	(3)	(4)
Dummy for the 1960s	-0.142 (-1.66)	-0.169 (-1.96)	-0.246 (-2.60)	-0.267 (-2.82)
Dummy for the 1970s	-0.145 (-1.70)	-0.171 (-1.99)	-0.243 (-2.56)	-0.261 (-2.76)
Dummy for the 1980s	-0.165 (-1.93)	-0.191 (-2.22)	-0.259 (-2.74)	-0.277 (-2.93)
Dummy variable for Sub-Saharan Africa	-0.014 (-3.24)	-0.015 (-3.45)	-0.016 (-3.39)	-0.018 (-3.58)
Dummy variable for Latin America and the Caribbean	-0.021 (-5.58)	-0.019 (-5.21)	-0.015 (-4.22)	-0.016 (-4.56)
Log of initial income	0.047 (2.11)	0.055 (2.43)	0.079 (3.22)	0.090 (3.74)
(Log of initial income) squared	-0.003 (-2.26)	-0.004 (-2.60)	-0.006 (-3.59)	-0.007 (-4.58)
Log of schooling	0.012 (2.93)	0.013 (3.04)	0.011 (2.53)	0.009 (1.89)
Assassinations		-23.783 (-2.26)	-17.868 (-1.82)	-22.923 (-2.52)
Financial depth			0.018 (3.08)	0.013 (2.19)
Black market premium			-0.020 (-4.48)	-0.018 (-4.09)
Fiscal surplus/GDP			0.093 (3.00)	0.177 (4.93)
Log of telephones per worker				0.007 (2.71)
No. of observations	83; 89; 96	78; 88; 95	45; 72; 76	41; 70; 67
R^2	0.21, 0.18, 0.32	0.20, 0.18, 0.34	0.42, 0.43, 0.49	0.42, 0.49, 0.59

t-statistics are in parentheses.

Estimated using Seemingly Unrelated Regressions: a separate regression for each period.

See Data Appendix for definitions and sources.

market exchange rate premiums grew significantly faster than countries with more shallow financial systems, large fiscal deficits, and sizable black market premiums. The regression also indicates that political assassinations are negatively correlated with long-run growth, while educational attainment is positively linked to growth.

The dummy variables for both Sub-Saharan African countries and Latin America and Caribbean countries are significant and negative. While the regressors are able to account for some of the poor growth performance of Africa, the regression does not explain all of it. Africa (and Latin America) grow more slowly than predicted by the cross-country growth regressions. A Chow test does not reject the hypothesis that the reported coefficients are the same for only the sample of Sub-Saharan African countries. Although the power of the Chow test is probably low, the data do not make us believe that the tragedy of Africa lies in different sensitivities to various economic indicators.

The coefficients on the catch-up variables, 0.079 on the logarithm of initial income and -0.006 on the logarithm of initial income squared in regression (3), imply that the catch-up effect is a concave function of initial income. For the given parameter values, the catch-up effect is strongest for countries with incomes of \$1020.⁷ Africa's initial per capita income (averaging over 1960, 1970, and 1980) is \$883. Thus, the regression indicates that Africa should enjoy a catch-up effect, even though this effect will, on average, be slightly less pronounced for Africa than for countries right around the "convergence maximum" of about \$1000.

Many studies of Africa cite the poor state of infrastructure. Low-quality infrastructure can hinder growth by depressing the marginal product of private investment. An influential study by Aschauer [1989] claimed that infrastructure had large effects on U. S. productivity growth; Canning and Fay [1993] and Easterly and Rebelo [1993] have similar findings for a cross-country sample, emphasizing transport and communication infrastructure.⁸

As an indicator of the state of a country's infrastructure, we use Canning and Fay's [1993] measure of telephones per worker.

7. To compute this, set the derivative of growth in the core regression with respect to INCOME equal to zero: $0 = 0.078936 - (0.005697)(2)(\log \text{ of initial real per capita GDP})$. Thus, initial real per capita GDP with the maximum catch-up effect is $\exp\{0.078936/(2*0.005697)\} = \1020 .

8. Easterly and Rebelo [1993] used consolidated public sector investment in transport and communications; these data are available for too few African countries to be of use here.

TABLE II
ECONOMIC INDICATORS: AFRICA VERSUS EAST ASIA

Variable	Africa mean	East Asia mean
Log of schooling	1.031	1.574
Assassinations	1.13E-05	3.73E-06
Financial depth	0.240	0.474
Black market premium	0.450	0.054
Log of telephones per worker	2.436	3.538
Fiscal Surplus/GDP	-0.051	-0.025

See the Data Appendix for definitions and sources.

We find a strong, positive link between growth and telephones per worker as shown in regression (4) of Table I. We also found significant coefficients in regression (4) with two other measures of infrastructure quantity/quality: the percent of roads that are paved, and the percent of transmission losses in the electricity system.⁹ Two other more quantitative infrastructure indicators—kilometers of roads per worker, and electricity generating capacity per worker—were not significant in the growth regression when controlling for all of the other explanatory variables in regression (4).

The Table I results suggest that a variety of economic indicators are closely associated with economic growth in a cross section of economies. These indicators account for between 42 percent and 59 percent of the cross-country variance of growth rates depending on the decade.

To illustrate the importance of these public policy indicators in accounting for growth differences, we compare the most slowly growing region, Africa, with the most rapidly growing region, East Asia. Table II gives average values of the explanatory variables of regression (4) of Table I for East Asia and Africa. East Asia's country characteristics were uniformly more favorable for growth than those of Africa. East Asia's average years of school attainment at the beginning of each decade was 72 percent higher than Africa's. The number of assassinations in East Asia was one-third of those in Africa. East Asia had twice the financial

9. The paved roads data are from the World Resources Institute 1992; other data are from the World Bank's World Development Report [1994b]. Unfortunately the paved roads and power losses are only available for a single year (1980 and 1990, respectively). We chose infrastructure indicators based on quantity of cross-country observations.

depth and its black market premium was practically one-tenth that of Africa's. East Asia's government deficits were half the size of those in Africa. East Asia had three times as many telephones per worker as Africa. (Hong Kong had more telephones in 1960 than Nigeria, even though Nigeria's population was seventeen times larger. By 1980 Hong Kong had more telephones than all of Sub-Saharan Africa.) Thus, East Asia enjoyed substantially better country characteristics—from policies, to infrastructure, to political stability—than Africa. These country characteristics—budget deficits, black market premiums, financial depth, political instability, infrastructure, and human capital—account for a substantial amount of the cross-country variation in growth rates. Specifically, as we document below, these public policy indicators account for about 44 percent of the growth differential between Africa and East Asia. The importance of public policies in accounting for growth differences, however, leaves open an important question: why did so many factors all go wrong in Africa?

III. ETHNICITY: GROWTH AND POLICY CHOICES

Political instability, rent-creating economic policies, and poor public goods may reflect a more fundamental country characteristic: ethnic divisions. After describing some country examples that highlight the role of ethnic conflicts in inducing growth-retarding policy decisions, we describe the measurement and validity of an assortment of ethnic diversity indicators for a broad cross section of countries. We then show that besides being correlated with economic growth, greater ethnic diversity increases the likelihood of adopting poor policies and underproviding growth-enhancing public goods. Country case studies, and our empirical findings from a cross section of economies suggest that ethnic conflicts affect the economy in more subtle ways than stimulating interethnic violence.

A. Ethnic Diversity: Concepts and Country Examples

The borders of African nations were determined through a tragicomic series of negotiations between European powers in the nineteenth century that split up ethnic groups and exacerbated preexisting high levels of ethnic and linguistic diversity.¹⁰ A vast

10. Negotiations about African nation borders paid far more attention to where explorers of each European nationality had happened to wander than to existing ethnic borders, so that many ethnic groups were split between neighboring countries. For a popular historical treatment see Pakenham [1991].

political science literature argues that these high levels of ethnic diversity have encouraged growth-impeding policies. For example, a leading Nigerian social scientist, Claude Ake, argues that a "conflict among nationalities, ethnic groups, and communal and interest groups" broke out after the independence of African nations. The resulting "struggle for power was so absorbing that everything else, including development, was marginalized" [Ake 1996, pp. 5,7].¹¹

Besides the analyses of political scientists, economic theories suggest that ethnically polarized societies are more likely to select socially suboptimal policies under many circumstances. Alesina and Drazen [1991] describe how a war of attrition between interest groups can postpone macroeconomic stabilization. In this model, the first group to concede and accept stabilization bears a disproportionate share of the cost. The groups differ in the welfare loss they suffer from postponing stabilization, but their type is not known to the other group. The stabilization is delayed as the groups accumulate information on the other group's likelihood of conceding. Although they focus on inflation, the logic applies equally to any distortion such as a black market premium or financial repression. We see ethnic diversity entering their model by making it more likely that there will be polarized groups engaged in a war of attrition.

For another example, corruption may be particularly damaging when there is more than one bribe-taker [Shleifer and Vishny 1993]. If each independent bribe-taker does not internalize the effect of his bribes on the other bribe-taker's revenues, then the result is more bribes per unit of output and less output. Ethnically diverse societies may be more likely to yield independent bribe-takers since each ethnic group may be allocated a region or ministry in the power structure. Mauro [1995] has already demonstrated the empirical association between ethnic fragmentation and high corruption.

Moreover, ethnically diverse societies may produce situations formally analogous to Shleifer and Vishny's [1993] uncoordi-

11. Scarritt [1993] concurs that in Africa, "The prevalent form of conflict . . . is competition over political and economic distribution in the context of unstable multiethnic coalitions" [p. 252]. The historian Davidson [1992] states flatly that African economic decline was due to the destruction caused by "rival kinship networks, whether of 'ethnic' clientelism or its camouflage in no less clientelist 'multi-party systems'" [p. 291]. Chazan [1988] says these ethnic groupings in Africa "have been proven to be effective channels for the extraction of state resources" [p. 134]. All of this contrasts, according to Gurr [1993], with Western democracies, which "have devised strategies that have contributed to a substantial decline in most kinds of ethnic conflict" [p. 290].

nated bribe-takers, beyond straight bribe collection. Specifically, uncoordinated ministries may each pursue a rent-seeking strategy without taking into account the effect of their actions on the other groups' rents. For example, one group may impose an overvalued exchange rate and strict exchange controls for the purpose of generating rents from reselling foreign exchange on the black market. Another group may impose very low interest rates (e.g., negative in real terms) on savers for the purpose of generating rents in the form of low-interest loans to their ethnic supporters. Different groups do not internalize the effects of their actions on other groups or society at large. For example, an overvalued official exchange rate creates incentives to smuggle local currency savings out of the country because of fear of devaluation, lowering the amount of financial savings that the other group can appropriate as low-interest loans. Likewise, highly negative domestic real interest rates create incentives to invest in foreign assets, giving exporters an additional incentive to underinvoice and keep foreign exchange outside of the country, lowering the amount of foreign exchange the group setting the official exchange rate can implicitly tax. As in Shleifer and Vishny, the results from uncoordinated rent-seeking are lower output and higher "bribes"—in this case higher black market premiums and more financial repression—than would occur in a monolithic government.

