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RESOURCES, RULE AND REBELLION IN SUB-SAHARAN AFRICA

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Colonialism almost never exploits the entire country. It is content with extracting natural resources and exporting them to the metropolitan industries thereby enabling a specific sector to grow relatively wealthy, while the rest of the colony continues, or rather sinks, into underdevelopment and poverty. In the aftermath of independence the nationals who live in the prosperous regions realize their good fortune and their gut reaction is to refuse to feed the rest of the nation. The regions rich in groundnuts, cocoa and diamonds stand out against the empty panorama offered by the rest of the country. The nationals of these regions look upon the others with hatred detecting envy, greed, and murderous impulses.

—— Frantz Fanon, *The Wretched of the Earth*, 1961

ABSTRACT

This thesis examines the fundamental role of natural resources in African state-building and development. I show how the economic organization of the colonial state around a limited number of cash crops and minerals continues to affect subnational variation in important political outcomes. More specifically, I examine how colonial resource extraction continues to shape spatial inequality, unequal ethnopolitical representation, ethnic identity salience, and armed conflict. I propose a macro-historical political geography framework that accounts for the dynamic interplay between geographic endowments, external demand and technology shocks, and political institution building. I apply this framework to the colonial age and derive specific implications on long-term legacies.

I argue that the 19th century transition from slave trading to mineral and cash crop exports powerfully shaped the spatial organization of the colonial state. Fiscal, administrative, and regulatory institutions responded to the revenue potential and production modes of local resource endowments. Both mineral and agricultural source areas received greater colonial investment. Early investments in narrow resource enclaves caused severe levels of spatial inequality that persist until the present day. I use fine-grained geospatial data on colonial resource extraction, infrastructure investments and present-day development to credibly identify these effects.

Mining areas were ruled more directly than their cash crop producing counterparts. Communal control over land and labor and significant profits in cash crop areas contributed to the rise of an early African elite. The revenue potential of cash crop production and the lack of direct state control make post-independence African governments more likely to include ethnic cash crop elites in their ministerial cabinets. I demonstrate that ethnic groups that saw colonial cash crop production in their homeland are significantly more likely to be included in post-colonial governments. Representation levels vary with changing market values of export crops.

Throughout the colonial age, both mining and cash crop areas experienced in-migration and rising local levels of ethnic diversity. In cash crop areas, communal control over modernization benefits and rising diversity politicized ethnic identities. I show that inhabitants of colonial cash crop areas are more likely to identify in ethnic rather than national terms. Cross-cutting cleavages in urban mining towns, if anything, reduced ethnic identity salience. During economic downturns, politicized identities and inter-ethnic struggles increase the potential for local violence in cash crop areas. Combining historical depth with spatial granularity significantly improves our theoretical and empirical grasp of subnational development in Sub-Saharan Africa.

ZUSAMMENFASSUNG

Die vorliegende Arbeit untersucht den Einfluss natürlicher Ressourcen auf Staatenbildungs- und Entwicklungsprozesse in Subsahara-Afrika. Eine begrenzte Anzahl wertvoller Mineralien und landwirtschaftlicher Exportgüter bestimmte die lokalen Ausprägungen des Kolonialstaats. Die Folgen ressourcenbasierter kolonialer Institutionen sind bis heute spürbar. Drastische ökonomische und politische Ungleichheit sowie regionale Unterschiede in der politischen Bedeutung von Ethnizität und lokaler Konfliktwahrscheinlichkeit lassen sich in nicht unerheblichem Masse auf die räumliche Verteilung kolonialer Exportressourcen zurückführen. Diese Dissertation entwickelt einen historisch und geographisch informierten theoretischen Ansatz, der geographische Ausgangsbedingungen, externe Nachfrage- und Technologieschocks sowie die Entstehung politischer Institutionen berücksichtigt. Dieser Ansatz wird auf die Kolonialzeit angewandt, um deren lokalen Langzeitfolgen besser zu verstehen.

Der Übergang vom Sklavenhandel zu landwirtschaftlichen Exporten im 19. Jahrhundert war von fundamentaler Bedeutung für die räumliche Organisation des Kolonialstaats. Das Steuerpotenzial und die Produktionsweisen der wichtigsten Ressourcen beeinflussten fiskalische, administrative und regulatorische Strategien der Kolonialherren. Sowohl Bergbau- als auch landwirtschaftliche Exportregionen erhielten höhere Investitionen. Frühe Infrastruktur führte zu Agglomerationseffekten und hoher Ungleichheit, die bis heute anhält. Die vorliegende Arbeit verwendet hochauflösende räumliche Daten um diesen Zusammenhang überzeugend aufzuzeigen.

Bergbauregionen wurden direkter beherrscht als landwirtschaftliche Exportzonen. In letzteren ermöglichten lokale und kommunale Kontrolle über Land sowie beachtliche Gewinne aus dem Export von Kakao, Kaffee, Baumwolle, Erdnüssen und Palmöl die Entstehung einer frühen afrikanischen Elite. Das Steuerpotenzial und die Abwesenheit direkter Staatskontrolle über landwirtschaftliche Exportregionen führte zu besserer Repräsentation lokaler Eliten in nationalen Regierungen. Die Repräsentation landwirtschaftlicher Exportregionen variiert über Zeit in Abhängigkeit globaler Marktpreise der lokal produzierten Exportgüter.

Interne Migration während und nach der Kolonialzeit brachte höhere ethnische Diversität in den Ursprungsregionen afrikanischer Ressourcenexporte mit sich. In landwirtschaftlichen Exportzonen führten kommunale Regierungsformen und Wettbewerb um die begrenzten Gewinne exportbasierter Modernisierung zur politischen Aktivierung ethnischer Identitäten. Diese Dissertation zeigt, dass sich Umfrageteilnehmer aus landwirtschaftlichen Exportregionen stärker ethnisch identifizieren und seltener über Gruppengrenzen hinweg heiraten als Bewohner der Bergbauregionen oder anderer ländlicher Gebiete. Gehen die Gewinne aus der landwirtschaftlichen Exportproduktion temporär zurück, verursachen politisierte Identitäten in kolonialen Exportregionen noch heute lokale Unruhen und Gewalt. Die in dieser Arbeit verfolgte Kombination aus historischer Tiefe und geographischer Präzision verbessert unser Verständnis politischer und ökonomischer Entwicklungsprozesse in Subsahara-Afrika.

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1

INTRODUCTION

What explains staggering economic and political inequalities in Sub-Saharan Africa? And why are ethnic divisions so important in armed conflict and politics more generally? This dissertation sets out to answer these questions.[1]

Popular takes on African development range from extreme afro-pessimism to bullish notions of an inevitably bright future. In early 2000, the British magazine The Economist wrote off the whole continent as "Hopeless Africa." A good decade later, the same publication put the "Africa rising" meme on its cover. Where eleven years suffice to turn even the most serious journalists' opinion upside down, things must have changed drastically. Or, alternatively, reporting lacks historical depth. On the face of it, both afro-optimists and pessimists have evidence on their side. Sub-Saharan Africa still is the poorest world region. More than 40% of its working population is employed in agriculture rather than in the generally more productive industrial or service sectors. Primary commodities still constitute large shares of African exports.

Low average income levels are distributed unequally among African citizens. Only Latin American countries have higher average Gini coefficients. Spatial measures of inequality between administrative units or ethnolinguistic homelands suggest that Sub-Saharan Africa is the most unequal world region. Inequality is far from a mere economic phenomenon. Only 58% of the total African population is represented by ethnic peers in national governments. Where economic and political inequalities align with regional or identity cleavages, potential for conflict is high. Together with Asia and the MENA region, Sub-Saharan Africa has the world's highest incidence of ethnic civil wars. Despite all of this, recent economic growth has been impressive. In the post-Cold War era, African economies have grown twice as fast as their European counterparts. Table 1.1 summarizes the relevant indicators at the level of world regions. In short, Sub-Saharan Africa lags behind on many fronts, but recent performance raises hope for improvement.

The present thesis investigates the deep roots of spatial economic inequality, unequal political representation, politicized ethnicity, and armed conflict. I

1 In the remainder of this thesis, I use the the terms Africa and Sub-Saharan Africa interchangeably. My use of the term Africa thus excludes the territories of what are today Morocco, Algeria, Libya, Egypt, and contested Western Sahara.

Figure 1.1: Africa in the Quality Press

Table 1.1: Sub-Saharan Africa in Comparative Perspective

Indicator	Eur.	N. Am.	Lat. Am.	Asia	MENA	SSA
GDP per capita (1990–2014)	22'545	38'195	8'587	10'220	19'074	2'490
Agric. Employment (1990–2014)	5.09	1.54	17.88	33.08	16.84	40.16
Gini (1990-2014)	32.28	36.69	51.94	37.26	38.45	45.59
Spatial Inequality 2012 (ADM1)	19.6	33.01	30.79	32.34	43.44	48.37
Ethnic Inequality 2012 (WLMS)	20.86	62.63	38.54	53.32	34.94	61.03
Pop. Share Represented (1990–2017)	72.41	75.75	72.31	87.38	68.46	57.67
Group Share in Conflict (1990–2017)	0.64	0	0.95	5.85	6.85	5.61
Annual GDP Growth (1990–2014)	1.93	2.36	3.23	4.8	4.87	4.35
Commodity Export Share (1990–2014)	15.69	19.20	22.31	24.70	55.93	37.64

Notes: Data on GDP levels and growth, agricultural employment shares, commodity exports, and individual inequality are taken from the World Development Indicators (World Bank 2015). Spatial and ethnic Gini coefficients are calculated based on per capita night lights within administrative region or language group polygons as in Alesina, Michalopoulos and Papaioannou (2016). Remote-sensed luminosity data comes from the National Geophysical Data Center (2014), gridded population data from CIESIN CIESIN (2015), ethno-linguistic group polygons from WLMS (2017) and administrative unit shapefiles from FAO (2014). Information on ethnic representation is taken from Vogt et al. (2015) and multiplied with population figures from Feenstra, Inklaar and Timmer (2013) to get at continent-wide representation shares. The ethnic conflict measure counts, for each country year, the share of politically relevant ethnic groups with ongoing conflict and averages to the level of world regions. Data comes from Vogt et al. (2015).

develop a long-term historical account of how trade in natural resources has shaped African state-building and politics long before, during, and after formal European colonization. More specifically, I show how the types and spatial distribution of tradable commodities affect interactions between state rulers and ethnic communities in producing regions. These interactions give rise to specific institutional choices which can usefully be described as resource regimes. The emerging institutional equilibria, in turn, provide unequal access to economic opportunities and political representation. Regional inequalities and the local institutional setups make ethnic mobilization more likely in some areas than in others. The colonial age was the most far-reaching episode of resource-related state building in African history. My main focus therefore concerns this period and its long-term consequences. My theoretical argument, however, is more general. The focus on natural resources helps to move beyond simplistic notions of colonial legacies. The colonial state and its local manifestations were, to a significant degree, endogenous to the resource endowments, production modes, and trading needs of local populations and European colonizers.

I deviate from journalistic hot takes in two main ways. First, I demonstrate the historical roots of economic and political inequality, ethnic identity salience, and conflict. African rulers and citizens face deep-rooted structural and institutional constraints. Understanding their nature and origins is key to assess the sustainability of the most recent growth episode and to design informed policies for economic and political development. Second, I stress the importance of spatial variation. Africa is not a country. Nor are individual African countries monolithic entities plagued by poverty, tribalism, and violence. Instead, economic development, political representation, ethnic identity salience, and armed conflict are, in many ways, subnational phenomena. In order to explain variation in these outcomes across space and time, we need to disaggregate our theories and empirical analyses to finer resolutions than the continental, empire, or country level. The inherently spatial nature of natural resource endowments and the institutional regimes built around them provide unique opportunities to do so. Combining temporal depth with spatial granularity, I argue, generates new theoretical insights and specific hypotheses that can be systematically tested.

1.1 MODERN AFRICAN HISTORY IN TWO GRAPHS

As far as temporal depth is concerned, a long price series of Africa's most important export commodities reveals quite a bit about modern African history.

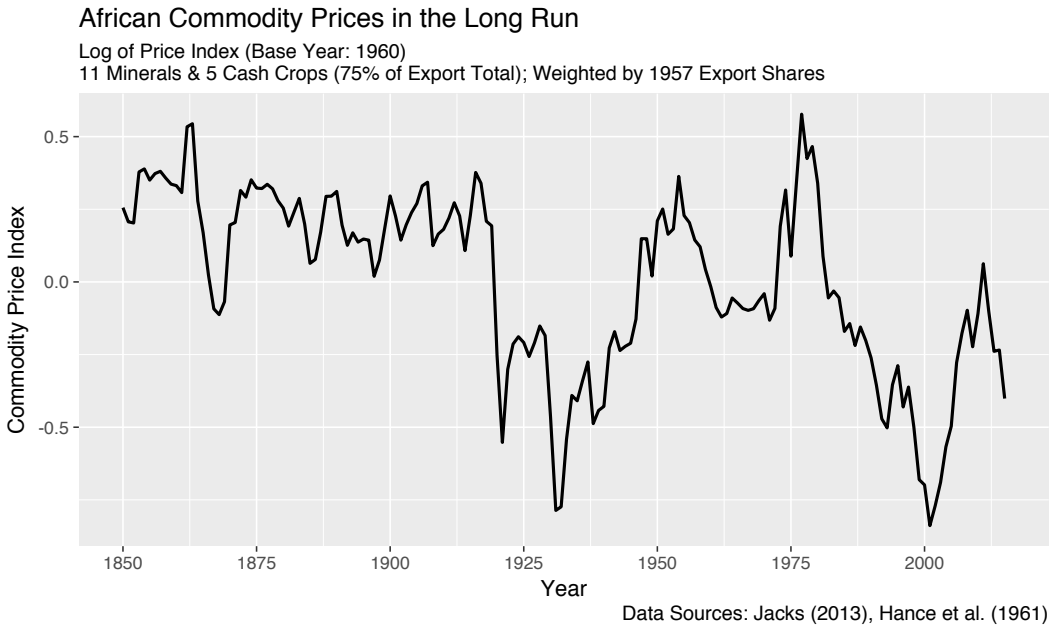

Figure 1.2: Historical African Commodity Prices

Figure 1.2 plots a weighted average of global prices for five cash crops (cocoa, coffee, cotton, groundnuts, palm oil), eleven minerals (coal, copper, chromium, diamonds, gold, iron ore, lead, manganese, phosphates, tin, zinc), and crude oil for the period 1850—2015. These 17 commodities constituted 75% of Sub-Saharan Africa's total export value in the late colonial age. The five cash crops alone contributed 49% (Hance, Kotschar and Peterec 1961). The series starts in 1850 at the high noon of the commercial transition from slave exports to trade in "legitimate" goods. Demand and technology shocks associated with early European industrialization and the formal abolition of the external slave trade in 1807 spurred a veritable rush for African resources – most notably oil-rich groundnuts and palm oil used as lubricants for machinery and in food and cosmetics production. Resource prices rose rapidly and then stabilized at consistently high levels during the last three decades of the 19th century. European merchants and trading houses discovered Africa and developed high hopes about its resource potential.

Rising commercial interest, geopolitical competition, and local struggles among African and European merchants motivated the formal conquest. Full territorial control was established around the onset of World War I. Revenues from trade taxes on cash crop and mineral exports became the fiscal backbone of the colonial state. Both world wars and the great depression between them led to rapidly declining resource prices. The 1920s and 30s saw the most heavy-handed and extractive forms of European colonialism. Governments struggled

to make ends meet. Post-World War II, increasing resource prices, anti-colonial sentiment, and rising African mobilization led to more developmental forms of colonial rule. However, reforms were too little and too late to stem the tide of decolonization. Suddenly in charge of newly independent states, African rulers rolled out ambitious programs of state-led development planning and import-substituting industrialization. Revenues from high-priced commodity exports played into their hands and allowed to build the political machines of the one-party state. The oil crises of the 1970s burst the bubble and resource prices went into a steep and long decline. Falling revenues and harsh structural adjustment programs were associated with widespread poverty, armed conflict, and ethnically exclusive military regimes.

Despite further declining resource prices, autocratic rule was gradually replaced with multi-party elections from the end of the Cold War onwards. However, elections alone did not bring peace. The 1990s and early 2000s saw the perhaps most deadly episodes of internal strife. Rwanda, Sierra Leone, and Liberia are the most obvious examples. The lowest point of resource prices was reached in 2001 – just months after The Economist had released its "hopeless continent" issue. While the ink was trying, resource prices picked up again. Surging demand from emerging markets – China in particular – spurred yet another resource boom. Without the mining boom of the 2000s, we probably would not have an Africa rising debate (Rodrik 2016). The crucial question for the years to come is whether this time is different. Will the next price bust lead to similarly disastrous results as the ones in the inter-war period or the 1980s and 90s? Or will recent political reforms, more stable and inclusive democracy, foreign investment, and economic diversification protect African countries against future vagaries of global commodity markets?

Time will answer these questions but seems unlikely to respond uniformly across the continent. Figure 1.3 overlays a map of late colonial commodity exports with a satellite-derived grid of mean luminosity at night in the year 2015 (Román et al. 2018). Night lights are a useful proxy for present-day population densities and economic activity (Elvidge et al. 1997; Chen and Nordhaus 2011; Henderson, Storeygard and Weil 2011; Weidmann and Schutte 2017). Two general lessons emerge. First, spatial variation matters. Both colonial export production and present-day centers of economic activity cluster in relatively small enclaves surrounded by vast hinterlands. Colonial and contemporary spatial inequalities are severe. Second, the economic centers of gravity have not shifted much since the colonial age. There is a clear visual correlation between colonial commodity production and contemporary luminosity. The first goal of

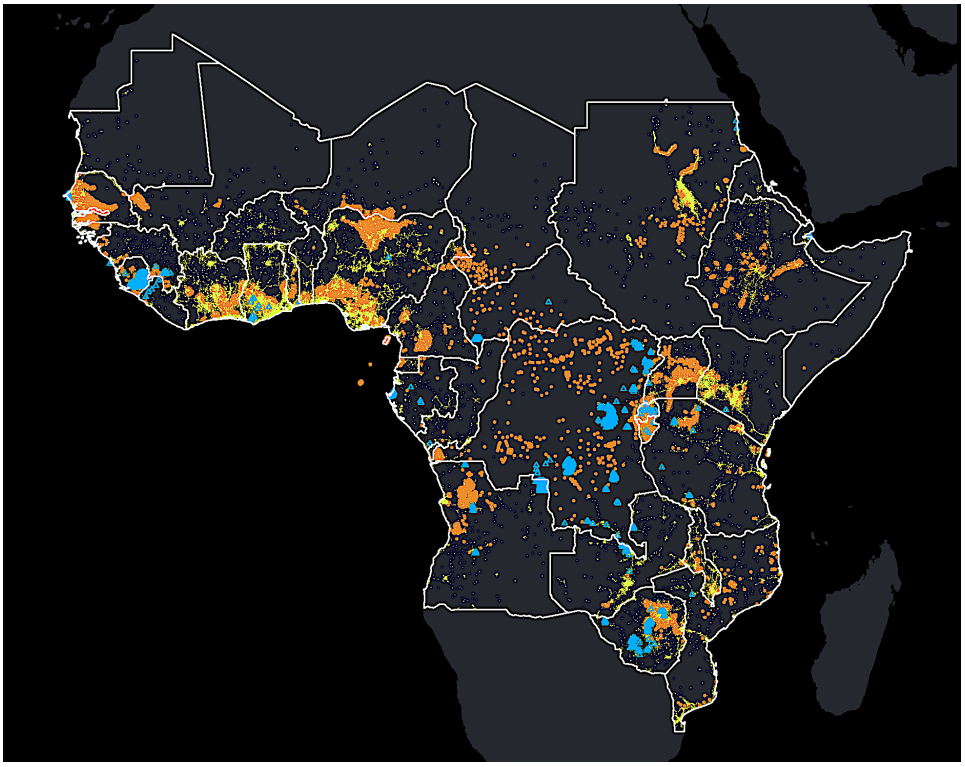

Figure 1.3: Colonial Export Source Areas and Contemporary Luminosity at Night
Cash Crops in Orange, Minerals in Blue, Luminosity in Yellow [2]

this thesis is to show that this relationship is causal and does not merely reflect generally favorable underlying conditions. The second is to illustrate how the type of colonial resources and their spatial distribution matter for the political representation of ethnic groups, ethnic identity salience, and patterns of violent conflict.

1.2 THE ARGUMENT

In the most general sense, I argue that the long-term interplay between fixed geographic fundamentals, exogenous demand and technology shocks, political institutions, and local adaptation strategies explains spatial and temporal variation in economic and political outcomes. First, natural endowments determine a subnational region's resource potential. Sub-Saharan Africa's geography inhibited early agricultural intensification, population growth, and state building along the lines of Mesopotamia, China, Egypt, and Western Europe. Early Africa's population was scattered in space, ethnolinguistically diverse, and

2 Colonial resource data based on a map by Hance, Kotschar and Peterec (1961). Luminosity data from Román et al. (2018)

highly mobile. Livelihood strategies were based on land-extensive agriculture, shifting cultivation of diverse crops, regional trade in crops and metals, as well as pastoralism. Under such conditions, taxing agricultural output of dense sedentary populations was no viable route to state formation (Herbst 2000). Second, demand and technology shocks open up opportunities for long-distance trade in valuable natural resources. The introduction of the camel to North Africa triggered a prosperous gold-salt trade through the Sahara. New ships on the Indian and Atlantic Oceans enabled the export of precious metals, ivory, and slaves to the Arab peninsula, India, Europe, and the New World. Without the inventions of the steamship and refrigerator in the 19th century, exporting cash crops would have been impossible.

Third, social organization and political institution building evolve around local resource endowments and trading opportunities. Early African state formation is inextricably linked to regional trade across ecological zones and long-distance trade in natural resources. Centralized and hierarchical forms of social organization emerged at sites of mineral extraction, important regional trade routes, and coastal or Sahelian entrepôts of long-distance commerce. Institutional forms reflect the underlying resource production modes and trading needs. Regional and long-distance trade require guarantees of safe passage and mechanisms of dispute resolution (Bates 1987). The capital-intensive nature of extracting and transporting precious metals invites monopoly control by a small and often authoritarian ruling elite. Fourth, the emerging institutions and resulting interactions between state builders and their subject populations determine the distribution of gains from trade and political power. Local communities will organize and mobilize in ways that maximize their well-being under the constraints of prevailing resource regimes. Strategic exit, resistance, or collaboration are common strategies.

How did this logic play out in the colonial age? And what did colonial resource regimes and local adaptation strategies imply for post-independence economic inequality, representation, ethnic identity salience, and conflict? As mentioned above, the commercial transition preceded formal European colonization. African geographic potential and European demand and technology shocks triggered the cash crop revolution of the 19th century. Perhaps for the first time, large numbers of African small and medium-scale producers entered the export market and shared in the gains from long-distance commerce (Hopkins 1973; Hill 1997). Formal European conquest followed soon after. Once European empires had partitioned the continent, they needed to administer and finance their new colonies. As budgets were tight, revenues had to be

raised locally. Taxing minerals and cash crop exports at the point of exit was the most readily available revenue-raising strategy. Limited fiscal resources and extractive rather than developmental intentions led colonial governments to channel infrastructure and public goods investments to areas where they yielded the highest returns in terms of taxable export production. As a result, cash crop and mining areas became narrow enclaves of economic activity and colonial state presence. Economic agglomeration in these source areas had strong path-dependent effects on subnational development and spatial inequality well beyond independence.

