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THREE ESSAYS IN POLITICAL ECONOMY OF DEVELOPMENT

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Table of Contents

List of Tables

List of Figures

Abstract

Chapter 1 exploits the emergence of two de facto states in Côte d'Ivoire during the 2002-2010 political crisis to examine the effects of export tax reduction on the living standards of cocoa farming households. Combining both spatial and temporal variations in exposure to a set of dichotomous export tax policies, I find that farmers in low export tax districts significantly increased their consumption expenditures relative to farmers in high export tax districts. I also provide evidence that the transmission of border prices to local farmers is a relevant mechanism through which the reduction of trade barriers enhances cocoa farmers' living standards.

Chapter 2 documents that contemporary political development in Africa is highly associated with the pre-colonial ethnic institutional background of the first national leaders. Using either direct measures of democracy and/or covariates of political participation from anthropological records, I show that the political legacy of the first African heads of states who inherited egalitarian and democratic norms from their ancestors has been autocracy. This statistical relationship is not only robust to an array of control variables including economic, geographic and historical factors, but potential endogeneity concerns that may undermine its validity are also addressed. Finally, exploring the potential mechanisms at play, I provide evidence that the natural resource potential of certain countries may have diverted their first national leaders away from their ancestral institutional heritage.

Chapter 3 shows a strong and positive relationship between the ethnic affiliation of African leaders and satellite nighttime luminosity in the historical homelands of ethnic groups. Using a unique dataset on 630 ethnicities and 86 leaders from 48 African countries, I show that luminosity is on average 75% relatively higher in leaders' ethnic homelands.

Chapter 1

Export Taxes and Consumption: A 'Natural Experiment' from Côte d'Ivoire

1.1 Introduction

In many developing countries, export taxes are often used by governments as a shield against revenue losses due to declining prices and deteriorating terms of trade in agricultural commodities. However, when export taxes are too high, they can depress farmers' earnings, deter production, and decrease public receipts (McMillan 2001). Because export taxes remain quite popular in many developing countries, they have received a lot of attention in the development literature. For example, it has been suggested that many factors, including pro-urban or interest-group bias (Bates 1981, Widner 1993), dynamic inconsistency (McMillan 2001), and incomplete information (Rodrik 1998) have contributed to the persistence of exorbitant export tax rates in developing countries. As a consequence, many economies in Africa experienced a significant decline in their market shares for primary commodities during the 1980s (McMillan 2001). Yet, there is little if any empirical evidence establishing a causal link between export taxes and farmers' living standards. In this analysis, I fill this gap by providing evidence that reducing export taxes significantly improves farmers' living standards. I also document that one potential mechanism that explains this causal relationship is the price premium associated

with export tax incentives.

This article exploits the advent of two *de facto* states in Côte d'Ivoire, the world's largest cocoa supplier, as a 'natural experiment' to examine the causal effect of export tax incentives on cocoa farmers' living standards, as measured by consumption expenditure. In autumn of 2002, an armed conflict split the country into a rebel-held area in the north (hereafter Northern CI) and a government-controlled territory in the south (hereafter Southern CI). This partition had significant implications for the cocoa sector, which alone employs about one-fifth of the twenty millions inhabitants of the country. The acting authorities of Northern CI, where cocoa production represents between 10% and 25% of the average national production (about 1.2 millions metric tons per year), drastically reduced export tax rates levied on cocoa beans.[1] Between 2002 and 2007, as exporters in the south faced the pre-partition tax rate of 220 FCFA ($0.44) per kilogram, their counterparts in the north paid between 50 FCFA ($0.10) and 150 FCFA ($0.30) per kilogram. This is equivalent to an average difference of about 75% between the two tax regimes.[2]

Using two waves of the Côte d'Ivoire household living standards surveys (HLSS), the pre and post partition "*Enquête sur le Niveau de Vie des Ménages*" (ENV 2002, ENV 2008), I analyze the effects of export tax relief on cocoa farmers' average consumption expenditure.[3] For this, I rely principally on the difference-in-difference-in-differences (hereafter DDD) identification strategy. By exploiting changes in consumption between cocoa and non-cocoa farmers in the experimental state (Northern CI), the DDD approach accounts for location-specific shocks affecting all farmers

[1] According to Witness (2007), the acting Minister of Economy in the north estimated the cocoa beans production in this area at 130,000 metric tons per year, i.e. 10 percent of the national production, approximately the annual production of Ecuador, the world's seventh largest cocoa producer. Another estimation, provided by the Director of the fiscal agency of the northern authorities, set cocoa production to 325,000 metric tons per year i.e. 20-25 percent of the national production.

[2] Before the creation in 2004 of the custom and tax organization ('La Centrale') in Northern CI, export taxes were set at $0.10 per kilogram of cocoa beans.

[3] ENV stands for Enquête sur le Niveau de Vie des Ménages which means Household Living Standard Survey (HLSS).

equally in this territory. It is also less vulnerable to time trends affecting all individuals across states because it takes into account changes in consumption among cocoa and non-cocoa farmers in the control state (Southern CI). To strengthen this identification strategy, I include a full set of fixed effects including province fixed effects, survey-round-districts fixed effects and survey-round-province fixed effects. To make the treatment and control groups as comparable as possible, I also consider the sample of individual farmers who resided in provinces belonging to the districts split between the two states.[4]

Estimates based on the DDD technique show that living standards of cocoa farmers residing in northern provinces, where exporters faced lower tax rates, improved significantly following the implementation of the tax relief policy. For example, the unconditional specification reported in table 1.3 suggests that exposure to low export taxes was associated with a relative increase in cocoa producers' average consumption expenditure by about 43% between 2002 and 2008. This is equivalent to an increase in consumption from the sample mean of 88,740 FCFA ($177.5) to approximately 126,900 FCFA ($254) over the 2002-2008 period. To ensure that these results are not driven by other tax-independent systematic shocks on consumption, I conduct a series of falsification exercises and robustness checks which support my identification hypotheses. Finally, I show that pass-through of international prices to local producers is a relevant underlying mechanism of this causal link between export taxes and farmers' consumption. In particular, estimates based on the unconditional price equation suggest that farmers residing in low tax areas tended to get an additional 39 FCFA ($0.08) on each kilogram of cocoa beans sold.

The present paper contributes to the debate about the short-run implications of liberalization policies on household well-being. The controversy is particularly fueled

[4]Before the administrative reform of 2011, Côte d'Ivoire was divided into 58 provinces (départements) regrouped into 19 administrative districts (régions). By focusing on the districts split between Northern and Southern CI, I assume that shared socio-economic, cultural and geographic characteristics within districts facilitate comparisons across groups.

by the distributive nature of trade reforms, which often disproportionately reallocate earnings across households. For example, labor-saving productivity advances can temporarily aggravate poverty through their detrimental effects on employment (Winters, McCulloch & McKay 2004). Researchers who have investigated the issue, using different empirical techniques, have come up with mixed results. Among other findings, it has been suggested, for example, that while penalizing the poor in India, trade liberalization also appears to be a source of income disparity in South Asia (Anderson, Cockburn & Martin 2010).[5] Yet, these seemingly unenthusiastic outcomes should be contrasted with the majority of the empirical assessments suggesting that trade liberalization has a strong pro-poor impact [see Winters, McCulloch & McKay (2004) and Anderson, Cockburn & Martin (2010) for a literature review]. Because it builds upon a 'natural experiment' this article extends previous research that investigates a causal link between trade liberalization in agriculture and household living standards in developing countries [see Topalova (2007) and Edmonds & Pavcnik (2006)]. However, the source of time and cross-sectional variations in exposure to the degree of liberalization makes this analysis plausibly less sensitive to endogenous political and economic processes.

The remainder of this paper is organized as follows. In section 1.2, I review some relevant historical and institutional background on the emergence of two de facto states during the 2002-2007 Ivorian political crisis. Section 1.3 elaborates on the data and the identification strategy. Section 1.4 provides details on the empirics of export taxation and consumption and highlights the main results. Finally, I examine theoretically and empirically the price pass-through mechanism in section 1.5 and conclude in section 1.6.

[5] As reported in Anderson, Cockburn & Martin (2010), farmers in India benefit from substantial subsidies and other protection policies whose complete removal can severely deteriorate their earnings. These authors also observe that although trade reforms can help shrink the gap between farm and nonfarm earnings, its effect on inequality in agriculture would be less prevalent in South Asia in particular because of the rise of income dispersion among farmers.

1.2 Institutional Background

1.2.1 Insurgency and the Creation of Two De Facto States

For almost two decades after its independence, Côte d'Ivoire was one of the richest economies in Western Africa and acquired a reputation for political and economic success within the region. Between 1960 and 1980, the country maintained strong and sustained economic growth of more than 7 percent per annum. Over the same period, average GDP per capita was about $1330 (in 2005 US dollars), nearly 6.3 percent of that of the United States. Dependent on primary commodities such as cocoa and coffee (more than 50% of total export in 2000), the Ivorian economy experienced an abrupt and lengthy decline in the 1980s, due in large part to the deterioration of the terms of trade (Espina, Bogetic & Noer 2007). By the time the country devalued its currency in 1993, its ten year average GDP growth had fallen to 0.50 percent.

In December 1999, a coup d'état perpetrated by a former chief-of-staff of the national army plunged the country into a vicious cycle of instability, so common in Sub-Saharan African states. Since then, the political scene of Côte d'Ivoire has been characterized by several episodes of turbulence ranging from street protests to anti-government subversions. The level and the scope of violence reached its peak in September 2002, when an initially unknown armed group simultaneously attacked the main cities of the country including Abidjan the capital city. Although the rebels, who would later be known as the Patriotic Movement of Côte d'Ivoire (MPCI), failed to overthrow the government, they were able to tighten their grip over the north half of the national territory. The MPCI initially took control of Bouaké in the center and Daloa in the west, the second and third largest cities of the country, respectively. Other important northern localities such as Korhogo,

Odienné, and Bouna also fell under rebel control. A counter-offensive by government troops against the rebels allowed them to regain the province of Daloa, but they failed to reconquer the other above-mentioned towns.

In November 2002, two other armed groups, the Movement for Justice and Peace (MJP) and the Ivorian Popular Movement for the Great West (MPIGO), seized control of the western cocoa-producing towns of Man and Danané, respectively. In early December 2002, the loyalist forces dislodged the rebels from the town of Man, but, unable to sustain their position, they finally abandoned the town in the hands of the rebels at the end of the same month. The three movements coalesced in late December 2002 into the *Forces Nouvelles* of Côte d'Ivoire (FNCI) and claimed control over 60% of the country. The Linas-Marcoursis peace agreement, signed in January 2003 by the belligerents and the government, established a buffer zone secured by French and UN peacekeepers, which formalized the cohabitation of two de facto states (Balint-Kurti 2007).

Unlike the rebellions in Liberia and Sierra-Leone, where territorial controls were often associated with 'scorched-earth', 'denial-of-resource' tactics (Innes 2005), or 'no living thing' operations (Gberie 2005), the rebels of the Forces Nouvelles opted for an autonomous governance system.[6] They organized their territory into ten jurisdictions, called 'zones', with each zone being administered by representatives of both the military and executive wings of the rebellion.

From a political economy perspective, existing theories on conflicts, which often emphasize 'greed' over 'grievance' as the main source of armed conflicts in developing countries, may not be sufficient to understand the Ivorian crisis. Africanists such as Marshall-Fratani (2006) and Bah (2010) argue that the Ivorian crisis should be understood as the consequence of state actors' preferences for non-inclusive policies

[6]'No living thing' was a joint-operation by the Sierra Leone army and the Revolutionary United Front (RUF) in 1998-1999, which consisted in killing people and destroying properties indiscriminately.

in a melting pot society. For these authors, the introduction of the concept of Ivoirité in the political discourse and the legal system in the mid-1990s generated social and political discriminations against certain categories of citizens.[7] These communities, in particular the northern ethnic groups and the descendants of the immigrants, felt despoiled from their constitutional rights on citizenship, land ownership, and political participation. This ethno-political grievance is thought to have set the stage for the 2002-2007 quasi-secession in Côte d'Ivoire (Bah 2010).

1.2.2 Implications for the Cocoa Trade

In Côte d'Ivoire, the cocoa sector has long been portrayed as the backbone of the national economy. The production of cocoa beans in the country is heavily concentrated in three regional groupings: the south-east (Moyen-Comoé), the center-west (Marahoué, Haut-Sassandra, Fromager and Sud-Bandaman), and the south-west (Dix-Huit Montagnes, Moyen-Cavally and Bas-Sassandra). Together, these districts contribute up to 87 percent of the national cocoa production (Primature 2006). Of the 8 administrative districts subdivided between the two 'states', half were among the major sources of cocoa production. These split districts are of a particular interest for this 'natural experiment' since communities belonging to them plausibly share similar cultural, socio-economic and geographic features. These include the districts of Marahoué, Haut-Sassandra, Dix-Huit Montagnes, Moyen-Cavally, Vallée du Bandama, Lacs, N'Zi Comoé and Zanzan (see Figure **??**).

In the midst of the political crisis, net export of cocoa beans from Côte d'Ivoire in 2004-08 exceeded 1.26 million metric tons per year, which represented more than 40 percent of the world share (ICCO, 2010). Although, this is a clear indication that the partition of the country had little effect on its production capability, the distri-

[7]The concept of Ivoirité was initially introduced by the former president Henri Konan Bédié (1993-1999), to promote the cultural identity of the country. It turns out that the concept was exploited to discriminate against other citizens, especially the northerners and the immigrants.

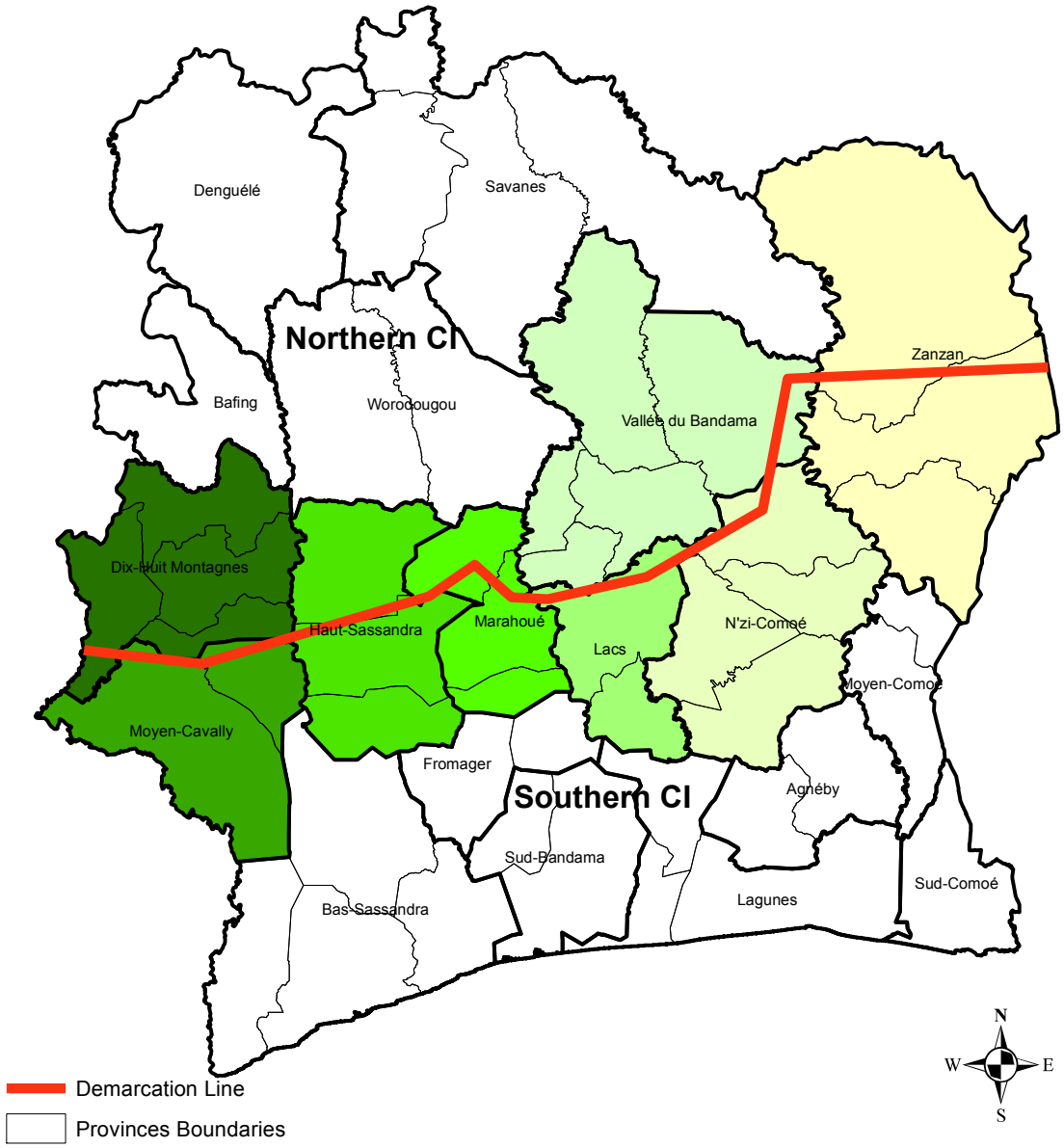

Figure 1.1: Côte d'Ivoire as Two de facto States (2002-2007)
Notes: The demarcation line separating Northern and Southern CI is a buffer zone placed under the surveillance of international forces. Regional and provincial boundaries are described by thick and thin black lines, respectively. The colored (or dark in black-and-white paper) regions with different levels of degradation represent the districts split between the two states.

butional effects of the crisis on revenues cannot be ignored. An obvious consequence of the conflict stems from the emergence of a new state actor, the Forces Nouvelles of Côte d'Ivoire (FNCI), with a fiscal capacity over a territory which makes up between 10 percent and 25 percent of the national cocoa production. In the provinces they controlled, the FNCI managed to maintain an operational bureaucracy which filled up the administrative void created by the absence of the official government. For example, they preserved some of the public infrastructures which facilitated the provision of a minimum service in education and health by local and international non-governmental organizations (Bah 2010, Balint-Kurti 2007).

Moreover, it has been documented that the FNCI introduced an export tax scheme on cocoa beans that was by far more competitive than the one in place in the government-controlled territory (Guesnet, Müller & Schure 2010). Such a policy may have induced significant implications for the revenues of non-institutional players such as cocoa farmers, itinerant traders, and exporters. Did the FNCI adopt a favorable export tax policy in the first place to help potential beneficiaries? As already mentioned, political scientists have put forward a number of reasons to explain the attempted coup that led to the partition of the country in 2002. These include ethno-political grievances such as rights for citizenships and political participation. It is also unlikely that the preferential export tax policy was intended to help the farmers. Instead, the northern authorities made it clear that their goal was to attract more exporters, mobilize more revenues, cut additional funds to Southern CI, and ultimately finance their war effort (Guesnet, Müller & Schure 2010).

Before the partition in 2002, the export tax levied by the government, known as the *droit unique de sortie* (DUS), was 220 FCFA ($0.44) per kilogram of cocoa beans across the country. While this tariff rate remained unchanged in the government-controlled south, the FNCI drastically reduced it to 50 FCFA ($0.1) per kilogram

as soon as they consolidated their grip over the north in late 2002 (Witness 2007). Later in 2004, they set up a more resourceful tax and custom organization, known as *La Centrale*, under which export tax on cocoa fluctuated between 125 FCFA ($0.25) and 150 FCFA ($0.30) per kilogram (Balint-Kurti 2007). Because *La Centrale* had sufficient resources to collect taxes at both the warehouses and borders, it is fair to assume that smuggling was limited.[8] The advantage of the low tariff policy is well summarized by an exporter in the south interviewed by Guesnet, Müller & Schure (2010):

> Last week I saw a lot of cross-border transport. ... We [exporter in the south] pay Francs CFA 333 taxes per kilo.[9] This means that those people who go to Bobo-Dioulasso [Burkina Faso] already benefit from avoiding paying this sum. The interest to do this is big. Even for the European firms, they say 'if I can get this lower price.[10] (p. 46)

Many players are involved in Côte d'Ivoire's cocoa trade, but the most important ones are the farmers, the itinerant buyers and the exporters. Farmers sell their crops to itinerant buyers (*traitants*) either directly or via occasional traders called *pisteurs* at farm-gate price. The *traitants* sell in turn their products to exporters, who in turn supply the international market (Kireyev 2010). This paper is particularly concerned about the causal effect of such a liberalization policy on smallholder cocoa farmers in Côte d'Ivoire. Looking at this first layer of the cocoa supply chain is attractive

[8] According to Witness (2007), "*La Centrale* has about 150 staff, including civilians and military, deployed at the zones' borders, in offices in major towns and at checkpoints. In each of 10 FN sub-zones, it also has one representative, a 'régisseur' who works with the tax officials."

[9] This estimate of 333 FCFA ($0.67) includes, in addition to the main export tax (DUS) of 220 FCFA ($0.44), other fiscal and quasi-fiscal levies such as the registration tax as well as fees collected by the regulatory institutions.

[10] According to Witness (2007), most of the cocoa beans from Northern CI was first transported to Bobo-Dioulasso, in Burkina Faso, before being exported outside Africa via the port of Lomé in Togo. Exporters used this route because it allows them to avoid double taxation. In fact, taking advantage of the free trade agreement between the members of the West African Economic and Monetary Union, exporters who paid the export taxes in Côte d'Ivoire could not be subject to the same taxes in Burkina Faso and Togo, also members of the Union.

for several reasons. First, it offers an opportunity to assess the effectiveness of price transmission from exporters to farmers, despite the complexity of the supply chain. Second, farm households' expenditures appear also to be a good proxy for earnings in rural areas since, as pointed by Winters, McCulloch & McKay (2004), farmers tend to spend their additional revenues on goods and services provided by other poor households. Finally, it enables me to explore how the reduction of export restrictions affects specific expenditure categories such as investments in education and health or the satisfaction of basic needs such as food and clothing.

1.3 Data and Methodology

1.3.1 Côte d'Ivoire Living Standards Survey Data

I use the 2002 and 2008 Côte d'Ivoire HLSS, known as the *Enquête sur le Niveau de Vie des Ménages* (ENV), compiled by the *Institut National de la Statistique* (INS). Interestingly, the 2002 and the 2008 rounds of the ENV were conducted three months before the inception of the conflict and a year after the dismantlement of the demarcation line, respectively. The ENV (2002) and ENV (2008) provide a rich set of information on living standards, demographics, and location for 10,800 and 12,600 households, respectively. There are 4,891 individual cocoa farmers in the combined surveys. Summary statistics for this sample indicate that the average per capita total consumption expenditure, in constant national currency, was about 88,740 FCFA or approximately 178 in US dollars (see Column 3 Panel A of Table 1.1). More than 70% of this expenditure was devoted to the basic needs such as food and clothing for resident and non-resident (transfers for example) household members, 17% of it went to investment in education and health, and the remainder was allocated to other types of spending including leisure and transportation.

