

Revisiting African Agriculture: Institutional Change and Productivity Growth¹

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Abstract

Africa is largely agrarian and the performance of agriculture shapes the performance of its economies. It has long been argued that economic development in Africa is strongly conditioned by politics. Recent changes in Africa's political systems enables us to test this argument and, by extension, broader claims about the impact of political institutions on economic development. Building on a recent analysis of total factor productivity growth in African agriculture, we find that the introduction of competitive presidential elections in the last decades of the 20th Century appears to have altered political incentives, resulting in policy reforms that have enhanced the performance of farmers.

1. Introduction

In the later decades of the 20th Century, political institutions in Africa changed. Prior to the late 1980s, open competition for national office was rare: politicians became heads of state either by launching military coups or by consolidating their political backing within the ruling party.

Subsequently, most heads of state were instead chosen in elections contested by rival parties that competed to capture political support from a majority of the national electorate.² On average, one third of Africa's people work in farming and 70% of its population resides in rural settings.

The late-century introduction of electoral competition thus led to the enfranchisement of a rural electorate.

In the decades after independence, agriculture – the largest single sector in most African countries – virtually collapsed (World Bank 1981), foreshadowing and accelerating Africa's subsequent economic decline; its current revival has lent impetus to Africa's economic recovery. It is our claim that the reform of political institutions and the consequent enfranchisement of Africa's farmers influenced the performance of its rural sector, thereby shaping the continent's economic trajectory.

² For reviews of this political transition, see Widner, J., Ed. (1994). Economic Change and Political Liberalization in Sub-Saharan Africa. Baltimore MD, Johns Hopkins University Press; Bratton, M. and N. van de Walle (1997). Democratic Experiments in Africa. Cambridge, Cambridge University Press; ; Josph, R., Ed. (1998). State, Conflict and Democracy in Africa Boulder, Lynne Rienner; and Bates, R. (2009). Political Reform. The Political Economy of Economic Growth in Africa, 1960-2000. B. J. Ndulu, S. O'Connell, R. Bates, P. Collier and C. Saludo. Cambridge, Cambridge University Press.

Figure 1 documents the nature and magnitude of political change in Africa. Classifying political systems along a 7-point scale that captures the level of electoral competition, the figure depicts the striking movement towards competitive politics³. In the 1970s, the mean lay below 3; by the 21st century, it lay above 6, indicating a significant shift from authoritarian to competitive electoral systems.

Figure 2 highlights the challenge to which this paper responds. It compares the rate of growth in total factor productivity in the agricultural sectors of 34 states, 1961-2007, differentiating between those whose political institutions did and did not allow for electoral competition when choosing the head of state. On average, the figure suggests, countries with electoral competition experienced a growth of total factor productivity of 1.04% in their agricultural sector, while the average rate was 0.48% per year in countries without.⁴

This paper probes the relationship between political institutions and economic performance by exploring the relationship between political reform and rural revival in Africa.

³ For details of this index (known as EIEC), consult the online Appendix.

⁴ Countries with scores of 6 or above on the EIEC scale (described below) were counted as possessing electoral competition. The difference is significant at $P=0.0007$ using a one-tailed t-statistic.

Figures 1 and 2 Near Here

2. The Literature

Our paper contributes to three literatures: The first addresses the impact of political reform in Africa; the second, “urban bias” in the developing world; and the last, “the new institutionalism”.

The first literature is best exemplified by the recent papers by Stasavage (2005) and Kudamatsu (2007). Working with data from 44 African countries, 1980-1996, Stasavage (2005) finds that governments chosen in elections openly contested by rival political parties spend more on primary education. Political reform led to higher levels and more geographically dispersed service delivery, he contends. Whereas urban dwellers may have had access to secondary and tertiary schooling, rural dwellers often lacked access even to primary schools. Stasavage therefore interprets the expansion of primary education after the re-introduction of competitive elections as a response to the needs – and demands -- of the rural electorate.

Working with household-level data from 28 African countries, Kudamatsu (2007) finds lower levels of infant and neo-natal mortality for children born following the introduction of competitive elections. As did Stasavage (2005), he attributes the change to improvements in service delivery, as politicians respond to the need to secure votes from an enfranchised citizenry.

Note that (Stasavage 2005) relates institutional change to changes in educational policy, but not to changes in educational achievement, whereas (Kudamatsu 2007) relates political change to changes in health outcomes, but not to changes in health policy. By exploring the impact of

institutional change on both policy reform and economic performance, this article combines their agendas.

Writing in the 1970s, Michael Lipton (Lipton 1977) exposed the manner in which public policies in South Asia conferred benefits upon urban dwellers while imposing costs upon those living in the rural areas. Pursuing this theme in Africa, (Bates 1981) noted the prevalence of similar policies and argued that the ability of Africa's governments to favor the urban areas depended upon their ability to demobilize the rural electorate. This paper seeks to advance the study of urban bias by observing the changes that resulted when that electorate was re-enfranchised.

Lastly, the "new institutional economics" now shapes the study of economic history (North, Wallace et al. 2009) and development (Harriss, Hunter et al. 1995; Acemoglu and Robinson 2012). Economic development, it argues, is promoted or retarded by the nature of the institutions within which the economy inheres. Drawing on the evidence generated by recent changes in political institutions Africa, this paper offers a test of this claim.

Section 3 lays out our basic argument. Sections 4 and 5 explore the relationship between institutional reform policy choice, and productivity growth in agriculture. Section 6 concludes.

3. The General Argument

The relationship between political reform and economic change in developing countries can be derived from well-established insights into the consumption behavior of poor persons and the structure of their economies on the one hand and from the logic of collective action and party competition on the other.

Engel's law holds that as income rises, the proportion of income spent on food declines; the income elasticity of food consumption is less than unity. From this micro-level regularity a macro-level implication follows: that economic development implies structural change (Kuznets 1966; Chenery and Taylor 1968; Anderson and Hayami 1986; Lindert 1991; Matsuyama 1992). When people are poor, a large percentage of their total expenditure will be devoted to food; absent foreign trade and significant economies of scale in farming, the rural sector therefore will be large. But when people earn higher incomes, the percentage spent on food will be less and, absent a comparative advantage in global markets, the rural sector will then comprise a smaller portion of the economy.

