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ETHNICITY AND ELECTION OUTCOMES IN GHANA¹

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Abstract

Is ethnicity the critical determinant of election results in Africa? We investigate this question empirically on the 2004 presidential poll in Ghana. We use variables from several data sources matched at the district level, and perform econometric analysis on the turnout rate and party vote shares, and on their evolution between two similar polls. We test the accuracy of two alternate models of voting, an ethnic model and a non-ethnic one that includes variables such as education, occupation or wealth. We provide robust evidence that the ethnic factor is a slightly better explaining factor for the structure of votes in Ghana, but does not rule out the significance of the non-ethnic model. We then show that the ethnic model fails to account accurately for the evolution of votes between two polls, which appears as the result of evaluative votes. Since a changeover of political power has occurred repeatedly in Ghana, the analysis of the motives of the pivotal voter is crucial. Our results show that non-ethnic determinants may ultimately drive election outcomes.

Keywords: Vote, Ethnicity, Elections, Africa.

Résumé

L'ethnicité est-elle le déterminant majeur des résultats électoraux en Afrique? Nous étudions empiriquement cette question pour le scrutin présidentiel de 2004 au Ghana, en utilisant des données provenant de sources variées, assemblées au niveau du district. Nous conduisons une analyse économétrique du taux de participation et des résultats des partis politiques, ainsi que de leur évolution entre deux élections similaires. Nous testons la précision de deux modèles alternatifs de vote, un modèle ethnique et un non-ethnique qui inclut des variables telles que l'éducation, la profession ou la richesse. Nous montrons que le facteur ethnique surpasse légèrement le modèle non-ethnique pour expliquer la structure des votes au Ghana, même si ce dernier reste statistiquement valide. Mais le modèle ethnique explique très mal l'évolution des votes entre deux élections, qui apparaît comme le résultat d'un vote d'évaluation politique non ethnique. Comme des alternances se sont produites au Ghana plusieurs fois, les motivations de l'électeur pivot sont cruciales. Nos résultats montrent donc que les facteurs non-ethniques semblent déterminer les résultats des élections.

Mots Clés : Vote, Ethnicité, Elections, Afrique.

JEL Codes : D72, O1

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1 Introduction

For about a decade, a wide scope of economic literature deals with the effect of ethnicity on development. It tends to demonstrate that the heterogeneity of a given population deters its capacity to set up the institutions suitable for economic growth and poverty reduction. The core of the argument at least implicitly centers on the specific political economy of such societies. A first kind of explanation deals with conflicts: conflicts would be more likely to occur in more heterogenous societies. This idea, supported by qualitative works like those by Horowitz (1985), is the main argument invoked by Easterly and Levine (1997) in their influential paper, and is investigated by a number of papers (Hegre and Sambanis 2006) (Collier, Hoeffler, and Rohner 2006). An other channel through which ethnicity may impact development pertains to the possible rivalry and non-cooperative relationships between groups. A range of papers investigates the properties of such a political economy, and shows that more heterogenous communities are associated with a lower access to development (Miguel 2006), (Dayton-Johnson 2000). This would be due to the difficulties they have to work together (Alesina and La Ferrara 2000) in a context where the provision of public goods is determined by the specific balance of power between the different groups (Banerjee and Somanathan 2007). Such mechanisms entail less financed states and less efficient public policies (Alesina, Baqir, and Easterly 1999).

Likewise, the rivalry between groups in a fragmented society impacts the aggregate social choice generated by democratic processes. Robinson (2001) investigates the impact of fractionalization on a materialistic rational choice model of conflict, that may well be applicable to votes. He shows that ethnic identity may substitute to social class belonging and determine individuals' choice. Roemer (1998) directly focuses on a voting model in which he introduces a non-economic issue (typically a religious affiliation). He shows that if there are two issues at stake instead of only one (e.g. the level of redistribution), the political platform of competing parties may change dramatically. Roemer even refers to Marx by saying that a non-economic issue may be purposely introduced by elites to divert the people's attention from the issue of class domination. By focusing on a non-economic debate, people would vote against their own economic interest and allow the perpetuation of unequal relationships.

In this framework, ethnicity and ethnic rivalries are typical non-economic issues that may prevail on economic ones in African democracies, and help understand some key features of the political economy of these countries. First, in a context of huge inequalities (Cogneau et al. 2007), African elites very often manipulate ethnic cleavages to win elections (see for example Norris and Mattes (2003), Glaeser (2005) or the comprehensive work by Posner (2006)). Second, the pattern of election results in African countries is commonly said to follow ethnic lines. Third, the weakness of civil societies shows that African poor are little organized while elites tend to stay in power and secure their position. Should we then conclude that ethnic cleavages are one of the outstanding explanatory factors for the political weakness of the poor, whose attention is diverted from the reality of political and economical oppression? In other terms, following Roemer's paraphrase of Marx, is ethnicity the opium of the masses?

If this was true, votes would be overwhelmingly determined by ethnic structures of the population, while economic and political determinants would play a secondary role. By economic and political determinants, we mean both class and evaluative determinants. Class vote refers to the vote cast by a citizen on the ground of his position in the wealth distribution. Typically, if class vote prevails, poor people tend to vote for liberal pro-redistribution party while rich people tend to vote for a conservative party. Class vote and ethnic vote are independent as soon as every ethnic group is heterogeneous enough in terms of social and economic outcomes (ie. ethnic lines do not reproduce class lines). Evaluative vote refers to the vote cast on the ground of an assessment of the quality of the policy implemented by the incumbent government. It may have the same pattern as class vote if the policy was significantly class-oriented, or as ethnic vote if clientelism or geographical favoritism provided incentives for ethnic groups to vote for a given candidate. But at a macro level, ethnic and non-ethnic voting are likely to be different.

Whether ethnic or non-ethnic determinants prevail is a key question about African countries, and much is said on this topic without rigorous analysis. Indeed, quantitative studies are extremely scarce on developing countries in general and African countries in particular, contrary to the number of those dealing with election outcomes in industrialized countries (see among many others Alesina and Rosenthal (1996) on American presidential and congressional elections, and Goux and Maurin (2004) or Lewis-Beck (1997) on French elections).

African elections have been little studied until very recently. Some recent papers analyze them through the lens of non representative individual level surveys. For example Erdmann (2007) uses descriptive statistics of a series of electoral results in Zambia as well as survey data on about a thousand people. He concedes ethnicity plays an important role but also evokes the relative political mobilization of ethnic groups and program evaluation as of a certain importance. Likewise, Lindberg and Morrison (2008) use survey data and qualitative data from focus groups to contest the importance of ethnicity or clientelism in Ghanaian elections. They emphasize the role played by evaluation of candidates and parties.

An important series of papers derives from the Afrobarometer surveys held in a growing number of African countries, with small samples stratified to be nationally representative. Political alignment was studied in Malawi (Ferree and Horowitz 2007), Nigeria (Lewis 2007), Benin (Battle and Seely 2007) or Kenya (Bratton and Kimenyi 2008). They provide insightful analysis on the individual motives for party alignments and often relate them to the political institutions or party structures. The shortcoming of such studies is that they use declarative information that may be subject to severe biases, for individuals may not declare what they really think or may have a biased perception of their own motives. For example, in a recent paper on Kenya, Bratton and Kimenyi (2008) present somewhat paradoxical results with about 90% of individuals denying that they vote on ethnic motives but yet a majority acknowledging that ethnicity is a major determinant of election outcomes. In such cases, the conclusions may be severely affected by the conditions in which information was collected. A solution to that problem is the post-poll surveys carried right after people voted in an election.

This kind of information is much more reliable, since people at least cannot shut their eyes on their political behavior - they may only lie consciously, which is much less frequent. That kind of surveys unfortunately does not exist in most African countries.

The use of aggregate electoral data allows to circumvent this declarative fallacy. Studies which involve such data (generally at the constituency or district level) are sometimes called "ecological studies", for their unit is a geographical area and not individual behaviors. They have the advantage to allow a wider coverage and to use the actual results of a given poll, but present the drawback to be subject to another fallacy sometimes called the "ecological fallacy", *i.e.* to misleading interpretations of the effect of aggregate characteristics on aggregate outcomes. We will of course try not to fall into this pit, and mention whenever such fallacious conclusions may be drawn. In the absence of reliable individual information, researchers are only free to choose between two different possible fallacies. Although papers using these two methods compete and denigrate each other, their complementarity is obvious.

Electoral outcomes were not used very frequently to study African elections, mainly because of the lack of reliable datasets aggregated on an appropriate level. Ecological studies include the one by Posner and Simon (2002) on the Zambian case, which shows that the electoral results are little influenced by economic conditions except the changes in poverty between two polls. On Ghana, a recent paper (Fridy 2007) used aggregate electoral data to disentangle the roles of ethnicity, economics and politics. This paper seems us to try and answer the good question, but the data and method involved do not allow the author to properly identify the effects of each of these factors, as we will try to show here.

The fact that Ghana was chosen as a field of research in two of the rare studies on African countries is not surprising. Politics in Ghana is especially interesting when it comes to analyzing the role of ethnicity in a democratic country: Ghana fulfills every pre-requisite for such a study. First, Ghana is democratic. After a long period of political turmoil in the 1970s and a "soft" dictatorship by Jerry Rawlings in the 1980s, multipartism and democracy were installed at the beginning of the 1990s and endure from then on. Free and fair elections were held and progressively recognized as "the only game in town", as we will see in section 2. In 2000, power shift peacefully from one of the two main parties to the other, which may be considered as the sign of a mature democracy. Second, politics in Ghana is made clearer by the fact that the political field is structured along a two-party system anchored in history. As we will see in section 2, the two main parties in Ghana somehow form a left-right or conservative-liberal scheme, which makes the study of economic voting accurate. Third, there is a historical background of ethnic rivalries in Ghana. Such rivalries originate in the period where Ashanti, Ewe or Fante kingdoms competed for occupying territories and selling slaves to the Europeans. Compromise, balance of powers and distrust between ethnic groups have always been key to understand Ghanaian politics. Although peace prevails for about a century, the ethnic factor exists and inter-ethnic violence frequently bursts locally (Tsikata and Seini 2004). Fourth, Ghana may be considered as an "average" African country. Its size, fractionalization, density and history make it quite comparable to most African countries, and its level of development make it appear as an

"upper-middle class" African country. This makes this country a fascinating field for the study of African democracy.

In this paper we intend to investigate the respective weight of ethnic and non-ethnic determinants of votes in a national election in Ghana. This is made possible by the collection of several district-level datasets from various sources, which allow to identify precisely the non-ethnic determinants of vote. The remainder of the paper is organized as follows: in section 2, we propose a historical survey of politics in Ghana and especially trace the origins and key features of the two-party pattern. Section 3 presents the different data sources used in the empirics and provides some descriptive statistics. We then estimate the determinants of vote following two different and complementary strategies: in section 4 we first analyze the results of the presidential election 2004 and show that ethnicity is a better explaining factor than non-ethnic characteristics, but does not account for the whole heterogeneity of votes, by far. Then in section 5 we examine the determinants of the evolution of votes and try to identify what made districts vote more or less for a given party than four years earlier in the previous presidential scrutiny. Thereby we control for the structural correlation between ethnicity and party affiliation and show that non-ethnic voting is key to understand the evolution of votes. These two methods (analysis of the structure or of the evolution) provide us two ways to reconstruct the voting outcomes and see which of the models (ethnic or non-ethnic) is the most accurate, which we do in section 6. Section 7 provides some robustness checks for these results and section 8 concludes.

