Economic Growth and Democracy in Africa: Revisiting the Feldstein-Horioka Puzzle

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Introduction

Concerns about increasing mass poverty in Africa have generated a large body of theoretical and empirical literature. The consensus among experts centres on two major internal causes for this African predicament. First, African countries are poor because they lack investment opportunities and capital to sustain economic prosperity (Barro, 1991). From this perspective, how much a nation saves and invests is a key determinant of its standard of living (Servén and Solimano, 1993). Robert Barro's work is representative of this view (1991). He has shown in his endogenous growth model that all countries, except those in Africa, are currently converging to standards of living compatible with their saving and investment in education.

The second argument among experts attributes the African predicament to autocratic rule or the absence of democratic institutions capable of fostering both good governance and economic prosperity (*The Economist*, 2004; van de Walle, 2001). For many scholars, there is no way of explaining the extreme poverty of many nations without taking into account the extent to which they are misgoverned (Olson, 1999). Even though democracy is posited as a palliative for Africa's low economic growth, the relationship between economic growth and democracy remains controversial in the scholarly literature. Several studies have produced contradictory evidence and thus uncertain policy implications. Adam Przeworski and Fernando Limongi's survey of 21 articles published on the subject between 1966 and 1992 showed that eight of the 21 articles found that democracies grow faster, eight found that authoritarian regimes grow faster, and five found no relationship at all (1993). To complicate the

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debate further, recent research suggests that democracy has only an indirect positive effect on economic growth because it increases levels of human capital and quality of life (see Emizet, 2000).

Another positive, indirect benefit of democratic governance is foreign investment. The predictable, rule-bound institutions associated with democratic governance tend to stimulate capital inflows that can foster growth. Unfortunately, stable, democratic institutions have been rare in Africa. Bhattacharya et al. (1997: 3) note in a survey of managers from private banks and mutual fund companies that investors perceive the risks to be higher in Africa than in other regions because of a lack of democratic governance.

There is yet another important investment benefit associated with the spread of democracy. In their analysis of OECD (Organization for Economic Co-Operation and Development) countries, which are all democracies, Martin Feldstein and Charles Horioka (FH, 1980) contend that investment opportunities are largely financed from domestic saving rather than from cross-national and foreign corporate ventures. Since African countries are notorious for capital outflows rather than capital inflows, the spread of democracy might not only help increase external investment but it might also provide the stable political environment necessary for higher domestic saving.

The two prominent prescriptions for Africa's poverty are thus interrelated in a way that has rarely been appreciated in the literature. Unfortunately, to date no study has attempted to empirically map the relations among democracy, investment, saving and economic growth in the African setting within the FH framework. In fact, the FH hypothesis, a crucial link between the democracy and capital accumulation perspectives, has yet to be assessed within the democracy-economic growth debate. This paper attempts to fill this gap by first testing the FH hypothesis and then analyzing the effects that each of the four variables above have on each other.

Another major weakness of extant literature that this article intends to remedy is methodological. With few exceptions, most early analyses of Africa within the democracy-economic growth debate were qualitative. Qualitative analyses allowed our understanding of the relationship between economic performance and democracy to advance only so far. Since they tended to focus on only a handful of countries, qualitative studies were not generalizable. However, extant quantitative studies on Africa that rely on cross-sectional regressions and studies that use time series cross-sectional (TSCS) methods are also limited for several reasons.

As a number of recent critiques emphasize, TSCS methods often suffer from omitted variable bias as a result of heterogeneity (Green et al., 2001). Questions have subsequently been raised about the reliability of the results produced by TSCS methods. Common quantitative

Abstract. The debate on the relationship between economic performance (sustained economic growth, saving and investment) and democracy remains unsettled. This article provides a critical review of the arguments by relying on the Feldstein-Horioka puzzle. A generalized method of moments (GMM) using 37 African countries from 1960 to 1998 reveals a close relationship among indicators of economic performance but no relationship between economic performance and democracy. Co-integration and vector error correction models contradict GMM results, however. Democracy fosters investment in eight countries, enhances saving in three other countries and sustains economic growth in five. Therefore, single country analyses using appropriate methodologies seem warranted to avoid putting forth ecological fallacies with detrimental policy implications.

Résumé. Le débat sur la relation entre performance économique (croissance économique soutenue, épargne et investissement) et démocratie est encore loin d'être clos. Cet article fait une analyse critique des thèses en présence en se basant sur le paradoxe de Feldtsein-Horioka. L'analyse de 37 pays africains de 1960 à 1998 utilisant la méthode des moments généralisée (MMG) démontre un lien étroit entre les divers indicateurs de performance économique, mais aucun lien entre ceux-ci et la démocratie. Cependant, la cointégration et les modèles vectoriels à correction d'erreurs contredisent les résultats basés sur la MMG. En effet, la démocratie favorise l'investissement dans huit pays, encourage l'épargne dans trois autres pays, et soutient la croissance économique dans cinq pays. Il semble justifié, par conséquent, de recourir à des analyses individuelles par pays utilisant des méthodologies appropriées pour éviter des erreurs écologiques aux répercussions néfastes sur la politique économique.

techniques can be problematic in another way as well. The process of aggregating and pooling cross-sectional data can lead to faulty inferences about the causal relationships between variables in specific countries. This study demonstrates that seemingly robust findings for pooled data are either insignificant or signed incorrectly when methods that model cross-sectional heterogeneity are employed. Of course, such concern about proper methods is not merely an academic issue. The substantive impact of common economic growth models resonates widely. If decision makers refer to the growing body of cross-national quantitative studies when crafting policy for the African predicament, the results could be disastrous.

This article addresses the methodological limitations of much extant quantitative research on Africa's economic woes by using co-integration and error correction models (ECMs)[1] of 37 African countries from 1960 to 1998. These methods allow researchers to look across both states and time while simultaneously taking country variations into account. The few studies that have used these methods to test the FH puzzle and growth have only focused on developed countries and other countries outside Africa. Given the gravity of the African economic situation, it is time to employ adequate and reliable methods to help bring understanding to the continent's plight. By using co-integration and ECMs, this article takes a first step toward providing a more complete understanding of the FH puzzle, growth and democracy in the African setting.

The first section summarizes the literature. A brief presentation of the research design follows. The third section presents the statistical analysis. The last section concludes the paper.

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The FH Puzzle, Economic Growth and Democracy: A Review

Economic growth and investment-saving nexus

The literature on economic growth is extensive. Most studies rely on the baseline neoclassical growth model that emphasizes the positive role of physical capital in affecting economic growth (Solow, 1956). Ross Levine and David Renelt (1992) have shown in their neoclassical growth model that even when a number of policy variables are controlled for, the only robust estimate to explain economic growth is investment as a share of gross domestic product (GDP). Investment in human capital may be important for growth, as endogenous growth models have demonstrated (Barro, 1991; Mankiw et al., 1992).

Despite increasing evidence of the importance of physical and human capital, some scholars question whether the "Solow model" fits Africa. Several economists have included an African dummy variable in their growth models to capture the continent's uniqueness (for example, Barro and Lee, 1993). The statistical significance of this dummy in cross-section regression analyses suggests that Africa's economic growth responds to different variables from those that explain growth elsewhere. Moreover, research that has eliminated the dummy has only transferred the puzzle elsewhere (Collier and Gunning, 1999).

Jeffrey Sachs and Andrew Warner's works are illustrative (1995, 1997). They demonstrated that states with a high ratio of natural resource exports to GDP, such as African countries, had abnormally slow growth rates between 1971 and 1989 (1995 paper). The correlation remained statistically significant even after controlling for a wide range of growth-related variables and several structural factors common in Africa, such as the lack of openness, a dominant primary exporting sector, landlocked economy, low life expectancy and tropical climate. Interestingly, investment rate became statistically insignificant.