More generally, separation of powers between distinct groups can lead to "common pool" problems, where each group seizes its share of the "pool" of rents until the pool is exhausted [Persson, Roland, and Tabellini 1997]. The common pool problem is alleviated only if checks and balances exist that give each group a veto over the other groups' rent appropriation. As we will see below, ethnically diverse societies not only by definition have distinct groups but are also empirically less likely to have the kind of political institutions that create effective checks and balances, i.e., democratic institutions and rule of law. To mix metaphors, the "common pool" story could help explain the otherwise inexplicable phenomenon of "killing the goose that lays the golden egg." It is not uncommon to observe in Africa some activity nearly taxed out of existence, that is, taxed far beyond the revenue-maximizing tax rate.

Other models tell us that polarized preferences lead to a low provision of public goods. In Alesina and Spolaore [1997] a public good like a school brings less satisfaction to everyone in an ethnically diverse situation because of the different preferences for

language of instruction, curriculum, location, etc. So less of the public good is chosen by society, lowering the level of output or growth. Although this lower provision may be socially optimal, given the constraint that the school must reconcile very different preferences by ethnic groups, the existence of this constraint is costly for output and growth compared with a homogeneous society.

Some work on data from U. S. localities finds evidence for ethnic diversity affecting public goods choice. Poterba [1996] finds that a larger fraction of elderly in a jurisdiction leads to lower public spending on education and that "this reduction is particularly large when the elderly residents and the school age population are from different racial groups." Alesina, Baqir, and Easterly [1997] find that a variety of public goods—roads, schools, trash pickup, libraries—worsen or receive less funding with higher ethnic diversity in a sample of U. S. cities.¹²

A few country anecdotes help give a flavor of how ethnic divisions can foster growth-retarding policies. Kenya has more than 40 ethnic groups, including Kikuyu (21 percent of population), Luhya (13), Luo (13), Kalenjin (11), Kamba (11), Masai (2), and Somali (2). A large Indian business community and some remaining white Kenyans add to the complicated mix. The Kikuyu led the fight for independence and dominated politics under President Kenyatta until 1978, at first in alliance with the Luo and then with the Kamba. Since 1978 the Kalenjin group of President Moi has been prominent in government, in alliance with Kamba, Luhya, and smaller groups [Cohen 1995; Throup 1987]. In the 1992 presidential elections, the Luo candidate won 75 percent of the vote in the Luo region, the two Kikuyu candidates together received 96 percent of the vote in the Kikuyu region, and the Kalenjin candidate—President Moi—received 71 percent of the vote in the Kalenjin region.¹³

Barkan and Chege [1989] analyze the allocation of road-

12. Other models in which it is more difficult to achieve a consensus for good policies in a polarized environment include Persson and Tabellini [1994], Alesina and Tabellini [1989], Lane and Tornell [1995], and Alesina and Rodrik [1994]. We should note that it is theoretically conceivable that the effect of diversity on public goods could go the other way. If each public good is purely "local" to each ethnic group, then the "common pool" type model could imply more public goods from ethnic fragmentation. Under other models, like those that feature "log-rolling," each ethnic representative gets his favorite local public projects funded while agreeing in return to support the other representatives' projects and so the result is *excessive* spending on public goods. Whether these considerations are relevant is an empirical issue our results will address.

13. Miller and Yeager [1994, p. 116]. Moi was elected with a plurality (36 percent) of the votes due to the splitting of opposition votes. Of course, ethnic bloc

building investments in Kenya between what they consider to be the home regions of the Kenyatta and the Moi ethnic coalitions during their respective governments. Each regional grouping contains a third of Kenya's population. They report that after Moi took over in 1978, the road-building investment share of the Kenyatta coalition home regions fell from 44 percent in 1979–1980 to 16 percent in 1987–1988. The share of the Moi coalition home regions rose from 32 percent to 57 percent. The share of health expenditures in 1987–1988 going to the regions of the Kenyatta ethnic coalition was 18 percent, while the regions of the Moi coalition received 49 percent.¹⁴

The history of Ghana provides an illustrative example of how ethnic conflict over economic rents adversely affects policy choices. Ghana's main export crop is cocoa, production of which is concentrated in the region of the Ashanti group who make up 13 percent of the population. The Ashanti Empire was dominant in precolonial times, to the resentment of other groups such as the coastal Akan groups (30 percent of population). Beginning with the runup to independence in the 1950s, cocoa replaced historical resentments as a bone of interethnic contention [Mikell 1989].

In the early 1950s Kwame Nkrumah, himself from one of the coastal Akan groups, split off from the traditional Ashanti-based independence party. He pushed a bill through the colonial legislature in 1954 to freeze the producer price of cocoa. An Ashanti-based opposition party to Nkrumah ran against him in the 1956 elections with the slogan, "Vote Cocoa," while also pushing for secession. With most of the other groups favoring Nkrumah, these efforts failed. Nkrumah continued to tax cocoa heavily—through the Cocoa Marketing Board and through the growing overvaluation of the official exchange rate.

In 1969–1971 Kofi Busia led the only Ashanti-based govern-

voting is hardly unique to Kenya, or to Africa. In Fiji's 1977 elections, 82 percent of people of Fijian origin voted for one party, while 86 percent of people of Indian origin voted for the other party [Milne 1981]. In Washington, DC's mayoral election in 1994, the white candidate got over 90 percent of the vote in the mostly white Ward 3, while the black candidate got over 90 percent of the vote in the mostly black Ward 8 (*Washington Post*).

14. Background studies of parliamentarians find that "the one characteristic they share with their constituents is ethnicity," since communities "want to be sure that a candidate will represent their interests" [Miller and Yeager 1994, p. 77]. Cohen [1995] says the group in power has systematically manipulated the multiple exchange rate system to extract rents for its particular ethnic group, which illustrates "how brazen ethnic-based rent-seeking coalitions can become." See also Nyangira [1987], Throup [1987], Haugerud [1995], and Bates [1989] for other examples of ethnic distributional conflicts in Kenya.

ment in modern Ghanaian history, having co-opted some of the coastal Akan groups as allies. One of Busia's first acts was to raise the producer price of cocoa. Later in his term, in 1971, he instituted a large devaluation that raised the domestic currency price of cocoa at a time when the world cocoa price was falling. The military overthrew him three days later and partially reversed the devaluation.

Though ethnic coalitions rotated with dizzying speed through the 1970s and early 1980s in Ghana, they all seemed to concur on punitive taxation of cocoa exports through the ludicrously overvalued official exchange rate (reflected in a high black market premium). Granting of permission to import goods at the official exchange rate was one way to dissipate these rents to political and ethnic supporters. The black market premium reached its historical peak in 1982, with the black market exchange rate at 22 times the official exchange rate [Wetzel 1995, p. 197]. The cocoa producers had received 89 percent of the world price of cocoa in 1949 [Bates 1981]. By 1983 they received 6 percent of the world price. Cocoa exports were 19 percent of GDP in 1955; by 1983 they were only 3 percent of GDP.¹⁵ Ghanaian cocoa is one of the classic examples of "killing the goose that laid the golden egg." Reforms finally began in the mid-1980s. The case of Ghana suggests that the interethnic struggle over rents from a commodity like cocoa has something to do with the choice of growth-retarding policies—like an overvalued exchange rate resulting in a high black market premium.¹⁶

Finally, in contrast to Ghana and Kenya, Botswana is an African success story with growth comparable to South Korea's. In terms of this paper's focus, it is noteworthy that Botswana has one of the most ethnically homogeneous populations in Africa and has adopted some of the best policies in Sub-Saharan Africa.

B. Measuring Ethnic Diversity

To evaluate empirically the hypothesis that ethnic divisions affect economic growth and public policy decisions, we use a variety of different measures of ethnic divisions. Primarily, we use a measure of ethnolinguistic fragmentation that was constructed in 1960 by a team of 70 researchers at the Miklukho-Maklai Eth-

15. Source: Frimpong Ansah [1991, p. 95].

16. Sources for the Ghana story are Bates [1981], Mikell [1989], Chazan [1982, 1987, 1988], Herbst [1993], Chazan and Fellow [1986], Wetzel [1995], and Rimmer [1992].

nological Institute in the Soviet Union and printed in the 1964 *Atlas Narodov Mira* (Atlas of Peoples of the World). We obtained these data from Taylor and Hudson [1972]. Taylor and Hudson discount the possibility that the country-by-country construction of the Soviet data were contaminated by ideological bias.¹⁷ However, some countries—most notably North and South Korea, North and South Vietnam, Taiwan, and Southern Yemen—were omitted from the Soviet data, which may reflect political considerations. The Soviet variable, ETHNIC, measures the probability that two randomly selected individuals in a country will belong to different ethnolinguistic groups. ETHNIC will increase with the number of ethnolinguistic groups and will increase the more equal is the size of the groups. Mauro [1995] and Canning and Fay [1993] also use these Soviet data to examine the relationship between ethnolinguistic fractionalization and long-run growth.¹⁸

Table III shows the most and the least ethnically diverse societies in the world according to the Soviets' measure of ETHNIC. Fourteen out of the fifteen most ethnically heterogeneous societies in the world are in Africa; eight countries classified as high-income countries by the World Bank's Development Report are among the most ethnically homogeneous, and no such rich countries are among the top-fifteen most ethnically diverse countries. Two of the East Asian fast growers (Japan and Hong Kong) are among the most ethnically homogeneous.¹⁹

Taylor and Hudson [1972] list two alternative measures of linguistic diversity. We investigated these alternatives and found they cover fewer countries and omit significant groups within countries. Roberts [1962] used secondary data sources, covered

17. They concluded that bias was not a big problem because (1) they found the Soviet measure to be strongly correlated with two alternative measures of linguistic diversity (discussed below), (2) the lack of any systematic difference in ETHNIC between Eastern bloc and Western bloc nations, and (3) the high ETHNIC for the USSR itself despite Soviet efforts to underplay its own ethnic splits.

18. There were two minor data entry problems in Mauro [1995]: (1) Chad and the Central African Republic were transposed and (2) Yemen was entered as 0.02 rather than 0.04. The simple correlation between growth and ethnic diversity with the corrected data is virtually identical to that estimated with Mauro's data. We did not follow Mauro in using Roberts' measure of 0 ETHNIC for South Korea, and in using Muller's estimate for Taiwan; we used only the data points in the original Soviet data as reported by Taylor and Hudson. We also checked Taylor and Hudson's calculations of ETHNIC against our recalculation from the raw data in *Atlas Narodov Mira* and found that these calculations matched.