2 Historical background

2.1 The origins of the two-party system

The Ghanaian two-party system is deeply rooted and dates back from the liberation movements under the colonial power (Buah 1998). In 1947, lawyer and journalist Joseph B. Danquah founded the first political party, the United Gold Coast Convention (UGCC). It included members of the African elite (mostly lawyers) and invited a young intellectual settled then in the United Kingdom: Kwame Nkrumah. The unity of this movement only lasted a year, the time necessary for six of the main UGCC leaders (the "Big Six") to be imprisoned in what remained as a milestone episode on the path to independence. But in 1949, Nkrumah broke away from the party and inaugurated his own party, the Convention People's Party (CPP). The CPP presented a more radical nationalist program, calling for "Self-government NOW", while the UGCC appeared by contrast more compromised with the colonial power. Besides, while UGCC leaders were almost all Ashanti and closely linked with Ashanti traditional chiefs, the CPP leaders appeared selfless and dedicated solely to the liberation of the people without any connection to a specific ethnic group. The CPP rapidly increased its influence among the people and obtained overwhelming majorities in the elections held in 1951 and 1956. It defeated the National Liberation Movement (NLM), which was created by Danquah and Kofi Busia in 1954 and succeeded to the UGCC.

The rivalry between the CPP and the NLM in the 1950s and 60s crystallized all major splits in Ghanaian politics. The NLM (also more generally referred to as "the Busia/Danquah tradition") had its strongholds in the Ashanti region. Its main supports were to be found among the cocoa growers and the traditional chiefs, whose interests were defended. It recruited among the educated elite and proposed a rather conservative project for Ghanaian society. By contrast, the CPP (and later all nkrumahist parties) defended the "masses" and presented a more radical political position. During his presidency (1957-1966), Kwame Nkrumah opposed the interests of cocoa growers by raising taxes on exports and contested the power of Ashanti traditional rulers (Higazi 2006). He made socialism the official ideology of the regime and drew his country closer to the Eastern bloc (although he remained as one of the first and most influential pan-africanist leaders).

After the fall of Nkrumah, overthrown by a coup in 1966, Kofi Busia came to power in 1969 and implemented a very different policy. He offered financial support to the revenues of cocoa growers, broke off with communist countries and leaned on the Akan majority group (of which Ashanti form a sub-group). But the economic crisis accelerated his fall and he was dismissed by a military coup in 1972. We thus see that as early as in the immediate aftermath of independence, the two main political forces were facing each other and implemented quite different political projects when they successively came to power.

The 1970's remained as the "kalabule" years, which refers to the variety of petty informal activities that the population had to devote to in times of economic anarchy (Chavagneux 1997). On the political level, military governments and coups attempts succeeded one another, until a last coup was successfully held by Flight Lieutenant Jerry Rawlings in 1979. He remained 112 days in power, just the time necessary to enforce a "house cleaning exercise" (restoring state authority through symbolic and sometimes violent decisions like executing the former military chiefs) and organize elections. Hilla Limann, a "Northerner" who professed to represent the inheritance of Nkrumah's CPP, became President but rapidly faced social unrest and discontent. In 1981 Rawlings came back at the head of the State as the power was almost left vacant.

Jerry Rawlings does not fall into one of the two political categories that we mentioned above. His presidency thus introduced some modifications in the two-party system but did not abolish it, quite the contrary. Rawlings tried (and eventually succeeded) to diminish the influence of the nkrumahist forces and integrate them in his own camp. The movements of young partisans who claimed their faithfulness to Kwame Nkrumah represented a threat for Rawlings, for they surely would oppose his project to carry on an economic adjustment under the supervision of the IMF and the World Bank. And yet this adjustment was deemed absolutely necessary to get off the economic crisis and have access to international aid flows. In the early years of his presidency, Rawlings made gestures of goodwill towards these revolutionary forces by creating People' and Worker's Defence Committees seemingly designed to enforce the revolution. Thereby he kept control on these potentially threatening activists. By determinedly imposing the economic adjustment during the 1980s, Rawlings sidelined nkrumahists.

In the opposition between nkrumahism and the Busia/Danquah tradition, nkrumahism was thus progressively replaced by Rawlings and his heirs. This activated the rivalry between Ashanti and Ewe, this latter group being strongly supportive of its member Jerry Rawlings, while Ashanti and to a larger extent Akan remained resolute opponents. But since these two conflicting main parties at least agreed upon the broad macroeconomic strategy (adjustment and international openness), nkrumahist movements represented a radical criticism of this system and progressively became protest parties under the Fourth Republic.

2.2 Political developments under the Fourth Republic

In 1992, a new constitution was adopted by referendum. It lifted the ban on political parties and opened the way to a presidential election. Jerry Rawlings was candidate in the name of the National Democratic Congress (NDC). He was challenged by Professor Abdu Boahen from the New Patriotic Party (NPP) which represents the follow up of the NLM as the heir of the Busia/Danquah tradition. The nkrumahist side was much divided between several parties and presented three candidates to this election, among whom former President Hilla Limann. To oppose Rawlings who benefited from his incumbent position, Limann paradoxically reached an agreement with Boahen, i.e. with the political party to which nkrumahists were the traditional opponents. This may have accelerated the loss of credibility and influence of nkrumahists on the Ghanaian political field (Chavagneux 1997).

Rawlings largely won the 1992 elections, at the first round (see Table 1). He benefited from a large support by the political elite for his adjustment and democratic policy. The opposition was severely beaten, and some of its partisans in Ashanti region began to commit violence. Traditional Ashanti chiefs appealed to appeasement. Although the poll was said "free and fair", the opposition boycotted the parliamentary election that immediately succeeded and denounced a "stolen verdict". In this 1992 presidential election, nkrumahists were severely defeated.

	1992			1996			2000			2004		
Rawlings	NDC	58%	Rawlings	NDC	57%	Kufuor	NPP	48%	Kufuor	NPP	52%	
Boahen	NPP	30%	Kufuor	NPP	40%	Atta-Mills	NDC	45%	Atta-Mills	NDC	45%	
Limann	PNC	7%	Mahama	PNC	3%	Mahama	PNC	2.5%	Mahama	PNC	2%	
Darko	NIP	3%				Hagan	CPP	2%	Aggudey	CPP	1%	
Erskine	PHP	2%				Tanoh	NRP	1%				
						Lartey	GCPP	1%				
						Brobby	UGM	0.5%				
						2nd Round						
						Kufuor	NPP	57%				
						Atta-Mills	NDC	43%				

Table 1: Results of the 1992, 1996, 2000 and 2004 presidential elections

The 1996 scrutiny saw the confirmation of the two-party system and the decline of nkrumahist parties. In spite of their effort to present a unique candidate, they could

only gather 3% of the votes and most of their activists joined the NPP in the already mentioned paradoxical alliance to defeat Rawlings. But 1996 also saw the consolidation of democracy. Although the opposition was almost as severely beaten as four years earlier, it did not boycott the parliamentary elections that took place right after. Besides, the logistical aspects of the elections were much better organized than in 1992. Overall, 1996 was a time of deepening democracy and two-party system (Nugent 1999). The 2000 elections perpetuated and intensified it, although the acrimony between the two competing parties was intense and ethnic hype was "at its worst" (Frempong 2007). In 2000, for the first time in the Fourth Republic, power shift from NDC to NPP peacefully, which may be considered as the sign of an accomplished democracy. This peaceful changeover of political power in 2000 anchored democracy in the Ghanaian reality and in the consciousness of citizens: in 2002, a clear majority of Ghanaians perceive their political regime as fully democratic or democratic with only minor problems (Gyimah-Boadi and Mensah 2003).

In this paper we will focus on the 2004 presidential election. This election brought together outgoing President John Kufuor, representing the NPP, and opponent John Atta-Mills from NDC. The NPP represents the rather conservative Busia/Danquah tradition in Ghanaian politics. It took the succession of the NLM. Its natural support are the middle or upper class, educated people and pro-business circles. On the other hand the NDC traditionally represents a more leftist pro-poor tradition, although it shares with the NPP the conviction that economic adjustment and international openness are vital. This economic opposition was sharpened during the 2004 presidential campaign, mainly on the initiative of the NDC which opposed its vision of a "social democracy" in the interest of the people to the so-called "owner democracy" it accused the NPP to impose (Nugent 2005). We call this first opposition an economic opposition. It may be one of the motives for voters to chose between the two parties.

A second opposition is the ethnic one: while the NPP represents the Akan tradition and is mostly supported by the heart of Ashanti regions, the NDC gathers supports from the Northern regions and from the Volta region where non-Akan people are a majority. This ethnic cleavage is likely to have played a role during this 2004 election, since the political campaign partly revolved around such themes. The NDC denounced the relationship between the King of Ashanti (the *asantehene*) and stoked fears among non-Ashanti that John Kufuor would enthrone the *asantehene* as king of Ghana. Moreover, the NDC tried to capitalize on the resentment felt by populations in the North after the NPP administration seemed to meddle in a long-lasting violent succession crisis in the Dagbon kingdom and did not prevent the beheading of the King and the massacre of dozens of members of his clan. This ethnic opposition between Akan and non-Akan could thus well be a second possible driver for voters in the 2004 election.

Last, the issues at stake in the campaign included the judgement that Ghanaians would have on the achievements and failures of the Kufuor administration since 2000. Two main features stand out. First, Ghana experienced a rapid growth episode during these years with a real GDP increasing yearly by more than 5%, leading to a decrease in measured poverty (Aryeetey and Kanbur 2006). Ghana benefited from massive debt reductions in the frame of the HIPC initiative, of which it reached the decision (start-

ing) point in 2002 and the completion point in 2004. This may be put to the credit of the incumbent administration and to the outgoing president, John Kufuor. Although a serious problem remained in urban areas with high and enduring unemployment rates (Nugent 2005), the outgoing president put forward this good economic achievement as one of the main reasons for him asking voters to renew his mandate. But a second element is the poisonous atmosphere created by a number of corruption cases that undermined the reputation of the government. The NDC led a very tough and somewhat slanderous campaign against corruption affairs in the NPP party, like NPP ministers having built luxurious mansions they could not afford on the only basis of their official salary. The NDC also denounced and blew up cases of unclear financing sources for the NPP. These two main elements are possible drivers for a positive or negative evaluation vote by the Ghanaian citizens.

We thus see that the setting of the 2004 presidential election opens the way to both ethnic and non-ethnic voting.

3 Data and method

Our study relies on an original compilation of several datasets that we match at the district level. This provides an important amount of information on the demographical, social and economic situation of every district. The lack of such accurate data may account for the rather weak results obtained by previous studies. In this section, we first present the electoral data that we use, then the social, economic and demographic data. We finally present the method implemented and discuss the multicollinearity problems that we might face in this study.

3.1 Electoral data

We first collected a set of electoral results on seven major national polls between 1992 and 2004 in Ghana: the 1992 presidential elections and the 1996, 2000 and 2004 presidential and parliamentary elections. These results are available at the constituency level.

Ghana used to be divided into 200 constituencies until the 2000 presidential and parliamentary polls. In 2004, a reform divided and rearranged the electoral map up to 230 constituencies. This change of boundaries does not impact our matching: since all socio-economic variables are only available at the district level, we aggregate the constituency data by simply summing them at the district level. This is made possible by the fact that every constituency (both before and after the boundary changes) is strictly included in a district.