Table 1.1 also provides information on the temporal and spatial distribution of

Table 1.1: Summary Statistics For Cocoa Farmers

	Full Sample			Southern CI			Northern CI		
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
	2002	2008	Pooled	2002	2008	Pooled	2002	2008	Pooled
Panel A: Outcomes									
Education	4.72	14.68	8.78	4.86	14.98	9.19	4.04	12.21	6.47
	(13.6)	(23.4)	(18.89)	(14.5)	(23.67)	(19.62)	(8.29)	(20.98)	(13.87)
Health	6.96	6.12	6.62	7.7	6.05	6.99	3.58	6.65	4.49
	(33.26)	(16.24)	(27.61)	(36.43)	(13.18)	(28.88)	(8.53)	(31.71)	(18.72)
Transfer	21.99	34.21	26.98	24.35	34.1	28.52	11.1	35.07	18.22
	(54.97)	(79.77)	(66.49)	(58.9)	(80.56)	(69.16)	(28.57)	(73.22)	(47.74)
Clothing	24.43	29.07	26.32	26.31	28.47	27.24	15.75	33.90	21.14
	(32.92)	(32.28)	(32.73)	(35.15)	(31.11)	(33.49)	(17.11)	(40.34)	(27.49)
Food	10.50	9.22	9.98	11.23	9.24	10.38	7.11	9.10	7.70
	(11.15)	(9.33)	(10.46)	(11.67)	(9.37)	(10.79)	(7.46)	(9.01)	(7.99)
Other	10.03	10.09	10.06	10.90	9.99	10.51	6.051	10.93	7.50
	(28.43)	(18.35)	(24.81)	(30.92)	(18.60)	(26.36)	(10.33)	(16.21)	(12.55)
Total	78.63	103.4	88.74	85.35	102.8	92.83	47.64	107.9	65.53
	(113.8)	(132.2)	(122.3)	(122.0)	(130.3)	(125.9)	(53.53)	(147.2)	(95.83)
Price	538	453	488	549	456	493	485	430	458
	(134)	(85)	(116)	(131)	(82)	(114)	(138)	(104)	(125)
Panel B: Head Characteristics									
Age	46.69	45.70	46.14	46.37	45.70	45.99	48.17	45.68	46.99
	(15.26)	(14.24)	(14.70)	(15.29)	(14.2)	(14.67)	(15.04)	(14.59)	(14.87)
Male	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.95	0.95
Married	0.86	0.85	0.85	0.86	0.85	0.85	0.87	0.88	0.88
Literate	0.42	0.51	0.47	0.44	0.53	0.49	0.35	0.38	0.36
Panel C: Household Characteristics									
Size	6.33	5.97	6.13	6.26	6.03	6.13	6.65	5.53	6.12
	(4.03)	(3.77)	(3.89)	(4.04)	(3.88)	(3.95)	(3.99)	(2.91)	(3.56)
Cement/Tile Floor	0.57	0.51	0.53	0.57	0.51	0.54	0.58	0.46	0.53
Mobile	0.03	0.21	0.12	0.03	0.22	0.14	0.01	0.10	0.05
Rural	0.93	0.87	0.90	0.92	0.87	0.89	0.97	0.88	0.93
Ethnicity									
Akan	0.33	0.35	0.34	0.38	0.40	0.39	0.07	0.06	0.07
Krou	0.27	0.19	0.22	0.25	0.19	0.22	0.33	0.19	0.27
Mande North	0.04	0.05	0.05	0.04	0.05	0.04	0.03	0.09	0.06
Mande South	0.15	0.10	0.12	0.09	0.06	0.07	0.44	0.37	0.41
Voltaique	0.04	0.06	0.05	0.04	0.06	0.05	0.02	0.05	0.04
Others	0.18	0.25	0.22	0.19	0.25	0.22	0.10	0.22	0.16
Religion									
Christian	0.41	0.44	0.43	0.44	0.46	0.45	0.26	0.31	0.28
Muslim	0.21	0.27	0.24	0.22	0.26	0.25	0.14	0.31	0.22
Others	0.38	0.29	0.33	0.33	0.28	0.30	0.60	0.38	0.50
Observations	2142	2749	4891	1758	2400	4158	384	349	733

Notes: In panel A, data on consumption expenditure and price per kilogram of cocoa beans are reported. Consumption expenditures are denominated in thousands of constant Franc CFA. Price is deflated by the domestic consumer price index. Approximatively, 500 FCFA correspond to $1. Categories of consumption are: investment in education and health; food and clothing expenditure; money transfers to non-resident household members; and other types of spending such as leisure, maintenance, transportation, etc. Standard deviations are reported in parentheses. Household characteristics as well as the characteristics of the household head are presented in panels B and C. [Data Source] ENV (2002) and ENV (2008)

cocoa farmers' per capita expenditure (Columns 4-9, Panel A). In terms of total expenditure, cocoa farmers in Southern CI with 92,830 FCFA ($186) did relatively better than their peers in Northern CI, who spent on average 65,530 FCFA ($131). Nonetheless, looking at changes in expenditure across surveys shows that cocoa farmers in Northern CI significantly increased their per capita expenditure. In particular, while cocoa farmers in Southern CI increased their consumption expenditure by approximately 20% between 2002 and 2008, consumption among their Northern counterparts went up by about 126% over the 5 year period. Some important characteristics of the household such as the age, gender, marital status of its head, its size and whether it belongs to a rural community are on average less likely to reflect these large differences in the living standards implied by the evolution of per capita expenditure. In fact, both the cocoa farmers in Southern and Northern CI were similar along these dimensions. For example, these farmers were essentially male (94%), married (85-88%), rural dwellers (87-93%), and on average 46 years old. As for the ethnic and religious affiliations as well as the degree of literacy, there was a great deal of heterogeneity among cocoa farmers in Southern and Northern CI. Cocoa farmers in Southern CI were more literate than those in Northern CI (49% vs. 36%); they were largely members of the Akan ethnic group (39% vs. 7%) and had fewer Mande Southern ethnicities than cocoa farmers in Northern CI (7% vs. 41%). Despite these differences or similarities at the mean, a robust investigation requires that this inquiry takes these characteristics into account, as control variables, in a more elaborate empirical exercise.

As already discussed, a major implication of the 2002-2007 armed conflict was the reallocation of communities - including the lands farmers used to grow their crops - to two separate territories in the same country. Moreover, the acting authorities in Northern CI (the FNCI) provided an export tax incentive in their territory that was more profitable for cocoa exporters than the tariff scheme in place in South-

ern CI. Raw data about farm-gate prices paid to cocoa producers by intermediary traders seem to indicate some important patterns of incentive transmission in favor of Northern farmers. As shown in Panel A of Table 1.1, farm-gate prices (deflated by the domestic consumer price index) decreased by about 93 FCFA in Southern CI between 2002 and 2008, which was approximately 70% higher than the fall in prices in Northern CI.

As pointed out by Benjamin & Deaton (1993), mean observations are less appealing than nonparametric distribution approaches when it comes to analyzing households' consumption in the field of agriculture. Following these authors, I compare in figure 1.2 the cross-state distribution of the log per capita consumption expenditure for cocoa farmers (top panel) and non-cocoa farmers (lower panel). Two important results stem from these distributions. First, as the pre and post-partition gaps in average consumption across states remained stable for non-cocoa farmers (lower panel), cocoa farmers in Northern CI significantly converged towards the consumption levels of their southern counterparts between the two periods. Figure **??** provides a much more intuitive, albeit simpler, visual representation of this convergence in consumption. The improvement in living standards, as measured by log per capita consumption expenditure, for the northerners relative to the southerners was approximately 0.411. Second, the kernel density displayed in figure 1.2 reveals that the preferential export tax policy also had important distributional effects. The effect is particularly more pronounced in the lower tail of the distribution, suggesting that the poorest farmers in Northern CI benefited relatively more from the tax reduction. In the following sections, I rely on a set of robust parametric and non-parametric econometric techniques to examine the causal effect on consumption of the liberalization policy implemented in Northern CI between 2002 and 2007.

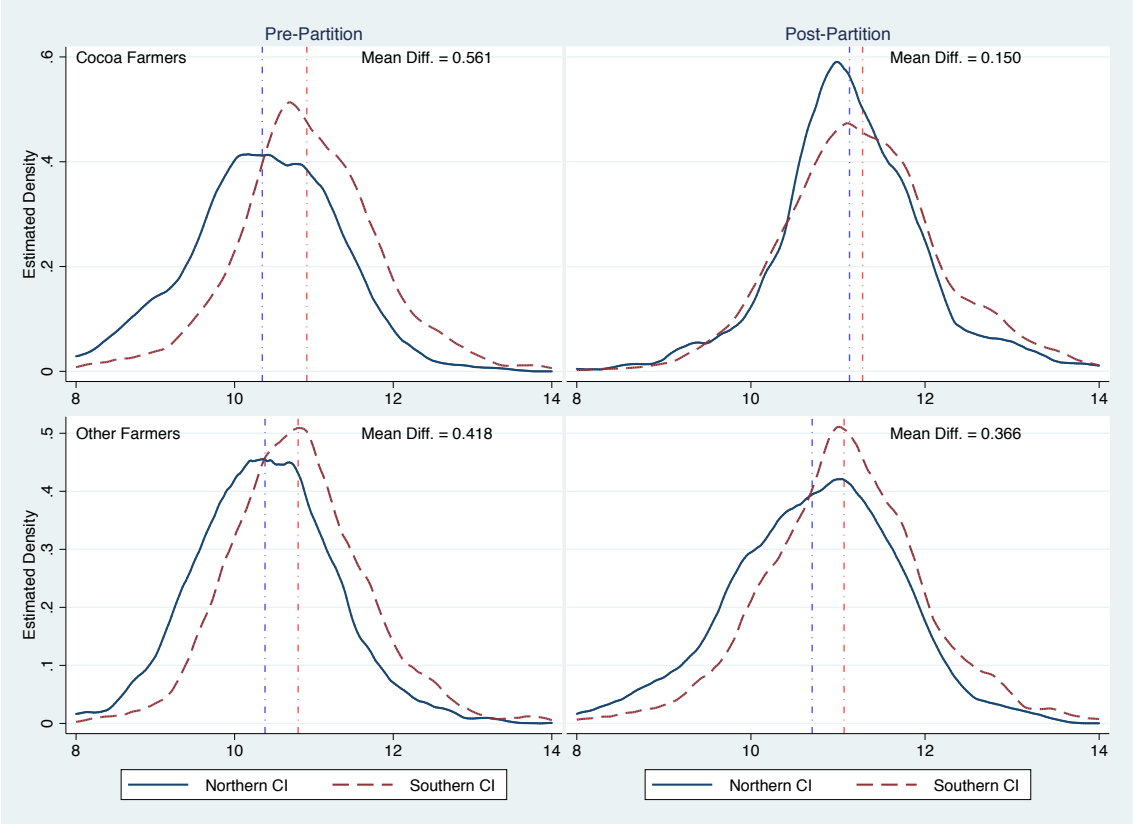

Figure 1.2: Distribution of Expenditures Across States and Sectors

Notes: Each panel compares the kernel distribution of the logarithm per capita consumption expenditure by sector across states. The mean difference is computed as the average log consumption expenditure in Southern CI (red or dashed line) minus the average log consumption expenditure in Northern CI (blue or solid line).

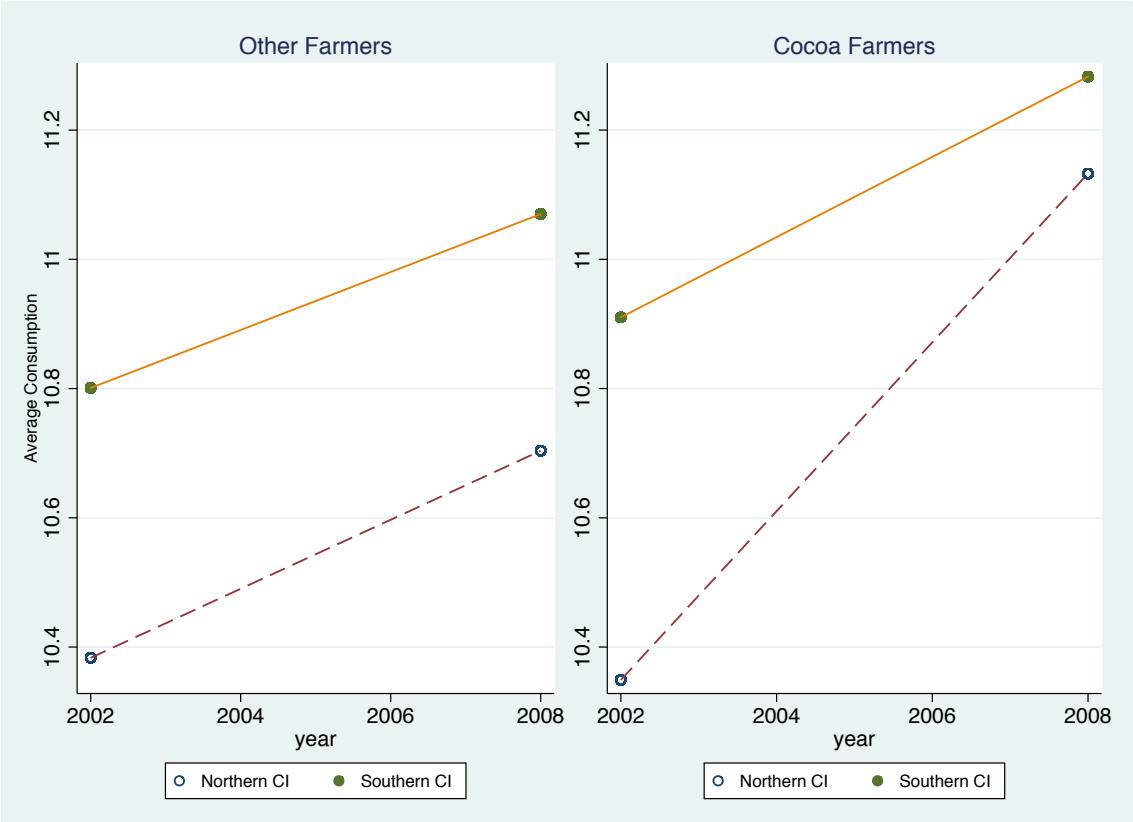

Figure 1.3: Differences in Average Expenditure

Notes: Each panel compares the differences in average log consumption expenditure between other farmers (left panel) and cocoa farmers (right panel) across states.

1.3.2 Identification

In this study, I exploit two plausible sources of exogenous variations in an individual farmer's exposure to different export tax regimes: a time variation and a cross-sectional variation. Before the division of Côte d'Ivoire into two administrative and political blocks, a uniform cocoa tariff system prevailed across all the 58 *départements* - or provinces - of the country. It is only after the apparition of the *Forces Nouvelles* in September 2002, along with their military and political capabilities to conquer and administer a significant portion of the national territory, that dichotomous export tax policies surfaced. While in the government-controlled south, the export tax on cocoa was maintained at 220 FCFA ($0.44) per kilogram, tariff rates fluctuated between 50 FCFA ($0.10) and 150 FCFA ($0.30) per kilogram in the rebel-held north (Witness 2007).

To identify the effects on cocoa farmers of the preferential export tax policy implemented in Northern CI, I employ principally the DDD approach. This empirical strategy is meant to control for any confounding factors affecting cocoa farmers' consumption patterns in Northern CI that are not caused, albeit correlated with, the export tax policy. First, exploiting the time and cross-sectional nature of the policy, I include both the year and state effects to absorb time trends and state-specific differences in consumption. Then, to immune the impact of the policy on consumption against state-specific shocks that coincided with its implementation in the experimental state, I also include state-by-year effects. In other words, I contrast changes in consumption expenditure between the treated group (cocoa farmers) and a control group (non-cocoa farmers) in the treatment state (Northern CI), with changes in consumption between a pair of untreated groups (cocoa farmers vs. non-cocoa farmers) in the control state (Southern CI).

To refine the identification of the impact of the export tax policy on consump-

tion, I also use a sub-sample of communities that resided in districts located on both sides of the demarcation line separating the two states. Because district creation often obeys certain socio-economic, cultural and geographic coherences, treated and control groups from these split districts would have the advantage of being more comparable. Here, I exploit the idea that, beyond shared observable and unobservable characteristics, one fundamental difference between farmers residing in these split districts was their exposure to different export tax policies.

To sum up, the percentage difference in export tax between the low and high tariff areas during the crisis was on average about 75%. Using a repeated cross-section, I aim at quantifying the effects of the tariff reduction in the experimental territory (Northern CI) on the living standards of the treated group (cocoa farmers). For two main reasons, I hypothesize that it was unlikely that farmers' exposure to low tariff would have been influenced by either their observed and unobserved characteristics. First, before the recognition of the state borders by the Linas-Marcoussis peace agreement, there were several occurrences of territorial shifts between the belligerents.[11] The cases of Man and Daloa, described in section 1.2.1, are two good examples. Second, the preferential export tax policy introduced in Northern CI was not intended to help the farmers. Instead, it was motivated by the Forces Nouvelles' own self-interest for tax resources (Guesnet, Müller & Schure 2010). This argument can be challenged by conjectures suggesting that the armed conflict in Côte d'Ivoire was a revolution of the northerners (Mande Northern and Voltaique) against the southerners (Akan, Krou and Mande Southern). But, looking at the ethnic composition of cocoa farmers in Northern CI weakens the underlying hypothesis suggesting that the policy could have been introduced for ethnic favoritism. In fact, it is clear from the summary statistics (Panel C, Column 9) that southern ethnicities such as

[11] On January 26^{th} 2003 the protagonists of the Ivorian Crisis signed a peace deal under the supervision of the international community, including France and the United Nations. A buffer zone, known as *la zone de confiance*, which defined the demarcation between the two territories was formed along the frontline and placed under the surveillance of the UN and French soldiers.

the Mandé Southern (41%) and the Krou (27%) are the dominant groups in cocoa farming in Northern CI.

1.4 Export Taxes and Consumption: The Causal Link

1.4.1 Preliminary Evidence

In table 1.2, I report the standard difference-in-difference (DD) estimation of the impact of export tax reduction on cocoa farmers' consumption expenditure. In panels A and B, I compare changes in the logarithm of consumption expenditure for cocoa farmers in Northern CI (treatment state) to that for cocoa farmers in Southern CI (control state). More specifically, as panel A examines changes in consumption using the sample of cocoa farmers from all districts, panel B focuses essentially on the subsample of cocoa farmers from the split districts in which individuals farmers are relatively more comparable than farmers from all districts. To test the validity of my identification hypothesis, I finally compare changes in consumption expenditure within a placebo subsample of cocoa farmers who were not exposed to the new export tax policy (panel C).

The results from both panel A and B are quite similar statistically and qualitatively. On the one hand, there was a significant increase in per capita consumption expenditure in both the treatment and control states. For example, in the subsample of split districts, the within-state logarithm of per capita consumption expenditure increased by about 0.784 in Northern CI, and by about 0.378 in Southern CI. On the other hand, per capita consumption expenditure remained relatively higher in the non-experimental state (Southern CI) than the experimental state (Northern CI). In particular, before the implementation of the new export tax policy (pre-

Table 1.2: Standard Difference-in-Differences

	[1] Pre-Partition	[2] Post-Partition	[3] Within-State Difference
Panel A: All Districts			
1. Northern CI (Treatment State)	10.349	11.133	0.783***
	(0.048)	(0.047)	(0.067)
	[384]	[349]	
2. Southern CI (Control State)	10.910	11.283	0.372***
	(0.022)	(0.019)	(0.029)
	[1758]	[2400]	
3. Cross-State Difference	-0.561***	-0.150***	
	(0.052)	(0.052)	
4. Difference-in-Differences	**0.411*** **		
	(0.073)		
Panel B: Split Districts			
1. Northern CI (Treatment State)	10.347	11.132	0.784***
	(0.048)	(0.049)	(0.069)
	[380]	[313]	
2. Southern CI (Control State)	10.781	11.160	0.378***
	(0.032)	(0.033)	(0.046)
	[636]	[780]	
3. Cross-State Difference	-0.434***	-0.028	
	(0.055)	(0.061)	
4. Difference-in-Differences	**0.406*** **		
	(0.082)		
Panel C: Falsification (Experiment Control)			
1. Split Southern CI	10.781	11.160	0.378***
	(0.032)	(0.033)	(0.046)
	[636]	[780]	
2. Non-Split Southern CI	10.983	11.342	0.359***
	(0.029)	(0.023)	(0.036)
	[1122]	[1620]	
3. Cross-District Difference	-0.202***	-0.182***	
	(0.045)	(0.040)	
4. Difference-in-Differences	**0.020**		
	(0.060)		

Notes: Column 3 reports the within-state difference in consumption expenditure which is the post-partition expenditure minus the pre-partition expenditure for the state identified in each row. The third row of each panel reports the cross-state (or cross-district) difference in consumption expenditure (example: row 3 = row 1 - row 2). The difference-in-differences reported in the fourth row of each panel is the post-partition cross-state difference minus the pre-partition cross-state difference. Alternatively, it can be obtained by subtracting the change in expenditure in Southern CI (or Non-Split Southern CI) from the change in expenditure in Northern CI (or Split Southern CI). Standards errors are in parenthesis and number of observations are in brackets. $*$, $**$, $***$ denote statistical significant at 10%, 5% and 1%, respectively.
Data Source: ENV (2002) and ENV (2008).

partition period), the logarithm of consumption expenditure of cocoa farmers in the split districts of Northern CI was 0.434 lower than that of their peers in Southern CI. But, this difference in consumption expenditure dropped to 0.028 after the new export tax policy was implemented in Northern CI. Overall, these results suggest that exposure to low export taxes not only improved significantly cocoa farmers' living standards, but it also contributed to shrink the pre-partition consumption gap that existed between cocoa farmers across states.

Estimates of the effects of the export tax reduction are displayed in row 4 of panels A and B. Thus, for the split districts (panel B), the DD estimate of the impact of the new export tax policy on the logarithm of consumption expenditures is about 0.406. It is positive and highly statistically significant. Economically, it suggests that there was approximatively a 50 percent relative increase in the consumption expenditure of cocoa farmers in Northern CI. To test whether the then identified effect of the policy is vulnerable to different time trends across territories, I conduct a falsification exercise using a pool of cocoa farmers drawn from the control state (Southern CI).

In panel C, I present the results of this placebo test. I compare, in particular, changes in the logarithm of per capita consumption expenditure of cocoa farmers in Southern CI selected from the sample of split and non-split districts. The difference-in-differences estimate for these two untreated groups of cocoa farmers is not significantly different from 0 (row 4 of panel C). This suggests that the effect of the policy on cocoa farmers' living standards, is less likely to suffer from an identification issue.

To complement the results from the DD estimation in table 1.2, I present in table 1.3 the DDD estimates of the impact of export taxes on consumption. In panel A, I contrast relative changes in consumption among a pair of treated and untreated cocoa farmers, which belong to Northern and Southern CI, respectively.

Before the partition, cocoa farmers in Northern CI lagged considerably, in terms of consumption, behind their peers from Southern CI. But, after the partition the consumption gap (in logarithm terms) drops from 0.561 to 0.150. Thus, this result suggests that the fall in export taxes improved relative consumption for cocoa farmers in Northern CI by approximately 50%. This is by construction equivalent to the DD estimation previously obtained in panel A of table 1.2.

One limitation of the DD estimate obtained in both table 1.2 and panel A of table 1.3 is its vulnerability to heterogenous time trends across states. For example, resources reallocation following the partition could have triggered disproportionate tax collection in Southern CI to the detriment of cocoa farmers. To test this hypothesis of non-parallel time trends across states, I compare in panel B of table 1.3 relative changes in consumption using a pair of untreated groups from each state. The DD estimation from this control group suggests that non-cocoa farmers in Northern CI experienced a relative increase in consumption of about 5.23%. This is clear indication that taking into account state-specific consumption shocks is appealing for identifying the effect of the export tax relief on farmers' living standards.

Overall, the DDD estimation obtained from subtracting the DD in panel B from the DD in panel A suggests that the fall in export taxes was accompanied by a relatively significant increase in consumption for cocoa farmers in Northern CI. The magnitude of this relative gain in well-being was about 43%. In what follows, I exploit the availability of a rich set of information from the ENV survey, at both the household and individual levels, to extend this analysis to a regression framework. Such a strategy has the advantage of taking into account other measurable individual-level characteristics and/or unobservable province and district specific factors that may influence rural households' living standards.