19. Two other East Asian miracles, Korea and Taiwan, are not in the Soviet sample. Other sources suggest that South Korea is perfectly homogeneous in terms of language use (e.g., Gunnemark [1991]). Taiwan is less clear since it includes native Taiwanese and Chinese from the Mainland. Singapore is in the Soviet sample with an ETHNIC value of 0.42.

TABLE III
ETHNOLINGUISTIC FRACTIONALIZATION INDEX (ETHNIC)
(66 COUNTRIES, 1960)

Country	ETHNIC	Country	ETHNIC
<i>15 Most fractionalized:</i>		<i>15 Least fractionalized:</i>	
Tanzania	93	Haiti	1
Uganda	90	Japan	1
Zaire	90	Portugal	1
Cameroon	89	Hong Kong	2
India	89	Yemen	2
South Africa	88	Germany	3
Nigeria	87	Burundi	4
Ivory Coast	86	Dominican Republic	4
CAR	83	Egypt	4
Kenya	83	Ireland	4
Liberia	83	Italy	4
Zambia	82	Norway	4
Angola	78	Iceland	5
Mali	78	Jamaica	5
Sierra Leone	77	Jordan	5

ETHNIC measures the probability that two randomly selected persons from a given country will not belong to the same ethnolinguistic group. The more groups there are, the higher ETHNIC. The more equally distributed the groups, the higher the ETHNIC.

Source: Taylor and Hudson [1972].

only Africa and Latin America, and omitted many linguistic groups. For example, Roberts omitted the second largest group in Kenya, the Luhya.²⁰ Nonetheless, the bivariate correlation between the Roberts and Soviet measures is 0.95 and highly significant. Muller [1964] constructs a database from census reports. However, he restricts his survey to the 200 most important world languages, in contrast to the 1600 languages included by the Soviets. This restriction causes Muller to omit many ethnic groups, especially in Africa. Muller omits not only the second largest Kenyan group, like Roberts, but also the third, fourth, and fifth largest groups.²¹ The correlation coefficient between the Muller

20. In Chad, Roberts omitted the Tubu, Mbum, Maba, Tama, Muba/Sokoro, Dago, Hausa, Masa/Musgu, and Kotoko groups, collectively accounting for 42 percent of the population according to the Soviet measure. In Ivory Coast, she omitted the Lagoon Tribes, Gere, Bakwe, Kulango, and Dan/Kweni peoples, amounting to 26 percent of the population according to the Soviet measure.

21. In Chad, Muller omits the same groups that Roberts does. He omits speakers of the Kru language in Liberia, which is the largest single group in the country—29 percent of the population. These omissions affect the ELF measure

and Soviet measures is 0.82 and significant. The lower value for Muller may reflect the systematic omission of a large number of linguistic groups. While there are shortcomings with the Soviet data (e.g., the omission of Korea and Taiwan), the Soviet data are notably more comprehensive than these other two measures reported by Taylor and Hudson. Thus, we focus on the Soviet data and use the Roberts and Muller measures to gauge the sensitivity of our findings with the Soviet data.

Besides the linguistic data reported by Taylor and Hudson [1972], we also incorporate into our analysis two additional measures of ethnolinguistic diversity constructed by Gunnemark [1991]. The first measure equals the share of the population of each country for whom the language spoken at home is not the official language of the country, as observed in 1990. In most African countries, the share of the population who do not speak the *official* language at home is over 90 percent. The bivariate correlation of this Gunnemark measure with the Soviet measure, ETHNIC, (measured in 1960) is high: 0.78. Gunnemark also provides data on the share of the population *not* speaking the most widely used language. The correlation of this measure with ETHNIC is 0.90. Thus, besides the Roberts and Muller ethnolinguistic diversity measures, we also use the two Gunnemark indicators to check the robustness of the results from the Soviet data (ETHNIC).²²

We surveyed the social science literature and found that the Soviet measure has been widely used. The social scientists who have used the Soviet measure for various purposes (none of which are closely related to this paper) include Estes [1984], James [1993], Kurian [1991], Lindenberg [1993], McCarty [1993], and Mueller and Murrell [1986]. We were unable to uncover any articles that used the alternative indices in our search of the social science literature on ethnic fragmentation, with the exception of Rustow [1967]. Rustow's [1967] use of the Soviet data is particularly interesting because it predates Taylor and Hudson's [1972] popularization of the index. Rustow constructed a measure of linguistic diversity in his study of political modernization and relies

based on his data. The Muller data ethnolinguistic fractionalization for Liberia, for example, is 0.67 compared with 0.83 for the Soviet measure.

22. Gunnemark [1991] is a compilation of data gathered by the international society of geolinguistic scholars (*Amici Linguarum*). Eighteen geolinguistic scholars are listed as contributors in the introduction. The bibliography lists numerous country-specific sources, although Gunnemark does not explain how these data were synthesized into single estimates.

overwhelmingly on the Soviet measure (he used Roberts for 5 countries, Muller for 4 countries, and the Soviet data for 89 countries).²³

Scholars in the field of “geolinguistics” (studies of the geographic distribution of language speakers across nations) have also relied on the Soviet data. Breton’s [1991] survey of the field stated that the last attempt at “a systematic and exhaustive calculation, using geographic methods, of the number of speakers of the languages of the world was carried out in 1964 by *Atlas Narodov Mira*.” This confidence in Soviet data is also reflected in its use by other geolinguistic researchers [Kloss and McConnell 1978; Ruhlen 1987; and Grimes 1992].

It is worthwhile assessing the relationship between ETHNIC and indicators of ethnic conflict. For example, The Minorities at Risk project at the University of Maryland collects information on ethnic groups that are under threat from national governments (for example, the Kurds in Iraq). As described in Gurr [1993], the definition of a “minority at risk” is a communal ethnic group that is (1) experiencing political or economic discrimination, and (2) taking political action in support of collective interests. Africa has the largest share of the population consisting of “minorities at risk” in the global sample. In fact, a few African countries—Burundi, Chad, South Africa—are in the anomalous condition of having the whole population belong to “minorities at risk.” Many other African countries have a share of “minorities at risk” over 50 percent. What this means is that the groups can alternate in power and each group is at risk when it is out of power.²⁴ We correlate the measure of ETHNIC in 1960 with the proportion of minorities at risk in 1990 for 72 countries. The correlation is 0.52 and is significant (P -value of .0001).

The Minorities at Risk project also collected data on specific incidents of state-initiated violence against minority groups. Harff and Gurr [1995] record all episodes of genocide over 1945–1995. Their definition of a genocide is a mass killing in which the

23. Rustow [1967] cited a different Soviet source (dated 1962, called *Numbers and Location of Peoples of the World*, from the same Ethnographic Institute) than *Atlas Narodov Mira*, but a spot check of the data revealed the figures to be the same. (This same alternative Soviet source was cited by Kloss and McConnell [1978] discussed in the next paragraph in the text.) Apparently, the same Soviet data were reported in other publications besides *Atlas Narodov Mira*.

24. To facilitate data collection, the Gurr [1993] project included only ethnic groups that have at least 100,000 population or 1 percent of population. As Gurr [1993] acknowledged, this biases downward the African measure because of the many small ethnic groups in Africa.

selection of the victims is determined at least in part by their ethnic identity, and in which there is government complicity (e.g., Idi Amin's killing of ethnic opponents in Uganda in the 1970s). We find that ETHNIC is 50 percent higher in countries where Harff and Gurr record episodes of genocide; ETHNIC is significant at the 1 percent level in a bivariate probit regression for genocide. We also collected data on civil wars from Sivard [1993]. ETHNIC is highly significant in a probit regression to predict the occurrence of a civil war (the dependent variable is a dummy variable that takes on the value of one if there is a civil war during the decade). We conclude that ETHNIC is a meaningful predictor of the potential for ethnic conflict as measured by its worst possible manifestations.

We examine two other measures of the potential for ethnic conflict. One of the thirteen political risk indicators collected by the International Country Risk Guide is "racial and nationality tensions." We take their rating of such tensions on a scale of 1 to 6 in 1984 (the earliest year available). The bivariate correlation for 93 countries between racial tension and ETHNIC is 0.70. Finally, we also use Taylor and Jodice's [1983] indicator of separatist movements, measured as the percent of the population engaged in separatist movements in 1960 and in 1975. The correlation of this variable (pooling the two observations) with ETHNIC is 0.64. While not definitive, ETHNIC's close association with an array of indicators of diversity and conflict gives some reassurance that ETHNIC is a meaningful measure of ethnic divisions.

C. Growth Regressions

The simple regression of growth on ETHNIC (with decade dummies) is highly significant, with a *t*-statistic of -4.4 . The magnitude of the coefficient ($-.023$) indicates that going from complete homogeneity to complete heterogeneity is associated with a fall in growth of 2.3 percentage points.²⁵ A one-standard-deviation increase in ETHNIC is associated with a decrease in per capita growth of about 30 percent of a standard deviation in growth

25. We estimate this and the following regressions with the method of seemingly unrelated regressions with one equation for each decade. We believe the pooled decade average, cross section sample is useful despite the lack of intertemporal variability of ETHNIC so that we can—as we will see—capture the intertemporal variation in the other variables. If we run the simple correlation between growth and ETHNIC as a cross section by averaging the decade growth rates, the association remains highly significant.

across countries. ETHNIC is not simply proxying for the Africa dummy here, because it also remains significant in the non-Africa sample (coefficient of $-.016$ and t -statistic of -2.3). This simple, reduced-form regression is an important result because we will argue that many of the standard explanatory variables in growth regressions are themselves endogenous to ETHNIC.²⁶

Table IV presents evidence on the empirical association between ETHNIC and economic growth, controlling for other factors. Regression (1) shows that ETHNIC is significantly correlated with growth after controlling for initial income and including dummy variables for countries in Sub-Saharan Africa and Latin America. In regression (2) we introduce measures of educational attainment and political stability. Ethnic diversity remains significant with little change in the coefficient. Moreover, ethnic diversity remains significantly negatively correlated with growth after controlling for financial depth, the fiscal surplus, and the black market exchange rate premium as shown in regression (3).²⁷ The economic magnitude of the coefficient on ETHNIC is substantial. Taken literally, the coefficient in regression (3) implies that if Nigeria had the sample mean value of ETHNIC (0.42) instead of its actual value of 0.87, its per capita growth rate over the 1960–1989 period would have been almost double its actual value of 0.7 percent per annum. In regression (4) we also include the logarithm of the number of telephones per worker as an indicator of national infrastructure. The significance of ethnic diversity weakens, and the coefficient diminishes when we also include the infrastructure measure. Apparently, ETHNIC is sufficiently correlated with public policy indicators such that it loses its independent association with long-run growth in regression (4) of Ta-

26. Many readers have wondered whether the relationship between growth and ETHNIC was nonlinear; for example, maybe having two equal groups is just as damaging to political economy as four equal groups; alternatively, maybe ethnic diversity only matters when there are many small ethnic groups (the upper range of ETHNIC). Unfortunately, our efforts to estimate a spline regression were unavailing; we found no evidence of a change in slope at $ETHNIC = .5$ and at $ETHNIC = .75$, which may simply reflect our small sample.

