The Political Economy of Agricultural Trade Interventions in Africa

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1.0 Introduction

This chapter explores the political economy of agricultural trade protection in Sub-Saharan Africa. Figure 1.1 portrays the impact of government intervention in support of agricultural and non-agricultural products by governments 1955-2005 in different regions of the globe.[1] In devising these measures, World Bank researchers calculated for a sample of agricultural and non-agricultural commodities the degree to which government policies – tariffs, subsidies, or currency distortions -- led to a separation of domestic from world market prices.[2] The measures represent un-weighted averages. When greater than 0, they indicate that government policies favor farming; when below, that their policies favor other sectors.

Figure 1.1 Near Here

As indicated in Figure 1.1, governments in Africa, like those elsewhere, have adopted more neutral policies over time. Increasingly their policies impact farming and other industries in an even-handed manner. And yet, compared to those in other regions, they have and continue to alter prices in ways that discriminate against farming.

Table 1.1 provides additional data. Decomposing the relative rates of assistance to agricultural and non-agricultural commodities, the table suggests that when seeking to alter relative prices, governments in other regions of the world tend to intervene in both non-agricultural and agricultural sectors, whereas those in Africa specifically target agriculture. In seeking to shape the performance and composition of their economies,

[1] Each figure depicts a locally-weighted kernel regression of the indicator against time.
[2] See Appendix 1 for specific definitions of these indicators.

governments in Africa, to a greater extent than do governments in other regions of the world, tend to focus on farming.

Table 1.1 Near Here

The data thus portray Africa as an outlier. Clearly, then, agricultural policies in Africa warrant further study. In this chapter we therefore devise a series of measures to explore these policies. We describe the levels of protection the manner in which they vary over space and time.[3] Drawing from the literature on the political economy of agriculture, we then advance and test a series of explanations what we observe.

2.1 Description

In this section, we establish the "stylized facts" about Africa's agricultural policies. We note regularities by region and time period.

Over Space: In their recent study of Africa's economic performance in its first fifty years of independence (Ndulu, Collier et al. 2007) stress the importance of differentiating between countries whose economies are resource rich, landlocked, or coastal. These economies behave as if possessing different production functions, they argue, and attempts to account for Africa's growth performance gained in explanatory power when taking this heterogreneity into account.

As depicted in Figure 2.1, while governments in our sample set of countries (see Table A.1) intervene in ways that raise the prices of agricultural importables relative to exportables, those in resource rich countries tend to exhibit the least bias against agricultural trade while those in countries that are landlocked tend to exhibit the greatest. The data in Figures 2.2 and 2.3 suggest that the governments of resource rich countries

[3] Using a series of standard indicators that we describe in the appendix.

tend to provide the most favorable policy environment for producers of both food and cash crops,[4] the governments of landlocked countries tend to impose the worst. As shown in Figure 2.4, while governments in all three types of the countries discriminate against agriculture, those in landlocked countries consistently discriminate the most severely while those that govern countries that are resource rich countries discriminate the least. Governments in coastal economies consistently fall between these two extremes.

Figures 2.1-2.4 Near Here

Over Time: The figures above also support comparisons over time. Figure 2.4 indicates that the bias against agriculture has abetted since the 1980s, but nonetheless remains; the RRA remains below 0. Figure 2.1 portrays the relative rate of protection of importable as opposed to exportable commodities, with negative numbers indicating a bias in favor of import-competing crops and thus against agricultural trade. This bias reached a low point around 1980 and then subsequently lessened during the period of market oriented reforms (the 1980s and 1990s). This indicator too remains negative, however.

Figures 2.2 and 2.3 depict the nominal rates of assistance for food and cash crops. The figures indicate that Africa's governments (with the exception of those in landlocked countries) have tended to protect food crops, raising the level of domestic prices above those prevailing in world markets while taxing cash crops. The distortions introduced by government policies have eroded over time, with nominal rates of assistance converging toward 0.

[4] Although maintaining a negative level of nominal assistance toward cash crops. (See appendix for details on the calculation of rates of assistance to food and cash crops.)

Figure 2.5 (A, B, C, D) jointly summarizes the movement of these indicators. Constructed for each decade since the 1970s, the two-by-two matrices jointly trace changes at the country level. In each matrix, cells to the left of zero on the horizontal axis (TBI) reflect an anti-agricultural trade bias, while cells below zero on the vertical axis (RRA) reflect an anti-agriculture bias. The array thus lends itself to the following interpretation:

Note that in the 1970s, every country in the sample implemented policies that were both anti-agriculture and anti-trade.[5] The dispersion of trade bias was relatively greater than the dispersion of relative rates of assistance to agricultural as opposed to non-agricultural commodities. Over time, the Figure 2.5 confirms, the decadal averages tended to converge, with the degree of convergence in trade bias exceeding that in the bias against agriculture. Despite these changes, however, even by the 21st century, there were no countries that were both pro-agriculture and pro-agricultural trade. Indeed, most of the sample set of countries remained in the cell that captures biases against both agriculture and agricultural trade.

Figure 2.5 (ABCD) Near Here

3.1 Theoretical Setting

Comparing patterns of agricultural policies over place and time, researchers tend to focus on the level of development, as signified by the degree of structural transformation and corresponding differences in the level of per capita income (Kuznets 1966; Chenery and Taylor 1968). When doing so, many highlight the paradoxical position of agriculture in the political economy of development: When agriculture composes the single largest

[5] With the exception of Kenya, which adopted policies favoring agricultural trade.

sector of the economy and farmers the single largest category in the labor force, then governments tend to manipulate prices in ways that lower the incomes of farmers; when, however, agriculture forms but a small portion of the GDP and farming a miniscule portion of the labor force, then governments tend to adopt policies that favor the fortunes of farmers. Given that political power tends to derive from income and numbers, the relationship between the level of development and the nature of government policy appears paradoxical.

To unravel this paradox, most turn to Engel's law, which holds that for a given rate of increase in personal income, there will be a less than proportionate rate of increase in the portion of income spent on food. The empirical relationship between average income and the size of the agricultural sector conforms to this regularity. And so too would the reversal in government policy: For when people are poor and spend a large portion of their incomes on food, they demand that governments protect their interests by adopting policies that lower the costs of food; as incomes improve and food forms a smaller portion of the consumption bundle, the pressures for governments to lower food prices declines (Bates and Rogerson 1980; Hayami and Anderson 1986; Lindert 1991).

As will be discussed below, we too find a relationship between the size of the agricultural sector[6] and the pattern of government policy. But we find little relationship between a country's level of per capita income and the nature of the price distortions that result from government policies. Two possible explanations come to mind. One is that the variation of per capita income may be so small within Africa as opposed to across regions that estimates of its relationship to differences in government policies cannot be rendered precise. A second possibility is that the causal path may run not through the

[6] As measured by the portion of land that is arable or by the share of population that lives in rural area.

macro economy (i.e. average income) but rather through other channels. In this paper, we explore this second possibility and focus on political institutions.

3.2 Our Arguments

Seeking to account for variation in policy choice, we advance three lines of argument. The first addresses differences in political institutions. As changes in institutions mark the course of the recent history of Africa, they help to account for variations in policies over time. The second addresses differences in the endowments of countries, with some being richly endowed with minerals, gem stones or petroleum deposits and many containing both rich regions and poor. Not being time varying, differences in these characteristics help to account for cross-country differences in agricultural policies. They do so, we argue, by influencing the politics of redistribution and revenue extraction, both of which of impinge upon agricultural policies.

Political Institutions: Citizens can affect policy choices through two channels: by lobbying or voting. The size of the rural sector affects the way in which farmers can employ these channels.

When the rural population constitutes a large percentage of the national population, then agricultural production tends to lie in the hands of a large number of small producers, dispersed throughout the countryside. As no single producer can influence government policy, and as organizing so large and diverse a population is costly, the incentives to lobby are small. In countries with large agricultural populations, agriculture should therefore be a weak interest group. In addition, when the portion of the population in agriculture is large, that which is urban is small. The number of consumers would then tend to be small and they would be spatially concentrated.

Consumers would therefore hold a relative advantage as lobbyists. We therefore expect governments in countries with large agricultural sectors to adopt relatively adverse policies toward farming (Olson 1971; Bates 1981).

The very factors – size and dispersal – that render farmers weak lobbyists can render them powerful in electoral settings, however (Varshney 1995; Bates 2007; Bates 2007). Where representation is achieved through electoral channels, and where rural dwellers constitute a large segment of the voting population, then politicians encounter powerful incentives to cater to the interests of farmers. With the introduction of electoral competition, politicians might encounter electoral incentives that would impel them to resist the political pressures emanating from urban consumers.

Figure 3.1 captures the changing nature of political institutions in Africa. When constructing the figure, we count as authoritarian military governments and governments formed by civilian regimes that were single- or no-party in nature – i.e. where the head of state had assumed office without having first to competing for it in a competitive election. As indicated in Figure 3.1, the portion of the observations containing authoritarian regimes fell from roughly 80% 1975-1989 to roughly 50% by the mid 1990's. As indicated in Figure 3.2, the percentage of observations containing multi-party systems rose from less than 20% of the country year observations 1975-1989 to near 50% in the mid-1990s.

Figures 3.1 and 3.2 Near Here

In the sections that follow, we relate the governments' choice of policy to 1) the size of the rural sector, as measured by the share of the population that dwells in rural areas; and 2) to changes in the nature of political institutions, and in particular to the

presence or absence of party competition in the selection of the head of state. But we emphasize the impact of political channels.