However, governing strategies varied between mineral, cash crop, and resource-poor areas. Capital intensive, highly valuable, and concentrated fixed-point resources are relatively easy to seize and administer (Le Billon 2001). Colonial states or state-like trading companies brought mineral production sites under direct control. They owned the land and production sites and tightly controlled local labor, capital, and output markets. Areas of land-extensive native cash crop production were governed differently. As long as output and revenues were flowing, colonial states chose more indirect forms of rule in cash crop areas. Control of land and labor remained in communal hands. Strictly regulated capital and output markets favored European-run finance and trading houses (Arriola 2013*b*). Nevertheless, African rural capitalists from cash crop areas managed to accumulate capital and, at times, successfully competed with European, Libyan, or Indian merchants in output marketing. These factors provided early opportunities for African elite formation.

Indirect rule and high revenue potential in cash cropping regions gave colonial and post-independence governments incentives to collaborate with local elites. Both the supply of elites and the demand for local intermediaries imply greater political power for cash crop than for mining or resource-poor areas. As long as the same crops remained important revenue sources of post-colonial states, ethnic elites from cash crop areas are more likely to be included in national governments. Cash crops were also produced on white settler estates and company-run plantations. Where this was the case, colonial rule turned out more direct and extractive. The state or white settlers owned the land. Forced or underpaid labor was common. However, were native producers had proven themselves capable or outcompeted white settlers, governments often refrained from intervening. Throughout the colonial age, the bulk of cash crop exports was produced by Africans rather than settlers or company plantations(Bauer 1956; Frankema, Green and Hillbom 2016).

Resource-poor African regions saw little colonial investment but highly extractive strategies of revenue generation. Direct hut, head, or poll taxes required local populations to earn income in cash. In many cases, labor migration to mining and cash crop regions ensued. Where mining or settler agriculture dominated the economy, the creation of labor reserves was an explicit colonial strategy. The limited local opportunities were further restricted by colonial governments to ensure steady flows of underpaid labor to the mines and plantations. In other colonies, resource-poor areas became main recruitment areas to satisfy labor demands in infrastructure construction and colonial militaries. Opportunities for economic accumulation, elite formation, and political representation remained scarce. Labor migration from resource-poor areas implied rising ethnic diversity in cash crop and mining regions. In cash crop zones, in-migrants depended on the goodwill of the communal elites who ran the local economy (Berry 1993). As labor was initially scarce, migration was mostly welcomed. However, population densities were steadily rising and land became less and less abundant.

Falling prices in the 1920s and 30s, high levels of taxation, cartelistic behaviors by European trading houses, crop diseases, and misguided colonial campaigns of agricultural intensification raised potential for local distributional conflict. Access to the gains from cash crop production required membership in the locally dominant ethnic community or at least personal favors from ethnic elites. Falling profits and continued in-migration motivated local communities to use identity markers as barriers to entry. Local ethnic coalitions excluded ethnic strangers to maximize the gains for in-group members. In-migrants became second-class citizens (Boone 2014). Ethnic diversity under communal forms of rule led to particularly salient ethnic boundaries in cash crop areas.

Mining towns were perhaps even more diverse and significantly more urban than cash crop regions. At times, inter-ethnic competition for jobs spurred identity-based mobilization. However, more direct forms of rule, strong cross-cutting incentives for class-based rather than ethnic mobilization, and urban melting pots prevented a similar politicization of ethnicity. Resource-poor areas were generally less diverse and did not provide the same economic incentives for identity activation as cash crop zones. Significant spatial inequalities and colonial policies of indirect rule have arguably politicized ethnicity across the board. Nonetheless, the unique combination of economic potential, communal rule, and ethnic diversity made ethnic identities even more relevant where cash crops were produced. Once politicized, local identities tended to remain salient in the post-colonial age.

The wealth differentials, unequal representation, and salient identities associated with spatially varying resource regimes help to understand patterns of intrastate conflict in post-colonial Africa. Ethnic groups whose homelands saw colonial cash crops are both richer and more likely to be politically represented in post-colonial governments. Cash crop elites and their local constituencies tend to benefit from the status quo and are unlikely to harness sufficiently strong grievances to violently challenge the prevailing order. As such, the probability of full-blown ethnic rebellion against the central state is low. The prediction for mineral-rich groups is less clear-cut. While mining areas are generally richer and have better infrastructure, they are not necessarily represented in central state governments. In general, higher local wealth should prevent the onset of ethnic civil wars. However, capital-intensive mining activities rarely benefit the entire local population. In addition, rent-seeking governments or mining companies may monopolize most gains or redistribute profits to other regions. Under such conditions, local grievances become likely and may increase the risk of ethnically based anti-regime mobilization. In line with the horizontal inequality literature, I therefore expect ethnic conflict to be especially likely to emanate from resource-poor ethnic homelands.

And yet, resource-rich areas are unlikely to be entirely peaceful. Local distributional struggles, diversity, and salient ethnic identities may produce local ethnic violence between sons of the soil and ethnic strangers. Such instances of conflict are likely to be less organized and tend to redress local rather than national-level grievances. As a result, they rarely cross the threshold of full-blown civil war. Local ethnic conflict is particularly likely where falling prices or adverse climate reduce the size of the pie and intensify inter-group competition. Mineral-rich areas may likewise see local protest and conflict activity when new mines or rising prices intensify in-migration and government extraction. The interplay between local resource potential, external demand, endogenous colonial institutions, and local adaptation strategies leads to clear predictions about the spatial or inter-group distribution of economic opportunities, political power, ethnic mobilization, and conflict.

1.3 EMPIRICAL APPROACH & PREVIEW OF RESULTS

In the empirical chapters of this dissertation, I test the plausibility of my argument. To that end, I combine spatially disaggregated data on the distribution of colonial export production and infrastructure investments with more recent information on economic activity, ethnic group-level representation in national

governments, individual-level ethnic identity salience, and political violence. Wherever possible, I use plausibly exogenous variation in geographically determined resource potential, world market prices, or climatic conditions to identify causal effects. In line with my theoretical predictions, I find that both cash crop and mining regions had better colonial infrastructure and have remained more developed until the present day. I present evidence that true path dependence rather than a simple continuation of resource production is driving the effect.

As for political representation, cash crop groups are, on average, more likely to be included in post-colonial cabinets. However, representation is not an unchanging colonial legacy of early elite formation and mobilization. Instead, cabinet shares vary in response to temporal changes in the value of cash crops that are produced in ethnic homelands. No such effects are found for minerals or staple crops. My analysis of spatially disaggregated survey data reveals that present-day inhabitants of colonial cash crop areas are particularly likely to identify in ethnic terms and less likely to marry across ethnic boundaries. Finally, I show that cash crop-rich groups are rarely involved in ethnic civil war. Quite strikingly however, local violence is not less common in resource-rich places. Economic downturns in cash crop areas are associated with increased odds of riots, protests, and small-scale battles. This effect is significantly stronger in ethnically diverse cash crop regions. Local ethnic conflict rather than falling opportunity costs of rebellion seems to drive the effect.

1.4 PLAN OF THE THESIS

The remainder of this dissertation is structured as follows. In Chapter 2, I briefly summarize the resource curse literature as far as it relates to the four outcomes I study in this thesis. I highlight strengths and weaknesses of previous work and outline what I see as my main contributions to the literature. Chapter 3 presents a simple political geography model of African resource regimes. The model encapsulates the main theoretical threads of my argument in stylized form. In Chapter 4, I apply the model to precolonial African history. The goal is to illustrate how the interplay between locational fundamentals, demand and technology shocks, and political institution building produced fascinating variation in African trading modes and state structures.

Resource regimes mattered long before European imperialists scrambled for Africa. A quick ride trough precolonial history helps to better grasp patterns of continuity and change in the 19th and 20th centuries. Far from just implementing metropolitan blueprints, European colonizers built endogenous institutions

around the export resources that came to constitute the fiscal backbone of their states. Chapter 5 describes in greater detail how the natural resources of the 19th century cash crop and mineral revolutions powerfully shaped within-colony institutional variation. I theorize how the fiscal, administrative, and regulatory strategies of colonial rule responded to revenue needs and local resource production modes. In Chapter 6, I argue that the emerging and spatially varying institutional setup had far-reaching consequences for the distribution of economic opportunity, political and ethnic mobilization, as well as patterns of violent conflict. I hypothesize explicitly subnational colonial legacies and discuss mechanisms of post-colonial persistence and change.

The second part of the dissertation empirically tests the implications derived in Chapter 6. Chapter 7 examines the effects of colonial resources and infrastructure on present-day spatial inequality. Chapter 8 demonstrates how post-colonial patterns of political representation vary with the type and temporally changing value of colonial export resources. Chapter 9 shows that, in line with my argument, ethnic identities are particularly salient in colonial cash crop areas. Chapter 10 studies armed conflict at the ethnic-group and more local levels. Large-scale ethnic rebellion against the states is unlikely to emanate from ethnic home regions that saw colonial cash crop production. At more local levels, however, political violence responds in predictable ways to the interaction between colonial resource endowments, economic shocks, and local ethnic demography. Last but not least, Chapter 11 recapitulates the main findings and discusses their relevance for academic and public debates.

2

BEYOND THE RESOURCE CURSE

This thesis is not the first to stress the fundamental role of natural resources in African economic and political development. It speaks to a large literature that highlights how natural resources undermine economic growth, representative government, and political stability. The notion of a resource curse remains relevant in both academic and popular debates. Neo-institutionalist scholars tend to dismiss direct effects of geographic endowments and resource dependence North (1991); Acemoglu, Johnson and Robinson (2001). Somewhat ironically, however, commodity extraction remains a center piece of their theories. In what follows, I selectively discuss the resource curse literature in as far as it relates to the four outcomes I study in this dissertation. I focus on economic and political variants of the resource curse mechanism that may operate either at the national or at more local levels. In each section, I highlight potential weaknesses and remaining questions. The final part of this section outlines my specific contributions to this broad and diverse literature.

2.1 ECONOMIC DEVELOPMENT AND INEQUALITY

The most well-known strand of the resource curse literature comes from growth and development economics. Scholars have noted that resource-dependent countries are poorer, more unequal and grow slower than economies with large manufacturing or service sectors. At the national level, theoretical approaches distinguish between economic and political mechanisms. On the economic side, we can differentiate Dutch disease, economic linkage, and volatility theories. First, dutch disease accounts point out how trade in natural resources cannibalizes generally more productive manufacturing industries. Massive revenues from resource production lead to domestic spending sprees on non-tradable goods and services. Increased domestic demand causes prices and real wages to rise. The real exchange rate appreciates and the competitiveness of non-resource export industries declines (Corden and Neary 1982; Auty 1994; Sachs and Warner 2001).

Second, natural resource production is commonly associated with less complex economic structures and lacks the upstream and downstream linkages

of manufacturing. Consequently, positive domestic spillovers are scarce and resource-related growth episodes less sustainable (Hirschman N.d.). Mineral and hydrocarbon production for export typically employs less people than manufacturing, service provision, or agriculture. As a result, gains from resource exports tend to be concentrated in the hands of a small subset of the general population. Third, the inherent volatility of global commodity markets makes resource-dependent economies vulnerable to negative price shocks. Dwindling revenues may spur unproductive distributional conflict and rent-seeking behaviors (Rodrik 1998; Sachs and Warner 2001).

In theory, quality institutions could rein in conflict and rent-seeking. However, a more political strand of the resource curse literature argues that commodity dependence undermines institutional development (Auty 1994; Ross 1999). Large revenues from resource exports reduce the need to raise taxes domestically. Weak state bureaucracies, unaccountable government, and poor economic policies are direct consequences. Where rulers do not depend financially on their populations, they have little incentive to respond to domestic needs or to implement growth-enhancing policies. Resource-rich countries tend to be autocratic rentier states whose rulers rely on patronage rather than sound policy to remain in office (Beblawi and Luciani 2015). Rentier states exhibit poor and highly volatile growth performance and are characterized by massive economic inequality.

Theories of extractive colonial institutions are closely related to the rentier state literature and particularly relevant for the present purpose. According to these theories, different forms of European colonization explain not only persistent income gaps between countries, but also account for a reversal of fortune among colonized territories (Acemoglu, Johnson and Robinson 2002). Where Europeans settled themselves, they implemented robust and inclusive institutions that produced long-term growth. Where dense native populations or unfavorable disease environments prevented European settlement, colonizers focused on extracting natural resources. The institutions they implemented to serve this task were hierarchical, coercive, and showed little concern for local populations (Acemoglu, Johnson and Robinson 2001). A small European elite monopolized political power and economic wealth. Natives were repressed and often forced to work as slaves in mines and on cash crop plantations (Engerman and Sokoloff 1997). After independence, economic and political elites maintained the extractive framework to bolster their wealth and power. The potential for economic growth remained low.

By their very nature, country-level accounts of the resource curse cannot account for significant subnational variation in economic development. Economic versions yield fascinating insights, yet often remain quite ahistorical and apolitical. To fully understand the economic effects of natural resources, we need to investigate the historical and political roots of resource regimes. Rentier state theories offer a genuinely political explanation for poor growth and inequality in resource-exporting nations. However, we do not learn how rentier states emerge. Both economic and rentier state theories tend to focus on hydrocarbon and, to a lesser extent, mineral resources. They do not reveal much about the most important African exports of the colonial age – crops such as cocoa, coffee, cotton, groundnuts, and oil palm.

The extractive institutions literature takes history, politics, and cash crops into account. Still, it leaves many questions unanswered, especially with respect to Sub-Saharan Africa. In marked contrast to Latin America, most African cash crop exports did not come from European-run plantations or settler estates. In Kenya and Ghana, agricultural export production was associated with rising native living standard both before and during the colonial age (Moradi 2008, 2009). We lack the counterfactual to credibly assess whether growth would have been higher in the absence of European colonization. That may well be the case. Nevertheless, the very nature of African cash crop production does not square well with the general thrust of the institutional theories proposed by Acemoglu, Johnson and Robinson (2001) and Engerman and Sokoloff (1997).

Second, European settlement does not explain institutional variation within Africa. The few African settler and semi-settler colonies were ruled much more coercively than countries where only a "thin white line" of Europeans was present (Kirk-Greene 1980; Austin 2008*b*). Third, disease environments may explain the late onset of formal conquest but not the near absence of settler colonies. By the time of the Scramble, Africa was no longer the "white man's grave." Medical advances and especially the introduction of quinine made malaria less of a constraint to white settlement (Curtin 1990). Fourth, the African cases that Acemoglu and Robinson (2012) discuss in more detail are far from representative. South Africa, Botswana, and King Leopold's Congo are highly relevant but clearly atypical examples of African colonies. Understanding extractive colonialism in the African context requires a deeper account of how resource types and production modes shaped colonial institutions.

A more recent empirical strand of the literature examines the subnational economic effects of resource production. Results at the local level paint a somewhat more positive picture of commodity extraction. Tolonen (2015)

show that the opening of gold mines reduces local infant mortality rates and is associated with greater female labor market participation as well as male upgrading from agricultural to skilled manual jobs (Kotsadam and Tolonen 2016). Fenske and Zurimendi (2017) analyze how variation in oil prices affects subnational outcomes in Nigeria. They find that southern Nigerian survey respondents born in years of high oil prices are better off in economic and educational terms. Mamo et al. (2017) demonstrate that the opening of new mines or rising mineral prices increase district-level night lights. However, they report very small spillover effects to neighboring districts and rapidly decreasing luminosity once mines close down. These findings make clear that a national-level curse is compatible with more positive local-level effects. While resource-rich regions benefit, the rest of the country does not. Levels of spatial and individual inequality increase.

Other scholars investigate the long-term effects of historical resource production in the colonial age. Dell (2010) shows that the forced labor schemes of the Peruvian mining mita were historically associated with insecure land tenure and low education rates. These effects have persisted. Present-day respondents from mita regions have lower household consumption, worse public infrastructure, and are more likely to rely on subsistence farming. In a more recent paper, Dell and Olken (2017) study the long-term effects of sugar production in the Dutch colony of Indonesia. They show that areas close to previous sugar factories are richer, better educated, and more industrialized than similar regions without historical sugar processing. These careful empirical studies significantly improve our grasp of the local-level economic effects of resource extraction.

However, analyses of present-day resource production tend to concentrate on oil and minerals, whereas the long-term persistence variant restricts the focus to individual cases. It remains to be answered whether these findings travel to other resource types and geographic contexts. As an aside, the frequently used term development is not without problems when it comes to colonial resource extraction. Dell and Olken's paper is titled "The Developmental Effects of the Extractive Colonial Economy." While this makes for a nice contrast with the country-level literature, it obscures the real empirical contribution. The counterfactual observations in subnational analyses of resource production always come from the same country. As such, we cannot say whether positive results are due to faster growth of resource areas or slower growth in their surroundings. Especially in the colonial context, blocking the development of

some sectors and areas to the benefit of others was often an explicit strategy. Spatial inequality seems the more appropriate term.

2.2 INSTITUTIONS AND POLITICAL REPRESENTATION

A more political branch of the resource curse literature illuminates the effects of resource dependence on regime types and representation. Ross (1999) has prominently shown that oil-rich states tend to be autocratic. The causal mechanisms proposed to explain this association are based on the rentier state literature. Petroleum rents can be used to finance repression or patronage spending. Wright, Frantz and Geddes (2015) present evidence that petroleum-exporting autocracies indeed have higher military spending. Resource wealth seems to provide autocrats with the means to ensure regime stability. Another approach regards resource-rich states as valuable prizes to compete for. The groups that win out monopolize power and wealth (Caselli and Cunningham 2009). Both mechanisms predict unaccountable and exclusive political institutions. A series of empirical studies has found a country-level correlation between resource dependence and corruption or other measures of poor institutional quality (Bulte, Damania and Deacon 2005; Ross 2015). At the subnational leevel, Knutsen et al. (2017) use Afrobarometer surveys and a difference-in-differences strategy to show that the opening of mines increases local corruption in African countries.

Similar to the economic version, the political resource curse literature neglects agricultural exports and does not account for the historical roots of resource-related institution building. While undemocratic and corrupt governments are almost by definition unrepresentative, the current literature does not explain which social groups run the rentier state to their advantage. Do petro-dictators and their ruling coalitions come from oil-producing regions? Or do they lack any personal or ethnic links to source areas and ruthlessly redistribute away from local populations?

Arriola (2013*b*) offers a not directly resource curse-related but highly relevant exception for the African context. He highlights the economic foundations of successful multi-ethnic opposition movements in African multi-party elections. In his view, a strong commercial elite that benefits from relatively liberal capital markets is needed to effectively mobilize. Business elites provide the upfront investments that make inherently fragile inter-ethnic coalition bargains credible. Patronage wealth, e.g. from Cameroonian oil exports, allows incumbents to buy support, tightly control capital markets, and thereby disrupt nascent opposition

coalitions. Arriola (2013*b*) further argues that post-independence presidents from cash crop regions often chose more liberal financial policies. Some decades later, these early choices facilitated opposition financing and electoral transfers of power. Arriola's study rightly points at the relevance of colonial cash crop production for early elite formation and institutional choices. However, the more historical aspects of his argument still await systematic analysis.

2.3 ETHNIC IDENTITY SALIENCE

A rich and multi-disciplinary literature investigates the causes of ethnic identity salience in African politics. Colonial anthropologists saw African "tribes" as fascinating subjects of study and generally believed in objective and age-old ethnic traditions and identities (Evans-Pritchard 1981). Classical modernization theories departed from such primordialist notions of ethnicity as immovable object. In their view, the unstoppable forces of modernization – industrialization, urbanization, formal education, and print capitalism – gradually replace tribal with national or even more universal identities (Deutsch 1953; Gellner 2008; Weber 1976; Anderson 1981) Africanists observed early on that, if anything, modernization was increasing rather than reducing ethnic identity salience. This spurred what Eifert, Miguel and Posner (2010) call a second generation of modernization theories. These approaches regard ethnicity as a useful base for competition over inherently scarce benefits of modernization (Bates 1987; Calhoun 1993).

In the African context, the perhaps most valuable prize of modernization is control of the state. (Eifert, Miguel and Posner 2010) have shown that ethnic identities become temporarily more salient around election time. The further demonstrate that people employed in more modern sectors are more likely to identify in ethnic than in class or occupational terms. (Posner 2005, 2004*b*) explains how electoral institutions and group size interact to make some ethnic coalitions more viable in political competition than others. Robinson's (2016) recent study revives classic modernization theory and finds that urbanization, education, and formal employment predict national rather than ethnic identity salience. Despite these contrarian findings, second-generation theories' focus on inter-group competition for scarce resources make them particularly relevant for the present purpose. Systematically testing these theories is hard, and empirical evidence accordingly scarce. Most quantitative work highlights national-level political competition or individual-level socio-economic attributes. Natural resources are conspicuously absent and truly subnational work remains rare.

This stands in marked contrast to the richness of the theoretical literature on African ethnicity. Beyond primordialism and different modernization approaches, constructivist and institutionalist scholars hint at various links between colonialism and ethnic identity salience. As indirect rule required governance through supposedly traditional institutions and colonial administrators' knowledge of local conditions was poor, they may have artificially "created" tribes and ethnic homelands (Vail 1989; Hobsbawm and Ranger 2012; Iliffe 1979). Institutionalizing ethnic categories in formal and informal law rigidifies previously fluid and overlapping identities (Mamdani 1996; Lieberman and Singh 2017).

Ali et al. (2018) provide quantitative evidence that ethnic identities are more salient in former British than former French West African colonies. This is in line with the notion that British colonies were ruled more indirectly than their French counterparts. Drastic economic inequalities between colonially sanctioned tribes spurred processes of ethnic stereotyping and emotionally charged comparisons of group worth (Horowitz 1985). Missionary ethnography, Bible translations, and formal education in "ethnic" African languages were crucial mechanisms of identity construction (Vail 1989; Posner 2003). Sociological, institutional, and psychological aspects of identity formation appear similarly relevant as economic competition. These factors are perhaps even harder to empirically investigate. In addition, they seem less directly related to natural resource extraction than ethnic competition and second-generation modernization theories.

2.4 POLITICAL VIOLENCE

The link between natural resources and political violence is almost as well-researched as the economic variant of the resource curse. Countless studies have found or rejected effects of different resource types at national and subnational levels. Collier and Hoeffler (2004) reported that primary commodity exporting countries face higher risks of civil war. They propose two rebel-centric mechanisms: Greed and feasibility. Natural resources are described as lucrative honey pots that quasi-criminal rebels try to seize. Once under control, commodities can be used to finance rebellion, pay recruits, and more effectively fight the state. Fearon (2005) advances a more state-centric mechanism based on the rentier state literature. He shows that the natural resource effect seems limited to oil and interprets this as evidence for weak state bureaucracies. Both approaches agree in one point. Resource rents make control of the state a

valuable prize to fight for and spur a rapacity dynamic among armed groups (Fearon and Laitin 2003).