More specifically, Sachs and Warner show that trade liberalization, a rare commodity in Africa, best explains disparities in economic growth between countries and regions (1997). Their conclusion is not universally accepted, however. In a regression analysis of 32 countries (of which 13 were African), Greenaway et al. (1997) found that trade liberalization had a negative impact on growth. They explain this outcome by the fact that liberalization has a positive impact on investment, which positively correlates with growth. Anke Hoeffler (2002) also rejects the hypothesis put forth by Sachs and Warner. By taking into account unobserved country-specific effects and the endogeneity of life expectancy, Hoeffler found in her GMM model that investment remained statistically significant in the growth regressions, despite controlling for openness. She concluded that the African dummy was the result of estimation

issues. Several other studies that have controlled for the negative effects of political instability (Brun, 1999; Gyimah-Brempong and Traynor, 1999) and ethnic fractionalization (Easterly and Levine, 1997) also indicate the robustness of investment as a share of GDP in explaining Africa's economic growth.

A different line of analysis asserts that saving rather than investment is the driving engine of economic growth. Gustav Papanek's cross-country regression analysis of 34 countries for the 1950s and 51 countries for the 1960s demonstrates that when foreign aid, foreign investment, domestic saving, and other resources are treated as separate independent variables, the saving rate explains over a third of economic growth (1973). However, other scholars contend that causality flows from economic growth to saving. This perspective views an increase in saving as the result of raising income when economic agents make decisions by taking the future into account (Fershtman and Weiss, 1993). A high economic growth rate increases wealth, but because wealth and consumption are interchangeable, consumption rises less than proportionately, thereby raising saving (Cole et al., 1992). Although ample evidence exists to support this contention in the OECD, there is limited empirical evidence that citizens in less developed countries (LDCs) respond to temporary income increases by increasing their saving (Carroll and Weil, 1994). A GMM analysis of 123 countries over the period 1961 to 1994 by Attanasio et al. (2000) finds a link between these two variables and investment (2000). They demonstrate that lagged saving positively Granger causes[2] investment rates, lagged investment rates positively Granger cause growth rates, and lagged growth rates positively Granger cause investment rates.

The relationship between investment and economic growth as well as that between saving and economic growth seem to suggest a major endogeneity issue between saving and investment. Nonetheless, most macroeconomic textbooks contend that the determinants of saving are different from those of investment (Gordon, 2003; Mankiw, 2000). Saving is said to depend mainly on income and wealth, and investment depends on profitability and risk. Thus, saving and investment can clearly differ ex ante. In a closed economy, however, national saving and domestic investment must be equal ex post. If saving rises, investment must also rise. This is not the case in an open economy and a world of unrestricted capital mobility, where the investment critical for growth may flow in from outside the country (Frankel, 1992).

The relative importance of saving and capital mobility was the object of a now classic analysis by FH (1980). By observing the relationship between saving and investment rates across countries, they claim to be able to test the hypothesis that capital is highly mobile across countries. They estimate cross-country regressions of the share of gross domestic investment in GDP as endogenous and the share of gross domestic

saving in GDP as exogenous. Using data from OECD democracies, FH (1980) obtain a significant coefficient that ranges between 0.85 and 0.95. They conclude that between 85 and 95 per cent of national saving is invested in the country of origin, and reject the hypothesis of perfect capital mobility. This discovery contradicts the widely held belief that "with perfect world capital mobility, there should be no relation between domestic saving and domestic investment: saving in each country responds to the worldwide opportunities for investment while investment in that country is financed by the worldwide pool of capital" (FH, 1980: 317).

FH (1980) further examine the possibility that the correlation between saving and investment varies with the degree of openness of the economy (measured as the share of trade in GDP) and with the size of the economy (the logarithm of GDP as a proxy for size). They find "no evidence that the relationship varied in relation to either the size of the economy or the importance of international trade" (FH, 1980: 325). A number of subsequent studies have confirmed the FH's finding that international capital mobility is limited (Dooley et al., 1987; Tesar, 1991). Moreover, the correlation between saving and investment may be evidence of a successful balance-of-payments policy (Argimon and Roldan, 1994).

Of course, the FH hypothesis does not remain unchallenged (see Barkoulas et al., 1996). Jeffrey Sachs (1981) was among the first to contradict the saving-investment nexus in his analysis of fluctuations in the current account balance of LDCs and OECD economies. Sachs regressed the current account on national saving and domestic investment, and established a significant negative correlation between investment and the balance on the current account. His view is that "variations in investment demand have dominated the medium-run behaviour of current accounts and exchange rates in the 1970s" (Sachs, 1981: 203). Other scholars argue that the inclusion of large industrialized countries in the same sample with LDCs may cause an upward bias in the estimated correlation between saving and investment. Small and poor countries can be expected to experience larger capital flows than will large industrialized countries (Harberger, 1980). Further complicating the issue, single studies of OECD and Asian countries have concluded that the saving-investment nexus cannot be generalized across countries (Anoruo, 2001; Barkoulas et al., 1996; Coakley et al., 1996).

Recapitulation 1. The initial argument of this review is the FH hypothesis, that capital is not mobile across countries. Thus, the first hypothesis is that exogenous changes in national saving have a positive effect on capital formation (**Hypothesis 1).** For simplicity, let

$$I_t = \alpha + \beta S_t + \varepsilon_t \qquad (1)$$

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where I_t = investment as a percentage of GDP:
S_t = saving as a percentage of GDP:
α & β = parameters to be estimated:
ε_t = profitability, risks and other correlates of investment.

The expectation is that $0 < \beta \leq 1$. However, the critics argue that, in a world characterized by international capital movement, current account should reflect the difference between saving and investment. Consequently, any excess saving should have an impact on current account (**Hypothesis 2**). By definition, current account (B_t) is

$$B_t = S_t - I_t = S_t - (\alpha + \beta S_t + \varepsilon_t) \tag{2}$$

$$B_t = -\alpha + (1 - \beta)S_t - \varepsilon_t. \tag{3}$$

If the FH hypothesis holds, then $0 < \beta \leq 1$, otherwise $0 \leq \beta < 1$, and hence supporting Sachs's argument that excess saving tends to be reflected in the current account.

The literature also highlights conflicting arguments related to the influence of investment and saving rates on economic growth (Y). However, the FH puzzle provides a rationale of looking at saving as the driving engine of economic growth. Because saving Granger causes investment (FH, 1980), saving is likely to foster economic growth (**Hypothesis 3**):

$$Y_t = \gamma + \delta S_t + \omega_t \tag{4}$$

where γ & δ = parameters to be estimated:
ω_t = all other variables known to explain economic growth, other than I_t and S_t.

Democracy and investment-saving-economic growth nexus

The FH puzzle and subsequent studies offer important insights into the investment-saving nexus and its implications for the causes of sustained economic growth. However, these studies implicitly assume that institutional arrangements are constant and property rights are well enforced. Since the 1970s, economic historians and political economists have challenged this assumption while simultaneously stressing the impact of institutional arrangements on economic prosperity (North, 1990; North and Thomas, 1973). In his study of long-term economic growth in 40 non-industrialized nations from 1850 to 1950, Lloyd Reynolds conjectured that "the single most important explanatory variable" was "political organization and the administration of government" (1983: 976).