Poor countries therefore exhibit a characteristic political-economic geography. The majority of the population works in farming; it lies widely scattered, each member producing but an infinitesimal percentage of the total agricultural output. A small portion of the population – often less than 10% -- works in manufacturing and service provision and dwells in towns. Because government policies often favor large investments and because of economies of scale in manufacturing, urban firms are often few in number and large in size, and a significant percentage of the urban dwellers therefore derive their incomes from a small number of employers (Little, Scitovsky et al. 1970; Little 1982; for an African case, see Kaplinsky 1978). While those who farm are thus dispersed, economically and geographically, those who earn their incomes in the urban sector are not. Spatially, they are concentrated in a few settlements and economically they often labor in enterprises sufficiently large to dominate their markets.

The political implications are immediate and ironic and follow from the logic of collective action (Olson 1971, 1985): In countries with large agricultural populations, farmers are weak lobbyists.

Being small, village producers rationally refrain from expending effort in attempts to influence agricultural prices; not so urban interests, which stand large in their markets. Being widely scattered, farmers face high costs of organizing; concentrated in towns, urban interests find it less expensive to do so. Urban interests therefore hold a relative advantage as lobbyists in less developed economies. In so far as government policy is influenced by organized groups, in countries with large agricultural sectors, it therefore tends to be adverse toward the interests of farmers (Olson 1971 and 1985; Bates 1981).

The result is a choice of public policies that, taken together, constitute “urban bias,” or measures that privilege the incomes of the urban sector at the expense of the rural. Under pressure from urban interests, governments adopt trade policies that protect domestic markets for urban manufacturers while leaving the market for agricultural products open to imports from abroad. The overvaluation of currencies cheapens imports of foreign foodstuffs and lowers the earnings of exporters of cash crops. Government regulations limit exports of raw materials, compelling farmers to sell cotton, vegetables, fruits, and other products to local processors at prices below those that they could secure were they to ship them to foreign buyers. In these and other ways governments intervene so as to shift relative prices in favor of consumers and against the producers of agricultural products.

Thus the standard account of urban bias. Central to this interpretation is a political assumption: interests, it assumes, gain representation solely by lobbying. But what if we now introduce competitive elections? Where representation is achieved through electoral channels and where rural dwellers constitute a large segment of the voting population, then politicians have an incentive to cater to the interests of farmers. The very factors that render farmers weak lobbyists

– that they are numerous and spatially dispersed – render them attractive to those competing for an electoral majority (Varshney 1995). The search for political majorities should therefore encourage politicians to resist the political pressures emanating from urban consumers and to champion policies that cater to the interests of the countryside.

Many African economies conform to the conditions that underpin the above argument. Their mean income is less than \$1,000 per annum (constant \$US2000) and in most countries agriculture remains the largest single industry, employing nearly a third of the labor force and harboring nearly three quarters of the population. By the logic of the argument advanced thus far, we should therefore expect to see the reintroduction of party competition and majoritarian politics leading to the adoption of policies that strengthen the incentives for farming.

4. Initial Evidence

To explore this possibility, we advance two kinds of evidence. The first is bivariate and addresses (1) the relationship between institutional reform and policy choice and (2) the relationship between policy choice and economic performance. The second is multivariate and is presented in the section that follows.

Political Reform and Public Policy

In Figure 3, an index of political institutions runs along the x-axis and measures of government policy appear on the y-axis. The figure suggests that differences in political institutions bear a

significant relationship with differences in public policies⁵ and in the way expected, given the argument advanced above.

Figure 3 Near Here

Institutions

As a measure of institutions, Figure 3 (following Figure 1) employs a scale known as EIEC (Executive Index of Electoral Competition). Developed by Ferree and Singh (2002) and subsequently amended and adopted by the World Bank for its Database of Political Institutions, the measure indicates the level of competition attendant the choice of chief executive..⁶

In the regressions which follow, we recast this index to form a dummy variable that takes the value 1 when the candidates from opposing parties campaigned for the presidency and 0

⁵ In each of the regressions that overlay the scatter plots in Figure 3, the coefficient on the measure of electoral competition is significant at conventional levels of significance.

⁶ See Beck, T., G. Clarke, et al. (2001). "New Tools and New Tests in Comparative Political Economy: The Database of Political Institutions." World Bank Economic Review. Bates, R. H., K. Ferree, et al. (1996). Toward the Systematic Study of Transitions. Development Discussion Paper No. 256. Cambridge MA, Harvard Institute for International Development..Ferree, K. and S. Singh (1999). Institutional Change and Economic Performance in Africa, 1970-1995. Annual Meetings of the American Political Science Association, Atlanta.

otherwise.⁷; We label the first set of governments as “competitive and the second as non-competitive or, more loosely, authoritarian.”⁸ We call this dummy variable ELECOMP67.

As a robustness check, we also employ the variable POLCOMP as a measure of political competition. The variable is described in the online Appendix and discussed in greater detail in (Jagers and Marshall, 2000). Based on the descriptions of the variable that appear in the POLITY codebook⁹, we consider observations that fall in the range 9 or above as “competitive” and those that fall at 8 or below as “non-competitive” and refer to the variable as POLCOMP910.¹⁰

Public Policies

⁷ In practice, this means we assign a 1 to all country years when the EIEC index is 6 or greater and 0 otherwise. For further details, see the online Appendix.

⁸ As discussed below, we explore the use of other cut points as well.

⁹ <http://www.systemicpeace.org/inscr/p4manualv2010.pdf>.

¹⁰ We have varied the cut-points to assess the robustness of our findings. Those based on POLCOMP remained significant when we reduced the cutoff to 8. There are only 9 observations of POLCOMP = 10 in the sample, precluding us from testing a POLCOMP dummy limited to 10s. Increasing the EIEC cutoff to 7 alone continued to generate significant results when analyzing agricultural output. When addressing TFP growth or RRA, an EIEC dummy limited to 7s retains the signs reported below, but the estimates are imprecise. The sample includes no observations of EIEC equal to 4 or 5, precluding tests with a cutoff below our baseline of 6.