Lujala (2010) empirically distinguishes between rebel- and state-centric explanations. Her analysis reveals that the location of natural resources matters. First, the petroleum-conflict link applies to onshore but not offshore oil production. Second, both oil production and the presence of lootable diamonds increases the risk of onset and the duration of civil wars. These findings support rebel-centric rather than rentier state explanations. A specific variant of the rebel-centric greed mechanism regards spatially concentrated resource wealth as driver of secessionist conflict. Local populations face incentives to break away from large states in order to maximize per-capita revenue flows (Ross 2012). Morelli and Rohner (2015) show that government-seeking and secessionist civil wars are more likely where both oil and ethnic groups are spatially concentrated. More skeptical scholars have argued that resource rents can improve state and counterinsurgency capacity and provide income that raises the opportunity cost of rebellion. Using temporal variation in global prices and oil discoveries, Cotet and Tsui (2013); Bazzi and Blattman (2014) show that neither oil nor other export commodities are significantly associated with conflict onset at the country level.

As with the economic development literature, these theories and findings remain strikingly apolitical and ahistorical. In addition, country-level effects of natural resources are rarely credibly identified. Regarding the latter, recent empirical work moves to the subnational level and employs more credible identification strategies. In a pioneering article, Dube and Vargas (2013) successfully distinguish rapacity from opportunity effects. Studying conflict events in Colombia, they find that rising oil prices increase conflict in petroleum regions whereas rising coffee prices reduce conflict in coffee-producing municipalities. Capital-intensive resources like hydrocarbons seem to attract greedy rebels while rising incomes in labor-intensive agricultural production raise the opportunity cost of rebellion.

Berman et al. (2017) replicate these findings for the African continent. They show that the opening of new mines and rising mineral prices predict conflict events. In a similar paper, Berman and Couttenier (2015) demonstrate that rising prices of agricultural exports lower conflict incidence in producing regions. Von Uexkull et al. (2016) and Harari and La Ferrara (Forthcoming.) use weather instead of price shocks and reach similar conclusions. Growing season droughts in agriculturally dependent regions raise conflict onset and/or incidence. Von Uexkull et al. (2016) shows that drought-related conflict incidence

is higher in politically excluded ethnic homelands within poor countries. On the agricultural side, these studies seem to provide strong evidence for the income-based opportunity cost mechanism. However, they do not distinguish between different crop types and often dismiss political or grievance-related mechanisms.

What's more, opportunity cost-related findings have recently been challenged from within the economic framework. Koren (2018) shows that higher rather than lower yields of food crops such as maize and wheat drive conflict events. Rebel groups need to rely on locally produced food and thus strategically attack fertile areas when yields are high. McGuirk and Burke (2017) present an even more nuanced account. They distinguish between food-producing and food-consuming grid cells on the one hand, and between factor and output conflict on the other. Factor conflict concerns the control of land and future production whereas output conflict intends to appropriate scarce food resources to survive. Factor conflict is more organized and violent than output conflict.

McGuirk and Burke (2017) show that rising prices of globally traded food crops reduce factor conflict in producing cells but increase it in consuming cells. Both effects are consistent with the opportunity cost mechanism. Output conflict uniformly increases in response to growing food prices. In both producing and consuming cells, rising prices increase the value of appropriable surplus and lower the real incomes of non-producing populations. A combination of rapacity and falling opportunity costs seem to explain output conflict.[1] McGuirk and Burke (2017) do not find any significant effects of cash crop prices.

The credible empirical designs of the subnational resource and conflict literature greatly advance our understanding of economic mechanisms. However, the literature remains apolitical and identity-blind. We learn little about the most important actors and their non-economic motivations and mobilization strategies. Crop price and weather shocks become mere proxies for local income. The political processes driving armed confrontation remain elusive. Hydrocarbons and minerals are seen as nothing more than centralized income pots which attract greedy rebels. With respect to oil, a recent set of studies has put forward more political and grievance-related mechanisms. Both Asal et al. (2016) and Basedau and Pierskalla (2014) find that oil wealth in politically excluded ethnic home regions is particularly risky. Both studies, however, lack credible identifi-

1 McGuirk and Burke (2017) operationalize factor conflict as all violent events coded by UCDP (battles, one-sided violence, and non-state or communal violence) and rely on all non-battle events from the ACLED dataset (one-sided violence, protests, and riots) to code output conflict. This choice is not entirely convincing. At the very minimum, one-sided violence against civilians occurs in both categories. Also, we do not know whether non-state actors or national armies are responsible for violence against civilians.

cation. In a more recent article, Hunziker and Cederman (2017) use geological structures as instrument for oil production and show that oil indeed causes conflict. This effect is limited to secessionist struggle and becomes even stronger where petroleum is concentrated in the homeland of politically excluded ethnic minorities. Equally careful empirical work on the more political aspects of cash crop agriculture does not yet exist.

2.5 MOVING AHEAD

The resource curse literature directly speaks to three of the four outcomes I study in this dissertation. Less is known about how resources relate to ethnic identity salience. Even with respect to economic inequality, political representation, and armed conflict, many questions remain unanswered. Most importantly, much of the literature on development and conflict is economic rather than political. Rentier state theories of poor economic policies, unrepresentative government, and civil strife only partially fill the gap. Just as its economic counterpart, the political resource curse literature falls short on three additional accounts. First, it does not examine the long-term historical relationship between natural resources and political institution building.

Theories of extractive institutions offer a useful corrective but run into trouble in the African context. Second, the economic and political variants of the resource curse remain ethnically colorblind. Much the same goes for the bulk of the quantitative branch of the resource-related conflict literature. Investigating the main actors, coalitions, and mobilization strategies seems key to develop genuinely political resource theories. Third, quantitative political science approaches rarely account for significant subnational variation in resource-related outcomes. On this front, there is something to be learned from the apolitical but rigorous political economy literature.

This dissertation starts to address all four gaps. First, the political and institutional aspects of colonial resource regimes offer a novel take on economic and political inequality, ethnic identity salience, and armed conflict in Sub-Saharan Africa. Second, a long-term historical view that combines locational fundamentals with external demand shocks and political institutions helps to understand how extractive colonialism played out in the African context. Third, I incorporate explicitly ethnic processes of mobilization, representation, and conflict. Finally, spatial disaggregation of both theory and analysis generates more specific hypothesis and allows for rigorous econometric testing.

Part I

THEORY

3

TRADE MADE THE STATE: A MODEL OF AFRICAN POLITICS

Writers from different disciplines and intellectual traditions have given post-independence African states a variety of bad names. The most prominent adjectives range from neopatrimonial, clientelist, patronage-based, weak, post- or neo-colonial to suspended in mid-air, extraverted, and gatekeeping. These terms intend to capture defining characteristics of *the* African state. Neopatrimonial, clientelist, and patronage-based refer to the notion that goods provision or material well-being more broadly depend on the discretion of political elites (Lemarchand 1972; Clapham 1985; Bratton and Van de Walle 1994). Elites trade material rewards for political loyalty in, more often than not, informal exchanges (Chandra 2004; Arriola 2009).

African states are weak in that they frequently fail to extend their monopolies of violence and tax apparatus across the entirety of their nominal territories (Jackson and Rosberg 1982; Herbst 2000). As a result, the linkages between states and society are underdeveloped and the state floats in "mid-air" (Hyden 1983; Migdal 1988). Insofar as these characteristics were shaped by European imperialists, African states are post- or neo-colonial (Young 2004; Englebert 2000; Wa Thiong'o 1992). They are extraverted where Africa's position in the global economy and its dependence on exports to or goodwill from more powerful outsiders dictates political affairs (Amin 1974; Bayart and Ellis 2000; Cooper 1981). In short, the gatekeeper state is strong at the interface with the outside but relatively weak domestically (Cooper 2002). Controlling the gate is the ultimate price and enables states and their rulers to buy their client-citizens' continued loyalty.

These defining features are often cited as root causes of staggering inequalities in economic well-being and political representation, ethnic contests for wealth and power, and the high incidence of violent conflict. While central state institutions are certainly important to make sense of the outcomes just mentioned, general characterizations of the African state face two limitations. First, they rarely articulate the origins of institutions. The African state is endogenous. Its institutions may be a consequence rather than a cause of, say, violent conflict or the relative distribution of political power (Tilly 1990; Acemoglu, Johnson and Robinson 2005). Alternatively, both state institutions and, for example,

economic inequality may be the result of some third, unobserved factor, e.g. natural resource endowments (Diamond 1997).

Second, generalizations at the country or even continent level fail to account for spatial variation between and within African countries. As such, they tell us little about which regions and groups get rich or where and when ethnicity becomes politically salient. Some generalizations from this literature are nonetheless helpful to cut through the complexity of Africa's political and economic history. The centrality of linkages between state and society on the one hand, and African states and the outside world on the other provide particularly valuable insights (Migdal 1988; Cooper 2002). Mere micro approaches that ignore these linkages and exclusively focus on local determinants of subnational development or conflict tend to miss the bigger picture.

In what follows, I sketch a simple political geography model of African resource regimes. The model is based on a liberal and selective reading of classical theories of historical state formation and colonialism. The most important inspiration comes from neo-institutionalist theories describing state institutions as functional regimes formed to realize potential gains from trade (North and Thomas 1973; North 1981; Bates 1987; Acemoglu, Johnson and Robinson 2005). In line with "neolithic", "appropriability" and "bellicose" theories of state formation, I incorporate natural resource endowments and external demand and technology shocks as exogenous sources of institutional variation across space and time (Diamond 1997; Scott 2017; Tilly 1990; Gennaioli and Voth 2015).

To capture some central tenets of Africanist and colonial historiography, I stress the linkages between African states and powerful outside trading partners that produced the particular institutional forms of informal and formal empire as well as direct and indirect rule (Cooper 2002; Gallagher and Robinson 1953; Crowder 1964; Gerring et al. 2011). Finally, the model is intended to account for the spatial distribution of economic activity, political power, ethnic identity salience, and violent conflict within African states. In contrast to most other institutional theories of state formation and economic development, my main goal is thus not to explain why African states appear different than their European counterparts or why African nations are, on average, poorer than the rest of the world (Acemoglu, Johnson and Robinson 2001, 2002; Dincecco and Onorato 2017).

After presenting the theoretical framework, I use it to structure a brief overview of precolonial and colonial political development in Sub-Saharan Africa. My aim is threefold. First, I illustrate the relevance of resource endowments, external demand and technology shocks, and long-distance trading for

institution building throughout African history. Second, I provide the historical context that is needed to understand the fundamental implications of natural resource exports for all four outcomes I study in this dissertation. Third, I point to the endogeneity of colonial institutions. The colonial state hardly ever was the *deus ex machina* or natural experiment as which it is frequently described. Finally, I draw from the foregoing discussions and use select elements of the theoretical model and the foregoing historical applications to derive long-term implications for economic and political inequality, ethnic identity salience, and armed conflict. These implications are then further developed and tested in the empirical chapters.

3.1 THE MODEL

The model consists of three main stages and has implications for the distribution of both economic and political payoffs. The basic logic of these steps is depicted in Figures 3.1, 3.2, and 3.3. The rectangle in each panel represents an arbitrary territory that will become, at some point, the outline of an African colonial and post-independence state. The letters A–E represent the actors in the model. A–D are early African coalitions, i.e. societies, ethnolinguistic groups, or proto-states. E is a powerful outsider in charge of a centralized state or empire.

3.1.1 *Locational Fundamentals*

In the first stage of the model, nature deals the cards and distributes initial endowments. These locational fundamentals are geographic features "that change little over time – even if their economic meaning may have evolved" (Davis and Weinstein 2002, p. 1270). The rhombus and the two flower symbols represent two different, potentially tradable natural resources. The rhombus is a high value-to-weight, non-perishable mineral point resource, say an underground copper deposit. The flowers are more diffusely distributed, bulkier and perishable agricultural resources, for example millet or oil palm crops that grow on highly suitable soils.

The half circle at the top is a natural trading hub, e.g. an important location at a navigable river or a piece of indentured shoreline that may serve as a natural harbor. This will become the gate in Cooper's (2002) gatekeeper state, i.e. "the interface of the ... territory with the outside world." The lines represent potential intra-regional and long-distance trade routes. At first, only the short solid within-territory routes between the mineral and agricultural resources

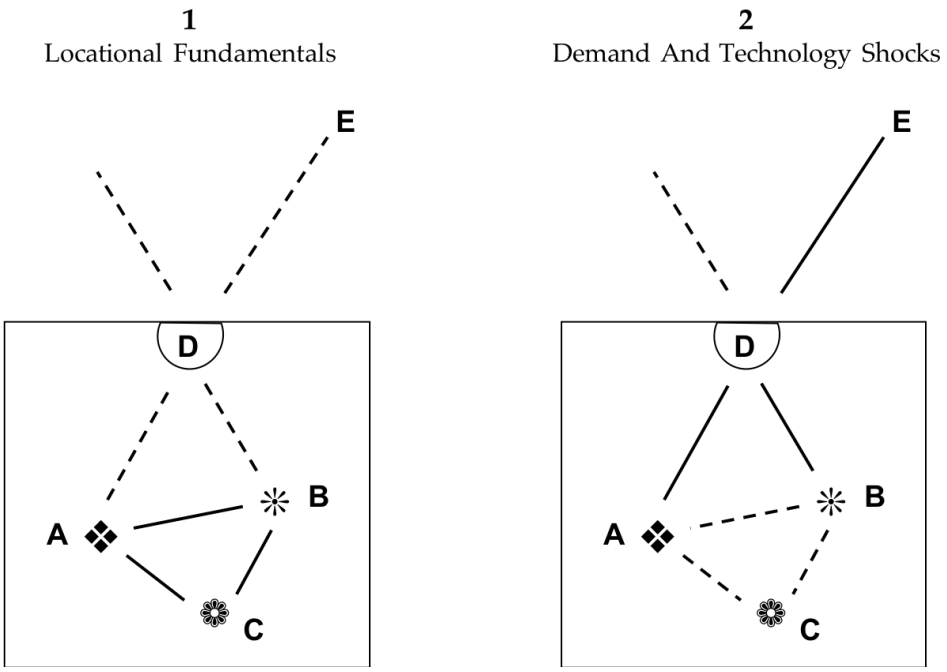

Figure 3.1: Model (1/3) Locational Fundamentals & External Shocks

are viable since transport costs are high. Head porterage or animal caravans through difficult geographic terrain are expensive and take time (Herbst 2000).

Along the viable trade routes, the political coalitions A–C trade, bargain, and compete with each other. The modes of interaction are diverse and range from peaceful commerce to violent conquest. Forms and outcomes of this process depend on the political structure within the coalitions and the balance of power between them. Both of these factors are shaped by the natural resource endowments, available transport and military technologies, and, crucially, the modes of interaction themselves (Hintze 1975; Tilly 1990; Bates 1987; Gennaioli and Voth 2015). Consider the domestic trade route between the mineral and agricultural sites as a first example. The potential gains from trade are clear. The agricultural coalitions needs metal to make hoes or weapons and the mining coalition needs food. Regional trade across ecological boundaries ensues (Bates 1987; Fenske 2014; Vansina 1968; Gray and Birmingham 1970).

As trade goes on, all three coalitions weigh the costs and benefits of peaceful commerce against the option of conquering and directly controlling the desired resources. The mineral coalition seems militarily superior since it has invested in coercive capacity to conscript mining labor and protect caravans. At the same time, however, directly controlling an agricultural society from afar is difficult, especially where the latter practices shifting cultivation of hard-to-tax

crops (Mayshar et al. 2018.). War is costly as it threatens to destroy the very resources it intends to capture (Fearon 1995). Peaceful trade continues and leaves an imprint on the internal organization of all three coalitions. The needs to ensure safe passage, extract tariffs, and settle disputes lead to increasingly state-like structures on all ends of the domestic routes (Bates 1987; Fenske 2014). If huge power differentials or bargaining failures lead to war, the type of battle as well as the human and financial intensity of war-making will have equally significant feedback effects on internal coalition structures (Hintze 1975; Tilly 1990).

3.1.2 *Demand and Technology Shocks*

In the second stage, external demand and technology shocks open up additional long-distance routes. Most importantly, the now solid line on top of the rectangle makes commerce with outside partners viable. If the natural resources are unavailable abroad or our territory has a comparative advantage in producing them, external demand increases their trading value. This alone may make delivering them profitable in spite of high transport costs. In many cases, however, technological innovations are required to spur long-distance trade.

Only the introduction of the camel and newly invented ships enabled trade across the Sahara as well as the Atlantic and Indian Oceans (Moseley 1992). The advent of the steamship, railway, and refrigerator in the 19th century made previously unimaginable long-distance trade in perishable agricultural resources possible (Hopkins 1973). The right-half panel in Figure 3.1 depicts a situation where outside trading partner E is interested in the mineral and crop resources in the homelands of groups A and B but not in the agricultural resource from C. Profitable long-distance trade along the newly viable trade routes commences. Quite frequently, this implies a shift away from previously flourishing internal trade routes.

New long-distance trade has to pass through natural trade hub within D's territory. Controlling this gate to external trade is immensely profitable (Cooper 2002). A queen, king, or ruling elite will benefit from that fact. The potential returns from tribute and tariffs motivate the establishment of violence monopolies and guarantees of safe passage (Bates 1987). Not surprisingly, many of the most powerful precolonial African states emerged around important coastal or inland trading hubs (Gomez 2018). Finally, the interested outside trading partner is a powerful state or, in some case, a specialized group of middlemen merchants

such as the Saharan Berber tribes. For the present purpose, the outsider's social and political organization is treated as exogenous. As trade gets going, E starts to interact and bargain primarily with D. D, in turn, interacts with the export source areas A and B and remains less interested in C. As previously for the internal case, cost-benefit and balance of power considerations shape the interactions between gatekeeper and natural resource coalitions on the one hand, and between gatekeeper and outside trading partner on the other. The choice of interaction modes and competitive selection will bring about an institutional equilibrium that can take various forms.

3.1.3 *Institutional Equilibria*

The third stage of the model captures the institutional equilibria or *resource regimes* that emerge from stage 2. Lines now no longer depict trade routes, but hierarchical relationships and governing modes between the actors of the model. I briefly discuss the most important competitive interactions and their institutional consequences. As the natural resource coalitions deal with their gatekeeping counterpart, they can either use the latter's useful but costly middleman function or try to capture the gate for themselves. The gatekeeper faces a similar choice between trading and seizing direct control over resource-rich areas. Last but not least, the powerful outsider has to decide whether to work through the gatekeeper or to push them away and directly trade with or even conquer the resource regions. Panels 3a and 3b in Figure 3.2 show two institutional equilibria that may emerge from a constellation where the outsider is more powerful than the gatekeeper and the gatekeeper more powerful than both resource coalitions.

In scenario 3a, the gatekeeping coalition conquers the mineral site but not the agricultural export region. This seems plausible where the mineral is a capital-intensive point resource that is easy to control, trade, and tax upon successful capture (Le Billon 2001; Sanchez de la Sierra 2017). As noted above, controlling diffuse agricultural resources is difficult and armed invasion may seriously disrupt production. Therefore, the agricultural coalition remains in place and continues to trade through the gatekeeper. Their relationship, however, is unequal. The bargain they reach reflects the power advantage of the gatekeeper who exerts informal influence over the agricultural coalition's elites. This influence often takes the form of a patron-client arrangement in which the gatekeeper trades material rewards for the agricultural coalition's continued cooperation (Bates 1981; Kasara 2007). In other words, the mining

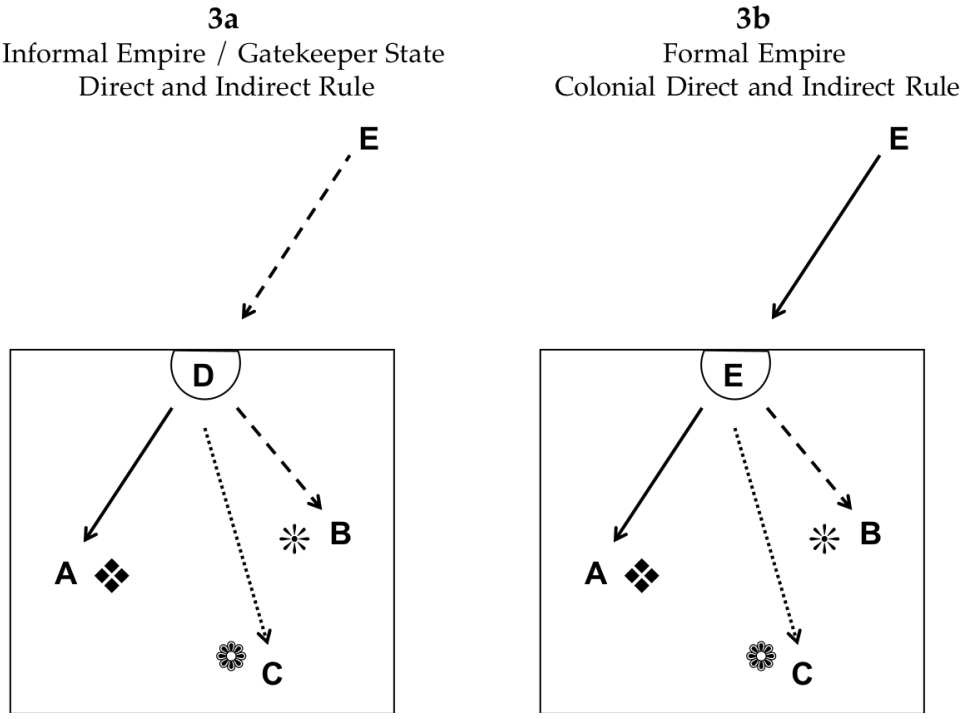

Figure 3.2: Model (2/3) Institutional Equilibria

site is ruled directly whereas the agricultural site is subject to indirect rule. As Gerring et al. (2011, p. 377) define these ideal types "a 'direct' style of rule features highly centralized decision making while an 'indirect' style of rule features a more decentralized framework in which important decision-making powers are delegated to [or remain in the hands of] the weaker entity." In both cases the gatekeepers may invest in physical infrastructure, administrative and tax capacity, or the occasional military campaign to ensure efficient resource extraction. Under direct rule, they perform these tasks themselves. Under indirect rule, they mostly work through local clients. As group C does not produce any sought-after export commodities, D either neglects it or establishes some indirect form of control in order to extract revenues unrelated to trade such as direct taxes or unpaid labor.

How does the interaction between gatekeeping coalition and the powerful outsider play out? As long as resources keep flowing and the gatekeeper is sufficiently reliable and cheap to use, the outside actor will refrain from directly controlling our territory's internal affairs (Robinson and Gallagher 1966). Conquering, and more importantly, ruling territories on the other side of a desert or ocean is costly and fraught with uncertainty. Limited knowledge of local geography, production modes, and social structures compound the

challenge (Reid 2011; Herbst 2000). Again, the commercial and military power differentials between outsider and gatekeeper shape interaction modes and bargaining outcomes. While outsiders are typically keen on avoiding formal conquest, they may still act *imperialistically*. They use commercial inducements and threats to manipulate domestic actors' behavior and the general terms of trade in their favor. The outcome is what Robinson and Gallagher (1966) call the informal empire of free trade. In short, "commercial and capital penetration tend . . . to lead to political co-operation and [informal] hegemony" (Gallagher and Robinson 1953, p. 10). The concept of informal empire applies most readily to the African situation in the 19th century before the short Scramble for full territorial control. However, it already contains key features of Cooper's (2002) gatekeeper state that (re-) enters the stage upon independence.