An enormous literature points to a diverse set of dismal outcomes related to autocratic governance in Africa that include poor infrastructure, poor education, poor health and political instability. Thus, most analysts attribute African leaders' poor performance to bad policies. For

example, William Easterly and Ross Levine (1997) have shown that growth country differences in Africa can be explained by the negative effect of ethnic fractionalization, which favours groups' policies at the expense of social policy. They contend that ethnic fractionalization increases polarization and thereby impedes agreement about the provision of public goods. It does this by generating positive incentives for growth-reducing policies that sustain rent-seeking activities for those in power, at the expense of society. Their conclusion is that rent-seeking activities based on ethnic polarization create long-term growth tragedies.

This argument is not new. Most qualitative studies in political science literature since the 1970s have contended that patron-client ties based on ethnic affinities produce policies that work against development in Africa (for a review, see van de Walle, 2001). Because the patronage system is based on a zero-sum game or the premise that "winner takes all," political scientists have been advocating the building of democratic institutions to avoid such an outcome. This solution relies on the experiences of the post-Second World War era, which suggest that limited governments and democracy have gone hand-in-hand.

A minimalist definition of democracy is a political system characterized by political and civil liberties (Gastil, 1989). Thus, people display their political power by expressing their choice of policies and leaders as well as by limiting leaders' power within an environment that guarantees socio-economic and political freedom. Mechanisms of competitive and periodic elections in democratic states motivate leaders to be responsive to the preferences of their constituencies. Therefore, democracy is informationally efficient because it punishes bad rulers and rewards good ones (O'Flaherty, 1990).

Democratic leaders thus strive to perform in office, and economic performance is especially important. The question remains, however, whether theoretically efficient democratic institutions spur or spawn investments (Brunett, 1997; Gasiorowski, 2000; Heo and Tan, 2001; Nelson and Singh, 1998; Sirowy and Inkeles, 1991). According to one of the two dominant approaches to this question, the "conflict perspective," democratic institutions inhibit investment opportunities by creating a setting in which interest groups make particularistic or distributional demands that are inimical to economic growth (Nelson, 1987). Moreover, the masses may dominate the electoral process and, given the broader base of the electorate in democracies, the median voter is likely to be poor. Thus, the political process will be controlled by the poor, whose immediate consumption patterns are likely to target redistributive policies that are inimical to profits and private investment. An interventionist state might be what the economy needs to break certain vicious cycles of underdevelopment. Therefore, democracy is likely to lower investment opportunities and hinder economic growth (Wade, 1990).

On the other hand, the "compatibility perspective" asserts that democracy nurtures a climate of open debate that is helpful for the efficient allocation of resources (Weingast, 1995). The positive impact (direct and indirect) of democracy on economic growth is based on the fact that democracies usually curb the power of the state to intervene in the functioning of the market and build an environment favourable for private economic activities to flourish. According to Milton Friedman (1962) and Freidrich von Hayek (1944), liberties in the political and economic arenas are complementary and interdependent because democracy is the best guarantor of limited government and free enterprise as well as a major constraint on the government from expropriating private holdings. Moreover, political competition embodied in the democratic process tends to promote economic growth and prosperity (de Mesquita et al., 2001). Consequently, democracies foster private investment and saving by sustaining a belief in the durability and the predictability of the political system. Democracies also provide rules of the game that reduce transaction costs to cope with uncertainty (North, 1990). Widely accepted rules in democracies increase the ability of individuals and organizations to make enforceable claims to propriety rights and to make others live up to agreements to which they are a part. Democratic institutions thus lower political risks and make investors, producers and consumers feel secure in their economic interactions. These institutions also create trust in economic activities and "trust is an important lubricant of a social system" (Arrow, 1974: 23).

Recapitulation 2. Other things being equal, investment, saving and economic growth should be higher in democracies than other types of governments. The last hypothesis then follows: democracies are likely to foster investment, sustain saving and foster economic growth **(Hypothesis 4**). This hypothesis can be represented by the following:

$$E_t = \phi + \varphi D_t + \nu_t \tag{5}$$

where E_t = economic performance:
D_t = democracy:
ϕ & φ = parameters to be estimated:
ν_t = correlates of each indicator of economic performance in the literature.

In sum, this paper assesses whether there may be a "virtuous circle" in the relationship among investment, saving, economic growth and democracy in the African context. Different theoretical threads from economic and political science literatures question whether democracy will prove to be an economic panacea. The FH hypothesis suggests that external investment rarely contributes to economic growth in democracies, while the conflict perspective on democracy and investment maintains

that the former decreases the latter. None of these conflicting ideas has been compellingly analyzed in African countries. The substantive significance of the relationships studied should be apparent.

Operational Definitions, Data Description and Methods

Economic data are from the World Bank (2001) and represent annual observations from 1960 or independence year to 1998 (unless otherwise specified) for 37 African countries. Saving (***S****aving*) and investment (***I****nvestment*) rates are defined as percentages of GDP. Economic *growth* (***Y***) is the annual percentage changes of real GDP per capita (1995 = 100). Current account balance (*Current*) refers to the difference between exports and imports of goods and services as a percentage of GDP.

Several proxies exist to operationalize "***D****emocracy*." I use the Polity IV measure of democracy (Jaggers and Marshall, 2004). As suggested in Polity IV, periods of interruption ("−66") are treated as missing values, periods of interregnum ("−77") are assigned values of "0," and periods of transition ("−88") are coded with the mean from the pre-transition year and the post-transition year substituted for each year of transition. The index of democracy or Polity is obtained by subtracting the autocracy index from the democracy index to obtain a score from −10 to +10. I use Christopher Gelpi's index from 1 (−10) to 21 (+10) to ease interpretation (1997).

The statistical analysis relies on the GMM (Arellano and Bond, 1991)[3] to model TSCS data and on co-integration and ECMs to model an individual country's data to assess the robustness of previous studies. Thus, the first step in the analysis of an individual country's data is to use augmented Dickey-Fuller (ADF) tests for stationarity (Dickey and Fuller, 1981). The Perron's unit tests were also used and were consistent with the ADF tests; that is, the 1974 oil shock created no breaks in the data. The second step is to run co-integration. The analysis relied on the vector autoregression (VAR) test or the maximum likelihood ECMs (Johansen 1995), communally known as vector ECMs (VECMs), because it has clearly better properties than alternative methods (see Pesaran et al., 2000). The **appendix** develops these methodological issues in more detail. Empirical analysis is generated on *Stata 8* running on Windows XP.

Empirical Analysis

The literature review indicates some good evidence that economic performance and democracy are causally related. To assess this claim, Table 1 provides the means of indicators of democracy and economic perfor

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TABLE 1
Means Democracy and Indicators of Economic Performance