Some readers have challenged our use of POLCOMP, arguing that we should employ the POLITY score instead. POLCOMP provides a measure of political competition, which is the specific focus of our hypothesis. In contrast, POLITY provides a measure of democracy, and its value is therefore affected by other factors, such as the nature of the limits on executive power.

Figure 3 contains data on roads, education, and agricultural research. Their relevance to the fortunes of farmers requires little discussion. Not so the data on rural bias.

As a measure of sectoral bias, we employ the Relative Rate of Assistance (RRA), calculated by Anderson (2010). The measure reflects the manner in which government intervention in markets shifts relative prices between agricultural and non-agricultural commodities and is calculated as the ratio of the impact policy interventions on the prices of goods made in the agricultural and non-agricultural sectors. across sectors. The imposition of an ad valorem tariff on imports of manufactured goods, for example, would generate an increase in the domestic prices of manufactured goods and trigger a decrease in the RRA, thus signaling a shift in relative prices against farmers.

Economic Performance

Thus far we have characterized our measures of institutions and policies and the relationships between them. We now describe our measures of the economic performance of the rural sector. The first is the total value of agricultural output; the second, total factor productivity (TFP). The first indicates whether, when correcting for changes in prices, farmers have altered their production, as by hiring more labor, clearing more land, or otherwise channeling more resources into farming. The second measure: TFP (our main focus) provides a more restrictive and economically more meaningful measure of economic performance. TFP rises when output increases even when the quantity and quality of the factors of production remain constant. When measured by TFP, then, increases in output reflect the adoption of improved technologies and the greater efficiency of producers. Given diminishing returns, it is the growth of productivity, not the

accumulation of productive factors, that in the long run leads to higher income. For that reason, we assess whether policy change yields increases not just in output but also in TFP.

Our estimates for the growth of total factor productivity (TFP) are drawn from the work of Block (2010) who combines data from 44 countries over 46 years (1961-2007). Block derives his estimates from an aggregation of crop-specific outputs in each country based on commodity prices specific to the countries included in the sample. From these data, he calculated Paasche indices, applying to all years the prices from the final year to avoid estimates spuriously resulting from increases in prices over time.¹¹

Policy Change and Economic Performance

The Figure 4 demonstrates the relationship between our measure of urban bias (RRA) and changes in TFP. The differences in the patterns of TFP growth rates when controlling for RRA (versus the baseline specification which excludes RRA) suggest the magnitude of the impact of urban bias. The difference in the mean rates of change in Total Factor Productivity in agriculture is significant at greater than the .10-level.¹²

¹¹ For details, consult the online Appendix.

¹² Block (2010) first estimated the growth rate pattern of TFP, thereby creating baseline estimates (for the available sample), and then re-estimated that result while including an additional explanatory variable (in this case, RRA). The extent to which that added variable explains agricultural TFP growth (and the timing of its effect) is reflected in the difference in the resulting TFP growth rate paths. He then calculated the resulting percentage difference in the mean TFP growth rates over the entire period, with and without the additional explanatory variable. The resulting shares of TFP growth explained by the added variables must be interpreted as an upper bounds, for reasons explained in Block (2010).

Figure 4 Near Here

5. Multivariate Estimates

The data thus far suggest that countries governed by executives chosen through political competition are more likely to choose policies that favor farmers and that these choices are associated with differences in the performance of agriculture. Multivariate methods enable us to sharpen and to deepen our analysis. After describing in greater detail our key dependent variable – the rate of growth of agricultural TFP -- we apply such methods in an effort to explore the relationship between political change and economic performance.

Political Reform and Economic Performance

To identify the impact of electoral competition on agricultural productivity growth, we employ a difference-in-difference specification. Given that the treatment, institutional change, occurred at different times in different countries, our model takes the form of a fixed effects regression with individual year dummies:

$$(4) \quad Y_{it} = \alpha_{0i} + \alpha_{1i}t + \lambda_t + \delta D_{it} + X'_{it}\beta + \varepsilon_{it}$$

where Y_{it} is either agricultural output or the growth rate of agricultural productivity in country i in year t , α_{0i} are time-invariant unobservable country effects, λ_t are year dummies, X is a vector of observed covariates, D_{it} is a dummy equal to one for each country-year observation in which there is electoral competition, and δ provides a measure of the relationship between electoral

competition and the growth of agricultural TFP (which we assume to be a constant).¹³ α_{1i} is a country-specific trend coefficient multiplying the time trend t , which provides a test of the identifying assumption of common trends implicit in difference-in-difference specifications.¹⁴

The results in Table 1 suggest that electoral competition is associated with increased agricultural output on the order of 7 to 9 percent. Models 1 and 2 regress ELECOMP67 and POLCOMP910 against measures of agricultural output_[RB1], while columns 3 and 4 demonstrate the robustness of these relationships to the inclusion of additional covariates: civil conflict, the average level of electoral competition in bordering states, and rural population share.¹⁵ Civil conflict was endemic in late century Africa, with 40% of countries experiencing at least one year of civil war between 1960 and 2000. Noting their occurrence enables us to control for the possibility that political competition affects TFP growth through its impact on political stability (Snyder and Mansfield 2000). If electoral competition were to generate strong political or economic forces, then their impact could spill across political boundaries; by controlling for the lagged average of the degree of electoral competition in each country's neighbors, we control for this possibility as well. Lastly, rural population share relates closely to the level of development, other correlates of which themselves bear upon productive efficiency. By including a measure of the relative size of the

¹³ We adjust all standard errors for clustering at the country level, in keeping with the cautions advocated by Bertrand, Duflo, and Mullainathan (2004) regarding serial correlation in difference-in-difference models.

¹⁴ The inclusion of country-specific trends reinforces the identifying assumption of our difference-in-differences interpretation, and distinguishes our regressions from the otherwise similar specifications estimated by Stasavage (2005).

¹⁵ All specifications include agricultural controls, as detailed in the table notes.

rural population, we thereby control for the impact of these unobserved variables. In addition, all specifications include country-specific time trends to demonstrate the robustness of our identifying assumptions.

Table 1 Near Here

Table 2 replicates this estimation strategy using agricultural TFP growth as the dependent variable. Here, too, we find that electoral competition is associated with an acceleration of TFP growth of approximately 0.5 percentage points. Note that this finding is consistent with the evidence contained in Figure 2.

