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**Do Institutions Limit Clientelism?
A Study of the District Assemblies Common Fund in Ghana**

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INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

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ABSTRACT

Analyses of how coveted central-government resources in Africa are shared have shown widespread patronage, ethnic cronyism, and pork-barrel politics. While some governments have attempted to rectify the situation by establishing revenue-sharing formulas, a key unanswered question is whether such institutions are able to achieve this goal. This paper presents an empirical investigation of a pioneering formula-based system of resource allocation from the central government to local governments in Ghana—the District Assemblies Common Fund (DACF). The evidence is consistent with governments being able to politically manipulate resource allocation within the confines of the formula-based system. Nevertheless, this does not suggest that the DACF completely fails to limit political influence. It indicates that other guiding structures of a formula-based system—in particular, how and when the formula can be altered—are important determinants of how well a program such as the DACF is able to resist political pressures.

Keywords: resource sharing, grants in aid, intergovernmental relations, Africa

1. INTRODUCTION

The prevailing empirical conclusion about resource sharing in Africa is that governments provide more funds to regions that support them politically. The African electorate has come to believe that it is gravely detrimental if the candidate that one openly supports does not assume power. This perception has been perpetuated by a history of rulers preferentially developing areas where their political support is concentrated.¹ Politics as the basis of relative development between tribes, classes, and geographic regions elicits negative consequences both economically and socially. A plausible expectation is that if development funds reaching an area can be made less sensitive to its political affiliation, the ensuing lowering of the stakes for losing power could possibly temper the pernicious nature of African politics. In addition, resource allocation and social policy based mainly on economic and welfare considerations could bolster development.

Some African governments have established formulaic revenue-sharing systems to indicate that central resource allocation decisions are unaffected by political considerations. Ghana is a pioneer in its formula-based system of financial transfers for local development from the central government. In 1994, the District Assemblies Common Fund (DACF) was established as required by the 1992 constitution of Ghana. This fund is the main source of revenue for the District Assemblies (DAs), which are responsible for “the overall development”² of each district in the country. However, a key unanswered question is whether institutions such as the DACF are able to detach an area’s political affiliation from its resource allocation. This paper presents an empirical investigation of politically motivated tactical use of Ghana’s DACF from its inception until 2005.

There is theoretical debate about the direction in which political influence will shift development resource allocation to areas based on their political affiliation. Dixit and Londregan (1996, 1998) and Lindbeck and Weibull (1993) argue the importance of swing voters and conclude that politicians will spend more in areas where the investment will switch the most votes to their benefit. However, Cox and McCubbins (1986) argue that politicians are like risk-averse investors and so target more funds to areas in which their political support is concentrated in order to have an assured return. These differing conclusions illustrate that in reality, the effect of politics on resource allocation may differ across politicians and political climates. Empirical examination of particular situations is therefore necessary. Such studies are especially important in the developing world, where the typical issues of resource allocation are confounded by the dearth of resources and the desperate need of the population. If formula-based systems are indeed effective in curtailing the role of politics in resource allocation from central to local government, they may be important instruments in precipitating economic development.

Empirical studies that have explored the relationship between politics and resource allocation in African countries, notably Barkan and Chege (1989) and Miguel and Zaidi (2003), have typically focused on the role of patronage and ethnic competition in regional variation in the provision of one particular public good within a country. However, evidence of ruling governments targeting certain public goods to their political supporters does not necessarily signify unfair advantage for these areas. Mitigating factors include regional inequality and the possibility of differences in preference for types of public goods.³ Other analyses of political economy in Africa, such as Kasara (2007), focus on the possible avenues of patronage by which ruling governments target the ethnoregional source of their political support or opposition. The contribution of this paper is to explore whether there is tactical political use of the

¹ In a striking example, Côte d’Ivoire’s first president, Félix Houphouët-Boigny, moved the capital of the country from Abidjan to his hometown and political base, Yamoussoukro. Barkan and Chege (1989) show that new road resources in Kenya in the 1980s were largely targeted to president Daniel Arap Moi’s political strongholds. Miguel and Zaidi (2003) show that in 1998, the Ghanaian government’s per pupil spending (\$23 on average) was \$15 higher in districts that had voted overwhelmingly for the political party of president Jerry John Rawlings.

² The 462nd Act of the Parliament of the Republic of Ghana, the Local Government Act (1993), Section 10, Functions of District Assemblies.

³ See Alesina, Baqir, and Easterly (1999) for discussion.

resources of a central development fund despite the constraints of a requirement to share the fund based on a uniformly applied formula.

I find evidence that during both of the two different political regimes that have been in power since the inception of the program, the DACF outcomes of districts depended on their political affiliation. Furthermore, the two regimes apparently employed different tactics in their politically motivated use of the DACF. During the first regime from 1994 to 2000, DACF disbursement to a government-supporting district was on average 1.1% higher than to a similar non government-supporting district. This disparity was equivalent to extra grant amounts ranging from \$21,371 to \$117,539 (PPP 2000 US\$). On the other hand, during the regime of the other main political party, a district that had voted for the incumbent was disadvantaged compared to a similar district that had voted for the opposition candidate in the presidential elections. During this period, from 2001 to 2005, a government-supporting district received DACF disbursement that was 16.8% lower than a similar non government-supporting district. The disparity was equivalent to grant amounts ranging from \$1,066,986 to \$2,995,640 (PPP 2000 US\$). The evidence suggests not only that the political affiliation of a district influenced its DACF outcomes but also that the different governments were able to overcome the constraints of functioning within a formula-based resource sharing framework to achieve their preferred targeting goals.

There is evidence that during both regimes, there was politically motivated consideration for the year's position in the election cycle in determining the DACF endowment and how closely disbursements matched announced allocations. During the period 1994 to 2000, the growth in disbursement and allocation from one year to the next was highest in election years. Apparently, the ruling government orchestrated the growth in disbursement and allocation so that increases grew progressively larger as an election year approached. During the period from 2001 to 2005, the government apparently sought to employ a different tactic from the previous regime. The election cycle in DACF allocation shows that growth in allocation was higher in nonelection years compared to election years. The election cycles in both regimes shared a common feature in that districts' disbursements and allocations were sensitive not only to the proximity of an election but also to their political affiliation.

I find little evidence that deviation of DACF disbursement from announced allocations was an important mode by which resources were targeted to certain areas because of political considerations. The likely reason the formula-based system failed to effectively prevent political motivation from influencing DACF sharing is the fact that the formula can be arbitrarily altered each year. Using the DACF formula from the previous year, counterfactual allocations were calculated for years in which the formula underwent a dramatic change. Incidentally, these were all election years. In election years, it appears that the DACF formula was manipulated to attract votes for the incumbent government in non-government-supporting districts by providing them with larger proportions of the fund than they would have received otherwise. The only nonelection year with a remarkable change in the DACF formula was 2002, the year after a major regime change in Ghana. The counterfactual allocations in this year show that the formula change allowed more funds to be allocated to districts that had voted for the new regime.

My results are consistent with governments being able to achieve sophisticated political goals using resource allocation within the confines of DACF rules. Nevertheless, this does not suggest that the DACF completely fails to restrict political influence. Rather, it shows that the structure of a formula based-system, such as how and when the formula can be altered, is an important determinant of how well it works. The next section describes local government in Ghana and presents an overview of the DACF program. Section 3 presents the data used in the empirical analyses. Section 4 presents the empirical methodology and analyses used to answer the following questions: Does the political affiliation of a district affect its DACF outcomes? Is there an election cycle in the DACF? Is the DACF formula manipulated for political reasons? A discussion of the results is also presented in this section. I summarize the findings in Section 5.

2. LOCAL GOVERNMENT IN GHANA

Local Government System

The history of local government in Ghana is deeply intertwined with the political history of the country. The government of the first administration, that of Kwame Nkrumah, the leader Ghana's independence movement, dismantled all structures of local government as part of a move to outlaw all political activity. Nkrumah's government was overthrown in 1966 in a military coup that set a precedent for a tumultuous political environment. Ghana experienced eight military coups in the following 15 years. The last coup occurred on December 31, 1981, led by Jerry John Rawlings. Until his government established the present system in 1988, local government did not exist in any sense as a different entity from central government.