In scenario 3b, the imperial outsider chooses formal conquest and replaces D – often reluctantly and out of dissatisfaction with previously established informal relations. The main premise is "trade with informal control if possible; trade with rule when necessary" (Gallagher and Robinson 1953, p. 14). Formal imperial rule often follows "local crises" where hitherto successful collaborative arrangements with domestic intermediaries break down (Robinson 1972). This may be the case if, for example, armed conflict between the mining and gatekeeping coalitions threatens the smooth continuation of trade. Alternatively, the agricultural coalition may seize the gate and fail to comply with previously agreed trade and tax regimes. Such local crises "drag" the outsider into "new and irksome commitments" (Gallagher and Robinson 1953, p. 12).

Apart from local crises, the decision to conquer depends on the commercial and geostrategic value of the territory, military and administrative cost-benefit calculations, as well as a permissive international environment (*ibid.*). Once in, the colonizer does not necessarily establish formal control and direct rule across the entire territory. More often than not, "colonial rule represent[s] a reconstruction of collaboration" (Robinson 1972, p. 133). Colonial governance is established to formally rule our territory. However, colonizers continue to search, find, and work through local intermediaries. In deciding where to apply direct or indirect forms of control, colonial governments face similar trade-offs as the domestic gatekeeper in scenario 3a. Natural resource types, the internal structure of local coalitions, and power differentials determine the choice. The equilibrium outcome is formal empire with significant within-colony variation in direct and indirect governing modes.

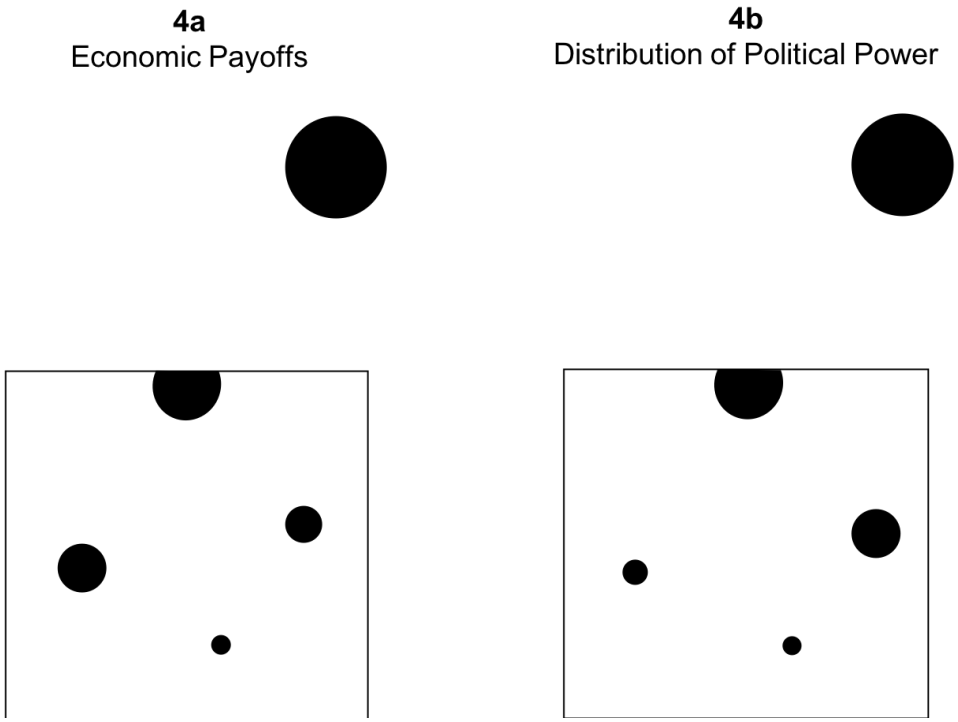

Figure 3.3: Model (3/3) Payoff Structure

3.1.4 *Economic and Political Payoffs*

The final stage of the model maps out the distributional consequences of the bargains and institutions that emerge from the previous steps. Panel 4a shows economic payoffs. In line with Acemoglu, Johnson and Robinson's (2005) framework, I regard the given set of political and economic institutions as main determinant of (a) how much is produced and traded, and (b) where produced output or gains from trade end up. Institutions shape the incentives of all actors to invest, produce, and trade (North 1991). In some cases, the relationship between the domestic or colonial gatekeeper and the resource-rich hinterlands encourages investment in physical infrastructure and capable but not overly coercive direct or indirect administration. Local economic opportunities arise and result in higher incomes (Acemoglu, Johnson and Robinson 2005). Resource-poor area C falls behind.

In general terms, productivity remains low where the gatekeeper or their intermediaries fail to protect individual or communal property rights (North 1981). The situation gets worse if they extract excessively in the form of forced labor or direct taxes (Acemoglu, Johnson and Robinson 2001; Engerman and Sokoloff 1997). In directly ruled areas, agents of the central state implement

such practices. Under indirect rule, these tasks are outsourced to what Mamdani (1996) calls "decentralized despots." The degrees of extraction and despotism as well as their associated economic outcomes vary in accordance with the previous stages of the model. Some regions and subpopulations of our territory benefit from their linkage to the gate, while others are neglected or even "underdeveloped" by whoever controls the gate or manipulates it from the outside (Hopkins 1973; Rodney 1972).

Both the institutional arrangements of stage 3 and the economic payoffs from stage 4a determine the distribution of political power across regions and coalitions. Institutions regulate *de jure* access to power whereas economic wealth is transferable into *de facto* power (Acemoglu, Johnson and Robinson 2005). From the perspective of the domestic or imperial gatekeeper, directly ruled areas are typically easier to monitor, tax and administer than regions under indirect rule. Institutional arrangements thus tend to give more *de jure* power to local intermediaries where the gatekeeper depends on their local networks and authority to achieve social control, tax extraction, or efficient public goods provision (Migdal 1988; Boone 2003; Kasara 2007; Baldwin 2015). Co-opting some local intermediaries to the highest echelons of power at the gate may help to stabilize collaborative patronage bargains and make them more credible or self-enforcing (Arriola 2009; Roessler 2016).

The modes of extraction and institutional arrangements at the two resource sites will impact upon local coalitions' *de facto* power or "threat capabilities" (Roessler and Ohls 2018). Capacity for collective action is greatest where resource production gives rise to a local commercial or political elite keen on protecting and furthering its status (Arriola 2013*b*, ch. 3). This elite has the means to reward local supporters, punish defectors, and develop powerful ethnic patronage networks (Fearon and Laitin 1996). Such mobilizational capacity can be used to threaten and bargain one's way into higher spheres of power at the gate (Roessler and Ohls 2018; Francois, Rainer and Trebbi 2015). As I will argue below, the interaction of resource types and institutional arrangements can lead to situations where *de facto* power is not strictly proportional to the economic payoffs. Both the gatekeeper's demand for collaborators and the local coalition's supply of capable elites as well as mobilizational potential tend to favor source areas of agricultural export commodities over those that produce mineral resources or food crops for domestic markets.

3.2 SOURCES OF PERSISTENCE AND CHANGE

One main claim of this dissertation holds that key aspects of the institutional and distributional equilibria that formed in the colonial age have persisted. Why should that be the case? Three mechanisms may explain the durability of economic and political spatial inequality: serial correlation, path dependence, and institutional persistence. Serial correlation links contemporary patterns of economic development to recurring direct effects of locational fundamentals (Davis and Weinstein 2002; Miguel and Roland 2011; Brakman, Garretsen and Schramm 2004). High present-day income levels in, for instance, colonial cash crop zones are the result of continuously high agricultural productivity.

In contrast, path dependence points to the increasing returns or coordination function associated with past investments in physical infrastructure or administrative capacity. Sunk investments create economies of scale and make it profitable to concentrate new economic activity close to them (Krugman 1991a). If there is more than one potential spatial equilibrium, past investments help economic agents to align their expectations and locate at the same, already well-endowed place (Krugman 1991b; Jedwab, Kerby and Moradi 2017). If relative economic advantages translate into greater *de facto* power, these economic geography mechanisms also stabilize the political power distribution (Acemoglu, Johnson and Robinson 2005).

Institutional persistence refers to incumbent elites' investment in the stabilization and maintenance of the equilibrium that caused their advantage in the first place. Incumbents typically eschew institutional or economic reforms that are likely to undermine their relative advantage (Acemoglu, Johnson and Robinson 2005). As a result, political and economic inequalities persist or even widen. However, neither geography nor history is destiny. Economic, technological, and institutional change disrupts pre-existing power and wealth distributions and produces new equilibrium outcomes. My model points to external demand and technology shocks as important drivers of such rearrangements of the system. Variation in resource prices, novel transport and extraction technologies, and the discovery of new resource deposits may shift the focus away from previously important source areas and trade routes.

At the same time, the institutional and distributional outcomes from stages 3 and 4 may provoke countermobilization. Under normal circumstances, resource-poor group C lacks the economic or political clout to fundamentally challenge the incumbent order. Some inhabitants migrate to the export source areas or the commercial hub in search of economic opportunities. Others stay where they

are, "work the system ... to their minimum disadvantage", and at best employ "weapons of the weak" (Scott 1985, p. xv). Such low-level acts of resistance undermine some aspects of the gatekeeper's schemes yet are neither intended nor able to uproot the ''larger structures of the state" *(ibid.)*.

On some occasions, temporary spikes in the *de facto* power of poor rural populations provide a window of opportunity to push for true institutional change (Acemoglu, Johnson and Robinson 2005). Such spikes are not limited to resource values and technological change. Skillful and charismatic leadership or support from outside actors may help to solve collective action problems and, at least temporarily, shift the balance of power (Cetinyan 2002; Salehyan 2009). Particularly egregious episodes of repression or extraction by the gatekeeper can inspire intense grievances and an altruistic "pleasure of agency" (Wood 2003) that overpowers any disadvantage in resource endowments and opportunity structures (Cederman, Gleditsch and Buhaug 2013; Peterson 2002; Tilly 2017).

The power balance and interaction modes between the coalitions shift accordingly. Transient surges in mobilizational capacity sometimes result in successful rebellion, revolution, or bargained institutional change (Acemoglu, Johnson and Robinson 2005). New economic, and political equilibria emerge. Quite frequently, these new orders differ less radically from the *ancien regime* than could be expected. Incoming elites tend to face similar structural constraints as their predecessors. In addition, they all too often succumb to the temptation of keeping extractive structures intact in order to bolster their power or enrich themselves (Cooper 2002; van de Walle 2009).

3.3 LIMITATIONS

Before I assess the model's relevance and derive testable implications, I clarify some main limitations. The model is, of course, highly stylized and abstracts from important aspects of reality. First, the focus on natural resources and trade implies a quite rationalist and materialist take on African politics. As such, the model pushes ideational factors to the background. The ideologies of imperialism, anti-imperialism, African nationalism, democracy, and various ethno-nationalisms have, without any doubt, greatly influenced modern African history. Assessing the extent to which such ideologies are exogenous or endogenous to the political economy logic of my model appears close to impossible. In the most general sense, it seems safe to assume that ideologies both influence and emerge from political and economic bargaining processes. My sole claim is that the logic of natural resource regimes provides particularly

valuable tools to understand within-territory variation in economic and political outcomes in Sub-Saharan Africa. Whether or not this claim is justified is in the end an empirical question.

Second, the model sets up several stark dichotomies that are in reality continuous phenomena. Some forms of mineral extraction, especially alluvial gold or diamond mining, are less capital intensive and more diffuse than the ideal type of the point resource (Le Billon 2001). Latifunda-style plantation agriculture features the same economies of scale, labor coercion and spatial concentration typically associated with large-scale colonial mining (Sokoloff and Engerman 2000). The distinction between direct and indirect rule in stage 3 is best approached as one in degree rather than in kind (Gerring et al. 2011). Much the same applies to informal and formal empire. The shifts from informal to formal empire and back between the mid-Victorian and the early post-independence age are precisely the point of Robinson and Gallagher's (1966) theory. Again, the only purpose of my categorical distinctions is to sharpen the focus and clearly articulate the logic of the model. The aim is to derive probabilistic instead of deterministic hypotheses. Crops or minerals that are closer to one end of the continuous range between diffuse and point resource tend to be associated with specific institutions and distributional outcomes.

Third, I use concepts from the historic literature and apply some of their key features to time periods outside of their intended empirical domain. Whether the gatekeeper state is useful to understand pre-colonial politics or the informal empire illuminates post-colonial affairs may be subject to intense debate. I do not interpret these concepts strictly by the letter. One of their main purposes is to assign intuitive labels to the institutional outcomes in stage 3 of the model. Last but not least, I do not formalize the model. I neither exploit the full parameter space of resource, technology, and power distributions nor mechanistically translate such parameter constellations into comparative static results. Instead, the model serves as a heuristic device to structure my discussion and verbally derive empirical implications.

In the next chapter, I apply important elements of the model to the history of African precolonial states. First, I articulate how locational fundamentals provide opportunities and constraints for aspiring state-builders. Second, I highlight the fundamental role of trade in early African state formation. Third, I discuss how geography and trading opportunities shaped institutional outcomes before formal colonization. The short ride through precolonial African history sets the stage for the discussion of the 19th century commercial transition and the colonial age. Understanding the role of resource endowments and

external shocks in precolonial times helps to disentangle the endogenous and exogenous aspects of European colonialism in Africa. Chapter 5 then starts by discussing the commercial transition as a crucial demand and technology shock that preceded and, in many ways, shaped formal colonial rule. The second half of the chapter outlines how colonial institution building responded to the opportunities and constraints posed by the spatial distribution and production modes of the export commodities of the commercial transition. Chapter 6 derives implications of colonial resource regimes for the post-colonial distribution of economic potential, political power, ethnic identity salience, and political violence within independent states.

4

GEOGRAPHY, TRADE AND STATES IN PRECOLONIAL TIMES

In what follows, I briefly discuss pre-colonial African state formation. My aim is to show that many of the conceptual themes of my model readily apply to the pre-colonial era. The purpose is analytical rather than historical. I show how locational fundamentals as well as demand and technology shocks produce different coalition and state structures. To preview my conclusions, I argue that from the earliest days onwards, African state formation was powerfully shaped by initially scarce opportunities for trade, especially long-distance trade.

This does not imply the irrelevance of other theories of state formation. As my discussion makes clear, geographical endowments, political institution building and war-making are important in shaping where and when trading opportunities emerge, how they are exploited, and what consequences these processes have for political and economic development. The history of precolonial African state formation allows some general conclusions that are remarkably similar to those underlying modern-day conceptualizations of the African state. More importantly, however, the interaction between geographic endowments, opportunities for long-distance trade, and state building allows to move beyond general characterizations and to theorize spatial and temporal variation in political, economic, and social outcomes both between and within African states.

4.1 LOCATIONAL FUNDAMENTALS IN PRACTICE

Geography rarely directly determines political outcomes. Nevertheless, initial endowments are key to understand the development of subsistence modes, societies, and states over the *longue durée* (Braudel 1995; Gallup, Sachs and Mellinger 1999). The African continent is the second largest of the world and home to great climatic and geographic diversity. A brief overview of the natural environment illustrates the common challenges that aspiring state-builders have faced – prior to, during, and after colonial times. As Herbst (2000) has noted in his seminal contribution, these challenges mainly amount to comparatively low population densities and high travel and transportation costs.

Territorial states as we know them have their roots in predominantly grain-based agricultural intensification. Rising agricultural productivity and increasingly dense sedentary populations lead to the development of non-agricultural crafts, sciences, and technologies (Diamond 1997; Hibbs and Olsson 2004). Rising productivity and dense populations make individual pieces of land more valuable. Where this process is based on transparent and thus easily appropriable cereal grains, an emerging class of political rulers quits agricultural production. Rulers extract tribute for the - often dubious - promise of providing protection against expropriation by others than themselves (Scott 2017; Tilly 1985; Olson 1993). The need for protection and incentives for tax appropriation combine to produce property right regimes. Sub-Saharan Africa's initial endowments in are, in many ways, inimical to this process.

The Neolithic transition from hunting and gathering to sedentary agriculture relies on the domestication of wild plants and animals for human consumption and production support (Diamond 2002). Some species lend themselves more naturally to these purposes than others. As far as crops are concerned, high nutritional value is key. Heavy-seeded wild grasses were the most common drivers of agricultural intensification and the establishment of fixed human settlements (Diamond 1997). Cereal grains like Emmer wheat, Einkorn wheat, and barley were domesticated in the Middle Eastern Fertile Crescent.

The Latin American, East Asian and Sub-Saharan maize, rice, millet, and sorghum crops have similar qualities. Of the roughly 200'000 wild plant species, only a couple of thousand are edible, and a fraction of these provides sufficient nutritional value to sustain large populations. Among the 56 most heavy-seeded wild grasses, only four (sorghum, rice, millet, and teff) are native to Sub-Saharan Africa. The respective number for Western Eurasia is 33 (Blumler 1992). Sedentary agriculture did not just spread by diffusion of crops from the Levant and Mesopotamia. It was independently adopted at various times and places. The domesticated plant species were not always cereal grains (Diamond 1997).

Sub-Saharan Africa saw at least three independent Neolithic revolutions. The Eastern Sahel, the Ethiopian highlands, and the fertile forest zones of present-day Cameroon developed sedentary agriculture between 4000 and 3000 BC. The Sahelian transition involved the domestication of sorghum and millet. Ethiopia had the African seed grain teff, as well as millet and coffee (Diamond 1997). The West African transition relied on oil palm and yam (Vansina 1990). The Cameroonian agricultural zones were home to the first proto-Bantu speaking people. Their millenia-long migrations brought sedentary

agriculture to Central, Eastern, and Southern Africa (Reid 2011).[1] The West African experience shows that agricultural intensification and rising population densities do not necessarily require cereal crops.

However, political centralization and the rise of kingdoms occurred much earlier in close proximity to the other two Neolithic pioneer areas. The archaeological evidence suggests that sorghum was first domesticated in the Butana area close to the city of Meroe. Meroe was the capital of one of the several Kush kingdoms in present-day Sudan (Winchell et al. 2017). [2] The Ethiopian highlands saw the rise and fall of the Aksum empire which flourished in the first seven to nine centuries of the Common Era. While Aksum is best known for its role in the Read Sea, Mediterranean, and Indian Ocean trades, its foundations lie in the domestication of grain crops, increasing agricultural productivity, and high population densities (Phillipson 1995; Boardman 1999).[3]. The comparison of Kush, Aksum, and the proto-Bantu areas of West Africa suggests that the path from sedentary agriculture to political centralization is by no means linear and deterministic.

The observation that earliest state formation is associated with cereal grains rather than agricultural intensification per se challenges what Mayshar et al. (2018.) call the "conventional production and surplus theory." The conventional view holds that surplus production and increasing populations give rise to specialization and trade. A non-producing elite engages in the development of writing, science, technology, and, ultimately, administration and state-building (Childe 1936; Lenski 1966; Olsson and Hibbs 2005). The appropriability theory provides an alternative approach. States only develop where rulers can easily expropriate agricultural surplus (Mayshar, Moav and Neeman 2017). Cereal grains are the ideal "political" crop because they are "visible, divisible, assessable, storable, transportable, and rationable" (Scott 2017, p. 129). In addition, they typically ripen simultaneously and are harvested in a short and well-defined season (Mayshar et al. 2018.). Their high nutritional value and durability in storage enable appropriation and consumption by a distant elite (Testart 1982; Allen 1997). The small unit size of individual grains makes them "legible" (Scott 1998). Precise measurement by weight or volume allows for elaborate schemes of output taxation (Scott 2017).[4]

1 But see Vansina (1995) for a critical take that stresses the contributions of local populations.
2 The Napata-Meroe Kush kingdom probably lasted from about 800 or 1000 BC to around 300 CE.
3 It remains contested whether domestic crops such as teff or imported Middle Eastern crops like wheat and barley did the heavy lifting in the cases of the Kush and Aksum kingdoms.
4 Scott (2017) presents some evidence that the earliest forms of writing were tax accounting exercises rather than representation of speech.

Grains grow above the ground and are visible. Assessing field size and potential output is easy. The combination of all of these factors makes cereal grains particularly attractive for roving and, increasingly, stationary bandits (Olson 1993). The real or fabricated threat of expropriation by the roving type enables aspiring state-builders to become stationary. They offer protection in exchange for taxes and tribute (Mayshar et al. 2018.; Tilly 1985). Emerging tax regimes pressure subject populations into further increasing output per unit. The upshot is a production and extraction cycle of political centralization and economic intensification.

Legume crops (e.g. beans, peas, lentils, groundnuts), perennial trees (e.g. bananas, oil palm, coconut) or roots and tubers (e.g. yams, cassava/manioc, potatoes) do not possess the complete mix of attributes that make cereal grains the early state-builder's daily bread. Some grow underground and can be left there until the tax collector is gone. Others have longer harvesting periods and are hard to monitor. Most of them perish when stored above ground for longer periods of time (Scott 2017). Against this backdrop, it is less surprising that the first powerful Bantu states did not develop before the 13th century CE. These states emerged far from the original areas inhabited by proto-Bantu speakers. New crops of the Columbian exchange or tradable resources such as ivory, gold, and later, slaves contributed to Bantu state building. The Kuba kingdom located in modern-day DRC owes much to the introduction of maize (Vansina 1978; Acemoglu and Robinson 2010). Great Zimbabwe and the Kongo kingdom in today's Zimbabwe, Angola, and Congo-Kinshasa were rich in non-agricultural resources (Bandama et al. 2016; Thornton 1977; Birmingham 1981).

Early African states were the exception rather than the rule. Most regions did not experience population growth and political centralization to the extent of Kush, Aksum, Kuba, Kongo, or Zimbabwe up until the colonial age. Sub-Saharan climate, fauna, and disease environments prevented the early adoption of technologies that accelerated the production and expropriation cycle of early Eurasian state building: The plow and complex irrigation (Goody 1969; Wittfogel 1959). Plow use makes sense where soils are flat, deep, and grains can be grown in a short season on relatively large tracts of land. Shallow, rocky, or heavily sloped soils tend to erode when extensively plowed. Most of African farmland conforms to the latter type (Djurfeldt et al. 2005). Pryor (1985, p. 732) classifies the typical African staple crops – sorghum, millet, maize, tree crops, roots and tubers – as plough-negative.

Plough-positive crops such as wheat, teff, barley, and rye are comparatively rare. Intensive plow agriculture depends on the availability of domesticated

draft animals. The best suited species are heavy herbivorous mammals. While 51 of the world's heaviest mammals are native to Sub-Saharan Africa, none of the 14 successfully domesticated species is among them (Diamond 1997). Again, the Ethiopian highlands are the exception that proves the rule. The imported ox was used to plow land and to cultivate teff, wheat and barley (Boardman 1999; Herbst 2000). But even here, agricultural over-intensification and soil erosion contributed to the decline of the Aksum empire (Butzer 1981). Apart from soil and crop types, the tsetse fly-transmitted trypanosomiasis disease obstructs the use of animals for agriculture and transportation. Large sways of the most fertile African farmlands are tsetse-infested (Ford 1971; Alsan 2015).