Table 2 Near Here

A troubling possibility is that the putative effect (agricultural TFP growth) precedes the supposed treatment (political reform). To assess this possibility, we follow Angrist and Pischke (2009) who invoke a form of Granger causality:

$$(5) \quad Y_{it} = \alpha_i + \lambda_t + \sum_{\tau=0}^m \delta_{-\tau} D_{i,t-\tau} + \sum_{\tau=1}^q \delta_{+\tau} D_{i,t+\tau} + X'_{it} \beta + \varepsilon_{it}$$

The model allows for m lags (post-treatment effects) and q leads (anticipatory effect). Figure 5(A) graphs the coefficient estimates of these post- and pre-treatment effects for $m = q = 4$ leads and lags surrounding the year in which each country transitioned into a system of competitive

elections. The results indicate no significant anticipatory effect on changes in agricultural productivity. The difference between the mean coefficients before and after political transition is 0.56 percentage points, a magnitude consistent with the estimates in Table 2.

Figure 5 Near Here

Political Reform and Policy Choice

Making use of the same difference-in-difference specification that we employed above,. Columns 1 and 2 in Table 3 suggest a positive relationship between our indicators of electoral competition and our measure of urban bias.¹⁶ The addition of country-specific trends in column 3 renders the coefficient of ELECOMP67 insignificant, however, although – as seen in column 4 -- rendering that of POLCOMP910 more precisely estimated.

While we believe the risk of reverse causality (in the sense that RRA would cause electoral competitiveness) is minimal, we remain keenly aware of the possible impact of excluded variables. In particular, pressure from the donor community could plausibly account for the co-variation of electoral competitiveness and policy support for domestic food producers. However, only in the case of column 5 is the participation in an IMF agreement significantly related to a shift in relative support for agriculture.

¹⁶ Recall: Positive changes in RRA indicate *less* urban bias, that is, more favorable policies toward agriculture.

There remains an additional concern, however: that agreements with the IMF may not be randomly distributed across countries. In columns 7-8 we therefore estimate a two-stage model in which we, as do others (e.g. Easterly 2005), instrument for IMF agreements using each country's level of US military assistance and previous colonial status.¹⁷ As in the previous models, POLCOMP910 remains positive and statistically significant, suggesting that electoral competition improved incentives for African farmers. This conclusion is reflected, as well, in Figure 5(B), which illustrates the increase in RRA in the years before and after a transition into a competitive electoral system (indicated by POLCOMP910).

Table 3 Near Here

Insofar as our argument is valid, we would expect that the magnitude of the impact of electoral competition should vary with the relative size of the rural electorate. This implication provides additional opportunity for testing. In Table 4 we interact rural population share with indicators of electoral competition, evaluating the partial derivatives at the 25th, 50th and 75th percentiles of the sample distribution.¹⁸ In columns 1, 2, 4, and 6, the total effect of electoral competition on RRA

¹⁷ Easterly (2005) argues that US military assistance is indicative of the recipient as being a “friend of the donor,” and thus a correlate of IMF agreements, while not affecting (in our case) agricultural price policy via any other channel. The F-tests of excluded instruments on 2SLS versions of the regressions on columns 7 and 8 are 8.6 – suggesting the possibility of weak instruments. This is of secondary concern, however, as our primary focus is on the effect of electoral competition, rather than on the specific effect of IMF agreements.

¹⁸ These points correspond to population shares of approximately 60, 70 and 80 percent, respectively.

increases with the rural population share, with the effect at the 75th percentile approximately three times greater than that found at the 25th percentile. This is the case with and without the inclusion of country-specific trends, and while instrumenting for our indicator of IMF agreements. Only in columns 7 and 8, where we both instrument for the IMF agreements and include country-specific trends, does this interaction effect disappear.

Table 4 Near Here

Mediation Analysis

Thus far we have demonstrated that agricultural TFP growth is higher in settings with electoral competition and that the effect operates at least in part through policy choices. To quantify the magnitude of the effect, we apply mediation analysis (Imai, et.al. 2011), estimating three linear regressions:

$$\begin{aligned}
 (6) \quad & a) \quad Y_i = \alpha_1 + \beta_1 T_i + X_i \varphi_1 + \varepsilon_{i1} \\
 & b) \quad M_i = \alpha_2 + \beta_2 T_i + X_i \varphi_2 + \varepsilon_{i2} \\
 & c) \quad Y_i = \alpha_3 + \beta_3 T_i + \gamma M_i + X_i \varphi_3 + \varepsilon_{i3}
 \end{aligned}$$

where Y is the outcome variable (agricultural TFP growth), T is the treatment variable (electoral competition), and M is the mediating variable (RRA), and X is a vector of control variables (including rural population share and the civil war dummy).

Equation 6a can be thought of as corresponding to the specification underlying Table 2, in which $\hat{\beta}_1$ provides an estimate of the “total average treatment effect” (in Imai, et. al.’s terminology),

with Equation 6b corresponding to that underlying Table 3. Equation 6c closes this loop, allowing us to decompose that total average treatment effect into the average *direct* effect of the treatment on the outcome ($\hat{\beta}_3$), and the *mediating* effect, or the extent to which the treatment variable operates through public policies. Note that the mediating effect and the direct effect sum to the total effect. The mediating effect is estimated as $\hat{\beta}_2\hat{\gamma}$ or, equivalently, $(\hat{\beta}_1 - \hat{\beta}_3)$.