For each of these polls, we know how many voters were registered, how many actually cast a ballot, how many of these votes were deemed valid, how many votes each of

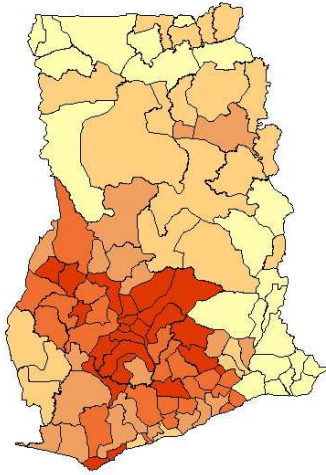


Figure 1: Vote for the NPP in 2000

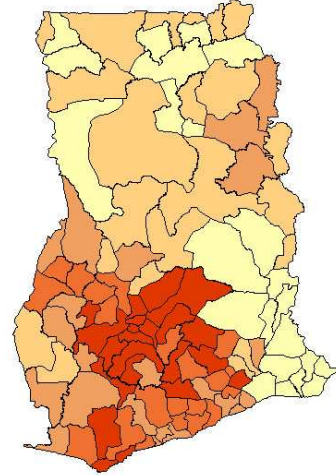


Figure 2: Vote for the NPP in 2004

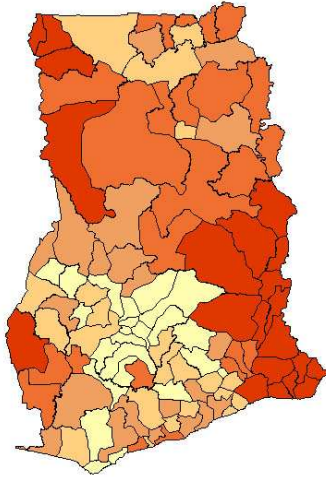


Figure 3: Vote for NDC in 2000

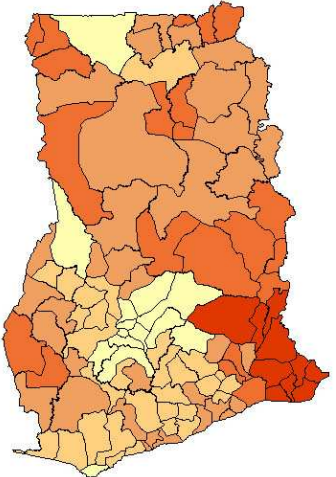


Figure 4: Vote for the NDC in 2004

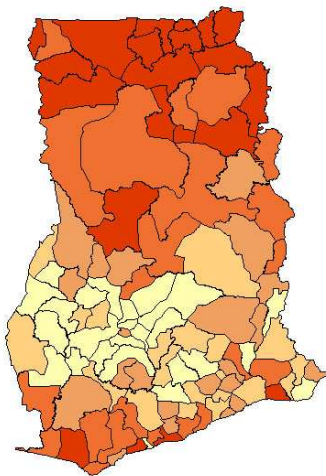


Figure 5: Vote for Nkrumahists in 2000

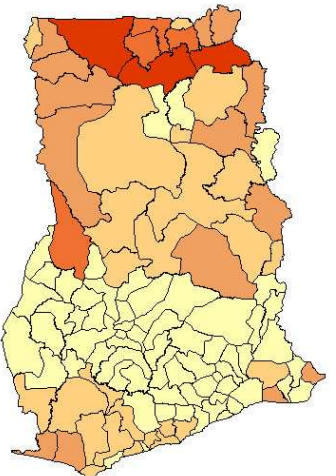


Figure 6: Vote for Nkrumahists in 2004

the candidates obtained as well as the party they represented - and of course who was eventually elected.

But in this paper we do not use all these electoral data. First, since all other variables used in our empirical strategy are drawn from the Census held in 2000 and a national survey held in 2003, the only electoral results that may be accounted for are those of 2004. But we will also use the 2000 results as a point of comparison and seek the determinants of the evolution of votes between these two polls. Second, in this paper we will concentrate on the determinants of vote to the presidential election, the institutions and the political preeminence of presidential elections (held just before the parliamentary ones, that are generally just a confirmation of the choice) making Ghanaian regime a presidential one. The analysis of parliamentary results are left for further research. The pattern of votes in 2000 and 2004 presidential elections are presented in Figures 1 to 6.

3.2 Social, economic and demographic data

Along with electoral data, we use social, economic and demographical data collected from three different sources: the 2003 Core Welfare Indicators Questionnaire (CWIQ) Survey, the 2000 Census and the 2000 Facility Census. The CWIQ survey is a nationally representative large sample household survey elaborated by the World Bank and carried out by the Ghana Statistical Service in 2003. It is a district-based probability sample that covered a total of 49,003 households (more than 210,000 individuals) nationwide, with 405 households (about 1000 individuals) drawn from each district, except for the metropolitan areas, where the numbers of households were as follows: Accra, 2,430; Kumasi, 1,620; Shama/Ahanta East, 1,215; Tema Municipal Area, 810. We use this survey to compute variables at the district level: occupational structure and average levels of expenditures in a variety of goods. The fair number of households in each district allows us to compute information on inequality and poverty such as Gini indicators, percentile ratios, or population under a certain poverty line. This survey also includes subjective questions on the degree of "happiness", sources of discontent and social cohesion.

These district-level results are completed by the regional paper reports of the 2000 Census Survey brought back from Accra. They provide cross-tabulations of some major socioeconomic dimensions for the whole population of every district, including education and the share of formal, informal and public sectors. The ethnic structure of each district is also drawn from there. We created a modality "Other Northern ethnic groups" that gathers the Mande, Gur and Grusi groups, each of which represent less than 4%. Most of this information at the district level is here used for the first time for the purpose of political analysis.

We also use information from the 2000 Facility Census that we obtained from the Ghana Statistical Service in Accra: this part of the 2000 Census gathers information on local amenities, public goods and equipment for the more than 70 000 localities of the country. The total population of each locality is provided, as well as information on

Variable	Source	Mean	St. Dev	Min	Max
Akan (%)	Census 2000	49.6	31.8	0.9	96.6
<i>Mole (%)</i>	Census 2000	16.4	25.2	0.2	96.4
<i>Ewe (%)</i>	Census 2000	12.5	20.7	0.0	92.7
<i>Ga (%)</i>	Census 2000	7.9	14.2	0.0	85.9
<i>Other northern groups (%)</i>	Census 2000	7.2	11.9	0.2	74.9
<i>Guan (%)</i>	Census 2000	4.3	8.7	0.0	51.7
<i>Others (%)</i>	Census 2000	2.1	3.4	0.0	21.0
Uneducated (%)	Census 2000	41.8	18.9	16.0	84.3
<i>Primary education (%)</i>	Census 2000	21.7	5.3	8.0	34.3
<i>Middle education (%)</i>	Census 2000	23.0	9.6	2.6	35.8
<i>Secondary education or more (%)</i>	Census 2000	13.5	7.6	3.9	29.9
Formal private sector (%)	Census 2000	15.3	6.1	3.9	27.5
<i>Public sector (%)</i>	Census 2000	7.7	4.0	1.7	18.2
<i>Informal private sector (%)</i>	Census 2000	77.0	9.4	58.8	94.2
Unemployed active workers (%)	CWIQ Survey 2003	10.3	9.1	0.5	54.7
<i>Employed active workers (%)</i>	CWIQ Survey 2003	73.3	10.7	28.6	92.6
<i>Inactive workers (%)</i>	CWIQ Survey 2003	16.4	4.3	6.9	33.6
Food exp.: Gini index	CWIQ Survey 2003	39.6	6.9	29.9	63.9
Food exp.: Share of the district in d10 (%)	CWIQ Survey 2003	8.4	13.7	0.0	69.6
Food exp.: Share of the district in d90 (%)	CWIQ Survey 2003	12.0	9.6	0.2	34.3
Feeling happy (%)	CWIQ Survey 2003	60.2	13.3	24.4	94.8
Complain on immorality (%)	CWIQ Survey 2003	5.9	4.7	0.0	16.9
Find most people helpful (%)	CWIQ Survey 2003	43.1	19.6	10.3	95.8
Share of the 5 main cities (%)	Facility Census 2000	31.7	13.6	10.8	86.5
Distance to a post office (km)	Facility Census 2000	15.2	11.4	0.0	54.4

Note: Results are individual level data aggregated up to the district level. Means and standard deviations are weighted by the population of each of the 110 district to be nationally representative. Alternative modalities not used in the regressions are in italics.

Table 2: Descriptive statistics for the main socio-economic variables

the access to some basic amenities: the presence of (or distance to) such equipments as a post office, hospital or primary school is mentioned. We thus have indicators both on the level of urbanization of every district (the share of the population which lives in cities for example) and on access to public goods. In dualist countries like Ghana, the level of urbanity may play a key role in structuring the political field. Likewise, as it derives from the policies implemented by central or local authorities, the availability of public goods or lack thereof might determine the opinion of citizens about the incumbent party.

Descriptive statistics on the variables used in the remainder of the paper are provided in Table 2. They all include 110 observations corresponding to the 110 districts, and come from three different sources. Results show how heterogenous the 110 districts are. Differences between the minimum and the maximum of each variable are very large, which corresponds to the gap between urban populous areas and rural ones, the coast in the South and arid landscapes in the North, the heart of Akan territories and the Ewe regions. This variance is necessary to identify properly the impact of these social and economic variables on the pattern of votes.

3.3 Methodological issues

We presented a framework in which Ghana is divided into two ethnic groups, Akan and non-Akan, and politics in Ghana is divided into two traditions, a conservative one and a more progressive one, which correspond to a class cleavage. Two parties compete, each of which broadly represents one political profile and one ethnic group: put in a very rough way, the NPP represents Akan and the rich, the NDC represents non-Akan and the poor. At the level of the political supply, the ethnic and economic divisions overlap. If it was the same in the population, we would have two groups and the outcome of elections would always reflect the weight of each of these two groups. It would be impossible to know which of the motives is the main driver for voters to make their choice, and this question would anyway have little sense. But if the ethnic and class cleavages do not exactly correspond to each other, then changes in political majorities are possible and we may try to determine which of the two possible drivers prevails.

The first empirical pre-requisite for our study to be feasible is thus that the ethnic factor and the socio-economic factor do not present a too high correlation. We would indeed be unable to say anything if high shares of Akan were always associated with, say, wealthier or more educated districts on average, the districts with the weakest shares of Akan being the ones left behind. To check for this possibility, we first break up our sample into sub-samples determined by the shares of Akan in the population and compute the same descriptive statistics as in Table 2.

Share of Akan (%)	[0;20[[20;40[[40;60[[60;80[[80;100[
Number of districts	41	6	8	32	23
Uneducated (%)	64.0	41.7	22.7	35.6	35.0
Formal private sector (%)	13.1	11.6	21.8	14.7	14.5
Unemployed active workers (%)	14.7	6.7	13.1	7.3	6.7
Food exp.: Gini index	45.2	37.8	33.6	39.2	37.5
Food exp.: Share of the district in d10 (%)	21.4	3.9	1.7	4.1	2.1
Food exp.: Share of the district in d90 (%)	5.5	8.1	26.9	9.9	12.7
Feeling happy (%)	61.3	50.0	56.7	62.3	60.5
Complain on immorality (%)	4.3	4.1	9.3	6.5	4.7
Find most people helpful (%)	58.8	34.2	37.1	38.1	34.0
Share of the 5 main cities (%)	28.7	39.9	33.0	30.5	35.3
Distance to a post office (km)	22.8	15.8	5.6	14.2	13.5

Table 3: Descriptive statistics by share of Akan

We may first notice that the share of Akan presents a quite polarized geographical distribution, with only 14 districts having an Akan population between 20 and 60% of the overall population. 41 districts are below 20%, the rest (55) having a vast majority of Akan. The results presented in Table 3 show that these different districts classes present similar profiles on average, except for the first class and the third class to which the two major cities of the country (Accra and Kumasi) belong. The share of uneducated population is significantly higher in the first class and lower in the third.