Redistribution: As noted by (Ndulu and O'Connell 2007), a larger portion of Africa's economies are based upon the extraction of natural resources than is the case in other regions of the world. One result is regional inequality, as the abundantly endowed areas tend to be richer than others. While in advanced industrial societies the politics of inequality takes the form of class conflict, in Africa, it tends to assume the form of regional conflict.

Roughly 80 percent of Africa's economies possess regions that appear significantly more prosperous than others,[7] and in roughly 70% of these cases, these regions include producers of cash crops. Examples would include the coffee industry in the relatively wealthy Central Province, Kenya, or the cocoa industry in the gold producing regions in Ghana. Such regions may present targets for taxation in support of regional redistribution of wealth.

The intensity of the demands for redistribution would depend, however, upon which region held power. In places such as Kenya, when the head of state, Jomo Kenyatta, was from the agriculturally productive Central Province, the government actively defended agriculture against redistributive claims (Bates 1989). In contrast, the political leadership in neighboring Tanzania came from the impoverished semi-arid zones, and government policy was employed to tax regions, such as Kilimanjaro, made wealthy from the production of cash crops. The incidence of benefits or costs from

[7] See, for example, the data gathered by Nordhaus, W. (2006). The G-Econ Database on Gridded Output: Methods and Data, Yale University.

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agricultural policies thus depends not only on regional differences in income but also upon the regional allocation of power.

In the sections that follow, we relate the governments' choice of policies toward the producers of cash crops to patterns of regional inequality and office holding.

The Revenue Imperative: For most African countries, trade taxes constitute the single largest share of public revenues. And for many, agriculture constitutes the largest portion of the economy and figures prominently among the goods traded. Insofar as governments seek to raise revenues, they are therefore likely to tax agriculture – exports in particular. Only when other major sources of revenues – such as mineral or petroleum deposits -- are available could we expect governments to deviate from this pattern. Governments endowed with ample revenues, moreover, are better able to fund the transfers and infrastructure that would enable them to lower prices for consumers. We should therefore expect them to attempt to a greater degree than others to adopt policies designed to lower the price of food crops.

Summary: Based on the preceding discussion, our expectations therefore are that:

1) agricultural taxation will increase with the rural population share;
2) electoral competition will mitigate the negative effects of rural population share;
3) the presence of an economically privileged region, all else being equal, will reduce support (increase taxation) for cash crops; and,
4) the presence of a president from a privileged region will mitigate the negative effects of the existence of a privileged region for cash crops.
5) resource-rich countries will impose less taxation (increase nominal rates of assistance) on agricultural exportables and intervene more vigorously to lower the

prices of agricultural importables by comparison with prices in international markets.

4.0 Parametric and Semi-parametric Regression Results

This section tests these hypotheses, combining both parametric and non-parametric analyses. Of central interest are the correlates of the relative rates of assistance for agriculture versus non-agriculture (RRA) –Table 4.1 – and the nominal rates of assistance for agricultural importables – Table 4.2-- and exportables -- Table 4.3.

Each table reports four sets of estimates, two (in columns 1 and 2) drawn from OLS models (with and without interaction terms); one drawn from a random effects model (column 3); and the last drawn from a system GMM model (column 4). The models include two control variables: per capita income (in logs) and the extent of arable land.

Before commenting on the tests of our arguments, we first note the coefficients on the control variables. Those in Table 4.1 suggest the absence of a relationship between the measure of per capita income and the measure of sectoral bias (RRA), thus challenging those who seek to explain government policy by appealing to per capita income. In Table 4.2, there is once again no significant relationship between income and government policy. In Table 4.3, by contrast, the coefficients are positive and significant, indicating that, as will be discussed below, the political economy of export crops differs from that of food crops.

We view the share of land that is arable a proxy for the overall importance of farming. The results suggest that the policy orientation of governments towards agriculture does indeed improve as the magnitude of this measure increases.

4.1 Rural Population Share and Political Institutions: We have argued that collective action on the part of farmers becomes increasingly difficult the greater their numbers; but that electoral competition transforms numbers into a political advantage. We thus expect our key indicators of agricultural policy interventions to decline as a function of rural population share, with this effect being conditional on the nature of the party system.

To represent the country's political system, we employ a measure contrived by Ferree and Singh (2002) and subsequently amended and adopted by the World Bank for its Database of Political Institutions (2002). The indicator (the Executive Index of Electoral Competitiveness, or EIEC) measures the level of competition that occurs during the executive selection process. Unlike other commonly used measures (i.e., Gastil's political and civil liberties indices), the EIEC is based upon readily observable features – the presence or absence of party competition. It consists of seven levels as follows:

Level 1 -- No executive exists
Level 2 -- Executive exists but was not elected
Level 3 -- Executive is elected, but was the sole candidate
Level 4 -- Executive is elected, and multiple candidates competed for the office
Level 5 -- Multiple parties were also able to contest the executive elections
Level 6 -- Candidates from more than one party competed in executive elections, but the President won more than 75% of the vote
Level 7 -- Candidates from more than one party competed in executive elections, but the President won less than 75% of the vote.

We deem a party system competitive when the EIEC score is greater than 6. Note that we omit all consideration of the "quality" of electoral competition, including whether elections have been deemed "free and fair."

As can be seen in Table A.2 , the mean share of the rural population in our sample is approximately 70 percent. The value of EIEC exceeded 6 in approximately 38 percent of country/year observations.

Estimation Strategy

Our generic specification is:

(1) $y_{it} = \alpha + \gamma_1 Elecomp_{it} + \gamma_2 Rurpopshare + \gamma_3 (Elecomp * Rurpopshare)_{it} + X_{it}\beta + \nu_i + \varepsilon_{it}$

where y_{it} is one of our key policy indicators for country *i* in year *t*, *Rurpopshare* is the share of a country's population living in rural areas, *X* is a vector of the control variables from our baseline specification, and v_i captures unobserved time-invariant country-specific. The interaction term in equation (1) requires that we evaluate a linear combination of coefficients ($\gamma_1+\gamma_3$ * *Rurpopshare*) in order to assess the impact of electoral competition (which we will evaluate at low and high levels of rural population share), and ($\gamma_2+\gamma_3$) to assess the impact of rural population share when the electoral system is competitive. In selected cases, we also present semi-parametric results for key explanatory variables.

In order to assess the robustness of our estimates, we employ a series of estimators to analyze this specification. For each LHS indicator we begin by excluding the interaction term from equation (1) while still allowing the measures of rural population and electoral competition to enter separately. We then estimate the fully

specified model (as with the first version) by OLS.[8] The interaction term allows the effect of rural population share to shift up or down when there are competitive elections, and allows the effect of competitive elections to vary as a function of the rural population share.

We then re-estimate our fully-specified model using a random effects estimator to exploit the panel structure of our data. The "within" standard deviation in rural population share in our sample is only 3.6, as compared with the "between" variation of 10.7, relative to the mean of 70.55. That is, most of the identifying variation lies in the cross-sectional dimension of the data. As the fixed-effects estimator depends solely on within country variation, we are unlikely to obtain meaningful parameter estimates using that approach. Applying the Hausman test, we find additional support for our choice of the random-effects estimator. In addition, we employ the system GMM dynamic panel estimator of Blundell and Bond (1998). This approach allows consistent panel estimation of models with a lagged dependent variable, which is appropriate in models of policy choice. Moreover, there may be some concern that rural population shares and adoption of competitive electoral systems may be influenced by excluded factors that may also influence the dependent variables. Using appropriately lagged levels and differences of each regressor as instruments, the Blundell and Bond system GMM estimator helps to alleviate the concern with potential endogeneity. We apply this empirical strategy to test our theoretical variables as determinants of: 1) the relative rates of assistance to agricultural and non-agriculture, 2) the nominal rate of assistance to agricultural importables, and 3) the nominal rate of assistance to agricultural exportables.

Relative Rates of Assistance

[8] All OLS estimates use robust standard errors, corrected for clustering at the country level.

Table 4.1 presents our results for RRA. Excluding the interaction between electoral competition and rural population share (in column 1), we find that the existence of competitive elections (controlling for average rural population share) shifts policy support significantly in favor of agriculture. The point estimate for rural population share in column 1 is negative as expected, but not statistically different from zero. Adding the interaction term permits a more nuanced analysis: At a low level of rural population share (50%, as compared with the sample mean of 70%), a competitive electoral system has no statistically discernable effect on relative rates of sectoral assistance; the impact of electoral competition is substantial when the rural population share is high (evaluated at 85%), however. This result is robust to estimation by alternative panel estimators as well as to the inclusion of a lagged dependent variable (which itself is estimated at an intuitively plausible level of 0.58 (s.e. = 0.39)).

To probe these relationships more deeply, we relax that assumption of linearity and estimate semi-parametric (or "partially-linear") models of the form:

$$y_i = X_i\beta + g(Rurpopshare_i) + \varepsilon_i \quad (2)$$

where X includes all of the variables included above *except for* the rural population share, and $g(.)$ is an unknown function relating the dependent variable to (in this case) rural population share. We illustrate this remaining non-parametric relationship separately for the sub-samples with and without electoral competitiveness.

Figure 4.1 displays the semi-parametric relationship between RRA and rural population share while controlling for electoral competition. In the absence of competitive elections, relative assistance to agriculture declines rapidly as the rural

population share increases above the sample mean. Competitive electoral systems appear to check the impact of larger rural populations.

Figure 4.1 Near Here

Nominal Rate of Assistance to Agricultural Importables

Consistent with our hypotheses, we find in Table 4.2 that trade policy support for agricultural importables – largely made up of food crops -- declines as a function of rural population share; controlling for average rural population share, electoral competition increases the level of protection for Africa's domestic producers of import-competing crops, though not to a significant degree. Nor are the interaction terms included in columns 2 – 4 statistically significant. When we evaluate the partial derivatives, however, we find that electoral competition transforms high values of rural population share from a political liability into a political asset: at a high level of rural population share (85%), the OLS and random effects estimates indicate a substantial and statistically significant benefit from electoral competition.