27. We have already noted that war is associated with ethnic fragmentation. Over the past three decades, many military conflicts have occurred in Africa. To gauge whether our results merely reflect the economic disruptions caused by war, we examine the relationships between wars and growth and between wars and policy choices. We use a dummy variable, WAR, that takes on the value 1 when Sivard [1993] reports a war taking place on the territory of a given country in a given decade. When we include WAR in the pooled cross-country, decade growth regressions of Table I that include policy indicators (regressions (3)–(4)), WAR enters with a P -value of greater than 0.10 and the results on the other variables remain unaffected.

TABLE IV
ETHNIC DIVERSITY AND LONG-RUN GROWTH
(DEPENDENT VARIABLE IS GROWTH OF PER CAPITA REAL GDP)

Variable	(1)	(2)	(3)	(4)	(5)
Dummy for the 1960s	-0.072 (-0.88)	-0.096 (-1.15)	-0.186 (-1.94)	-0.254 (-2.66)	-0.224 (-2.37)
Dummy for the 1970s	-0.074 (-0.90)	-0.098 (-1.17)	-0.182 (-1.90)	-0.248 (-2.59)	-0.217 (-2.30)
Dummy for the 1980s	-0.094 (-1.14)	-0.117 (-1.40)	-0.198 (-2.07)	-0.263 (-2.76)	-0.232 (-2.46)
Dummy variable for Sub-Saharan Africa	-0.013 (-2.82)	-0.014 (-2.98)	-0.012 (-2.46)	-0.013 (-2.53)	-0.013 (-2.49)
Dummy variable for Latin America and the Caribbean	-0.022 (-6.52)	-0.021 (-5.88)	-0.017 (-4.74)	-0.018 (-4.90)	-0.019 (-5.22)
Log of initial income	0.033 (1.56)	0.039 (1.82)	0.066 (2.69)	0.086 (3.58)	0.081 (3.41)
(Log of initial income) squared	-0.003 (-1.83)	-0.003 (-2.09)	-0.005 (-3.10)	-0.007 (-4.25)	-0.006 (-4.23)

TABLE IV
CONTINUED

Variable	(1)	(2)	(3)	(4)	(5)
Log of schooling	0.011 (2.85)	0.011 (2.83)	0.009 (2.28)	0.009 (1.98)	0.010 (2.22)
Assassinations		-20.730 (-2.04)	-14.874 (-1.56)	-21.480 (-2.45)	-21.862 (-2.45)
Financial depth			0.015 (2.54)	0.012 (2.10)	0.011 (1.90)
Black market premium			-0.020 (-4.63)	-0.019 (-4.46)	-0.019 (-4.52)
Fiscal surplus/GDP			0.088 (2.88)	0.171 (4.82)	0.158 (4.40)
Log of telephones per worker				0.005 (1.74)	0.005 (1.86)
ETHNIC	-0.020 (-3.19)	-0.017 (-2.74)	-0.016 (-2.54)	-0.011 (-1.53)	
AVG-ETHNIC					-0.020 (-2.73)
No. of observations	78; 84; 90	75; 83; 89	44; 69; 72	40; 68; 64	41; 70; 67
R ²	0.31, 0.24, 0.35	0.27, 0.23, 0.36	0.43, 0.44, 0.51	0.43, 0.49, 0.61	0.45, 0.52, 0.60

t-statistics are in parentheses.
 Estimated using Seemingly Unrelated Regressions: a separate regression for each period.
 AVG-ETHNIC is the average value of ETHNIC and the Muller [1964], Roberts [1962], and two Gunmemark [1991] measures of ethnolinguistic diversity.
 See the Data Appendix for definitions and sources.

ble IV.²⁸ We get similar results when the analysis is restricted to the non-African countries. Thus, as suggested by theory and country studies, ETHNIC may primarily affect growth indirectly by influencing public policy decisions.

Three out of the other four ethnolinguistic diversity indicators have a stronger direct link with growth than the Soviet measure, ETHNIC. As summarized in Table V, Gunnemark's [1991] measure of the percent of the population not speaking the official language, Gunnemark's measure of the percent of the population not speaking the most widely used language, and Roberts measure of the probability of two individuals speaking different languages remain significantly correlated with long-run growth even when controlling for the wide array of policy and infrastructure indicators of regression (4) of Table IV. The Muller measure of the probability that two randomly selected individuals speak different languages gives results similar to the Soviet measure.²⁹ Furthermore, as indicated in regression (5) of Table IV, the average of the five linguistic diversity measures has a significant link with long-run economic growth, even after controlling for the policy indicators.³⁰ These findings suggest that ethnic diversity may have a direct link with economic growth that is independent of the policy and infrastructure indicators used in regression (4) of Table IV (which may simply mean that it is picking up other unobservable policy indicators). Thus, depending on the particular ethnolinguistic diversity measure, there is empirical ambiguity about the strength of the association between growth and ethnolinguistic diversity after controlling for numerous public policy indicators. This result, along with the theoretical predictions regarding the impact of ethnic diversity on public policy choices, leads us to examine whether ethnic diversity affects growth indirectly through the public policy indicators included in many growth regressions.

Before continuing, it is worth noting two issues: measurement error and the AFRICA dummy variable. The ethnic diversity indicators may be measured with error. To control for

28. It is worth noting that the infrastructure quality indicators mentioned earlier (percent roads paved and percent electrical system losses) remain significant in growth regression (4) even when ETHNIC is included.

29. For completeness, the Muller measure has a weaker relationship than ETHNIC in the sense that, even in a regression like (3) of Table IV, the Muller measure enters insignificantly.

30. This average index takes the average across the five individual ethnolinguistic indicators in Table V. It uses only indicators with nonmissing values, so that it maximizes the number of observations.

TABLE V
 ETHNIC DIVERSITY AND LONG-RUN GROWTH: ALTERNATIVE MEASURES
 (DEPENDENT VARIABLE IS GROWTH OF PER CAPITA REAL GDP)

Ethnic explanatory variable	Other explanatory variables	Coefficient (<i>t</i> -statistic) on ethnic variable	<i>R</i> ²	Number of observations
Gunnemark1 Percent not speaking official language	None Many*	-0.015 (-3.86) -0.018 (-3.18)	0.04,0.09,0.07 0.44,0.55,0.59	103,109,109 40,68,65
Gunnemark2 Percent not speaking most widely used language	None Many*	-0.0239 (-4.55) -0.02 (-2.77)	0.04,0.11,0.11 0.41,0.53,0.60	105,111,111 41,69,66
Roberts Probability of two individuals speaking different languages	None Many*	-0.046 (-5.48) -0.035 (-3.31)	0.15,0.34,0.28 0.78,0.80,0.70	39,41,42 10,24,20

ETHNIC-Soviet Probability of two individuals speaking different languages	None	-0.023 (-4.42)	0.5,0.13,0.08	101,105,105
Muller Probability of two individuals speaking different languages	Many*	-0.011 (-1.53)	0.43,0.49,0.61	40,68,64
	None	-0.021 (-3.24)	0.06,0.05,0.04	83,86,86
	Many*	-0.008 (-1.15)	0.36,0.45,0.61	36,56,54
AVG-ETHNIC Average value of ETHNIC and Muller, Roberts, and Gunnemark1 and 2	None	-0.024 (-4.67)	0.06,0.11,0.10	106,112,112
	Many*	-0.020 (-2.73)	0.45,0.52,0.60	41,70,67

Estimated using Seemingly Unrelated Regressions.

*These regressions also include all of the explanatory variables of regression (4) in Table I.

The regressions for 'none' include only decade dummies.

measurement error, we instrument for each ethnic measure with the other ethnic measures.³¹ Our only exceptions to this procedure are that we do not use Roberts as an instrument for any of the others, since it drastically reduces the sample (recall that Roberts covered only Asia and Africa) and we do not use Muller as an instrument for Roberts because that reduces the sample size by a fourth. The instrumental variable results are similar to those presented above. After controlling for measurement error, the Muller measure—which we noted suffers from substantial measurement error—is now significantly correlated with growth even after controlling for a wide array of public policy indicators. The results on the Soviet, two Gunnemark, and Roberts measures are unaltered when using instrumental variables. Finally, note that the AFRICA dummy is still significant when including ETHNIC, though its magnitude weakens modestly. This can be seen by comparing the AFRICA dummy variable in regressions (1) - (4) of Table IV that include ETHNIC with regressions (1) - (4) of Table I that exclude ETHNIC. The AFRICA dummy falls from -0.018 in Table I, Regression (4) to -0.013 in the analogous regression with ETHNIC in Table IV. The fall in size of the Africa dummy variable and its continued significance do not affect this paper's major objective: investigating whether ethnic diversity affects public policy choices.³²

D. Ethnic Diversity, Political Instability, and Policy Choices

Ethnically fragmented economies may find it difficult to agree on public goods and good policies. They also may be politically unstable. Table VI presents evidence on the effects of ethnic diversity on political instability and policy choices. The simple relationship between ethnic diversity and assassinations is insignificant. There is no evidence that ethnic diversity affects this manifestation of political instability. This lack of correlation is not unique to this indicator—out of a set of nine indicators of political instability, we found only one (constitutional changes) to be correlated with ethnic diversity. A related observation is that Africa does *not* have significantly above average political instability by these measures, despite its well-documented ethnic con-

31. To economize on tables, we do not display the results discussed in this section and in several other subsequent sensitivity checks. The results were provided to the editor and referees, and are available upon request.

32. Put differently, adding enough policy indicators such that the AFRICA dummy variable loses its significance would not help explain why AFRICA has such poor policies.

TABLE VI
DETERMINANTS OF ECONOMIC INDICATORS

Dependent variable	C	ETHNIC	R ²	Number of observations
Log of schooling	1.508 (17.12)	-0.991 (-6.21)	0.08,0.09,0.10	83; 85; 91
Assassinations	1.24E-05 (1.52)	1.03E-06 (0.07)	-0.01,-0.06,-0.02	98; 105; 105
Financial depth	0.417 (11.44)	-0.266 (-3.67)	0.09,0.06,-0.02	94; 100; 103
Black market premium	0.070 (1.82)	0.252 (3.39)	0.05,0.08,-0.04	97; 107; 106
Fiscal surplus/ GDP	-0.026 (-5.48)	-0.013 (-1.37)	-0.14,-0.02,-0.13	55; 87; 82
Log of telephones per worker	4.331 (18.95)	-3.067 (-7.17)	0.21,0.23,0.04	95; 103; 92

t-statistics are in parentheses.