	Democracy	Economic Growth	Investment/GPD	Saving/GDP
Mauritius	20.55	5.53	22.75	19.29
Botswana	19.69	9.77	27.53	26.34
Gambia (1965–98)	16.61	3.89	16.35	4.28
South Africa	15.85	3.24	18.93	22.19
Nigeria	8.67	3.45	17.58	17.43
Lesotho	8.24	5.44	37.34	−46.91
Somalia (1960–90)	8.06	2.52	19.86	−1.58
Benin	8.03	3.17	14.31	3.48
Senegal	7.64	2.48	12.92	5.90
Zambia	7.29	1.72	21.44	24.17
Sudan	7.23	2.97	14.66	9.01
Mali (1967–98)	7.22	2.87	18.17	3.37
Africa	**6.98**	**3.54**	**19.86**	**11.91**
Congo-Brazzaville	6.28	4.36	34.59	18.31
Central African Rep.	6.05	1.47	14.29	3.43
Kenya	6.03	4.66	21.21	18.89
Burkina Faso	5.85	3.42	18.21	2.36
Guinea-B. (1970–98)	5.83	2.05	26.67	−2.25
Niger	5.82	1.81	12.14	5.43
Sierra Leone (1967–98)	5.78	.74	12.39	4.41
Ghana	5.77	2.45	13.38	8.78
Egypt	5.51	5.46	21.67	13.00
Togo	5.10	4.19	19.51	17.05
Burundi (1965–98)	5.09	2.86	11.51	1.85
Chad	5.05	1.95	8.72	−2.75
Liberia (1960–86)	4.85	2.23	23.27	28.75
Rwanda	4.79	3.08	11.52	1.79
Congo-Kinshasa	4.59	.37	11.79	10.68
Mauritania	4.36	4.24	32.85	19.33
Madagascar	4.31	4.36	19.12	4.49
Malawi	4.31	4.36	19.12	7.49
Cameroon (1965–98)	4.09	3.52	19.78	20.94
Tunisia (1961–98)	3.76	5.23	26.37	24.69
Gabon (1970–96)	3.48	5.82	35.53	46.69
Algeria	3.46	3.45	35.14	33.09
Morocco	3.44	4.17	20.01	14.16
Swaziland	2.81	6.02	26.12	21.99
Ivory Coast	2.59	4.82	17.93	23.21

Sources: Data on democracy are from Keith Jaggers and Monty Marshall, 2004; data on economic variables are from World Bank, 2001.

mance by ranking African countries from the most democratic (Mauritius) to the most autocratic (Ivory Coast) from 1960 to 1998. The table shows no association between high democracy scores and high economic performance. Economically, Africa performed well from 1960 to 1998, averaging 3.54 per cent economic growth a year (**boldface**). Invest

ment and saving as percentages of GDP remained positive, averaging 19.86 and 11.91 per cent a year, respectively. The continent remained largely autocratic from 1960 to 1998, with an average score of almost 7.00 (−4 on polity scale). Nevertheless, several autocracies performed economically well compared to democracies. For example, Swaziland, which was one of the two most autocratic states, outperformed Mauritius, Gambia and South Africa. Gabon (3.48 score) and Algeria (3.46) also outperformed all four democracies in terms of investment and saving as percentages of GDP. With a few exceptions of high economic performance in the middle of the distribution, Table 1 shows a pattern that resembles a normal U-shaped curve with high economic performance at the two ends of democracy scores.

The next step is to assess the causal relation between economic performance and democracy. The analysis starts with the two-step GMM estimator of 37 African countries from 1960 to 1998, because the results from the one-step procedure produced estimates that were inefficient. The statistical analysis performed both polynomial (U-shaped curve) and linear specifications, but the latter produced more efficient estimates than the former. Therefore, Table 2 represents the linear specification. The Sargan test statistic also shows that all the instrument sets are uncorrelated with residuals. Moreover, all the models fit the data well, as illustrated by the Wald χ^2.

The *investment* model suggests that 40 per cent of saving remain at home to finance investment opportunities. Although this number is definitely below the FH threshold of 85 to 95 per cent found for OECD countries, the result is important because it calls forth policies to stimulate saving in Africa. Thus, the finding supports the FH's view, or **hypothesis 1.** However, the relationship between saving and investment is bi-directional. Investment also positively Granger causes saving, which contradicts the FH finding of unidirectional causality from saving to investment.

Second, the *current* account model indicates that Sachs's hypothesis of capital mobility (**hypothesis 2**) is not supported by the statistical analysis. Although *investment* and *saving* are correctly signed, they are not statistically different from zero at the .10 level of significance. Third, the *growth* model confirms **hypothesis 3**, that changes in saving foster economic growth, and undermines the neoclassical argument that investment is the engine of economic growth. It is also consistent with Jeffrey Sachs and Andrew Warner's view that investment is usually not statistically significant in growth analyses (1997). However, *growth* also positively Granger causes *saving*. Thus, causality between *saving* and *growth* is bidirectional and positive.

The impact of democracy on economic performance is mixed. *Democracy* positively Granger causes *saving* and *growth*, but does not

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TABLE 2
Two-Step GMM of TSCS Data

	Dependent Variables				
	Investment	Saving	Current Account	Growth	Democracy
Constant	−.00002[c]	.00003[c]	−.0004[c]	−.2642[a]	.0515[c]
	(1.18E−06)	(9.66E−07)	(.0001)	(.180)	(.012)
$Investment_{t-1}$	.4856[c]				
	(.0001)				
$Investment_{t-2}$	.0295[c]				
	(.0001)				
$Saving_{t-1}$		.2579[c]			
		(.0001)			
$Saving_{t-2}$		.1304[c]			
		(.0001)			
$Current_{t-1}$			.6442[c]		
			(.023)		
$Current_{t-2}$			.0270[b]		
			(.014)		
$Growth_{t-1}$				.0249	
				(.067)	
$Growth_{t-2}$				−.0852[b]	
				(.051)	
$Democracy_{t-1}$					.9967[c]
					(.018)
$Democracy_{t-2}$					−.2169[c]
					(.019)
$Saving_t$	.4024[c]		1.7012	156.0156[b]	−5.3596
	(.0001)		(1.509)	(76.013)	(21.274)
$Investment_t$		.5079[c]	−.9201	50.5603	−2.1865
		(.0001)	(2.129)	(113.867)	(17.949)
$Growth_t$	.00008[c]	.00005[c]			−.0041
	(8.51E−07)	(5.57E−07)			(.004)
$Democracy_t$	−.00001[c]	.00002[c]		.0789[b]	
	(1.16E−06)	(1.85E−06)		(.043)	
Wald χ^2	1.43E+06[c]	8.66E+05[c]	2195.00[c]	19.71[c]	8815.15[c]
m_1	−1.02	−1.01	−3.45[c]	−3.98[c]	−3.68[c]
m_2	1.00	−1.01	−1.26	1.05	1.18
Sargan χ^2 test (df = 700)	36.46	35.64	35.05	30.03	32.58
(N)	1162	1198	1180	1185	1202

[a]$p < .10$, [b]$p < .05$, and [c]$p < .01$.

Granger cause *investment*. This finding is partly consistent with **hypothesis 4**. Finally, economic performance has no statistically significant influence on democracy. This result contradicts most previous studies that have established the statistically significant impact of economic growth

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on democracy. The next step is to take into account country variations by using ADF and co-integration.

Assessing unit roots and co-integration

Table 3 presents the results from ADF tests. The maximum lag, which relies on both the Akaike information criterion (AIC) and the Bayesian information criterion (BIC), is 4 for several countries.[4] The test consists of checking the value of tau (τ), because the test displays only negative values. If the value of the test is lower than the critical value, the null hypothesis of unit root is rejected in favour of stationarity. The null hypothesis of unit root for investment, saving, current account and democracy cannot be rejected for most countries at a 10 per cent level of significance. However, all first-differenced series reject the null hypothesis of unit root at the 5 per cent level of significance or better. (The results are not reported due to space limitation.) Thus, the four variables exhibit one order of integration [I(1)] for most countries in the sample. Note that only Swaziland's *democracy* test indicates little variation. The null hypothesis of unit root is rejected at the 10 per cent level of significance or better for economic growth, except for Botswana, Congo-B, and Gabon. The nonstationarity of investment, saving, current account and democracy calls for the application of co-integration procedure to avoid the problem of spurious regression.