Figure 4.2 captures the negative impact of rural population share in the absence of electoral competition. In the presence of electoral competition, however, this debility is mitigated. There is a very great difference indeed in the impact of high levels of rural population share in societies with and without electoral competition.

Figure 4.2 Near Here

Nominal Rate of Assistance for Agricultural Exportables

Table 4.3 suggests that rural population share bears little relationship with the level of nominal protection of agricultural exportables. As seen at the bottom of Table 4.3, the data suggest that at high levels of rural population share, producers of agricultural

exportables do benefit from electoral competition. The impact is very small, however, and the statistical support is weak. Figure 4.3 confirms that nominal assistance for agricultural exportables in the absence of competitive elections is not a function of rural population share, save perhaps at high levels of the latter. In the absence of competitive elections, when the share of the population that is rural is high, then agricultural exportables are highly taxed.

As will be discussed below, the differences in the results for importables and exportables suggest that the political economy of food and cash crops differs. That cash crops tend to be grown in specific regions whereas food crops tend to be grown by rural families everywhere render the former susceptible to the impact of regional rivalries and the politics of economic redistribution.

4.2 Regional Inequality and Presidential Origin

Data collected by the authors indicate that most African states contain rich regions and poor and that in roughly 70% of the instances in which the country is marked by regional inequality, the prosperous region is a center for the production of cash crops. Particularly in the case of cash crops, then, we would expect the politics of agricultural policy making to be immersed in the politics of regional inequality, as poor regions seek to employ power to extract resources from rich, while rich regions seek to beat back efforts at political redistribution.

To illustrate, consider the historic rivalries between the socialist systems of Tanzania and Ghana on the one hand and the "capitalist" systems of Kenya and Cote d'Ivoire on the other.[9] In Tanzania, President Julius Nyerere drew his political support

[9] See, for example, Barkan, J. D. (1994). Beyond Capitalism vs Socialism in Kenya and Tanzania. Boulder CO, Lynne Rienner.

from the cities and the semi-arid lowlands; in Ghana, President Kwame Nkrumah drew his support from the cities and the semi-arid north. Both seized a major portion of the revenues generated by the export of cash crops – coffee and cocoa – in order to finance projects designed to benefit their constituencies. In their neighboring states of Kenya and Cote d'Ivoire respectively, the Presidents' political constituencies lay in the richer regions. In Kenya, Jomo Kenyatta's constituency contained producers of coffee; in Cote d'Ivoire, Houphouet Boigny's contained producers of cocoa. Rather than endorsing economic equality, Jomo Kenyatta and Houphouet Boigny instead advocated the accumulation of wealth. Both employed the power of the sate to defend the fortunes of their region from those championing the fortunes of less well endowed regions or propounding economic equality.[10]

The intuition imparted by these cases informs the models reported in Table 4.4. In columns 1-3, the dependent variable is an indicator of relative policy support for cash versus food crops in which positive values indicate relatively greater support for cash crops and negative values indicate a bias against cash crops in favor of food crops.[11] We find weak statistical support in columns 1-3 for the notion that the existence of a region privileged with cash crops results in reduced relative support for cash versus food crops when the president is not from a privileged region. This effect disappears when the president is from a privileged region. Indeed, we further find that relative support for

[10] Following the rapid rise of cocoa and coffee prices in the 1970s, Houphouet Boigny did launch a series of efforts to promote the fortunes of the north. Subsequent events suggest that the wisdom of these efforts, as the diverging fortunes of the two regions exacerbated political tensions in in Cote d'Ivoire.

[11] See Appendix 1 for the specific definition of this "cash-food bias indicator (CFBI)." See Table A.3 for construction of the indicators of nominal rates of assistance for cash and food crops.

cash crops increases significantly when the president is from a privileged region in a country with a cash crop region.

In columns 4-9, we explore the correlates of the respective components of this index. In columns 4-6, the dependent variable is the nominal rate of assistance for cash crops; in columns 7-9, the nominal rate of assistance for food crops. For each dependent variable, we estimate three models: ordinary least squares, random effects, and GMM – the last to enable us to control for the impact of hysteresis in policy choice.

The coefficients in columns 4-9 reconfirm that the politics surrounding cash crops differ from those surrounding food crops. For food crops (columns 7-9), the larger the share of the population in agriculture, the greater the tendency of the governments to intervene in ways that lower domestic prices relative to those prevailing in global markets; in addition, governments tend to alter this policy when they must secure electoral majorities in order to secure power. Neither tendency characterizes the treatment of cash crops, however (columns 4-6). Rather, policies toward cash crops appear to be shaped by the politics of regional inequality. In states in which cash crops are grown in "privileged regions," the government intervenes in ways that lower the incomes of farmers. As can be inferred from the partial derivatives, when a politician from that region holds executive power, policies become more favorable to the producers of cash crops. The significance levels of the coefficient on presidential origins tend, however, to be low. The low value may well result from measurement error. Not all privileged regions produce cash crops; and not all cash crops emanate from privileged regions. That a president comes from a privileged region thus need not imply that his political interests are aligned with the economic interests of the producers of cash crops.

Table 4.4. Near Here

4.3 Revenue Imperative

Policies toward agriculture are also affected by their need for revenues. Certainly in Africa governments have employed marketing boards and other instruments to extract revenues from the exports of cash crops; and they have expended revenues in efforts to build bureaucracies capable of purchasing food crops at prices lying below their level in international markets and to subsidize the prices of food crops for urban consumers (Bates 1981);(Krueger, Schiff et al. 1992).

The coefficients on "cash region" in Table 4.4, which are negative and significant in all models, are therefore suggestive. The import remains somewhat ambiguous, however, as they could be the result of efforts at regional re-distribution as well as efforts to raise public revenues for other purposes. The coefficients on "resource rich" in Table 4.3 suggest that governments with alternative sources of revenues refrain from shifting prices against the producers of cash crops; the coefficients are not statistically significant, however. The coefficients on this variable in columns 4-6 of Table 4.4 also suggest that having alternative sources of income is of no significant consequence for the manner in which governments intervene in markets for cash crops. More interesting are the coefficients linking the variable "resource rich" with the prices for food crops. As seen in Table 4.2 and columns 7-9 in Table 4.4, when governments possess alternative sources of revenue, they do not lighten the burden on the producers of cash crops. Rather, having access to profits from the export of petroleum, gem stones, or metals appears to be associated with greater – and thus more expensive -- efforts to keep the local price of food crops low relative to prices in international markets.

5. Conclusion

In this chapter, we have explored patterns of variation in the content of agricultural policies in Africa. We have looked at the impact of the government's need for revenues, the incentives for farmers to lobby, and their capacity to affect electoral outcomes. We have also explored the political impact of regional inequality, especially insofar as it is generated by cash crop production. These factors operate in ways that deepen our appreciation of the impact of politics on the making of agricultural policies.

Appendix: Policy Indicators

The principal indicators of trade interventions that we examine in this chapter draw on the new data set constructed through the World Bank's Distortions to Agricultural Incentives Project.[12] We propose models to explain direct agricultural distortions – specifically nominal rates of assistance to agricultural tradables relative to non-agricultural tradables (e.g., the relative rate of assistance), as well as the nominal rates of assistance to agricultural importables and agricultural exportables (and their ratio, known as the Trade Bias Indicator).

For each of these commodity aggregates (x), the nominal rate of assistance when an ad valorem tariff is the sole intervention is calculated as:

$$(1) \qquad NRA\_x = \frac{E \times P(1+t_m) - E \times P}{E \times P} = t_m$$

t_m is tariff rate, E is the nominal exchange rate, and P is the dollar-denominated world price of the commodity. Anderson, et. al. provide a detailed discussion of how this basic formula is modified to incorporate additional distortions, such taxes and subsidies on domestic production of the relevant commodities.

We also examine key ratios among these indicators. The relative rate of assistance captures the relative support given to agriculture versus non-agriculture:

$$(2) \qquad RRA = \left[\frac{1 + NRAag^t}{1 + NRAnonag^t} - 1 \right]$$

[12] See Anderson, et. al. (2007), Appendix 2.

Thus, when agriculture is relatively favored (disfavored) by trade interventions in agriculture versus non-agriculture, the RRA is greater (less) than one. Similalry, Anderson, et. al., provide an indicator of trade bias *within* agriculture, by comparing the relative assistance to exportables versus importables (e.g., the trade bias indicator):

$$(3) \qquad TBI = \left[\frac{1 + NRAag_x}{1 + NRAag_m} - 1 \right]$$

The TBI is greater than one when interventions are relatively favorable to agricultural exportables (interpreted as a pro-trade regime).

Our analysis also makes reference to nominal rates of assistance to food crops and cash crops. To construct these aggregates, we use the nominal rates of assistance calculated by the World Bank data set, weighting within each category by the share in the value of production of each commodity within that category. Our food crop aggregate includes cassava, maize, millet, tubers, sorghum, wheat, rice, and yams. Our cash crop aggregate includes cotton, cocoa, coffee, nuts, sugar, tobacco, and tea. Analogous to the TBI, we calculate a "cash-food bias indicator" (CFBI):

$$(4) \qquad CFBI = \left[\frac{1 + NRAcashcrops}{1 + NRAfoodcrops} - 1 \right]$$

As in the previous cases, this indicator is greater (less) than one when cash crops are favored (disfavored) relative to food crops by trade policy interventions.