The availability of public goods, as documented by the distance to the nearest post office, follows the same pattern. The first class also stands out as having the largest share of its population included in the poorest 10% and the weakest share being among the richest 10%, while the group of the two capitals has more than a quarter of its population in this last national decile. The share of formal sector is much higher in this group as well. Our robustness checks in section 7 will assess the sensitivity of our results to these specificities. The four other classes present a homogenous profile on average with respect to our explanatory variables. Since a given share of Akan is not always associated with given socioeconomic characteristics, we should be able to disentangle the effects of the ethnic dimension and the other variables.

The aim of this paper is to regress the political behavior of a district (turnout and vote results) on a set of characteristics, some related with ethnicity, some related with social and economic conditions. A major concern with the "ecological" studies like this paper is the possible multicollinearity between explanatory variables. Since most of the variables we introduce in our regressions describe aspects of a same reality (say the level of development of each district), these variables are likely to form coherent sets of characteristics (wealth, public goods, education) that could make them correlated. This may all the more be an issue as using district-level data makes the sample size rather limited, so that we might not be able to properly disentangle the effects of our variables. This may lead to biased estimators or underestimated standard errors.

In order to investigate this multicollinearity issue, we compute the classical Variance Inflation Factor (VIF). The share of the variance unexplained after regressing each of the explanatory variables on the others is called the tolerance index for this variable. The VIF index is the inverse of this tolerance index. It is straightforward that the more explanatory variables are introduced in a model, the higher the VIF. We compute these indicators on the largest set of variables we will use. It is thus an upper bound for the multicollinearity we will face in the econometric models.

	VIF	Tolerance (1/VIF)
Akan (%)	2.13	0.47
Uneducated (%)	4.60	0.22
Formal private sector (%)	3.19	0.31
Unemployed active workers (%)	2.53	0.39
Food exp.: Gini index	3.50	0.29
Food exp.: Share of the district in d10 (%)	4.52	0.22
Food exp.: Share of the district in d90 (%)	2.23	0.45
Feeling happy (%)	1.35	0.74
Complain on immorality (%)	1.81	0.55
Find most people helpful (%)	1.65	0.60
Share of the 5 main cities (%)	1.20	0.84
Distance to a post office (km)	2.67	0.38

Table 4: Indices of multicollinearity

It is generally admitted that multicollinearity is a matter of concern when the VIF indicator exceeds 5 (some papers also retain 10 as a relevant threshold), ie. when more

than 80% of the variance of a given variable is accounted by a linear combination of the others. As shown in Table 4, the variables used in the general model do not fall in this case, although the correlation between the share of uneducated people and the other variables may be considered as worrying. We will take this matter of concern into account when coming to the robustness checks in section 7, by dropping the variables which have the highest VIF.

4 Estimating the results of the 2004 presidential election

4.1 Confronting general, ethnic and non-ethnic models

The NPP and NDC scored a total of 97% in the 2004 presidential election. We may thus consider that the results for one of the two parties almost determines the results of the other, so that we may only estimate one of the two results to have a (almost) complete picture of this election. This is why we focus on the vote for the incumbent and ultimately winning NPP candidate, John Kufuor. But in section 4.2 we will also pay attention to the determinants of voting for the two other political groups, the NDC and the Nkrumahists.

We begin this analysis by simply seeking which are the determinants of the voting pattern in the 2004 presidential election. Our econometric model is the following:

$$y_{j2004} = \alpha\theta_j + \beta U_j + \gamma V_j + \epsilon_j$$

where y_{j2004} is the share of votes obtained by the NPP in district j in 2004, θ_j is the ethnic composition of the district, U_j is a vector of non-ethnic characteristics of the district population (level of education, occupational structure, wealth, subjective well-being) and V_j a vector of characteristics of the district (public goods, urbanity). If ethnic voting is an overwhelming determinant, we should have α highly significant while β and γ would be non significant. Adding non-ethnic variables would hardly improve the share of variance explained.

Besides this general model, we estimate an ethnic model and a non-ethnic model, both of them being nested in the general model. The ethnic model is obtained with $\beta = \gamma = 0$ while the non-ethnic model is obtained when $\alpha = 0$.

The NPP represents the Busia/Danquah tradition which is closely related to the Akan people. The geographical patterns of votes clearly reveal it: Figures 1 and 2 show that the highest scores were obtained by the NPP (more precisely by its candidate John Kufuor, himself an Ashanti) in Ashanti region. The share of Akan (of which Ashanti form a sub-group) could thus play a role in explaining the votes - we show in section 7 that taking Ashanti rather than Akan does not affect our results. But as we also explained, the NPP represents the rather conservative wing of Ghanaian politics.

Its traditional supports are to be found among the educated well-off citizens who are economically and socially integrated, while NDC tried to gather the votes of people who feel left behind. These two dimensions are confronted in the regressions presented in the first three columns of Table 5.

	Depending variable: share of votes for the NPP			Depending variable: turnout rate		
	(1)	(2)	(3)	(4)	(5)	(6)
Akan (%)	0.47*** (0.04)	0.52*** (0.03)		-0.00 (0.02)	0.02 (0.01)	
Formal sector (%)	0.61** (0.25)		0.52 (0.38)	0.07 (0.10)		0.07 (0.10)
Uneducated (%)	-0.45*** (0.10)		-1.01*** (0.13)	-0.05 (0.04)		-0.05 (0.03)
Unemployed (%)	0.03 (0.16)		-0.03 (0.25)	-0.17*** (0.06)		-0.17*** (0.06)
Food exp.: Share of the district in d10 (%)	0.24* (0.14)		-0.10 (0.21)	0.01 (0.06)		0.01 (0.06)
Food exp.: Share of the district in d90 (%)	-0.17 (0.13)		-0.60*** (0.18)	-0.08 (0.05)		-0.08* (0.05)
Food exp.: Gini	0.18 (0.24)		0.76** (0.36)	0.02 (0.10)		0.02 (0.09)
Share of the population in the five biggest cities (%)	0.02 (0.07)		-0.05 (0.10)	-0.00 (0.03)		-0.00 (0.03)
Distance to the nearest post office (km)	0.00 (0.00)		0.00 (0.00)	-0.00** (0.00)		-0.00** (0.00)
Feels happy (%)	0.17** (0.08)		0.39*** (0.11)	0.01 (0.03)		0.01 (0.03)
Complains on immorality	-0.03 (0.24)		-0.36 (0.36)	0.13 (0.10)		0.13 (0.10)
Finds most people helpful	0.07 (0.06)		-0.08 (0.08)	0.08*** (0.02)		0.08*** (0.02)
Observations	110	110	110	110	110	110
R-squared	0.80	0.69	0.55	0.30	0.02	0.30

OLS estimation. Standard errors in parentheses. Significantly different than zero at 90% (), 95% (**), 99% (***) confidence levels. Regressions include a constant.*

Table 5: General, ethnic and non-ethnic models for NPP votes and turnout

The first striking results is that ethnicity has a very strong effect on the patterns of votes (first three columns). When the share of Akan is introduced alone in the regression (column 2), it accounts for almost 70% of the variance of the share of votes for the NPP. The coefficient has the expected positive sign. But this effect does not rule out the role of socio-economic variables, which by themselves account for 55% of the NPP vote pattern (column 3). When these two dimensions are added (column 1), the R-squared raises to about 80%, revealing a strong predicting power of our general model. The fact that the coefficient of the share of Akan slightly decreases when the other variables are introduced in the model shows that there is some collinearity but its magnitude seems to remain low.

The political picture drawn by these estimations deserves comments. After having controlled for the ethnic dimension (ie. in the general model), the social and economic variables that positively drive the vote for NPP are the share of formal sector, the share of educated people and the feeling of happiness. The first two dimensions are classical indicators of the level of development of a district. The latter subjective variable tends to confirm that voting for the NPP reveals a conservative attitude, but it may also be related to the fact that John Kufuor was the outgoing President. Regardless of the positions he or his party defended during the campaign - conservative or not -, general satisfaction is likely to be put to his credit and increase the share of citizens who wish he carries on the job.

An other variable enters positively though less significantly in the general model: the share of people in the district who belong to the poorest 10% at the national level, *i.e.* a measure of the incidence of poverty. It may be considered paradoxical given the political platform that the NPP put forward, or more exactly given the pro-poor platform that the opposing party NDC tried to embody. But it may appear as the results of an evaluative vote, for growth in Ghana allowed significant poverty alleviation during the years previous to the poll.

We also tried to introduce non-linear effects, like a quadratic function of the share of Akan or interaction terms between the ethnic dimension and non-ethnic variables. None of the results obtained is significant. We thus keep the purely linear model.

An other important determinant of election outcomes is the level of participation in the vote. The differences in political mobilization among groups may be critical. Turnout may first be determined by the social and economic conditions of voters. The level of education and the remoteness of the residence areas are examples of determinants of participation. But it may also be that the participation is mostly determined by ethnic identities, if some groups are more prone to defend their interests or feel closer to the national political field. We thus try to account for the level or turnout that was observed in the Ghanaian districts during the 2004 presidential election. Results are displayed in the last three columns of Table 5.

Ethnicity appears to play no significant role, even without controlling for the other variables. The key determinants of turnout in a district are the level of unemployment (plays negatively), the average distance to the nearest post office (plays negatively) and the share of the population that finds most people helpful (as opposed to looking out for themselves - plays positively). Although we cannot assert that unemployed participate less in the vote (this would typically be an ecological fallacy), but only that districts where unemployment is high participate less on average, the role played by the unemployment variable suggests that political participation is eased by economic and social integration. This is an even more general result than the one already established that participating in civil society activities increases the propensity to vote (see Brady, Verba, and Schlozman (1995) or Bratton (1999) on Zambia). The effect of the average distance to the nearest post office underlines the logistical component of turnout, while also capturing the subjective implication of citizens in the political issues, of which remoteness might be deterrent. Finally, the impact of the share of people who find

others helpful suggests that the level of trust and social cohesion at the local level plays a role, which confirms results obtained for example in the US (Knack and Kropf 1998) or India (Krishna 2002). This is in line with numerous economic studies that present trust as a determinant of collective influence and political claim. We tried to see if ethnic heterogeneity is a determinant of this level of trust and/or of participation, as is documented in other contexts (Alesina and La Ferrara 2000), (Miguel 2006), and computed local indicators of ethnic fractionalization. But we do not find any significant effect, although the sign is negative as expected (results not shown).