Water scarcity in the arid and semi-arid zones poses an additional challenge for agricultural intensification. Not surprisingly, dense populations cluster in areas with abundant rainfall (Le Blanc and Perez 2008). However, drought-resistant crops such as millet, sorghum, and groundnuts are suited for the drier savannah zones (Papaioannou and Frankema 2017). Perhaps more important than absolute levels of precipitation are the variability, seasonality, and unpredictability of rainfall patterns. Sub-Saharan Africa exhibits more extreme temporal shocks in rainfall than other tropical regions, e.g. in South-East Asia. Climatic variability makes adaptation by choice of crop types and farming practices much harder and is associated with lower population densities (Papaioannou and Frankema 2017).

Large-scale irrigation systems may be a solution. However, they were and still are only sparsely used in Sub-Saharan Africa. Africa has less surface water and higher evaporation than other world regions. Flat terrain in West Africa complicates the construction of dams. The most suitable areas for irrigation are relatively small spots scattered across different regions. The large and shallow groundwater reserves of early East Asian rice field are conspicuously absent (Biswas 1986; MacDonald et al. 2012). In addition, labor scarcity, land abundance, and less centralized political structures impeded large upfront investments in irrigation systems (Wittfogel 1959; Herbst 2000). This last point underscores the reciprocal relationship between agricultural intensification, surplus production, and political centralization.

Africa's initial biogeographic endowments thus inhibited the growth of centralized territorial states on a similar scale as in Eurasia. Where agriculture intensified at slower pace or not at all, subsistence modes were based on land-extensive practices. Shifting cultivation and pastoralism remain important livelihood strategies up to the present day (Union 2013; Ickowitz 2006). African societies that did not develop centralized states were therefore widespread, rel-

atively small, and highly mobile (Herbst 2000). The Bantu expansion illustrates this pattern. Bantu migrants successfully adapted to different climatic and geographic conditions. They came up with greatly varying subsistence modes, social structures and more than 500 distinct sub-languages (Lewis 2009).

Relatively recent quantitative research generalizes this intuition. Geographic variation in land quality and elevation, as well as shorter times since the first occurrence of sedentary agriculture predict ethno-linguistic diversity (Michalopoulos 2012; Ahlerup and Olsson 2012). The causal mechanisms may be both evolutionary and political. For one, high migration costs across geographic zones lead to location-specific skills, modes of production, and cultures (Michalopoulos 2012). Second, political entrepreneurs rarely manage to conquer, administer, and ultimately homogenize diverse populations inhabiting heterogeneous terrain (Ahlerup and Olsson 2012). Under these conditions, controlling people rather than fixed territory became key to political organization and the accumulation of wealth and power (Herbst 2000). Early African societies were thus characterized by communal, often overlapping attachments to the real or imagined kin group, village, or chiefdom (Reid 2011). In factor endowment parlance, labor rather than land was the scarce resource (Iliffe 2017). Put differently, locational fundamentals profoundly shaped internal coalition structures.

4.2 DEMAND, TECHNOLOGY AND TRADE

Controlling people requires the accumulation of wealth or coercive power to buy support or enforce allegiance. Where the acquisition of both could not rely on agricultural surplus production, aspiring rulers had to look elsewhere. Access to high-value, mainly non-agricultural trading goods and control of both regional and long-distance commerce became the foundations of state centralization in Sub-Saharan Africa. In short, trade made the state. At first sight, this claim may appear counterintuitive. Taxing merchants is the tax collector's nightmare. They are mobile and can easily hide their wealth – at least the part they hold in currency rather than cargo (Scott 2017).

More importantly, Sub-Saharan Africa's geography does not favor long-distance trade. The African shoreline is astonishingly regular and provides few natural harbors to facilitate maritime trade. Navigable rivers are few and far between. Their navigability is often interrupted by falls, rapids or shallow water during the dry season (Herbst 2000). The Congo, Zambezi, and Blue Nile rivers are cases in point. The alternative of wheeled transport was probably known but hardly ever used to carry goods or people (Law 1980). Long-distance

road networks were notably absent in pre-colonial times. Just as in the case of large-scale irrigation, geographic, social, and political fragmentation impeded the construction and maintenance of roads. The costs of construction in terms of scarce labor may have outweighed the benefits of increased access to sparsely populated hinterlands of little agricultural value (Herbst 2000).

The adoption of several transport technologies softened many of these constraints long before formal European colonization. Around the onset of the Common Era, the camel was introduced to North Africa and opened up trade through the Sahara (Moseley 1992). Sub-Saharan Africa got connected to Mediterranean trade networks. The invention of the fighting-friendly Tuareg saddle played a similarly important role (Dalgaard et al. 2018.). Merchant warriors conducted most of the early Trans-Saharan commerce (Conrad 2009). New ships such as the dhow and, from the 15th century onwards, the Portuguese caravel enabled long-distance maritime trade across the Indian and Atlantic oceans (Moseley 1992; Chaudhuri 1985; Pearson 2003). Apart from these long-distance trades, more local and regional commerce developed across ecological boundaries. Ecological diversity does not only cause social and linguistic differentiation, but also provides incentives for economic specialization and exchange (Bates 1987; Fenske 2014).

Why should trade lead to state formation? In an influential essay, Bates (1987) proposes a Ricardian theory of African political centralization. In short, state-like institutions emerge to enable and protect specialization and trade. The argument is functionalist and owes much to the neo-institutionalist school of political economy (North and Thomas 1970). The prospect of potential gains gives rise to institutional reforms that realize them. Institutions establish order and provide mechanisms of dispute resolution and contract enforcement. Decentralized forms of market protection and dispute resolution exist, but tend to be less reliable than the "centralized alternative" (Bates 1987).

Successful institutional reform requires trading communities to overcome a collective action problem. Market protection is a public good from which others than the initial providers benefit without contributing. Incentives for centralizing reforms are strongest where a small elite can expect to at least partially monopolize the gains from trade. The capital requirements of long-distance trade in terms of transport, security, and wages lead to a higher concentration of gains and, in turn, state formation. The taxation of commerce provides another avenue to concentrate gains in the hands of emerging state-builders (Bates 1987). Once institutions are reformed, trade proceeds in relative peace and yields substantial economic gains. Bates (1987) provides some

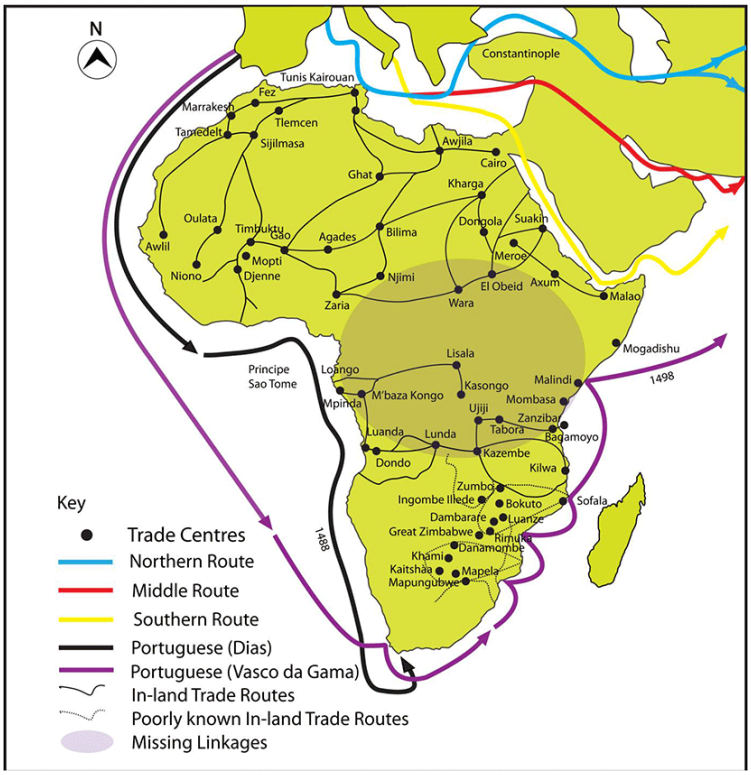

Figure 4.1: Known Pre-1500 Trade Routes in Africa (Source: Chirikure (2017))

correlational evidence that ecological diversity, the presence of market centers and trade caravans, as well as engagement in long-distance trade are positively associated with political centralization. Fenske's 2014 more systematic analysis shows that ecological diversity indeed predicts political centralization for the sample of African societies in Murdock's (1967) Ethnographic Atlas.

The relative scarcity of viable trade routes and natural entrepôts may have, in fact, facilitated the control and taxation of these strategic locations. Political centralization occurred around important natural harbors, navigable rivers, and central nodes of land-based trade networks. Human or animal porterage across difficult terrain restricted long-distance trade to high value-per-weight goods. Trading bulky and perishable agricultural commodities remained unprofitable. Tradable goods included gold, ivory, salt, iron, copper, and increasingly, self-transporting slaves (Reid 2011). The source areas of these tradable resource became arenas of early state building. A cursory glance at the most powerful pre-colonial states and empires confirms these two intuitions. The maps in Figures 4.1, 4.2, and 4.3 show a visual correlation between trade, resources, and African states prior to 1500 CE.

Archeological traces of spoil tips at Meroe suggest that iron ore was mined (Rehren 2001). Aksum's ascent owed at least as much to the Red Sea port of

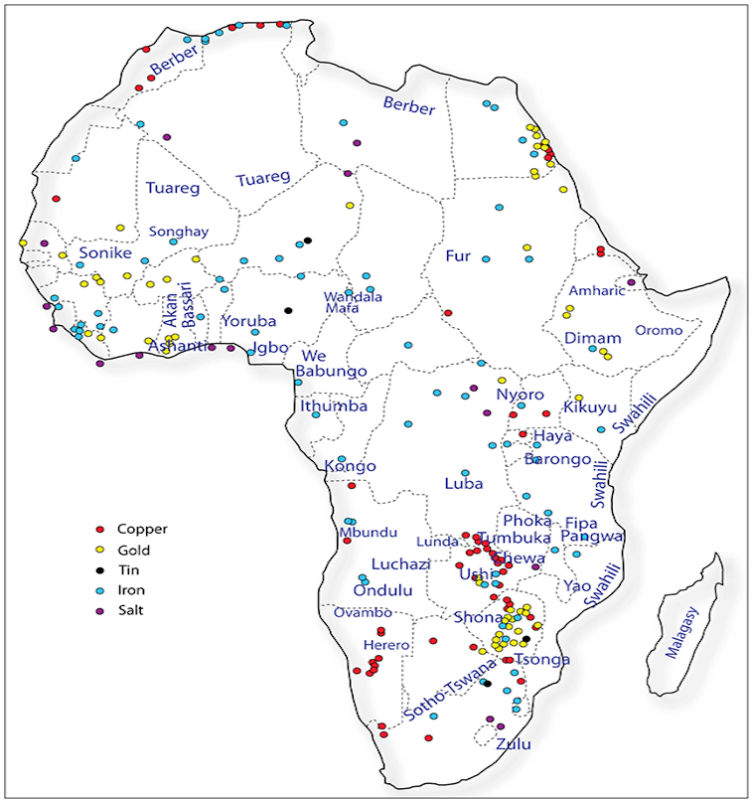

Figure 4.2: Source Areas of Long-Distance Trading Resources in pre-colonial Africa (Source: Chirikure (2017))

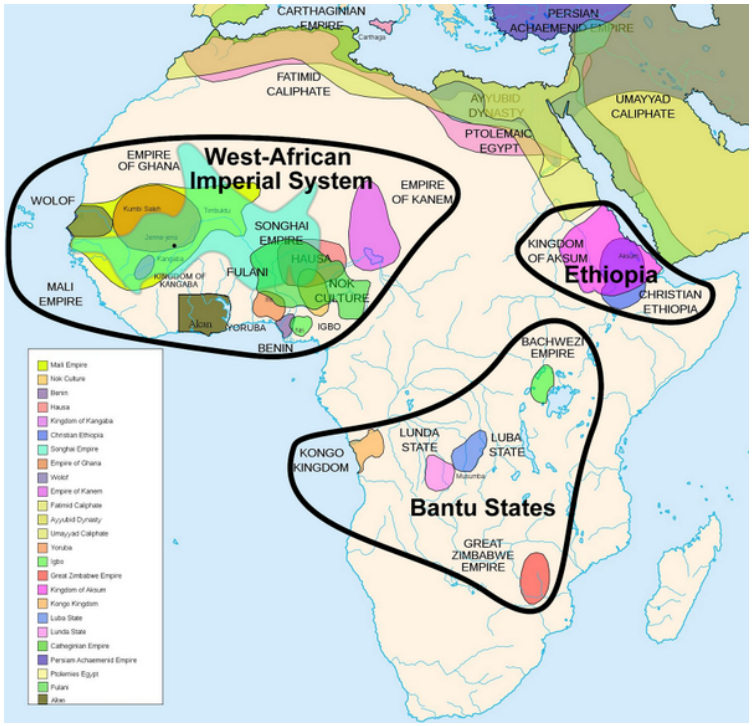

Figure 4.3: Early African States, ca. 500 BCE – 1500 CE (Source: Strohm (2014))

Adulis as to grain-based agricultural intensification in the highlands. Adulis was the hub of a flourishing trade between the Mediterranean world, the southern Arab Peninsula, and the Indian subcontinent (Phillipson 1995). The main export resources were gold and ivory. Great Zimbabwe and its predecessor Mapungubwe produced gold, iron, copper, and bronze (Bandama et al. 2016). Metal goods were delivered along with ivory to the coastal city state and natural harbor of Kilwa. Imported goods included silk, spices, and porcelain from places as far as India and China (Chirikure 2017; Prinsloo and Colomban 2008). The rise of the Kuba kingdom in present-day Congo-Kinshasa is linked to an important middleman role in the copper and ivory trades along the navigable Kasai river (Gray and Birmingham 1970). Trade brought in new crops such as maize, cassava, and tobacco (Acemoglu and Robinson 2010). The Kongo kingdom benefited from the copper mines of Mboko Songho and river trade between the Livingstone falls and the interior. After the Portuguese arrival, trade in slaves but also other goods gained further momentum (Vansina 1992). The Ndongo kingdom in today's Angola controlled the salt mines at Kisama (Birmingham 1981).

The medieval Sahel empires of Ghana, Mali, and Songhai provide the most vivid example for the relationship between trading and state building. The strategic intersection between the Niger river and the southern entrepôts of the Trans-Saharan trade explains these kingdoms' wealth and power (Austen 2010). The Saharan trade intensified after the Umayyad Caliphate conquered North Africa in the 7th and 8th centuries CE. Salt from the Mediterranean and Saharan mines was traded for gold and slaves from West Africa (Gomez 2018). The rulers of Ghana, Mali, and Songhai controlled some gold production directly. More frequently however, they heavily taxed its movement from more southern areas through important trade hubs such as Aoudaghost, Oulata, Gao, Djenne, and Timbuktu.

Their indirect grip on source areas in today's Ghana may have to do with the diffuse and low-capital nature of alluvial gold mining. In fact, medieval gold mining in the creeks and rivers south of Ghana, Mali, and Songhai was not entirely different from the shifting cultivation of cash crops. The Persian writer Ibn al-Faqih al Hamadhani noted that "In the country of Ghana gold grows in the sand as carrots do, and is plucked at sunrise" (cited in Conrad 2009, p.22). Further east of the Niger bend, the empire of Kanem-Bornu emerged. Though short of gold, it controlled the southern terminus of another trans-Saharan route north of Lake Chad. Ivory and slaves were the main trading goods (Austen 2010).

The prosperous trade in timber, gold, ivory and slaves on the East African coast led to the formation of the Swahili city states Mogadishu, Pate, Mombasa, Malindi, Zanzibar, and Kilwa (Davidson 1969). The centralization and growth of the Luba kingdom in the south of present-day Congo-Kinshasa combines shorter-distance regional trade across ecological zones with an aggressive seizure of new opportunities for long-distance trade (Wilson 1972). Reid (2002) documents a similar pattern for the 19th century Buganda kingdom. Even in relatively decentralized societies such as the Igbo tribes in southeastern Nigeria or the groups that came to be known as Nyamwezi in northwestern Tanzania, trade provided the impetus for more or less successful attempts at political consolidation.[5]

The arrival of the Europeans from the 15th century onward further intensified long-distance trading, particularly in West Africa. What this new force implied for state formation is difficult to assess. On the one hand, coastal trade was growing and provided new opportunities for African state-builders. On the other, the onset of the Atlantic slave trade fundamentally changed the rules of the game. The result was a severe militarization of African politics and a drastic decimation of the population (Lovejoy 2011; Manning 1990). Slavery was by no means new to Africa. Slaves had long been a profitable commodity in Arab-dominated trans-Saharan, Red Sea, and Indian Ocean trades. Domestic elites practiced slavery even before they traded with the Arabs. Once again, low agricultural productivity, land abundance, and the scarcity of labor are important factors to understand the popularity of slavery throughout much of Africa's history. Some form of coercion was usually needed to recruit labor beyond the family (Austin 2008*a*,*b*). According to Herbst (2000, pp. 42-43), African rulers' and early warlords' efforts "concentrated on seizing booty since it was hard to hold onto territory. As most farmers had nothing to seize, the most valuable treasure was slaves (i.e., the farmers themselves)."

Nonetheless, the Atlantic trade marked the onset of a hitherto unparalleled intensity and brutality of African slave trading. An arguably conservative guesstimate indicates that twelve million Africans were shipped out from the Atlantic coast (Eltis et al. 1999). The other three trades combined to roughly six million exported slaves (Nunn 2008; Lovejoy 2011). With the exception of the early Portuguese colony of Angola, Europeans rarely penetrated inlands and raided slaves themselves. They rather set up coastal entrepôts and bought slaves from African rulers and middlemen in exchange for European goods such as cotton cloth, alcohol, and, most importantly, firearms (Reid 2011). Imported

5 See Bates (1987) on the Aro confederacy in Nigeria as well as Reid (2011) and Roberts (1970) on the Nyamwezi kingdoms of Urambo and Umyanyembe.

weapons prompted a vicious gun-slave cycle. African states and warlords attacked each other to capture slaves that were needed to pay for the Western "killer apps" (Ferguson 2012) that, in turn, ensured protection and political survival (Lovejoy 2011). The result was a prisoner's dilemma-type arms race of "raid or being raided" (Gemery and Hogendorn 1974; Whatley 2014).

The experience of the Ashanti, Dahomey, Oyo, and Benin kingdoms in present-day Ghana, Benin, and Nigeria, shows however that slave trading can be compatible with the growth and consolidation of centralized states (Austin 2005; Bates 1987; Laitin 1986; Igbafe 1975). The institutional design of the Ashanti empire provides a particularly instructive example for some key aspects of my model. In contrast to the Sahel empires, Ashanti's rise is inextricably linked to direct control of the gold sources around Kumasi. Alluvial mining was complemented and, in some cases, replaced by capital-intensive deep shaft methods that heavily relied on Ashanti's control of slave labor (Hilson 2002; Botchway 1995). The source areas of slaves were often indirectly ruled vassal states such as Dagomba in the 19th century. Dagomba's internal political structures remained intact as long as they delivered a heavy annual tribute of slaves (Wilks 1989). In short, Ashanti was an informal trading empire that combined elements of direct and indirect rule.

The split of the Senegambian Jollof Confederation as well as the gradual weakening of the Ndongo kingdom, in contrast, illustrate the more fragmenting forces of the Atlantic slave trade (Birmingham 1981; Nunn 2008). The case of the Kongo kingdom which formally remained independent until 1891 is ambiguous (Davidson 1996; Thornton 1977). Where slave-raiding and warfare contributed to political centralization, they were likely to produce more militaristic and authoritarian forms of governance (Hintze 1975; Whatley 2014; Spruyt 1996).[6]

4.3 WARFARE AS INTERACTION MODE

The history of pre-colonial state formation in Africa seems broadly in line with Bates's (1987) Ricardian view of political centralization. Contrary to his view, though, the interaction modes were often violent. Like slavery, warfare had been a constant feat of African politics long before the first European contact. The Sahel empires and the later Yoruba kingdom of Oyo owed much of their prowess to the effective use of cavalry and river fleets (Austen 2010; Law 1975).

6 Nunn (2008) presents some correlational evidence that the areas most heavily affected by the slave trades had more fragmented political systems. However, the direction of causality is unclear. European slave merchants and African raiders may have strategically selected weaker targets (Austin 2008*b*).

The Ashanti were not only commercial and political, but also military innovators (Arhin 1980). Much the same goes for the Fulani jihadists who founded the Sokoto caliphate in northern Nigeria (Smaldone 1976).

In early modern Europe, according to Tilly's (1990) famous dictum, "war made the state." Inter-state conflict led to the consolidation of a small number of increasingly large and powerful states. The threat of external rivals prompted European state-builders to invest in large and sophisticated military forces. These investments needed to be financed and operated through taxes and military service. As a result, political survival depended on the development of ever-more capable tax bureaucracies. The live-or-die process of warfare weeded out less centralized and efficient systems (Tilly 1990; Cederman 1997).

Densely populated, agriculturally productive, and highly contested land provided incentives to centralize control. States built the physical and administrative infrastructure to enforce tax collection, move troops, and defend increasingly clear territorial borders against foreign intrusions. Feudal arrangements with local notables were gradually replaced with direct rule. Taxation and military service intensified the reciprocal linkages between rulers and ruled that would eventually lead to more consultative governance in the form of legislatures and elections (Tilly 1985; Herbst 2000). Over the long haul, this process promoted a prosperous and relatively peaceful equilibrium between few high-capacity but, at the same time, accountable territorial states (Dincecco and Onorato 2017).

In much of Sub-Saharan Africa, the relative abundance and low value of agricultural land forestalled such a development (Herbst 2000). As already noted above, controlling people rather than fixed territory was key. The typical form of African warfare was the raid rather than the European-style structured campaign or set-piece battle (Reid 2012; Lamphear 2013). This specifically African styles of warfare did not result in the administrative and infrastructural investments commonly associated with European battles. Nor did African warfare bring about clearly demarcated state borders (Herbst 2000).

4.4 TAKING STOCK

A couple of broad lessons emerge from this, admittedly stylized, history of pre-colonial African states. First, they were typically less territorial than elsewhere since power rested on controlling people, strategic tradable resources, and commercial entrepôts. State borders as well as property rights to agricultural lands remained ambiguous. Direct state power was highest at the center and

gradually lost strength through an extended sphere of influence under indirect forms of rule (Boulding 1963; Herbst 2000). Second, centralized states were few and far between, since profitable natural resources and trade hubs were far from ubiquitous.

Third, political elites's dependence on subject populations remained limited. Taxing trade rather than production was the main source of power and wealth. Conversely, regular people depended on the goodwill of elite patrons to avoid enslavement and at least partially share in the gains from trade. Where goodwill was in short supply, exit instead of voice was the preferred strategy (Hirschman 1970). Retreat into the ungoverned hinterlands often proved safer than life under oppressive state rule (Scott 1985, 2017; Herbst 2000).