Equations estimated using Seemingly Unrelated Regression procedures.

flicts.³³ These results suggest that, for some countries, high levels of ethnic conflict coexist with governments that for long periods successfully suppress overt political opposition.

Although ethnic diversity is not significantly correlated with fiscal surpluses, ethnic diversity is significantly negatively correlated with school attainment, financial depth, and the number of telephones per worker, and ethnic diversity is significantly positively correlated with the black market premium.³⁴ (Ethnic diversity was also positively correlated with the other infrastructure measures mentioned earlier: electrical system losses and the percentage of roads that are unpaved.) Although the results do not hold for every policy indicator, the data are consistent with the view that ethnic diversity tends to slow growth by making it more difficult to agree on the provision of public goods and policies that

33. The nine measures of political instability were antigovernment demonstrations, assassinations, cabinet changes, constitutional changes, coups, government crises, purges, revolutions, and riots. The source, as in some of the measures used by Barro [1991] and Alesina, Ozler, Roubini, and Swagel [1996], was Banks [1994]. The variables are defined in the Data Appendix. Africa was below average for the whole sample on six of these measures, and above average for three of them; constitutional changes was the only indicator significantly above average for Africa.

34. The associations between ETHNIC and telephones, black market premium, financial depth, and school attainment are also highly significant in a pure cross section.

foster economic growth. Since Africa is much more ethnically diverse than other regions, this feature of African economies helps explain their tendency to choose growth-retarding policies.³⁵

We examined the sensitivity of the finding that ethnic diversity hinders the adoption of growth-promoting public policies. First, we recomputed the Table VI results using the four alternative measures of ethnolinguistic diversity plus the average of the ethnolinguistic diversity indicators. Although the black market premium, which was significantly related to the Soviet ETHNIC, is not significantly related to the other ethnic measures (even though the magnitude and sign of the relationship are similar), schooling, financial depth, and telephones per worker are still strongly related to all four alternative measures of ethnic diversity, and the average of the ethnolinguistic diversity indicators. Thus, each of the ethnic diversity measures is strongly linked to public policy indicators that are highly correlated with long-run growth. We also redid the Table VI results including dummy variables for Africa and Latin America. We find very similar results, except that schooling is not significantly related to ETHNIC at the 0.05 significance level. Finally, we reran the Table VI results excluding African countries even though this substantially reduces the sample size. ETHNIC remains significantly linked with the black market premium and the infrastructure stock. These sensitivity analyses tend to confirm the original conclusion: while every measure of ethnic diversity is not significantly related to every public policy indicator in every subsample of countries, each ethnic diversity measure is significantly related to various public policy indicators that are significantly correlated with economic growth in every subsample that we examined. Moreover, as we exemplify below, the relationship between ethnic diversity and public policy choices is economically large.

We do not claim to have comprehensively detailed the links between ETHNIC and public policies, although polarization predicts poor policy choices in a variety of political economy models. ETHNIC may also weaken the organization of the government in which policies are made, weakening the centralization of control emphasized by Shleifer and Vishny [1993] and weakening the useful checks and balances emphasized by Persson, Roland, and

35. Our results on policy choices in Table VI are largely unaffected by the inclusion of the WAR variable described earlier. While WAR is significantly positively associated with the black market premium and assassination, ethnic diversity has independent effects other than those through war.

Tabellini [1997]. Weaker organization makes competitive rent-seeking more feasible. For example, as Mauro [1995] pointed out, ETHNIC is positively correlated with corruption. We confirmed this in our data: a measure of corruption in 1990 is significantly and positively correlated with ETHNIC measured in 1960. A subjective measure of "rule of law" in 1990 is significantly and negatively correlated with ETHNIC in 1960. Moreover, higher ETHNIC measured in 1960 significantly predicts that a nation will be less democratic in 1990.³⁶

Econometrically, the correlation between ETHNIC and the public policy indicators helps clarify why the partial correlation between long-run growth and some measures of ethnolinguistic diversity are not robust to the inclusion of the wide array of public policy indicators used in regression (4) of Table IV: ethnic diversity affects many of the explanatory variables used in standard growth regressions. Our interpretation of those results is *not* so much that one should throw one more variable—ETHNIC—into growth regressions.³⁷ Our interpretation is that ETHNIC helps explain some of the explanatory variables used in growth regressions and, through these policy indicators, growth itself.

E. Assessing Africa's Performance: The East Asia Comparison

We now put our results in context by comparing East Asia's growth miracle with Africa's growth tragedy. We start by ignoring the role of ethnicity and simply showing how much of the East Asia–Africa growth differential is accounted for by the public policy indicators used in regression (4) of Table IV. By subtracting Africa's value for each explanatory variable from East Asia's country value and multiplying this difference by the regression coefficient (from regression (4) in Table IV), we compute that part of the difference in growth rates between East Asian and African countries associated with each explanatory variable.³⁸ Table II gives the values for the public policy variables. Taken together, Africa's high budget deficits, financial shallowness, substantial

36. Our measures of corruption and rule of law are from the International Country Risk Guide, while our measure of democracy is the well-known Gastil index published by Freedom House.

37. Here we are careful to hedge by using the phrase "... not so much ..." because some measures of ethnolinguistic diversity maintain a robust independent partial correlation with growth after controlling for a wide array of public policy indicators as shown in Table V.

38. Recall that we demonstrated earlier that the coefficients on the explanatory variables are not significantly different for Africa from the rest of the sample.

black market exchange rate premiums, high political instability, weak infrastructure, and low human capital account for 2.6 percentage points of the 3.4 percentage point differential between East Asia and Africa (Table VII.A).³⁹ Although these factors appear to explain most of the East Asia–Africa growth difference, they are offset by one factor that was in Africa’s favor. Africa’s income at the beginning of each decade was much lower than East Asia’s. This convergence effect predicts that Africa should have grown 1.1 percentage points faster than East Asia, so that on net, the non-ETHNIC explanatory variables in regression 4 of Table IV account for 1.5 percentage points (2.6 - 1.1) of the 3.4 percentage point growth differential. The non-ETHNIC variables account for about two-fifths of the growth difference.

Now consider the direct effect of ETHNIC on growth. As discussed above, this direct effect is relatively modest. The direct effect explains an additional 0.2 percentage points of the growth differential. Thus, all explanatory variables in regression (4) of Table IV account for about half (1.7 percentage points) of the difference between East Asian and African growth rates. Of the unexplained differential, most is due to the Africa dummy, and the remainder to the positive East Asia residual.⁴⁰

Next, consider the indirect effect of ETHNIC on growth: ETHNIC helps account for long-run growth differences by explaining public policy decisions. ETHNIC is 0.74 in the 27 observations for the Africa group included in this sample and 0.53 in the 19 observations for the East Asia group. (This sample excludes Korea and Hong Kong, as discussed earlier, so likely understates the difference in ethnic diversity between the two regions.) We use the policy regressions in Table VI to explain how much of the East Asia–Africa policy differences are attributable to ETHNIC. Although these types of calculations may be sensitive to the simple linear functional form that we have used

39. These decomposition results are virtually identical to those obtained from regression (4) of Table I, which does not include ETHNIC. We use the regression results from Table IV to facilitate comparisons across the different scenarios presented in Table VII.A.

40. The positive East Asia residual reminds us that not all of the Africa dummy is necessarily due to “Africa.” The Africa and Latin America dummies reflect how these two underachieving regions compare with the rest of the sample, which includes at least one overachieving region—East Asia. If we put for symmetry a dummy to measure how much of *East Asia’s* performance is not fully captured by the regressions, then the Africa dummy is reduced in magnitude and significance compared with regressions (4) and (5) of Table IV. With the Soviet ETHNIC, AFRICA is just barely significant and with AVG-ETHNIC, the AFRICA dummy is no longer significant.

TABLE VII.A
 DECOMPOSITION OF GROWTH DIFFERENTIAL BETWEEN AFRICA AND EAST ASIA
 (BASED ON REGRESSION (4), TABLE IV WITH SOVIET ETHNIC MEASURE)

	<i>Africa–East Asia growth differential accounted for this variable</i>	<i>% of difference in each variable explained by ETHNIC</i>	<i>Growth differential implicitly explained by ETHNIC through this variable</i>
<i>Political/policy indicator RHS variables:</i>			
Log schooling	0.5%	43%	0.2%
Assassinations	0.0%	3%	0.0%
Financial depth	0.3%	21%	0.1%
Black market premium	0.8%	13%	0.1%
Fiscal surplus/ GDP	0.5%	11%	0.1%
Log telephones per worker	0.5%	60%	0.3%
<i>(1) Total effect through political/policy indicator RHS variables on growth</i>	2.6%	28%	0.7%
ETHNIC—Soviet (the partial effect of ETHNIC in regression (4), Table IV)	0.2%		0.2%
<i>(2) Joint effect of all policy indicator and ETHNIC RHS variables</i>	2.8%	34%	1.0%
Convergence effect (growth effect includes both linear and quadratic terms on initial income)	–1.1%		

TABLE VII.A
CONTINUED

	<i>Africa–East Asia growth differential accounted for this variable</i>	<i>% of difference in each variable explained by ETHNIC</i>	<i>Growth differential implicitly explained by ETHNIC through this variable</i>
(3) <i>Joint growth effect of all RHS variables</i>	1.7%	56%	1.0%
Residual	1.7%		
unexplained difference of which: Africa dummy	1.3%		
(4) <i>Actual per capita growth differential, East Asia–Africa</i>	3.4%	28%	1.0%
<i>Ethnic diversity:</i>			
<i>Africa:</i>	0.744		
<i>East Asia:</i>	0.527		

throughout this paper, we present these calculations to illustrate the potential importance of ethnic diversity on economic growth. We find that ETHNIC indirectly accounts for about 28 percent of the 2.6 percentage point growth difference attributable to political/policy indicators. When we include the direct effects of ETHNIC, ETHNIC alone explains about one percentage point of the 3.4 percentage point East Asia–Africa growth differential.

This calculation is sensitive to measured differences in ethnic diversity, which may in turn be influenced by the countries included in the sample. Consequently, we redo the calculation using the average value of all five ethnolinguistic diversity measures based on regression (5) of Table IV. This measure, AVG-ETHNIC, maximizes sample size because it ignores ethnolinguistic diversity indicators with missing values. The measured difference in ethnic diversity between East Asia–Africa is larger using AVG-ETHNIC (0.257) than with ETHNIC (0.217). The decompo-

sition results in Table VII.B show that AVG-ETHNIC explains 1.4 percentage points of the 3.5 percentage point growth difference between Africa and East Asia, so that AVG-ETHNIC alone accounts for about two-fifths of the growth difference.