Table 1.1

Correlation with Relative Rates of Assistance between Agricultural and Non-Agricultural Sector				
Region	Sub-Sahara Africa	Latin America	Asia	Europe and North America
Nominal Rates of Assistance for Agricultural Sector	0.87	0.91	0.94	0.99
Nominal Rates of Assistance for Non-Agricultural Sector	-0.08	-0.60	-0.52	-0.28

Table 4.1. Determinants of Relative Rate of Assistance (RRA), 1975 – 2003

	(1)	(2)	(3)	(4)
	OLS	OLS	RE[a]	SYS-GMM[b]
log_rgdpch	0.030	0.030	0.042	0.011
	(0.099)	(0.101)	(0.094)	(0.046)
landlocked	-0.028	-0.031	-0.050	-0.012
	(0.147)	(0.148)	(0.137)	(0.059)
resourcerich	-0.048	-0.046	0.013	-0.012
	(0.121)	(0.124)	(0.116)	(0.052)
land_arable	0.014	0.014	0.011	0.006
	(0.004)***	(0.004)***	(0.005)**	(0.002)***
Rural pop. share	-0.003	-0.004	-0.002	-0.002
	(0.007)	(0.007)	(0.006)	(0.003)
Elecomp dummy	0.121	-0.051	-0.264	-0.223
	(0.043)**	(0.193)	(0.175)	(0.110)*
Elecomp x rur pop shr		0.003	0.005	0.004
		(0.003)	(0.003)**	(0.001)**
RRA(t-1)				0.580
				(0.039)***
Constant	-0.477	-0.408	-0.553	-0.079
	(1.119)	(1.119)	(1.025)	(0.481)
Observations	400	400	400	394
R-squared	0.21	0.21	0.20	
Total Effect of:				
Rural pop. Share w/ comp. elections		-.001	0.004	0.002
		(0.006)	(0.006)	(0.003)
Comp. election, w/ rural pop shr = 50%		0.075	0.003	-0.038
		(0.063)	(0.054)	(0.038)
Comp. election, w/ rural pop shr = 85%		0.163	0.190	0.092
		(0.071)**	(0.074)***	(0.020)***

Robust standard errors (clustered by country)in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%
Year dummies not reported.
a. Random effects model
b. One-step system GMM

Table 4.2. Determinants of Nominal Rate of Assistance for Agricultural Importables (1975 – 2003)

	(1)	(2)	(3)	(4)
	OLS	OLS	RE	SYS-GMM
log_rgdpch	-0.005	0.004	-0.030	-0.001
	(0.058)	(0.058)	(0.091)	(0.024)
landlocked	0.049	0.031	0.025	0.012
	(0.090)	(0.092)	(0.123)	(0.039)
resourcerich	-0.488	-0.472	-0.406	-0.177
	(0.104)***	(0.102)***	(0.160)**	(0.024)***
land_arable	0.040	0.040	0.035	0.013
	(0.005)***	(0.004)***	(0.005)***	(0.004)***
Rural pop. share	-0.014	-0.018	-0.017	-0.006
	(0.005)**	(0.006)***	(0.011)	(0.002)**
elecomp	0.175	-0.449	-0.428	-0.035
	(0.060)**	(0.547)	(0.583)	(0.330)
elecomp_poprurptot		0.009	0.009	0.002
		(0.008)	(0.009)	(0.005)
NRA_ag importables (t-1)				0.635
				(0.079)***
Constant	0.921	1.117	1.310	0.267
	(0.813)	(0.806)	(1.409)	(0.262)
Observations	375	375	375	374
R-squared	0.47	0.49	0.49	
Total Effect of:				
Rural pop. Share w/ comp. elections		-0.009	-0.008	-0.004
		(0.008)	(0.012)	(0.004)
Comp. election, w/ rural pop shr = 50%		0.002	0.024	0.053
		(0.148)	(0.161)	(0.100)
Comp. election, w/ rural pop shr = 85%		0.318	0.340	0.114
		(0.155)*	(0.163)**	(0.076)

Robust standard errors (clustered by country)in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%
Year dummies not reported.

Table 4.3. Determinants of Nominal Rate of Assistance to Agricultural Exportables, 1975-2003

	(1)	(2)	(3)	(4)
	OLS	OLS	RE	SYS-GMM
log_rgdpch	0.183	0.184	0.159	0.051
	(0.068)**	(0.070)**	(0.068)**	(0.029)*
landlocked	-0.133	-0.137	-0.125	-0.042
	(0.089)	(0.091)	(0.067)*	(0.027)
resourcerich	0.054	0.056	0.004	0.018
	(0.093)	(0.095)	(0.080)	(0.028)
land_arable	0.008	0.008	0.012	0.002
	(0.003)**	(0.003)**	(0.004)***	(0.001)**
Rural pop. share	0.003	0.002	-0.003	-0.0002
	(0.005)	(0.005)	(0.005)	(0.001)
elecomp	0.034	-0.131	-0.425	-0.149
	(0.049)	(0.287)	(0.293)	(0.083)*
elecomp_poprurptot		0.002	0.007	0.002
		(0.004)	(0.004)	(0.001)*
NRA_ag				0.728
exportables (t-1)				(0.083)***
Constant	-1.852	-1.796	-1.284	-0.501
	(0.693)**	(0.695)**	(0.727)*	(0.255)*
Observations	427	427	427	425
R-squared	0.43	0.43	0.41	
Total Effect of:				
Rural pop. Share w/		0.004	0.004	0.003
comp. elections		(0.004)	(0.005)	(0.001)*
Comp. election, w/		-0.011	-0.093	-0.035
rural pop shr = 50%		(0.097)	(0.092)	(0.029)
Comp. election, w/		0.073	0.139	0.044
rural pop shr = 85%		(0.072)	(0.087)†	(0.024)*

Robust standard errors (clustered by country) in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%
† P-value = .11
Year dummies not reported.

Table 4.4 The Role of a Privileged Cash Crop Region and Presidential Origin on Protection of Cash versus Food Crop Protection

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		Dep. Var: CFBI			Dep. Var: nra_cashcrops			Dep. Var: nra_foodcrops	
	OLS	RE	SYS-GMM	OLS	RE	SYS-GMM	OLS	RE	SYS-GMM
Cash region	-0.186	-0.186	-0.097	-0.234	-0.234	-0.075	-0.011	-0.011	-0.016
	(0.156)	(0.065)***	(0.078)	(0.081)**	(0.051)***	(0.025)**	(0.101)	(0.071)	(0.050)
Pres. from	-0.035	-0.035	-0.002	-0.078	-0.078	0.069	-0.056	-0.056	0.047
privlg region	(0.205)	(0.158)	(0.085)	(0.106)	(0.099)	(0.032)*	(0.175)	(0.176)	(0.096)
Cash x pres	0.263	0.263	0.118	0.192	0.192	-0.032	0.118	0.118	0.005
from privlg.	(0.252)	(0.182)	(0.106)	(0.126)	(0.109)*	(0.038)	(0.262)	(0.217)	(0.156)
Rural pop.	0.035	0.035	0.017	0.009	0.009	0.003	-0.021	-0.021	-0.012
share	(0.011)***	(0.005)***	(0.006)**	(0.007)	(0.003)***	(0.024)	(0.007)**	(0.003)***	(0.003)***
Comp.	-0.079	-0.079	-0.065	0.056	0.056	0.007	0.120	0.120	0.048
elections	(0.065)	(0.058)	(0.038)	(0.066)	(0.041)	(0.024)	(0.053)**	(0.049)**	(0.037)
log_rgdpch	0.418	0.418	0.193	0.078	0.078	0.016	-0.222	-0.222	-0.121
	(0.171)**	(0.068)***	(0.083)**	(0.147)	(0.043)*	(0.037)	(0.113)*	(0.066)***	(0.067)
landlocked	-0.199	-0.199	-0.095	-0.146	-0.146	-0.044	0.065	0.065	0.027
	(0.135)	(0.074)***	(0.069)	(0.121)	(0.055)***	(0.027)	(0.141)	(0.094)	(0.088)
resourcerich	0.532	0.532	0.242	-0.048	-0.048	-0.041	-0.556	-0.556	-0.344
	(0.191)**	(0.096)***	(0.109)**	(0.081)	(0.063)	(0.001)*	(0.146)***	(0.068)***	(0.064)***
land_arable	-0.020	-0.020	-0.009	0.006	0.006	0.002	0.025	0.025	0.015
	(0.008)**	(0.005)***	(0.004)**	(0.003)	(0.003)**	(0.001)**	(0.007)***	(0.004)***	(0.004)***
Lagged dep.			0.547			0.705			0.370
Var.			(0.051)***			(0.074)***			(0.036)***
Constant	-5.208	-5.208	-2.458	-1.580	-1.307	-0.361	2.890	2.890	1.452
	(1.674)***	(0.745)***	(0.923)**	(1.426)	(0.433)***	(0.336)	(1.217)**	(0.609)***	(0.627)**
Observations	246	246	242	249	249	248	249	249	247
R-squared	0.36	0.36		0.31	0.31		0.33	0.33	
Total Effect of:									
Cash-priv w/	0.078	0.078	0.021	-0.043	-0.043	-0.107	0.107	0.107	-0.011
pres from prv	(0.329)	(0.205)	(0.141)	(0.154)	(0.125)	(0.042)**	(0.291)	(0.215)	(0.170)
Pres from prv	0.229	0.229	0.116	0.114	0.114	0.037	0.062	0.062	0.051
if there is	(0.129)*	(0.073)***	(0.061)*	(0.085)	(0.038)***	(0.022)	(0.128)	(0.068)	(0.081)
cash prv reg.									

Robust standard errors (clusterd by country) in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

Year dummies not reported.