	Share of votes for the NPP		Turnout rate	
	(1)	(2)	(3)	(4)
Akan (%)	0.38*** (0.04)		-0.00 (0.01)	
Formal sector (%)		0.61** (0.25)		0.07 (0.10)
Uneducated (%)		-0.45*** (0.10)		-0.05 (0.04)
Unemployed (%)		0.03 (0.16)		-0.17*** (0.06)
Food exp.: Share of the district in d10 (%)		0.24* (0.14)		0.01 (0.06)
Food exp.: Share of the district in d90 (%)		-0.17 (0.13)		-0.08 (0.05)
Food exp.: Gini		0.18 (0.24)		0.02 (0.10)
Share of the population in the five biggest cities (%)		0.02 (0.07)		-0.00 (0.03)
Distance to the nearest post office (km)		0.00 (0.00)		-0.00** (0.00)
Feels happy (%)		0.17** (0.08)		0.01 (0.03)
Complains on immorality		-0.03 (0.24)		0.13 (0.10)
Finds most people helpful		0.07 (0.06)		0.08*** (0.02)
$\widehat{\text{Vote}}_{\text{NPP, non-eth}}$ (%)	0.47*** (0.09)			
$\widehat{\text{Vote}}_{\text{NPP, eth}}$ (%)		0.89*** (0.08)		
$\widehat{\text{Turnout}}_{\text{non-eth}}$ (%)			1.00*** (0.15)	
$\widehat{\text{Turnout}}_{\text{eth}}$				-0.03 (0.91)
Observations	110	110	110	110
R-squared	0.75	0.80	0.30	0.30

OLS estimation. Standard errors in parentheses. Significantly different than zero at 90% (), 95% (**), 99% (***) confidence levels. Regressions include a constant.*

Table 6: J-tests of the ethnic vs. non-ethnic model

We now try to determine which of the two models (ethnic or non-ethnic) best explains the pattern of votes. The two models are non-nested, so that we can use the J-test as suggested by Davidson and McKinnon (1981) and used for example by Collier and Hoeffler (2004). The J-test is based on an artificial nesting procedure. We first calculate the reconstructed shares of votes for the NPP by our two models, and obtain \hat{Y}_{eth} , $\hat{Y}_{\text{non-eth}}$. We then add these reconstructed values to the alternative models and regress $y_{j2004} = f(\text{ethnic}, \hat{Y}_{\text{non-eth}})$ and $y_{j2004} = f(\text{non-ethnic}, \hat{Y}_{\text{eth}})$. If, say, \hat{Y}_{eth} is significant in the non-ethnic model and $\hat{Y}_{\text{non-eth}}$ is not significant in the ethnic model, we reject the non-ethnic model in favor of the ethnic model.

Table 6 shows that we cannot reject any model in favor of the other to explain the share of vote for the NPP. Values predicted by each model turn out to be significant in the alternative model. We thus stick to the share of variance explained by each of the two models as an indicator of which is the most powerful, and see that the ethnic model is slightly ahead. But we cannot reject the accuracy of the non-ethnic one. On the other hand, the J-tests lead to reject the ethnic model in favor of the non-ethnic one as far as turnout is concerned. The value reconstructed by the non-ethnic model is highly significant in the ethnic regression, whereas the contrary does not hold. In section 6 we will try to stack the two levels of estimation (turnout and party choice) and see which of the ethnic or non-ethnic models overall fits best to the actual results.

In order to enhance the parsimony of the model, reduce the collinearity and better identify the significant variables, we propose a reduced form of the three models. These were obtained through an automatic "drop the least significant" procedure until all variables are significant at the 90% threshold. Results are shown in Table 11 in Appendix. These restricted general models confirm that the effect of ethnicity is strong but does not rule out the impact of other non-ethnic variables on party affiliation, while ethnicity does not help to understand the level of turnout.

4.2 Votes for the NDC and the Nkrumahists

As we explained in section 2.2, the 2004 election brought together outgoing President John Kufuor, who represented the NPP, NDC candidate John Atta-Mills and two other candidates: Edward Mahama for the PNC and George Aggudey for the CPP. These two candidates claimed their relation to nkrumahism. In our analysis, we add the results they obtained, for they pretty much represent the same political family and play the similar role of "anti-system outsider". Determinants of votes for the NDC and the Nkrumahists are displayed in Table 7.

Not surprisingly, the pattern of votes for the NDC (columns 1 to 3) is quite symmetrical to the one obtained for NPP. This reflects the fact that the two-party system represents a tremendous share of votes, nkrumahist parties obviously failing to shake up this pattern. The negative sign and the high significance of the share of people in the first decile shows that the NDC failed in its attempt to attract the votes of the poor. The ethnic model explains a higher share of the variance than the non-ethnic one.

	Share of votes for the NDC			Share of votes for the Nkrumahist parties		
	(1)	(2)	(3)	(4)	(5)	(6)
Akan (%)	-0.45*** (0.04)	-0.46*** (0.04)		-0.01 (0.02)	-0.06*** (0.02)	
Formal sector (%)	-0.80*** (0.27)		-0.71* (0.38)	0.19 (0.12)		0.19 (0.12)
Uneducated (%)	0.44*** (0.11)		0.98*** (0.13)	0.01 (0.05)		0.03 (0.04)
Unemployed (%)	-0.19 (0.17)		-0.13 (0.25)	0.16** (0.08)		0.16** (0.08)
Food exp.: Share of the district in d10 (%)	-0.31** (0.15)		0.02 (0.21)	0.06 (0.07)		0.07 (0.06)
Food exp.: Share of the district in d90 (%)	0.19 (0.13)		0.62*** (0.18)	-0.03 (0.06)		-0.01 (0.06)
Food exp.: Gini	-0.41 (0.26)		-0.97*** (0.36)	0.23** (0.11)		0.21* (0.11)
Share of the population in the five biggest cities (%)	-0.00 (0.07)		0.06 (0.10)	-0.02 (0.03)		-0.01 (0.03)
Distance to the nearest post office (km)	-0.00* (0.00)		-0.00 (0.00)	0.00 (0.00)		0.00 (0.00)
Feels happy (%)	-0.15* (0.08)		-0.36*** (0.11)	-0.03 (0.04)		-0.03 (0.03)
Complains on immorality	0.19 (0.26)		0.51 (0.37)	-0.16 (0.11)		-0.15 (0.11)
Finds most people helpful	-0.03 (0.06)		0.11 (0.08)	-0.04 (0.03)		-0.04 (0.03)
Observations	110	110	110	110	110	110
R-squared	0.76	0.59	0.49	0.46	0.12	0.46

OLS estimation. Standard errors in parentheses. Significantly different than zero at 90% (), 95% (**), 99% (***) confidence levels. Regressions include a constant.*

Table 7: Models for the NDC and Nkrumahist votes

But the vote for the nkrumahists, as low as it may be, seems to have a quite clear political meaning and may not be considered as a residual white noise on the margins of the two-party system. Quite the contrary, votes for these anti-system candidates appear to be driven by political concerns that push them to cast a protest vote. Ethnicity appears to very poorly explain the vote for the nkrumahists. Its coefficient is not significant in the general model, and its explaining power is low when economic variables are controlled for. The economic variables have the decisive effect on this protest vote: the level of inequality has the largest positive and significant effect, while the rate of unemployment ranks second. These results converge on the idea that votes for the nkrumahist parties are frequent in the most fragile part of the population in Ghana. People who are (either themselves or people close to them) excluded from the labor market and who witness a high level of inequalities are prone to vote for these candidates. This makes the determinants of voting for the nkrumahist parties typically non ethnic. The economic and political explaining factors clearly and consistently dominate and account for 46% of the variance, ethnicity being of very little help to

understand this vote.

The ethnic factor thus seems to have a strong influence on the structure of votes in the 2004 presidential election in Ghana. But it does not rule out the accuracy of economic factors to account for these results, and does not help to explain the turnout rate.

5 Assessing the evolution of votes and turnout

In the previous section, we saw that the ethnic model was slightly better than the non-ethnic one for explaining the general structure of votes in Ghana. But it is also important to try and explain what drives the evolution of votes in a district. It may well be that the structure of the results is determined by ethnicity, just as voting patterns in industrialized countries often present geographical regularities, but that the outcome of the election is determined by the deviation from this pattern in one sense or the other. The way votes may change marginally from an election to the next one may be decisive and these marginal changes may be driven by other determinants than those impacting the gross distribution of votes. This is all the more important in countries like Ghana, where changeovers of power occurred in the past.

One can find it obvious that ethnicity does not play a role in the evolution of votes. If the ethnic composition of a district is stable between two elections, i.e. if we suppose that internal migration flows and differential population growth rates between ethnic groups do not imply significant evolutions of the shares of ethnic groups in a given district, any change in the election outcomes may only result from other determinants than the ethnic one. But this relies on the assumption that the political system is perfectly ascriptive. There would be no possible evolution in the political affiliation of ethnic groups, for example in the fact that being Akan prompts people to vote for the NPP. Yet a large share of literature on this topic underlines how politicians try to build alliances with such and such ethnic group, how a party may lose the support of a given group etc. (see the seminal work by Horowitz (1985)). The importance of differential mobilization is also put forward, with electoral campaigns keen to play the ethnic card and stimulate the support and participation of a given group.

If these strategies are decisive, ethnicity should also be the main factor behind the evolution of votes between two presidential elections. Politicians would try to increase the support of ethnic groups that lacked them and raise the turnout level among his supporters. Campaign would revolve around ethnic rivalries or splitting themes, and the ethnic factor would appear key for the evolution.

We thus now try to explain the evolution in the share of votes obtained by the NPP between two elections. We would have liked to estimate a model in difference:

$$\Delta y_j = \alpha X_j + \beta \Delta X_j + \epsilon_j$$

where $\Delta y_j = y_{j,2004} - y_{j,2000}$ and $\Delta X_j = X_{j,2004} - X_{j,2000}$. But the right-hand side variables, which include the ethnic and non-ethnic determinants, are only observed at

one point in the time, so that we can only estimate $\Delta y_j = \alpha X_j + \epsilon_j$. However, the very limited variation that one could expect in such a short period of time makes it likely that β is null. The effect we capture here is thus an effect of the mobilization of groups, which may increase or decrease their support in response to political campaigning or the appreciation they make of the candidates involved.

We thus estimate the same model as in the previous section, except that the depending variable is now $\Delta y_j = y_{j,2004} - y_{j,2000}$. Table 8 shows the results.

	Evolution in the share of votes for the NPP			Evolution in the turnout rate		
	(1)	(2)	(3)	(4)	(5)	(6)
Akan (%)	0.02 (0.02)	-0.03 (0.02)		-0.02 (0.02)	-0.01 (0.01)	
Formal sector (%)	-0.13 (0.13)		-0.14 (0.13)	-0.07 (0.10)		-0.07 (0.10)
Uneducated (%)	0.07 (0.05)		0.04 (0.05)	0.05 (0.04)		0.07* (0.04)
Unemployed (%)	0.09 (0.09)		0.08 (0.09)	-0.13* (0.07)		-0.13* (0.07)
Food exp.: Share of the district in d10 (%)	0.16** (0.08)		0.15** (0.07)	-0.05 (0.06)		-0.03 (0.06)
Food exp.: Share of the district in d90 (%)	0.08 (0.07)		0.06 (0.06)	-0.02 (0.05)		-0.00 (0.05)
Food exp.: Gini	-0.08 (0.13)		-0.05 (0.12)	0.00 (0.10)		-0.02 (0.10)
Share of the population in the five biggest cities (%)	-0.07** (0.04)		-0.08** (0.04)	-0.08*** (0.03)		-0.08*** (0.03)
Distance to the nearest post office (km)	0.00 (0.00)		0.00 (0.00)	-0.00 (0.00)		-0.00 (0.00)
Feels happy (%)	0.00 (0.04)		0.01 (0.04)	-0.07** (0.03)		-0.08** (0.03)
Complains on immorality	-0.75*** (0.13)		-0.77*** (0.13)	0.43*** (0.10)		0.44*** (0.10)
Finds most people helpful	-0.11*** (0.03)		-0.11*** (0.03)	0.04 (0.02)		0.05* (0.02)
Observations	110	110	110	110	110	110
R-squared	0.62	0.02	0.61	0.32	0.01	0.31

OLS estimation. Standard errors in parentheses. Significantly different than zero at 90% (), 95% (**), 99% (***) confidence levels. Regressions include a constant.*

Table 8: Models for the evolution of NPP vote and turnout

Our results show clearly that the ethnic factor is of very poor help when it comes to explaining the evolution of votes between two elections (columns 1 to 3). The coefficient is not significant even when the variable is introduced alone in the regression, and the R-squared of the ethnic model is very low. The non-ethnic model explains about 60% of the variance in voting evolutions. The NPP increased its scores in the poorest areas, which seems to confirm that the good economic results were put to the credit of the incumbent while the opposing party did not manage to benefit from the discontent of the most disadvantaged sections of the population. This seems to be the main reason

why John Kufuor increased its results from 48% of the votes in the first round of 2000 up to 52% in the first and only round of 2004. The NPP lost support in the most urbanized districts, where discontent about the economic policy was the highest. The share of people who quote items linked to immorality (corruption, reprehensible behaviors of politicians, violence...) as one of the main current problems has a strong negative impact on the results for the NPP. John Kufuor seems to have suffered from the tough campaign led by the NDC that denounced corruption in the incumbent party.