As another experiment, we use the ETHNIC extremes—Tanzania (highest Soviet-measured ETHNIC in Africa and also in the world) and Japan (lowest ETHNIC in East Asia and tied for lowest in the world)—to compute the upper bound of the ETHNIC effect. We now find that ETHNIC indirectly accounts for about 50 percent of the Tanzania–Japan growth difference attributable to political/policy indicators (i.e., the counterpart to line (1) in Table VII.A).⁴¹ After adding in the direct ETHNIC effect, ETHNIC accounts for about 4.1 percentage points of the growth difference between Tanzania and Japan (counterpart to line 4 in Table VII.A), which equals the actual growth difference.

In sum, ethnic diversity differences are important for explaining Africa's growth tragedy versus Asia's miracle. The inclusion of ETHNIC in growth regressions modestly weakens the AFRICA dummy that has been a prominent feature of those regressions. But more importantly, ETHNIC helps explain Africa's growth-retarding policies compared with East Asia's growth-promoting ones. The direct and indirect effects of ethnic diversity on growth are economically large. Ethnic diversity alone explains between one-fourth and two-fifths of the East Asia–Africa growth differential and may fully account for some extreme country cases. While hardly supporting a mono-causal view of Africa's difficulties, our results suggest that ethnic divisions have played a significant role in Africa's growth tragedy.

F. Levels of Income and Ethnic Diversity

Some models of growth predict that a country fundamental like ETHNIC would affect the *level* of income rather than its *rate of growth*. It is instructive to see how income is related to ETHNIC. We do this in two ways. First, we regress the levels of income in 1960, 1970, 1980, and 1990 on ETHNIC, using the method of seemingly unrelated regressions. We impose the same coefficient on ETHNIC across decades, but allow for different intercepts. The resulting regression statistics are shown in Table

41. The Tanzania–Japan comparison is done just for the 1970s and 1980s, since Tanzania lacks data for the 1960s. Also, these policy indicators explain more than the total Tanzania–Japan growth differential because they are offset by a substantial convergence advantage for Tanzania.

TABLE VII.B
DECOMPOSITION OF GROWTH DIFFERENTIAL BETWEEN AFRICA AND EAST ASIA
(BASED ON REGRESSION (5), TABLE IV WITH AVERAGE ETHNIC MEASURE)

	<i>Africa–East Asia growth differential accounted for this variable</i>	<i>% of difference in each variable explained by AVG-ETHNIC</i>	<i>Growth differential implicitly explained by AVG-ETHNIC through this variable</i>
<i>Political/policy indicator RHS variables:</i>			
Log schooling	0.6%	56%	0.3%
Assassinations	0.0%	19%	0.0%
Financial depth	0.3%	27%	0.1%
Black market premium	0.8%	7%	0.1%
Fiscal surplus/ GDP	0.4%	15%	0.1%
Log telephones per worker	0.5%	73%	0.4%
<i>(1) Total effect through Political/Policy Indicator RHS variables on growth</i>	2.5%	35%	0.9%
ETHNIC— average of all measures (the partial effect of ETHNIC in regression (5), Table IV)	0.5%	100%	0.5%
<i>(2) Joint effect of all policy indicator and ETHNIC RHS variables</i>	3.0%	46%	1.4%
Convergence effect (growth effect includes both linear and quadratic terms on initial income)	–1.3%		

TABLE VII.B
CONTINUED

	<i>Africa-East Asia growth differential accounted for this variable</i>	<i>% of difference in each variable explained by AVG-ETHNIC</i>	<i>Growth differential implicitly explained by AVG-ETHNIC through this variable</i>
<i>(3) Joint growth effect of all RHS variables</i>	1.8%	78%	1.4%
Residual unexplained difference of which: Africa dummy	1.7% 1.3%		
<i>(4) Actual per capita growth differential, East Asia-Africa</i>	3.5%	40%	1.4%
<i>Ethnic diversity:</i>			
<i>Africa:</i>	0.685		
<i>East Asia:</i>	0.428		

VIII. The coefficient on ETHNIC in the income regressions is large and significant. A movement from complete heterogeneity to complete homogeneity (ETHNIC going from one to zero) is associated with an income increase of 3.8 times. A one-standard-deviation decrease in ETHNIC is associated with an increase in income of 0.4 standard deviations. The relationship between ETHNIC and the level of income also remains statistically significant in the non-Africa sample, as shown in Table VIII.

Our second method to explore the relation of ETHNIC to income level is to do a simple income accounting exercise, to see by which channels ETHNIC is associated with income level. A similar exercise was recently performed by Hall and Jones [1996], who regressed total factor productivity levels on a variety of country fundamentals. We use here the 1980s averages for total factor productivity and capital stocks per worker estimated by King and Levine [1994].

TABLE VIII
 CROSS-SECTIONAL ASSOCIATION OF LEVELS OF OUTPUT PER WORKER, TFP, AND
 CAPITAL PER WORKER WITH ETHNIC FRACTIONALIZATION

<i>(a) Seemingly Unrelated Regressions for log of income in 1960, 1970, 1980, and 1990 on Ethnic Fractionalization</i>		
	Whole sample	Non-Africa sample
Coefficient on ETHNIC	-1.34	-1.18
<i>t</i> -statistic	-5.78	-3.92
<i>R</i> ²	.13,.15,.21,.22	-.08,-.03,.02,.00
± std. dev. change in dependent variable associated with one-standard-deviation increase in ELF	-0.397	-0.350
#observations	105,108,108,106	69,71,71,69
<i>(b) Estimating effect of ethnic fractionalization on TFP and capital per worker</i>		
	<i>Log TFP, average worker, average 1980-1988</i>	<i>Log capital per 1980-1988</i>
<i>Regressions for:</i>		
<i>Whole cross-country sample:</i>		
coefficient on ELF, 1960	-0.91	-2.21
<i>t</i> -statistic	-6.06	-4.97
<i>R</i> ²	0.26	0.21
#observations	101	101
#std. dev. change in dependent variable associated with one-standard-deviation increase in ELF	-0.51	-0.45
<i>Sample excluding Africa:</i>		
coefficient on ELF, 1960	-0.60	-0.97
<i>t</i> -statistic	-2.44	-1.63
<i>R</i> ²	0.11	0.05
#observations	66	66
#std. dev. change in dependent variable associated with one-standard-deviation increase in ELF	-0.35	-0.22

Log TFP calculated as log output per worker - 0.4*log capital per worker.

Source: output per worker and capital per worker are from King and Levine [1994] (based on Summers-Heston output, investment, and labor data).

We find that ETHNIC has a large and statistically significant association with the productivity and capital per worker components of output per worker. A movement from complete heterogeneity to complete homogeneity is associated with a productivity increase of 2.5 times and an increase in capital per worker of 9.2 times. A one-standard-deviation decrease in ETHNIC is associated with half a standard deviation increase in both productivity and capital per worker. Although the capital per worker channel is insignificant in the non-Africa sample, the productivity channel remains robust to change of sample.

Thus, we find that ETHNIC has both growth and level effects on income. Our findings are thus robust to a variety of growth models, given our finding that ETHNIC is negatively related to country characteristics like financial depth, infrastructure, schooling, and the black market premium that would have growth effects in some models and income effects in others. Either way, we find that the effects of ethnic fractionalization are large, and thus help explain Africa's growth tragedy.

IV. CONCLUSIONS

Understanding Africa's growth tragedy requires not only an accounting of the relationship between slow growth and unfavorable country characteristics, but also an understanding of why country characteristics were so unfavorable. Africa's poor growth—and resulting low income—is associated with low schooling, political instability, underdeveloped financial systems, distorted foreign exchange markets, high government deficits, and insufficient infrastructure. High ethnic diversity is closely associated with low schooling, underdeveloped financial systems, distorted foreign exchange markets, and insufficient infrastructure. While motivated by Africa, these results are not particular to Africa. In evaluating the extent to which cross-country differences in ethnic diversity explain cross-country differences in public policies and political stability, we conduct the analysis on a broad cross section of countries. The results lend support to theories that interest group polarization leads to rent-seeking behavior and reduces the consensus for public goods, creating long-run growth tragedies

DATA APPENDIX

Code	Description	Source
AFRICA	Dummy variable for Sub-Saharan African countries (according to World Bank definition).	World Bank: AGO, BDI, BEN, BWA, CAF, CIV, CMR, COG, COM, CPV, DJI, ETH, GAB, GHA, GIN, GMB, GNB, GNQ, HVO, KEN, LBR, LSO, MDG, MLI, MOZ, MRT, MUS, MWI, NAM, NER, NGA, RWA, SDN, SEN, SLE, SOM, STP, SWZ, SYC, TCD, TGO, TZA, UGA, ZAF, ZAR, ZMB, ZWE.
AGOVDEM	Antigovernment demonstrations: any peaceful public gathering of at least 100 people for the primary purpose of displaying or voicing their opposition to government policies or authority, excluding demonstrations of a distinctly antiforeign nature.	Banks [1994]
ASSASS	Assassinations: number of assassinations per thousand population, decade average.	Banks [1994]
AVELF	Average value of ETHNIC and Muller, Roberts, and Gunnemark 1 and 2.	
BLCK	Black market premium: log of 1+ black market premium, decade average.	World Bank [1991] and Pick's Currency Yearbook [various years]
CABCHG	Major cabinet changes: the number of times in a year that a new premier is named and/or 50% of the cabinet posts are occupied by new ministers.	Banks [1994]
COMPOLT	Dummy = 1 for countries with genocidal incident involving ethnic victims or mixed ethnic and political victims.	Harff and Gurr [1995]
CONSTCHG	Major constitutional changes: the number of basic alternations in a state's constitutional structure, the extreme case being the	Banks [1994]

DATA APPENDIX CONTINUED

Code	Description	Source
	adoption of a new constitution that significantly alters the prerogatives of the various branches of government.	
CORRUPTI	Measure of corruption (1980–1989)	Political Risk Services [various years]
CORRUPTM	Mauro measure of corruption (1980–1983)	Mauro [1995]
COUPS	Coups d'état: the number of extraconstitutional or forced changes in the top government elite and/or its effective control of the nation's power structure in a given year. Unsuccessful coups are not counted.	Banks [1994]
DEMOC	Measure of democracy (Gastil's Political Rights)	Gastil [1990, 1987]
DUM60	Dummy variable for 1960s	
DUM70	Dummy variable for 1970s	
DUM80	Dummy variable for 1980s	
ELF60	ETHNIC: index of ethnolinguistic fractionalization, 1960. Measures probability that two randomly selected people from a given country will not belong to the same ethnolinguistic group.	<i>Atlas Narodov Mira</i> [1964]
GOVTCRIS	Major government crises: any rapidly developing situation that threatens to bring the downfall of the present regime—excluding situations of revolt aimed at such overthrow.	Banks [1994]
GYP	Growth rate of real per capita GDP	World Bank [various years]
GUNN1	Gunnemark1: percent of population not speaking the official language.	Gunnemark [1991]