Table 1.3: Standard Difference-in-Difference-in-Differences

	[1] Pre-Partition	[2] Post-Partition	[3] Time Difference
Panel A: Cocoa Farmers (Treatment Group)			
1. Northern CI (Treatment State)	10.349	11.133	0.783***
	(0.048)	(0.047)	(0.067)
	[384]	[349]	
2. Southern CI (Control State)	10.910	11.283	0.372***
	(0.022)	(0.019)	(0.029)
	[1758]	[2400]	
3. Cross-State Difference	-0.561***	-0.150***	
	(0.052)	(0.052)	
4. Difference-in-Differences	0.411***		
	(0.073)		
Panel B: Other Farmers (Control Group)			
1. Northern CI (Treatment State)	10.383	10.704	0.320***
	(0.010)	(0.011)	(0.015)
	[8009]	[8347]	
2. Southern CI (Control State)	10.801	11.070	0.269***
	(0.009)	(0.007)	(0.012)
	[10236]	[16089]	
3. Cross-State Difference	-0.418***	-0.366***	
	(0.013)	(0.013)	
4. Difference-in-Differences	0.051***		
	(0.019)		
Difference-in-Difference-in-Differences	**0.360*** **		
	(0.077)		

Notes: The fourth row of each panel compares cross-states relative changes in consumption among cocoa farmers (panel A) and non-cocoa farmers (panel B). The difference between these relative DD estimates gives the DDD estimation of the impact of export taxes on cocoa farmers' consumption, displayed in bold at the bottom of table 1.3. Standards errors are in parenthesis and number of observations are in brackets. $*$, $**$, $***$ denote statistical significant at 10%, 5% and 1%, respectively.
Data Source: ENV (2002) and ENV (2008).

1.4.2 Regression DDD Specification

To further examine the causal link between export taxes on cocoa beans and individual cocoa producer's living standards, I estimate variants of the following regression à la Gruber (1994), where the response variable is log per capita consumption expenditure in constant domestic currency of farmer i from household h located in province p at time t:

$$Y_{ihpt} = \alpha + \lambda_1 Lib_i + \lambda_2 Post_t + \lambda_3 Cocoa_i + \gamma_1(Lib_i \cdot Post_t) + \gamma_2(Cocoa_i \cdot Post_t) + \gamma_3(Lib_i \cdot Cocoa_i) + \delta(Lib_i \cdot Cocoa_i \cdot Post_t) + X_i^{'}\beta_x + Z_{ht}^{'}\beta_z + \beta_p + \varepsilon_{ihpt}. \tag{1.1}$$

Unlike the standard approaches presented in tables 1.2 and 1.3, this specification offers more flexibility in terms of integrating additional covariates that may affect the farmer's living standard, as measured by his consumption expenditure. The terms α and β_p are the constant and the province fixed effects, respectively. The province fixed effects control for hard-to-account-for local institutional and cultural features as well as time-invariant geographic factors that may affect the farmer's earnings and expenditures. The vector $X_i^{'}$ summarizes the individual farmer controls, such as his ethnic and religious affiliations, while the vector $Z_{ht}^{'}$ incorporates controls for both the household itself and the characteristics of the household's head. Controls at the household level include the size of the household, and dummies for rural residency and cement tile floor. For the head of the household, I include his age and dummies for gender, marital status, literacy (whether he can read and/or write) and ownership of mobile phone.

Lib_i, $Post_t$ and $Cocoa_i$ are dummy variables for the liberalization-friendly state, the post-partition time period, and an identifier for individual cocoa farmers, respectively. Including these dummies separately in equation 1.1 aims at disentangling

their exclusive effects on consumption. These include the experimental state fixed effects (λ_1), the post-partition variation in consumption (λ_2), and consumption patterns specific to cocoa farmers (λ_3). Consistent with the DDD tradition, the model in equation 1.1 also takes into account the interaction effects of these indicator variables. In particular, while γ_1, the coefficient of the interaction term $Lib_i \cdot Post_t$, absorbs time-specific changes in consumption in the experimental state, the coefficient γ_2 on the interaction term $Cocoa_i \cdot Post_t$ aims at controlling for the overall time-variation in cocoa farmers' consumption. Finally, γ_3, the coefficient of the term $Lib_i \cdot Cocoa_i$ captures time-invariant consumption patterns specific to cocoa farmers in the experimental state (Northern CI).

The measure of interest in this DDD empirical exercise is the coefficient δ of the triple interaction term $Lib_i \cdot Cocoa_i \cdot Post_t$. This coefficient captures the magnitude of the causal effect of export tax reduction on cocoa farmers' living standards, as measured by per capita consumption expenditure. It bears such an economic interpretation because it compares cross-states differences in consumption between cocoa farmers and other farmers before and after the implementation of the preferential export tax policy. To close the presentation of the model in equation 1.1, I define ε_{ihpt} as an idiosyncratic error term. In all specifications, I follow Cameron, Gelbach & Miller (2011) and report cluster-robust standard errors at the household and census block levels. This approach accounts for arbitrary correlation across individual-level observations within both the households and census blocks.

1.4.3 Main Findings

In table 1.4, I report estimates of variant specifications of equation 1.1. The DDD estimates using a specification unconditional to household controls and to any disaggregated location (district and province) fixed effects are displayed in column 1. Column 2 presents the results including individual-level and household-level con-

Table 1.4: Regression Difference-in-Difference-in-Differences

	Dependent variable is log total consumption expenditure				
	[1]	[2]	[3]	[4]	[5]
Lib	-0.418***	-0.282***	-0.750***	-0.282***	-0.283***
	(0.048)	(0.051)	(0.076)	(0.050)	(0.052)
Post	0.269***	0.288***	0.357***	0.424***	0.362***
	(0.040)	(0.041)	(0.040)	(0.091)	(0.071)
Cocoa	0.109***	0.084***	0.036	0.100***	0.098***
	(0.033)	(0.030)	(0.024)	(0.029)	(0.030)
$Lib \cdot Post$	0.051	0.011	-0.085	0.417***	-0.245
	(0.076)	(0.075)	(0.070)	(0.150)	(0.248)
$Cocoa \cdot Post$	0.103**	0.030	0.018	-0.041	-0.050
	(0.045)	(0.044)	(0.037)	(0.042)	(0.041)
$Lib \cdot Cocoa$	-0.144*	-0.137*	-0.105*	-0.112	-0.111
	(0.078)	(0.081)	(0.060)	(0.080)	(0.081)
$Lib \cdot Cocoa \cdot Post$	0.360***	0.459***	0.478***	0.250**	0.206**
	(0.117)	(0.119)	(0.111)	(0.111)	(0.099)
Constant	10.801***	10.790***	10.732***	10.733***	10.693***
	(0.027)	(0.085)	(0.107)	(0.081)	(0.086)
Observations	47572	43432	43432	43432	43432
Adjusted R^2	0.074	0.186	0.246	0.218	0.241
Household Controls	No	Yes	Yes	Yes	Yes
Province FE	No	No	Yes	No	No
Survey-Round-District FE	No	No	No	Yes	No
Survey-Round-Province FE	No	No	No	No	Yes

Notes: Two-way cluster-robust standard errors at the household and census block levels are reported in parentheses. The dependent variable is per capita total consumption. $*$, $**$, $***$ denote statistical significant of the coefficient at 10%, 5% and 1%, respectively.
Data Source: ENV (2002) and ENV (2008).

trols, but without controlling for district-level and province-level fixed effects. In columns 3-5, I estimate the effect of export taxes on consumption using a variety of estimation strategies robust to the inclusion of diverse fixed effects. These include province fixed effects (column 3), survey-round-district fixed effects (column 4) and survey-round-province-fixed effects (column 5). Both the survey-round district and province fixed effects have the advantage to compare cocoa farmers to other farmers within the same location (district or province) pre and post partition across states. The DDD estimates are positive and statistically significant across specifications. For example, the results based on the specification with individual-level, household-level and province fixed effects (column 3) suggest that exposure to low export taxes was accompanied with an increase in relative consumption of about 61%. Comparing the beneficiaries of the tax relief to others within the same location, the magnitude of the impact of export taxes on consumption varies between 28% (column 4) and 23% (column 5).

In table 1.5, I examine potential heterogeneity, induced by the export tax relief, across categories of consumption spending. More specifically, I estimate the effects of the policy on investment in education and health, inter-household transfers, basics needs such as food and clothing, and other types of spending including leisure, transportation, etc. In addition to the full sample based on all districts (panel A), I also report results using the subsample of districts split between the two de facto states (panel B). In each specification from column 1 to column 6, I control for both the household controls (individual-level and household-level) and the province fixed effects. Although column 1 of panel A has been previously discussed (see column 3 of table 1.4), I report it to contrast its results from the estimates based on split districts (column 1 of panel B). Except for investment in education, estimates based on the full sample are positive and significant for the other categories of spending. As for the split districts, the results are qualitatively similar to the full sample case in panel

Table 1.5: Regression Difference-in-Difference-in-Differences

	[1] Total	[2] Education	[3] Health	[4] Transfer	[5] Clothing	[6] Food	[7] Other
Panel A: All Districts							
Lib	-0.750***	-0.529**	-0.306	0.117	-0.603***	-0.486***	-0.369
	(0.076)	(0.229)	(0.238)	(0.647)	(0.088)	(0.067)	(0.288)
Post	0.357***	0.396***	0.374***	0.625***	0.402***	0.071	0.546***
	(0.040)	(0.063)	(0.070)	(0.074)	(0.045)	(0.046)	(0.056)
Cocoa	0.036	-0.029	0.140**	0.034	0.082***	0.042*	0.070
	(0.024)	(0.041)	(0.054)	(0.055)	(0.025)	(0.023)	(0.044)
$Lib \cdot Post$	-0.085	0.036	0.115	0.071	0.062	-0.172**	-0.224**
	(0.070)	(0.098)	(0.138)	(0.107)	(0.069)	(0.073)	(0.107)
$Cocoa \cdot Post$	0.018	0.112*	-0.019	0.037	-0.053	-0.034	-0.042
	(0.037)	(0.059)	(0.066)	(0.069)	(0.037)	(0.034)	(0.068)
$Lib \cdot Cocoa$	-0.105*	0.220**	-0.070	-0.067	-0.084	-0.202***	-0.175**
	(0.060)	(0.096)	(0.100)	(0.135)	(0.075)	(0.072)	(0.089)
$Lib \cdot Cocoa \cdot Post$	0.478***	-0.235	0.369***	0.528***	0.304***	0.440***	0.450***
	(0.111)	(0.157)	(0.143)	(0.186)	(0.096)	(0.108)	(0.163)
Constant	10.732***	8.188***	7.750***	8.551***	9.762***	9.662***	8.110***
	(0.107)	(0.164)	(0.174)	(0.180)	(0.136)	(0.097)	(0.166)
Observations	43432	21831	29627	35941	41352	43363	42871
Adjusted R^2	0.246	0.202	0.117	0.199	0.182	0.297	0.157
Panel B: Split Districts							
Lib	-0.232	0.189	0.192	0.754	-0.306	-1.043***	-0.241
	(0.212)	(0.328)	(0.314)	(0.651)	(0.287)	(0.402)	(0.787)
Post	0.351***	0.321***	0.401***	0.809***	0.441***	-0.005	0.629***
	(0.049)	(0.085)	(0.103)	(0.094)	(0.052)	(0.060)	(0.070)
Cocoa	0.095***	-0.006	0.104	0.112**	0.098**	0.027	0.129**
	(0.034)	(0.055)	(0.072)	(0.048)	(0.043)	(0.028)	(0.060)
$Lib \cdot Post$	0.099	0.081	0.239	0.053	0.189*	0.163*	-0.270*
	(0.094)	(0.120)	(0.177)	(0.150)	(0.102)	(0.092)	(0.148)
$Cocoa \cdot Post$	0.029	0.153	0.091	0.103	-0.019	0.025	-0.089
	(0.060)	(0.103)	(0.093)	(0.100)	(0.073)	(0.050)	(0.098)
$Lib \cdot Cocoa$	-0.101*	0.181*	0.006	-0.061	-0.038	-0.094	-0.243**
	(0.061)	(0.108)	(0.113)	(0.128)	(0.076)	(0.070)	(0.099)
$Lib \cdot Cocoa \cdot Post$	0.332***	-0.250	0.110	0.278	0.115	0.189*	0.508**
	(0.114)	(0.168)	(0.146)	(0.187)	(0.113)	(0.109)	(0.201)
Constant	10.261***	8.097***	6.544***	8.028***	9.660***	9.782***	7.347***
	(0.162)	(0.350)	(0.275)	(0.291)	(0.257)	(0.372)	(0.406)
Observations	22469	11402	15639	18390	21481	22427	22174
Adjusted R^2	0.220	0.168	0.115	0.209	0.176	0.268	0.131
Household Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Two-way cluster-robust standard errors at the household and census block levels are reported in parentheses. Dependent variables are log per capita consumption by categories of spending displayed in each column. In all specifications, province fixed effects, household-level and individual-level controls are included. $*$, $**$, $***$ denote statistical significant of the coefficient at 10%, 5% and 1%, respectively.
Data Source: ENV (2002) and ENV (2008).

A, but only the coefficients on total expenditure, food and other types of spending are statistically significant. Estimates based on all districts (panel A in table 1.5) suggest that export tax relief induced an increase in log per capita expenditure for health (0.369), transfer (0.528), clothing (0.304), food (0.440) and other types of expenditure such as leisure and transportation (0.450). As for investment in education, its coefficient is negative (-0.235) but statistically insignificant.[12]

So far, the results from the parametric empirical analysis suggest that the implementation of a preferential export tax treatment in Northern CI, between 2002 and 2007, turned out to be revenue-enhancing for cocoa farmers. Where export tax reduction occurred, the mean of the overall consumption spending went up. This improvement in consumption was associated with higher spending in health, nutrition, clothing, inter-household transfers, etc. The gain in living standards for cocoa farmers is consistent with the nonparametric results in figure 1.2. Moreover, an attentive scrutiny of the kernel density in the upper panel of figure 1.2 reveals that the export tax policy also had important distributional effects. The effect seems to be more pronounced in the lower tail of the distribution, suggesting that poorest farmers in Northern CI benefited relatively more from the tax reduction than the wealthiest farmers. In the next subsection, I explore this potential heterogeneity in the impact of the export tax policy on consumption.

[12]The apparent negative but statistically insignificant effect of export tax alleviation on investment in education can be explained by several factors. First, as pointed out by Sany (2010), more than 50% of school-aged children were out of school between 2002 and 2004 in Northern CI. Second, local and international NGOs, with the support of UNICEF, filled the void left by the official government in the educational system, and often provided cost-saving incentives to parents in order to encourage enrollment. Finally, it could be the case that favorable conditions in the cocoa sector, including the pecuniary opportunities they offer, pull children away from schools towards cocoa fields (Nkamleu & Kielland 2006).

1.4.4 Distributional Effects

An important aspect of the expenditure distribution in figure 1.2 (top panel), is that the lower-tail inequality between cocoa farmers across states significantly decreased over time. To closely investigate potential distributional effects of the export tax reduction, that may not be captured by mean estimators, I rely on a quantile estimation strategy. More specifically, I estimate the effect of the policy on the median and both the lower and upper quarters. Median estimators are thought to be more well-suited than mean estimators in dealing with outliers. But, looking specifically at upper and lower expenditure quantiles provides a good assessment on how the liberalization policy under investigation affects inequality across farm households.

In columns 1-3 of table 1.6, I report the coefficients from the quantile regression estimation for the first ($\tau = 0.25$), second ($\tau = 0.50$) and third ($\tau = 0.75$) quarters of expenditure. To contrast the quantile estimates from the previous results, I report in column 4 the coefficients from the least squares estimation. In all specifications, I control for all the relevant individual-level and household-level characteristics previously defined as well as for province fixed effects. Overall, the results suggest that reducing export taxes on cocoa beans had positive and statistically significant effects on expenditure at all quarters of distribution examined. But, more specifically, the effects of the policy on conditional distributions vary in magnitude across expenditure groups. The overall tendency, for both the full sample and the subsample of split districts, is that the impact of export tax on consumption decreases as the quantiles increase. For example, both the results based on all districts and the split districts indicate that the first quarter coefficients are significantly higher than the third quarter coefficients. As for the median coefficients, while being slightly lower than the first quarter coefficients, they are similar to the OLS coefficients. These results suggest that poor farm households benefited relatively more from the

Table 1.6: Distributional Effects

	Quantile Regression Estimates			
	[1]	[2]	[3]	[4]
	$\tau = 0.25$	$\tau = 0.50$	$\tau = 0.75$	**OLS Estimates**
Panel A: All Districts				
Lib	-0.528	-0.479	-0.161	-0.750***
	(0.380)	(0.555)	(0.327)	(0.076)
Cocoa	0.017	0.042	0.051**	0.036
	(0.027)	(0.032)	(0.022)	(0.024)
$Lib \cdot Cocoa$	-0.065	-0.111	-0.061	-0.105*
	(0.090)	(0.083)	(0.079)	(0.060)
Post	0.373***	0.359***	0.379***	0.357***
	(0.044)	(0.052)	(0.042)	(0.040)
$Lib \cdot Post$	-0.101	0.046	-0.035	-0.085
	(0.094)	(0.084)	(0.071)	(0.070)
$Cocoa \cdot Post$	0.021	-0.024	-0.007	0.018
	(0.037)	(0.039)	(0.035)	(0.037)
$Lib \cdot Cocoa \cdot Post$	0.568***	0.468***	0.251**	0.478***
	(0.150)	(0.132)	(0.102)	(0.111)
Constant	10.202***	10.745***	11.228***	10.732***
	(0.111)	(0.105)	(0.092)	(0.107)
Observations	43432	43432	43432	43432
Panel B: Split Districts				
Lib	-0.277	-0.335	-0.005	-0.232
	(0.543)	(0.522)	(0.801)	(0.212)
Cocoa	0.067*	0.077**	0.059**	0.095***
	(0.040)	(0.036)	(0.027)	(0.034)
$Lib \cdot Cocoa$	-0.067	-0.095	0.008	-0.101*
	(0.078)	(0.080)	(0.071)	(0.061)
Post	0.347***	0.400***	0.409***	0.351***
	(0.063)	(0.060)	(0.052)	(0.049)
$Lib \cdot Post$	0.086	0.201**	0.118	0.099
	(0.118)	(0.100)	(0.095)	(0.094)
$Cocoa \cdot Post$	0.027	-0.022	0.038	0.029
	(0.066)	(0.055)	(0.069)	(0.060)
$Lib \cdot Cocoa \cdot Post$	0.474***	0.317**	0.076	0.332***
	(0.179)	(0.130)	(0.122)	(0.114)
Constant	9.789***	10.456***	11.074***	10.261***
	(0.487)	(0.246)	(0.476)	(0.162)
Observations	22469	22469	22469	22469
Household Controls	Yes	Yes	Yes	Yes
Province Fixed Effects	Yes	Yes	Yes	Yes

Notes: One-way cluster-robust standard errors at the census block level are reported in parentheses. $*$, $**$, $***$ denote statistical significant of the coefficient at 10%, 5% and 1%, respectively.
Data Source: ENV (2002) and ENV (2008).

export tax reduction than households at the upper-tail of the income distribution. Also noteworthy is the fact while the coefficient of the third quarter is statistically significant at 1% in the full sample case, it is insignificantly different from 0 in the case of the split regions.

1.4.5 Robustness Checks

In addition to the placebo test presented in panel C of table 1.2, I reinvestigate the validity of my identification strategy by conducting a series of falsification exercises. In particular, I estimate the following equation using different samples of individuals that were not directly exposed to the favorable export tax policy:

$$Y_{ihpt} = \alpha + \beta_p + \gamma Lib_i + \lambda Post_t + \delta(Lib_i \cdot Post_t) + X_i^{'}\beta_x + Z_{ht}^{'}\beta_z + \varepsilon_{ihpt}. \quad (1.2)$$

Here, the outcome variable is log per capita consumption expenditure in constant domestic currency for a given individual i from household h located in province p at time t. The idea is to check, for other farmers (especially non-cocoa farmers), whether being a resident of the experimental state (Northern CI) was associated with an increase in the living standards. If the relationship between consumption expenditure for non-cocoa producers and residency in Northern CI appears to be insignificantly different from zero, then this would suggest that my identification strategy is valid.

Table 1.7 presents the results of the various falsification tests. Equation 1.2 is estimated using respectively all farmers (including cocoa farmers) and subsample of farmers without cocoa farmers. As before, the results using all districts are distinguished from the results based on the split districts. I also include household controls and province fixed effects in all specifications. In columns 1-2, I compare the overall change in the logarithm of per capita consumption expenditure for the

Table 1.7: Falsification Exercise

	Including Cocoa Farmers		**Excluding Cocoa Farmers**	
	All Districts	Split Districts	All Districts	Split Districts
	[1]	[2]	[3]	[4]
Lib	-0.773***	-0.225	-0.758***	-0.029
	(0.074)	(0.211)	(0.079)	(0.511)
Post	0.358***	0.355***	0.349***	0.353***
	(0.040)	(0.050)	(0.040)	(0.049)
$Lib \cdot Post$	-0.065	0.120	-0.078	0.096
	(0.069)	(0.094)	(0.070)	(0.094)
Constant	10.737***	10.263***	10.734***	10.410***
	(0.107)	(0.161)	(0.111)	(0.342)
Observations	43432	22469	38832	20530
Adjusted R^2	0.244	0.218	0.241	0.216
Household Controls	Yes	Yes	Yes	Yes
Province Fixed Effects	Yes	Yes	Yes	Yes

Notes: Two-way cluster-robust standard errors at the household and census block levels are reported in parentheses. The dependent variable is the logarithm of per capita total consumption expenditure in constant domestic currency. In all specifications, province fixed effects, households and individual farmer's characteristics are included. $*$, $**$, $***$ denote statistical significant of the coefficient at 10%, 5% and 1%, respectively.
Data Source: ENV (2002) and ENV (2008).

residents of Northern CI to that of the residents of Southern CI, including the cocoa farmers from both states. In columns 3-4, I reexamine the same difference-in-differences, with the exception that cocoa farmers are excluded. In all specifications, the estimated coefficients are all not significantly different from zero. This suggests that residency in Northern CI was not itself a source of income gain for both farmers. In other words, my identification strategy cannot be rejected by these placebo tests.

Perhaps the identified improvement in cocoa farmers' living standards in Northern CI, documented in previous sections, is explained by alternative factors unrelated to the liberalization policy. These include for example differences in production, productivity, size of cropland, availability of labor and time allocation to farming. To examine this hypothesis, I reestimate equation 1.1 using these potential factors as outcomes variables. The rationale here is to shed light on any probable comparative advantage that goes with cocoa farming in Northern CI beyond the fact that this state benefited from a liberalization policy.

In panel A of table 1.8, estimates from the DDD strategy suggest that farmers in Northern CI did not devote more time to farming relatively to their counterparts in Southern CI (column 1). Moreover, I find no evidence that neither production (column 2) nor productivity (column 3) of cocoa beans in Northern CI were relatively higher. In table 1.8, farmers were asked whether they had hired more labor (panel B) and had increased the size of their cropland (panel C) between the last harvest and the date of the interview. For each question, the motivations of their choice should be specified. In case they answered in the affirmative, the motivations varied from "availability of labor" to "increase in farm-gate prices". As shown in column 1 of panel B and C, cocoa farmers in Northern CI reported that had hired more labor and had increased the size of their cropland in comparison to cocoa farmers in Southern CI. Interestingly, they also reported that relative favorable farm-gate

prices justified these outcomes (column 3 in panel B and C)[13]. In the next section, I investigate one relevant mechanism, price pass-through, underlying the association between the alleviation of export restrictions and the living standards of agricultural households.