The local government system in Ghana is multitiered and, as of 2007, comprises 10 Regional Coordinating Councils at the top level, and three Metropolitan Assemblies, 11 Municipal Assemblies, and 124 District Assemblies at the second level.⁴ I refer collectively to all the types of assemblies as District Assemblies (DAs), as the nomenclature mainly denotes the population under the assembly's jurisdiction.⁵ Each assembly's area of authority is typically comprised of one or more constituencies, which are constructs of the legislative arm of government.⁶ The duties of the DAs include all "deliberative, legislative and executive functions"⁷ of government within the district. This broadly describes all aspects of development in the district, including planning, budgeting, the provision of public goods, and the promotion of productive activity. The DAs are the rating authority for their jurisdiction and charge licensing fees as well as fees for any service or facility they provide. In essence, the substantive share of the work of local government is carried out at the DA level. The Regional Coordinating Councils are mainly responsible for coordinating budget proposals and monitoring districts in the region. The sub-district tiers are for disseminating information from the DAs to the general public and vice versa.

Each DA consists of a district chief executive (DCE) and the members of parliament representing constituencies within the district, in addition to elected and appointed members. The assembly functions through a committee system in which final decisions on the proposals and initiatives of subcommittees are made by an Executive Committee.⁸ The DCE is appointed by the president and is the head of the Executive Committee. The local government law also states that not less than 30% of the members of the DA must be appointed by the president. The rest of the membership is elected by universal adult suffrage. Elections to the DAs are held on a nonpartisan basis once every four years. In reality, informal party activity plays a major role in the elections. The office of DCE and presiding member cannot be filled by the same person for more than two consecutive terms; however, both elected and appointed members are eligible to serve as assembly members indefinitely. The highest position an elected member of the DA can hold within the structure is the ceremonial office of the presiding member, who convenes and presides over meetings. The highest position within the district assembly structure, the DCE, is always filled by a central government political appointee.

⁴ At the time the system was adapted in 1988, there were three Metropolitan Assemblies, four Municipal Assemblies, and 103 District Assemblies.

⁵ A district has a minimum population of 75,000 people, a municipality has a minimum of 95,000 people, and a metropolis has a minimum of 250,000 people.

⁶ The Parliament of Ghana consists of one member of parliament (MP) from each of 230 constituencies.

⁷ The 462nd Act of the Parliament of the Republic of Ghana, the Local Government Act (1993), Section 10, Functions of District Assemblies.

⁸ Each DA has at least the following subcommittees reporting to an Executive Committee: Development and Planning, Social Services, Works, Justice and Security, Finance and Administration.

Overview of the District Assemblies Common Fund

The 1992 Constitution of the Republic of Ghana required the establishment of a District Assemblies Common Fund (DACF),⁹ from which grants are to be disbursed to DAs according to a formula. The sharing formula for the DACF endowment is determined each year by the head of the DACF office, who is known as the administrator. The administrator is appointed by the president for a renewable term of four years and is a de facto political appointee.¹⁰ The first DACF formula was presented to Parliament in March 1994, and disbursements to districts began shortly thereafter.

The Ghanaian constitution states that Parliament should have the final say on determining the DACF formula. However, in practice, the sharing formula recommended by the administrator is always approved by Parliament without change. The ruling government presumably has some direct influence on the final formula, because the administrator submits the proposed formula and the various districts' resulting DACF shares to the office of the president prior to making a recommendation to Parliament.

The DACF is the most important source of funding for DAs and covers between 80% and 90% of an assembly's annual expenditure. While there are broad guidelines, DAs are free to use the funds as they wish as long as the intended use is in the budgets furnished to the DACF administrator prior to the distribution of disbursements. The total endowment of the fund is determined annually by Ghana's Parliament and by law cannot be less than 5% of the total revenues of Ghana. A later act, in 1993, defined the total revenues of Ghana as "all revenue collected by or accruing to the central government other than foreign loans, grants, non-tax revenue and revenues already collected by or for DAs under any enactment in force."¹¹ This act limits the statutory size of the DACF endowment, but the fund is still very important nationally: it typically constitutes about 25% of the central government's total domestic development budget in a year.

The DACF formula has changed almost annually since 1994. However, the same three overarching categories have been used in calculating districts' shares. These categories are denoted as "need," "responsiveness," and "service pressure." Each category contains several variables that are inputs to functions that produce numerical comparisons of districts based on those variables. A district's share of the DACF endowment is calculated as a weighted linear combination of these transformations and is increasing in some variables and decreasing in others. Table 1 shows the variables that comprised each of the formula categories and the respective weights attached to their transformations for the years 1994 to 2005. The functions used in the formula are shown in the appendix (Table A.1).

While the broad categories of variables used in the formula have not changed, the compositions of the categories and their weighting have changed each year. The "need" category is meant to measure a district's lack of services relative to other districts in the country. This is the category that has seen the most changes in its composition. In 1994, the "need" of a district was measured with transformations of its 1992 GDP per capita and population. In 1996, population was dropped and number of health facilities and basic education facilities were considered. In 2000 further refinements were made to the category by dropping the 1992 GDP per capita and including population per doctor and pupils per teacher as measures. In 2002, the percentage of the district supplied with safe drinking water was considered, and in 2004, mileage of tarred roads in the district was also added as an indicator.

The "responsiveness" category, incorporated into the formula to motivate districts to generate local revenue, is comprised of measures that are believed to reflect the DA's efforts in that regard. Up to 1995, the sole variable used in this measure was the level of locally raised revenue per capita. From 1996 to 2001, the increase in locally generated revenue per capita was added to the category. In 2002, the level of locally raised revenue per capita was dropped from the category. Between 2003 and 2005, the

⁹ The Constitution of the Republic of Ghana, Article 252.

¹⁰ The first DACF administrator was appointed in 1993 by president Jerry John Rawlings of the National Democratic Congress (NDC) political party. That administrator was replaced in 2001 at the beginning of the presidency of John Agyekum Kufour of the rival New Patriotic Party (NPP).

¹¹ The District Assemblies Common Fund Act 1993 (Act 455).

“responsiveness” of a district was measured by a transformation of only one variable, the increase in locally raised revenue.

Table 1. Variables and weights used in calculating DACF allocations

Factor	Percentage Weight in District Assembly Common Fund Formula in Year:											
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
‘Need’	35	35	35	35	35	35	40	40	50	55	35	35
GDP per capita (1992)	30	30	15	10	10	5						
Population	5	5										
Health facilities			10	12.5	12.5	15	12.5	12.5	12.5	12.5	5	5
Population/Doctor							7.5	7.5	7.5	7.5	5	5
Population/Nurse											5	5
Education facilities			10	12.5	12.5	15	12.5	12.5	12.5	12.5	5	5
Pupils/Teacher							7.5	7.5	7.5	7.5	5	5
Water coverage									10	10	5	4
Tarred Roads mileage											5	6
Dilapidated Schools										5		
‘Responsiveness’	20	20	20	20	20	20	15	15	5	5	2	3
Revenue per capita	20	20	15	15	15	15	10	10				
Increase in revenue per capita			5	5	5	5	5	5	5			
Increase in revenue										5	2	3
‘Service Pressure’	15	15	15	15	10	10	10	10	10	5	3	2
Population density	15	15	15	15	10	10	10	10	10	5	3	2
‘Equality’	30	30	30	30	35	35	35	35	35	35	60	60

Note: Due to transformation of variables before weighted linear combination, district DACF share is decreasing in GDP per capita (1992), health facilities, education facilities, water coverage, and mileage of tarred roads. District DACF share is increasing in population, population per doctor, population per nurse, pupils per teacher, dilapidated schools, revenue per capita, increase in revenue per capita, increase in revenue, and population density.

The “service pressure” category is meant to capture the intensity of use of public facilities in a district. It has consisted solely of the population density of the district since the inception of the DACF. In 2003, there was a one-time inclusion of a “poverty” category in the DACF formula. This category was comprised of the proportion of schools in the district that are dilapidated.

At some point while the DACF formula is being used to calculate each district’s share of the endowment, the actual amount of the endowment is decided by the central government. Before the DACF endowment is shared according to the formula to calculate districts’ allocations, an amount called the “contingency” from 1994 to 1999 and later renamed the “reserve” is subtracted. This amount was 5% of the endowment in 1994, 10% from 1995 to 2004, 20% in 2005, and 25% in 2006. The DACF office reports that this “reserve” amount is used for bulk purchases for the DAs and to support the Regional Coordinating Councils and the office of the DACF administrator in their monitoring roles. Also, a proportion of the “reserve” is distributed evenly between all the members of parliament for development projects of their choosing in their constituencies. In addition to the three categories in the formula, an item labeled “equality” stipulates which percentage of the DACF allocation is to be distributed evenly between

the districts. This provision assures every district a certain proportion of the DACF endowment. The “equality” item was increased dramatically in 2004, to 60% from about 30% in all the previous years.