Table 5 summarizes the results of our analysis. As before, we employ ELECOMP67 and POLCOMP910 as treatment variables. The mediating variable is RRA. The exercise thus measures the extent to which the effect of electoral competition on agricultural TFP growth operates through the mediating effect of electoral competition on agricultural price policy (RRA) as opposed to other channels. By including an interaction term between electoral competition and rural population share, we are able further to determine whether these effects are a positive function of rural population share (which we evaluate at the 25th, 50th, and 75th percentiles of its distribution). Columns 1-3 introduce ELECOMP67 as the treatment variable. We find the total treatment effect of electoral competition on TFP growth is on the order of 1.5 percentage points. Note that while the total effect is a (slightly) declining function of rural population share, the extent to which the effect of political reform on TFP growth is mediated by RRA increases with the share of the rural population. At the 75th percentile of rural population share, nearly 14% of this total treatment effect is mediated through RRA. When we use POLCOMP910 as the treatment variable, these effects remain significant and increase in magnitude (columns 4 – 6). In this

instance, both the total treatment effect and the magnitude of the mediation effect are strongly positive functions of rural population share.¹⁹

That the direct effect of changes in political institutions is greater than the effect that runs through changes in policy suggests that the re-introduction of political competition affected rural producers through multiple channels. These might have included policies which affected the profitability of farming in ways other than relative prices, such as by increasing school enrolments, building roads, and introducing new seed varieties, for example.²⁰ Field reports suggest that with democratization came other “non-policy” changes as well: a greater willingness to permit private merchants to purchase agricultural commodities and to sell consumer goods to farmers; to let non-governmental organizations operate in rural areas; and to allow freer communications, be it by pamphleting or FM radio, thereby promoting the more rapid exposure of bottlenecks in the provision of goods and services needed by farmers. Such sources of vitality, unleashed in rural communities at the same time as was greater competition for the votes of farmers, may help to account for the portions of the impact of political reform on the performance of farmers that our analysis left unexplained.

¹⁹ Data limitations again impact on our analysis. The anomalous estimate of the mediation effect’s share of the total treatment effect in column 4 is an artifact of the small and statistically insignificant point estimate of the total treatment effect at the low level of rural population share.

²⁰ Lack of data prevented us from exploring these policies in the same manner as we did RRA.

Table 5 Near Here

7. Conclusion

In the period of authoritarian politics, Africa's leaders stood astride a narrow political base, consisting of organized interests largely lodged in urban centers: the government and its employees, the labor movement, and manufacturers with their attendant service industries. In response to threats to their welfare, members of this coalition pressed for measures to lower the prices of agricultural goods and policy makers responded as if finding credible threats of political protests should they fail to do so. Following the reintroduction of electoral competition, political leaders in many African countries found themselves in a new political environment: they now faced an electorate that was largely rural. It is our argument that their desire for office led them to alter their political strategies, resulting in adoption of economic policies more favorable to farmers. And in response to these changes in policy, it would appear, production increased and total factor productivity rose in rural Africa.²¹

²¹ Among the possible challenges to this interpretation, one stands out: that we wrongly assume that rural voters engage in policy- or performance-based voting. We post our rejoinder to the online Appendix.

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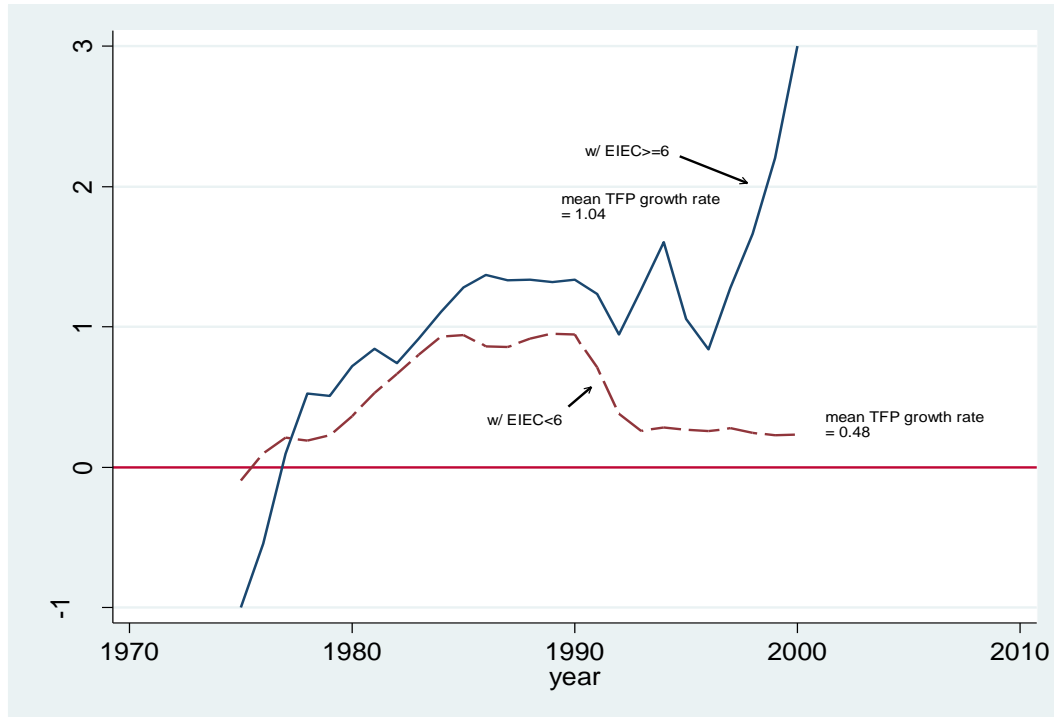
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Figure 1. Index of Political Competition



Source: World Bank, Database of Political Institutions (Beck and Clarke, 2001)

Figure 2. Agricultural TFP Growth Profile for Country-Years With and Without Electoral Competition



Source: (Block 2010)