1.5 Mechanism: Price Pass-Through

1.5.1 A Basic Model

In this subsection, I introduce a simple theoretical framework that sheds light on the welfare implications of trade reforms in an underdeveloped agricultural economy. It complements a large body of research that has identified the transmission of border prices to local farmers as an important mechanism through which trade liberalization enhances social welfare (see for example Porto (2006), and Winters, McCulloch & McKay (2004)). Conceptually, the most closely related model is Casaburi & Reed (2013), who draw on Chaudhuri & Banerjee (2004). Unlike these authors, who capture trade reforms by export or credit subsidies, I consider trade liberalization through the lens of export tax incentives.

I consider a large economy with significant market power in the production of an agricultural commodity. The economy is divided into two separate oligopsonistic markets $m = \{n, s\}$, populated each with a large number of farmers F_m and a small number of homogeneous traders T_m. Although land and crop yield are assumed to be equally distributed across markets, they vary across farmers within each market. An individual farmer i receives the average market price p^m per unit of output y_i^m sold to a trader operating in market m. The trader in turn sells the product in the

[13]It is worth noting that it takes at least five years for a cocoa tree to produce cocoa beans. Therefore, increasing the size of cropland between two harvest seasons should not necessarily translate into more production. This suggests that the results regarding no significant difference in production (panel A) and increase in the size of cropland (panel C) are not contradictory.

Table 1.8: Alternative Potential Driving Factors

	[1]	[2]	[3]
Panel A			
	Time Worked	**Output**	**Productivity**
All Regions	-0.433	-0.077	0.131
	(2.108)	(0.109)	(0.164)
Observations	37656	16426	12562
Adjusted R^2	0.074	0.188	0.126
Split Regions	-4.571*	-0.105	0.175
	(2.442)	(0.120)	(0.189)
Observations	19312	7007	5351
Adjusted R^2	0.063	0.168	0.160
Panel B			
	Hired More Workers	**Why?**	
		Available Labor	**High Sales Price**
All Regions	0.132***	0.034	0.077*
	(0.049)	(0.120)	(0.042)
Observations	12129	3862	3862
Adjusted R^2	0.057	0.112	0.106
Split Regions	0.066	0.001	0.015
	(0.076)	(0.161)	(0.038)
Observations	6088	2090	2090
Adjusted R^2	0.074	0.128	0.061
Panel C			
	Increased Cropland Size	**Why?**	
		Available Labor	**High Sales Price**
All Regions	0.189***	-0.025	0.298***
	(0.045)	(0.097)	(0.079)
Observations	43276	11787	11787
Adjusted R^2	0.057	0.073	0.085
Split Regions	0.125**	-0.032	0.184**
	(0.055)	(0.102)	(0.093)
Observations	22375	6581	6581
Adjusted R^2	0.031	0.063	0.076
Household Controls	Yes	Yes	Yes
Province Fixed Effects	Yes	Yes	Yes

Notes: Two-way cluster-robust standard errors at the household and census block levels are reported in parentheses. In panel A, dependent variables are: weekly hours worked in farming (column 1), log of output produced in kg (column 2), log (output/cropland size) (column 3). In panel B and C, dependent variables are dummies for hiring more labor, increasing cropland size (column 1), availability of labor (column 2), and higher farm-gate prices (column 3). In all specifications, province fixed effects, households and individual farmer's characteristics are included. $*$, $**$, $***$ denote statistical significant of the coefficient at 10%, 5% and 1%, respectively.
Data Source: ENV (2002) and ENV (2008).

international market at per unit wholesale price p^w. Since each trader is assumed to exert a degree of monopsony power, the per unit price to which the commodity is purchased from farmers is given by:

$$p^m = p^w(1 - \tau^m) - f^m, \tag{1.3}$$

where τ^m and f^m are the market-specific export tax rate levied by the government and transactions costs, respectively. The latter includes transport costs and other charges incurred by the trader. In this model, the degree of trade liberalization prevailing in the economy is captured by the degree of export tax incentive. In particular, market n is said to be more liberalized than market s if $\tau^n < \tau^s$.

Whenever a transaction occurs in market m, the utility enjoyed by farmer i who sells his produce at the average unitary price p^m can be written as:

$$u_i^m = [p^w(1 - \tau^m) - f^m]y_i^m. \tag{1.4}$$

From equation 1.4, I write the average welfare for farmers transacting in market m as:

$$W^m = \int_{y_L}^{y_H} u^m f(y)\, dy, \tag{1.5}$$

where $f(y)$ denotes the probability density function (pdf) of the land output y with support over the interval $[y_L, y_H]$.

Combining equations 1.4 and 1.5, I can derive the difference in changes in average welfare across markets in response to a change in international price p^w. Under the assumption of perfectly inelastic supply, this difference is given by:

$$\frac{dW^s}{dp^w} - \frac{dW^n}{dp^w} = E[y](\tau^n - \tau^s). \tag{1.6}$$

According to equation 1.6, in response to an increase in international price, farmers

transacting in low export tax environments tend to experience a more rapid increase in average welfare. This simple theoretical intuition is consistent with the empirical findings I have documented so far in the previous sections. If, for example, τ^n and τ^s denote respectively the export tax rates in Northern CI and Southern CI with $\tau^n < \tau^s$, then equation 1.6 would suggest that cocoa farmers in Northern CI are more likely to be better off than their Southern CI's counterparts following a positive price shock in the international market.

One potential channel the literature has identified as an important factor through which favorable international market conditions can translate into increasing welfare is the price pass-through mechanism. To see this, I compare changes in prices across markets following a change in international prices. From equation 1.3, I can write:

$$\frac{dp^s}{dp^w} - \frac{dp^n}{dp^w} = \tau^n - \tau^s. \tag{1.7}$$

Equation 1.7 not only suggests that price pass-through is more pronounced in low export tax environments, but it also implies that the transmission of international prices to local farmers is an important mechanism through which trade liberalization improves living standards. This intuition becomes obvious when I combine equations 1.6 and 1.7 to obtain:

$$\frac{dW^s}{dp^w} - \frac{dW^n}{dp^w} = E[y](\frac{dp^s}{dp^w} - \frac{dp^n}{dp^w})??. \tag{1.8}$$

In the next subsection, I investigate empirically the hypothesis that exposure to low export tax was accompanied by an increase in farm-gate prices received by farmers.

1.5.2 Empirical Evidence

To formally investigate the price mechanism predicted in the basic model above, I start by comparing in table 1.9 farm-gate prices received by local farmers across

states. As before, I consider both the sample of cocoa farmers in all districts (panel A) and the subsample of cocoa farmers in the split districts (panel B). Overall the results indicate in both cases a fall in per kilogram farm-gate prices over time. Nonetheless, farmers exposed to low export tax experienced a relatively less severe decrease in prices compared to farmers residing in high export tax jurisdictions. The estimates from the difference-in-differences suggest that a cocoa farmer in Northern CI (treatment state) received on average between 38.93 FCFA (all districts) and 39.73 FCFA (split districts) more for each kilogram of cocoa sold. Again the placebo in panel C of table 1.9 supports the validity of the identification strategy.

To complement the inquiry on the price pass-through mechanism, I also estimate the following equation:

$$Price_{ihpt} = c + \sigma_p + \theta_0 Lib_i + \theta_1 Post_t + \theta_2 (Lib_i \cdot Post_t) + W_i^{'} \sigma_x + \varepsilon_{ihpt}, \qquad (1.9)$$

where $Price_{ihpt}$ is the price received by cocoa farmer i from household h located in province p at time t. While the terms Lib_i, $Post_t$ and $Lib_i \cdot Post_t$ are defined as before, the terms c, σ_p and ε_{ihpt} represent the constant, the province fixed effects and the error term, respectively. As in the previous difference-in-differences regressions, standard errors are clustered at the household and census block levels. The vector $W_i^{'}$ includes a set of household level control variables such as the age and gender of the head as well as indicators for a rural area, literacy and ownership of a mobile phone, and cement or tile floor.

Table 1.10 presents estimates from equation 1.9. In columns 1-3 and 4-6, I report the results using the sample for all districts and the subsample for the split districts. Consistent with the results from table 1.9, exposure to low export tax was accompanied by a significant increase in farm-gate prices received by cocoa farmers in Northern CI. For example, taking into account both the household characteris-

Table 1.9: Price Mechanism using Standard Difference-in-Differences

	[1] Pre-Partition	[2] Post-Partition	[3] Within-State Difference
Panel A: All Districts			
1. Northern CI (Treatment State)	484.60	430.12	-54.48***
	(7.95)	(6.07)	(10.04)
	[301]	[293]	
2. Southern CI (Control State)	549.10	455.69	-93.41***
	(3.49)	(1.77)	(3.57)
	[1399]	[2151]	
3. Cross-State Difference	-64.49***	-25.57***	
	(8.38)	(5.29)	
4. Difference-in-Differences		**38.93*** **	
		(9.50)	
Panel B: Split Districts			
1. Northern CI (Treatment State)	483.32	430.77	-52.55***
	(7.91)	(6.32)	(10.28)
	[299]	[268]	
2. Southern CI (Control State)	528.88	436.60	-92.28***
	(5.94)	(3.43)	(6.47)
	[486]	[664]	
3. Cross-State Difference	-45.56***	-5.83	
	(9.79)	(6.73)	
4. Difference-in-Differences		**39.73*** **	
		(11.67)	
Panel C: Falsification (Experiment Control)			
1. Split Southern CI	528.88	436.60	-92.28***
	(5.94)	(3.43)	(6.47)
	[486]	[664]	
2. Non-Split Southern CI	559.86	464.21	-95.65***
	(4.28)	(2.02)	(4.22)
	[913]	[1487]	
3. Cross-District Difference	-30.98***	-27.61***	
	(7.30)	(3.79)	
4. Difference-in-Differences		**3.37**	
		(7.53)	

Notes: Column 3 reports the within-state difference in per kilogram farm-gate price which is the post-partition price minus the pre-partition price for the state identified in each row. The third row of each panel reports the cross-state or cross-district difference in price per kilogram (example: row 3 = row 1 - row 2). The difference-in-differences reported in the fourth row of each panel is the post-partition cross-state difference minus the pre-partition cross-state difference. Alternatively, it can be obtained by subtracting the change in price in Southern CI (or Non-Split Southern CI) from the change in price in Northern CI (or Split Southern CI). Standards errors are in parentheses and number of observations are in brackets. $*$, $**$, $***$ denote statistical significant at 10%, 5% and 1%, respectively.
Data Source: ENV (2002) and ENV (2008).

tics and the provinces fixed effects (columns 3 and 6), the additional per kilogram farm-gate prices received by northern cocoa farmers varied between 53 FCFA (all districts sample) and 64 FCFA (split districts subsample). The latter is equivalent to approximately 13% of the pooled sample average farm-gate price. This result suggests that the transmission of border prices to local farmers is a relevant mechanism through which export tax incentives improve the living standards of farm households.

1.6 Conclusion

A large literature has been devoted to the poverty-reducing effects of trade liberalization policies [see Winters, McCulloch & McKay (2004)]. Despite their methodological rigor, critics have often raised some skepticism about the causal implications of previous studies. An important issue is the non-randomness of liberalization policies, which are thought to be the echoes of the influential activities of various interest groups (Mayer 1984, Trefler 1993). For example, it has been suggested that farmers in poor countries who are often less educated, less organized and geographically scattered have a relatively weaker lobbying power on trade issues than their counterparts in developed nations (Anderson, Hayami & George 1986, Olson 1985).

In this analysis, I exploit a rare opportunity of a 'natural experiment', characterized by a temporary coexistence of two de facto 'states' in Côte d'Ivoire, to examine the causal link between the reduction of trade barriers and farm household consumption. Using both time and cross-sectional variations in export taxes, I show that exposure to low export taxes on cocoa beans increased the living standards of cocoa farmers by a significant margin. I also provide evidence that the transmission of international prices to local producers is one potential mechanism through which export tax incentives contribute to improved living standards among farm house-

Table 1.10: Price Mechanism using Regression Difference-in-Difference

	All Districts			**Split Districts**		
	[1]	[2]	[3]	[4]	[5]	[6]
Lib	-64.494***	-65.843***	-74.530***	-45.560**	-46.926**	-322.553***
	(16.751)	(16.787)	(19.215)	(19.552)	(19.517)	(2.820)
Post	-93.410***	-92.155***	-91.196***	-92.276***	-91.170***	-100.175***
	(6.967)	(6.883)	(6.413)	(13.421)	(13.869)	(12.022)
$Lib \cdot Post$	38.927**	46.538**	53.609***	39.730*	47.104**	63.796***
	(19.782)	(19.727)	(16.854)	(21.838)	(21.551)	(19.344)
Male		-5.033	2.513		-13.458	-10.709
		(10.355)	(10.933)		(15.813)	(17.415)
Age		-0.077	-0.151		-0.338	-0.374
		(0.153)	(0.159)		(0.281)	(0.298)
Literate		7.830**	6.561**		1.404	4.321
		(3.357)	(3.310)		(6.069)	(6.732)
Cement/Tile		9.318**	6.070		7.415	-0.672
		(3.859)	(4.166)		(6.093)	(5.596)
Mobile		1.500	-2.256		6.960	3.115
		(3.726)	(3.749)		(5.993)	(7.909)
Rural		36.415***	39.204***		37.561***	43.652***
		(5.917)	(6.892)		(11.897)	(11.535)
Constant	549.097***	514.880***	537.733***	528.876***	517.518***	762.330***
	(6.167)	(14.238)	(15.841)	(12.287)	(32.038)	(31.439)
Observations	4144	3910	3910	1717	1582	1582
Adjusted R^2	0.152	0.162	0.250	0.117	0.126	0.262
Province FE	No	No	Yes	No	No	Yes

Notes: Two-way cluster-robust standard errors at the household and census block levels are reported in parentheses. The dependent variable is the farm-gate price per kilogram of cocoa received by each individual farmer. In columns 1-3 and 4-6, estimates using the full-sample, and the sub-sample of split districts are reported, respectively. In each sub-sample, three specifications are considered: baseline estimates without any controls (Columns 1, and 4); estimates with household's controls such as demographics and wealth proxies (Columns 2, and 5); and estimates with both household's controls and province fixed effects (Columns 3, and 6). $*$, $**$, $***$ denote statistical significant of the coefficient at 10%, 5% and 1%, respectively.
Data Source: ENV (2002) and ENV (2008).

holds. These results suggest that exorbitant export taxes have detrimental effects on farmers' earnings and living standards. Thus, non-optimal export taxation can deter production and ultimately be self-defeating for developing countries, including the ones with a significant market share in an agricultural commodity (McMillan 2001).

Chapter 2

Do Good Leaders Produce Bad Institutions in Africa?

2.1 Introduction

A glance at recent works on comparative development reveals that, while the interest in the proximate determinants of income is still vivid in the literature, the trajectory of the intellectual curiosity has progressively shifted towards examining the fundamental causes of economic prosperity. At the core of this inquiry, the empirically well-grounded and quite intuitive institutional hypothesis identifies incentive-driven societal actions and political organizations as the ultimate causes of economic development.[1] Beyond their importance for economic outcomes, institutions are also thought to have a long-lasting effect and an intrinsically durable characteristic. For example, the seeds for democracy at the state level today may have been sowed before industrialization at the village level (Giuliano & Nunn 2013). Or, the prevalence of an adverse pathological environment in former colonies may have induced the introduction of extractive institutions, which is probably the source of contemporary poor institutional settings (Acemoglu, Johnson & Robinson 2001). Proponents of the institutional view have also suggested that disruptive societal choices and/or historical events - known as critical junctures - may have embarked countries in different economic and political trajectories.[2] Nonetheless, a fewer consensus has

[1] See Acemoglu, Johnson & Robinson (2005) for a review.

[2] Collier & Collier (1993), Daron & Robinson James (2012), among others, discuss the concept of critical junctures and its relevance for institutional and economic outcomes.

emerged from the literature on the specifics that trigger such dichotomous paths. As some authors have supported that initial wealth (or the lack of it) may have initiated diverging development trajectories (Engerman & Sokoloff 2002), others have insinuated that dissimilar paths may follow a major political break such as independence (Acemoglu et al. 2008) or the end of Cold War (Villalón & Huxtable 1998).

In this analysis, I contribute to the literature on critical junctures by exploring a new avenue: the qualitative profile of the African national leaders at independence. Since, it has been suggested that *"at birth of new polities, leaders mold institutions"*, I argue that the leadership options faced by African nations at independence, along with the intrinsic characteristics of these leaders, may have been a critical step in subsequent political development.[3] More specifically, combining a novel dataset on the ethnic affiliation of the earliest heads of states in Africa with anthropological information, I document that the first "big men" who inherited traditional egalitarian and democratic norms seem to have been the ones who transmitted non-democratic practices to their contemporary countrymen. Although this result seems counter-intuitive and at odds with previous empirical findings that support an intergenerational transmission of democracy (Giuliano & Nunn 2013), the historical and political context of Africa may offer some plausible and testable explanations.

In the African context, this shift in the transmission of institutional capital from local ethnic groups to contemporary states via the fathers of independence is understandable in several regards. For example, it has been argued that early statehood, which was often accompanied with ethnic institutional development, may have been an impediment to contemporary political development (Hariri 2012). Also, as suggested by Englebert (2000), the discrepancy between pre-colonial and post-colonial states in Africa may have incentivized the emergence of non-democratic institutional

[3]The quote is from Putnam, Leonardi & Nanetti (1994) who attributes it to Montesquieu.

rules as a strategy to cope with legitimacy issues. For example, Hastings Banda, a member of the relatively egalitarian Chewa ethnicity from Malawi, ended up being President for life while holding several ministerial cabinets such as agriculture, foreign affairs, justice, and natural resources among others (Jackson & Rosberg 1982).

Without systematically rejecting the transmission channels mentioned above, I contend that the prospects of accessibility to new resources, which often characterized the formation of new colonial territories beyond ethnic nations, may have diverted certain rulers from their ethnic institutional norms. In particular, I show that anticipated resource opportunity - as proxied by proven oil reserves - is one potential channel through which pre-colonial ethnic institutional capital did not materialize into contemporary inclusive national polity (Tables 2.7 and **??**).

Relying on the institutional profile of the national leaders at independence to investigate consecutive political development in Africa may entail some endogeneity issues. In particular, political organizations and societal traits of certain ethnic groups may predispose their descendants to be more competitive in the race for power. Or, it could be the case that unobserved or hard-to-account-for ethnic characteristics may drive the statistical association between leaders' institutional profile and political change. To deal with these potential simultaneity or omission concerns, I employ different empirical strategies. First, as in Hariri (2012), I use the time that has elapsed between the Neolithic Revolution and independence as an instrument for pre-colonial ethnic institutional features of the first leaders.[4] Because the transition from nomadic lifestyle to sedentariness could be a relevant proxy for initial codifications of societal norms, I argue that the timing of the Neolithic Revolution can capture exogenous variation in the acquisition of institutional traits.[5]

[4]The Neolithic Revolution is the transition from the nomadism to agriculture and settlement that several societies experienced in the course of human history.

[5]By construction the data on the timing of the Neolithic Revolution is country-specific and not ethnic-specific. Since there is no specific data on when the leaders' ethnic groups transitioned from hunter-gathering to agriculture, I use the available country-level data as the proxy for the ethnicity-level data.

Using this instrumental variable strategy, I find similar result as the OLS estimation: the legacy of "good" leaders has been "bad" institutions. Second, in addition to these common empirical strategies (OLS and IV), my findings is not altered when alternative methods such as fixed effects and difference-in-differences are employed.

As far as I know, this study is the first attempt to establish a link between the institutional profile of the heads of states - as measured by the pre-colonial institutional traits of their ancestors - and political change. In doing so, it brings a new insight to the debate on institutional change and comparative development. Beyond its close affinity with the debate on the importance of history and culture (Gennaioli & Rainer 2007, Giuliano & Nunn 2013, Michalopoulos & Papaioannou 2013*b*), this paper is also related to the idea that certain disruptive societal choices or historical events - the so-called critical junctures hypothesis - may influence subsequent economic and institutional development (Collier & Collier 1993, Engerman & Sokoloff 2002). In the African context, only a recent analysis by Wantchékon & García-Ponce (2013) has investigated empirically the "critical junctures" hypothesis. While these authors examine the relationship between independence movements and post-Cold War democracy, this study focuses on the institutional background of the fathers of independence and its association with contemporary institutional development. Finally, this paper also adds to the debate about leadership quality, political selection and outcomes as initiated in the citizen-candidate literature (Besley & Coate 1997). Moreover, I fill the empirical void on the effects of leaders on institutions by showing that the quality of the first African leaders did matter for consecutive political development.

The remainder of this paper is organized as follows. In section 2.2, I discuss some relevant historical and theoretical background. Section 2.3 elaborates on the data collection of the pre-colonial ethnic institutional traits of the first leaders used in this paper, and describes other relevant data sources. Section 2.4 provides details on

the empirical exercise and highlights the main findings. Finally, I explore potential mechanisms in section 2.5 and conclude in section 2.6.

2.2 Historical and Theoretical Background

2.2.1 Pre-Colonial Ethnic Institutions in Africa

Unlike theories suggesting that the economic and political fate of modern Africa is rooted in its colonial history, other analyses have implied that Africa's contemporary economic and institutional fortune should not be systematically dissociated with the complexity of its traditional polity (Gennaioli & Rainer 2007, Michalopoulos & Papaioannou 2013*a*, Osafo-Kwaako & Robinson 2013). Before colonization, Africa was inhabited by various cultural and linguistic groups characterized by diverse degrees of hierarchical polities.[6] At the top of the pyramid, sovereigns such as the Moro Naba (Mossi Kingdom) and Sonni Ali (Songhai Empire) in Western Africa, Molambo (Bubi Kingdom) and Ilunga Sungu (Luba Kingdom) in Central Africa, and Gaki Sherocho (Kaffa Kingdom) in Eastern Africa exerted their authority over highly centralized political entities. At the bottom, the political power of local headmen from ethnic groups such as the Lobi (Western Africa), the Bari (Northern Africa), the Kung (Southern Africa) and the Kikuyu (Eastern Africa) was circumscribed to the village, not beyond. Other ethnicities, structured in the form of petty or large chiefdoms, lay in the middle of the two aforementioned systems of jurisdictional hierarchy. These include the Tukulor (Western Africa), the Bwaka (Central Africa), the Nama (Southern Africa), and the Saadi (Northern Africa).

In addition to this remarkable variety in political centralization, Africa's ethnicities are also quite heterogeneous in other institutional traits such as class strat-

[6]The information of the jurisdictional hierarchy of ethnic groups in Africa and elsewhere is collected from the Ethnographic Atlas by **?** and later corrected by Gray (1999)

ification, inheritance distribution rules for real property and the transmission of political power, among others (Murdock 1959). For example, although they lack any centralized political structure beyond the village, the Teke from the Republic of Congo tends to choose their local headmen through elections. Alternatively, other ethnicities such as the Baule from Côte d'Ivoire and the Angas from Nigeria rely respectively on matrilineal and patrilineal systems as succession rules. No doubt that this significant diversity in the spatial distribution of the institutional traits of ethnic groups is interesting in and of itself for economic and statistical analysis (Gennaioli & Rainer 2007, Nunn & Puga 2012), but more than that, these specific socio-political characteristics have also been present in the political life of some African countries. For example, the institutional norms of the Zanaki from Tanzania served as the basis of the Ujamaa, a socio-political and economic program promoted in the 1960s by Julius Nyerere, the first President of the country (Stoger-Eising 2000). Since Nyerere was himself from the Zanaki ethnicity, other heads of states may have also relied on their ancestral institutional background in conducting public affairs.