Tables 4a and 4b report the Johansen co-integration tests (1995). The analysis used the lag specification from the Johansen test that jointly minimizes the AIC and the BIC. The highest maximum lag in the Johansen test was 6 for Niger, while most time series were accommodated with one lag. Table 4a indicates that the null hypothesis of no co-integration between investment and saving ($r = 0$) can be rejected by both the maximum eigenvalue (λ-max) and the trace test (λ-trace) at the 10 per cent level of significance or better for 25 out of 37 countries. The fact that saving and investment are co-integrated suggests a rejection of the hypothesis that capital is internationally mobile for these countries in the long run. Although suggestive, it is consistent with the FH result that saving is likely to remain at home to finance investment opportunities.

Second, the relationship between the investment-saving nexus and current account shows that the null hypothesis of no co-integration can also be rejected in favour of the alternative hypothesis of at least one co-integrating vector at the 10 per cent significance level or better, except for Botswana and Gabon. This finding indicates the existence of some form of capital flight from African countries. Finally, the last two columns of Table 4a provide co-integration tests for investment, saving and economic growth. The null hypothesis of no co-integration is rejected at the 10 per cent level of significance for all countries except Liberia.

TABLE 3
Augmented Dickey-Fuller Unit Roots (τ-values)

	Investment	Saving	Current Account	Growth	Democracy
Algeria	−3.157	−2.804	−5.042[c]	−10.479[c]	−1.457
Benin	−2.888	−2.731	−1.919	−5.080[c]	−2.215
Botswana	−3.219[a]	−2.432	−2.094	−2.551	−3.934[b]
Burkina Faso	−2.029	−2.101	−1.148	−6.466[c]	−3.124
Burundi (1965–98)	−0.959	−2.876	−2.478	−5.040[c]	−2.090
Cameroon (1965–1998)	−1.598	−1.969	−3.526[c]	−3.248[a]	−1.482
Central A.R.	−2.163	−2.464	−4.216[b]	−4.309[c]	−0.528
Chad	−1.647	−1.475	−2.988	−4.468[c]	−1.171
Congo-B.	−4.285[c]	−2.898	−6.021[c]	−2.862	−3.733[b]
Congo-K.	−4.593[c]	−6.101[c]	−3.906[b]	−3.673[b]	−3.026
Egypt	−2.074	−2.594	−1.370	−3.673[b]	−2.558
Gabon (1970–96)	−4.669[c]	−3.273[a]	−1.499	−2.808	−2.063
Gambia (1965–98)	−3.654[a]	−3.191	−2.686	−4.464[c]	−1.826
Ghana	−0.840	−1.433	−1.488	−4.109[b]	−3.987[b]
Guinea-B. (1970–98)	−1.069	−3.717[b]	−2.964	−5.551[c]	−1.947
Ivory Coast	−1.949	−2.387	−2.647	−3.530[a]	−2.138
Kenya	−4.194[b]	−4.018[b]	−3.264[a]	−5.974[c]	−2.109
Lesotho	−2.493	−1.766	−0.704	−6.427[c]	−4.172[b]
Liberia (1960–86)	−2.909	−2.023	−3.194	−3.896[b]	−4.052[b]
Madagascar	−4.098[b]	−2.446	−2.942	−4.478[c]	−1.819
Malawi	−1.857	−0.803	−3.085	−5.185[c]	−1.246
Mali (1967–98)	−2.331	−2.664	−3.179	−4.215[b]	−2.216
Mauritania	−6.185[c]	−2.731	−1.863	−5.527[c]	−10.172[c]
Mauritius	−2.107	−3.675[b]	−3.201	−4.484[c]	−1.861
Morocco	−1.696	−2.959	−2.222	−5.679[c]	−16.016[c]
Niger	−1.483	−2.986	−2.976	−4.212[b]	−2.090
Nigeria	−2.519	−2.074	−5.485[c]	−4.370[c]	−2.360
Rwanda	−1.399	−3.032	−3.782[b]	−4.884[c]	−1.106
Senegal	−2.092	−1.193	−1.608	−6.050[c]	−4.435[c]
Sierra L. (1967–98)	−2.430	−1.853	−2.216	−4.707[c]	−2.476
Somalia (1960–90)	−1.042	−2.309	−1.822	−3.393[a]	−1.532
South Africa	−4.252[b]	−3.223[a]	−3.752[b]	−5.005[c]	−1.407
Sudan	−4.119[b]	−3.635[b]	−2.707	−4.344[c]	−2.823
Swaziland	−2.998	−2.586	−2.430	−3.393[a]	−29.237[c]
Togo	−2.829	−2.602	−2.946	−4.463[c]	−1.901
Tunisia (1961–98)	−2.185	−2.903	−2.210	−4.808[c]	−1.710
Zambia	−2.789	−2.659	−5.323[c]	−4.907[c]	−1.770

[a]$p < .10$, [b]$p < .05$, and [c]$p < .01$.

According to Table 4a, both λ-max and the λ-trace show the existence of one co-integrating vector ($r \leq 1$) for most countries in either the *investment-saving-current account* system or *investment-saving-economic growth* system. Except for the investment-saving nexus, there is at least one co-integrating vector associated with investment,

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TABLE 4A
Co-integration Results of Economic Performance Model

	Invest-Saving		Invest-Saving-Current		Invest-Saving-Growth	
(Critical values at 10%)	λ-Max (12.07)	λ-Trace (13.30)	λ-Max (18.60)	λ-Trace (26.79)	λ-Max (18.60)	λ-Trace (26.79)
Algeria	23.36[a]	26.50[a]	42.51[a]	42.58[a]	35.54[a¥]	59.17[a¥]
Benin	10.61	8.79	25.95[a]	26.03	24.11[a]	36.97[a]
Botswana	9.79	14.42[a]	13.73	20.15	15.98	29.11[a]
Burkina Faso	6.43	6.77	125.25[a]	126.48[a]	35.30[a]	41.65[a]
Burundi	8.77	10.82	103.96[a]	103.97[a]	28.05[a]	34.82[a]
Cameroon	24.37[a]	25.71[a]	82.85[a]	82.97[a]	31.18[a]	47.06[a]
Central African Rep.	31.55[a]	32.77[a]	74.09[a]	74.09[a]	42.27[a¥]	69.63[a¥]
Chad	15.02[a]	15.50[a]	55.73[a]	55.79[a]	27.55[a¥]	42.99[a¥]
Congo-Brazzaville	14.21[a¥]	18.61[a¥]	36.50[a]	37.29[a]	35.96[a¥]	58.85[a¥]
Congo-Kinshasa	33.66[a]	38.87[a]	20.30[a]	29.79[a]	29.63[a¥]	54.29[a¥]
Egypt	20.12[a]	21.66[a]	95.52[a]	95.52[a]	23.27[a¥]	38.78[a¥]
Gabon	9.70	10.33	9.43	13.06	31.12[a]	41.69[a]
Gambia	8.03	10.20	356.09[a]	356.09[a]	29.83[a]	38.25[a]
Ghana	14.86[a]	16.44[a]	70.45[a]	70.53[a]	28.46[a]	38.61[a]
Guinea-Bissau	29.58[a]	29.61[a]	49.13[a]	49.14[a]	22.22[a¥]	41.63[a¥]
Ivory Coast	14.79[a]	15.52[a]	158.53[a]	158.53[a]	47.67[a]	56.97[a]
Kenya	29.58[a]	29.61[a]	95.32[a]	95.33[a]	30.87[a]	52.44[a]
Lesotho	3.79	5.04	88.59[a]	88.68[a]	25.48[a]	29.99[a]
Liberia	2.91	4.53	53.85[a]	53.82[a]	16.48	20.62
Madagascar	13.89[a¥]	18.56[a¥]	164.64[a]	164.74[a]	35.79[a]	48.03[a]
Malawi	26.62[a]	28.39[a]	69.08[a]	69.35[a]	31.67[a¥]	55.30[a¥]
Mali	10.07	11.66	214.35[a]	214.42[a]	28.42[a]	35.57[a]
Mauritania	9.50	9.56	52.56[a]	56.59[a]	36.73[a]	44.85[a]
Mauritius	23.35[a]	26.67[a]	25.09[a]	30.41[a]	34.36[a¥]	60.23[a¥]
Morocco	5.97[¥]	10.87[¥]	15.68[¥]	26.60[¥]	21.38[a¥]	31.60[a¥]
Niger	24.95[a]	28.97[a]	38.53[a]	47.38[a]	30.03[a¥]	46.53[a¥]
Nigeria	18.92[a]	23.87[a]	221.05[a]	221.06[a]	23.69[a]	37.25[a]
Rwanda	11.32[¥]	14.81[¥]	81.72[a]	96.20[a]	24.20[a¥]	36.37[a¥]
Senegal	18.79[a]	26.42[a]	21.76[a]	21.78	43.41[a]	49.68[a]
Sierra Leone	2.82	3.43	28.84[a]	29.21[a]	23.82[a]	25.59
Somalia	8.67	12.73	66.12[a]	66.32[a]	34.03[a]	45.87[a]
South Africa	14.48[a]	15.65[a]	22.86[a]	22.88[a]	20.76[a¥]	30.83[a¥]
Sudan	22.60[a]	23.45[a]	75.83[a]	76.45[a]	25.66[a]	31.74[a]
Swaziland	8.91[¥]	13.22[¥]	69.29[a]	69.25[a]	37.95[a]	48.83[a]
Togo	20.51[a¥]	22.26[a¥]	26.36[a]	31.09[a]	22.61[a]	34.16[a]
Tunisia	7.91[¥]	12.50[¥]	39.23[a]	42.15[a]	31.18[a]	42.86[a]
Zambia	14.07[a]	16.10[a]	69.34[a]	69.35[a]	38.89[a]	53.81[a]