DATA APPENDIX CONTINUED

Code	Description	Source
GUNN2	Gunnemark2: percent of population not speaking the most widely used language.	Gunnemark [1991]
LATINCA	Dummy variable for Latin America and the Caribbean	
LLY	Financial depth: ratio of liquid liabilities of the financial system to GDP, decade average. Liquid liabilities consist of currency held outside the banking system + demand and interest-bearing liabilities of banks and nonbank financial intermediaries.	King and Levine [1993b]
LRGDP	Log of initial income: log of real per capita GDP measured at the start of each decade (1960, 1970, 1980).	Summers and Heston [1988]
LRGDPSQ	(Log of initial income) squared: log of initial real per capita GDP squared.	Summers and Heston [1988]
LSCHOOL	Log of schooling: log of 1 + average years of school attainment, beginning of each decade (1960, 1970, and 1980).	Barro and Lee [1993]
LTELPW	Log of telephones per worker: log of telephones per 1000 workers.	Canning and Fay [1993]
MULLER	Probability of two randomly selected individuals speaking different languages.	Muller [1964]
PAVROAD	Paved road (% of total).	World Resources Institute [1992]
POWLOSS	Power losses (percent).	World Bank [1994b]
PROP90	Proportion of population belonging to minorities at risk in 1990.	Gurr [1993]

DATA APPENDIX CONTINUED

Code	Description	Source
PURGES	Purges: any systematic elimination by jailing or execution of political opposition within the ranks of the regime or the opposition.	Banks [1994]
RACIALT	Racial tension for 1984, 1 (low tension) to 6 (high tension).	Knack and Keefer [1995]
REVOLS	Revolutions: any illegal or forced change in the top governmental elite, any attempt at such a change, or any successful or unsuccessful armed rebellion whose aim is independence from the central government.	Banks [1994]
RIOTS	Riots: any violent demonstration or clash of more than 100 citizens involving the use of physical force.	Banks [1994]
ROBERTS	Probability that two randomly selected individuals do not speak the same language.	Roberts [1962]
RULELAW	Rule of law: law and order tradition (0–6 scale).	Political Risk Services [various years]
SEPART60	Percent of population belonging to separatist movements, 1960.	Taylor and Jodice [1983]
SEPART75	Percent of population belonging to separatist movements, 1975.	Taylor and Jodice [1983]
SURP	Fiscal surplus/GDP: decade average of ratio of central government surplus (+) to GDP, both in local currency, current prices.	IMF [various years] <i>International Financial Statistics</i> (line 80), and IMF [various years] <i>Government Finance Statistics</i> (line L 80)
WAR	Dummy for war on national territory during the decade.	Sivard [1993]
WARCIV	Dummy for civil war.	Sivard [1993]

REFERENCES

- Ake, Claude, *Democracy and Development in Africa* (Washington, DC: The Brookings Institution, 1996).
- Alesina, Alberto, "Political Models of Macroeconomic Policy and Fiscal Reforms," in Stephen Haggard and Steven Webb, eds. *Voting for Reform: Democracy, Political Liberalization, and Economic Adjustment* (New York, NY: Oxford University Press, 1994).
- Alesina, Alberto, Reza Baqir, and William Easterly, "Public Goods and Ethnic Divisions," Harvard University and World Bank mimeo, March 1997.
- Alesina, Alberto, and Allen Drazen, "Why Are Stabilizations Delayed?" *American Economic Review*, LXXXI (1991), 1170–1188.
- Alesina, Alberto, Sule Ozler, Nouriel Roubini, and Phillip Swagel, "Political Instability and Economic Growth," *Journal of Economic Growth*, I (1996), 189–211.
- Alesina, Alberto, and Dani Rodrik, "Distributive Politics and Economic Growth," *Quarterly Journal of Economics*, CIX (1994), 465–490.
- Alesina, Alberto, and Enrico Spolaore, "On the Number and Size of Nations," *Quarterly Journal of Economics*, CII (1997), 1027–1056.
- Alesina, Alberto, and Guido Tabellini, "External Debt, Capital Flight and Political Risk," *Journal of International Economics*, XXVII (1989), 199–220.
- Aschauer, David A., "Is Public Expenditure Productive?" *Journal of Monetary Economics*, XXIII (1989), 177–200.
- Atlas Narodov Mira* (Moscow: Miklukho-Maklai Ethnological Institute at the Department of Geodesy and Cartography of the State Geological Committee of the Soviet Union, 1964)
- Banks, Arthur S., "Cross-National Time Series Data Archive," Center for Social Analysis, State University of New York at Binghamton, 1994.
- Barkan, Joel, with Michael Chege, "Decentralising the State: District Focus and the Politics of Reallocation in Kenya," *Journal of Modern African Studies*, XXVII (1989), 431–453.
- Barro, Robert, "Economic Growth in a Cross Section of Countries," *Quarterly Journal of Economics*, CVI (1991), 407–443.
- Barro, Robert, and Jong-Wha Lee, "International Comparisons of Educational Attainment," *Journal of Monetary Economics*, XXXII (1993), 363–394.
- Barro, Robert, and Xavier Sala-i-Martin, "Convergence," *Journal of Political Economy*, C (1992), 223–251.
- Bates, Robert H., *Markets and States in Tropical Africa: the Political Basis of Agricultural Policies* (Berkeley, CA: University of California Press, 1981).
- , *Beyond the Miracle of the Market: The Political Economy of Agrarian Development in Kenya* (Cambridge and New York: Cambridge University Press, 1989).
- Baumol, William J., Sue Anne Batey Blackman, and Edward N. Wolff, *Productivity and American Leadership: The Long View* (Cambridge, MA: MIT Press, 1992).
- Berg, Elliot, "L'Integration Economique en Afrique de l'Ouest: Problemes et Strategies," *Revue d'Economie du Developpement*, XCIII (1993), 51–82.
- Bevan, David, Paul Collier, and Jan Willem Gunning, "Trade Shocks in Developing Countries: Consequences and Policy Responses," *European Economic Review*, XXXVII (1993), 557–565.
- Blomstrom, Magnus, and Mats Lundahl, eds., *Economic Crisis in Africa: Perspectives on Policy Responses* (New York, NY: Routledge, 1993).
- Borgin, Karl, and Kathleen Corbett, *The Destruction of a Continent: Africa and International Aid* (San Diego, CA: Harcourt Brace Jovanovich, 1982).
- Bouton, Lawrence, Christine Jones, and Miguel Kiguel, "Macroeconomic Reforms and Growth in Africa: *Adjustment in Africa* Revisited," Working Paper Series No. 1394, Washington, DC, World Bank, 1994.
- Breton, Roland J.-L., *Geolinguistics: Language Dynamics and Ethnolinguistic Geography* (Ottawa, Canada: University of Ottawa Press, 1991).
- Canning, David, and Marianne Fay, "The Effect of Transportation Networks on Economic Growth," Discussion Paper Series, Columbia University, Department of Economics, 1993.
- Chazan, Naomi, "Ethnicity and Politics in Ghana," *Political Science Quarterly*, XCVII (Fall 1982), 461–485.

- , *Elections in Independent Africa*, Fred M. Hayward, ed. (Boulder, CO: Westview Press, Westview Special Studies on Africa, 1987).
- , *The Precarious Balance: State and Society in Africa*, Naomi Chazan and Donald Rothchild, eds. (Boulder, CO: Westview Press, 1988).
- Chazan, Naomi, and Deborah Pellow, *Ghana, Coping with Uncertainty* (Boulder, CO: Westview Press, 1986).
- Chhibber, Ajay, and Stanley Fischer, eds., *Economic Reform in Sub-Saharan Africa* (Washington, DC: World Bank, 1992).
- Cohen, John M., "Ethnicity, Foreign Aid, and Economic Growth: The Case of Kenya," HIIID Development Discussion Paper No. 520, 1995.
- Collier, Paul, and J.W. Gunning, "Aid and Exchange Rate Adjustment in African Trade Liberalization," *Economic Journal*, CII (1992), 925–939.
- Collier, Paul, and Colin Mayer, "Financial Liberalization, Financial Systems, and Economic Growth: The Assessment," *Oxford Review of Economic Policy*, V (1989), 1–12.
- Davidson, Basil, *Black Man's Burden: Africa and the Curse of the Nation-State* (New York, NY: Times Books, 1992).
- Easterly, William, "Economic Stagnation, Fixed Factors, and Policy Thresholds," *Journal of Monetary Economics*, XXXIII (1994), 525–557.
- Easterly, William, and Sergio Rebelo, "Fiscal Policy and Economic Growth: An Empirical Investigation," *Journal of Monetary Economics*, XXXII (1993), 417–457.
- Elbadawi, Ibrahim, "World Bank Adjustment Lending and Economic Performance in Sub-Saharan Africa in the 1980s: A Comparison of Early Adjusters, Late Adjusters, and Nonadjusters," Working Paper Series No. 1001, Washington, DC, World Bank, 1992.
- Elbadawi, Ibrahim, and Benno Ndulu, "Long-Term Development and Sustainable Growth in Sub-Saharan Africa," AERC, mimeo, 1994.
- Enke, Stephen, *Economics for Development* (London: Dennis Dobson, 1963).
- Estes, Richard J., *The Social Progress of Nations* (Praeger, 1984).
- Fischer, Stanley, "The Role of Macroeconomic Factors in Growth," *Journal of Monetary Economics*, XXXII (1993), 485–511.
- Fosu, Augustin K., "Effect of Export Instability on Economic Growth in Africa," *Journal of Development Areas*, XXVI (1992a), 323–332.
- , "Political Instability and Economic Growth: Evidence from Sub-Saharan Africa," *Economic Development and Cultural Change*, XL (1992b), 829–841.
- Frimpong-Ansah, Jonathan, *The Vampire State in Africa: The Political Economy of Decline in Ghana* (London: James Currey Limited, 1991).
- Gastil, R. D., "The Comparison Survey of Freedom: Experiences and Suggestions," *Studies in Comparative International Development*, XXV (1990), 25–50.
- , *Freedom in the World: Political Rights and Civil Liberties 1986–1987* (Westport, CT: Greenwood Press, 1987).
- Glickman, Harvey, *The Crisis and Challenge of African Development* (New York, NY: Greenwood Press, 1988).
- Grimes, Barbara, ed. *Ethnologue: Languages of the World*, 12th ed. (Dallas, TX: Summer Institute of Linguistics, 1992).
- Gunnemark, Erik V., *Countries, Peoples and Their Languages: The Linguistic Handbook* (Gothenburg, Sweden: Lanstryckeriet, 1991).
- Gurr, Ted Robert, *Minorities at Risk: A Global View of Ethnopolitical Conflicts* (Washington, DC: United States Institute of Peace Press, 1993).
- Gyimah-Brempong, Kwabena, "Export Instability and Economic Growth in Sub-Saharan Africa," *Economic Development and Cultural Change*, XXXIX (1991), 815–28.
- Hadjimichael, Michael T., Dhaneshwar Ghura, Martin Muhleisen, Roger Nord, and E. Murat Ucer, "Effects of Macroeconomic Stability on Growth, Savings, and Investment in Sub-Saharan Africa: An Empirical Investigation," IMF Working Paper 94/98, 1994.
- Hall, Robert E., and Charles I. Jones, "The Productivity of Nations," NBER Working Paper No. 5812, November 1996.
- Harff, Barbara, and Ted Robert Gurr, "Victims of the State: Genocides, Politicides and Group Repression from 1945 to 1995," University of Maryland, mimeo, 1995.
- Haugerud, Angelique, *The Culture of Politics in Modern Kenya* (Cambridge, MA: Cambridge University Press, 1995).