A number of studies have investigated the economic and political consequences of this significant heterogeneity in pre-colonial ethnic institutional arrangements. Although these studies generally agree on the persistence nature of the ethnic institutional traits, the results they have often generated are sometimes diverging. For example, early statehood is thought to fuel economic development (Michalopoulos & Papaioannou 2013*b*) while being inversely related to democracy (Hariri 2012). If political centralization is positively correlated with the provision of public goods such as education and health (Gennaioli & Rainer 2007) or if it tends to increase regional prosperity (Michalopoulos & Papaioannou 2013*b*), therefore, as suggested by the modernization argument, it should be less likely to engender non-democratic institutions. In the same vein, Giuliano & Nunn (2013) have also suggested that

preindustrial democratic societies are the precursors of modern-day democratic nations. However, the data exploited by theses authors, which identified Somalia, Morocco, Egypt and Tunisia as the African champions of democracy at the local level, are difficult to reconcile with the contemporary poor institutional performance of these countries (as measured by the polity score). These irregularities in previous studies encourage further empirical scrutiny about the importance of pre-colonial institutional characteristics for contemporary outcomes.

2.2.2 Leadership Quality and Outcomes

The tradition in the literature, when it comes to leadership quality, has been so far to investigate its economic consequence. For example, the unpredictable death of a leader (Jones & Olken 2005) or his level of education (Besley & Reynal-Querol 2011) has been used to predict economic performance. However, as for the institutional consequence of national leadership, the focus has been essentially on how political regimes - autocracy or democracy - select politicians, not the other way around. Here, I fill this void by considering the emergence of new states, about fifty years ago in Africa, as an opportunity to investigate the link between political development and the ethnic institutional profile of national leaders.

Whether it is informative about individuals' competence or honesty, intrinsic or acquired ethnic characteristics can be decisive in the choice of the median voter. In particular, I contend that having or lacking inclusive ethnic institutional traits may affect voters' perception on the leaders' morality in conducting public affairs. For example, because local autocracy is thought to be more pronounced in stratified societies (Gennaioli & Rainer 2007), as opposed to egalitarian communities, a descendant from a stratified ethnicity could be perceived as more inclined to produce non-inclusive institutions.

Despite the fact that culturally-induced traits are generally persistent, it has

been recognized that they can be challenged, if not deteriorated, by incentive-driven factors such as psychological and material rewards associated with power (Caselli & Morelli 2004). The distribution of power in Côte d'Ivoire between 1960 and 2000 is a good illustration of this theory. Under the presidency of Felix Houphouet-Boigny, a descendant of the inclusive Baule ethnic group, the key ministerial portfolios were concentrated in the hands of his fellow Akan people.[7] For example, under his 33 years of presidency, the ministries of economy, agriculture, and national defense, among others, have been generally occupied by either a Baule or a member of the Akan cultural family. Henri Konan Bedie, a Baule native and his successor, was the first Ivorian (the others being French descendants) to be appointed as the Minister of Economy in 1966. Since Côte d'Ivoire is the world top producer of cocoa (40% world production) and has also important oil reserves, the gap between Houphouet-Boigny's political agenda and its ethnic values could have been motivated by rent-seeking behavior. Far from being an exception, the case of Boigny seems to reflect a widespread experience across Africa. Indeed, this paper provides evidence that potential access to natural resource is one reason why descendants of inclusive ethnicities failed to generate democratic institutions in Africa.

2.3 Data

2.3.1 Leaders and their Ethnic Affiliation

To determine the identity and the ethnic affiliation of the founding fathers of post-colonial Africa, I employ a couple of approaches. First, I exploit the Archigos dataset, compiled by Goemans et al. (2006), to obtain information on the identity of 51 African heads of states at independence. Second, using a variety of sources,

[7]The Akan is a cultural group which comprises sub-ethnic groups such as the Baule, Asante, Anyi, Nzema and others who essentially live in Côte d'Ivoire and Ghana.

the then identified heads of states are matched to their respective ethnic groups.[8] It is worth mentioning that this data collection initiative, which has been voluntarily restricted to the ethnic identity of the first leaders of the sovereign African nations, is autonomous from similar enterprises undertaken by authors such as Kasara (2007) and, Franck & Rainer (2012). Columns 1-5 of Table 2.1 provide more details on the leaders' identity, their birthplace, their country of origin and their respective ethnicity.[9]

It is important to distinguish the purpose of this investigation from previous works that have used similar dataset on the ethnic identity of African leaders. Authors such as Londregan, Bienen & Van de Walle (1995), Kasara (2007) and, Franck & Rainer (2012), among others, have used similar information of leaders' ethnic identities to investigate chauvinism and political transition in Africa. This line of inquiry is beyond the scope of this paper, which is more concerned about the transmission of ethnic institutional capital to modern polity via national leaders.

2.3.2 Pre-Colonial Institutional Heritage

One objective of this paper is to use the collected information on the ethnic identity of the earliest national leaders in Africa to uncover their ethnic institutional heritage. For this, I use primarily the Ethnographic Atlas database, constructed by Murdock (1967), which provides detailed information on the preindustrial characteristics of more than 1200 societies around the globe. For Africa, the atlas contains information on 834 ethnic groups, identifies their location and describes their main cultural, political and economic features. I complement Murdock's atlas with alternative sources such as Nicholls (1913), Wilson (1971), and Stoger-Eising

[8] A leader's ethnicity is defined as the ethnicity of his parents. In the case where his parents are from difference ethnicities, I consider first the ethnicity of the father, the ethnicity of the mother being the other alternative.

[9] South Sudan, which gained independence in July 2011, is not dissociated from Sudan in this study.

Table 2.1: Ethnicities and Inherited Ethnic Institutional Capital of Leaders

Country	Leader	Birthplace	Ethnicity	Equality	Inclusiveness	Democracy	Heritage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Algeria	Bella	Maghnia	Algerians	Yes	No	No	Yes
Angola	Neto	Bengo	Kimbundu	No	No	No	No
Benin	Maga	Parakou	Bariba	No	No	No	No
Botswana	Khama	Serowe	Tswana	No	No	No	No
B. Faso	Yameogo	Koudougou	Mossi	No	No	No	No
Burundi	Micombero	Rutovu	Rundi	No	No	No	No
Cameroon	Ahidjo	Garoua	Adamawa	No	Yes	-	Yes
Cape Verde	Pires^{+}	Fogo		-	-	-	-
CA Republic	Dacko	Bouchia	Bwaka	Yes	Yes	No	Yes
Chad	Tombalbaye	Koumra	Sala/Sara	-	Yes	-	Yes
Comoros	Abdallah	Domoni	Comorians	-	-	-	-
Congo	Youlou	Madibou	Teke	No	-	Yes	Yes
Côte d'Ivoire	Boigny^{+}	Yamoussoukro	Baule	No	Yes	No	Yes
DR Congo	Kasavubu	Tshela	Kongo	No	No	No	No
Djibouti	Aptidon^{+}	Lughaya	Esa	Yes	No	No	Yes
Egypt	Nasser	Bakos	Egyptians	Yes	No	Yes	Yes
Eq.Guinea	Nguema	Nsegayong	Ngumba	Yes	Yes	No	Yes
Eritrea	Afeworki^{+}	Asmara	Tigrinya	Yes	No	No	Yes
Ethiopia	Menelek II	Shewa	Amhara	Yes	-	-	Yes
Gabon	Mba	Libreville	Fang	No	No	No	No
Gambia	Jawara^{+}	Barajally	Malinke	No	No	No	No
Ghana	Nkrumah	Nkroful	Nzema	No	No	No	No
Guinea	Toure	Faranah	Malinke	No	No	No	No
G.-Bissau	Cabral	Bissau	Pepel	No	Yes	-	Yes
Kenya	Kenyatta	Gatundu	Kikuyu	No	No	No	No
Lesotho	Jonathan	Leribe	Sotho	No	No	No	No
Liberia	Tubman	Harper	Americo Liberian	-	-	-	-
Libya	Idris	Al-Jaghbub	Sanusi	Yes	-	-	Yes
Madagascar	Tsiranana	Ambarikorano	Tsimihety*	-	Yes	-	Yes
Malawi	Banda^{+}	Kasungu	Chewa	-	Yes	No	Yes
Mali	Keita	Bamako	Bambara	No	No	No	No
Mauritania	Daddah	Boutilimit	Trarza	Yes	No	-	Yes
Mauritius	Ramgoolam	Belle Rive		-	-	-	-
Morocco	Mohammed V	Fes	Moroccans	Yes	No	-	Yes
Mozambique	Machel	Madragoa	Thonga	No	No	No	No
Namibia	Nujoma^{+}	Ongandjera	Ambo	No	No	No	No
Niger	Diori	Soudoure	Zerma	Yes	-	Yes	Yes
Nigeria	Azikiwe	Zungeru	Igbo	Yes	Yes	No	Yes
Rwanda	Kayibanda	Tare	Ruanda	Yes	No	No	Yes
Senegal	Senghor	Joal	Serer	No	No	No	No
Sierra Leone	Margai	Gbangbatoke	Mende	Yes	No	No	Yes
Somalia	Daar	Beledweyne	Hawiya	Yes	No	Yes	Yes
South Africa	Botha	Greytown	Boers	No	No	No	No
Sudan	Abboud	Suakin	Shaigiya*	Yes	-	-	Yes
Swaziland	Subhuza II	Zombodze	Swazi	No	No	No	No
Tanzania	Nyerere	Butiama	Zanaki*	-	Yes	Yes	Yes
Togo	Olympio	Lome	Ewe	No	No	Yes	Yes
Tunisia	Bourguiba	Monastir	Tunisians	-	No	-	No
Uganda	Obote	Akokoro	Lango	No	No	No	No
Zambia	Kaunda^{+}	Chinsali	Bemba	No	No	No	No
Zimbabwe	Mugabe^{+}	Harare	Zezuru	No	-	No	No

Notes: * Anthropological information on these ethnicities is from secondary sources other than the primary source based on Murdock (1967). These sources include Wilson (1967) for the Tmisihety, Stoger-Eising (2000) for the Zanaki and Nicholls (1913) for the Shaigiya.
$^{+}$ These national leaders were still in power after the end of the Cold-War.

(2000) to identify the institutional characteristics of the ethnicities not recorded in the primary data source. Of the 48 heads of states, for which the ethnic affiliation is acknowledged in my database, I have been able to systematically match 47 leaders to the institutional traits of their ethnicities.[10] Since, Tubman Harper the first president of Liberia and an Americo-Liberian descendant is from an ethnicity that is not institutionally categorized, I coded its institutional characteristics as missing and dropped it from the analysis. Columns 6-8 of Table 2.1 report the institutional characteristics that local communities may have transmitted to their descendants who would later become the founding fathers of modern Africa.

Having identified the leaders, their ethnicity, and the institutional background of their ancestors, I construct the variable of interest, labeled as "Heritage", using three pre-colonial institutional features. The first variable, identified as "Class Stratification" ranges from 1 to 5, and describes the extent of class differentiation within the ethnic group. I assign a score of 1 if there is an "absence of significant class distinctions among freemen" in an ethnic society and 0 otherwise. The second variable, "Succession to the Office of Local Headman", provides information about the appointment process of the local headman. As in Giuliano & Nunn (2013), an ethnic group has a democratic experience and given a score of 1 if the mode of succession of its local headman is through elections or consensus, and 0 otherwise. The third and last variable captures the "Inheritance Distribution for Real Property (Land)". I assign a score of 1 to an ethnic group that falls into the category "equal or relatively equal", and 0 otherwise.

Why are the leaders with the aforementioned ethnic institutional heritage defined as "good" leaders in this study? Simply because these variables are either direct measures of democracy - in the case of the succession by elections or consensus -

[10]Since the islands of Cape Verde, Comoros and Mauritius appear in the Ethnographic Atlas as uninhabited, the ethnic identities of their respective first leaders, Pedro Pires, Ahmed Abdallah and Sir Seewoosagur Ramgoolam, are coded as unknown.

or correlates of political participation - in the case of the absence of stratification or the equal distribution of inheritance. For example, Ember et al. (1997) use anthropological data and show that absence of class stratification, a measure of equality, is positively correlated with political participation across cultures. As for the equal distribution of inheritance among the heirs, De Toqueville (1829) in his assessment of democracy in Western societies has also praised the "virtue of the law of partible inheritance" as an important foundation of the Anglo-American political inclusion. Finally, a recent paper by Giuliano & Nunn (2013) has also shown that some states are democratic today because their ancestors embraced democracy before the industrial Revolution. In the context of this study, I assume that the African leaders with one of these ethnic institutional qualities are the ones that took office at independence with a democratic heritage.

Figures 2.1 - 2.4 show the spatial distribution of the three pre-colonial institutional characteristics that are the focus of this analysis: class stratification; succession of the local headman; and inheritance distribution for real property. The blue and green polygons on these maps indicate the variables that have been coded as 1, while the other colored polygons show the variables coded as 0. Finally, polygons showing missing information and uninhabited areas are left blank. As shown in these maps, there is a substantial degree of variation in the ethnic institutional traits within and across the African countries. It also appears that some of these institutional characteristics may overlap. For example, while the Bwaka (Central African Republic) and the Ngumba (Equatorial Guinea) are both characterized by egalitarian property rights and societal inclusiveness practices, the Egyptian Arabs (Egypt) and the Zerma (Niger) seem to have been characterized by both egalitarian property rights and democratic norms. Other societies such as the Teke (Congo), the Baule (Côte d'Ivoire) and the Ewe (Togo) could only claim one dimension of the ethnic institutional capital as defined above, namely societal inclusiveness.

To construct the country-level independent variable of interest in this study, the starting point is the ethnic identity of each country's first leader at independence. If the first head of state is a descendant of an ethnic group whose institutional traits fall in one of the three categories of the ethnic institutional capital previously defined - i.e. societal inclusiveness, democratic norms, and egalitarian property rights - then his country is assigned a score of 1 for that variable. The countries whose leaders do not satisfy this requirement are given the score of 0.[11]

[11] Under this criterion, 25 out of 47 countries are identified as having a leader from a democratic background. However, when I impose that the first leader be a descendant of an ethnic group whose characteristics fall in three or two categories, I ended up with 0 and 7 countries, respectively.

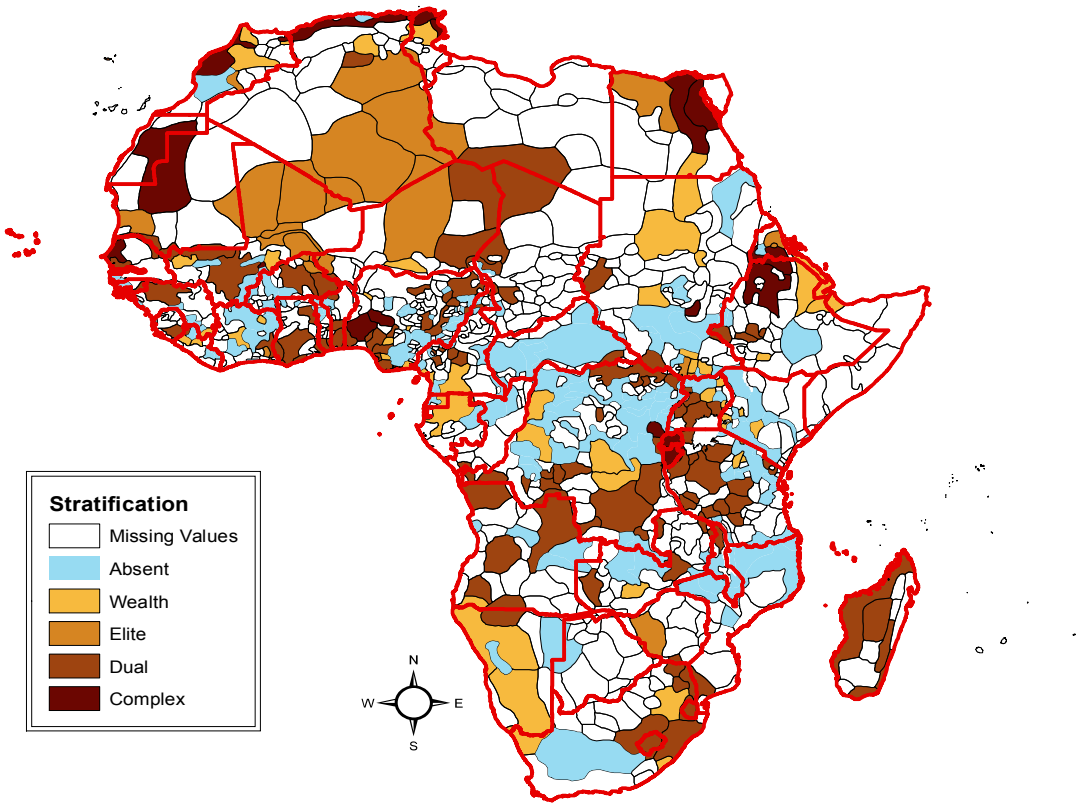

Figure 2.1: Spatial Distribution of Social Stratification in Ethnic Territories

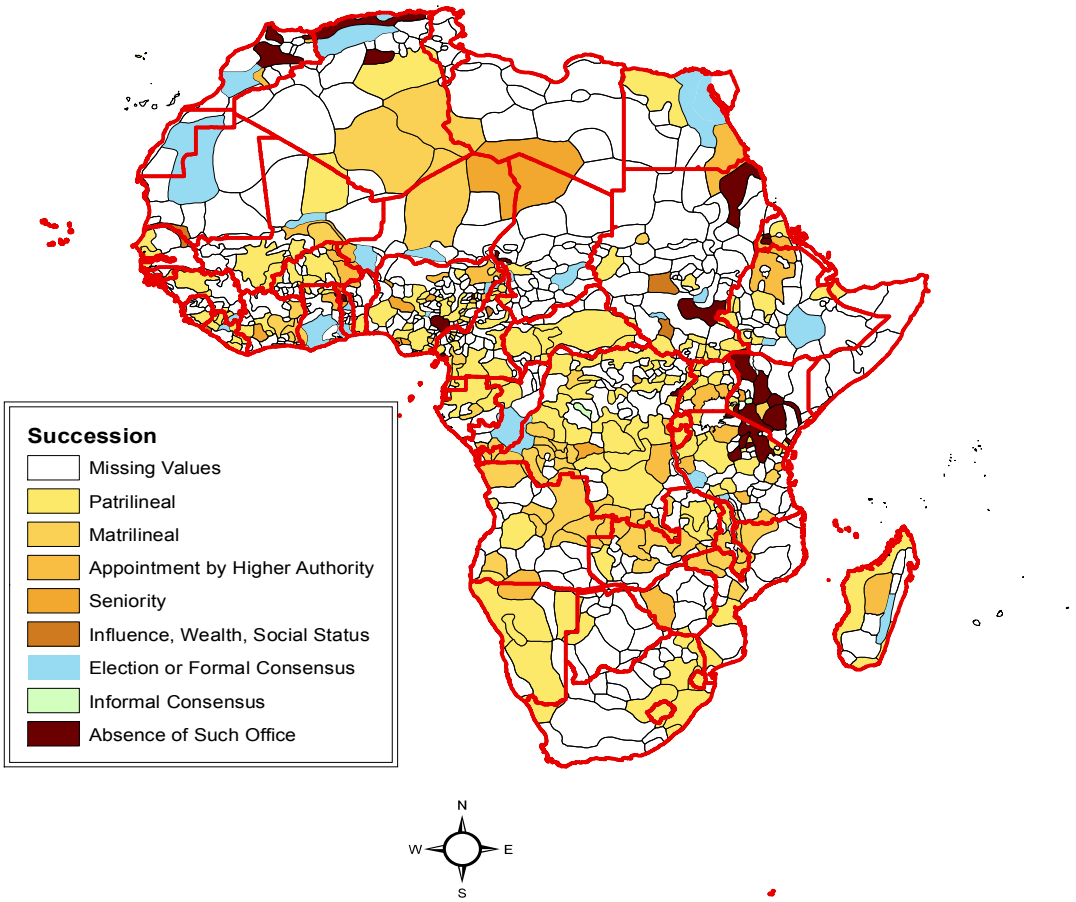

Figure 2.2: Succession to the Office of the Local Headman

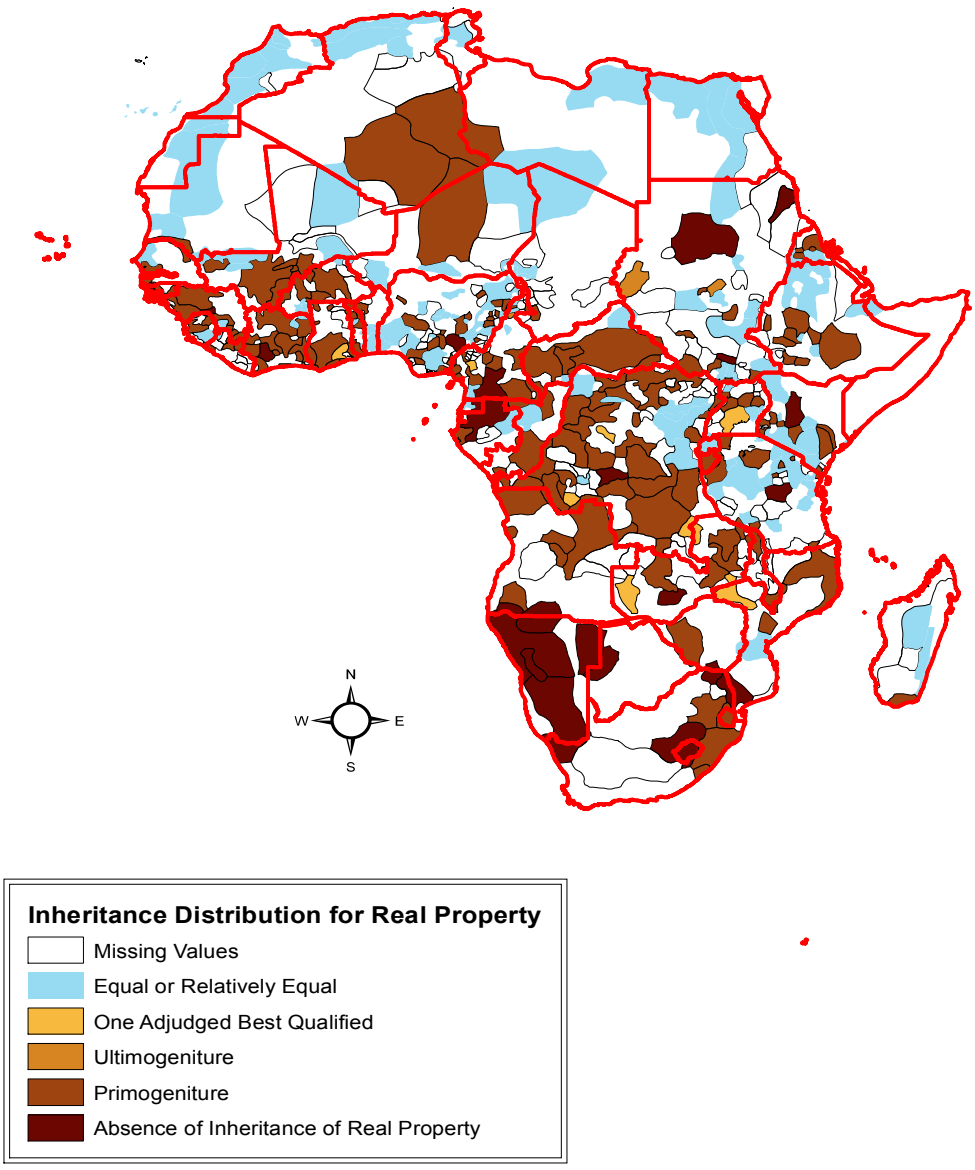

Figure 2.3: Inheritance Distribution for Real Property (Land)

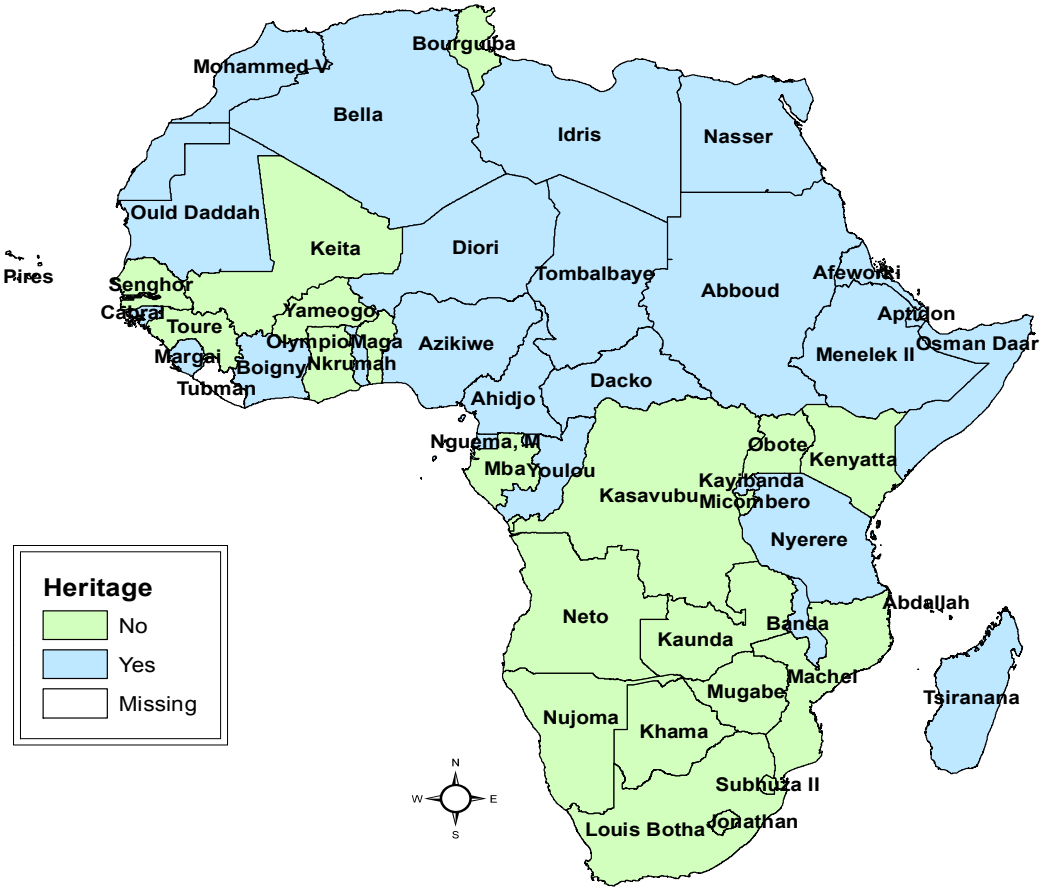

Figure 2.4: First Leaders and Democratic Heritage

In figure 2.4, the countries whose leaders could claim an ethnic institutional capital heritage are shown in blue, and the countries whose leaders do not have such an institutional background are shown in green. As previously mentioned, countries for which there is no information on the ethnic institutional background of the first leaders are displayed in white (See Liberia for example).