Figure 3. Public Policies and Electoral Competition

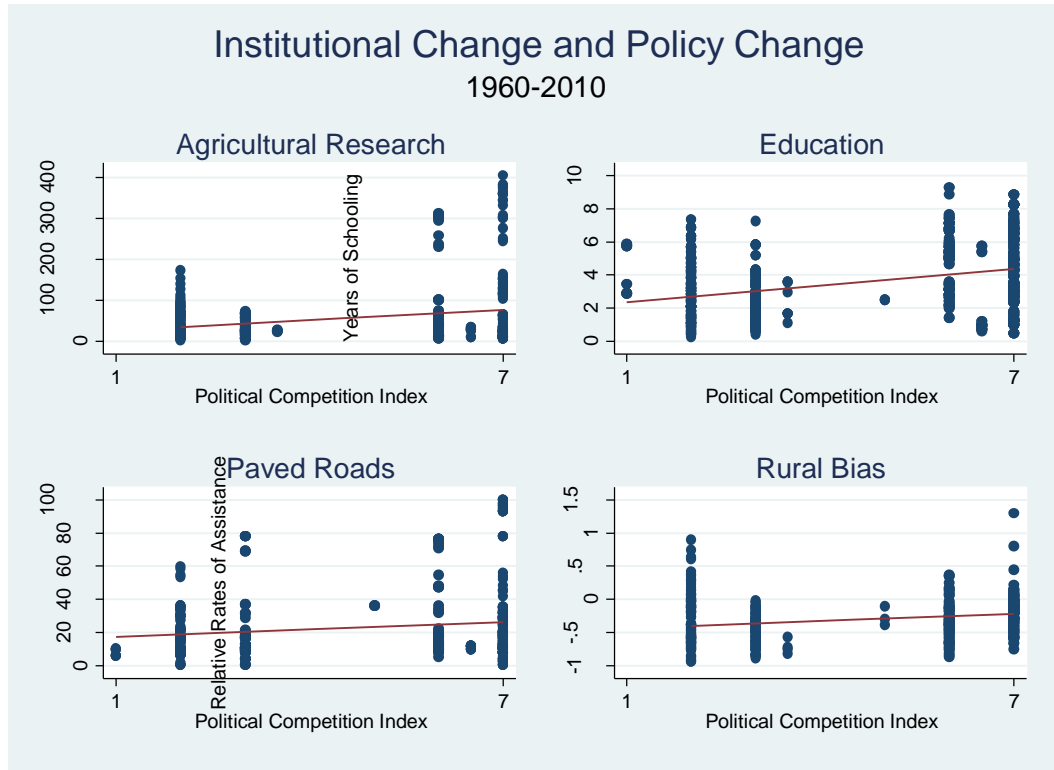


Figure 4. The Effect of Relative Rate of Assistance on Agricultural TFP Growth

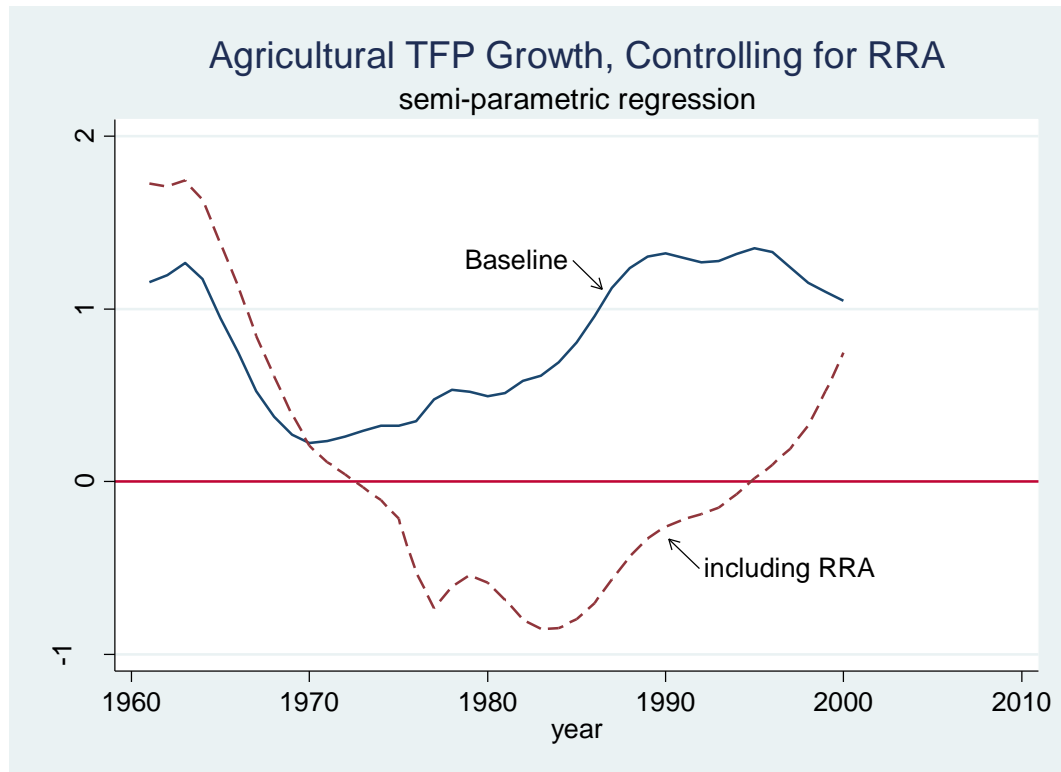


Figure 5. Before & After Transition to Competitive Elections

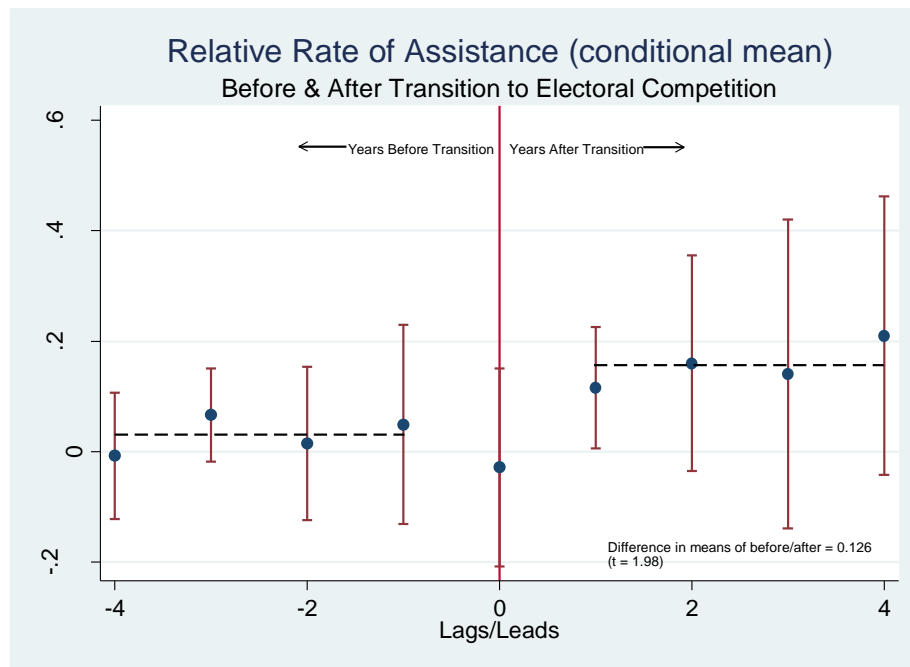
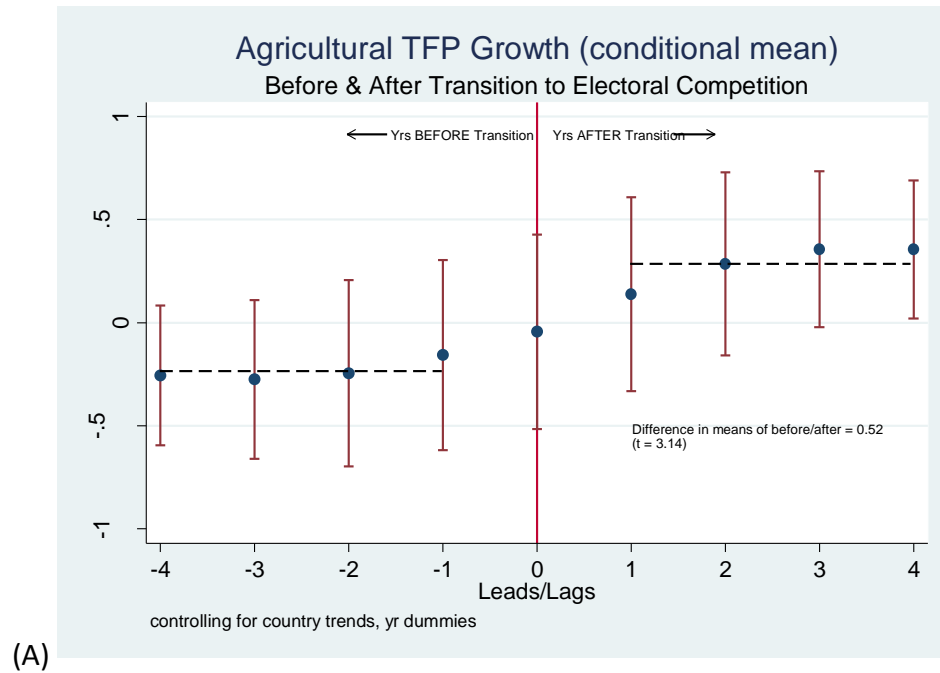


Table 1. Effect of Electoral Competition on Agricultural Output

VARIABLES	(1) log_agric output	(2) log_agric output	(3) log_agric output	(4) log_agric output
ELECOMP67 ^a	0.0717** (0.0287)		0.0755** (0.0293)	
POLCOMP910 ^b		0.0999** (0.0459)		0.0874* (0.0478)
Rural Pop. Share			-0.0357* (0.0199)	-0.0341 (0.0215)
Civil War dummy			0.00884 (0.0232)	0.0208 (0.0229)
Avg EIEC of neighbors (t-1)			0.00426 (0.0120)	0.00527 (0.0131)
Constant	7.207 (18.05)	4.579 (17.89)	57.41* (33.31)	53.11 (35.47)
Observations	605	605	605	605
R-squared	0.716	0.716	0.729	0.727
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Country Trends	YES	YES	YES	YES

Robust standard errors (clustered at country level) in parentheses *** p<0.01, ** p<0.05, * p<0.1
Notes: ^a ELECOMP67 is a dummy variable =1 if EIEC ≥6. ^b POLCOMP910 is a dummy variable =1 if POLCOMP ≥9. All specifications also include controls for rainfall, share of irrigated land, years schooling for the population, log of population, and log of arable land, and a full set of year dummies.

Table 2. Effect of Electoral Competition on Agricultural TFP Growth

	(1)	(2)	(3)	(4)
ELECOMP67	0.585** (0.226)		0.544** (0.210)	
POLCOMP910		0.568* (0.306)		0.439* (0.263)
Rural Pop. Share			-0.0463 (0.199)	-0.0344 (0.205)
Civil War dummy			-0.192 (0.168)	-0.111 (0.160)
Avg EIEC of neighbors (t-1)			0.203 (0.127)	0.221 (0.138)
Constant	-48.62 (32.08)	-77.16*** (26.37)	48.13 (265.3)	9.858 (266.9)