[a]Rejection of null hypothesis of no-co-integration at 10 per cent or better; [¥] indicates rejection of the null hypothesis that the rank order is 1 at 10 per cent level or higher (the critical value for λ-max and λ-trace is 2.69).

saving and current account on the one hand, and investment, saving and economic growth on the other hand. In other words, the results suggest some type of relationship between these variables in the long run.

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TABLE 4B
Co-integration Results of Democracy Model

	Investment		Saving		Economic Growth		Democracy	
	r = 0		r = 1		r = 2		r = 3	
(Critical values)	λ-Max (24.73)	λ-Trace (43.95)	λ-Max (18.60)	λ-Trace (26.79)	λ-Max (12.07)	λ-Trace (13.33)	λ-Max (2.69)	λ-Trace (2.69)
Algeria	53.93[a]	77.26[a]	18.12	23.33	3.38	5.21	1.82	1.82
Benin	27.98[a]	45.20[a]	12.29	17.22	4.46	4.92	0.47	0.47
Botswana	27.32[a]	61.61[a]	17.32	33.61[a]	10.43	16.29[a]	5.86[a]	5.86[a]
Burkina Faso	36.40[a]	51.28[a]	9.07	14.88	5.55	5.81	0.27	0.27
Burundi	32.15[a]	45.97[a]	10.99	13.83	2.30	2.83	0.53	0.53
Cameroon	28.14[a]	53.12[a]	22.00[a]	34.91[a]	15.67[a]	19.96[a]	9.24[a]	9.24[a]
Central A.R.	46.33[a]	81.96[a]	34.12[a]	35.62[a]	1.47	1.49	0.03	0.03
Chad	31.19[a]	47.65[a]	14.40	16.46	1.71	2.06	0.35	0.35
Congo-B.	30.96[a]	48.73[a]	12.35	17.75	3.17	5.39	2.23	2.23
Congo-K.	39.09[a]	78.59[a]	29.45[a]	39.50[a]	8.11	10.05	1.95	1.95
Egypt	28.71[a]	41.83	12.30	13.12	0.61	0.82	0.20	0.20
Gabon	33.99[a]	57.84[a]	15.76	23.85	7.35	8.09	0.73	0.73
Gambia	30.34[a]	39.87	7.12	9.52	1.92	2.40	0.48	0.48
Ghana	31.04[a]	46.09[a]	11.16	15.05	2.61	3.89	1.28	1.28
Guinea-B.	31.23[a]	57.43[a]	22.16[a]	26.20	3.12	4.05	0.93	0.93
Ivory Coast	46.05[a]	53.35[a]	6.38	7.30	0.93	0.93	0.00	0.00
Kenya	38.69[a]	65.14[a]	21.19[a]	26.45	5.25	5.26	0.02	0.02
Lesotho	25.49[a]	43.18	12.99	17.69	4.20	4.70	0.49	0.49
Liberia	18.83	30.19	7.87	11.36	2.45	3.48	1.08	1.08
Madagascar	36.09[a]	47.45[a]	10.28	11.35	0.95	1.07	0.12	0.12
Malawi	30.55[a]	53.29[a]	20.72[a]	22.75	1.79	2.03	0.23	0.23
Mali	30.75[a]	39.35	6.49	8.59	2.11	2.11	0.00	0.00
Mauritania	38.44[a]	62.85[a]	13.88	24.41	10.40	10.53	0.13	0.13
Mauritius	36.23[a]	78.11[a]	29.59[a]	41.87[a]	10.83	12.28	1.46	1.46
Morocco	24.61	50.71[a]	13.77	26.09	8.59	12.33	3.74[a]	3.74[a]
Niger	98.24[a]	135.17[a]	20.21[a]	36.93[a]	14.81[a]	16.78[a]	2.70[a]	2.70[a]
Nigeria	25.70[a]	46.28[a]	11.86	20.58	5.91	8.72	2.81	2.81
Rwanda	46.91[a]	76.30[a]	25.59[a]	29.39[a]	3.28	3.80	0.52	0.52
Senegal	44.32[a]	55.99[a]	9.67	11.67	1.07	1.99	0.93	0.93
Sierra Leone	25.78[a]	38.06	10.13	12.28	1.77	2.15	0.38	0.38
Somalia	34.69[a]	55.65[a]	11.12	20.95	8.12	9.84	1.71	1.71
South Africa	22.18	44.67[a]	15.26	22.49	9.16	7.22	0.06	0.06
Sudan	25.07[a]	36.17	7.41	11.09	3.19	3.69	0.50	0.50
Swaziland	44.15[a]	63.10[a]	9.06	18.95	6.87	9.89	3.02[a]	3.02[a]
Togo	27.27[a]	45.25[a]	11.82	17.99	6.04	6.17	0.13	0.13
Tunisia	36.04[a]	49.29[a]	8.01	13.25	5.24	5.24	0.00	0.00
Zambia	39.94[a]	62.46[a]	18.94[a]	22.52	2.59	3.99	1.41	1.41

[a]$p < .10$ or better.

Table 4b illustrates the democracy system and shows the existence of long-term causality between economic performance and democracy. According to the trace statistic (λ-trace), the null hypothesis of no co-integration can easily be rejected in favour of the alternative—that there is at least one co-integrating vector for all countries, except Egypt, Gambia, Lesotho, Liberia, Mali, Sierra Leone and Sudan. In general,

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the maximal eigenvalue (λ-max) suggests the existence of one non-zero co-integrating vector in the system for all countries, except Liberia, Morocco and South Africa. However, the λ-max rejects the null hypothesis for Morocco and South Africa. Thus, the λ-max and λ-trace only concur with the case of Liberia. In other words, the two tests fail to reject the null hypothesis of no co-integration, except for Liberia. At least three co-integrating vectors exist for Botswana and Niger and at least two for the Central African Republic, Congo-K, Guinea-B, Kenya, Malawi, Mauritius, Rwanda, Swaziland and Zambia.