It is apparent that districts have essentially no capacity to affect their future DACF allocations by anticipating what the formula will be. The increases in the “reserve” and “equality” provisions of the formula have tended to make the division of the DACF more of a simple equal distribution of the fund. A district could still make economically substantial gains if it could anticipate the future formula and change its actions to maximize its share. However, there are several reasons that DAs cannot accurately predict what actions they should take to affect their future allocations. First, the variables used in the formula change so often that DAs cannot accurately anticipate them. Second, the weights applied to the transformations of the variables are also varied every year. Third, the data on the variables used in the DACF formula are available from the relevant sector ministry only after a two- or three-year lag. If a district is able to make changes in some variable in any given year, that variable may not even be a consideration in the DACF formula by the time the data are available. Finally, the nonlinear transformations of the variables used in the formula create a measure of comparison of the situation in a district with the situation in all others. This means that a district cannot affect its share of the DACF by affecting any variable unless it is able to correctly anticipate what all other districts in the country are doing. All these factors prevent DAs from changing their behavior in order to affect their measures of the variables used to calculate their share of the DACF endowment.

3. DATA

The data used in the empirical analysis are a panel data set for the years 1994 to 2005 consisting of two types: election results and DACF data. Data relating to the DACF were obtained from internal documents from the headquarters of the DACF in Accra, Ghana. The unit of observation in this data set is the district. It contains measures of the variables used in the formula to calculate the districts' shares of DACF endowment and their allocations for each year. The disbursement to each DA is also collected from annual reports of the use of the DACF. The following variables are available more or less annually from the years in which they became relevant: population, number of health facilities, population per doctor, population per nurse, number of elementary schools, pupils per teacher, percentage of district with potable water, and mileage of tarred roads. The districts' DACF allocations for 1995 are not available. A summary of this data set is shown in Table 2.

Table 2. Summary statistics of DACF data

Variable	Observations	Mean	Std. Dev.	Min.	Max.
Real allocation in millions (2000 Cedis)	1,266	1,890	1,440	138	8,590
Real disbursements in millions (2000 Cedis)	1,376	1490	1,290	156	8,650
Disbursement/Allocation	1,266	0.91	0.23	0.25	1.53
Share of DACF Fund	1,018	0.0088	0.0034	0.0056	0.0451
Population	1,376	155,581	162,946	42,721	1,658,937
Population density (Persons per km ²)	1,376	0.0172	0.0212	0.0002	0.1904
Hospitals	1018	12.53	17.01	1.00	198.00
Doctors	578	5.49	12.66	1.00	161.00
Nurses	138	41.83	91.84	2.00	959.00
Enrollment in elementary school	578	25,975	21,585	5,620	261,658
Elementary school teachers	578	893	746	54	7,307
Length of tarred roads (km)	138	64.11	87.35	0.05	791.75
Percentage of district with pipe-borne water	358	41.44	20.90	3.97	100.00
Schools	1,018	160.81	82.57	39.00	740.00
Proportion of schools that are dilapidated	166	0.34	0.08	0.15	0.58
Locally raised revenue in millions (nominal cedis)	660	464	1,810	16.3	29,900
Locally raised revenue per capita (nominal cedis)	880	1,563	1,852	60	18,022
Annual percentage change in locally raised revenue	798	46.92	111.60	-88.73	1,619.28
Annual percentage change in locally raised revenue per capita	770	61.87	146.08	-87.56	1,939.74
Gross Domestic Product in 1992 (nominal cedis)	110	374	128	133	846

Note: Unless otherwise stated, statistics are calculated based on values from 1994 to 2005.

Election results for the 1992, 1996, 2000, and 2004 parliamentary and presidential elections were obtained from the headquarters of the Ghana Electoral Commission in Accra, Ghana. The variables in the data set include the number of registered voters, the voter turnout, the number of valid votes, the political party of each candidate, and the number of votes each candidate received. The unit of observation for all these election data is the constituency, but the data were further aggregated to the district level. A party is described as winning a constituency or district in the presidential election if it captures a majority of the votes there. The list of political parties that contested each election presented in the appendix (Table A.2) shows that the National Democratic Congress (NDC) and the New Patriotic Party (NPP) are the two main political forces in Ghana. Using the election results, the following political variables were created: *GOVT*, a dummy variable equal to 1 if the district was won by the ruling government in the last presidential

election and equal to 0 otherwise; *WINNERMARG*, which is equal to the difference between the percentage of votes captured by the political party that won the district and the percentage of votes captured by the political party in second place; and *GOVT*WINNERMARG*, which is an interaction of *GOVT* and *WINNERMARG*. A summary of the election data is shown in Table 3.

Table 3. Summary statistics of election data

Variable Description	Observations	Mean	Std. Dev.	Min.	Max.
Won by elected president in 1994	110	0.79	0.41	0	1
Vote concentration* in 1994	110	0.50	0.15	0.25	0.91
Margin of Victory in 1994	110	38.93	25.40	0.10	94.79
Margin of Victory in districts won by elected president in 1994	110	34.33	28.63	0.00	94.79
Won by elected president in 1996	110	0.73	0.45	0	1
Vote concentration* in 1996	110	0.59	0.14	0.39	0.98
Margin of victory in 1996	110	37.14	27.38	0.46	96.85
Margin of victory in districts won by elected president in 1996	110	31.07	31.03	0.00	96.85
Won by elected president in 2000 first round election	110	0.48	0.50	0.00	1.00
Vote concentration* in 2000 first round election	110	0.52	0.12	0.31	0.89
Margin of victory in 2000 first round election	110	31.57	24.53	0.88	92.05
Margin of victory in districts won by elected president in 2000 1st round election	110	13.00	19.62	0.00	71.72
Won by elected president in 2000 run-off election	110	0.62	0.49	0.00	1.00
Vote concentration* in 2000 run-off election	110	0.59	0.10	0.50	0.93
Margin of victory in 2000 run-off election	110	33.86	23.59	0.07	91.48
Margin of victory in districts won by elected president in 2000 run-off election	110	19.71	22.33	0.00	76.90
Won by elected president in 2004	138	0.55	0.50	0	1
Vote Concentration* in 2004	138	0.54	0.11	0.32	0.90
Margin of victory in 2004	138	30.82	22.21	0.41	89.25
Margin of victory in districts won by elected president in 2004	138	15.81	20.84	0.00	75.98
NDC political stronghold**	110	0.35	0.48	0	1
NPP political stronghold**	110	0.13	0.33	0	1
Split in 2004 redistricting	110	0.25	0.44	0	1
Area (km ²) before 2004 redistricting	110	2172	2561	122	17440
Area(km ²) after 2004 redistricting	138	1720	1793	150	12955

Notes: * Vote concentration is calculated as the sum of the squares of the vote share of each political party. Lower values of vote concentration symbolize higher vote dispersion.

** A political stronghold is a district that has voted for the same political party in all elections from 1992 to 2000.

4. EMPIRICAL ANALYSES AND DISCUSSION

Background

One difficulty in arguing that some central-government transfers are influenced by political considerations, be it a political cycle or the political affiliation of the receiving group, is that the criteria for resource allocation can often be arbitrarily amended to justify any transfers. In the case of DACF in Ghana, this problem is diminished because the formula for determining districts' allocations each year is recorded in memoranda between the DACF office and the Parliament of Ghana. Nevertheless, in any year, the choice of the formula variables, their weighting, and the nonlinear transformations used in calculating district allocations can be manipulated to achieve politically motivated targeting of certain areas.

Using the measures of variables used in the formula and their transformations, I calculate what districts' allocations should be and find a perfect match between my calculations and the districts' allocations listed in the memoranda provided to members of parliament and the various DA offices. While the DACF formulas are strictly followed in determining the DACF allocations that are announced to the districts, the amount of funds actually released to districts, DACF disbursements, generally differs from the allocations. The ratio of annual disbursement to allocation over the period 1994 to 2005 ranges between 0.91 and 1.53. Throughout the discussion, I make a distinction between districts' DACF disbursement and allocation in order to determine any politically motivated nonrandom deviations of disbursement from allocation.