Table A.1

Countries in the Sample	
Benin	Morocco
Burkina Faso	Cameroon
Mozambique	Nigeria
Chad	Cote d'Ivoire
South Africa	Senegal
Egypt	Ethiopia
Sudan	Togo
Ghana	Kenya
Uganda	Zaire
Madagascar	Mali
Zimbabwe	Tanzania

Table A.2

Variables and Descriptive Statistics

Variable	Units	Mean	Standard Deviation	Source
NRA	Percent			Anderson et al. 2007
___agricultural tradables		-0.147	0.331	
___non-ag tradables		0.078	0.154	
___agricultural importables		0.119	0.484	
___agricultural exportables		-0.291	0.274	
___foodcrops		-0.078	0.32	
___cashcrops		-0.283	0.323	
RRA	Percent	-0.198	0.276	Anderson et al. 2007
Anti-trade bias	Percent	-0.284	0.365	Anderson et al. 2007
Competitive elections	0/1	0.317	0.466	Ferree and Singh 2002 Beck, T.G. Clarke at al. 2001.
Rural population share	Percent	0.756	0.126	World Development Indicators 2007
Real GDP per capita		1530.4	1481.9	World Development Indicators 2007
Landlocked	0/1	0.362	0.481	Ndulu, Collier et al. 2007
Coastal	0/1	0.538	0.499	Ndulu, Collier et al. 2007
Resource rich	0/1	0.176	0.381	Ndulu and O'Connell 2007
Arable land share	Percent	0.11	0.092	World Development Indicators 2007
Cashcrop priveleged region	0/1	0.723	0.448	Bates 2007
President from privleged region	0/1	0.465	0.5	Bates 2007

Table A.3 Definitions

Variable	Definition
NRA	Nominal rates of assistance: The unit value of production at distorted prices less the unit value at undistorted prices expressed as a fraction of the undistorted price. The distortions include subsidies, tariffs, taxes, and manipulations of the exchange rate. 0 implies the neutrality of government policy. Positive numbers imply subsidization; negative numbers imply taxation
___agricultural tradables	
___non-ag tradables	
___agricultural importables	
___agricultural exportables	
___foodcrops	Weighted average of NRAs for cassava, maize, millet, tubers, sorghum, wheat, rice, and yams (weighted by value share of production)
___cashcrops	Weighted average of NRAs for coffee, cotton, sugar, nuts, cocoa, tobacco, tea (weighted by value share of production)
RRA	Relative rates of assistance. Classifying commodities as originating from the agricultural or non-agricultural sector, the RRA is based upon the the ratio between the average rate of assistance (weighted by the relative value of the industry'es share of ttal production) of agricultural and non-agirultural tradables. Values less than 0 suggest policy descrimination against agriculture.
Anti-trade bias	Classifying each industry as import competing, non-tradable, or exportable, the measure of trade bias is the weighted average of the nominal rate of assistance for importables relative to that for exportables. Values greater than zero indicate an anti-trade bias.
Competitive elections	A government is said to be competitively elected when the incumbent head of state achieved office by contesting an election in which she faced a rival who was sponsored by an organized party and received less than 75% of the vote.
Rural population share	The percent of population living in rural areas.
Real GDP per capita	Average real income, computed in constant 2000 US dollars.
Landlocked	Countries whose borders fail to touch the sea.
Coastal	Countries whose borders touch the sea.
Resource rich	A country is classified as resource-rich starting in the first year (i) current rents from energy, minerals and forests exceed 5% of Gross National Income (GNI); (ii) a forward moving average of these rents exceeds 10% of GNI; and (iii) the share of primary commodities in exports exceeds 20% for at least a 5-year period following this initial year.
Arable land share	The share of total land surface suitable for cropping.
Cashcrop priveleged region	The existence within a country of a region of significantly greater than average wealth based on cash crop production.
President from privleged region	Takes the value 1 when the country has a priveleged region and the president is a native of that region

Figure 1.1

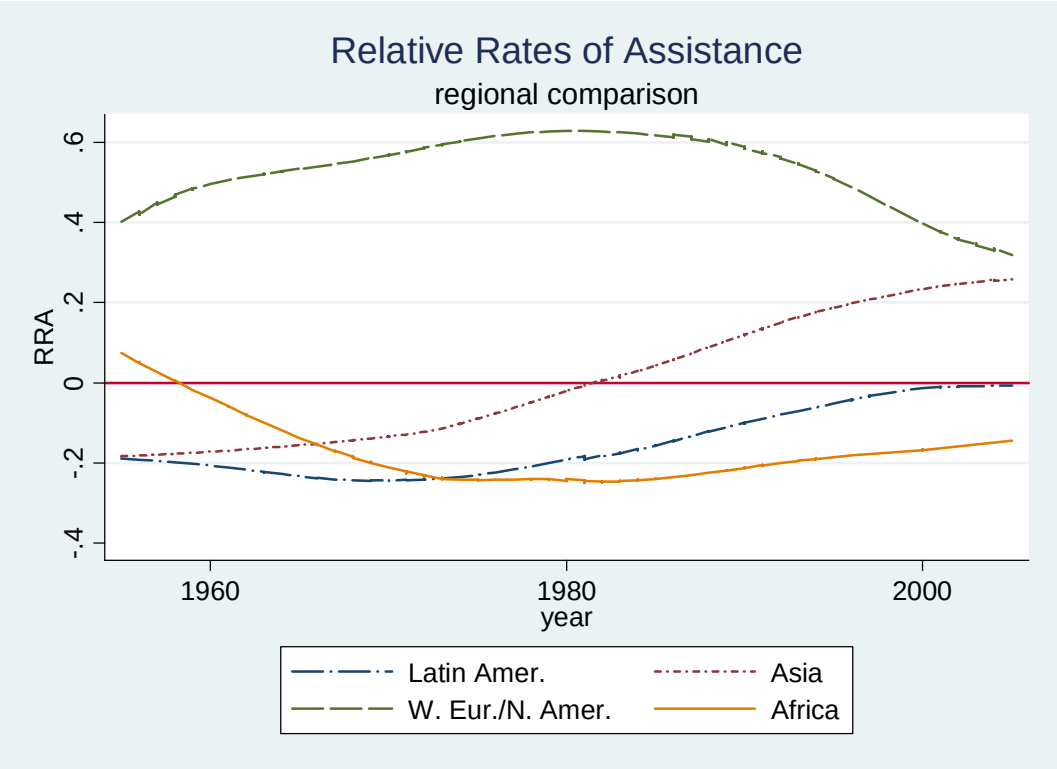

Relative Rates of Assistance
regional comparison
RRA
-.4
-.2
0
.2
.4
.6
1960
1980
2000
year
Latin Amer.
Asia
W. Eur./N. Amer.
Africa

Figure 2.1

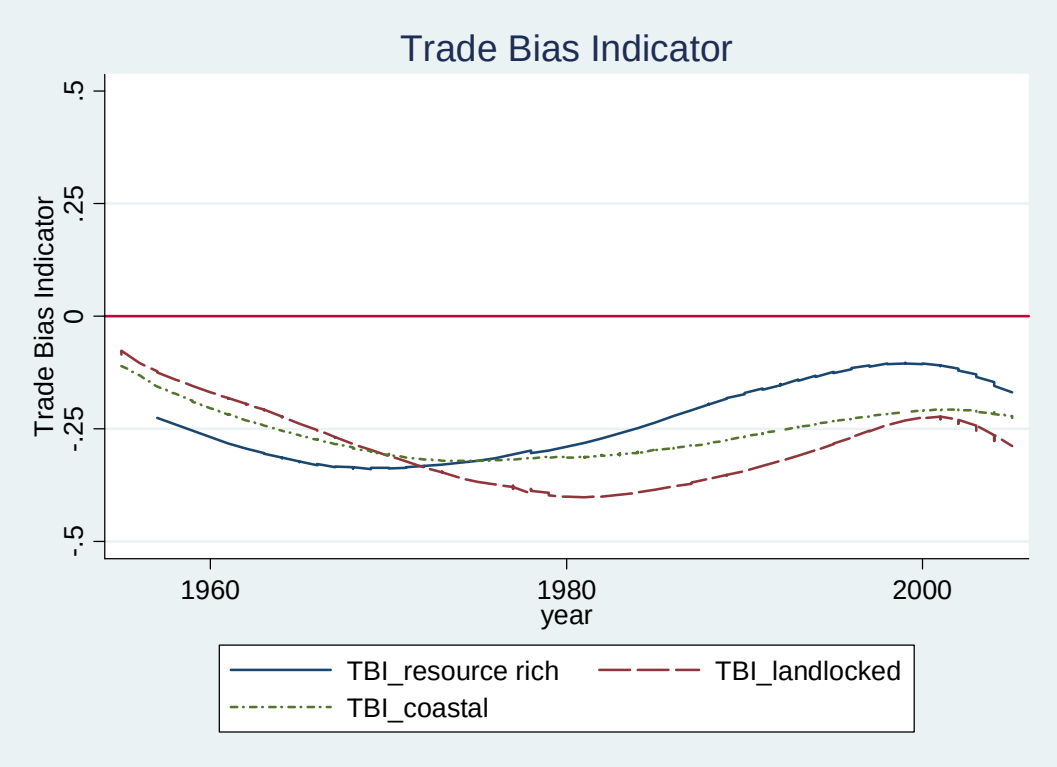

Trade Bias Indicator
Trade Bias Indicator
.5
.25
0
-.25
-.5
1960
1980
2000
year
TBI_resource rich
TBI_landlocked
TBI_coastal