Except for Liberia, the results indicate some type of long-term equilibrium between economic performance and democracy. Note that the Johansen test treats each variable as potentially endogenous. The results thus suggest that if people expect a long-term departure from autocracy to democracy, then economic performance would be sustained; otherwise, it would decline in the long run. This is consistent with the results from Table 2 on the impact of democracy on saving and growth. Likewise, long-term economic performance may be a prelude to the building of democratic institutions, as several studies contend. Therefore, the co-integration tests imply that each equation in the democratic system should include the corresponding EC term (see appendix) extracted from the Johansen approach under the premise that some long-term relationship exists between economic performance and democracy. The next step is to associate these suspected causal relations using the VECMs.

Evaluating causality through VECMs, given structural and policy constraints

Most African quantitative analyses of economic performance and democracy rely on several structural and policy constraints to assess the linkage between these variables. The usual constraints include primary dominant sector (agricultural, mining, or oil dominant), the degree of ethnic fractionalization, access to the sea and economic openness (see section 1, review). Although these constraints provide some variations in cross-section regressions and TSCS studies, they are likely to remain constant in single countries' studies using co-integration and VECMs. Therefore, for the sake of parsimony, the statistical analysis summarizes the VECM results by grouping African countries according to these constraints in order to establish meaningful patterns and to assess the robustness of previous studies.

Given space limitation, the VECM tables are omitted, but the results are briefly discussed here. The first statistical finding indicates that the FH hypothesis does not apply to most African countries. Saving positively Granger causes investment for Kenya, Mauritius, Nigeria, Rwanda, South Africa and Zambia. The long-term negative impact of saving on

investment was found for nine countries. The long-term equilibrium effect of saving on investment is mostly negative. This contradicts the results from Table 2 and **hypothesis 1**, that exogenous changes in saving spur investment.

Investment positively Granger causes saving only for Benin. The effect of investment on saving is negative for 12 countries. Thus, the finding contradicts the TSCS result from Table 2 that indicates a statistically significant and positive effect of investment on saving. Although there is no positive long-term bidirectional effect between them, saving and investment seem to have negative bidirectional causality for six countries. Thus, the first hypothesis that exogenous changes in national saving rates have a positive effect on investment is not supported for 31 countries out of 37 from the sample.

The second **hypothesis**, that excess saving follows private rates of return, does not hold, except for Algeria, Botswana, Ghana, Niger and Nigeria. Consistent with Table 2, there is no statistical evidence that African countries export their saving abroad.

The relation between investment-saving nexus and economic growth follows a different pattern. The statistical result provides no unidirectional causality from investment to economic growth, except for South Africa. This finding is clearly consistent with Table 2, which shows no significant statistical causality from investment to economic growth. Nonetheless, investment negatively Granger causes growth for 12 countries, a result that is not highlighted by the TSCS results from Table 2. Unidirectional positive causality, running from growth to investment, was found for Burundi, Congo-K, Gabon, Mauritania, Mauritius, Rwanda, Sierra Leone and Somalia, while nine countries exhibit negative Granger causality. There is no positive bidirectional causality between investment and economic growth, but six cases provide statistically significant negative causality running in both directions. This last result contradicts that of Table 2, which only shows positive causality from growth to investment.

Most striking is the long-term negative impact of saving on economic growth for ten countries. A positive correlation exists for only Cameroon, Ghana, Niger and Sierra Leone. Unidirectional positive causality from economic growth to saving was found for Benin, Congo-K, South Africa and Sudan, while 13 countries exhibited a negative causality in the same direction. Three countries provide a situation of negative bidirectional causality. In other words, **hypothesis 3**, that saving spurs economic growth, is not supported by the findings, although Table 2 indicates a statistically significant and positive bidirectional causality between saving and growth.

The long-term unidirectional positive impact from democracy to investment is found for Kenya, Liberia, Mauritania, Niger, Somalia, South Africa, Sudan and Togo. On the other hand, positive causality runs from

investment to democracy in the following countries: Ghana, Madagascar, Mali, Sierra Leone and Sudan. Positive bidirectional causality exists for only Sudan. The results from Table 2 are deceiving because they provide no similar information.

The long-term positive impact of democracy on saving is unidirectional for Morocco, Niger and Swaziland. Moreover, in the long term, saving positively Granger causes democracy for Mali and Morocco. These results contrast with those presented in Table 2, which show the positive effect of democracy on saving. Positive causality runs both ways for only Morocco. The final relationship is between democracy and economic growth. The long-term positive causal relationship runs from democracy to economic growth for Benin, Chad, Sierra Leone, South Africa and Togo. The finding also suggests that economic growth positively Granger causes democracy for Gabon, Malawi, Morocco and South Africa. Positive long-term causality runs in both directions for South Africa.

Empirical evidence partly supports **hypothesis 4**, that democratic institutional arrangements are likely to foster investment in eight countries, enhance saving in three other countries, and sustain economic growth in five countries. In total, a third of the countries in the sample benefit from democracy. At the same time, investment, saving and growth can sustain democracy for five countries, two countries and four countries, respectively. The positive effect of democracy on economic performance was not captured by the GMM results. Thus, the use of co-integration and VECMs provides additional information on long-term causality between economic performance and democracy that was not captured by the TSCS analysis. Therefore, any policy implication drawn from TSCS alone is likely to have unintended consequences.

The question is now whether these findings fit any structural or policy pattern specific to the African dummy found in the literature. The statistical analysis relied on three major constraints characteristic of the African dummy with respect to **hypotheses 1**, **3** and **4**. These constraints include dominant exporting sector, ethnic fractionalization and the lack of economic openness. The overall picture from extant literature is that these constraints impede economic performance and democratic governance.

In sum, the statistical results partly support this contention. Of 21 agriculture-dominant exporters, eight countries experienced negative causality running from economic growth to saving. Investment negatively Granger causes saving for seven mineral countries. The highest number of mining exporters had causality running from growth to investment. The oil-dominant group was probably the worst: except for Nigeria (positive correlation from saving to investment) and Gabon (from growth to saving), the other four major oil exporters did not perform well on their indicators of economic performance.

The oil group was also outperformed by the other two groups in terms of the relationship between economic performance and democracy. The best performance is indicated by Granger causality that runs from democracy to investment for mineral-dominant countries and from investment to democracy for agriculture-dominant countries. On average, democracy is likely to foster investment for mineral-dominant exporters.

A comparison between *highly* and *less* fractionalized countries divided along their mean score of .59 is also revealing. The expectation is that less fractionalized countries should outperform highly fractionalized ones on indicators of economic performance and democratic governance. However, except in the case whereby growth positively Granger causes investment, *highly* fractionalized states seem to have outperformed *less* fractionalized states on economic performance. The long-term positive impact of democracy on growth was found in five *highly* fractionalized countries, compared to zero *less* fractionalized polities. Moreover, growth positively Granger causes democracy for three *highly* fractionalized countries (13%) and for one *less* fractionalized country (8%). These results seem to contradict several previous works contending that ethnic fractionalization is an antidote to economic performance and democratic governance.

The final constraint is economic openness. Openness has been found to have some positive effects on economic performance in cross-national regressions. However, closed economies outperformed open economies in every category related to causality between economic performance and democracy, except Granger causality from saving to democracy, which favoured open economies. There is no open economy that exhibits any long-term positive Granger causality from democracy to investment. However, democracy positively Granger causes investment for eight (28% of total) closed economies. Another positive edge for closed economies is causality from democracy to growth.