Fourth and relatedly, pre-colonial states were unequal and stratified. Trading and ruling were elite activities and the general population continued to rely on subsistence agriculture or pastoralism (Law 1978 in Bates). Mining, smelting, and processing precious metals were no forces for mass employment, at least not of the voluntary, wage-paying kind (Botchway, Meyerowitz, Herbert). Fifth, centers of commercial and political gravity readily shifted with new trading opportunities, technologies, and demand shocks. The arrival of the Arabs and Europeans, the new ships of the deserts and oceans, as well as emerging long-distance trades in gold, ivory, copper, and, sadly, slaves amply illustrate this pattern. In other words, pre-colonial states were gatekeeper states *avant la lettre*.

Stressing the importance of trade in early political development by no means negates the importance of geographic endowments, political initiative and warfare. The relationship between geography, exogenous changes in market forces, and political institution building is a complex and interactive one. In light of the foregoing discussion of pre-colonial state formation, a quick recap of the model in Chapter 3 seems appropriate. Geography determines where certain resources and natural trade routes are viable. Market forces and transport technologies facilitate the emergence of trade. Only where state-builders seize and protect these opportunities, gains will materialize on a long-term basis. The emerging institutions further develop in response to interactions with outside trading partners and armed rivals. The institutional setup, in turn, shapes the domestic distribution of economic resources and political power.

Only through this interactive process can we understand the fundamental transformation that came with the "commercial transition" and resource revolutions of the 19th century. The background and context of pre-colonial state building helps to grasp continuity and change in what, I will argue, has shaped

African affairs shortly before, during, and long after formal European colonization. As before, external demand and technology shocks provided the trigger. Resource endowments decided where the revolutions were felt most intensively. Commercial and political coalitions were quick to react. The institutions they set up largely reflected the resource, tax, and trading needs of a narrow elite.

What changed were the types of resources and rulers. Agricultural export commodities replaced slaves and complemented minerals. Export agriculture opened previously unseen economic opportunities to African producers. Most importantly, institution building across – almost – the entire continent was monopolized in the hands of Europeans imperialists. Ethiopia, once again, deviated from the general pattern. The European approach to rule was more territorial and extractive than ever before. Severely constrained budgets, limited developmental vision, and the geographically circumscribed availability of high-value resources combined to produce severe inequalities both across and within African territories.

The following chapter offers a descriptive account of the commercial transition. I then move on to discuss the impact of commodity exports on (a) the partition of Africa and (b) the specific, spatially varying manifestations of colonial rule.

5

RESOURCES RULE: THE COMMERCIAL TRANSITION AND COLONIAL INSTITUTIONS

The commercial transition from slave trading to so-called "legitimate trade" in natural resources marks a watershed in African history. According to Hopkins (1973, p. 126), "[m]odernity dates not from the imposition of colonial rule, as used to be thought, but from the early 19th century." In his view, "the colonial rulers simply carried further a process which was already under way." While this may appear too stark of a statement, the commercial transition does have a role to play in explaining when and where the switch from informal to formal empire took root. More importantly, I argue, the transition provides the key to unlock the puzzle of striking spatial variation in the intensity, form, and consequences of colonial rule. In what follows, I provide a brief overview of the natural resources, demand shocks, technologies, and policies that fueled legitimate trade and brought about the cash crop and mineral revolutions. This discussion is then followed by a more detailed account of the relationship between natural resource trade and the European colonizers' institutional choices.

5.1 THE RESOURCE REVOLUTIONS OF THE COMMERCIAL TRANSITION

In line with the basic structure of the schematic model presented in Chapter 3, I first explain some features of the resources involved. Sought-after cash crops and minerals of the 19th century trades were only available in some African regions. Resource endowments can thus be seen as important locational fundamentals. In a second step, I discuss the European technology and demand shocks that spurred legitimate trade with Africa. Last but not least, I outline the effects of the commercial transition on Afro-European interaction and local coalition structures.

5.1.1 *Resource Types: Producing Cash Crops and Minerals*

The factor requirements, production modes, and industrial uses of African commodities underline their significance for economic and political development

during and after the colonial age. The main resources of the first, largely West African, commercial transition were vegetable oils and oil seeds. Palm oil was extracted from the greasy flesh of the palm fruit. Palm kernels and groundnuts were shipped out in raw form and processed in Europe. Apart from culinary uses, vegetable oils served as lubricant for machinery and railways and formed the basis of soap, candle, margarine, and nitroglycerine production (Lynn 2002; Hopkins 1973).

African cotton and coffee became prominent export commodities in the late 19th century. The same goes for the non-native cocoa crop which rapidly spread through the coastal West African forest zones from about 1880 onward (Coe and Coe 2013; Clarence-Smith and Topik 2003). Natural gums and rubber were important from the mid-19th to early 20th century but quickly lost in significance, partially due to competition from Malaysia (Berry 1993). Gums are useful thickening agents in food production and have adhesive qualities. Rubber was used to produce hoses, tires, and somewhat later, conveyer belts (Harms 1975; Lowes and Montero 2017.). West African commodity trade preceded the 1807 British Abolition act and the international agreements with other imperial powers to end the external slave trade (Dalrymple-Smith and Woltjer 2016). However, legitimate trade only really took off after the abolition of slavery was agreed upon and gradually enforced by the British Navy's West Africa Squadron (Lloyd 2012).

In East Africa, the commercial transition started more gradually. It significantly gained steam with the arrival of railways in the fertile interior around 1900. A boom in cotton, coffee, tea, and tobacco production ensued. Before, slave trading had continued on a significant scale until well into the 1880s (Reid 2011). While commodities such as ivory, cloves, and sesame seeds complemented the ongoing 19th century slave trade, they did not replace it as in West Africa.

In Southern Africa as well as parts of Central and East Africa, mineral extraction was the driving force. Massive diamond and gold discoveries at Kimberley (1866) and the Witwatersrand (1886) in modern-day South Africa spurred a veritable rush for exploration, extraction, and political control (Austen 1987; Zeleza 1997). Similar processes unfolded in the copper-rich regions of Katanga in what was to become the Belgian Congo and, from the 1920s on, the Northern Rhodesian Copperbelt (Birchard 1940; Posner 2005). The Lunda region in northeastern Angola saw another important diamond rush (Birmingham 2006). Minerals and gemstones were basic inputs for currency, jewelry and

ornament production. They were also used to make wires, conductors, or in the case of diamonds, tools for cutting, drilling, and polishing (Hopkins 1973).

The production of minerals and crops differed markedly in terms of land, labor and capital requirements. The large-scale mining of gold, copper, and diamonds took place on clearly defined, small tracts of land and was based on large upfront capital investments. The open pit and deep shaft methods that were used to tap into the huge deposits at Kimberley, the Rand, Katanga, and the Copperbelt are prime examples. While Africans had practiced deep-shaft mining before the commercial transition, European companies such as De Beers, the Belgian Union Minière du Haut-Katanga, or the Portuguese Diamang spurred an unparalleled boom in capital-intensive mining methods (Herbert 1984; Botchway 1995; Jewsiewicki 1977; Blainey 1965; Clarence-Smith 1979).

Less intensive methods of alluvial gold and diamond mining remained common, e.g. in Sierra Leone. But even there, mining was aggressively brought under European company control (Greenhalgh 1985). On the one hand, this meant continuity from the precolonial age. Mineral deposits, capital investment, marketing, and export remained concentrated in the hands of a small, but now of course, European elite (Amin 1972). On the other, minerals did not dig themselves out of the ground. European mining companies required African labor which was in short supply (Austen 1987; Oliver and Atmore 2005). European attempts to solve this dilemma had far-reaching consequences for colonial state organization.

The new trade in cash crops that complemented mineral and gradually replaced slave exports was at least as transformative. In pre-colonial times, long-distance trade in perishable bulk commodities was mostly unprofitable. New European technologies and demands fundamentally changed the game. Perhaps for the first time, Sub-Saharan Africa's comparative advantage in the production of high-value export crops on abundant agricultural land could be realized (Austin 2008*a*, 2014). At the same time, lower capital requirements allowed large numbers of African small- and medium-scale producers to enter the export market (Hopkins 1973).

Export crop production led to an increasing monetization of land, labor, and output markets and yielded substantial profits for many African smallholders. This mass-level onset of rural capitalism is what made 19th century African export agriculture revolutionary (Hill 1997). The land, labor, and capital requirements differed from mineral extraction but also between different crops. I limit my discussion to the perennial fruit trees cocoa, coffee, and oil palm, as well as the annual groundnut and cotton crops. Although other agricultural

produce was exported, these five crops were by far the most important. At the end of the colonial era, their combined share in Sub-Saharan exports was 49% (Hance, Kotschar and Peterec 1961).

The perennial cocoa and palm trees grow best in tropical, humid, and high-precipitation areas such as the coastal West African forest zones (Lynn 2002; Ruf and Siswoputranto 1995). Coffee Arabica needs the altitudes of Ethiopian, Kenyan, and Tanzanian highlands. Robusta grows at lower altitudes and can be cultivated in the West African forest zones from Guinea to Angola (Clifford 2012; Meyer 1965). The annual cotton and groundnut crops grow in drier savannah zones further away from the coast. Suitable forest and savannah lands were, at least initially, abundant (Roberts 1996; Hogendorn 1978; Tosh 1980).

Where virgin land is opened to tree crop production, some upfront investment is needed. Acquiring seedlings, remunerating labor, or investing time to clear the forest are costly activities. Young trees need to be planted, nurtured, and pruned. It takes between three and five years until cocoa, palm, or coffee trees reach maturity and can be harvested for the first time. Their perennial growth cycle make fruit trees somewhat more capital-intensive than annual crops (Austin 2014). Once matured, cocoa, coffee, and palm trees remain productive for about 25 years. The clearing of previously unused forests is more profitable than replanting seedlings at the old location, even if land has laid fallow for a couple of years. Virgin forest land ensures more fertile soils, lower risk of pests and diseases, and better protection against wind (Ruf and Siswoputranto 1995). This so-called "forest rent" made cocoa, coffee, and to a lesser extent, palm naturally compatible with long-established practices of shifting cultivation (*ibid.*).

The peculiar growth and harvesting cycle implies softer labor demands than in the case of annual cash crops. The actual work that has to be done is not necessarily less intense. In fact, the clearing of bushes and trees was more difficult in forest than in savannah zones (Reid 2011). However, the seasonal distribution of labor demand was more favorable. Harvesting matured trees requires most labor but can be done year-round or during a relatively long season. The main harvest is done when the planting and harvesting seasons of the most important food crops of both forest and savannah are over (Tosh 1980; Bates 1987). Exactly when it was needed the most, labor was therefore available and cheaper in wage and opportunity cost.

In addition, fruit trees can be intercropped with important food crops such as yam, vegetables, plantains, and cassava on the same agricultural land (Oladokun 1990; Tosh 1980). The situation in the savannahs is different. Agricultural labor

demand is highest during the relatively short planting and harvesting seasons of food crops such as sorghum, millet, maize, and cassava. During the dry season, labor is more or less freely available. Unfortunately, the growing and harvesting cycles of groundnuts and cotton almost perfectly overlap with the food cropping seasons. The soil and land demands of Savannah food and cash crops are similar. The choices of what to plant, where to employ seasonal labor, and how to balance the needs of cash and food crop production imply harder trade-offs in cotton and groundnut regions than in cocoa, coffee, and palm areas (Tosh 1980; Austin 2008*a*, 2014; Anderman et al. 2014). These different and seasonally varying factor requirements explain why cocoa, oil palm, and coffee were the more popular cash crops among African smallholders and elites. They voluntarily rushed into production as soon as the opportunity presented itself.

Cotton and groundnut production involved heavier inducements and coercion by European but also African elites. Cotton was the Europeans' favorite crop but often failed (Onyeiwu 2000). It placed even higher demands on thin and erosion-prone savannah soils and scarce seasonal labor than groundnuts. Intercropping with cassava worked better for groundnuts than for cotton. In times of drought and famine, groundnuts could be eaten. African smallholders in Senegal, Mali, and Northern Nigeria preferred to plant groundnuts and undermined colonial cotton schemes (Hogendorn 1978; Roberts 1996). Cotton only really prospered where exceptionally fertile soils, two annual rainy seasons, European and African elite campaigns, or capital-intensive irrigation systems loosened some of the aforementioned constraints. The Buganda area in what is now Southern Uganda, the Gezira irrigation schemes south of Khartoum, and the Tanzanian"plant more crops" campaigns of the 1920s and 30s are cases in point (De Haas and Papaioannou 2017; Abdelkarim and Barnett 2013; Dawe 1993; Iliffe 1979).

In sum, large-scale mineral extraction was by far more capital intensive than cash crop production. However, mining required cheap labor to yield the envisaged returns. Cash crop agriculture made use of abundant land, and in the case of perennial trees, seasonally abundant labor. For tree crops and groundnuts, traditional agricultural practices such as shifting cultivation and intercropping proved more compatible with local ecological conditions than intensive European or New World production methods. As John Iliffe (1979, p. 146) has put it with respect to cotton and groundnut schemes, "capital and technology alone made little impression on Tanganyika's environment." Land-extensive methods and the high market price of relatively scarce labor implied the absence of significant economies of scale in cash crop farming

(Ross 2014). These factor requirements are crucial to understand variation in the institutional strategies both European colonizers and African communities adopted to exploit valuable resources to their advantage. Before I turn to discussing these strategies, I outline the technologies, demands and policies modes that led to the commercial transition.

5.1.2 *Technology, Demand and Coalitions: The European and African Origins of the Trade Revolutions*

The commercial transition would have been unthinkable without a precipitous decline in trading costs throughout the 19th century. European innovation in transport and communications technology paved the way. During the heyday of the Atlantic slave trade, the aptly called trade winds necessitated the long triangular sailing route between Europe, the African West Coast and the New World. Only the advent of the steamship made direct maritime trade between Europe and West Africa profitable (Darwin 2012). The invention of the refrigerator allowed to transport perishable agricultural goods over long distances (Frankema, Williamson and Woltjer 2018). European railways began to connect mineral-rich and fertile parts of the African interior with the coastal entrepôts of maritime trade. The telegraph and submarine communications cables facilitated information flows (Hopkins 1973; Darwin 2012; Hogendorn 1975).

Yet new technologies alone do not explain surging European demand for African raw materials. Their rising value as industrial inputs and consumption goods is closely linked to changes within industrializing Europe. Rising productivity in manufacturing increased supply and lowered the price of industrial goods such as textiles, shoes, cutlery, clocks, and furniture. African vegetable oils, cotton, and metals served as inputs to the production process and lubricants of machinery. Rising wages of an emerging middle class and the associated consumer revolution increased the demand for manufactured products and imported luxuries such as tea, coffee, and chocolate (Hopkins 1973; Coe and Coe 2013; Clarence-Smith and Topik 2003).

The hygienic and lifestyle needs of urban and disease-prone but wealthy industrial centers required vegetable oil-based soap and other grooming and medical products (Hogendorn 1978; Roberts 1996). Candles made from palm oil were used to light factories, especially before the invention of the light bulb and widespread electricity supply (Hopkins 1973). These demands and the falling prices for imported manufactures from Europe implied continuously improving terms-of-trade for the producers and merchants of African commodity exports

(Frankema, Williamson and Woltjer 2018). The Confederate export boycott during the American Civil War and the boll weevil epidemic that infested US cotton fields in the late 19th century spurred intense British campaigns to diversify its cotton sources (Lange, Olmstead and Rhode 2009). The formation of the British Cotton Growing Association in 1902 and its active role in promoting cotton in colonial Africa were a direct consequence (Onyeiwu 2000).

Liberal policies and ideologies, especially in England, were equally important. High food prices, the Irish famine and industrial lobbyists' fear of rising wages culminated in the lifting of tariffs and other protectionist measures, most famously in the 1846 repeal of the Corn Laws (Williamson 1990). Custom duties on new world goods were lifted soon after (Howe 1997). Abolitionist sentiment and growing domestic opposition to the repulsive trade in human cargo resulted in the 1807 Slave Trade Act that banned the trading but — not yet — ownership of slaves. Slave patrols by the Royal Navy's West Africa Squadron provided imperfect but progressively effective enforcement (Lloyd 2012).

"Legitimate" goods such as gum, rubber, and ivory had been exported on slave ships for decades before the 1807 Abolition Act (Dalrymple-Smith and Woltjer 2016). Only after 1807, however, both African and European merchants had to find real alternatives to slave trading. A new generation of specialized commodity traders arrived from Europe (Hopkins 1973). In 1844 and 1861, the French liberalized import restrictions on colonial oil seeds (Hogendorn 1975). Tariff reductions only applied to raw seeds and French vessels in order to protect the domestic processing and shipping industries (Roberts 1996).

The lifting of trade barriers and abolitionist moves should not be taken as evidence that the ideologies of the day were entirely laissez-faire, enlightened, and egalitarian. European thought at the time was deeply imbued with paternalistic, racist, and, ultimately interventionist notions of a civilizing mission. Initially, most imperial policymakers were optimistic that commerce alone would do the trick. The leading British free trade lobbyist Richard Cobden wrote that

> "Commerce is the great panacea, which, like a beneficent medical discovery, will serve to inoculate with the healthy and saving taste for civilization all the nations of the world [...] Not a bale of merchandise leaves our shores but it bears the seeds of intelligence and fruitful thought to the members of some less enlightened community [...] Our steamboats and our miraculous railroads are the advertisements and vouchers of our enlightened institutions." (quoted in Darwin (2012, ch. 1))

Unsurprisingly, things did not work out as smoothly. How well European technologies, demands, merchants, and policies fared on the ground depended on local conditions and Afro-European competition, conflict, and collaboration.

As important as these external stimuli were, the commercial transition would have been equally unthinkable in the absence of forceful African agency. Superior local knowledge and the repurposing of political, production, and trading networks were decisive factors. This point applies more readily to cash crop agriculture than mineral production where European agency was heavy-handed and coercive. Nonetheless, pre-colonial discoveries in the interior, the long-standing trade in gold and copper, and the arrival of metals at the coastal slaving hubs likely raised European hopes and ambitions. As Foster (1968, pp. 41, 54) writes: "It is not an exaggeration that between 1550 and 1800 Europeans learned virtually nothing new about the lands beyond the African coastline. [...] By 1875, in fact, European possessions in Africa still only comprised the coastal forts and trading stations and a few tiny colonies."

As for cash crops, the development of the earliest production and trading centers was more of an African affair. Palm fruits had been important goods on the Nembe canoes during the precolonial Niger river trade (Alagoa 1970). Small quantities had also been exported to Europe since at least the 16th century (Lynn 2002). After 1807, the Nembe, Ijo, and Efik river traders, who had been important middlemen in the slave trade, seamlessly shifted to palm oil trading (Manning 1969). As a consequence, the Niger Delta came to be known as the Oil Rivers long before the discovery of petroleum resources in 1956. Important slave-trading states such as Oyo and Dahomey became crucial players in palm oil production, not least due to their continued access to unfree labor (Manning 1969; Law 2002).

Cotton planting, spinning, and weaving were common African activities before the European frenzy in the late 19th century. The areas around Kano in the Northern Nigerian Sokoto Caliphate and parts in today's Senegal and Mali were early centers of handicraft textile industries (Roberts 1996; Hogendorn 1978). The ubiquity of cotton raised European merchants' and administrators' hopes to tap into and further develop African production. Local producers, however, preferred pre-existing trading networks and the more competitive prices paid by African buyers (Roberts 1996; Hogendorn 1978). When Europeans intensified their cotton campaigns and built the first railways, producers and merchants were quick to produce more profitable groundnuts for export. The links between local producers and elite Hausa and Wolof traders were instrumental. In Senegal, the marabouts of the Islamic Mouride Brotherhood

jumped on board and began to dominate groundnut production. Similar to Oyo and Dahomey elites, Mouride marabouts took advantage of unpaid labor that their religious disciples had to provide for seven years (Cruise O'Brien 1971; Boone 2003).

The rise of cocoa in the British Gold Coast Colony from 1880s onwards is perhaps the most striking example of an African-led cash crop revolution. Cocoa was first planted in the southeastern Akim Abuakwa area but rapidly spread north and west to the Ashante and Brong-Ahafo regions. By 1911 the Gold Coast was the world's leading cocoa exporter (Ross 2014). The British were initially more interested in gold and did not much to stimulate the cocoa boom. The crucial exception was the early construction of railways from the coast to mining areas. Without rail transportation, the less coastal areas could not have adopted cocoa so quickly (Hogendorn 1975; Jedwab and Moradi 2016). In the early southeastern boom, agricultural entrepreneurs and "rural capitalists" were the driving force (Hill 1997).

They quickly expanded the cocoa frontier by pooling capital and labor resources they had acquired in earlier palm oil trades (Green and Hymer 1966). In Asante and Brong Ahafo, the Akan chiefs capitalized on their control of land and labor that had previously been channeled into gold mining and the kola nut trade (Hogendorn 1975; Manning 1969). They liberally leased out new cocoa land to local and, increasingly, in-migrating commoners (Ross 2014). Traditional gold mining in Asante collapsed in the wake of the cocoa boom. Progressively free labor secured higher returns in the cocoa than the mineral sector, which increasingly concentrated at the big deposits of Tarkwa and Obuasi (Hogendorn 1975). In short, African coalitions of entrepreneurs, smallholders, and precolonial elites coproduced the cocoa miracle in spite, rather than because of European colonial advances (Green and Hymer 1966). In 1924, a French observer accurately noted:

> "Forget the proverb that there is nothing new under the sun – or at least cite cocoa in the Gold Coast as an exception. In the history of the world there has certainly never been such rapid development of an entire economic sector launched by the local inhabitants." (cited in Ross (2014, p. 59))

Even where European encouragement or coercion were present, African producer and elite coalitions often shaped what was planted where and when. The British Cotton Growing Association introduced American cotton to Uganda and the Germans promoted coffee production in Tanganyika. However, the Buganda and Chagga chiefs were prime agents behind the widespread adoption

of these crops by native producers (Wrigley 1957, 1960; Iliffe 1979). While smallholders in the Ugandan Lango and Busoga regions initially resisted or, at times, abandoned cotton to preserve food security, they readily planted the crop when the terms-of-trade were favorable (Tosh 1980; Austin 2014; Nayenga 1981). In Kenya and Côte d'Ivoire, colonial land expropriation, white settler privilege, and labor coercion long delayed the growth of native cash crop production. African political mobilization against these policies from the 1920s onwards and their eventual removal in the late colonial age spurred veritable booms (Frankema, Green and Hillbom 2016). Ivorian coffee and cocoa exports only went through the roof after labor restrictions were lifted. Native planters easily outcompeted the small number of government-protected European settlers who had dominated the trade before (Chauveau and Léonard 1996).

In some cases, cash crop production was developed and firmly controlled by European settlers or large concession companies. Brutal regimes of labor coercion instead of African entrepreneurship drove concessionary rubber production in Liberia and the Belgian Congo (Lowes and Montero 2017.; Harms 1975). Further examples of more coercive cash crop regimes include cotton, coffee, and sugar in Angola and Mozambique as well as the company-run cotton schemes in today's Chad and Central African Republic (Isaacman and Roberts 1995). In Kenya and Southern Rhodesia planting coffee, tea, and tobacco was long an exclusive white settler privilege. Company-run schemes and settler estates mostly emerged after formal colonization. European imperial powers saw cash crops as a means to make their colonial acquisitions profitable. European-run cash crop projects relied on colonial capital investment, government favoritism to acquire land and labor below market rates, and agricultural methods that clashed with local ecological conditions (Amin 1972; Iliffe 1979). Consequently, settler and company agriculture often failed and in general contributed less to African export volumes than native production (Frankema, Green and Hillbom 2016; Bauer 1956).