Figure 2.2

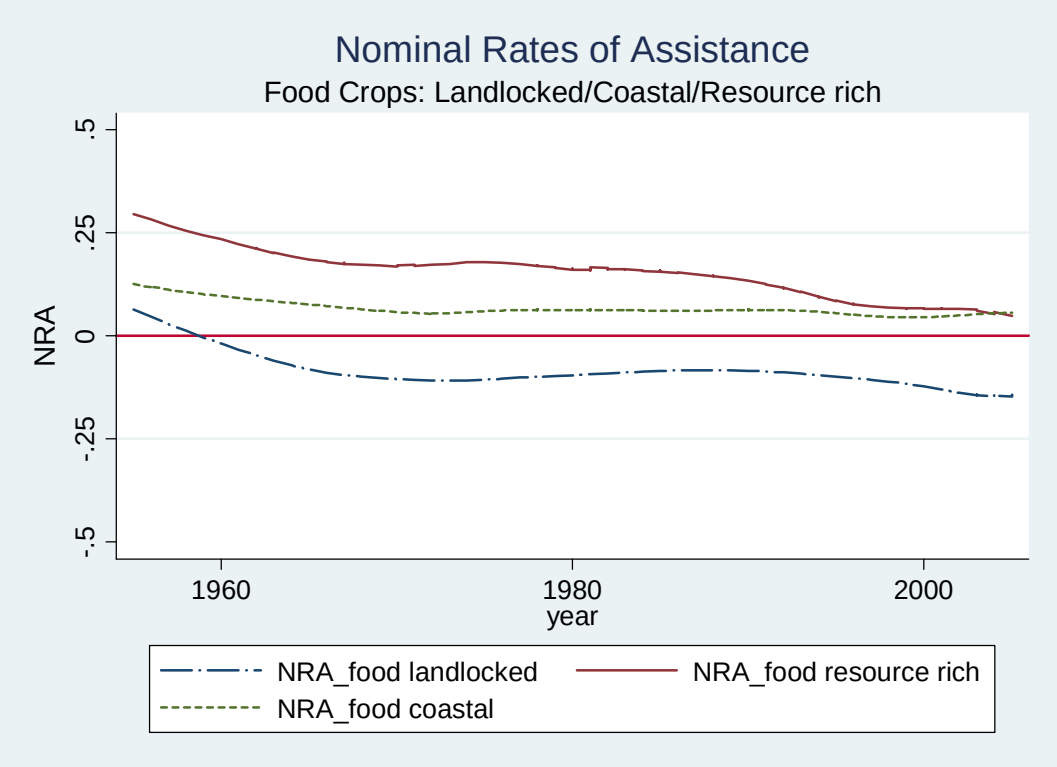

Nominal Rates of Assistance
Food Crops: Landlocked/Coastal/Resource rich
NRA
.5
.25
0
-.25
-.5
1960
1980
2000
year
NRA_food landlocked
NRA_food resource rich
NRA_food coastal

Figure 2.3

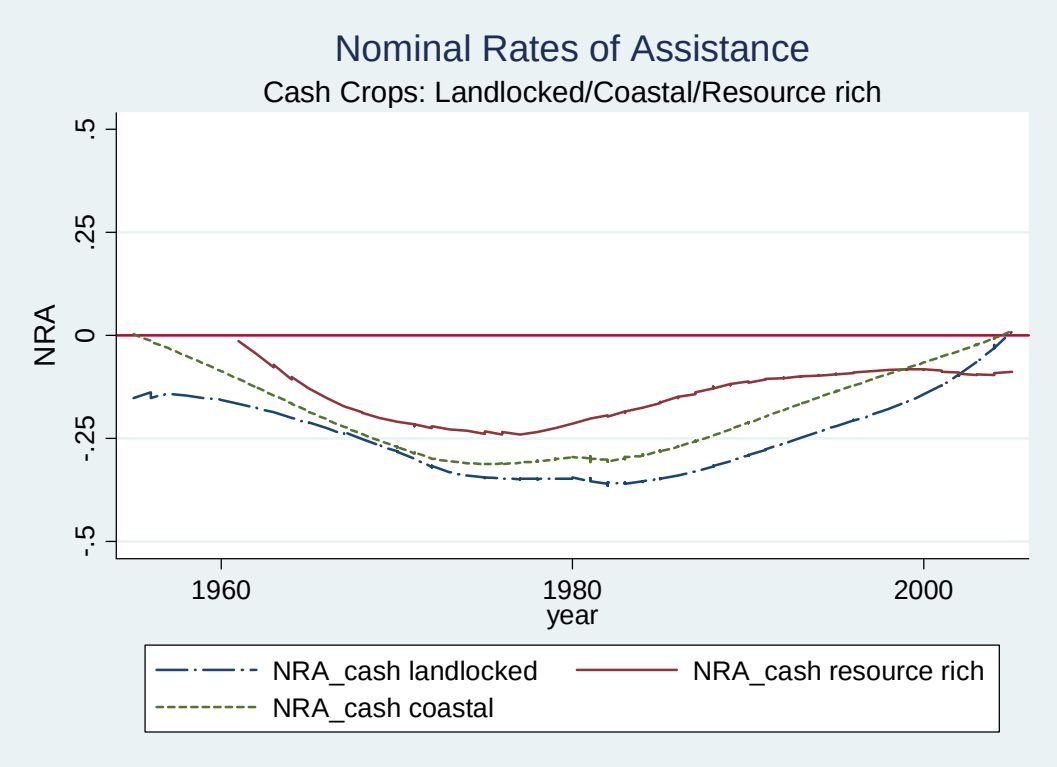

Nominal Rates of Assistance
Cash Crops: Landlocked/Coastal/Resource rich
NRA
.5
.25
0
-.25
-.5
1960
1980
2000
year
NRA_cash landlocked
NRA_cash resource rich
NRA_cash coastal

Figure 2.4

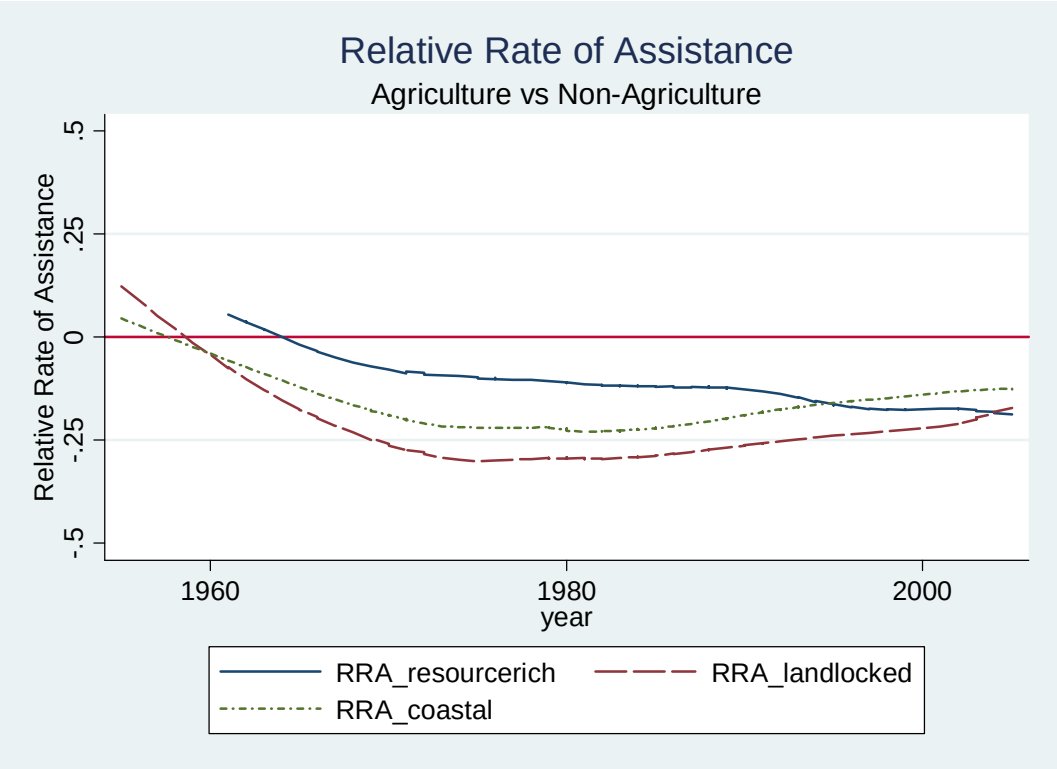

Relative Rate of Assistance
Agriculture vs Non-Agriculture
Relative Rate of Assistance
-.5
-.25
0
.25
.5
1960
1980
2000
year
RRA_resourcerich
RRA_landlocked
RRA_coastal

Figure 2.5 (A, B / C, D)