The mean of DACF allocations, mean disbursements, the ratio of allocation disbursed, and the coefficient of variation in disbursements are shown in Figure 1. Both the districts' allocations and disbursements have been growing over time for government-supporting as well as non-government-supporting districts. The average of the disbursement-to-allocation ratio is shown to have been falling over the years, with an anomalously large decrease in 2002. The DACF administrator explained that in that year, only one-quarter of the amounts allocated to districts were disbursed due to "technical and transitional difficulties" with his staff. The unitless coefficient of variation shows that the first four years of the DACF program were characterized by the highest degree of inequality in distribution, with a sharp reduction beginning in 1998.

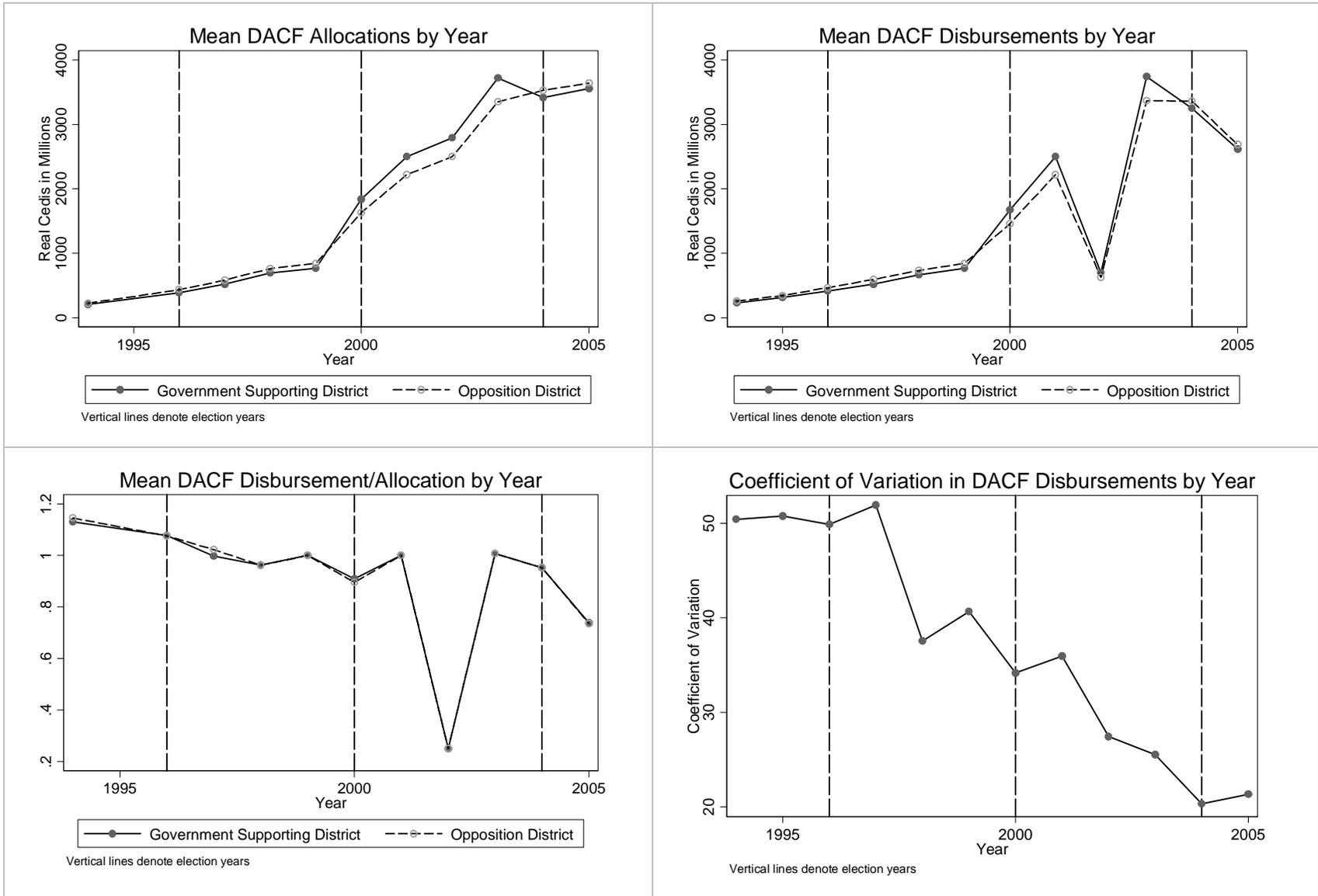
In the following empirical analyses, the assumption is that there is no feedback mechanism by which DAs are able to intentionally affect their future shares of the DACF endowment by affecting the measures used in the DACF formula. This assumption is made due to the fact that the formula used in any year could not be anticipated by the DAs, and on the basis of interviews with the DACF administrator.

Does the Political Affiliation of a District Affect Its DACF Outcomes?

The purpose of the empirical analyses in this section is twofold: first, to see if a district's political affiliation has any influence on its DACF outcomes, namely, allocation, disbursement, and proportion of allocation disbursed, and second, if such influence exists, to determine the direction of the influence. Due to differences between the types of areas that support the two political parties that have been in power over the period covered,¹² there may be differences in districts' DACF outcomes even in the absence of political manipulation. However, if the political affiliation of a district is not systematically taken into consideration in choosing the DACF formula, a regression model that controls for equity considerations should produce statistically insignificant coefficients on variables that capture whether or not the district is perceived as a ruling government supporter.

¹² Some evidence is presented in Appendix A.

Figure 1. Graphical presentation of statistics of real DACF allocations and disbursements



There are two opposing theoretical predictions for the direction in which political influence will drive a district's DACF disbursement and allocation. The works of Lindbeck and Weibull (1993) and Dixit and Londregan (1996, 1998) posit that voters are willing to compromise their ideological party support in return for resources targeted to them, and therefore governments target resources to areas where they will reap the largest marginal benefit in terms of votes for their political party. Central-government transfers will favor areas that have a high density of voters that can be swayed to change their vote from the opposition with promises of regional transfers. Following the predictions of this model, in a regression with DACF disbursement or allocation as the dependent variable, one expects a positive sign on variables that measure the likelihood of the ruling government being able to use targeted resources to make voters switch votes. In effect, areas with many swing voters will be favored. However, Cox and McCubbins (1986) and related models argue that political parties act as risk-averse investors who seek to maximize their assured payoff in terms of votes. The central government will invest most in its support groups, that is, its resource transfers will favor areas that are deemed to support it strongly. In a regression with DACF disbursement or allocation as the dependent variable, one expects a positive sign on a variable that measures the support that the ruling government has in a district.

Due to the fact that the DACF is meant to serve genuine equity purposes, it is not immediately clear what regression models can provide the answers to the questions posed. I make the assumption that from 1994 to 2005, the equity comparisons between districts in Ghana have not changed. As such, if the political affiliation of a district is not systematically taken into consideration in choosing the DACF formula, fixed effects (FE) estimation should produce a statistically insignificant coefficient on variables expected to have statistically significant coefficients in both the opposing theories of the central government's tactical use of resources.

Constraints in the available data on voter preferences in Ghana limit the ability to test the theory proposed by Lindbeck, Weibull, Dixit, and Londregan (LWDL). Ideally, this theory requires an estimation of the distribution of the electorate's preferences for the two competing political parties in each district. This is needed to estimate the density of population at the point of the distribution that divides the votes between the two parties—the "cut point" density calculated for Swedish municipalities in Dahlberg and Johansson (2002). The other measure of the proportion of swing voters used is the margin between the vote share of the two political parties in the last election. In an FE model of DACF outcomes, I find no statistically significant coefficients on *WINNERMARG* and *GOVT*WINNERMARG*. However, using these estimates as proof against the LWDL theory is likely to lead to errors, because Johansson (2003) found evidence in support of the theory using the cut-point density estimate even when winner margin estimates showed no statistically significant coefficients.

The available data lend themselves to testing the Cox and McCubbins (CM) theory. The dummy variable *GOVT* is predicted to have a positive coefficient according to the CM theory. A negative coefficient on this variable does not necessarily provide evidence in support of the opposing theory (by LWDL) but is suggestive that the opposing theory better predicts reality. Dahlberg and Johansson (2002) test the two theories using data from a temporary grant program to Swedish municipalities and find evidence in support of the theory by LWDL and evidence against the CM theory. In that paper, the coefficient of a dummy variable on whether the ruling government has a majority on the municipal council is negative when it is statistically significant.