In brief, both external stimuli and local agency were key drivers of the commercial transition. "Africans ma[d]e their own history, but not necessarily under conditions of their own choosing." (Roberts 1996, p. 24). African early adopters readily sold palm oil, kernels, and groundnuts to European merchants. The latter began to show up in droves and offered competitive prices. Metropolitan demand was high and transport costs declined. The cash crop and mineral revolutions predated or coincided with the earliest years of formal colonization. Put differently, an "informal empire of free trade" was developing decades before the idea of formal conquest captured the French

and British "official mind" (Robinson and Gallagher 1966). This informal empire rested on unequal but informal exchange between African producer and middlemen coalitions on one side and European trading companies on the other. Their interactions were not always harmonious. Fierce competition for trading opportunities among and between Africans and Europeans led to an intensification of violent conflict throughout the 19th century (Hopkins 1973; Reid 2012).

5.2 ENDOGENOUS INSTITUTIONS: CASH CROPS, MINERALS AND COLONIALISM

These patterns of conflict and collaboration ushered in the most radical episode of commercial state building the African continent had ever witnessed. The natural resources and trading modes of the commercial transition already bore the imprint of what were to become defining characteristics of the colonial state. In the following sections of this chapter, I explain how type and location of natural resources shaped colonial strategies shortly before, during, and after the Scramble.

5.2.1 *From Informal to Formal Empire*

The formal partition of Africa by European imperial powers had multiple causes. Theories of imperialism typically distinguish between economic, geopolitical, and local motivations. The Hobson-Lenin view sees colonialism as a natural outgrowth of expansionary capitalism (Hobson 1975; Lenin 1999). European capital owners and industrialists supposedly pushed submissive governments into acquiring profitable outlets for capital investment and industrial produce. Around the time of the Scramble, European credit was cheap, manufacturing productivity high, and some industrial, financial and merchant elites indeed lobbied for expansion (Cain and Hopkins 1986, 1987). African consumer markets for European products were, however, modest in potential. Private investments in, for example, railways turned out to yield losses (Hogendorn 1975; Cooper 1981). Contrary to Hobson's (1975) capitalist interest group approach, European politicians were first hesitant to consider conquest and formal control (Darwin 2012). Geopolitical competition partly changed their perspective. The British Empire was large and prospering, primarily due to trade with India. France wanted to catch up and had a lot to compensate for. The defeats in the Napoleonic and Franco-Prussian Wars spurred ambition to increase French

power outside of Europe. The late but forceful rise of Prussia and the unification of Germany led to counterbalancing and German hopes to disrupt the colonial game. And yet, Eurocentric economic or geopolitical theories cannot explain why some places were colonized sooner, later or not at all (Robinson and Gallagher 1966).

If the goal is to understand the varying manifestations of European imperialism rather than the general phenomenon, local factors have to be taken seriously. In terms of my model, these factors entail the local resource endowments, coalition structures, interaction modes, and informal bargains between imperial outsider, gatekeeper, and resource coalitions. In Robinson and Gallagher's (1966) view, the failure of previously established informal cooperation gave rise to formal empire. The trigger was the Mahdist tax revolt in informally controlled or perhaps already indirectly ruled Egypt. The rebellion threatened the sea route to India through the Suez Canal. Britain invaded in 1882 to restore order and did not leave until Egyptian independence in 1922. British control spurred compensatory desires by the French who had built and run the Suez Canal before. These desires were then satisfied on the African West Coast. The Boer wars in South Africa may be seen as similar local crises that threatened the Southern route to India around the Cape.

The essence of this account is local unrest that threatens economic interests outside of Africa and causes geopolitical competition. The only problem is that French preparations to penetrate the West African interior predate the Egyptian crisis (Brooks 1975; Frankema, Williamson and Woltjer 2018). What's more, Robinson and Gallagher (1966) attacked Eurocentrism but replaced it with their own economic India bias. This made some sense from a British perspective. Between the 1860s and 90s, the Indian share in British imperial trade volumes never fell below 60 percent. The African shares started at 7 percent but continuously rose to 18 percent in the 1890s. For France, African trade was essential and contributed between 65 and 74 percent of total imperial commerce (Frankema, Williamson and Woltjer 2018). In addition, prices were developing favorably. The terms of trade and export volumes of African commodities such as palm oil, gum, and groundnuts were almost steadily rising between 1830 and 1900. This suggests that genuine economic interest in the resources of the commercial transition at least partially impacted upon European cost-benefit analyses of informal versus formal control (Frankema, Williamson and Woltjer 2018).

Antony Hopkins (1973) argues that a different kind of local crisis explains the west coast roots of the Scramble for Africa. In his view, the commercial transition

prompted "local crises of adaptation" among West African states and rulers. The end of the slave trade and economic mobilization by masses of cash cropping smallholders undermined the authority of precolonial elites. Violent power struggles commenced and subverted the bargains between African elites and European merchants from the slave-trading era. The situation got worse when palm oil prices dropped in the 1860s and intensified competition. European governments saw their commercial interest at stake and invaded to pacify the situation. According to Hopkins (1973), formal conquest directly follows from the disruptive effects of successful African cash crop agriculture.

While certainly relevant in some cases, Hopkins's approach faces two limitations. First and just as with the slave trade, it is not clear whether the cash crop trade eroded or stabilized pre-colonial coalitions. Ashanti, Dahomey, and Oyo benefitted greatly from early palm oil and cocoa production. Their access to domestic slave labor enabled some large-scale production that deviated from Hopkins's pattern of a smallholder revolution (Law 2002). In the Niger Delta, the small gatekeeper states of the slave trade at Bonny and Old Calabar as well as the trading state of Nembe continued to prosper from the early Nigerian oil river trade (Lynn 2002). Second, the negative price shocks between 1860 and 1890 were limited to palm oil. The terms of trade for groundnuts and other resources continued to improve (Frankema, Williamson and Woltjer 2018).

The most important crises of adaptation were perhaps faced by European merchants and trading houses (Law 2002; Lynn 2002). They had to compete against African coalitions with superior local knowledge, military prowess, and well-oiled commercial networks. Imperial merchants frequently complained about the unfair and immoral advantage of African competitors who continued to rely on slaves (Reid 2011). In all likelihood, domestic slavery increased rather than diminished during the commercial transition (*ibid.*). Trading groups such as the Nembe used war canoes to protect their monopolies against European newcomers in search of direct access to palm producing areas (Darwin 2012). Wolof and Fula traders emerged as important middlemen of the early groundnut trades along the Upper Guinea Coast (Barry 1998). European trading agents intensified their lobbying for government protection and pacification in their favor (Reid 2011). The imperial mood began to shift from the informal empire of free trade to a more muscular approach of protecting commercial interests. Already in 1860, the British Prime Minister Palmerston noted as much:

> "Trade ought not to be enforced by Cannon Balls, but on the other hand Trade cannot flourish without security, and that security may

> often be unattainable without the Protection of physical force." (quoted in Darwin (2012, ch. 1))

A combination of rising commercial interest, local crises, and geopolitical competition increasingly dragged European governments into the African interior. In addition, advances in military technology lowered the cost of conquest. The invention of the automatic Maxim gun in 1894 was a breakthrough in this regard (Reid 2011). The Scramble began and reached its first apex at the 1885 Berlin conference. The imperial powers staked out territorially fixed spheres of influence according to the doctrine of effective occupation. Katanga, Kimberley, and the Rand became main arenas of imperial competition. The same goes for the strategic trade arteries of the Congo and Niger Deltas. Full partition and territorial control of now formal empires were achieved around 1914 (Coquery-Vidrovitch 2004).

The emerging institutional contours of formal colonial rule reflected the resource types, contested trading networks, and interaction modes of the commercial transition. The taxation of mineral and agricultural exports was to become the fiscal backbone of colonial states (Young 1994; Austin 2010; Frankema and van Waijenburg 2014). Imperialists consolidated direct control of key commercial entrepôts and mining sites, which were highly valuable, geographically concentrated and thus comparatively easy to seize and administer. Regarding the cash crop trade, imperial governments tended to side with the trading houses and cut out African middlemen (Crowder 1968; Arriola 2013*b*).

In stark contrast, cash crop production mostly remained in native hands. Where European settlers or concessionary companies were scarce or produced unsatisfactory results, colonial administrations were often happy to side with local producers (Frankema, Green and Hillbom 2016; Austin 2008*b*). Neither the soap-producing Lever Brothers nor the chocolate manufacturer Cadbury received British backing for palm or cocoa plantations (Hopkins 1973; Ross 2014). Colonial governors tried out different approaches but converged over time on relatively indirect forms of rule in native cash crop areas. Local intermediaries continued or began to play important roles in regulating access to land, labor, and capital (Boone 2003; Berry 1993). Places without cash crops or minerals saw great spatial and temporal variation in institutional forms. In the most general sense, colonizers used resource-poor areas to conscript cheap or forced labor for mining, settler agriculture, infrastructure construction, and military service (Amin 1972; Mkandawire 2010).

In what follows, I discuss colonial institutions in more detail. I focus on three central and closely intertwined pillars of the African colonial state: Their

fiscal, administrative, and regulatory regimes. The fiscal state emerged from the metropolitan imperative to achieve financial self-sufficiency. The administrative state manifested itself in different forms of direct and indirect rule. The regulatory state governed colonial factor and output markets. All three institutional pillars are frequently cited as general features of African colonialism (Young 1994; Beissinger and Young 2002; Mamdani 1996). All European empires had to raise revenues locally, relied on African intermediaries, and intervened in markets. There is, not surprisingly, intense debate over the extent to which the revenue imperative, indirect rule, and interventionist ambitions shaped imperial strategies across and within individual empires and colonies. How colonial fiscal, ruling, and regulatory strategies played out on the ground, I argue, varies with the natural resource endowments and production modes at the sub-colony level. Different resource types produced spatially varying institutional equilibria. These institutions, in turn, shaped distributional outcomes, coalition structures, and interaction modes well beyond independence.

5.2.2 *The Revenue Imperative*

Regardless of whether imperial powers reluctantly or enthusiastically scrambled for Africa, once they were in, they had to finance their acquisitions. Metropolitan governments and their constituencies saw African colonies as potential financial burden and, by and large, questioned their fiscal value. Apart from military expenses and few large grants for infrastructure development, Metropolitan treasuries did nothing to finance their colonial outposts. Instead, the goal was to achieve fiscal self-sufficiency and make African subjects "pay for their own conquest" (Beissinger and Young 2002, p, 29). To achieve the *mise en valuer* of the colonies, governments were in desperate need to find local revenue sources and develop taxation regimes to exploit them (Sarraut 1923).

The institutional consequences of the revenue imperative are hotly debated. Some scholars argue that the revenue imperative generated bureaucratic authoritarian states that effectively maximized extraction from African peoples and resources. The colonial state became "the crusher of rocks" (Young 1994, p. 1) whose "pervasive revenue hunger all along the chain of command" expressed itself in the tendency "to tax or impose fees on anything that moved" (Mamdani 1996, p. 56). Revenue extraction in the form of indirect trade taxes and direct head, hut, or poll taxes were, as (Reid 2011, p. 146) argues, "the key purpose" of colonial rule. Direct taxation forced Africans into unfree or underpaid labor in the mines, public works projects, and cash crop plantations. In rural areas,

colonial tax demands coerced smallholders to abandon food in favor of cash crops, which may have reduced food security and living standards (Rodney 1972; Amin 1972).

An alternative account holds that governments satisfied the revenue imperative by minimizing effort instead of maximizing revenues (Frankema 2011). After all, budgets were tight and colonial governors had to work through the limited human, administrative, and fiscal resources at their disposal. In this view, colonial strategies aimed at administration on the cheap (Gallagher and Robinson 1953). A "thin white line" of European officials ruled large populations scattered across vast territories (Kirk-Greene 1980). Colonizers therefore established what Berry (1992) calls "hegemony on a shoestring." Governments could not rely on effective tax bureaucracies but continuously struggled to make ends meet (Herbst 2000). Their revenue generation strategies thus adjusted to local conditions and pragmatically focused on the areas, people, and resources that appeared easiest to exploit (Gardner 2012).

Both accounts rightly stress the extractive rather than developmental nature of colonialism. Securing revenue trumped all considerations of long-term investment in the internal development of African colonies. Nonetheless, neither account suits as general characterization of African colonial rule. The balance between absolutist and minimalist extraction varied in time and space. French, Portuguese, and Belgian strategies were more heavy-handed than their British counterparts. Direct forms of taxation in cash or in kind were more common in non-British colonies. The extensive use of forced labor under the French prestation (*corvée*) regime serves as a case in point (van Waijenburg 2018).

These differences, however, did not only result from metropolitan blueprints or governing ideologies. Instead, they are to a significant degree endogenous to the resource endowments and commercial potential of different territories. Various forms of forced labor, direct, and indirect taxation often occurred within the same empire or colony. As such, institutional differences between imperial powers may have more to do with 19th century British superiority and the ability to selectively choose its African holdings. In brief, Britain "ended up with the plums", whereas France "got what it could – much of it arid lands on the edge of the Sahara plus choicer morsels along the coast" (Burbank and Cooper 2010, p. 315). Frankema and van Waijenburg (2014) show that the size and source composition of colonial budgets does not vary much once underlying geographic factors are accounted for. Their tax data reveals that revenues per capita and direct tax shares differ more between coastal and landlocked than between British and French colonies.

How do cash crops and minerals fit into the picture? First and foremost, export commodities provided an easily exploitable source of indirect trade taxes. With the rare exceptions of some resource-poor colonies such as the landlocked parts of French Equatorial Africa and Upper Volta, indirect revenues made up at least half of colonial budgets. If anything, the indirect share in revenues expanded between 1911 and 1937 (Frankema and van Waijenburg 2014). Trade taxes were conveniently collected at the gate, i.e. the coastal ports from which export commodities were shipped to Europe. As a consequence, colonial governments channeled their limited investments to areas where they contributed to export commodity production and indirect revenue. Direct forms of taxation required more effort. Tax collection had to be managed and enforced at the local level. Colonizers, regardless of metropolitan identity, lacked an administrative apparatus extending far into the countryside (Herbst 2000). Taxation and labor recruitment were outsourced to local chiefs or village headmen who were paid a substantial share of the revenues they collected (Berry 1993). Tax burdens, local investment, and the tightness of oversight varied in response to colonial needs and local conditions.

In regions of large-scale and capital-intensive mining operations, European governments or mining companies established direct control over important source areas. These areas quickly transformed into urban, commercial, and administrative hubs (Zeleza 1997). Comparatively large capital investment in physical infrastructure and mining technology ensured the effective exploitation and transport of easily taxable metals and gemstones. A minority population of European administrative and commercial elites increasingly clustered in mining cities (Austen 1987). Settlers performed crucial functions in the mining operations, marketing of mineral produce, and local administration. Due to these services and pervasive racial favoritism, colonial governments were more responsive to settler demands than to any needs of the black majority. European-run mining towns received higher investments in public goods such as schools, hospitals, local security, and social welfare (Huillery 2010; Mkandawire 2010). Some cities or boroughs emerged as scattered islands where colonial governments deviated from their non-developmental playbook (Jedwab, Kerby and Moradi 2017; Mkandawire 2010).

The perhaps more fundamental impact of spatially concentrated mining enclaves was felt in their surroundings. As noted above, scarce labor was needed to work the mines. In the early 20th century, market wages for miners were typically too high to make capital investments profitable. Colonial governments or the companies that preceded them developed a dual strategy to solve this

conundrum. They imposed heavy direct taxes on rural populations and simultaneously curtailed local economic opportunities (Mkandawire 2010). Direct tax burdens required Africans to come up with cash. Various native land acts and designations of Crown lands prevented rural populations from earning income locally (Amin 1972). These policies brought the most fertile agricultural lands under government or settler control. As if this was not enough, colonial governments prohibited Africans from planting high-value export crops on whatever land remained accessible. They also banned Africans from more high-wage mining and processing jobs (Acemoglu and Robinson 2010). The only remaining alternative was to work in the mines or on European settler estates.

Large parts of South Africa, the two Rhodesias, Nyasaland, Mozambique, and Angola thus became labor reserves for European mineral and, where it developed, cash crop production (Oliver and Atmore 2005). The strategy worked well for European mining interests. Between 1911 and 1920 real wages in South African mines declined by 30 percent (Wilson 2011). They did not recover to previous levels until 1970 (Austin 2010). African living standards stagnated or deteriorated (Crowder 1968; Rodney 1972). Colonial strategies were even less subtle in the Belgian Congo or parts of French Equatorial Africa. Concessionary companies were given free rein to coercively conscript mining and plantation labor, of which the former was quantitatively more important (Mkandawire 2010).

Relatively capable colonial states and local administrations emerged where mining or plantation agriculture dominated the economy. Direct taxation in the labor reserves generated both revenues and valuable labor. The stakes of effective enforcement were high. Colonial governments tightly monitored the chiefs they hired or forced to collect taxes. In the mining towns themselves, governments implemented racially segregated regimes of public goods and social welfare provision. The administration was able and the settlers willing to finance these programs through direct taxation. (Mkandawire 2010) provides country-level evidence that former labor reserve and mining colonies have higher tax capacity until the present day.

Notably different fiscal regimes characterized areas of native cash crop production. The direct tax burden was often lower than in the labor reserves. Governments reduced their efforts at direct taxation where tariffs and duties generated sufficient revenue (Frankema 2011). Direct taxes were not only costly to collect, they tended to backfire, provoke revolt, and risked to seriously disrupt agricultural production. The 1898 Hut Tax Rebellion in Sierra Leone is

but one early example (Abraham 1974). In 1851, the pre-Scramble coastal Gold Coast colony implemented hut taxes. The measure was revoked ten years later due to disappointing results (Frankema and van Waijenburg 2014). Indirect trade taxes started to flow in and the Gold Coast government did not collect any direct taxes until independence. Southern Nigeria did not levy direct taxes until the late 1920s (Austin 2010). The effective tax burden remained comparatively low. In coastal cash crop colonies like Nigeria, Dahomey, Togo, Senegal, and Cote d'Ivoire, the share of direct taxes in government revenues hardly ever exceeded 30 percent (Frankema and van Waijenburg 2014).

None of this implies that direct extraction was entirely absent in cash crop areas. In both French and British colonies, forced or underpaid labor requirements constituted a direct form of extraction that never showed up in colonial budgets (van Waijenburg 2018). Some form of hut, head, or poll tax was levied in most rural areas. Yet the producers and chiefs of cash crop regions were better positioned than others to pay or collect direct taxes. Cash crops enhanced rural incomes of landowners and producers alike. Moradi (2008, 2009) shows that native living standards in the cash crop colony of the Gold Coast and even the "semi-settler" colony of Kenya increased throughout the colonial age. In the cotton-growing areas of Uganda, smallholders' real wages rose only moderately above subsistence levels (De Haas 2017). The inherently more difficult characteristics of the cotton crop and Ganda chiefs' tight control over land, seeds, and tax collection may have suppressed further growth (Wrigley 1957). As long as direct taxes were flowing and agricultural output could be taxed at the port, colonial governments were happy to give their intermediaries free rein. They more readily outsourced the regulation of land and labor than in mining areas and labor reserves (Boone 2003; Berry 1993; Herbst 2000).

Fiscal regimes in mining enclaves and labor reserves featured many aspects of Crawford Young's (1994) absolutist notion of "Bula Matari." In contrast, cash crop regimes conformed more readily to minimalist conceptions of the tax state (Frankema 2011). The colonial reality saw many intermediate forms. In the labor reserve colony of Nyasaland, African skill and settler incompetence produced a boom in native tobacco production. The government refrained from aggressively siding with the settlers (Frankema, Green and Hillbom 2016). In French Cameroon and Cote d'Ivoire, settler privileges were long maintained despite ideal conditions for native production. Across Sub-Saharan Africa, cash crop production grew more or less continuously despite a declining long-term trend prices throughout the colonial era (Frankema, Williamson and Woltjer 2018). Direct taxes, forced cultivation, and colonial revenue hunger may have

contributed at least as much to this pattern as the more benign forces of infrastructure investment, producers' efficiency gains, or entrepreneurial innovation. As a result, colonialism deepened and intensified the cash crop revolution beyond its natural proportions (Gann and Duignan 1969). Nevertheless, the crops and production modes remained the same. The emerging institutions differed from what was found in areas of mineral extraction, labor recruitment, or subsistence farming.

5.2.3 *Indirect Rule and Association*

Indirect and direct rule are similarly contested concepts. Just as in the case of colonial tax regimes, interpretations range from absolutist to minimalist and it remains unclear whether governing modes reflected metropolitan blueprints or local conditions. Mahmood Mamdani (1996) describes indirect rule as decentralized despotism. In his view, colonial governments set up authoritarian administration by native middlemen. Rather than adequately reflecting any precolonial structures, indirect rule containerized mobile and overlapping local populations in territorially rigid tribal homelands. Precolonial polities had been characterized by multiple and fluid loyalties. Authority structures used to be inherently accountable or democratic. After the Scramble, indirect rule severed the reciprocal linkages between elites and their citizens. It turned the overwhelming majority into powerless subjects of despotic collaborators. Citizen status and rights were limited to the white minority. Where usefully hierarchical structures did not exist, they were created by colonial fiat (Mamdani 1996). The resulting institutions were neocustomary rather than traditional in any genuine sense of the term (Boone 2014).

A more minimalist approach regards indirect rule as pragmatic, constantly evolving trial-and-error attempt at colonialism on the cheap. As Kirk-Greene (1980, p. 26) noted, occupation was "by no means yet synonymous with administration". The Nigerian Governor Lord Lugard (2013) eloquently summarized and promoted the main principles of indirect rule. Nevertheless, the Lugardian playbook remained far from a universally applicable governing ideology. Apparently, the British officials could not even agree among themselves whether Uganda was under direct or indirect rule (Herbst 2000). Colonialism as a project of "restoring collaboration" amounted to switching between informal alliances with natives of temporary use and reliability (Robinson 1972). According to (Cooper 1996, p. 11) "The much celebrated policy of indirect rule represented an attempt to make retreat sound like policy."

The debate whether French direct and British indirect rule represented a difference in kind or degree is ongoing (Ali et al. 2018; Cogneau and Moradi 2014; Frankema and van Waijenburg 2014; Müller-Crepon 2018). Crowder (1964) sees the French approach as qualitatively different from its liberal and pragmatic British counterpart. The initial desire to thoroughly assimilate colonial subjects into cultural and political Republicans was indeed unique. The native chiefs were seen as low-level but still natural extensions of the Metropolitan structure. They were "auxiliary instruments" whose power emanated from colonial capitals and, ultimately, Paris (Crowder 1964). British rule, by contrast, was a project of more conservative modernization. Africans should be integrated into the empire and colonial economy according to their own, genuinely traditional ways. Gold Coast and Nigerian Governor Clifford wrote that , "[t]he [British] Political Officer should be the Whisper behind the Throne, but never for an instant the Throne itself." (quoted in Young 1994, p. 149).