Similarly, the ethnic card that was played during the campaign does not seem to have had a differential impact on the political mobilization of different groups (columns 4 to 6). The evolution of turnout between the two polls was not affected by the ethnic composition of the groups. This evolution is rather determined by the fact that urban districts participated less than in 2000, which may have partly offset the fact that they voted less for the NPP. The districts where a large discontent exists on moral problems appear to have participated significantly more than others. Last, everything else being equal, districts where people feel happy have voted less. Kufuor may have reached an even better result if he had managed to stimulate the support of the ones who would have cast a positive evaluative vote on his action.

The J-tests (see Table 9) unambiguously lead to reject the ethnic model in favor of the non-ethnic one to account for the evolutions of both turnout and support to the NPP.

6 Election outcomes reconstructed by the two models

Our ethnic and non-ethnic models give us a set of results both on political choice and on participation. The ethnic model is superior in the structural analysis but does not rule out the accuracy of the non-ethnic one, while the turnout rate is much better explained by the non-ethnic model. In the analysis of the evolution of votes, the non-ethnic model gives much better results in the party choice regression and in the turnout regression. We now try to stack these results and provide a comparison of the predicted values they generate. To do this, we simply compute the number of votes obtained by each party as predicted by the two different models, following the two different methods. To compute the results derived from, say, the ethnic model, we calculate the number of votes obtained by the NPP in each district as follows: $\hat{N}_{1\text{eth}} = \hat{y}_{i,\text{eth}} * \hat{t}_{\text{eth}} * N_{\text{registered}}$ for the first method, $\hat{N}_{2\text{eth}} = (y_{2000} + \hat{\Delta}y_{\text{eth}}) * (t_{2000} + \hat{\Delta}t_{\text{eth}}) * N_{\text{registered}}$ for the second one, $N_{\text{registered}}$ being the number of people registered on the electoral roll in every district, \hat{y} and \hat{t} being respectively the predicted levels of vote for the NPP and turnout, and $\hat{\Delta}y$ and $\hat{\Delta}t$ their evolutions. Of course, \hat{N}_1 and \hat{N}_2 may not be properly called predictions in a strict sense, since our regressions were run on the 2004 results, so that our parameters are calibrated conditionally to the result. They are more reconstructions than predictions.

Since the OLS estimator is an unbiased estimator, the national turnout rate is perfectly reconstructed by the turnout regression and the national share of votes for the NPP is perfectly reconstructed by the party regression. So \hat{N}_1 and \hat{N}_2 only differ from the real number of votes N because the error terms of the two regressions cumulate when

	Evolution in the share of votes for the NPP		Evolution in the turnout rate	
	(1)	(2)	(3)	(4)
Akan (%)	0.01 (0.01)		-0.01 (0.01)	
Formal sector (%)		-0.13 (0.13)		-0.07 (0.10)
Uneducated (%)		0.07 (0.05)		0.05 (0.04)
Unemployed (%)		0.09 (0.09)		-0.13* (0.07)
Food exp.: Share of the district in d10 (%)		0.16** (0.08)		-0.05 (0.06)
Food exp.: Share of the district in d90 (%)		0.08 (0.07)		-0.02 (0.05)
Food exp.: Gini		-0.08 (0.13)		0.00 (0.10)
Share of the population in the five biggest cities (%)		-0.07** (0.04)		-0.08*** (0.03)
Distance to the nearest post office (km)		0.00 (0.00)		-0.00 (0.00)
Feels happy (%)		0.00 (0.04)		-0.07** (0.03)
Complains on immorality		-0.75*** (0.13)		0.43*** (0.10)
Finds most people helpful		-0.11*** (0.03)		0.04 (0.02)
$\hat{\Delta}_{NPP, eco}$	1.01*** (0.08)			
$\hat{\Delta}_{NPP, eth}$		-0.58 (0.64)		
$\hat{\Delta}_{Turnout, eth}$			0.99*** (0.14)	
$\hat{\Delta}_{Turnout, eth}$				1.34 (1.20)
Observations	110	110	110	110
R-squared	0.62	0.62	0.32	0.32

OLS estimation. Standard errors in parentheses. Significantly different than zero at 90% (), 95% (**), 99% (***) confidence levels. Regressions include a constant.*

Table 9: J-tests of the ethnic vs. non-ethnic model of evolution

turnout rate and vote share multiply, but this does not provide any accurate information on the predicting power of our procedure. So we rather compute an absolute deviation measure by summing the absolute values of the differences by district between the number of votes reconstructed and the real number. The results are displayed in Table 10.

Results confirm the superiority of the ethnic model in the first method, although turnout was shown to be better reconstructed by the non-ethnic one. The ethnically

	\hat{N}_{gen}	\hat{N}_{eth}	\hat{N}_{eco}
$\sum_j \hat{N}_{1,j} - N_j $ (structure method)	608 795 13.5%	824 154 18.2%	878 146 19.4%
$\sum_j \hat{N}_{2,j} - N_j $ (evolution method)	265 877 5.8%	416 583 9.2%	265 192 5.8%

Table 10: Deviation of the reconstructed numbers of votes from the real numbers, according to the different methods

reconstructed results deviate only by 18.2% whereas the results of the non-ethnic model are 1 percentage point worse. This illustrates the fact that the non-ethnic model is slightly poorer than the ethnic one for reconstructing the pattern of votes in the 2004 presidential election in Ghana. But the non-ethnic model is much more accurate to reconstruct the votes according to the second method, with almost 95% of the votes accurately predicted. The distribution of errors even makes the non-ethnic model slightly better than the general model, though it is a special case of the latter: overestimated shares of voices must be offset by underestimated turnout rates, and vice-versa. Anyway, the accuracy of the non-ethnic model to reconstruct votes on the basis on their evolution from the previous poll appears clearly.

7 Robustness checks

The method employed in this paper and the limited number of observations make robustness checks necessary. Our preliminary investigation of multicollinearity problems in section 3.3 rose a first concern: the fact that some districts may have special characteristics that intertwine ethnicity and socioeconomic factors and may drive the results while making it impossible to disentangle the two possible factors. For example, if the districts with less than 20% Akan are the poorest and less educated, and all vote overwhelmingly against the NPP, they could determine our results and make the comparison between the ethnic and the non-ethnic model irrelevant. In order to check for this possibility, we re-run our regressions on different sub-samples of districts, and drop the observations that could have such a decisive effect. Results are presented in Appendix.

Tables 12 and 13 present the regression results on different sub-samples, one on the shares of votes and the other on their evolution. We first exclude the districts that have less than 20% Akan in their population, for they seem to have certain characteristics of their own (remind Table 3). We then do the same with the districts where Akan represent more than 80% of the population. Since we examine the evolution of votes, we also try to identify the "swing districts" as the ones where the NPP votes increased or decreased by more than 5 percentage points. Their voting behaviors may respond to peculiar incentives, which may be of crucial importance given the role they played

in the general outcome. We also investigate the determinants of vote in districts where turnout rose especially fast.

Because of the gap between the Northern regions and the rest of the country (in terms of wealth, education, ethnic composition), we try to see if our results hold when these areas are excluded from the analysis. Because the Volta region (the Eastern part of the country) presents specific characteristics and is a stronghold of the NDC, we also try to exclude it from the sample. Last, because of the importance of the rural-urban divide, we drop the districts of the two main cities of the country, and go further by excluding the districts with a population higher than 250 000.

These checks show that our results are very robust to these changes in the sample. The variables that stand out as the most significant to explain the share of votes for the NPP are the share of Akan, the share of uneducated people and the share of formal sector. Their significance holds in almost every sub-sample considered. The signs of the coefficients do not vary. The results on the share of population in the first decile are also robust but seem mainly driven by the opposition between the Northern regions and the two main cities of the country, for the variable loses its significance when these regions are withdrawn from the sample. This opposition also seems to overlap the role of the subjective happiness variable: this variable also loses its significance in the sub-samples that exclude Northern regions or the capitals.

The non significant role of the share of Akan for explaining the evolution of votes is also very robust. The only variable that appears key throughout the sub-samples is the share of people who feel concerned by morality issues like violence, corruption, which drags down the support to the NPP. It is even the only significant variable when the sample is restricted to districts where NPP strongly increased or decreased its results. But the other variables appear quite sensitive to changes in the sample. The share of poor is significant only in the general sample and when the capitals are dropped. The decrease in support from urban districts (share of the population in the five biggest cities) seems driven by the raising support of Northern regions, since this variable is no more significant when these regions are dropped. The share of formal sector appears in several sub-samples as significantly associated with a decrease in support for the NPP, which did not appear in the full sample. This may appear as a mechanical bouncing effect after pro-business sections of the population strongly supported John Kufuor in 2000.

Overall, the main finding appears robust (ethnicity having no incidence on the evolution of votes) but only few of the determinants appear robust across the sub-samples.

But maybe the non-significance of the ethnic variable only comes from the fact that we did not choose the appropriate ethnic group. It may be that the evolution of votes for the NPP followed ethnic lines, but not the cleavage between Akan and non-Akan. To test for this possibility, we replace the share of Akan by the share of the six other groups and see whether they play a significant role. We also include the share of Ashanti, an Akan sub-group whose empire used to dominate most of current Ghana, and which remains the core of NPP strongholds. Table 14 in Appendix shows that most of these groups have no significance either, with the exception of the share of

Mole (plays negatively) and the share of other Northern ethnic groups (Mande, Gur and Grusi, plays positively), these two variables having a poor significance. These variables may artificially hide the fact that the poorest districts increased their support to the incumbent candidate, since the Northern ethnic groups generally belong to the poorest sections of the population. But we try to see if these variables could play a more important role than the non-ethnic model to explain the evolution of votes for the NPP. The J-tests (see Table 15) show that it is not the case. The superiority of the non-ethnic model appears robust to changes in the ethnic group considered.