In choosing the regression specification to determine whether districts' political affiliation affects their DACF outcomes, I also allow for slope and constant coefficients to differ across the two periods coinciding with the rule of the two different political party regimes during the period 1994 to 2005. The regression specifications estimated are the following:

$$y_{it} = \alpha_0 + \alpha_1 t + \alpha_2 GOVT_{it} + \alpha_3 PI + \alpha_4 PI * t + \alpha_5 PI * GOVT_{it} + a_i + u_{it} \quad (1)$$

$$y_{it} = \alpha_0 + \alpha_2 GOVT_{it} + \sum_{t=1994}^{t=2004} \gamma_t (YEAR_t) + \sum_{t=1994}^{t=2004} \varphi_t (YEAR_t * GOVT_{it}) + a_i + u_{it} \quad (2)$$

where the dependent variable is either *LOG PER CAPITA DISBURSEMENT*, *LOG PER CAPITA ALLOCATION*, or *DISBURSEMENT/ALLOCATION*; P1 is a dummy variable set to 1 from 1994 to 2000; and YEAR_t is a dummy variable equal to 1 in year t.

Table 4 shows the results of the regression in (1) for the three different DACF outcomes. The statistically significant coefficients on *GOVT* and its interactions in columns (1) and (2) show that districts' DACF outcomes are influenced by their political affiliation. The coefficients on the period dummy interactions in column (1) are jointly significant and show a difference in the influence of a district's political affiliation on its DACF disbursement between the period from 1994 to 2000 and the period from 2001 to 2005. In the first period, government-supporting districts had higher DACF disbursements and allocations compared to non-government-supporting districts, but in the second period they were disadvantaged compared to non-government-supporting districts.

Table 4. Fixed effects regressions of DACF disbursement and allocation from 1994 to 2005

	Dependent variable is:		
	Log per Capita DACF Disbursement* (1)	Log per Capita DACF Allocation (2)	Disbursement/ Allocation* (3)
P1	-0.603*** (0.088)	-0.143** (0.079)	-0.313*** (0.021)
P1 * t	0.037*** (0.010)	0.004 (0.009)	0.020*** (0.002)
P1 * GOVT	0.196*** (0.059)	0.172*** (0.057)	0.014 (0.042)
t	0.203*** (0.008)	0.275*** (0.008)	-0.055*** (0.002)
GOVT	-0.185** (0.034)	-0.157*** (0.032)	-0.015** (0.008)
Constant	8.515*** (0.080)	7.902*** (0.070)	1.445*** (0.019)
R ²	0.83	0.83	0.67
Observations	1,198	1,198	1,088

Notes: P1 = 1 if year is 1994 to 2000 and = 0 if year is 2001 to 2005. t = 0 is 1994, t = 1 is 1995, and so on.

*Observations from 2002 are omitted because only first-quarter disbursements were made. Standard errors are shown in parentheses.

** Significant at 10%

*** Significant at 5%

Columns (1) and (2) show that between 1994 and 2000, a government-supporting district received a DACF disbursement that was 1.1% higher than a similar non-government-supporting district and had been promised an allocation that was 1.5% higher than that for a non-government-supporting district. However, during the regime of the other main political party, between 2001 and 2005, a government-supporting district received a DACF disbursement that was 16.8% lower than a similar non-government-supporting district, even though it had been promised an allocation that was only 14.5 percent lower than that for a non-government-supporting district. The statistically significant coefficient on *GOVT* in column (3), where the dependent variable is *DISBURSEMENT/ALLOCATION*, suggests that there was

consideration of a district's political affiliation in determining the proportion of allocation that would be dispersed during the period from 2001 to 2005. The results from (1) suggest not only that the political affiliation of a district influenced its DACF outcomes but also that the different regimes had different targeting goals that they were able to achieve using the DACF.

Table 5 shows the results of the FE estimations based on (2). In contrast to the per regime period averages shown in Table 4, this specification is a refinement of the specification in (1) and allows an estimation of the advantage in DACF outcomes for government-supporting districts in each year. In columns (1) and (2) the statistical significance of the coefficients on *GOVT* and its interactions is strong evidence against the assertion that the DACF outcomes for districts are independent of their political affiliation. The coefficients also show that government-supporting districts tended to see an advantage from 1994 to 2000 but were disadvantaged from 2001 to 2005, compared to non-government-supporting districts. In column (3), where the dependent variable is *DISBURSEMENT/ALLOCATION*, the statistically significant coefficients suggest that there were nonrandom deviations of DACF disbursement from allocation in two years during the regime from 1994 to 2000. In 1994 and 1997, the ratio of DACF disbursement to allocation was 1.5% and 2.4% lower, respectively, in government-supporting districts.

Table 5. Fixed effects regressions of DACF disbursement and allocation from 1994 to 2005

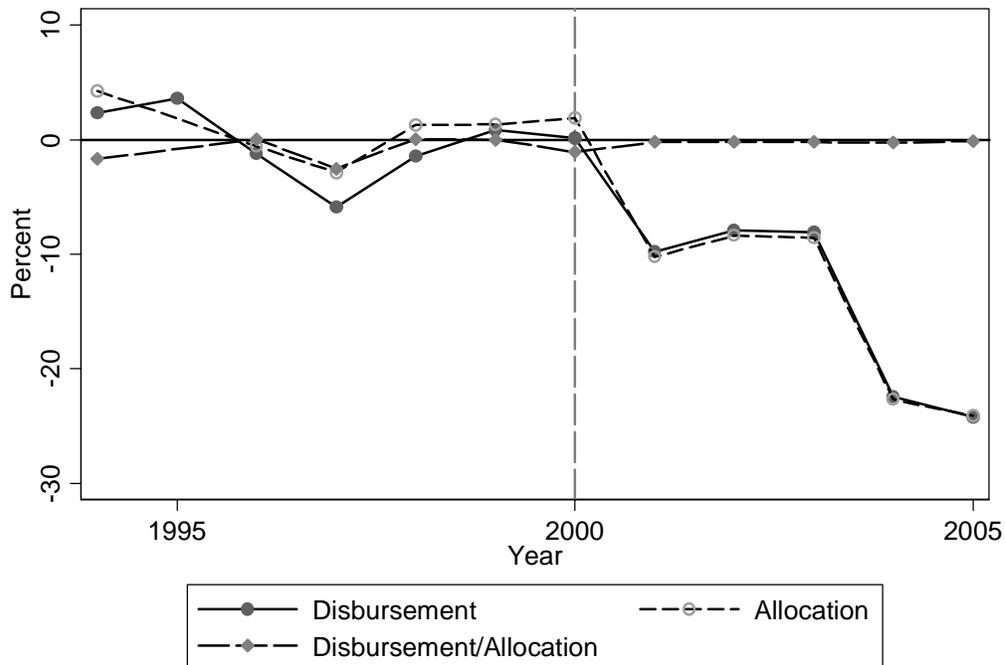
	Dependent variable is:		
	Log per Capita DACF Disbursement (1)	Log per Capita DACF Allocation (2)	Disbursement/ Allocation (3)
GOVT	-0.242*** (0.050)	-0.241*** (0.051)	-0.001 (0.007)
GOVT *1994	0.266*** (0.081)	0.283*** (0.083)	-0.015*** (0.012)
GOVT *1995	0.278*** (0.081)		
GOVT *1996	0.230*** (0.081)	0.235*** (0.083)	0.001 (0.012)
GOVT *1997	0.183*** (0.079)	0.212*** (0.081)	-0.024*** (0.012)
GOVT *1998	0.230*** (0.079)	0.254*** (0.081)	0.002 (0.012)
GOVT *1999	0.251*** (0.079)	0.254*** (0.081)	0.001 (0.012)
GOVT *2000	0.243*** (0.079)	0.260*** (0.081)	-0.010 (0.012)
GOVT *2001	0.144*** (0.064)	0.138*** (0.065)	-0.001 (0.010)
GOVT *2002	0.163*** (0.064)	0.157*** (0.065)	-0.001 (0.010)
GOVT *2003	0.161*** (0.064)	0.155*** (0.065)	-0.001 (0.010)
GOVT *2004	0.017 (0.065)	0.014 (0.066)	-0.001 (0.010)
Constant	10.609*** (0.036)	10.909*** (0.037)	0.74*** (0.005)
Time Dummies (2005 omitted)	Yes	Yes	Yes
Observations	1,308	1,198	1,198
R ²	0.84	0.84	0.98

Notes: Standard errors are shown in parentheses. ** Significant at 10%, *** Significant at 5%

The coefficients in columns (1) and (2) of Table 5 portray the same story of the influence of a district's political affiliation on its DACF outcomes as does the regression specification in (1). The estimates of the advantage of government-supporting districts in DACF disbursements and allocations are plotted in Figure 2. The trends in DACF disbursement are of most interest, as, based on the estimates in column (3), it appears that the deviations of disbursement from allocation were seldom used tactically (except in 1994 and 1997). The plot shows that in 1994 and 1995, government-supporting districts' DACF disbursements were about 2% and 3.5% higher, respectively, than similar non government-supporting districts. From 1996 to 1998, it appears that non-government-supporting districts received DACF disbursements that were higher than government-supporting districts with similar characteristics. In 1999 and 2000, disbursements in government-supporting districts were again higher than in others.