Among the 47 countries, for which information on the institutional background of the first leaders are available, 25 countries were run at independence by leaders coming from institutionally inclusive - from the perspective of this study - local communities. Most of the countries identified in Giuliano & Nunn (2013) as having a tradition of local democracy in Africa, namely Somalia, Morocco and Egypt are in this sample. It also includes Sub-Saharan African countries such as Côte d'Ivoire, Niger, Rwanda and Malawi, among others. For the 22 remaining countries, the map shows that they are also spatially spread all over the African continent. Among them, there are Southern African countries such as South Africa and Namibia, as well as Western African countries such as Mali and Senegal, and Tunisia a Northern African state.

2.3.3 Measuring Democracy

To measure the contemporaneous level of political development in Africa, I use the most recent version of the Polity2 score, developed in the Polity IV project by Marshall & Jaggers (2012). This is a broad measure of democracy, which classifies countries from the most exclusive political regime (-10) to the most inclusive political system (+10). Specifically, the country-level Polity2 score is obtained from subtracting each country's Autocracy score from its Democracy score. Since both the Autocracy and Democracy variables reflect, by construction, the extent to which political participation is fair and open as well as the constraints on the chief executive, so does the Polity2 index.

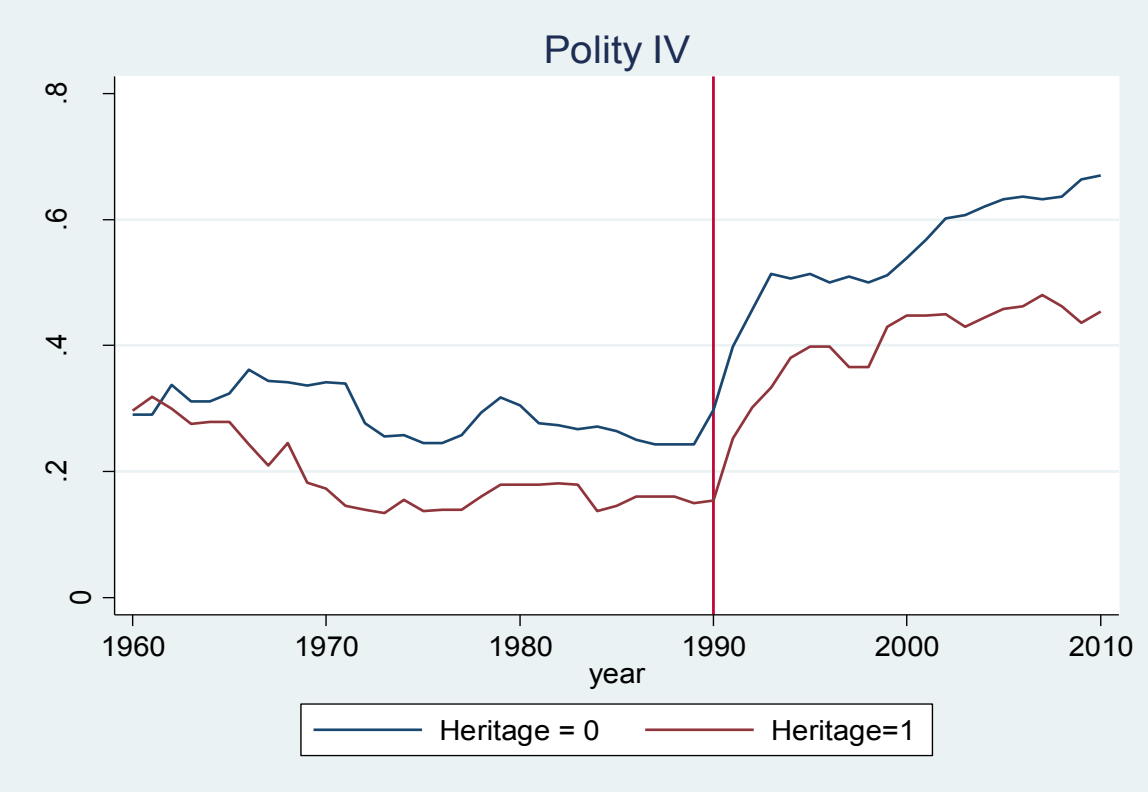

Figure 2.5: Annual Changes in Average Level of Democracy using Polity2 Score

As shown in figure 2.5, post-independence political experience in Africa under the two types of leadership defined above is characterized by two waves. During the first wave, which lasts from 1960 to 1990 and overlaps with the Cold War era, there was less variation in democratic experience.[12] Nonetheless, countries for which the variable heritage is coded as 1 performed better politically than their counterparts during this time period. As for the second wave, which starts at the end of the Cold War in 1990, there is a significant variation in democratic scores with a notable comparative advantage in favor of countries whose leaders lack the ethnic institutional capital as previously defined. These countries' mean normalized - on a 0-1 scale - post-Cold War democratic score is about 0.571 when the others have 0.416 (Table 2.2).

Motivated by this significant variation in Africa's institutional trend after 1990, and following authors such as Wantchékon & García-Ponce (2013) and Hariri (2012), the primary empirical specifications in this study (OLS and IV estimations) use the post-Cold War average level of democracy as the main dependent variable. The average normalized level of democracy at that time varies from the minimum score of 0.045 to the maximum score of 1.[13] Since a score of 1 indicates the most inclusive political regime (equivalent to +10 in the original coding system), states like Botswana (0.886), South Africa (0.932), Cape Verde (0.954) and Mauritius (1) seem to be the most democratic African regimes. At the bottom of the list, Swaziland (0.045), Eritrea (0.170), Libya (0.182) and Morocco (0.191) are the least democratic states.

It is worth mentioning that in addition to the OLS and IV specifications, I also use, for extensions, alternative empirical strategies that are not restricted to the

[12] This result is consistent with similar observation in Wantchékon & García-Ponce (2013) in which countries with insurrectional legacy and civil disobedience legacy present similar trends during the Cold War period.

[13] The statistics on the minimum and maximum values are not shown in the summary statistics Table 2.2, but they are available upon request.

post-Cold War polity scores. In particular, in the Difference-In-Differences and the Fixed Effects estimations, I consider annual democratic scores for both the pre-Cold War and the post-Cold War era to analyze the link between ethnic institutional capital of the first leaders and the trajectory of contemporaneous political development in Africa.

2.3.4 Neolithic Revolution and Other Historical Events

Is the intrinsic quality of a politician stemming from his ethnic heritage, whether it signals his competence or his degree of honesty, important for political competition? If one answers this question by the affirmative, then linking institutional heritage to political outcome may entail some endogeneity problems. Simply put, some African leaders who competed for power right after colonization may have been selected by their constituencies or the former colonial powers because their ancestral heritage was a significant asset. To overcome this issue, I must identify a source of exogenous variation in the institutional characteristics of national leaders. Before that, it is important to recall that a critical assumption of this paper is that leaders' institutional quality was inherited from their ancestors. Thus, a possible source of exogenous variation in the pre-colonial institutional features of ethnic nations can eventually be used as an instrument for the institutional quality of the first leaders. Because it ascertains the transition from the nomadic lifestyle to sedentariness, which is the starting point of initial codification of societal norms, I use the timing since the Neolithic Revolution as instrument for the pre-industrial institutional traits that the ethnic groups transmitted to the national leaders. Of course, this instrumental variable may not be perfect for two main reasons. First, it is by construction a country-level proxy for the transition from hunting and gathering to agriculture and settlement, not an ethnic-specific proxy, which would have been ideal for this paper. Second, its accuracy could be undermined by potential

migration patterns across the continent, something Putterman & Trainor (2006), who collected the data, have claimed that they took into account. Nonetheless, as shown in Table 2.2, countries in which the leaders inherited some ethnic institutional capital seem to have experienced their agricultural Revolution almost 1000 years before their counterparts.

Other historical variables may have been important for contemporaneous level of democracy. As a precaution against the likelihood that factors such as colonial origins, ethnic or religious fragmentations and the duration of civil conflict drive the link between ethnic heritage and democracy, I include them as control variables. The colonial origin control is a dummy variable indicating whether the country is a former British, French or Portuguese colony, which aims at capturing the difference in democratic experiences among countries distinguished along their former colonial powers. The data on ethnic and religious fragmentation, and years of civil conflict are collected from Fearon & Laitin (2003) and the Correlates of War project compiled by Sarkees & Schafer (2000), respectively.

2.3.5 Economic and Geographic Factors

Motivated by the empirical regularities between economic development and democracy, I control for development statistics using data provided by the World Bank such as GDP per capita, population size, and the share of population living in urban areas. More specifically, while the data on GDP per capita and population size cover the period 1960-2010, information on the share of the urban population I use is restricted to the period 1950-1955 and it aims at giving the extent of urban lifestyle at independence. By including the latter, I want to ascertain, as in Wantchékon & García-Ponce (2013), that the result is not influenced by the degree of earlier "modernization." In order to take into account the resource curse hypothesis and its implications for institutional development, I also include a variable that captures for

Table 2.2: Summary Statistics

	Full		Heritage=0		Heritage=1	
	(1)		(2)		(3)	
Panel A. Pre-Colonial Institutional Traits and Neolithic Revolution						
	Mean	Std.	Mean	Std.	Mean	Std.
Property Rights	0.38	0.49	0.00	0.00	0.76	0.44
Societal Inclusiveness	0.25	0.44	0.00	0.00	0.53	0.51
Democratic Norms	0.17	0.38	0.00	0.00	0.43	0.51
Heritage	0.53	0.50	0.00	0.00	1.00	0.00
Neolithic Revolution (x1000)	2.89	1.27	2.53	0.24	3.47	1.20
Panel B. Democracy, Relevant Controls, and Potential Mechanisms						
Polity2 (Post-Cold War)	0.52	0.23	0.57	0.24	0.42	0.18
GDP per Capita (Logarithm)	6.61	1.10	6.67	1.14	6.51	1.05
Population (Logarithm)	15.82	1.38	15.91	1.19	16.06	1.37
Urban Population Growth (% of Total Population)	5.56	1.77	5.45	2.11	5.73	1.49
Natural Resource Dependence	1.86	1.18	1.73	1.20	2.04	1.21
Ethnic Fragmentation	0.64	0.24	0.62	0.26	0.69	0.20
Religious Fragmentation	0.47	0.24	0.55	0.25	0.43	0.29
Years of Civil Conflict	6.78	9.78	6.82	9.77	7.48	10.47
French Ex-Colony	0.41	0.50	0.32	0.48	0.48	0.51
British Ex-Colony	0.37	0.49	0.46	0.51	0.32	0.48
Ruggedness	0.99	1.14	1.01	1.35	0.87	0.88
Latitude	13.50	9.67	14.24	10.09	12.94	9.97
European Language	0.04	0.13	0.02	0.03	0.002	0.01
Executive Constraints in 1970	3.02	1.72	2.95	1.91	1.96	1.06
Crude Oil Proved Reserves (Billion Barrels)	1.47	5.10	0.31	0.91	2.73	7.09

each country its degree of natural resource dependence. Using the World Bank WDI data on mineral fuel, ores and metal exports as a share of merchandise exports and following Jensen & Wantchékon (2004), I attribute to each country a score ranging from 1 to 4 according to its degree of resource dependence. In particular, a country receives a score of 1, 2, 3 and 4 if the share of natural resources in merchandise exports was less than 25%, between 25% and 50%, between 50% and 75%, and greater than 75%, respectively over the period 1980-2010.

I also include geographic factors such the absolute value of latitude and measure of terrain ruggedness index. Following Jared (1997), it is possible that countries situated along similar latitudes, because they shared similar climates, were more likely to be exposed to the propagation of institutional capital and technology. As for terrain ruggedness, it could incentivize reliance on guerilla warfare as a method of political dissent and ultimately affect institutional outcomes such as democracy (Wantchékon & García-Ponce 2013). The data on the index of terrain ruggedness comes from Nunn & Puga (2012).

2.4 The Empirics of Leaders' Institutional Heritage and Democracy

As already discussed in section 2.3.3, democratic experience in post-independence Africa is marked by a significant variation in the post-Cold War era (Figure 2.5). As a consequence, the left-hand side variable in the primary econometric specifications of this study (OLS and 2SLS) is the average level of post-Cold War democracy, covering the period 1991-2010. This raises the question of whether or not it is pertinent to use the ethnic institutional profile of the first leader to predict long-term political changes.[14] As relevant as this question is, its resolution necessitates a rigorous sta-

[14]In the database on national leadership in Table 2.1, approximately 18% (9 out of 51) of the African first heads of states stayed in power after the end of the Cold War. These heads of states

tistical investigation as I intend to do here using the critical junctures hypothesis. A key insight of this institutional path dependence theory is that contemporary institutional development may well be explained by certain critical historical moves or choices (Collier & Collier 1993). This idea is well summarized by Bratton, Van de Walle & Lange (1997) when they write that *"a contingent model of change assumes that one agent's initiative prompts another actor's response and that political events cascade iteratively from one to another."*

In what follows, I use a couple of conventional econometric frameworks to formally investigate the link between African leaders' ethnic institutional traits at independence and contemporary political development.

2.4.1 Ordinary Least Squares

In Table 2.3, I summarize the results based on the following ordinary least squares regression that associates the post-Cold War average level of democracy with the African leaders' ethnic institutional profile at independence:

$$Democracy_i = \alpha + \beta Heritage_i + X_i^{'}\Gamma + \varepsilon_i, \tag{2.1}$$

where $Democracy_i$ is the average level of democracy over the period 1991-2010 in state i, as measured by the Polity2 index; $Heritage_i$ is a binary variable that equals 1 if the first leader of state i is a descendant of an ethnic group with at least one of the following institutional characteristics: absence of class stratification among freemen; equal or relatively equal distribution of inheritance for real property; and/or using elections or other forms of consensus in the succession of the local headman. Otherwise, it takes the value 0. In addition to these two variables, I also include X_i, which is a set of country-specific control variables including geographic,

are indicated with the symbol (+) in Table 2.1.

historical, and economic factors. For the economic variables, I use the post-Cold War average of GDP per capita, population size (both in logarithm terms), the share of population living in urban areas between 1955 and 1960 as well as the natural resource dependence measure. While the coefficient β, the parameter of interest, captures the effects of the first leaders' ethnic institutional quality on contemporary democracy, the terms α and ε_i are the constant and the stochastic error, respectively.

To assess the importance of the first leader's quality on democracy, I start by evaluating a univariate regression in which average post-Cold War democracy is regressed on the variable Heritage (Column 1). If Heritage captures democratic norms, either directly (succession by consensus) or indirectly (no stratification and partible inheritance rules being positively correlated to political participation), one might intuitively expect a positive coefficient β, suggesting that leaders with the aforementioned ethnic institutional backgrounds should be more likely to transmit democracy as a political legacy. On the contrary, the results displayed in column 1 indicate a negative (-0.154) and statistically significant coefficient at the 5% level on Heritage, implying that leaders with good ethnic institutional capitals produce less democracy relatively to their counterparts without a similar heritage. Although this less intuitive result requires additional empirical investigations, it is still consistent with the summary statistics compiled in Table 2.2, in which it appears that the political legacy of the institutionally well-endowed leaders is less inclusive than the legacy of their counterparts.

In subsequent columns (columns 2-6), I progressively add the relevant subcategories of controls (columns 2-5) including successively the economic controls (column 2), the geographic controls (column 3), the historical controls (column 4), and both economic and geographic controls (column 5), before I consider all the controls variables in column 6. The economic controls are: the average level of GDP per capita (logarithm) and population size (logarithm) between 1991 and 2010; the share of

Table 2.3: Ordinary Least Squares Estimates

Dependent Variable is Post-Cold War Average Level of Democracy						
	(1)	(2)	(3)	(4)	(5)	(6)
Heritage	-0.154**	-0.150**	-0.158**	-0.140**	-0.152**	-0.129**
	(0.061)	(0.062)	(0.061)	(0.057)	(0.063)	(0.055)
GDP per Capita		-0.027			-0.028	-0.032
		(0.035)			(0.038)	(0.031)
Population		0.011			0.010	0.009
		(0.026)			(0.030)	(0.028)
Urban Growth		-0.020			-0.017	-0.022
		(0.023)			(0.021)	(0.019)
Resource Dependence		-0.021			-0.025	-0.019
		(0.024)			(0.024)	(0.023)
Latitude			-0.001		0.000	0.008**
			(0.003)		(0.003)	(0.003)
Ruggedness			-0.015		-0.016	-0.005
			(0.038)		(0.043)	(0.039)
French Ex-Colony				-0.037		-0.052
				(0.073)		(0.072)
British Ex-Colony				-0.020		-0.074
				(0.066)		(0.070)
Ethnic Fragmentation				0.220		0.266
				(0.166)		(0.178)
Religious Fragmentation				0.197		0.340**
				(0.125)		(0.144)
Years of Conflict				-0.005**		-0.007***
				(0.002)		(0.002)
Constant	0.571***	0.724	0.603***	0.384***	0.751	0.445
	(0.050)	(0.553)	(0.058)	(0.109)	(0.635)	(0.576)
Observations	47	46	47	47	46	46
R^2	0.128	0.206	0.139	0.302	0.211	0.454

Robust Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

urban population at the eve of the 1960s; and the natural resource dependence variable. Including this first subcategory of control variables in column 2 does not alter the qualitative result of the univariate case; the coefficient of Heritage is still negative and statistically significant at the 5% level, and neither GDP per capita nor the two population variables seem to have been statistically important for contemporary democratic performance.

In columns 3-5, I first add to the baseline specification the geographic (column 3) and historical controls (column 4) separately, before considering together both the economic and geographic covariates in column 5. Once again the negative correlation between the first leader's ethnic institutional heritage and post-Cold War democracy is robust across these alternative specifications. More specifically, the geographic factors including the absolute latitude and the terrain ruggedness index have no significant statistical effects on contemporary democracy whether they are included solely (column 3) or with the economic controls (column 5) in the reduced form equation 2.1. As for the historical controls in column 4, while former colonies dummies and both ethnic and religious fragmentation seem not to matter for democracy in this framework, the extent of civil wars is negatively associated with post-Cold War political participation at the 5% level of statistical significance. Although there is less intellectual consensus on the detrimental effects of war in general and civil war in particular on institutional building (Blattman & Miguel 2010), this finding suggests that the extent of civil conflict may have weakened democratic institutions in Africa after the fall of the Berlin Wall and the collapse of the Soviet Union.

Column 6 includes all the covariates from the subset of controls previously presented. Interestingly, the coefficient of the absolute value of latitude enters the system with a positive and statistically significant sign at the 5% level. This provides support to the argument of Jared (1997) that technology and institutions were

easily spread along the East-West axis than along the North-South axis.[15] In addition to the importance of this geographic factor, two historical variables, namely religious fragmentation and the duration of civil conflict, appear in the specification with the expected signs. I find a strong and positive correlation between religious diversity and political inclusion, as measured by the polity score. Also, as before, the duration of civil war appears to hinder democracy. Regarding the coefficient of Heritage, it is still negative and statistically significant at the 5% level confirming that the result of the univariate case in column 1 is robust to controlling relevant geographic, historical and economic factors. In sum, African leaders who inherited egalitarian and democratic norms from their ancestors, as opposed to the ones without such an institutional quality, have been on average less successful in conveying inclusive institutions as political legacy. On average, the post-Cold War democracy score in the countries of the "good" leaders is about 0.15 lower - on a 0-1 scale - than the level of democracy in the countries of their counterparts.

2.4.2 Two-Stage Least Squares

In the previous section, both the univariate and the multivariate OLS estimations of the reduced-form specifications, linking first leaders' ethnic institutional quality to democracy, have shown a reversal of fortune in the transmission of democratic norms in Africa. Before I investigate the underlying mechanisms at play, it is important to address potential concerns that may affect the reliability of the OLS results. Perhaps the quality of the first leaders at the birth of new African states was an important aspect of their accession to political power. It is possible, for instance, that the initial political and institutional traits of some ethnic groups may predispose their descendants to be more or less competitive in the race for power and its exercise.

[15]The positive correlation between latitude and democratic outcome, as measured by the polity score, means that African countries at high attitude tend be relatively more democratic than tropical countries.

Or, it may be the case that the leaders who ended up being heads of states at independence were chosen by the former colonial powers because of their initial political or institutional heritage. If the advent of the first leaders in power happened under any of these circumstances or similar conditions, then the results presented so far will suffer from an endogeneity bias.

To deal with this potential endogeneity problem, I use an instrumental variables approach. As in Hariri (2012), I employ the time that has elapsed between the Neolithic Revolution and each country's independence date as an instrument for the pre-colonial ethnic institutional features of its dwellers. Because the Neolithic Revolution ascertains the transition from nomadic lifestyle to sedentariness, it may be relevant in explaining initial codifications of societal norms, thus being a correlate of the institutional features of the countries' ethnicities.