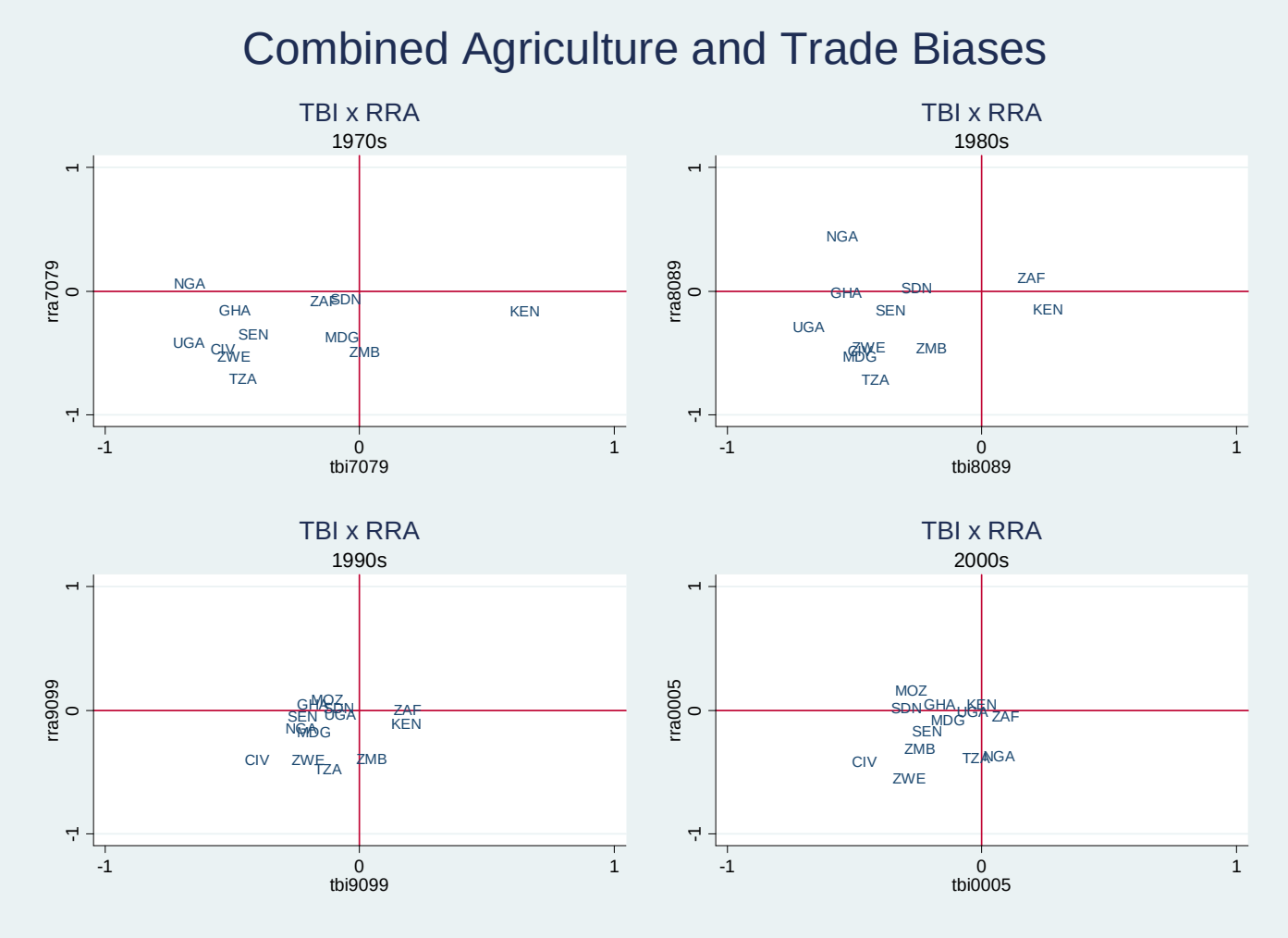


Figure 3.1

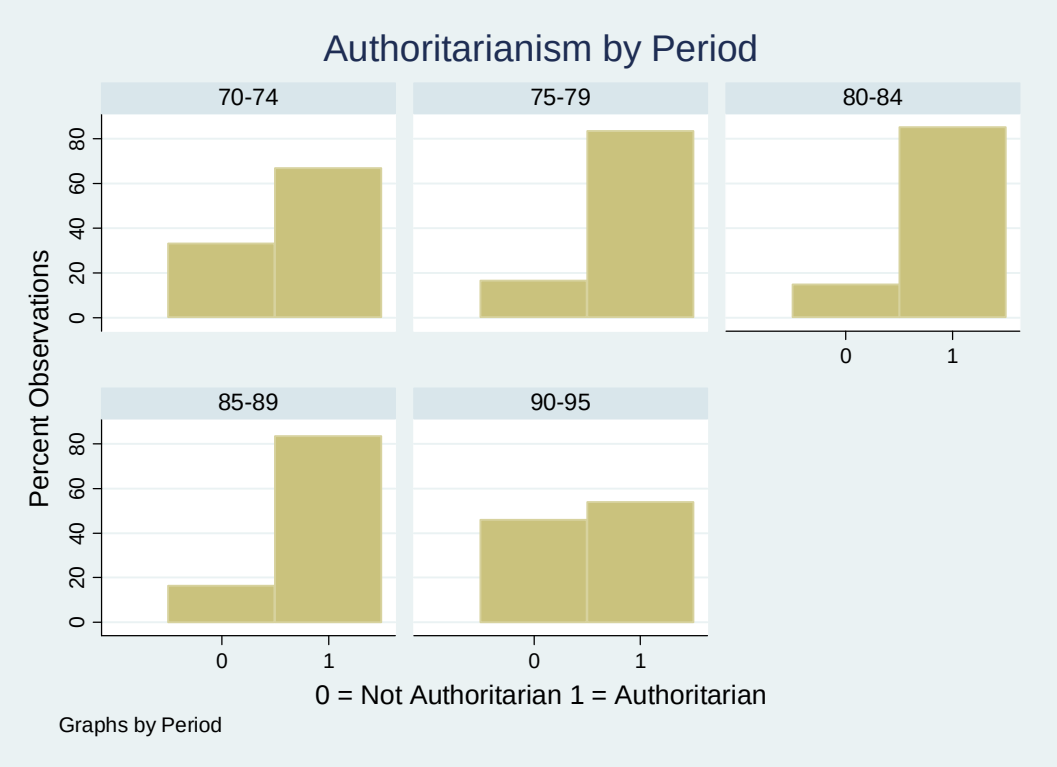

Authoritarianism by Period
70-74
75-79
80-84
85-89
90-95
Percent Observations
0
20
40
60
80
0
1
0 = Not Authoritarian 1 = Authoritarian
Graphs by Period

Figure 3.2

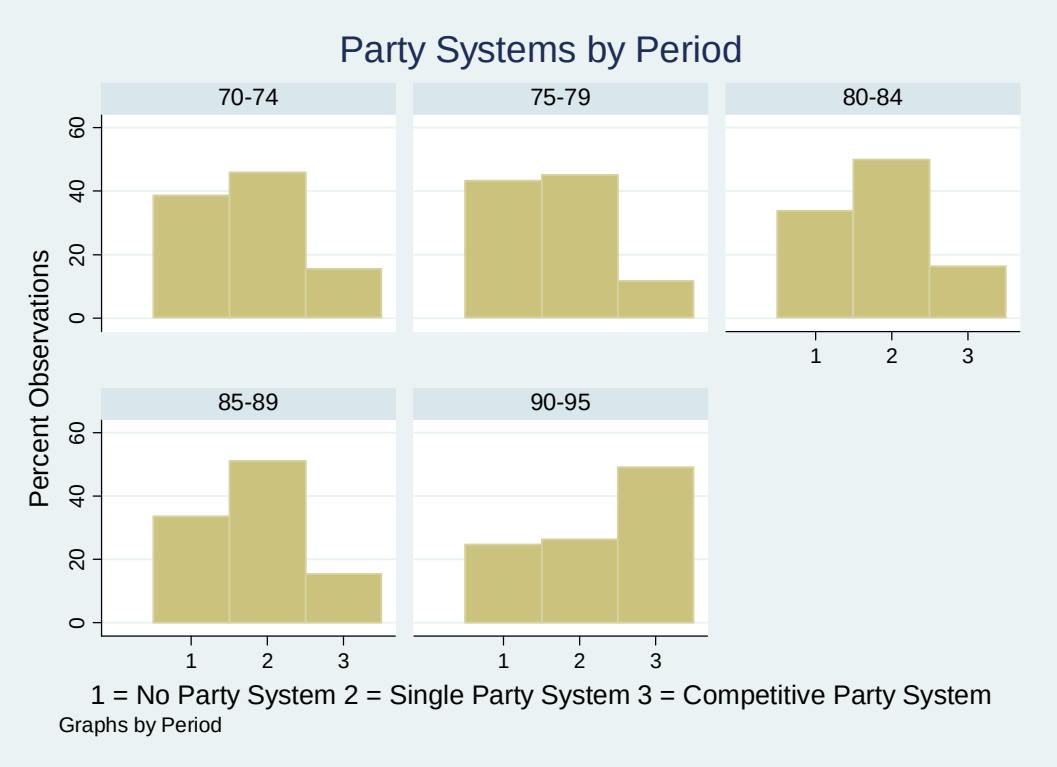

Party Systems by Period
70-74
75-79
80-84
85-89
90-95
Percent Observations
0
20
40
60
1
2
3
1 = No Party System 2 = Single Party System 3 = Competitive Party System
Graphs by Period