After 2000, government-supporting districts' DACF disbursements and allocations were clearly significantly lower than those of similar districts that were viewed as supporting the opposition. Between 2001 and 2005, there is no evidence that deviations of disbursement from allocation were anything but random. However, there is strong evidence that government-supporting districts were disadvantaged in terms of both DACF disbursement and allocation. Furthermore, the magnitude of the disadvantage, between 8% and 24% during this period, was much higher than the estimated advantage that government-supporting districts had between 1994 and 2000.

Figure 2. Advantage of government-supporting districts over similar non-government-supporting districts by year



Vertical line denotes year of regime change

At a minimum, the results in Tables 4 and 5 provide evidence against the suggestion that the DACF allocates and disburses resources to DAs without any consideration of their political affiliation. The results also suggest that the two political regimes that have ruled Ghana between 1994 and 2005 chose to favor different kinds of districts; from 1994 to 2000, the ruling party targeted relatively more funds to its supporters, but from 2001, the ruling party targeted relatively more funds to opposition supporters.

Is There an Election Cycle in the DACF?

Having found evidence of politically motivated tactical use of the DACF, I consider that the political influence in DACF disbursements, allocations, and the proportion of allocation that may change based on the proximity to elections. Again I make the assumption that equity comparisons between districts in Ghana did not change during the time period studied. Using data from 1994 to 2005, FE estimation is carried out on the specifications

$$y_{it} = \alpha_0 + \alpha_1 t + \alpha_2 ELECYEAR_t + \alpha_3 GOVT_{it} + \alpha_4 ELECYEAR_t * GOVT_{it} + \alpha_5 P1 * t + \alpha_6 P1 * ELECYEAR_t + \alpha_7 P1 * GOVT_{it} + \alpha_8 P1 * ELECYEAR_t * GOVT_{it} + a_i + u_{it}, \quad (3)$$

$$y_{it} = \beta_0 + \beta_1 t + \beta_2 ELECYEAR1_t + \beta_3 ELECYEAR2_t + \beta_4 ELECYEAR3_t + \beta_5 GOVT_{it} + \beta_6 GOVT_{it} * ELECYEAR1_t + \beta_7 GOVT_{it} * ELECYEAR2_t + \beta_8 GOVT_{it} * ELECYEAR3_t + \beta_9 P1 * t + \beta_{10} P1 * ELECYEAR1_t + \beta_{11} P1 * ELECYEAR2_t + \beta_{12} P1 * ELECYEAR3_t + \beta_{13} P1 * GOVT_{it} + \beta_{14} P1 * GOVT_{it} * ELECYEAR1_t + \beta_{15} P1 * GOVT_{it} * ELECYEAR2_t + \beta_{16} P1 * GOVT_{it} * ELECYEAR3_t + a_i + u_{it}, \quad (4)$$

where the dependent variable is either *LOG ALLOCATION*, *LOG DISBURSEMENT*, or *DISBURSEMENT/ALLOCATION*; *ELECYEAR* is a dummy that equals 1 if the year is a presidential election year; *ELECYEAR1* is a dummy that equals 1 if the year is one year after a presidential election; and *ELECYEAR2* and *ELECYEAR3* are defined similarly to *ELECYEAR1*. *P1* is a dummy variable that equals 1 for years 1994 to 2000 and 0 otherwise.

Table 6 shows FE regression coefficient estimates for (3) and (4). In a typical year, each district receives a disbursement and allocation that is higher than it received the previous year. However, the statistically significant coefficients in columns (1) to (6) provide evidence that during both regimes, politically motivated consideration of the year's position in an election cycle played a role in determining the DACF endowment and how closely disbursements matched allocations.

During the period 1994 to 2000, the growth in disbursement from one year to the next was highest in election years. Growth in DACF disbursement to districts one year, two years, and three years after an election (also the year before an election) was 19%, 23%, and 24% lower, respectively, compared to that in an election year. DACF allocations in this period also show an election cycle. Again the growth in allocation was highest in election years, and the difference between growth in an election year and that in another year of the election cycle is larger the closer that year is to an election year: growth in allocation one year, two years, and three years after an election was 16%, 19%, and 28% lower, respectively, compared to that in an election year (columns (3) and (4)). These election cycles suggest that the government sought to depress growth in the DACF endowment in nonelection years so that there could be a larger increase in election years. There also appears to be an election cycle in the proportion of allocation that was actually disbursed. This proportion was highest in the year before an election, when the growth in allocation and disbursements was the most depressed. The election cycle in *DISBURSEMENT/ALLOCATION* suggests that the quality of management of the DACF was itself tactically adjusted to suit political goals.

Table 6. Fixed effects estimation of election cycle in DACF disbursements and allocation

	Log Disbursement		Log Allocation		Disbursement/Allocation	
	(1)	(2)	(3)	(4)	(5)	(6)
t	0.225*** (0.004)	0.225*** (0.004)	0.276*** (0.005)	0.277*** (0.005)	-0.050*** (0.001)	-0.050*** (0.001)
ELECYEAR1	-0.111*** (0.031)	-0.110*** (0.044)	0.041 (0.030)	0.038 (0.043)	-0.132*** (0.004)	-0.129*** (0.006)
ELECYEAR2	-1.284*** (0.036)	-1.353*** (0.050)	0.156*** (0.035)	0.088** (0.048)	-0.803*** (0.005)	-0.803*** (0.007)
ELECYEAR3	0.178*** (0.036)	0.111*** (0.050)	0.173*** (0.034)	0.105*** (0.048)	0.005 (0.005)	0.004 (0.007)
GOVT		-0.158*** (0.055)		-0.152*** (0.054)		-0.003 (0.008)
GOVT * ELECYEAR1		0.005 (0.061)		0.013 (0.059)		-0.005 (0.009)
GOVT * ELECYEAR2		0.133** (0.070)		0.135*** (0.067)		0.001 (0.010)
GOVT * ELECYEAR3		0.132** (0.070)		0.133*** (0.067)		0.001 (0.010)
P1 * t	-9E-05*** (2E-05)	-1E-04*** (3E-05)	4E-05*** (2E-05)	4E-05 (3E-05)	-1E-04*** (3E-06)	-1E-04*** (5E-06)
P1 * ELECYEAR1	-0.105*** (0.043)	-0.105 (0.073)	-0.221*** (0.041)	-0.228*** (0.070)	0.096*** (0.006)	0.106*** (0.011)
P1 * ELECYEAR2	1.019*** (0.043)	1.066*** (0.070)	-0.375*** (0.041)	-0.327*** (0.067)	0.760*** (0.006)	0.762*** (0.010)
P1 * ELECYEAR3	-0.454*** (0.043)	-0.427*** (0.070)	-0.506*** (0.046)	-0.470*** (0.074)	0.057*** (0.007)	0.051*** (0.011)
P1 * GOVT		0.074 (0.079)		0.075 (0.078)		-0.006 (0.012)
P1 * GOVT * ELECYEAR1		-0.009 (0.092)		-0.001 (0.088)		-0.012 (0.013)
P1 * GOVT * ELECYEAR2		-0.105 (0.090)		-0.106 (0.087)		-0.002 (0.013)
P1 * GOVT * ELECYEAR3		-0.078 (0.090)		-0.093 (0.094)		0.007 (0.014)
Observations	1198	1308	1198	1198	1198	1198
R ²	0.89	0.89	0.91	0.91	0.98	0.97

Notes: t = 0 is 1994, t=1 is 1995, and so on. Standard errors are shown in parentheses. Constants are not shown.