Last, we try to provide a robustness test for the potential multicollinearity problem between variables. In section 3.3 we saw that some variables have high VIF, *i.e.* they are close to a linear combination of the other variables. The three main variables for which this problem may exist are the share of uneducated people, the share of people in the first decile and the share of people who work in the formal sector. In Table 16 we drop these three variables one after another. If the multicollinearity was major, some of our results would change dramatically. They do not. Only the share of those who feel happy becomes non significant when the share of uneducated is dropped in the first method, and the share of unemployed becomes significant when the share of poor is dropped in the second method. But the signs, significance and magnitude of all other effects are quite stable across the different specifications.

8 Conclusion

In this paper we tried to investigate empirically the common view that in African democracies, political cleavages would follow ethnic cleavages and votes would be overwhelmingly determined by ethnicity. Ghana is an excellent example for such a story, since results of the two main parties are quite precisely located on the map, and their natural support is to be found among the two main rival groups of the country, Akan and Ewe. But these two parties also present quite different political platforms, one being more conservative and the other one being more poor-oriented. Moreover, one is the incumbent while the other at least tries to embody change.

Our empirical results indicate that ethnicity plays an important role in the structural pattern of voting distribution. But it does not rule out the effect of economic determinants, which account for a slightly lower share of the variance but may certainly not be ruled out. These determinants draw an informative picture of the political affiliations in the different sections of the population, as defined by the position on the job market, the fact to live in urban or rural areas or the level of education. Evaluative voting also exerts a significant effect: having benefited from good economic conditions increases the support for the incumbent candidate, while being upset by moral issues linked to politics encourages to vote for the opposing party.

Moreover, ethnicity stops being a decisive factor when we investigate the determinants of the evolution of votes between two elections. Evaluative votes relative to the political and economic context make the difference. The marginal increase or decrease in the

support to a party is proven to be key, for Ghana experienced a changeover of political power very recently.

This work tends to show that it is necessary to have a balanced ethnic structure for non-ethnic determinants to play a role. Indeed, the fact that Akan represent about 50% of the population in Ghana makes it possible that marginal changes driven by non ethnic issues entail a shift in power. Would it be the case if the main group in a country represented 80% of the population? The example of Burkina Faso tends to invalidate it: Mossis form a vast majority and President Blaise Compaoré has been staying in power for more than 20 years, although the political scene is very lively and segmented. But as Posner (2004) or Miguel (2004) argue convincingly, the specific political and institutional contexts determine the ethnic cleavage that will end up being salient in the quest for power, every ethnic group being divided into a number of sub-groups that may form alliances to reach power. But this requires a genuinely democratic system and institutions that grant a balanced access to voice and empowerment. More than the ethnic structure, the fact that Ghana is much more fluid (Bossuroy and Cogneau 2008) and democratic than most of its neighbors may account for the open political field and even for the fact that the politically salient ethnic cleavage divides the country into two halves.

This work anyway contributes to rejecting a too naive grid of analysis on elections in Africa. The point is not to deny the fact that ethnicity plays a tremendous role. We even bring evidence on that. But the role of ethnicity is circumscribed and economic or political factors may constitute the nexus in the battle for power. In any democracy, even the more so-called "mature", non-economic issues may be emphasized such as regionalism, traditional identity or religion. But a well established democracy allows to circumscribe these effects and open the way to class or evaluative political voting. An African country like Ghana makes no exception to this rule.

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9 Appendix

	Share of votes for the NPP	Turnout
Akan (%)	0.48*** (0.04)	
Formal sector (%)	0.39** (0.17)	
Food exp.: Share of the district in d10 (%)	0.41*** (0.10)	
Uneducated (%)	-0.35*** (0.08)	
Feels happy (%)	0.19*** (0.07)	
Distance to the nearest post office (km)		-0.00*** (0.00)
Finds most people helpful		0.08*** (0.02)
Unemployed (%)		-0.17*** (0.04)
Complains on immorality		0.17* (0.09)
Observations	110	110
R-squared	0.79	0.27

OLS estimation. Standard errors in parentheses. Significantly different than zero at 90% (), 95% (**), 99% (***) confidence levels. Regressions include a constant.*

Table 11: Restricted models of votes for the NPP and turnout

Depending variable: share of votes for the NPP	Districts with less than 20% Akan dropped		Districts with more than 80% Akan dropped		Only districts where NPP score increased/ decreased by more than 5 pct points		Only districts where turnout rose by more than 20 pct points		Northern regions (*) dropped		Northern regions (*) + Volta dropped		Accra and Kumasi districts dropped		Only districts with population less than 250 000	
Akan (%)	0.34*** (0.07)	0.34*** (0.07)	0.51*** (0.05)	0.51*** (0.05)	0.39*** (0.05)	0.39*** (0.05)	0.49*** (0.05)	0.49*** (0.05)	0.47*** (0.04)	0.47*** (0.04)	0.36*** (0.05)	0.36*** (0.05)	0.47*** (0.04)	0.47*** (0.04)	0.42*** (0.05)	0.42*** (0.05)
Formal sector (%)	0.59* (0.34)	0.59* (0.34)	0.30 (0.31)	0.30 (0.31)	0.37 (0.32)	0.37 (0.32)	0.80** (0.31)	0.80** (0.31)	0.56* (0.29)	0.56* (0.29)	0.56* (0.31)	0.56* (0.31)	0.58** (0.26)	0.58** (0.26)	0.71** (0.28)	0.71** (0.28)
Uneducated (%)	-0.40** (0.19)	-0.40** (0.19)	-0.36*** (0.11)	-0.36*** (0.11)	-0.20* (0.11)	-0.20* (0.11)	-0.50*** (0.12)	-0.50*** (0.12)	-0.65*** (0.10)	-0.65*** (0.10)	-0.49*** (0.17)	-0.49*** (0.17)	-0.44*** (0.10)	-0.44*** (0.10)	-0.53*** (0.11)	-0.53*** (0.11)
Unemployed (%)	-0.39 (0.45)	-0.39 (0.45)	0.13 (0.17)	0.13 (0.17)	-0.09 (0.18)	-0.09 (0.18)	-0.15 (0.26)	-0.15 (0.26)	-0.43 (0.39)	-0.43 (0.39)	-0.74* (0.43)	-0.74* (0.43)	0.05 (0.17)	0.05 (0.17)	-0.11 (0.19)	-0.11 (0.19)
Food exp.: Share of the district in d10 (%)	0.04 (0.41)	0.04 (0.41)	0.38** (0.15)	0.38** (0.15)	0.34* (0.18)	0.34* (0.18)	0.38** (0.18)	0.38** (0.18)	-0.34 (0.31)	-0.34 (0.31)	-0.41 (0.46)	-0.41 (0.46)	0.20 (0.15)	0.20 (0.15)	0.28* (0.16)	0.28* (0.16)
Food exp.: Share of the district in d90 (%)	-0.35** (0.15)	-0.35** (0.15)	-0.06 (0.16)	-0.06 (0.16)	-0.14 (0.20)	-0.14 (0.20)	-0.11 (0.15)	-0.11 (0.15)	-0.26** (0.13)	-0.26** (0.13)	-0.32** (0.13)	-0.32** (0.13)	-0.17 (0.17)	-0.17 (0.17)	0.06 (0.20)	0.06 (0.20)
Food exp.: Gini	0.30 (0.32)	0.30 (0.32)	-0.04 (0.26)	-0.04 (0.26)	-0.12 (0.30)	-0.12 (0.30)	-0.01 (0.30)	-0.01 (0.30)	0.51* (0.28)	0.51* (0.28)	0.55* (0.32)	0.55* (0.32)	0.20 (0.24)	0.20 (0.24)	0.11 (0.25)	0.11 (0.25)
Share of the population in the five biggest cities (%)	-0.01 (0.07)	-0.01 (0.07)	0.10 (0.08)	0.10 (0.08)	0.13 (0.13)	0.13 (0.13)	0.02 (0.09)	0.02 (0.09)	-0.02 (0.07)	-0.02 (0.07)	-0.02 (0.07)	-0.02 (0.07)	0.09 (0.09)	0.09 (0.09)	0.05 (0.09)	0.05 (0.09)
Distance to the nearest post office (km)	-0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	0.00* (0.00)	0.00* (0.00)	0.00* (0.00)	0.00* (0.00)
Feels happy (%)	0.11 (0.09)	0.11 (0.09)	0.15* (0.08)	0.15* (0.08)	0.29** (0.11)	0.29** (0.11)	0.18* (0.10)	0.18* (0.10)	0.06 (0.08)	0.06 (0.08)	0.09 (0.08)	0.09 (0.08)	0.16** (0.08)	0.16** (0.08)	0.21** (0.09)	0.21** (0.09)
Complains on immorality	-0.06 (0.34)	-0.06 (0.34)	0.05 (0.28)	0.05 (0.28)	0.38 (0.30)	0.38 (0.30)	0.01 (0.31)	0.01 (0.31)	0.11 (0.32)	0.11 (0.32)	0.18 (0.32)	0.18 (0.32)	-0.22 (0.29)	-0.22 (0.29)	-0.12 (0.38)	-0.12 (0.38)
Finds most people helpful	0.12 (0.07)	0.12 (0.07)	-0.00 (0.07)	-0.00 (0.07)	-0.15 (0.11)	-0.15 (0.11)	0.14* (0.07)	0.14* (0.07)	0.12** (0.06)	0.12** (0.06)	0.13* (0.07)	0.13* (0.07)	0.09 (0.06)	0.09 (0.06)	0.13** (0.06)	0.13** (0.06)
Observations	69	87	87	87	65	65	76	76	86	86	74	74	108	108	103	103
R-squared	0.62	0.81	0.81	0.81	0.79	0.79	0.84	0.84	0.84	0.84	0.72	0.72	0.78	0.78	0.78	0.78

OLS estimation, with constant. Standard errors in parentheses. Significantly different than zero at 90% (), 95% (**), 99% (***) confidence levels.
(*) Northern regions = Upper East, Upper West and Northern.*