Using the premises that earlier institutional arrangements depend on the timing of the Neolithic Revolution, and that having or not a particular institutional profile is an indirect consequence of the Neolithic Revolution, I estimate the following linear probability equation:

$$Heritage_i = \kappa + \sigma Neolithic_i + X_i^{'}\Delta + \mu_i, \tag{2.2}$$

where $Neolithic_i$ is the time that has run out between the Neolithic transition and the accession of state i to independence. $Heritage_i$ is a dummy variable that indicates, as before, whether or not the leader of the state i is a descendant of an ethnic group having egalitarian and democratic pre-colonial institutional norms. X_i is a set of controls identical to the ones defined in the OLS case. κ, μ_i and σ are the constant, the error term, and the coefficient of correlation between the variables $Neolithic_i$ and $Heritage_i$, respectively.

In the 2SLS terminology, equation 2.2 being the first-stage, the second stage is

Table 2.4: Two-Stage Least Squares Estimates

Second Stage: Dependent Variable is Post-Cold War Average Level of Democracy						
	(1)	(2)	(3)	(4)	(5)	(6)
Heritage	-0.453***	-0.536**	-0.481***	-0.341**	-0.601**	-0.305**
	(0.175)	(0.222)	(0.168)	(0.172)	(0.256)	(0.122)
GDP per Capita		-0.053			-0.071	-0.075**
		(0.043)			(0.062)	(0.035)
Population		0.028			0.027	0.017
		(0.044)			(0.048)	(0.027)
Urban Growth		-0.013			-0.004	-0.022
		(0.027)			(0.028)	(0.018)
Resource Dependence		0.010			0.010	0.004
		(0.040)			(0.045)	(0.024)
Latitude			-0.002		0.003	0.012***
			(0.004)		(0.006)	(0.004)
Ruggedness			-0.027		-0.037	-0.000
			(0.034)		(0.036)	(0.031)
French Ex-Colony				-0.026		-0.015
				(0.088)		(0.075)
British Ex-Colony				-0.015		-0.043
				(0.075)		(0.078)
Ethnic Fragmentation				0.311*		0.356**
				(0.181)		(0.166)
Religious Fragmentation				0.101		0.368**
				(0.156)		(0.156)
Years of Conflict				-0.005		-0.008***
				(0.003)		(0.003)
Constant	0.729***	0.709	0.793***	0.467***	0.823	0.486
	(0.108)	(0.822)	(0.108)	(0.138)	(0.963)	(0.535)
Observations	44	43	44	44	43	43
R^2	.	.	.	0.050	.	0.346
First Stage: Dependent Variable is Heritage Dummy						
Neolithic	0.169***	0.151***	0.177***	0.166***	0.147**	0.196***
	(0.040)	(0.047)	(0.041)	(0.048)	(0.054)	(0.069)
Economic Controls	No	Yes	No	No	Yes	Yes
Geographic Controls	No	No	Yes	No	Yes	Yes
Historical Controls	No	No	No	Yes	No	Yes
Observations	44	43	44	44	43	43
R^2	0.159	0.208	0.168	0.219	0.209	0.275

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

the equation 2.1. Using the 2SLS procedure, I estimate both equations and compile the regression results in Table 2.4. This technique implies that the effect of Heritage on contemporary democratic performance is causal if the exclusion restriction that the variable Neolithic is absent from equation 2.1 is valid. In other words, if the timing between the Neolithic transition and independence matters for post-Cold War democracy, it is probably because its correlation with the ethnic institutional quality of the first leaders.

As shown in Panel 2 of Table 2.4, there is a strong and positive correlation between the Heritage dummy and the Neolithic variable. As for the coefficient of the variable of interest, the Heritage dummy, its estimates via 2SLS with the subsets of controls are presented in columns 1-6 of Panel 1 in Table 2.4. Once again, I find a strong and negative correlation between the Heritage dummy and post-Cold War democracy levels. On average, the institutional legacy of "good" leaders has been about 0.45 lower, in terms of the polity score, than the institutional legacy of the leaders with the alternative ethnic institutional quality. The estimated coefficient is higher than the OLS estimates (Table 2.3) and it is highly statistically significant with an average standard deviation of about 0.18.

2.4.3 Extensions: Difference-in-Differences and Fixed Effects

It could be the case that unobserved or hard-to-account-for country-specific (or ethnic-specific) characteristics are driving the statistical link between leaders' ethnic institutional quality and post-Cold War political trajectory in Africa. Ideally, a time-series cross-sectional data on the ethnic institutional background of the African leaders would be preferred to deal with these potential issues, but the binary nature of the Heritage is an obstacle for such an econometric analysis. Nonetheless, following Wantchékon & García-Ponce (2013), I can exploit the structural break in the African states' polity score in 1990, as shown in figure 2.5, to extend the

econometric analysis beyond the cross-sectional frameworks used so far.

Political scientists such as Villalón & Huxtable (1998) have often interpreted this discontinuity in African polities following the fall of the Berlin Wall as one of the most critical steps in the emergence of different political paths. In the same vein, Wantchékon & García-Ponce (2013) have also suggested that the end of the Cold War could also be seen as the end of direct international interferences in African national polities. If these theories are accurate, then the impact of the leaders' ethnic institutional quality on democracy in their respective countries should be more important after than before 1990.

As in Wantchékon & García-Ponce (2013), I confront this hypothesis to an empirical scrutiny using the difference-in-differences method. In doing so, I compare democracy levels between pre and post stage of the Cold War in the two categories of countries: the ones where the first leaders inherited the egalitarian and democratic norms and the ones where the first leaders did not have such a heritage. In particular, the following equation is estimated:

$$Democracy_{it} = \alpha_i + (Heritage_i \cdot post1990_t)'\varphi + post1990_t'\vartheta + \epsilon_{it}, \tag{2.3}$$

where $Democracy_{it}$ is the average level of democracy at time t, t being the period before or after the Cold War; $\alpha_i i$ is the country fixed-effects which captures time-invariant country characteristics; $post1990_t$ is a dummy variable that equals to 1 for the post-Cold War era, and 0 otherwise; $Heritage_i \cdot post1990_t$ is an interaction between the $Heritage_i$ dummy and the $post1990_t$ dummy; and ϵ_{it} is the error term. While the coefficient ϑ captures the overall difference in democracy levels between the Cold War era and the post-Cold War era, the coefficient φ should inform the reader on the difference in the post-Cold War levels of democracy between the two types of countries.

The same hypothesis can also be tested using the fixed-effects approach. For this, I estimate the following equation:

$$Democracy_{it} = \alpha_i + \pi_t + (Heritage_i \cdot post1990_t)'\theta + post1990_t'\phi + v_{it}, \qquad (2.4)$$

where $Democracy_{it}$ is defined as before with the exception that t is now every year since independence before and after the end of the Cold War; αi, π_t and X_{it} are the country and year fixed effects, and a set of time-varying controls such as GDP per capita and population size, respectively. The coefficient θ aims at capturing the difference in democracy levels after the Cold War between the two categories of countries.

The results of both the DID and the FE estimations, displayed in Table 2.5, are consistent with the previous findings obtained from both the OLS and IV estimations. The political legacy of the leaders whose ancestors had inclusive and democratic pre-colonial institutions has been less democratic than the political legacy of their counterparts. This result is not only robust to several control variables such as economic, historical and geographic covariates, but it is also strong when alternative econometric methods to the standard OLS procedure are used, including the DID and FE techniques. Moreover, the statistical links between the ethnic institutional quality of the first African leaders and contemporary democracy levels seem to be a causal relationship, as suggested by the results of the 2SLS methodology.

Table 2.5: Difference-in-Differences and Fixed-Effects Estimates

Dependent Variable is Average Level of Democracy since Independence					
	DD	**FE**		**FE Robust SE**	
	(1)	(2)	(3)	(4)	(5)
Heritage x Post Cold War	-0.154**	-0.039**	-0.036**	-0.039**	-0.036**
	(0.061)	(0.016)	(0.016)	(0.016)	(0.016)
Post Cold War Dummy	0.324***				
	(0.058)				
GDP per Capita			-1.122*		0.080***
			(0.064)		(0.312)
Population			-0.175		0.051***
			(0.213)		(0.008)
Constant	0.247***	0.353***	0.144	0.353***	-1.093***
	(0.030)	(0.112)	(0.127)	(0.092)	(0.193)
Observations	93	2352	2299	2352	2299
R^2	0.303	0.358	0.361	0.583	0.589
Country FE	Yes	Yes	Yes	Yes	Yes
Year FE	No	Yes	Yes	Yes	Yes

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

2.5 Uncovering Potential Mechanisms

Did the ethnic institutional characteristics of the first African leaders at independence play a crucial role in subsequent political development? The sequence of statistical methods I have used so far to investigate this important issue suggests that I answer this question in the affirmative. Surprisingly, leaders whose ethnicities are identified in anthropological records as having democracy-enhancing features seem to have been the ones who transmitted non-democratic institutions as political legacy. The question now is why did the "good" leaders produce "bad" institutions? In what follows, I explore a series of theories about social norms, whether they are attitudinal (what people from a particular kinship are supposed to do) or behavioral (what they actually do), that may be relevant in explaining this institutional turnabout. Specifically, using the World Values Survey database, I start by examining whether or not individuals belonging to the ethnicities I have identified as having inclusive ancestral backgrounds tend to be more or less supportive of contemporary democratic institutions. Next, I also investigate alternative explanations including political and materialistic motivations that may have incentivized African national leaders to opt for a political choice that is at the odds of their social virtues.

2.5.1 Attitudes Towards Democracy

One of the underlying hypotheses of this paper is the idea documented by Giuliano & Nunn (2013) that suggests an intergenerational transmission of democracy. These authors have empirically demonstrated that the transmission of democracy from pre-industrial local communities to modern states may have been partly possible because of the positive impact of the earlier democratic experiences on citizens' attitudes towards contemporary democratic institutions. In the context of this paper, it is unclear whether the non-transmission of local democracy is explained by

the national leadership effects solely or a shift in the perception about democracy of the descendants of the politically inclusive ethnicities. Using both the World Values Survey (WVS hereafter) database and the information collected by Fearon (2003) on the share of ethnic groups in each country, I test the latter hypothesis by looking at people's perception and beliefs about democratic institutions in their respective countries of residence. From the integrated WVS database, which contains five waves, I use the information on the 14 African countries in which the survey has been conducted at least once.[16]

Following Giuliano & Nunn (2013), I estimate the following individual-level regression using the OLS technique:

$$Y_{ict} = \alpha_t + \pi_t + \beta DemoHeritage_c + X'_{ict}\gamma + \varepsilon_{ict}, \tag{2.5}$$

where Y_{ict} represent successively one of the three outcomes variables capturing individual i's perception about democracy in his country of residence c during the wave t of the World Values Survey. The first outcome, labeled in the WVS as E117, is an ordinal and discrete variable varying from 1 to 4 that summarizes respondents' self-reported assessment about the importance of diverse political systems. Regarding democracy, the possible answers and their numerical values are: it is a very bad (1), fairly bad (2), fairly good (3) or very good (4) method of governance. The second outcome variable (E123) collects the informants' opinion about the following statement: "Democracy may have problems but it is better than any other form of government." Possible answers are: strongly disagree (1), disagree (2), agree (3), and agree strongly (4).[17] The third variable (E235), which assesses people's view

[16]The World Values Survey covered the following periods: 1981-1984, 1989-1993, 1994-1999, 1999-2004 and 2005-2008. Among the African countries, only South Africa appears in the five waves. While countries such Nigerian, Morocco and Egypt are included in three and two waves respectively, the remaining 10 African countries appear in one wave.

[17]In the original WVS database the coding structure for the responses to E117 and E123 is as follows: very good (1), fairly good (2), fairly bad (3), and very bad (4); agree strongly (1), agree

about the importance for them to reside in a democratically governed country, attributes to each answer a numerical value varying from 1 to 10. While a score of 1 indicates that democracy is "not important at all" for the respondents, a score of 10 means that it is "absolutely important" for them.

$DemoHeritage_c$ is a country-level variable, which measures either (i) the proportion of a country's ethnicities whose ancestors were characterized by egalitarian and democratic norms or (ii) a dummy variable that equals 1 if the respondent lives in a country where the first leader is a descendant of an ethnic group with egalitarian and democratic norms, and 0 otherwise. X_{ict} captures a set of individual characteristics including age, gender, and schooling. While α_t denotes the survey-wave fixed effects, the stochastic error term is captured by ε_{ict}. The variable of interest $DemoHeritage_c$ being country specific in all the regressions, I cluster the standard errors at the country level.

As shown in Table 2.6, there is a positive correlation between the $DemoHeritage$ variable and self-reported attitudes towards democratic institutions in the different specifications of equation 2.5. More specifically, as the share of individuals who have inherited egalitarian and democratic norms increases in a country, the taste for democratic institutions becomes stronger (Table 2.6 Column 1 and 3). Similarly, residents of countries in which the first leader is a descendant of an institutionally well-endowed ethnicity are more likely to demand more democracy than their counterparts whom leaders did not have such an ancestral background.

Although this result rules out the political culture hypothesis as a potential mechanism through which good leaders has generated bad institutions in Africa, it has the merit to support one underlying theory of this paper. Because descendants of ethnicities who were governed through equal and inclusive institutions are more likely to support contemporary democracy, the contention of this paper is reconcil-

(2), disagree (3), and strongly disagree (4).

Table 2.6: Attitudes Towards Democracy

	Democratic System		Democracy is Better		Democracy is Important	
	(1)	(2)	(3)	(4)	(5)	(6)
DemoHeritage (Share)	0.336***		0.217		0.853**	
	(0.042)		(0.183)		(0.315)	
DemoHeritage (Dummy)		0.241***		0.136		0.570**
		(0.047)		(0.174)		(0.205)
Gender (=1 for Male)	0.047***	0.048***	0.059**	0.059**	0.046*	0.054**
	(0.010)	(0.010)	(0.019)	(0.019)	(0.025)	(0.023)
Age	-0.010	-0.017	0.041	0.037	0.037	0.017
	(0.013)	(0.015)	(0.053)	(0.054)	(0.036)	(0.038)
Education Level	0.031	0.023	-0.033	-0.031	0.319***	0.270**
	(0.023)	(0.027)	(0.033)	(0.036)	(0.094)	(0.092)
Constant	3.270***	3.308***	3.103***	3.141***	7.734***	8.060***
	(0.079)	(0.081)	(0.163)	(0.150)	(0.395)	(0.350)
Wave Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	31537	31537	17069	17069	15471	15471
R^2	0.046	0.040	0.015	0.010	0.035	0.033

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

able with the intergenerational transmission of democracy as shown by Giuliano & Nunn (2013). Nonetheless, the question of why good national leaders have generated non-democratic institutions, despite the fact that their constituencies value democracy more than other political systems, is still unanswered. In the following subsection, I explore other potential mechanisms that may explain this unpredictable political trajectory taken by certain national leaders.

2.5.2 Beyond the Political Culture Argument

In this subsection, I explore three other channels that historians and political scientists have often highlighted as the reasons why African states may have failed to deliver inclusive institutions: the leadership legitimacy, the assimilation (or the lack of thereof) hypothesis and the *"politics of the belly"*.[18] The first hypothesis, which is closely related to the debate on state legitimacy, asserts that the discrepancy between pre-colonial ethnic territories and contemporary states has weakened the vertical integration between the society and politicians (Englebert 2000). From this perspective, the first leaders at independence may have been incentivized to establish non-constraining institutions as a strategy to cope with legitimacy issues. For Englebert (2000), leaders of ethnically incompatible states may often rely on non-inclusive institutions to address potential challenges such as political contestation. I test this hypothesis by looking at the difference in the degree of executive constraints - obtained from the Polity IV database - on the two categories of leaders the first decade after independence (1970).[19] As shown in column 2 of Table 2.7 (Panel A), countries with "good" leaders - the ones for which the heritage dummy is coded as 1 - tend to have less executive constraints than their counterparts. But when this variable is included in the OLS regression of equation 2.1, its coefficient

[18] See Bayart (1993)

[19] For ease of comparison I use the year 1970 because most the African states gained independence around 1960.

becomes insignificantly different from zero. At the same time, the heritage dummy conserves its statistical attributes as derived from the previous OLS estimation; its coefficient is negative and statistically different from zero. This result suggests that the leadership legitimacy hypothesis is probably a poor mechanism in this framework (Panel B Column 2 of Table 2.7).

The second hypothesis, the so-called transplantation theory recently operationalized by Hariri (2012), states that early institutional development in the form of political centralization in particular might have been an obstruction to European settlement. This author went on to argue that this early statehood has contributed to limit the infusion of democratic norms although colonization itself was not an "export of democracy". Europeans who settled durably in former colonies are thought to have put in place inclusive institutional infrastructures that would later foster political development (Acemoglu, Johnson & Robinson 2001, Hariri 2012). Thus, Hariri (2012) concludes that the contemporary autocratic rules in many non-European states are probably a consequence of early political centralization in pre-colonial states, which impedes long-term settlement. Using the fraction of the population speaking a European language as its mother tongue - the data is from Hall & Jones (1999) - I test this assimilation hypothesis in the context of this study. I find on the one hand that the statistical link between the heritage dummy and the share of native speakers of a European language is negative but barely significant (see Panel A Column 1 of Table 2.7), and on the other hand, taking into account this variable as a control in equation 2.1 does not affect the quality of the previous findings (Panel B Column 1 of Table **??**).

Before I present and discuss the empirical assessment of the so-called "politics of the belly", it is worth putting this concept into perspective. This term, originally known as "La politique du ventre", was initially introduced in the literature by the French political scientist Bayart (1993) in his book "The State in Africa: The Politics

Table 2.7: Alternative Mechanisms

Panel A: Relevance of Mechanisms using Least Squares Estimation				
Dependent Variables are:	European Descent	Executive Constraints	Rent Opportunity	
			Oil	Diamond
	(1)	(2)	(3)	(4)
Heritage	-0.008	-0.905*	0.268**	-0.323**
	(0.007)	(0.469)	(0.113)	(0.134)
Economic Controls	Yes	Yes	Yes	Yes
Geographic Controls	Yes	Yes	Yes	Yes
Observations	43	46	46	46
R^2	0.326	0.204	0.448	0.220
Panel B: Mediating Role of Mechanisms using Least Squares Estimation				
Dependent Variable is Post-Cold War Average Level of Democracy				
Heritage	-0.116*	-0.139**	-0.099	-0.137*
	(0.069)	(0.066)	(0.063)	(0.068)
European Descent	1.670			
	(1.694)			
Executive Constraints		0.022		
		(0.022)		
Oil			-0.223**	
			(0.084)	
Diamond				0.068
				(0.076)
Economic Controls	Yes	Yes	Yes	Yes
Geographic Controls	Yes	Yes	Yes	Yes
Observations	43	46	46	46
R^2	0.168	0.217	0.323	0.213

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

of the Belly". His thoughts are summarized by Berman (1998):

> Jean-Francois Bayart chose..."the politics of the belly"... [as] a metaphor that summed up the constant references and analogies in political discourse throughout sub-Saharan Africa to politics as "eating" or "devouring", of getting one's share of the state's resource. These cultural forms themselves encapsulate the personal, materialistic and opportunistic character of African politics, and the relative unimportance... of ideology, principal or policy.

To empirically assess this "politics of the belly" hypothesis, I argue that African leaders at independence may have anticipated the resource potential - in oil and diamond for example - of their newly established states, and this could have driven away some leaders from their cultural heritage. No doubt that many African countries were not equipped to conduct costly mineral explorations, but the involvement of many colonial companies such as the British Petroleum and the Bureau de Recherche de Petrole - a French institution created in 1945 - in oil exploration for example in Africa (See Figure 2.6) may have triggered some appetites among the first African leaders.[20] Ultimately, this rent opportunity could have been determinant in the type of institutions that the new African leadership introduced at independence, which I believe may have persisted nowadays. To test this hypothesis I collect information on countries' potential in both oil and diamond productions, which have often been identified in the literature as driving the within Africa resource curse hypothesis through their detrimental effects on institutions (Lujala, Gleditsch & Gilmore 2005, Ross 2001).

I consider two datasets as proxies for the resource potential of African countries at independence in order to test this "politics of the belly" hypothesis. First, I use the average level of crude oil proved reserves over the period 1980-2010 as provided

[20]For references on oil exploration in colonial Africa, see for example Ferrier & Bamberg (1994)

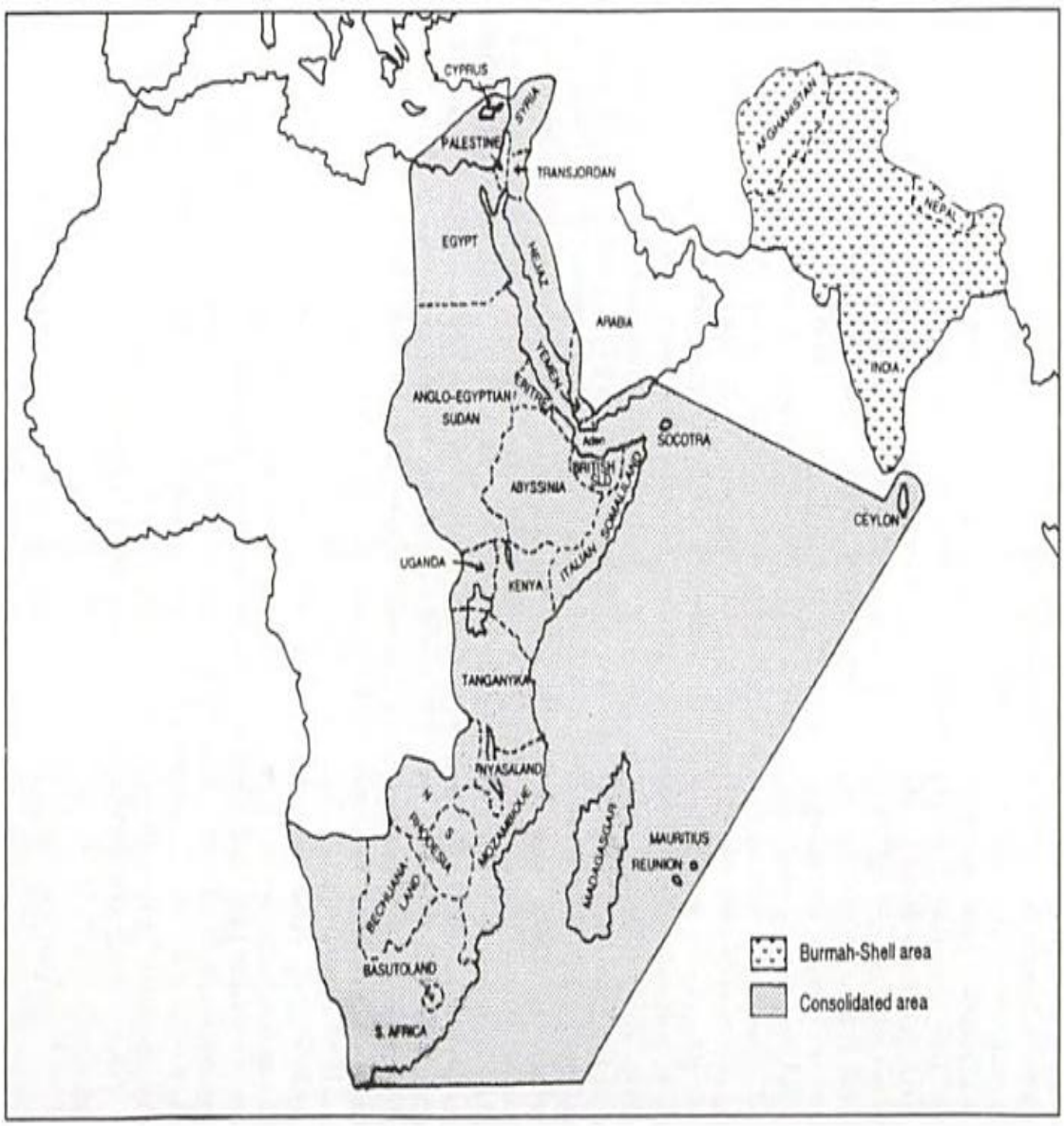

Figure 2.6: Activities of the Consolidated Petroleum Company in Colonial Africa

by the US Energy Information Administration. In particular, I construct for each country a dichotomous variable that takes the value 1 when the average level of proven reserves in crude oil is greater than or equal to 100 billion barrels; and 0 otherwise. Second, I rely on a dataset, constructed by Nunn & Puga (2012), measuring for each African country carats of gem-quality diamond extraction per square kilometer over the period 1958-2000. Of the 51 African countries for which this information is available, only 16 countries have produced gem-quality diamonds over the time period considered with a minimum of about 300 thousands carats per square kilometer (Lesotho) and a maximum of approximately 210 million carats (Botswana). To distinguish gem-diamonds producing countries from other countries, I define a dummy variable that takes the value 1 if the country produces gem-quality diamond; and 0 otherwise.