** Significant at 10%

*** Significant at 5%

During the period from 2001 to 2005, the election cycle in disbursement is V-shaped, with the highest growth occurring not in an election year but in the year before an election. The anomalously low disbursement in 2002 makes it hard to discern tactical motivation for the structure of growth of DACF disbursement during this period. Based on estimates shown in columns (3) and (4) of Table 6, growth in disbursement one year and two years after an election was 10% and 72% lower, respectively, while that in the year before an election was 19% higher, compared to an election year. The election cycle estimated is largely influenced by low disbursements in 2002, even though this low level of disbursement appears to have been driven by constraints at the DACF office. The election cycle in DACF allocation during this period is more likely to be indicative of what the government planned to do with its choice of the DACF endowment. It appears that the government during this regime sought to use a different tactic than the previous regime. The election cycle in DACF allocation is such that growth in allocation was higher in nonelection years compared to election years. The growth in allocation one year, two years, and three years after an election was 4%, 16%, and 18% higher, respectively, compared to that in an election year. This result is the opposite of what was observed in the period 1994 to 2000, where it appears that the government limited the size of the DACF endowment in order to have larger increases in an election year. It suggests again that the governments in the two regimes employed different political strategies.

In managing the growth of the DACF endowment, as well as the proportion of the allocation disbursed, a shared tactic was employed by the two different regimes. It appears that they both considered the districts' political affiliation and not just the year of the election cycle. The statistically significant coefficients on the *GOVT* dummy and its interactions in columns (2) and (4) show that government-supporting districts perceived a different political cycle from non-government-supporting districts. For the period 1994 to 2000, the growth in DACF disbursements for government-supporting districts one year, two years, and three years after an election year was 26%, 29%, and 29% lower, respectively, compared to growth in an election year. In non-government-supporting districts, in contrast, there was less of a reduction in growth of disbursement in the other years compared to an election year, at 19%, 25%, and 27% lower one, two, and three years after an election, respectively. Similarly, in the growth of DACF allocations, non-government-supporting districts perceived less of a change in nonelection years compared to election years.

Using the DACF allocation as an indication of what the government intended to do in terms of disbursements during the period 2001 to 2005, there is evidence that government-supporting and non-government-supporting districts would have experienced a different election cycle in growth of DACF disbursements in this period also. One year after an election, the growth in DACF allocations for government-supporting districts was 10% lower compared to an election year. However, for such districts, the growth in allocation two and three years after an election year was 7% and 9% higher, respectively, compared to growth in an election year. In non-government-supporting districts, in contrast, there was a greater increase in the growth of disbursements in the other years compared to an election year, at 4%, 9%, and 11% higher one, two, and three years after an election, respectively.

Overall, there is strong evidence of political considerations affecting the size of the DACF endowment. The estimates show that disbursements and allocations may have been sensitive not only to the proximity of an election but also to districts' political affiliations. This is further evidence that governments are able to achieve sophisticated political goals within the confines of the DACF rules.

Is the DACF Formula Manipulated to Achieve Political Goals?

The previous two sections have presented evidence of tactical political use of the DACF. Targeting of DACF resources to particular areas due to their political affiliation could have been achieved with deviations of disbursement from allocation. However, the evidence presented does not support that this was the major mode of targeting. The most obvious avenue for government to target districts is through the DACF formula. The frequency with which the DACF formula changed makes it a likely mode by which government-supporting and non-government-supporting districts were targeted differently.

There have been adjustments in the DACF formula each year. My strategy to determine whether the formula was manipulated to achieve political goals is to see whether the major changes had obvious political motivation. It is striking that the major changes in the DACF formula all took place in election years—1996, 2000, and 2004. I also calculate the counterfactual in 2002 because it was the first full year of the DACF under an administrator appointed by the government of a different regime since the commencement of the program. I calculate what each district’s share would be in each of these years if the formula in the previous year had been employed. I then compare the outcome for government-supporting and non-government-supporting districts under the actual formula to the calculated counterfactuals.

The results of this exercise are shown in Table 7. In the election years, 1996, 2000, and 2004, the actual average proportion of the fund received by non-government-supporting districts was higher than that received by government-supporting districts. This is exactly the opposite of the pattern under the counterfactual; government-supporting districts would have received on average a larger proportion of the fund than non-government-supporting districts. Also, the actual average proportion for government-supporting districts was lower than the counterfactual average. However, the actual average for non-government-supporting districts was higher than the counterfactual. These results suggest that if the formula was manipulated for political reasons in election years, it was changed to provide non-government-supporting districts larger proportions of the fund than they would have received otherwise. These observations point to the government changing the formula in election years to try to garner votes from opposition-supporting districts.

Table 7. Districts’ Proportion of DACF Funds under actual and counterfactual DACF formula

	Average District Share of Fund		
	All	Government-Supporting	Non-Government-Supporting
1996 Actual	0.0091 [0.0045]	0.0088 [0.0045]	0.0101 [0.0047]
1996 Counterfactual	0.0091 [0.0028]	0.0093 [0.0030]	0.0085 [0.0019]
2000 Actual	0.0091 [0.0031]	0.0089 [0.0029]	0.0097 [0.0037]
2000 Counterfactual	0.0091 [0.0023]	0.0093 [0.0025]	0.0087 [0.0018]
2002 Actual	0.0091 [0.0025]	0.0096 [0.0033]	0.0086 [0.0015]
2002 Counterfactual	0.0091 [0.0022]	0.0085 [0.0021]	0.0096 [0.0022]
2004 Actual	0.0072 [0.0015]	0.0070 [0.0014]	0.0074 [0.0015]
2004 Counterfactual	0.0072 [0.0017]	0.0073 [0.0020]	0.0072 [0.0013]

Note: Standard deviations are shown in brackets.

The variance of the distribution under the counterfactual in 1996 and 2000 is lower than the actual variance. However, the variance of the counterfactual in 2004 is slightly higher than the actual variance. I suggest that the tighter distribution in a highly competitive election year is indicative of a lower willingness to benefit any one group at the expense of the other. Using political support for the incumbent government in the previous presidential election as a predictor of expected support in the next

election (see appendix Table A.3), one can conclude that the incumbent in 1996 and 2000 perceived more widespread support than in 2004. I suggest that in 1996, the incumbent government perceived such widespread political support that it could actively pursue non-government-supporting districts with the DACF even to the detriment of its supporters. A similar political scenario existed in 2000, though to a lesser extent. In 2004, when the political support for the districts was perceived to be split almost fifty-fifty between the incumbent and the opposition, the government-supporting and non-government-supporting districts were treated very similarly.

The counterfactual in 2002 suggests that the formula was changed to benefit districts that had brought the new regime into power in 2001. With the appointment of an NPP-selected DACF administrator at the end of 2001, the first opportunity for the central government to show any preferential treatment to its supporting districts through the DACF would have been in 2002. The departure from the tradition of making major changes to the DACF formula in election years also suggests a different motivation for the formula change. This hypothesis is borne out in the differences between the counterfactual compared to actual proportions in 2002 as opposed to election years. As shown in Table 7, the formula change in 2002 resulted in the average proportion of the DACF received by government-supporting districts being higher under the actual formula compared to the counterfactual. The average proportion received by non-government-supporting districts would have been higher under the counterfactual, that is, if the formula had not changed. The variance of the actual distribution of districts' proportions of the fund was also larger than in the counterfactual.

The evidence in Table 7 suggests strongly that the DACF formula is manipulated to achieve political goals. The fact that the formula can be changed with such ease shows an important loophole in the structure of the institution of the DACF. The government is somewhat constrained by having to justify its DACF sharing decisions based on a formula that is uniformly applied to all districts. However, the ability to arbitrarily alter the choice of indicators and weights used in the DACF formula allows the government to achieve some politically motivated targeting of the DACF resources.