Figure 4.1

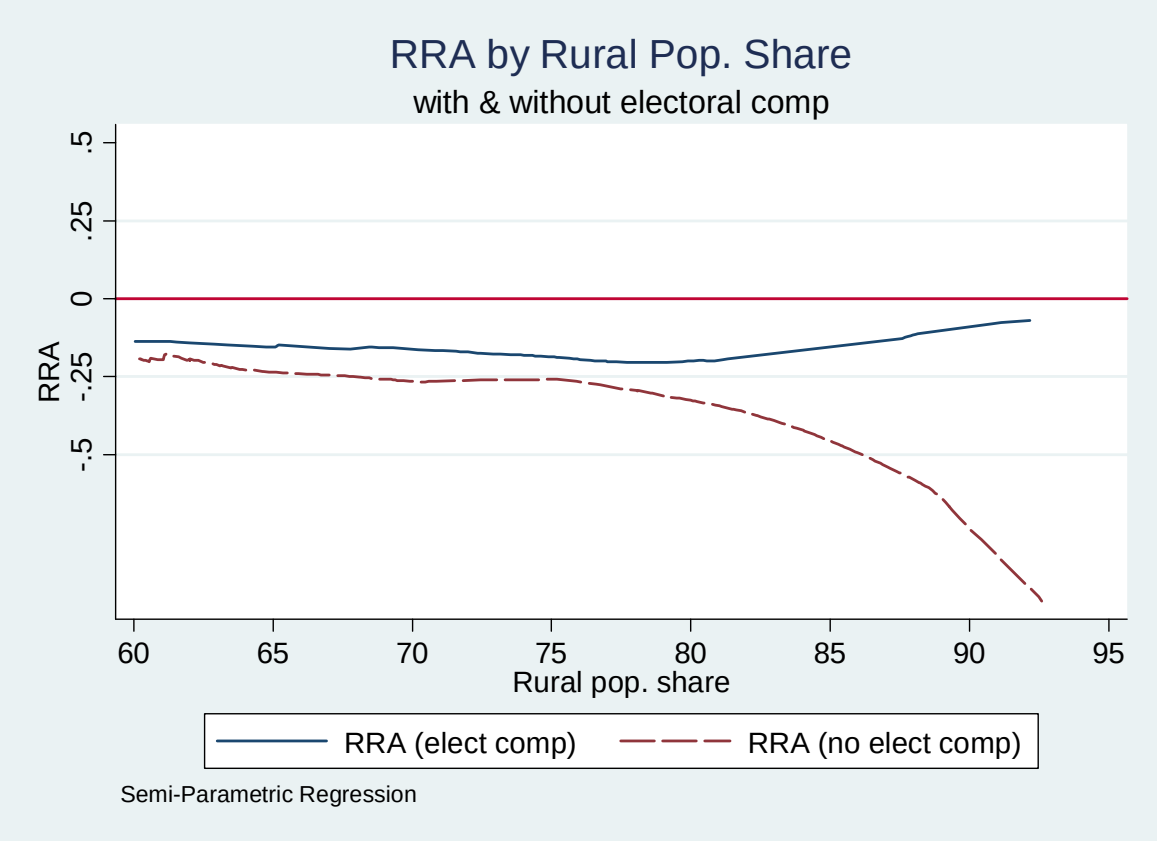

RRA by Rural Pop. Share
with & without electoral comp
RRA
.5
.25
0
-.25
-.5
60
65
70
75
80
85
90
95
Rural pop. share
RRA (elect comp)
RRA (no elect comp)
Semi-Parametric Regression

Figure 4.2

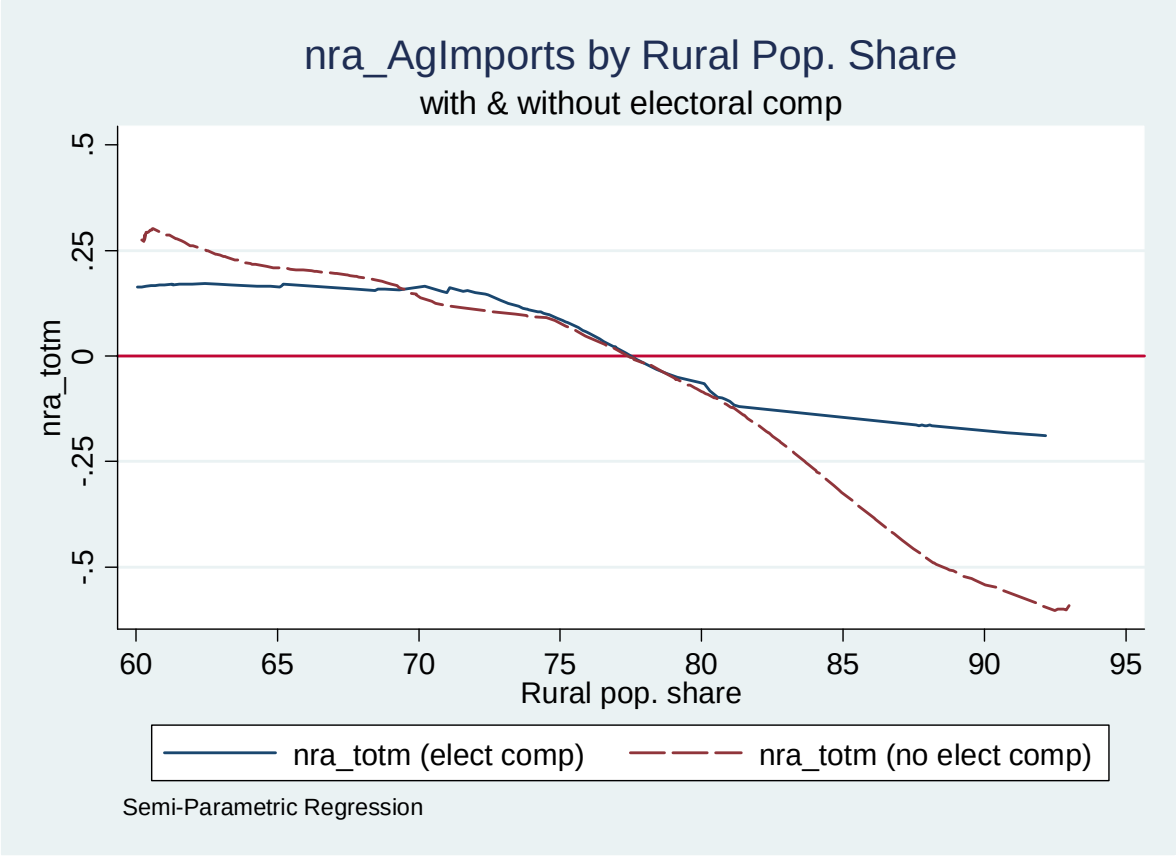
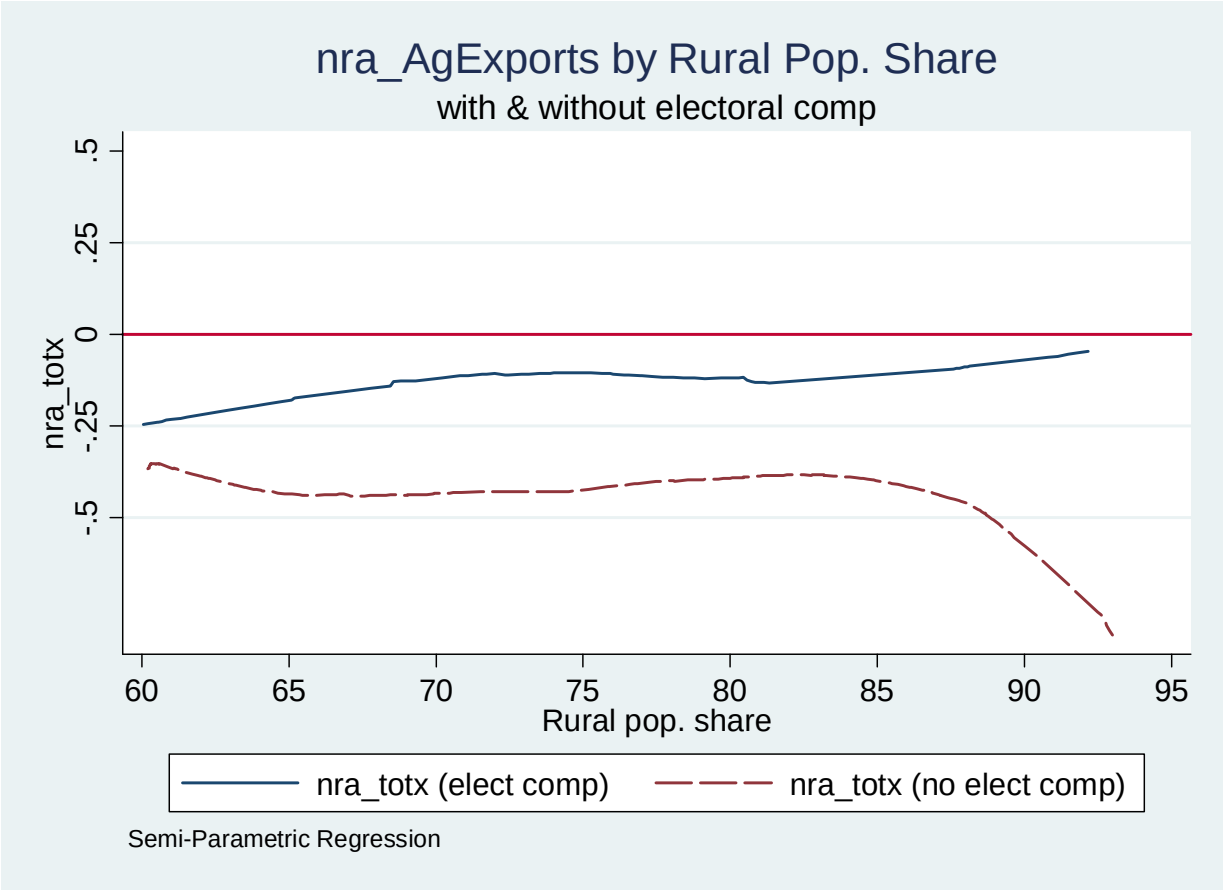

nra_AgImports by Rural Pop. Share
with & without electoral comp
nra_totm
.5
.25
0
-.25
-.5
60
65
70
75
80
85
90
95
Rural pop. share
nra_totm (elect comp)
nra_totm (no elect comp)
Semi-Parametric Regression

Figure 4.3


nra_AgExports by Rural Pop. Share
with & without electoral comp
nra_totx
.5
.25
0
-.25
-.5
60
65
70
75
80
85
90
95
Rural pop. share
nra_totx (elect comp)
nra_totx (no elect comp)
Semi-Parametric Regression

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