Conclusion

The purpose of this article was to revisit the FH puzzle within the development-democracy debate. Two concluding remarks are warranted. First, the evidence suggests that the debate is country-specific and should not be generalized across time and space. Conflicting results from co-integration and VECMs on the reciprocal beneficial effects of economic performance and democracy suggest that democratic governance might not be a panacea for all African countries, even after taking into account structural and policy constraints related to the African dummy model found in the literature. Thus, policy analysts should be careful

when engineering social policies, because a policy designed to achieve a goal in one country might be unsuitable for achieving the same goal in another country.

Second, the statistical analysis indicates that the TSCS analysis might not be adequate in designing policies because it masks tremendous variations between countries. The results from co-integration and VECMs suggest that in ignoring countries' particularities, previous studies have missed both the existence and the absence of the low-frequency information between economic performance and democracy. A combination of TSCS and country studies remains invaluable for understanding the linkage between democracy and economic prosperity.

The idea that democracy can change citizens' lives across the globe is now a truism. In his influential analysis of various "scapes" at play in the processes of globalization, Arjun Appadurai refers to how "globally variable synaesthesia" of the political and ideological "ideoscope" of democracy "has clearly become a master term" (1996: 37). In other words, democracy today offers the magic potion to solve all human misfortunes, including the African predicament. Unfortunately, democratic institutional arrangements in many African countries can neither mobilize capital nor enhance economic growth. Maybe Przeworski et al. (2000: 217) are quite right in stating that "political regimes have no impact on the growth of total income when countries are observed across the entire spectrum of conditions." There is little that many African regimes can do to spur and sustain economic prosperity. Autocrats failed in the past and democrats might follow the same failed path in Africa. Guillermo O'Donnell was the first to warn us against the "universalistic fallacy" that finds democracy and economic development to be highly correlated everywhere and all the time (1973). Consequently, country studies based on the right methodological analysis are critical and pooling countries together to make bold generalizations can be misleading, because the precise relationship between democracy and economic performance remains "a black box" (Rueschemeyer et al., 1992: 32).

This is not to suggest that democratic institutional arrangements have no effect on economic performance. As this paper demonstrates, they can have a substantial impact on some countries, but a marginal impact on others. Moreover, as several studies suggest, democracies may have an indirect effect on economic growth (Emizet, 2000). One major indirect effect may be the negative impact of democracy on "deprivation." This issue remains under-explored and might shed new light on the democracy/economic development debate. As Amartya Sen points out (1999), lack of freedom is a "deprivation," and democracy remains a major factor in freeing people from social anxiety and political insecurity, so important in human development. In other words, democracies facilitate the rise of free people, especially entrepreneurs or corporate managers, whose

strategic and organizational choices shape, if not determine, national economic performance (see Chandler, 1990). Until we grasp this trajectory of democracy, we will not be able to relate it to economic performance.

Appendix: Description of ADF and ECMs

The ADF is used to test for non-stationary variables to avoid the possibility of spurious regressions. The equation to estimate the ADF tests takes the following form:

$$\Delta \boldsymbol{X}_{\mathrm{t}} = \alpha_0 + \beta_1 \boldsymbol{X}_{t-1} + \delta \boldsymbol{t} + \sum_{i=1}^{m} \theta_i \Delta \boldsymbol{X}_{t-i} + \boldsymbol{\varepsilon}_{\mathbf{t}} \qquad \text{(A1)}$$

where Δ is the first-difference operator $(\mathbf{X}_t - \mathbf{X_{t-1}})$, **t** is the time trend, ε is the stationary random error, and **m** is the maximum lag length based on both the AIC and the BIC. The second step is to run co-integration. The advantage of co-integration is to undertake hypothesis testing on the co-integrating vectors (Engle and Granger, 1987) by using the VAR test or the maximum likelihood ECM. The VAR procedure aims to obtain the likelihood ratio (LR) and the vector used for co-integration is as follows:

$$\Delta \boldsymbol{Y}_t = \theta_0 + \sum_{i=1}^{k=1} \theta_i \Delta \boldsymbol{Y}_{t-1} + \alpha\beta' \boldsymbol{Y}_{t-k} + \varepsilon_t \qquad \text{(A2)}$$

where $\Delta =$ the difference operator:
$\boldsymbol{Y}_t =$ variables of interest:
$\beta =$ consists of r $(r \leq n - 1)$ co-integrating vectors:
$\alpha =$ error correction parameters.

In equation A2, the null hypothesis is that the matrix $(\Pi = \alpha\beta')$ has a reduced rank of $r \leq n - 1$. The alternative hypothesis is that the matrix $(\Pi = \alpha\beta')$ has full rank. Note that when only two variables are run in the model, the full rank must be 2. The VAR procedure provides two statistics that include the value of the LR test based on the maximum eigenvalue of the stochastic matrix (λ-max) and the value of the LR test based on the trace of the stochastic matrix (λ-trace).

The existence of at least one co-integrating vector in the system indicates the presence of causality. Having identified co-integrated variables, a constrained VECM exists that captures both the short- and long-run dynamic adjustment of variables. Equation A3 presents the VECM, which is a VAR system constrained by the one-lagged error correction (EC) term. If x_t and y_t are co-integrated of any order, then there must exist an ECM representation of the following form, assuming the theory provides that Y_t is the explanatory variable:

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$$\Delta \boldsymbol{X}_t = \alpha_0 + \delta_1 \boldsymbol{z}_{t-1} + \sum_{i=1}^{m} \beta_i \Delta \boldsymbol{X}_{t-i} + \sum_{j=1}^{n} \gamma_j \Delta \boldsymbol{Y}_{t-j} + \varepsilon_t \qquad \text{(A3)}$$

where z_{t-1} = is the error-correction term, interpreted as reflecting disequilibrium responses.

Other terms are defined as before. Equation A3 states that changes in $\mathbf{x}_t$ depend not only on changes in $\mathbf{y}_t$, but also on the extent of disequilibrium ($\delta \mathbf{z}_{t-1}$) between the levels of x and y. The VECM holds that the temporal causality can emerge from two sources—the sum of the coefficients of the lagged change variables γ_j (*standard Granger test*) *or the coefficient of the lagged EC term* δ_1 ($\delta_1 \mathbf{z}_{t-1}$). Standard Granger causality tests overlook the latter channel.

Notes

1 Most time series are nonstationary because they are characterized by a random walk; that is, this period's value is equal to the last period's value plus a random error, even after a deterministic trend has been removed. Thus, running regression with such data leads to spurious results. Differencing creates stationary series, but the valuable information from social theory concerning the long-run equilibrium properties of the data is sometimes lost. Engle and Granger (1987) have shown that differencing is not necessary because two nonstationary series can be expected to wander in such a way that they do not drift too far apart, thanks to disequilibrium forces that tend to keep them together. Such variables are said to be co-integrated. Thus, ECMs provide a way of testing both causality and long-run equilibrium between or among co-integrated variables.

2 Granger (1969) developed this definition of causality. For example, democracy is said to Granger cause economic growth if prediction of the current value of growth is enhanced by using past values of democracy.

3 The GMM estimator is an instrumental variable estimator that uses all past values of the explanatory variables and all strictly exogenous variables as instruments. This estimator requires that all explanatory variables be measured as deviations from their period means and be estimated in difference form. The greatest advantage of GMM is its ability to provide internal instrumental variables in an efficient combination between endogenous and exogenous variables.

4 In the case of conflict between the two criteria, the preference criterion was the BIC over the AIC (Boswijk and Franses, 1992).

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