5. CONCLUSION

In this paper, I have conducted an empirical investigation of the Ghana DACF, from which central resources are made available to local governments. In particular, I explored the presence of politically motivated tactical use of the DACF. The DACF was implemented in 1994 to galvanize the workhorses of Ghana's system of decentralized government. The resources from the DACF alleviated the immense inadequacy of the locally raised resources of the DAs in relation to their mandated responsibilities. With an average of over 88% of the revenue of DAs being derived from the DACF, the fund creates a direct link between central government influence and the welfare of citizens at the local level. This situation immediately creates an opportunity for the DACF to become a political tool. The distinctive feature of the DACF is that it relies on a formula to determine districts' allocations. In this framework, how does political influence exist?

I find that the DACF formula rules are followed in calculating the districts' allocations. However, the amount of funds that the districts actually receive—their disbursements—is generally different from this amount. Governments are apparently able to tactically target resources despite the formula-based system of sharing DACF resources. During the period 1994 to 2000, the political party in power targeted DACF resources to districts where it had majority political support. However, during the period 2001 to 2005, the political party in power targeted resources to districts where it perceived the opposition to have more political support. Both of the political regimes were therefore driven somewhat by political motivations in making resource allocations from the central to the local government level. These regimes were able to overcome the constraints of making DACF allocations within the formula-based framework to achieve, at least in part, some of their targeting goals.

The size of the DACF endowment itself showed some political considerations. There was an election cycle in the growth of DACF disbursements, allocations, and even the proportion of allocation disbursed during both political regimes. The two regimes seemed to employ different tactics in this regard as well. From 1994 to 2001, the election cycle was such that growth in DACF disbursements and allocations was highest in election years, and the difference between growth in an election year and that in another year of the election cycle was larger the closer that year was to an election year. It seems that growth in disbursements and allocations was depressed in nonelection years so that there could be a larger increase in election years. The political party in power from 2001 to 2005 apparently had a different strategy. Growth in DACF allocation was higher in nonelection years compared to election years. In both political regimes, there is evidence that the election cycles in DACF outcomes depend on district political affiliation.

The evidence shows that most of the targeting of DACF resources was achieved by changing the DACF formula. The DACF formula was changed every single year, with five dramatic changes. Counterfactual allocations calculated suggest that the DACF formula was purposefully manipulated, as most of the major changes occurred in election years. These formula changes resulted in non-government-supporting districts receiving higher allocations than government-supporting districts in election years. It appears that governments tried to use the DACF resources to attract more votes in opposition districts in election years. The formula change in 2002, the only nonelection year with a major formula change, resulted in an allocation that provided government-supporting districts with a greater allocation than they would have received otherwise.

The results of this study are consistent with governments being able to achieve sophisticated political targeting of resources within the constraints of DACF rules. The evidence shows that there is scope for political influence in a formula-based system of central transfers. These findings also show that maximizing the effectiveness of formula-based systems requires other considerations. In particular, the ability to arbitrarily change the guiding formula may be an important loophole through which politics can operate. Nevertheless, it is possible that the institution has limited the extent to which politics drives resource allocation.

APPENDIX A: SUPPLEMENTARY MATERIALS

Table A.1. Functions of variables as used in DACF Formula

Variable	Function to which weight in formula is applied
GDP (1992)	$Y_i = \text{GDP per Capita of District } i$ $1/(Y_i) / \sum(1/Y_i)$
Population	$P_i = \text{Population of District } i$ $(P_i / \sum P_i)$
Health facilities	$H_i = \text{Health Facilities in District } i$ $1/\{(H_i / \sum H_i)/(P_i / \sum P_i)\} / \sum\{(1/(H_i / \sum H_i)/(P_i / \sum P_i))\}$
Population/Doctor	$D_i = \text{Doctors in District } i$ $P_i = \text{Population of District } i$ $1/\{(D_i / \sum D_i)/(P_i / \sum P_i)\} / \sum\{(1/(D_i / \sum D_i)/(P_i / \sum P_i))\}$
Population/Nurse	$N_i = \text{Nurses in District } i$ $P_i = \text{Population of District } i$ $1/\{(N_i / \sum N_i)/(P_i / \sum P_i)\} / \sum\{(1/(N_i / \sum N_i)/(P_i / \sum P_i))\}$
Education facilities	$E_i = \text{Education Facilities in District } i$ $P_i = \text{Population of District } i$ $1/\{(E_i / \sum E_i)/(P_i / \sum P_i)\} / \sum\{(1/(E_i / \sum E_i)/(P_i / \sum P_i))\}$
Education facilities In need of major repair	$E_i = \text{Education Facilities in District } i$ $DE_i = \text{Dilapidated Education Facilities in District } i$ $\{(DE_i / \sum DE_i)/(E_i / \sum E_i)\} / \sum\{(DE_i / \sum DE_i)/(E_i / \sum E_i)\}$
Pupil/Teacher	$T_i = \text{Teachers in District } i$ $S_i = \text{Student Enrollment of District } i$ $1/\{(T_i / \sum T_i)/(S_i / \sum S_i)\} / \sum\{(1/(T_i / \sum T_i)/(S_i / \sum S_i))\}$
Water coverage	$W_i = \text{Percentage of District } i \text{ with Access to Safe Water Source}$ $P_i = \text{Population of District } i$ $1/\{(W_i / \sum W_i)/(P_i / \sum P_i)\} / \sum\{(1/(W_i / \sum W_i)/(P_i / \sum P_i))\}$
Revenue per capita	$RP_i = \text{Revenue per Capita of District } i$ $(RP_i / \sum RP_i)$
Increase in revenue per capita*	$\text{IncRP}_i = \text{Percentage Increase in Revenue per Capita of District } i$ $(\text{IncRP}_i / \sum \text{IncRP}_i)$
Population density	$S_i = \text{Population Density of District } i$ $(S_i / \sum S_i)$
Increase in revenue*	$\text{IncR}_i = \text{Percentage Increase in Revenue of District } i$ $(\text{IncR}_i / \sum \text{IncR}_i)$

Note: * This variable is set to 0% for districts that do not have a positive increase.

Table A.2. Dates of elections, political parties contesting presidential and parliamentary elections

Presidential Elections				Parliamentary Elections		
Date	Contesting Political Parties	Constituencies Won	Districts Won	Date	Contesting Political Parties	Seats Won
1992, Nov 3	National Democratic Congress (NDC)	153	87	1992, Dec 29*	NDC	189
	New Patriotic Party (NPP)	43	19		National Convention Party (NCP)	8
	People's National Convention (PNC)	5	4		Every Ghanaian Living Everywhere (EGLE)	1
	National Independence Party (NIP)	0	0			
	People's Heritage Party (PHP)	0	0			
1996, Dec 7	NDC	138	80	1996, Dec 7	NDC	133
	NPP	62	30		NPP	61
	PNC	0	0		People's Convention Party (PCP)	5
			PNC		1	
2000, Dec 7	NPP	106	53	2000, Dec 7	NPP	99
	NDC	91	55		NDC	92
	PNC	3	2		PNC	3
	National Reform Party (NRP)	0	0		CPP	1
	United Ghana Movement (UGM)	0	0		NRP	0
	Convention People's Party (CPP)	0	0		UGM	0
			EGLE		0	
			Great Consolidated Popular Party (GCPP)		0	
2000, Dec 28	NPP	129	68			
	NDC	71	42			
2004, Dec 7	NPP	126	76	2004, Dec 7	NPP	128
	NDC	104	62		NDC	94
	PNC	0	0		PNC	4
	CPP	0	0		CPP	3

Notes: In 1992, 1996, and 2000, there were 110 districts and 200 constituencies in Ghana. In 2004, there were 138 districts and 230 constituencies.

* Opposition parties boycotted the 1992 parliamentary elections due to accusations of electoral fraud and malpractice and voter intimidation during the presidential elections.

Table A.3. Statistics of DACF formula indicators in political strongholds* of the two leading political parties in Ghana, NDC and NPP

Variable**	Average in NDC Strongholds	Average in NPP Strongholds
Population	124,038	139,924
Revenue (millions of Cedis)	182	277
Percentage change in revenue	44	42
Revenue per capita (Cedis)	1,197	1,568
Distance of tarred roads (km)	46	61
Population density (persons per km ²)	0.022	0.013
Hospitals	11	11
Schools	145	161
Percentage of population with access to safe water	48	40
Distance to Accra (km)	298	173
Teachers	723	1,068
Doctors	3	5
Enrollment in primary school	20,242	26,998
Nurses	30	36

Notes: * A political stronghold is a district that has voted for the same political party in all elections from 1992 to 2000.

** All values relate to 2005.

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