As shown in columns 3 and 4 of both Tables 2.7 and **??**, the results regarding the rent opportunity dummies are mixed. While the column 3 of Table 2.7 (Panel A) displays a strong and positive correlation between the proven oil dummy and the heritage dummy at the standard statistical significance levels, the statistical relationships between the latter and the diamond dummy is negative and significant at the 5% level. These results suggest that the countries whose leaders are the descendants of institutionally well-endowed ethnic groups are potentially richer in oil but have limited access to gem-quality diamonds comparatively to their counterparts. Moreover, when these rent opportunity dummies are successively controlled for in the OLS estimation of the reduced-form equation 2.1 (Panel B of Table 2.7), the effect of the heritage dummy on democracy remains qualitatively intact in the case of the diamond dummy (it is still negative and significant), but disappears in the case of the proven oil dummy (Panel B Columns 3 and 4 of Table 2.7). At the same time, the statistical link between the oil dummy and political participation, as measured by the polity score, is strongly negative and significant at the 5% level.

In other words, what I have termed the rent opportunity mechanism is well captured by the oil curse than the diamond curse, which is consistent with a number of important contributions in the literature on resource curse. For example, Ross (2001) shows that oil is an obstruction to democracy in the measure that it makes national leaders less dependent on fiscal contributions while facilitating their access to repressive means against demands for political overture. If oil, a natural resource, is a curse for democracy, why diamond, another natural resource, appears to be less detrimental to democracy in this study? One potential explanation for this empirical result is provided by Lujala, Gleditsch & Gilmore (2005), who distinguished the effects of lootable versus nonlootable diamonds on national institutions via their impacts on civil conflicts. For these authors, "easily exploited resources like secondary diamonds can be used to finance ongoing conflicts that can drag on for prolonged periods. Nonlootable resources, on the other hand, may even depress the risk of conflict onset and incidence." In the context of this paper, this would suggest that gem-quality diamonds, whose exploitation is both skill and technological-intensive, are less likely to hinder democracy as implied by the results in Panel B of Table 2.7.

To sum up, "the politics of the belly", while being detrimental to political participation in Africa seems to have been one potential channel through which African leaders, with good pre-colonial ethnic institutional background, failed to deliver inclusive and participatory institutions to their contemporary countrymen.

2.6 Conclusion

A recent but growing literature documents that a significant number of present-day economic, cultural and political outcomes are the manifestations of long-lasting and deeply rooted societal features. For example, a noteworthy contribution by Giuliano & Nunn (2013) provides evidence for an intergenerational transmission of democracy

from pre-colonial ethnic societies to contemporary modern states. This paper is also interested in the persistence of institutional arrangements, but unlike previous studies that consider a more pluralist approach - by focusing on the share of the population with a particular societal characteristic - the emphasis here is on the ethnic institutional heritage of the national leader and its implications for national polity. In particular, I match a new constructed data on the ethnic identity of the first African heads of states with anthropological records to investigate the importance of the national leaders' ethnic institutional heritage for contemporary political trajectory.

Exploiting Africa's ethnic diversity and heterogeneous cultural norms, I find that contemporary democratic experiences are relatively bleaker in countries whose first leaders were the descendants of an institutionally inclusive ethnicity. The statistically significant and negative relationship between leaders' ethnic institutional background and contemporary political development appears to be robust to a set of control variables including economic, geographical and historical factors, and across a variety of econometric techniques. In addition, concerns about potential endogeneity issues that are susceptible to affect the validity of this finding are addressed without deteriorating its statistical robustness. As for the potential mechanisms that may have explained this institutional turnabout, I document that the inclination of certain African leaders towards rent-seeking, also known as "the politics of belly", is one potential channel that may have jeopardized "good" leaders' ability to perpetuate good institutions they inherited from their ancestors.

This article adds to a series of intellectual efforts social scientists are making to explain cross-country irregularities in economic and political development. First, by linking leadership quality in nascent African states at independence to long-term political development, it suggests that the impact of individual leaders on African political development is as important as other historical events such as

colonial experiences and armed conflicts, as documented in the literature of critical junctures. Second, on the interaction between institutions and leaders, although the literature agrees that political institutions and national leadership influence each other, a fewer empirical studies have looked at the effects of individual leaders on political system. If democracy and autocracy are thought to be important for leaders' selection, this paper shows empirically that the quality of the leader seems also to matter for the type of political system. Finally, the intellectual debate about the resource curse has often analyzed the importance of this phenomenon under the "Dutch disease" hypothesis, ignoring sometimes alternative mechanisms. This analysis espouses the idea that natural resources endowment may have a detrimental effect on institutions building through their impact on politicians' incentives (Caselli & Cunningham 2009).

Despite their importance in sharpening our understanding of relevant economic and political issues, researches documenting the persistence of certain societal characteristics are often limited when it comes to policy guidance. Nonetheless, because it identifies leaders' inclination to rents as an obstruction to their ability to perpetuate the democratic legacy of their ancestors, this study suggests that limiting the power of individual leaders could be beneficial for institutional building in developing countries.

Chapter 3

Leadership Favoritism in Africa

3.1 Introduction

Recently, there has been a growing intellectual curiosity in economics and social science about the importance of ethnicity in comparative development. For example, pre-industrial ethnic statehood (Michalopoulos & Papaioannou 2013*b*), ethnic-level democratic practices (Giuliano & Nunn 2013) and traditional agricultural techniques (Alesina, Giuliano & Nunn 2013) have been empirically identified as potential sources of heterogeneous socioeconomic outcomes. It has also been suggested that while ethnic polarization fuels civil conflicts (Reynal-Querol & Montalvo 2005), the degree of ethnic fragmentation impedes economic growth via its detrimental effects on governance (Easterly & Levine 1997) and the provision of public goods (Franck & Rainer 2012, Burgess et al. 2013). This paper explores one mediating factor in the ethnic-based argument of the backwardness of many African economies: national leadership. In particular, it reexamines how the inclination of prominent political figures to discriminate in favor of their co-ethnics can hinder local development.

In theory, ethnic favoritism operates as a chauvinistic apparatus of power that restricts equal access to public resources (Fearon 1999, Caselli & Coleman 2013). In particular, members of the ruling ethnicity tend to exert exclusive control over the political and socioeconomic privileges of the state. Despite ample anecdotal evidence suggesting the prevalence of ethnic favoritism in the polity spectrum, empirical research indicates mixed findings. For example, using a cross-country regression analysis, Kasara (2007) shows that crops growers from the same ethnic groups as na-

tional leaders in Africa face disproportionately higher tax rates, thus casting doubt on the widespread presence of favoritism in Africa. In the same vein, Kudamatsu (2009) provides evidence that inter-ethnic random presidential transition in Guinea did not translate into significant changes in relative infant mortality among ethnic groups. Unlike these findings, case studies from Kenya suggest that better schooling outcomes in primary education (Kramon & Posner 2012) and relatively high quality road network (Burgess et al. 2013) are associated with the ethnic affiliation of national leaders. Similarly, Franck & Rainer (2012) use survey data to show that the provision of public goods such as education and health is in fact characterized by a large and widespread ethnic favoritism across Sub-Saharan Africa.

This analysis contributes to the debate about ethnic favoritism in Africa. However, instead of relying on country-level investigations, it focuses on ethnic territories within and across countries. This has the merit to shed light on the consequence of power-driven ethnic bias on local development. In particular, to overcome the lack of reliable socioeconomic statistics in developing countries, this study exploits satellite-captured luminosity data as a proxy for subnational development. The approach builds upon the premise that economic performance, as measured by GDP, is strongly correlated with luminosity (Doll, Muller & Morley 2006*a*, Henderson, Storeygard & Weil 2012*a*). It has been suggested for example that socioeconomic outcomes in the historical homelands of the African ethnic groups can well be captured by outer space nighttime lights (Michalopoulos & Papaioannou 2013*b*, Papaioannou 2013). However, these luminosity-based analyses have often ignored the importance of ethnic favoritism in the African politics.

In Africa, relevant determinants of luminosity, including states provision of education, healthcare, and public infrastructures, are often driven by national leaders' inclination to disproportionately serve their own ethnic groups (Burgess et al. 2013, Franck & Rainer 2012). Famous examples are Houphouet-Boigny (Côte d'Ivoire)

and Mobutu Sese-Seko (Ex-Zaïre), who turned Yamoussoukro and Gbadolite, their respective native villages into lavish cities (Kasara 2007).

This paper does not aim at challenging the validity of luminosity as a pertinent proxy for development in poor-data regions. Instead, it argues that ethnic favoritism which often emerges in countries with weak executive constraints should not be ignored as a driving factor of luminosity. In particular, I provide empirical evidence that in addition to measuring actual economic-driven nighttime light density, satellite images could also be picking up luminosity stemming from diverted resources in favor of the ethnic group in power.

A closely related analysis, undertook by Hodler & Raschky (2014), documents a strong pattern of favoritism within the administrative boundaries of national leaders' birthplaces using a large sample of institutionally heterogeneous countries. Unlike the approach of these authors, this analysis is restricted to the homelands of Africa's ethnic groups, as documented in the ethnographic atlas of Murdock (1959). While these authors document that less than 4% variation in luminosity for the world as a whole is explained by the leaders' effect, the estimates I document for Africa are as high as 75%.

In what follows, I elaborate more on the data collection process in Section 3.2. I first present the data on the identity of the African national leaders, their ethnic affiliation, and the ethnic-level luminosity measures. Second, I report summary statistics describing the relationships between leaders' ethnicity and the degree of luminosity in the homelands of ethnic groups. Section 3.3 discusses the estimation strategy and summarizes the main findings. I conclude in Section 3.4.

3.2 Data

3.2.1 Data Sources

To test whether ethnic favoritism in Africa is a potential factor driving up local development, as measured by the intensity of nighttime light density, this analysis brings together different data sources. First, I explore the Archigos dataset, compiled by Goemans et al. (2006), to obtain the identity of the African heads of states between independence and 2004. From 2004 onwards, I complement the Archigos series with a manually collected information on the identity of leaders using different relevant sources including the official websites of state houses and other media sources. Second, complementing Kasara (2007) with various other sources, I match the then identified African national leaders to their respective ethnic groups.

Data on light density at night in the historical ethnic territories were assembled by Michalopoulos & Papaioannou (2013*b*), who use the ethnographic atlas by Murdock (1959) and the Defense Meteorological Satellite Program's Operational Linescan System (DMSP/OLS) satellite image information to link pre-colonial statehood to contemporary local development in Africa. The data depict the distribution of nighttime light, including human settlements and other sources of luminosity, collected between 8:30pm and 10:00pm local time by the DMSP/OLS. As in Michalopoulos & Papaioannou (2013*b*), this measure is obtained from averaging light density per square kilometer for 2007 and 2008, and the aggregated at the level of the historical homeland of each ethnic group.

To account for the correlation between pre-colonial ethnic-level statehood and contemporaneous measures of local development, acknowledged in recent research (see for example Gennaioli & Rainer (2007) and Michalopoulos & Papaioannou (2013*b*)), I use Murdock (1967)'s index of "Jurisdictional Hierarchy Beyond the Local

Community." This variable ranges from 0 to 4, and captures the degree of political complexity within each ethnicity. An ethnicity with a score 0 is characterized by a political structure circumscribed at the level of the local community. While a score of 1 and a score of 2 characterize petty and paramount chiefdoms, respectively; 3 and 4 indicate highly centralized entities including large pre-colonial states.

I also consider other relevant variables including contemporary institutional performance, as measured by the rule of law index; development statistics such as GDP and population density; and a set of location identifiers (distances from sea, border, and capital) and geographical characteristics (surface area, area under water, land suitability for agriculture, elevation, malaria stability index, diamond mine dummy, and oil field dummy).

3.2.2 Summary Statistics

Table 3.1 displays the summary statistics of the light density measures using the sample of all observations (Panel A) and two alternative subsamples (Panels B and C). In Panel B, I focus on the subsample of observations that contains luminosity information of ethnicities for which a co-ethnic had run office at least once between independence and 2007. In Panel C, the observations are restricted to cases where a co-ethnic of an ethnic group was the incumbent head of state in 2007.

Table 3.1: Summary Statistics

	(1) Obs.	(2) Mean	(3) St. Dev.	(4) p25	(5) Median	(6) p75	(7) Min	(8) Max
Panel A: All Observations								
Light Density	683	0.3682	1.5280	0.0003	0.0224	0.1495	0	25.1403
Panel B: Leader Dummy Independence–2007								
Leader Dummy = 0								
Light Density	594	0.2693	1.0081	0	0.0170	0.1090	0	13.0862
Leader Dummy = 1								
Light Density	86	1.0632	3.3288	0.0294	0.1672	0.4879	0	25.1403
Panel C: Leader Dummy 2007								
Leader Dummy = 0								
Light Density	636	0.3292	1.4557	0	0.0189	0.1273	0	25.1403
Leader Dummy = 1								
Light Density	44	0.9552	2.3139	0.0357	0.2101	0.7754	0	14.1415

Notes: The Table presents summary statistics for the mean nighttime light density data captured by satellite and use as proxy for local development. Panel A describes the statistics for all observations. In Panels B and C, the reported descriptive statistics distinguish between ethnicities affiliate to national leaders and other ethnic groups.

Both Panels B and C of Table 3.1 indicate a large discrepancy in the degree of luminosity across the historical homelands of ethnic groups. In particular, mean and median light densities are significantly higher in the historical homelands of leaders. For example, while average and median light densities are approximately 0.955 and 0.210 in the ethnic territories of contemporary leaders, average and median luminosity is as low as 0.329 and 0.167 in the homelands of other ethnic groups (Panel C of Table 3.1). Similar patterns are observed when I focus on the descendants of ethnicities that exert power between independence and 2007 (Panel B): mean and median nighttime light densities are higher in leaders' ethnic territories (1.063 and 0.167) compared to other groups (0.269 and 0.017). This preliminary evidence shows that ethnic-level nighttime light density is correlated with the ethnic affiliation of national leaders, suggesting that luminosity could potentially reflect some degree of ethnic favoritism. In the next section, I investigate more systematically this hypothesis using a regression-based approach.

3.3 Empirical Analysis

3.3.1 Estimation

To investigate the importance of ethnic favoritism in local development across ethnic territories, I estimate a specification similar to Michalopoulos & Papaioannou (2013*b*). One difference with the empirical model of these authors is the inclusion in the specification of an indicator variable measuring whether a descendant of an ethnic group has once ruled the country to which his ethnicity belongs. This would potentially facilitate comparisons with other relevant variables found to be important determinants of local development. The following equation is estimated:

$$Light_{ic} = \alpha_0 + \alpha_c + \beta Leader_{ic} + \gamma GDP_c + \delta IQL_i + X_{ic}^{'}\theta_x + \varepsilon_{ic}, \qquad (3.1)$$

where $Light_{i,c}$ measures, as in Michalopoulos & Papaioannou (2013*b*), the nighttime light density in the historical territory of ethnic group i in country c. As already discussed in Section **??**, information on light density were collected by these authors from the DMSP/OLS database for the period 2007-2008. Like in Michalopoulos & Papaioannou (2013*b*), I compute $Light_{i,c}$ as $ln(0.01 + LightDensity_{i,c})$ in order to take into consideration non-normality and potential outliers in the distribution of luminosity data across ethnic nations. $Leader_{i,c}$ is a dummy variable that equals 1 if a descendant of ethnic group i was the head of state in country c in 2007 (panel A of Table 3.2), or has assumed such a position at least once since independence (panel B of Table 3.2), and 0 otherwise. GDP_c is the logarithm of per capita GDP of country c, which is often proxied by luminosity at the local level. Ethnic-level institutional characteristics are captured by IQL_i, which measures the degree of political centralization beyond the village. Most of the control variables used in Michalopoulos & Papaioannou (2013*b*) and described earlier, including geographical factors, environmental features and natural resources endowments are taken into account by the vector $X_{i,c}$. Other hard-to-account-for country-specific factors that could potentially affect light density at night are captured by the country fixed effects α_c. Finally, the terms α_0 and $\varepsilon_{i,c}$ are the constant and the unobservable stochastic error, respectively. In the spirit of Cameron, Gelbach & Miller (2011) and following Michalopoulos & Papaioannou (2013*b*), standard errors are clustered at both the country and ethnic-family levels.

3.3.2 Results

In Table 3.2, I report estimates of equation 3.1 using various least squares specifications. As in Michalopoulos & Papaioannou (2013*b*), I control for a rich set of variables including the rule of law, population density, location-specific variables (distances from sea, border, and capital), and a set of geographical characteris-

tics (surface area, submarine area, land suitability to agriculture, elevation, malaria stability index, diamond mine, and oil field dummy). In panel A and B, I use information on the leader in office in 2007 and on all leaders since independence, respectively. In both panels, I start by investigating separately the relationships between luminosity and leaders' ethnic affiliations (Column 1); luminosity and per capita GDP in 2007 (Column 2); and finally luminosity and political centralization (Column 3). The coefficients of both income and political centralization are positive and highly significant across panels. This is consistent with the idea that luminosity is not only a good proxy for local development, but also that early statehood is important to understand contemporary divergent development paths within countries (Michalopoulos & Papaioannou 2013*b*). The coefficients on leader dummy, in column 1 of both panels A and B, are also positive (0.683 and 0.596) and statistically different from 0.

In Columns 3-6, I augment the specification with the leader dummy with income (Column 3), political centralization (Column 4), and both income and centralization (Column 6). Adding these correlates of luminosity one by one or together has little effect on the impact of leaders' ethnicities on local development in the historical homelands of ethnic groups, as measured by nighttime light density. Controlling for all the relevant economic, historical, institutional, and geographical variables, the results suggest that an African leader's average contribution to change in light density in his ethnic homeland relatively to other ethnic territories varies between 75% and 82%.[1] This suggests that ethnic favoritism is an important determinant of local development, as captured by satellite nighttime light density. Leaders' inclination to divert resources towards their co-ethnics in Africa is large and statistically significant.

[1]To compute the magnitude of the leader's effect, I use the following expression proposed by Halvorsen & Palmquist (1980): $100(e^{\beta} - 1)\%$.

Table 3.2: Luminosity and Ethnic Favoritism in Africa

Dependent variable is $ln(0.01 + LightDensity_{i,c})$						
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A.						
Leader (2007)	0.6833***			0.6767***	0.6194***	0.6028***
	(0.1811)			(0.1706)	(0.1975)	(0.1852)
GDP (2007)		0.5021***		0.5012***		0.5110***
		(0.1274)		(0.1274)		(0.1263)
Statehood			0.1599***		0.1405**	0.1625***
			(0.0605)		(0.0627)	(0.0512)
Rule of Law (2007)	0.5007**	0.2795	0.4809**	0.2616	0.4688**	0.2200
	(0.2201)	(0.2150)	(0.2213)	(0.2098)	(0.2174)	(0.2085)
Observations	680	680	680	680	680	680
Adjusted R-squared	0.490	0.530	0.488	0.539	0.495	0.546
Panel B.						
Leader (Indep–2007)	0.5959***			0.5945***	0.5690***	0.5637***
	(0.1782)			(0.1705)	(0.1832)	(0.1743)
GDP (2007)		0.5021***		0.5018***		0.5119***
		(0.1274)		(0.1288)		(0.1275)
Statehood			0.1599***		0.1480**	0.1696***
			(0.0605)		(0.0626)	(0.0512)
Rule of Law (2007)	0.5076**	0.2795	0.4809**	0.2680	0.4727**	0.2232
	(0.2215)	(0.2150)	(0.2213)	(0.2094)	(0.2184)	(0.2080)
Observations	680	680	680	680	680	680
Adjusted R-squared	0.110	0.270	0.377	0.481	0.498	0.546
Additional Controls						
Population Density	Yes	Yes	Yes	Yes	Yes	Yes
Location Controls	Yes	Yes	Yes	Yes	Yes	Yes
Geographic Controls	Yes	Yes	Yes	Yes	Yes	Yes

OLS estimates linking luminosity to ethnic favoritism are reported in Table 3.2. The dependent variable is log(0.01+light density at night from satellite) at the ethnicity-country level. In columns 1-6, I control for various variables including contemporary institutional performance, as measured by the rule of law, population density, location (distances from sea, border and capital), and a set of geographical characteristics (surface area, area under water, land suitability for agriculture, elevation, malaria stability index, diamond mine dummy, and oil field dummy). Leader Dummy, the variable of interest, equals 1 if the descendant of the ethnic group was the head of state in 2007 (panel A) or has occupied such as position at least once since independence (panel B). Double-clustered standard errors at the country and ethnic-family levels are reported in parentheses. ***, **, and * show statistical significance at the 1%, 5%, and 10% level, respectively.

3.4 Conclusion

A recent but growing empirical literature examine the importance of historical determinism and cultural norms in explaining contemporary cross-country divergence in prosperity and freedom. In particular, early comparative advantage in wealth (Engerman & Sokoloff 2002), past pandemics (Acemoglu, Johnson & Robinson 2001, Voigtländer & Voth 2012), slave trade (Nunn & Wantchékon 2011), and precolonial statehood (Michalopoulos & Papaioannou 2013*b*, Hariri 2012) have hypothesized and empirically identified as potential sources of comparative development. In this strand of literature, researchers have utilized innovative information gathering techniques to overcome data constraints that often characterize developing countries. For example, satellite data that capture the intensity of light density in a particular geographic area have proven to be a reliable measure of local development (Doll, Muller & Morley 2006*b*, Henderson, Storeygard & Weil 2012*b*, Michalopoulos & Papaioannou 2013*b*, Hodler & Raschky 2014).

In this analysis, I argue that in a context where executives have less constraints, relevant determinants of luminosity might reflect leaders' tendencies to divert resources towards their co-ethnics. Confronting this hypothesis to data, I document that the ethnic affiliation of national leaders in Africa is an important source of variation in nighttime light density across the historical homelands of ethnic groups. More specifically, satellite-captured luminosity across Africa mirrors a great degree of ethnic favoritism. This finding suggests that controlling for measures of ethnic favoritism may improve the predictive power of luminosity as a proxy for subnational development in poor-data and fragile institutional environments.

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Appendix

List of Countries included in Chapter 3 (Tables 3.1 and 3.2): Angola, Burundi, Benin, Burkina Faso, Botswana, Central African Republic, Côte d'Ivoire, Cameroon, Congo, Djibouti, Algeria, Egypt, Eritrea, Ethiopia, Gabon, Ghana, Guinea, Gambia, Guinea-Bissau, Equatorial Guinea, Kenya, Liberia, Libya, Lesotho, Morocco, Madagascar, Mali, Mozambique, Mauritania, Malawi, Namibia, Niger, Nigeria, Rwanda, Sudan, Senegal, Sierra Leone, Somalia, Swaziland, Chad, Togo, Tunisia, Tanzania, Uganda, South Africa, Congo Democratic Republic (Ex-Zaïre), Zambia, Zimbabwe.