Observations	605	605	605	605
R-squared	0.668	0.661	0.679	0.672
Number of ctys	27	27	27	27
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Country Trends	YES	YES	YES	YES

Robust standard errors (clustered at the country level) in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Table 3. Effect of Electoral Competition on Relative Rate of Assistance (DiD specification)

VARIABLES	(1) FE	(2) FE	(3) FE	(4) FE	(5) FE	(6) FE	(7) FE-2SLS	(8) FE-2SLS
Dependent Variable: Relative Rate of Assistance								
ELECOMP67	0.103* (0.0576)		0.000303 (0.0366)		0.00333 (0.0341)		-0.00818 (0.0357)	
POLCOMP910		0.177 [†] (0.106)		0.157*** (0.0472)		0.152*** (0.0481)		0.116* (0.0691)
Rural Pop Shr	-0.000144 (0.0107)	0.00128 (0.0106)	0.0134 (0.0189)	0.0207 (0.0181)	0.00987 (0.0180)	0.0172 (0.0177)	0.0104 (0.0270)	0.0240 (0.0306)
Civil War dummy	-0.0292 (0.0769)	0.0163 (0.0693)	-4.55e-05 (0.0403)	0.0105 (0.0379)	0.0103 (0.0427)	0.0207 (0.0393)	-0.0121 (0.0373)	-0.0113 (0.0362)
Under IMF Agreement					0.0579* (0.0301)	0.0544 (0.0315)	0.138 (0.199)	0.114 (0.204)
Constant	-0.372 (0.819)	-0.474 (0.813)	-26.21 (18.48)	-30.90* (17.03)	-20.24 (17.09)	-25.29 (16.27)	-18.16 (33.56)	-29.11 (36.30)
Observations	401	401	401	401	401	401	261	261
R-squared	0.230	0.242	0.466	0.479	0.474	0.486		
Number of countries	15	15	15	15	15	15	14	14
Country FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Country- Trends	NO	NO	YES	YES	YES	YES	YES	YES
Robust standard errors (clustered at country level) in parentheses					*** p<0.01, ** p<0.05, * p<0.1		[†] p= .117	

Note: Negative values of RRA indicate that government policies favor consumers of agricultural products, i.e. the presence of urban bias; a positive increase indicates a shift in favor of agricultural producers.