Table 12: General model of vote for the NPP tested on different sub-samples

Depending variable: evolution of votes for the NPP	Districts with less than 20% Akan dropped		Districts with more than 80% Akan dropped		Only districts where NPP score increased/decreased by more than 5 pct points		Only districts where turnout rose by more than 20 pct points		Northern regions (*) dropped		Northern regions (*) + Volta dropped		Accra and Kumasi districts dropped		Only districts with population less than 250 000	
	Alkan (%)	Formal sector (%)	Uneducated (%)	Unemployed (%)	Food exp.: Share of the district in d10 (%)	Food exp.: Share of the district in d90 (%)	Food exp.: Gini	Share of the population in the five biggest cities (%)	Distance to the nearest post office (km)	Feels happy (%)	Complains on immorality (%)	Finds most people helpful (%)	Observations	R-squared		
	0.05 (0.03)	-0.03 (0.03)	-0.03 (0.03)	0.03 (0.03)	0.03 (0.03)	0.03 (0.03)	0.03 (0.03)	0.03 (0.03)	0.03 (0.03)	0.03 (0.03)	0.03 (0.03)	0.03 (0.03)	0.02 (0.02)	0.02 (0.02)	0.01 (0.02)	0.01 (0.02)
	-0.39** (0.16)	0.12 (0.15)	0.12 (0.15)	-0.11 (0.18)	-0.11 (0.18)	-0.11 (0.18)	-0.11 (0.18)	-0.11 (0.18)	-0.11 (0.18)	-0.11 (0.18)	-0.11 (0.18)	-0.11 (0.18)	-0.12 (0.13)	-0.12 (0.13)	0.00 (0.14)	0.00 (0.14)
	0.09 (0.09)	-0.04 (0.06)	-0.04 (0.06)	0.03 (0.07)	0.03 (0.07)	0.03 (0.07)	0.03 (0.07)	0.03 (0.07)	0.03 (0.07)	0.03 (0.07)	0.03 (0.07)	0.03 (0.07)	0.06 (0.05)	0.06 (0.05)	0.08 (0.06)	0.08 (0.06)
	0.52** (0.21)	0.03 (0.08)	0.03 (0.08)	0.14 (0.10)	0.14 (0.10)	0.14 (0.10)	0.14 (0.10)	0.14 (0.10)	0.14 (0.10)	0.14 (0.10)	0.14 (0.10)	0.14 (0.10)	0.08 (0.09)	0.08 (0.09)	0.16 (0.10)	0.16 (0.10)
	0.12 (0.20)	0.09 (0.07)	0.09 (0.07)	0.16 (0.10)	0.16 (0.10)	0.16 (0.10)	0.16 (0.10)	0.16 (0.10)	0.16 (0.10)	0.16 (0.10)	0.16 (0.10)	0.16 (0.10)	0.19** (0.08)	0.19** (0.08)	0.13 (0.08)	0.13 (0.08)
	0.09 (0.07)	-0.08 (0.08)	-0.08 (0.08)	0.01 (0.12)	0.01 (0.12)	0.01 (0.12)	0.01 (0.12)	0.01 (0.12)	0.01 (0.12)	0.01 (0.12)	0.01 (0.12)	0.01 (0.12)	0.11 (0.09)	0.11 (0.09)	0.07 (0.10)	0.07 (0.10)
	-0.36** (0.15)	0.06 (0.13)	0.06 (0.13)	0.11 (0.17)	0.11 (0.17)	0.11 (0.17)	0.11 (0.17)	0.11 (0.17)	0.11 (0.17)	0.11 (0.17)	0.11 (0.17)	0.11 (0.17)	0.09 (0.06)	0.09 (0.06)	0.07 (0.10)	0.07 (0.10)
	-0.05 (0.03)	-0.11*** (0.04)	-0.11*** (0.04)	-0.03 (0.07)	-0.03 (0.07)	-0.03 (0.07)	-0.03 (0.07)	-0.03 (0.07)	-0.03 (0.07)	-0.03 (0.07)	-0.03 (0.07)	-0.03 (0.07)	-0.23* (0.13)	-0.23* (0.13)	-0.07 (0.13)	-0.07 (0.13)
	0.00 (0.00)	0.00** (0.00)	0.00** (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
	0.02 (0.04)	0.01 (0.04)	0.01 (0.04)	0.04 (0.06)	0.04 (0.06)	0.04 (0.06)	0.04 (0.06)	0.04 (0.06)	0.04 (0.06)	0.04 (0.06)	0.04 (0.06)	0.04 (0.06)	0.01 (0.04)	0.01 (0.04)	-0.01 (0.05)	-0.01 (0.05)
	-0.90*** (0.16)	-0.90*** (0.14)	-0.90*** (0.14)	-1.14*** (0.17)	-1.14*** (0.17)	-1.14*** (0.17)	-1.14*** (0.17)	-1.14*** (0.17)	-1.14*** (0.17)	-1.14*** (0.17)	-1.14*** (0.17)	-1.14*** (0.17)	-0.72*** (0.15)	-0.72*** (0.15)	-0.25 (0.19)	-0.25 (0.19)
	-0.09** (0.04)	-0.06** (0.03)	-0.06** (0.03)	-0.09 (0.06)	-0.09 (0.06)	-0.09 (0.06)	-0.09 (0.06)	-0.09 (0.06)	-0.09 (0.06)	-0.09 (0.06)	-0.09 (0.06)	-0.09 (0.06)	-0.11*** (0.03)	-0.11*** (0.03)	-0.11*** (0.03)	-0.11*** (0.03)
	69	87	87	65	65	65	65	65	65	65	65	65	86	86	103	103
	0.69	0.70	0.70	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.61	0.61	0.38	0.38

OLS estimation, with constant. Standard errors in parentheses. Significantly different than zero at 90% (), 95% (**), 99% (***) confidence levels. (*) Northern regions = Upper East, Upper West and Northern.*

Table 13: General model of the evolution of vote for the NPP tested on different sub-samples

	Share of votes for the NPP						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Asante (%)	-0.04 (0.03)						
Mole (%)		-0.06* (0.03)					
Ewe (%)			-0.02 (0.03)				
Ga (%)				0.02 (0.04)			
Other northern ethnic groups (%)					0.09* (0.05)		
Guan (%)						0.01 (0.06)	
Others (%)							0.11 (0.17)
Formal sector (%)	-0.10 (0.13)	-0.10 (0.13)	-0.14 (0.13)	-0.13 (0.13)	-0.12 (0.13)	-0.14 (0.13)	-0.13 (0.13)
Uneducated (%)	0.02 (0.05)	0.07 (0.05)	0.06 (0.05)	0.05 (0.05)	0.04 (0.04)	0.04 (0.05)	0.05 (0.05)
Unemployed (%)	0.08 (0.09)	0.09 (0.08)	0.08 (0.09)	0.08 (0.09)	0.07 (0.09)	0.08 (0.09)	0.08 (0.09)
Food exp.: Share of the district in d10 (%)	0.13* (0.08)	0.20** (0.08)	0.14* (0.07)	0.15** (0.07)	0.13* (0.07)	0.15** (0.07)	0.15** (0.07)
Food exp.: Share of the district in d90 (%)	0.02 (0.07)	0.07 (0.06)	0.07 (0.06)	0.05 (0.07)	0.05 (0.06)	0.06 (0.06)	0.06 (0.06)
Food exp.: Gini	-0.00 (0.13)	-0.03 (0.12)	-0.08 (0.13)	-0.05 (0.13)	-0.06 (0.12)	-0.05 (0.13)	-0.07 (0.13)
Share of the population in the five biggest cities (%)	-0.09** (0.04)	-0.06* (0.04)	-0.07** (0.04)	-0.07** (0.04)	-0.07** (0.03)	-0.08** (0.04)	-0.07** (0.04)
Distance to the nearest post office (km)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Feels happy (%)	0.03 (0.04)	0.03 (0.04)	-0.00 (0.04)	0.01 (0.04)	0.00 (0.04)	0.01 (0.04)	0.01 (0.04)
Complains on immorality (%)	-0.75*** (0.13)	-0.74*** (0.13)	-0.77*** (0.13)	-0.77*** (0.13)	-0.79*** (0.13)	-0.77*** (0.13)	-0.78*** (0.13)
Finds most people helpful (%)	-0.10*** (0.03)	-0.11*** (0.03)	-0.11*** (0.03)	-0.11*** (0.03)	-0.11*** (0.03)	-0.11*** (0.03)	-0.11*** (0.03)
Observations	110	110	110	110	110	110	110
R-squared	0.62	0.63	0.62	0.61	0.63	0.61	0.62

OLS estimation. Standard errors in parentheses. Significantly different than zero at 90% (), 95% (**), 99% (***) confidence levels. Regressions include a constant.
(*): Other Northern groups = Mande, Gur, Grusi.*

Table 14: General model of the evolution of vote for the NPP tested on different ethnic groups

	Share of votes for the NPP			
	(1)	(2)	(3)	(4)
Mole (%)	-0.02 (0.02)			
Other northern ethnic groups (%)			0.07 (0.04)	
Formal sector (%)		-0.10 (0.13)		-0.12 (0.13)
Uneducated (%)		0.07 (0.05)		0.04 (0.04)
Unemployed (%)		0.09 (0.08)		0.07 (0.09)
Food exp.: Share of the district in d10 (%)		0.20** (0.08)		0.13* (0.07)
Food exp.: Share of the district in d90 (%)		0.07 (0.06)		0.05 (0.06)
Food exp.: Gini		-0.03 (0.12)		-0.06 (0.12)
Share of the population in the five biggest cities (%)		-0.06* (0.04)		-0.07** (0.03)
Distance to the nearest post office (km)		0.00 (0.00)		0.00 (0.00)
Feels happy (%)		0.03 (0.04)		0.00 (0.04)
Complains on immorality (%)		-0.74*** (0.13)		-0.79*** (0.13)
Finds most people helpful (%)		-0.11*** (0.03)		-0.11*** (0.03)
$\widehat{\Delta}_{NPP, eco}$	1.02*** (0.08)		0.95*** (0.08)	
$\widehat{\Delta}_{NPP, Mole}$		-1.73* (0.93)		
$\widehat{\Delta}_{NPP, Other northern}$				0.36* (0.21)
Observations	110	110	110	110
R-squared	0.62	0.63	0.62	0.63

OLS estimation. Standard errors in parentheses. Significantly different than zero at 90% (), 95% (**), 99% (***) confidence levels. Regressions include a constant.*

Table 15: J-tests of the ethnic vs. non-ethnic model of evolution tested on other ethnic groups

	Share of votes for the NPP			Evolution of votes for the NPP		
	(1)	(2)	(3)	(4)	(5)	(6)
Akan (%)	0.56*** (0.04)	0.45*** (0.04)	0.46*** (0.04)	0.01 (0.02)	0.01 (0.02)	0.02 (0.02)
Formal sector (%)	0.88*** (0.27)	0.63** (0.25)		-0.17 (0.13)	-0.12 (0.13)	
Uneducated (%)		-0.46*** (0.10)	-0.51*** (0.10)		0.06 (0.05)	0.08 (0.05)
Unemployed (%)	-0.15 (0.17)	0.16 (0.15)	0.22 (0.15)	0.12 (0.08)	0.17** (0.08)	0.05 (0.08)
Food exp.: Share of the district in d10 (%)	0.29* (0.16)		0.26* (0.15)	0.16** (0.08)		0.16** (0.08)
Food exp.: Share of the district in d90 (%)	0.04 (0.13)	-0.20 (0.13)	-0.10 (0.13)	0.05 (0.06)	0.05 (0.07)	0.06 (0.06)
Food exp.: Gini	-0.19 (0.25)	0.40* (0.21)	0.18 (0.25)	-0.02 (0.12)	0.07 (0.11)	-0.08 (0.13)
Share of the population in the five biggest cities (%)	0.07 (0.07)	0.00 (0.07)	-0.02 (0.07)	-0.08** (0.03)	-0.08** (0.04)	-0.07* (0.03)
Distance to the nearest post office (km)	0.00 (0.00)	0.00* (0.00)	0.00 (0.00)	0.00 (0.00)	0.00* (0.00)	0.00 (0.00)
Feels happy (%)	0.10 (0.08)	0.18** (0.08)	0.18** (0.08)	0.01 (0.04)	0.01 (0.04)	-0.00 (0.04)
Complains on immorality (%)	0.12 (0.26)	-0.09 (0.24)	0.14 (0.24)	-0.78*** (0.13)	-0.79*** (0.13)	-0.79*** (0.12)
Finds most people helpful (%)	0.05 (0.06)	0.09 (0.06)	0.07 (0.06)	-0.10*** (0.03)	-0.09*** (0.03)	-0.10*** (0.03)
Observations	110	110	110	110	110	110
R-squared	0.76	0.80	0.79	0.61	0.60	0.61

OLS estimation. Standard errors in parentheses. Significantly different than zero at 90% (), 95% (**), 99% (***) confidence levels. Regressions include a constant.*

Table 16: General model for NPP votes and their evolution with some potentially multicorrelated variables dropped