- Helleiner, Gerald K, *Theory and Reality in Development: Essays in Honor of Paul Streeten*, Saniaya Lall, and Stewart Frances, eds. (New York, NY: St. Martin's Press, 1986).
- Herbst, Jeffrey, *The Politics of Reform in Ghana, 1982-91* (Berkeley, CA: University of California Press, 1993).
- Husain, Ishrat, and Rashid Faruquee, eds. *Adjustment in Africa: Lessons from Case Studies* (Washington, DC: World Bank, 1994).
- International Monetary Fund, *International Financial Statistics* (Washington, DC: various years).
- , *Government Finance Statistics* (Washington, DC: various years).
- James, Estelle, "Why Do Different Countries Choose a Different Public-Private Mix of Educational Services?" *Journal of Human Resources*, XXVIII (Summer 1993), 571-592.
- Kamarck, Andrew M., *The Economics of African Development* (New York, NY: Praeger, 1967).
- Kidron, Michael, and Ronald Segal, *The State of the World Atlas*, 5th ed. (Hong Kong: Penguin Books, 1995).
- Killick, Tony, "The Developmental Effectiveness of Aid to Africa," Working Paper Series No. 646, Washington, DC, World Bank, 1991.
- King, Robert G., and Ross Levine, "Finance and Growth: Schumpeter Might Be Right," *Quarterly Journal of Economics*, CVIII (1993a), 717-738.
- King, Robert G., and Ross Levine, "Finance, Entrepreneurship, and Growth: Theory and Evidence," *Journal of Monetary Economics*, XXXII (1993b), 513-542.
- King, Robert G., and Ross Levine, "Capital Fundamentalism, Economic Development, and Economic Growth," *Carnegie-Rochester Series on Public Policy*, XL (1994), 259-292.
- Kloss, Heinz, and Grant D. McConnell. *The Written Languages of the World: A Survey of the Degree and Modes of Use* (Quebec: Les Presses de l'Université Laval, 1978).
- Knack, Stephen, and Philip Keefer, "Institutions and Economic Performance: Cross-Country Tests Using Alternative Institutional Measures," *Economics and Politics*, VII (1995), 207-227.
- Kurian, George T. *New Book of World Rankings*, 3rd edition (New York NY: Facts on File, 1991).
- Lane, Philip, and Aaron Tornell, "Power Concentration and Growth," Harvard Institute of Economic Research, Discussion Paper No. 1720, Harvard University, 1995.
- La Porta, Rafael, Florencio López-de-Silanes, Andrei Shleifer, and Robert W. Vishny, "Law and Finance," NBER Working Paper No. 5661, July 1996.
- Levine, Ross. "Law, Finance, and Economic Growth," University of Virginia, mimeo, 1997.
- Levine, Ross, and David Renelt, "Sensitivity Analysis of Cross-Country Growth Regressions," *American Economic Review*, LXXXII (1992), 942-963.
- Levine, Ross, and Sara J. Zervos, "What We Have Learned about Policy and Growth from Cross-Country Regressions," *American Economic Review, Papers and Proceedings*, LXXXIII (1993), 426-30.
- Lewis, John Prior, *Development Strategies Reconsidered* (New Brunswick, NJ: Transaction Books, 1986).
- Lindenberg, Marc M. *The Human Development Race: Improving the Quality of Life in Developing Countries* (International Center for Economic Growth, 1993).
- Mauro, Paolo, "Corruption and Growth," *Quarterly Journal of Economics*, CX (1995), 681-712.
- McCarty, Therese, "Demographic Diversity and the Size of the Public Sector," *Kyklos*, LXVI, (1993), 225-240.
- Mikell, Gwendolyn, *Cocoa and Chaos in Ghana* (New York, NY: Paragon House, 1989).
- Miller, Norman, and Rodger Yeager, *Kenya: The Quest for Prosperity* (Boulder, CO: Westview Press, 1994).
- Milne, R. S. *Politics in Ethnically Bipolar States: Guyana, Malaysia, Fiji* University of British Columbia Press (Vancouver: 1981).
- Mueller, Dennis C. and Peter Murrell, "Interest Groups and the Size of Government," *Public Choice*, XLVIII (1986) 125-45.
- Muller, Siegfried H., *The World's Living Languages: Basic Facts of Their Struc-*

- ture, Kinship, Location, and Number of Speakers (New York, NY: Ungar, 1964).
- Ndulu, Benno J., *Economic Reform in Sub-Saharan Africa*, Ajay Chhibber and Stanley Fischer, eds. (Washington, DC: World Bank, 1991).
- Nyangira, Nicholas, *The Political Economy of Kenya*, Michael G. Schatzberg, ed. (New York, NY: Praeger, 1987).
- Pack, Howard, "Productivity and Industrial Development in Sub-Saharan Africa," *World Development*, XXI (1993), 1-16.
- Pakenham, Thomas, *The Scramble for Africa* (New York, NY: Random House, 1991).
- Persson, Torsten, Gérard Roland, and Guido Tabellini, "Separation of Powers and Accountability," *Quarterly Journal of Economics*, CXII (1997), 1163-1202.
- Persson, Torsten, and G. Tabellini, "Is Inequality Harmful for Growth?" *American Economic Review*, LXXXIV (1994), 600-621.
- Pickett, James, "Low-Income Economies of Sub-Saharan Africa: Problems and Prospects," *African Development Bank, Economic Research Papers*, XII (1990), 1-48.
- Pick's Currency Yearbook (New York, NY: Pick Publishing Corporation, various years).
- Political Risk Services, *International Country Risk Guide* (Syracuse, NY: various years).
- Poterba, James M. "Demographic Structure and the Political Economy of Public Education," NBER Working Paper No. 5677, July 1996.
- Ravenhill, John, ed., *Africa in Economic Crisis* (Basingstoke, NH: Macmillan, 1986).
- Rimmer, Douglas, ed., *Africa 30 Years On* (London: Villiers Publications Ltd., 1991).
- , *Staying Poor: Ghana's Political Economy 1950-1990* (New York, NY: Pergamon Press, 1992).
- Roberts, Janet, "Sociocultural Change and Communication Problems," in *Study of the Role of Second Languages in Asia, Africa, and Latin America*, Frank A. Rice, ed. (Washington DC: Center for Applied Linguistics of the Modern Language Association of America, 1962), pp. 105-123.
- Ruhlen, Merritt, *A Guide to the World's Languages, Volume 1: Classification* (Stanford, 1987).
- Rustow, Dankwart A., *A World of Nations: Problems of Political Modernization* (Washington, DC: Brookings Institution, 1967).
- Sadiq Ali, Shanti, and Anirudha Gupta, eds., *Africa: Dimensions of the Economic Crisis; An Analysis of the Problems and Constraints of Development* (New Delhi: Sterling Publishers, 1987).
- Scarritt, James R., *Minorities at Risk: A Global View of Ethnopolitical Conflicts*, Ted Robert Gurr, ed. (Washington, DC: United States Institute of Peace Press, 1993).
- Shleifer, Andrei, and Robert Vishny, "Corruption," *Quarterly Journal of Economics*, CVIII (1993), 599-617.
- Sivard, Ruth L., *World Military and Social Expenditures: 1993*, 15th ed. (Washington, DC: World Priorities, 1993).
- Soludo, Charles C., "Growth Performance in Africa: Further Evidence on the External Shocks versus Domestic Policy Debate," UNECA Development Research Paper Series No. 6 (November), United Nations, 1993.
- Summers, R., and A. Heston, "A New Set of International Comparisons of Real Product and Price Levels Estimates for 130 Countries, 1950-1985," *Review of Income and Wealth*, XXXIV (1988), 1-25.
- Taylor, Charles Lewis, and Michael C. Hudson, *World Handbook of Political and Social Indicators*, 2nd ed. (New Haven, CT: Yale University Press, 1972).
- Taylor, Charles Lewis, and David A. Jodice, *World Handbook of Political and Social Indicators*. Vol. I, 3rd ed. (New Haven, CT: Yale University Press, 1983).
- Throup, David W., *The Political Economy of Kenya* Michael G. Schatzberg, ed. (New York, NY: Praeger, 1987).
- Turok, Ben, *Africa: What Can Be Done?* (London: Zed Books, 1987).
- Wetzels, Deborah L., *The Macroeconomics of Fiscal Deficits in Ghana: 1960-94*, Ph.D. thesis, Oxford University, 1995.
- Wheeler, David, "Sources of Stagnation in Sub-Saharan Africa," *World Development*, XII (1984), 1-23.

- World Bank, *Accelerated Development in Sub-Saharan Africa: An Agenda for Action* (Washington, DC: World Bank, 1981).
- , *Sub-Saharan Africa: from Crisis to Sustainable Growth—a Long-Term Perspective Study* (Washington DC: World Bank, 1989).
- , *World Development Report 1991: The Challenge of Development* (New York, NY: Oxford University Press, 1991).
- , *Adjustment in Africa: Reforms, Results, and the Road Ahead* (New York, NY: Oxford University Press, 1994a).
- , *World Development Report 1994* (New York, NY: Oxford University Press, 1994b).
- , *World Bank National Accounts* (Washington, DC: World Bank, various years).
- World Resources Institute, *World Resources: 1992–93* (New York, NY: Oxford University Press, 1992).