Table 4. Effect of Electoral Competition on Relative Rate of Assistance, as a function of Rural Population Share

VARIABLES	(1) FE	(2) FE	(3) FE	(4) FE	(5) FE-2SLS	(6) FE-2SLS	(7) FE-2SLS	(8) FE-2SLS
ELECOMP67	-0.372* (0.182)		-0.252 (0.257)		-0.501** (0.230)		-0.233 (0.243)	
Elecomp x rurpopshr	0.00632** (0.00286)		0.00360 (0.00344)		0.00690** (0.00330)		0.00300 (0.00332)	
POLCOMP910		-0.364 (0.215)		-0.550* (0.296)		-0.414 (0.558)		0.273 (0.457)
polcomp910xrurpopshr		0.00790* (0.00371)		0.0105** (0.00420)		0.00782 (0.00784)		-0.00272 (0.00626)
Rural Pop. Share	-0.00265 (0.0101)	-0.000366 (0.00623)	0.00680 (0.0177)	0.0158** (0.00718)	-0.00993 (0.00758)	0.00392 (0.00604)	-0.00220 (0.0342)	0.00881 (0.0104)
Civil War dummy	-0.00268 (0.0531)	0.0196 (0.0400)	0.0142 (0.0422)	0.00132 (0.0267)	-0.0151 (0.0378)	0.0162 (0.0486)	-0.0190 (0.0354)	-0.0200 (0.0464)
Under IMF Agreement	0.121*** (0.0285)	0.0805*** (0.0181)	0.0501* (0.0273)	0.0478 (0.0274)	0.264* (0.156)	0.366 (0.256)	0.143 (0.190)	0.257 (0.218)
Constant	-0.0435 (0.668)	-0.194 (0.521)	-25.57 (17.74)	-20.69** (8.269)	0.611 (0.514)	-0.490 (0.532)	-19.58 (33.57)	-3.022 (19.12)
Total Effect of Electoral Competition Evaluated with Rural Population Share at:								
25 th percentile	0.014 (0.042)	0.118* (0.059)	-0.032 (0.056)	0.088 (0.071)	-0.080 (0.046)	0.063 (0.092)	-0.049 (0.051)	0.107 (0.099)
50 th percentile	0.067 (0.047)	0.185** (0.075)	-0.001 (0.037)	0.177** (0.063)	-0.021 (0.039)	0.130** (0.052)	-0.024 (0.036)	0.084 (0.071)
75 th percentile	0.137* (0.067)	0.272** (0.107)	0.039 (0.041)	0.293*** (0.080)	0.055 (0.055)	0.217** (0.092)	0.009 (0.044)	0.054 (0.087)
Observations	432	548	432	548	279	313	279	313
R-squared	0.314	0.287	0.471	0.412				
Number of ccode	15	15	15	15	15	14	15	14
Country FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Country-Trends	NO	NO	YES	YES	NO	NO	YES	YES

Robust standard errors (clustered at country level) in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 5. Mediation Analysis (Treatment = electoral competition; Mediating variable = RRA)

	(1)	(2)	(3)	(4)	(5)	(6)
	Columns 1-3: Treatment = ELECOMP			Columns 4-6: Treatment = POLCOMP910		
Dep. Var:	Ag TFP gr	RRA	Ag TFP gr	Ag TFP gr	RRA	Ag TFP gr
ELECOMP67	2.401** (1.107)	-0.438*** (0.158)	3.242*** (1.084)			
Elecomp x rurpopshr	-0.0132 (0.0151)	0.00664*** (0.00215)	-0.0259* (0.0148)			
POLCOMP910				-11.39*** (1.92)	-1.00*** (0.198)	-9.17*** (1.95)
Polcomp910xrurpopshr				0.187*** (0.032)	0.0187*** (0.003)	0.146*** (0.032)
Relative Rate of Assistance			1.917*** (0.439)			2.217*** (0.530)
Rural Pop. Share	-0.0831** (0.0350)	-0.0176*** (0.00500)	-0.0494 (0.0346)	-0.0096 (0.029)	-0.005* (0.003)	0.002 (0.029)
Civil War dummy	-0.127 (0.231)	-0.00116 (0.0329)	-0.124 (0.222)	-0.231 (0.243)	0.034 (0.025)	-0.306 (0.238)
Constant	5.569** (2.322)	0.914*** (0.331)	3.817* (2.274)	0.628 (2.465)	0.138 (0.254)	0.321 (2.405)
Observations	277	277	277	373	373	373
R-squared	0.218	0.382	0.277	0.160	0.416	0.203
Number of countries	11	11	11	11	11	11
Evaluated with Rural Pop Share at:						
	<u>25th pctl</u>	<u>50th pctl</u>	<u>75th pctl</u>	<u>25th pctl</u>	<u>50th pctl</u>	<u>75th pctl</u>
Total Effect of Treatment	1.60*** (0.293)	1.49*** (0.246)	1.34*** (0.278)	0.039 (0.288)	1.63*** (0.398)	3.71*** (0.615)
Direct Effect of Treatment	1.66*** (0.283)	1.44*** (0.238)	1.16*** (0.027)	-0.269 (0.281)	0.972** (0.389)	2.59*** (0.606)
Mediation Effect	-0.065 (0.076)	0.044 (0.069)	0.185** (0.093)	0.308** (0.123)	0.660*** (0.228)	1.12*** (0.377)
Mediation Effect as Share of Total Effect	-4.0%	2.9%	13.8%	787%	40.4%	30.2%

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1 Note: All specifications estimated by fixed effects and include a full set of year dummies. Robust standard errors calculated by bootstrapping (with 1000 repetitions).

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