Again, natural resource endowments help to understand within-colony institutional variation. As noted above, mining towns were under direct government or company rule. Governments chose equally direct rule where settler or plantation agriculture emerged as the main show in town. The ungrateful task of running important labor reserves was outsourced to true or appointed native chiefs. However, they remained under more direct and interventionist supervision of colonial administrators. Under such conditions, they closely resembled Mamdani's decentralized despots. Chiefs had to collect heavy direct taxes, conscript unfree labor, and enforce tight land and planting regulations. As such, they almost naturally appeared authoritarian and coercive. The chief tended to become "the most hated member of [the] community" (Crowder 1968, p. 85). Coercive indirect rule spurred communal reaction in the form of exit and voice (Herbst 2000; Hirschman 1970). In 1930s French Cameroon, large numbers of young Bamiléké migrated to European or Duala-run cash crop areas to escape chiefly authoritarianism (Eckert 1999). Anti-chief and anti-tax revolts occurred throughout the colonial age (Boone 2014).

In cash crop areas, indirect rule took somewhat more benign forms. Even where the formal rules of the game were similar to labor reserve areas, the informal workings of indirect ruling arrangements tended to diverge. In French colonies, wealthy chiefs and cash crop producers could buy themselves out of mandatory labor requirements (van Waijenburg 2018). In contrast to the labor reserves, cash crop chiefs typically had personal stakes in the agricultural economy (Austin 1988; Boone 2003). In struggles with the administration, they were more likely to side with their community than labor reserve chiefs whose

main source of wealth and power was the colonial government. The chiefs' initially reluctant but still forceful role in the Ghanaian cocoa holdups illustrate these incentives (Austin 1988; Berry 1993). The fact that colonial administrations did not directly control land rights and production modes increased local chiefs' and communities' bargaining power.

However, cash crop regions were far from immune against internal conflict. Rising values of land, in-migration, chiefly rent-seeking, falling prices, and crop epidemics were frequent sources of trouble (Boone 2014; Danquah 2003). This led to legal and informal fights for land, labor, and output (Berry 1993). But even in such cases, cash crop incomes helped to keep events under control. After internal conflict had led to the destoolment of a number of chiefs in the Ghanaian cocoa areas, communities appointed candidates who were rich enough to provide patronage and settle remaining legal disputes (Bates 1987; Berry 1993). In other places, such as the Beti areas in southwestern Cameroon or the Kenyan Kikuyu reserve after the Mau Mau revolt, a new class of cash crop and/or mission-educated elites came to replace the appointed chiefs as powerful local patrons and interlocutors of the colonial administration (Quinn 2006; Berry 1993; Boone 1995; Tignor 2015).

Just as in the case of fiscal regimes, the formal and informal workings of the administrative state were in part endogenous to the prevailing modes of commodity production. Other local factors and metropolitan governing ideologies played their roles too. Many scholars have noted that indirect rule tended to work better where it aligned with more state-like precolonial structures (Englebert 2000; Gerring et al. 2011; Müller-Crepon 2016). The patriarchal abuses of artificially installed warrant chiefs in southeastern Nigeria and the 1929 Igbo Women's War underline this point (Van Allen 1975). With respect to metropolitan differences, (Müller-Crepon 2018) provides systematic evidence that precolonial states were dismantled earlier and more frequently in French than in British colonies. For precolonial states like Dahomey and Futa Djallon, it seems plausible to assume that British force would have resulted in treaties rather than the destruction of pre-existing authority structures (McGowan 1981; Law 1977). In the Sahelian Mossi kingdoms, on the other hand, French intervention had more to do with low cash crop potential, desires to create labor reserves and, to that end, cut off the Trans-Saharan trade (Newbury 1966; Cordell and Gregory 1982; Raynaut 2002).

However, even French policy varied in space and evolved over time. French officials readily cooperated with the Senegalese Mouride Brotherhood in what Boone (2003) rightly describes as indirect rule over groundnut production. From

the 1920s onwards, lofty goals of assimilation gradually gave way to a policy of association (Crowder 1964). Reformers such as the Minister of Colonies and future Prime Minister Albert Sarraut as well as Robert Delavignette, a colonial administrator who later directed the Ecole Nationale de la France d'Outre-Mer, entered the stage. They advocated more economically efficient and locally informed rule over African territories (Sarraut 1923). Using local authority structures to French advantage and encouraging native cash crop production were part and parcel of their program (Cohen 1978). While Sarraut failed to achieve parliamentary backing and metropolitan financing for his ambitious development plans, his ideas greatly influenced a new generation of colonial administrators. Delavignette was just one of them. African language training, anthropology, history and geography began to complement mere administrative instruction at the Ecole Nationale (Thomas 2005). On the ground, new administrators had substantial leeway to deviate from the Republican blueprint (Huillery 2009). As a result, French colonial policy came to appear more British.

5.2.4 *Regulation of Factor and Output Markets*

The spatially varying fiscal and administrative regimes led to stark differences in the organization of factor and output markets. These differences are key to understand how colonial institutions structured the within-territory distribution of economic potential and political power. The control of land, labor, capital, and output varied from place to place. In mining areas, Crown lands, and at concessionary plantations, land was under direct government or company control. In some regions of white settler farming, land titling reforms selectively created private property rights. More often, however, the government continued to own the land and granted settlers long-term usage rights. Formal and informal market transactions of usage rights were sometimes possible but the long-term security of land tenure depended on governmental goodwill, racial, and, in post-colonial times, often ethnic favoritism (Boone 2014).

In native cash crop areas, land remained under local control. This was a direct consequence of initially abundant land. Even the most profitable cash crop areas relied on land-extensive rather than intensive farming practices. The allocation of property and usage rights was left to local intermediaries and communal authority structures (Herbst 2000, ch. 6). This reflected colonial governments' stern belief in the precolonial half-truth of tribal land ownership. Under such "neocustomary regimes" access to land hinged upon membership in

real or imagined local kin groups (Boone 2014). Investing in political identities and acquiring favors from powerful patrons provided the key to ensure tenure security and continued profits (Berry 1993). Communal coalition structures were subject to constant renegotiation. As such, they neither reflected precolonial societies nor colonially invented tribal autocracies (Berry 1993). In areas without cash crops or white settlement, similar neocustomary land rights prevailed. As land values and population densities were growing slower than in cash crop areas, the stakes of land ownership remained lower. Colonial land tenure regimes have persisted well beyond independence. Up to the present day, less than 10 percent of agricultural land in Sub-Saharan Africa is registered under private title (Deininger 2003). Both government- and community-controlled land regimes were non-market institutions with high potential for distributive conflict and politicization (Boone 2014).

Labor markets showed similar institutional variation. They were most heavily regulated in the mining towns and labor reserves where Africans were banned from high-wage jobs and profitable agricultural activities (Mkandawire 2010). Early British and long-lasting French, Portuguese and Belgian practices of conscripting unfree labor were similarly interventionist. The whole colony of Upper Volta was relegated to a labor reserve. Voltaic labor served in European and native cash crop production as well as on road, railway, and irrigation projects (Cordell and Gregory 1982). When labor restrictions were lifted upon increasing native and international pressure, French labor regimes evolved in more British directions (Eckert 1999; Ross 2014).

Rural populations in the labor reserves and non-cash crop areas faced strong pressures to earn incomes in order to pay direct taxes and secure their livelihoods. Massive migration into mining and cash crop zones commenced. Initially, governments, migrants, and receiving areas thought of migration as a seasonal or at least temporary phenomenon. Governments tried to keep mining workers attached to their tribal homelands. They feared permanent settlement as potential source of working class consciousness and political unrest (Posner 2005; Cooper 1996). At first, mining workers indeed retired in their rural homelands (Posner 2005). Over the long haul, however, the growth of shanty towns in mining areas and increasing rural-to-urban migration made permanent settlement an undisputable reality (Reid 2011).

In cash crop areas, migrant labor was initially welcomed to make agricultural land and capital investments in seeds and tree crops profitable. Communal arrangements rather than contractual wage labor were the norm. In south-central Cote D'Ivoire, native families adopted stranger farmers into their households

to help with planting and harvesting coffee trees (Boone 1995). In the Ghanaian cocoa zones, local chiefs and other landowners developed sharecropping regimes, leased land to migrant tenants, and allowed them to keep between half and one third of the proceeds of their labor (Robertson 1982; Hill 1997). Despite significant economic gains, most in-migrants remained "second-class citizens" of the native community (Boone 2014).

Indigenous smallholders, by contrast, received land or cocoa trees as gifts from chiefs and other patrons. Migrants who managed to assimilate or marry into the local community were treated similarly (Robertson 1982). Community membership and patron-client relations were as important in labor mobilization as in governing access to land. Chiefly status or patronage wealth facilitated control over human resources. The constant, mostly voluntary migration flows to native cash crop enclaves suggest that the local institutions provided returns closer to efficient market rates than wage labor in the mines or public works projects (Hill 1997; Austin 2014). In the long run, migration to mining towns and cash crop areas led to higher population densities and increasing levels of local ethnic diversity.

At the colony level, capital, credit and output markets were tightly controlled by governments and their European clients. Especially in colonies with European settler agriculture and mining interests, the goal was to prevent the rise of a native financial and commercial elite (Arriola 2013*b*, ch. 3). Banking monopolies of European-run or metropolitan houses helped to limit African capital accumulation. Such a monopoly even applied to the cash crop colony of the Gold Coast (*ibid.*). In mineral and agricultural output markets, colonial governments similarly protected the interests of large European trading houses. In line with the pre-Scramble complaints about African competition and in stark contrast to how cash crop production was organized, colonial governments were quick to cut out African middlemen (Crowder 1968).

In some cases, trading minorities such as the Lebanese in French West Africa and the Indians in Uganda played powerful roles in output marketing (Nayenga 1981; Amin 1972). These groups posed little risk to colonial governments and performed important functions. Overall, however, the marketing of mineral and agricultural export commodities tended to be brought under oligopolistic and government-protected European control. Much the same goes for the few processing activities that were performed locally rather than in the European industrial core, e.g. cotton ginning in Uganda (Crowder 1968; Nayenga 1981).

In cash crop areas, colonial policies only partially succeeded in limiting African capital accumulation. Efficient but informal local capital markets and

high profits gave rise to a new bourgeoisie of African planter-merchants (Hill 1997; Boone 1995). Chiefly and other entrepreneurs who owned or leased land acquired significant wealth. Their ability to purchase young tree crops and remunerate labor secured growing returns on reinvested cash crop profits (Austin 2005). They continued to compete with European trading houses in local and sometimes even colony-wide markets. Perhaps more importantly, they were keen to extend their commercial activities to other domains and began to lobby against market restrictions. According to Arriola (2013*b*, ch. 3), this combination of successful native accumulation in the face of government restrictions produced a prosperous but thoroughly politicized business elite with strong roots in the cash cropping sector.

When Ghanaian cocoa prices fell in the 1920s and 30s and European buying houses resorted to even more cartelistic behaviors, African producers, chiefs, and merchants were able to collectively orchestrate a powerful series of holdups (Austin 1988; Boone 2003). Instead of liberalizing output markets, the government stepped in and established the first cash crop marketing board (Bauer 1956). The output market was effectively nationalized under the pretext of protecting African producers against volatile global markets. Not surprisingly, government price stabilization turned out as a one-directional affair to the detriment of native producers and merchants (Bauer 1956). The Ghanaian marketing board became a model for similar policies in a large number of African cash crop colonies. According to Austin (2010, p. 16) "the . . . discovery that the export marketing board could be a . . . revenue-raiser, . . . was the major fiscal innovation of colonial rule."

In sum, markets for land, labor, capital and output were organized in interventionist and, from a European perspective, unconventional ways. All four markets contained redistributive and essentially political features. In mining and plantation areas, access to government-controlled land, cheap labor, capital and output marketing opportunities depended on racial identity and government favoritism. In cash crop areas, land and labor mobilization were contingent on communal identity or local patronage. Some opportunities for capital accumulation and trading were open to natives. The advent of the marketing board put output markets under state control. Cash crop and mining regions saw faster growth of increasingly diverse populations than other agricultural areas or labor reserves. All four markets were structured in ways that made control of the central state or local authority structures useful strategies to accumulate wealth and power. Upward mobility required access to national or local patronage networks.

The colonial fiscal, administrative, and regulatory states can thus be seen as resource regimes that varied in accordance with the underlying resource endowments, production modes, and export values. Different resource regimes tended to persist beyond independence and had forceful effects on local coalition structures, distributional outcomes, ethnic identity salience, and violent conflict. In the next chapter, I theorize these long-term effects and derive empirical implications.

6

CONTINUITY AND CHANGE: EMPIRICAL IMPLICATIONS

The demand and technology shocks of the commercial transition shifted the economic centers of gravity to coastal trading hubs and the source areas of valuable minerals and cash crops. While some of these locations had thrived before, a number of new focal points emerged. Soil suitability for cash crops and newly discovered mineral deposits constituted favorable locational fundamentals that were activated by demand and technology shocks. Spatially varying resource endowments, factor requirements, and production modes of the legitimate trading resources led to the resource regimes described in the foregoing chapter. Local resources and the corresponding fiscal, administrative, and regulatory institutions shaped the spatial distribution of economic and political opportunities. Local coalitions formed or rearranged to effectively exploit what (Bates 1983, p. 152) has called the "benefits [of] modernization." In the subsequent paragraphs, I elaborate the specific implications of colonial resource regimes for post-colonial economic and political inequalities, ethnic identity salience, and armed conflict.

6.1 SPATIAL INEQUALITY

From the outset, colonial economic activity concentrated in a small number of coastal trading hubs and important source areas of mineral and agricultural export commodities. Where these enclaves had already developed during the the 19th century commercial transition, incoming governments were happy to channel their limited fiscal resources to areas that promised the highest return in terms of easily taxable export flows. In other places, cash crop or mining enclaves were created from scratch to open up new sources of revenue. The construction of physical infrastructure such as railways, roads, power plants, and in rare cases, irrigation schemes enabled new mining and cash crop areas to serve coastal export markets that had previously been out of reach. The groundnut and cotton booms in Northern Nigeria and Uganda were direct and in part intended consequences of railway construction (Hogendorn 1978, 1975).

The demand and technology shocks of the 19th century and the colonial focus on a handful of high-value resources restricted the benefits of long-

distance trading to areas with high geographic potential for cash cropping or mineral extraction. These were few and far between and did not just reflect unchanging, generally favorable locational fundamentals. The sought-after crops and minerals differed from the native or imported cereal grains and salt mines that had fueled the precolonial rise of Kush, Aksum, Kuba, and Ndongo. Colonial governments, throughout their reign, remained far from opening up all potentially viable source areas of export production. With limited local knowledge, severely constrained budgets, and no encompassing interest in their mostly non-settler subjects, imperialists concentrated on regions that produced satisfactory results after modest start-up investments. Minimal effort was made to economically integrate the colonies or to more broadly bolster productivity. Previously important internal hubs, such as the Sahelian entrepôts of the Trans-Saharan trade were gradually undermined (Raynaut 2002; Goerg 1980; Coquery-Vidrovitch 1976). The lion's share of colonial traffic was directed from mineral and cash crop areas to the coastal gates (Crowder 1968).

As a result, the economic landscape resembled a "pattern of many productive 'islands' set in vast seas of emptiness" (Hance, Kotschar and Peterec 1961, p. 495). Voluntary and enforced labor migration to economic enclaves led to the growth of cities and towns. Economic specialization and rising incomes in cash crop or mineral production brought about urban markets for food and other consumption goods. Complementary economic activities by commercial food crop producers, merchants, trading houses and moneylenders concentrated around the main economic enclaves. White settler demands in mining areas and rising black incomes in cash crop regions increased local demand for public goods such as schools and hospitals. In short, a new, specifically colonial and commodity-driven spatial equilibrium emerged. Whether cash crop or mineral enclaves had better prospects for long-term development is difficult to assess. Infrastructure investments and administrative capacity were arguably higher in mining zones but cash crop areas saw more opportunities for African accumulation.

Spatial agglomeration and differential development are common features of structural shifts in economic growth (Krugman 1991a,b). As such, some level of spatial inequality can be seen as natural and positive corollary of long-term development. However, the institutional setup of the colonial fiscal, administrative, and regulatory state resulted in more severe inequalities at, in all likelihood, lower absolute levels than the typical growth process in resource-rich and not yet industrialized economies (Acemoglu and Robinson 2010). Politicized colonial intervention in factor and output markets inhibited the development of

the internal economic linkages, capital markets, and downstream processing and marketing activities that allowed, for example, Chinese cash crop areas to rapidly industrialize after the economic reforms of the 1980s (Marden 2015).

Why has the African colonial equilibrium persisted beyond independence? First, the continued economic and fiscal importance of the very same export resources may have prevented spatial shifts in economic activity. Second, increasing returns on initial investments may have led to true path dependence. Similarly, the coordinating function of previous activities in the case of multiple, potentially viable equilibria may have contributed its part. Last but not least, institutional persistence and incumbents' incentives to maintain the prevailing economic regime may have prevented significant change. Chapter 7 of this dissertation uses fine-grained spatial data on the source areas of colonial exports to map out the spatial equilibrium and test for its persistence. I will show that resource endowments indeed caused investments in physical infrastructure. These investments then led to extreme spatial inequalities in economic activity that have endured until the present day. Persistence cannot be explained by serial correlation alone. True path dependence is the quantitatively more important mechanism.

6.2 ACCESS TO POLITICAL POWER

From the 1920s and 30s onward, rising political consciousness and African resistance achieved initially modest but increasingly forceful gains. Rural and urban protest against restrictive economic policies and labor repression as well as calls for political representation began to spread through African empires. Especially post-World War II, these activities intensified. The reluctant Africanization of lower ranks of the colonial service and first representative bodies were just the prelude to the tidal wave of decolonization that swept the African continent in the late 1950s. Suddenly and without much preparation, Africans came to control newly independent states. Who were the Africans in charge? From which regions and backgrounds did the new elite of post-independence presidents, ministers, and high-ranking officials emerge? Put differently, how was political power distributed across regions and ethnic groups?

One key purpose of the colonial setup was to restrict African resistance and political mobilization. Indirect rule under supposedly traditional institutions was intended to suppress any unified nationalist sentiment. Limits on African accumulation, permanent settlement in mining towns, and political association

served to prevent the rise of modern class-based or anti-colonial movements. Once again, Africans managed to first gradually and later explosively subvert these schemes. The spatial variation in colonial institutions and economic activity provided early opportunities for elite formation and political mobilization in some places but not in others. These early differences were to shape access to political power for a long time.

In explaining differential access to central state power among regions and social groups, it is useful to distinguish between supply- and demand-side considerations. On the supply side, the availability of competent elites and the capacity for collective political mobilization are the key factors determining a group's political potential. Elites have the necessary political skills, formal education, and financial resources that make them attractive candidates for political office (Ricart-Huguet 2018.; Arriola 2013*a*). Ambition for state power is likely to be realized where elites command a loyal followership that can be mobilized to threaten, bargain and, if necessary, fight its way to representation (Roessler and Ohls 2018).

On the demand side, incumbent gatekeepers decide whom to promote to the highest ranks of state power. As we have seen, central state power is immensely valuable in terms of controlling revenues and regulated markets in land, capital, and output. Incumbent rulers are generally hesitant to share the spoils of political power. They deviate from this pattern in two main ways. First, powersharing will become a necessity if continued monopoly rule in the face of powerful outside challengers threatens political survival. Second, self-interested incumbents will upgrade potential coalition partners who credibly promise to enlarge the pie.

Both supply and demand factors privileged colonial cash crop areas over their mineral or resource-poor counterparts. The opportunities for profit and accumulation led to the early rise of an African commercial elite (Arriola 2013*b*). The locally indirect and communal forms of rule gave local chiefs and commercial patrons the leeway to assemble loyal and effective coalitions. Rising incomes enabled families and patrons to invest in the formal education of their children and clients (Berry 1993). Colonial supply of education tended to follow initial investments in physical infrastructure. Even where education was outsourced to Christian missions, the cross followed the flag and the crops (Jedwab, zu Selhausen and Moradi 2018).

The first universities clustered in mining cities and trading hubs. However, mining wages were low and many African students came from the prosperous cash crop zones. European buying cartels, restrictions on land, crops and labor,

as well as misguided campaigns for agricultural intensification spurred early political mobilization in cash crop areas. The Ghanaian cocoa holdups, the Kenyan Young Kikuyu Association, the Ivorian Syndicat Agricole Africain, and the Tanzanian cooperative movement were early arenas of African collective action and anti-colonial resistance (Bates 1987; Tignor 2015; Eckert 2007; Widner 1993). In short, cash crop areas had a head start in terms of both elite formation and mobilizational capacity.

On the demand side, incumbent rulers could hardly ignore cash crop elites. Attempts to keep them out or to actively undermine their local power tended to backfire. The fate of the first Ghanaian president Kwame Nkrumah who was deposed in a coup in 1966 amply illustrates this pattern (Boone 1995). Julius Nyerere's Tanzanian government was more successful in bringing cash crop areas under tight state control. A harsh regime of forced cultivation and villagization produced disastrous economic results (Coulson 1981; Havnevik 1993). Even Nyerere's cabinets contained a number of late colonial cash crop elites (Mtei 2009).

In most other cases, post-independence governments co-opted cash crop elites and used their local authority to mutual advantage. Continued export production was crucial to stabilize revenue flows. As land rights and production modes were rarely under direct government control, local intermediaries were needed to ensure efficient production and acquiescence to heavy taxation through tariffs and marketing boards (Bates 1981; Kasara 2007; Boone 2003). These economic and institutional features made incumbents more likely to pay heed to cash crop elites' political aspirations. When distributional conflicts between gatekeeper and cash crop coalitions occurred, the bargaining space for peaceful agreement was large.

The supply side factor of early elite formation tends to persist over time. Incumbent elites invest in their reproduction and nurture successors with similar regional or ethnic credentials (Ricart-Huguet 2018.). They may well sever the link to their cash cropping roots and fully focus on capital-city careers. Mobilizational potential, in contrast, may wax and wane with the economic value of local resource production. Sufficient patronage resources are needed to effectively mobilize local clients. On the demand side, cash cropping coalition partners become easier to ignore if their mobilizational capacity and revenue generating potential are low. In Chapter 8 of this dissertation, I show that ethnic regions endowed with colonial cash crops are more likely to be represented in African governments throughout the post-independence era. This effect is, however, neither static nor deterministic. Exogenous changes in global cash

crop prices predict temporal variation in cash crop elites' representation in ministerial cabinets. No such effects are found for mineral or food producing homelands.

6.3 ETHNIC IDENTITY SALIENCE

Much has been written about how European colonizers invented or politicized African ethnicities. Theoretical approaches abound and a multitude of historical case studies presents evidence for different causal processes. Mamdani (1996) argues that the legal codification of indirectly ruled tribal homelands created ethnic groups or at least rigidified previously fluid identities. Posner (2004*b*, 2005) shows how district and national borders as well as electoral institutions explain which underlying tribal or linguistic identities are activated as political winning coalitions.

Missionary education and language standardization contributed to the creation of new or more salient imagined communities (Hobsbawm and Ranger 2012; Vail 1989; Posner 2003). Social and regional inequalities spurred emotion-laden inter-group comparisons and intense competition over inherently scarce economic and political opportunities (Horowitz 1985; Bates 1983). These institutional, constructivist, sociopsychological, and materialist approaches are useful to understand the general importance of ethnicity in post-colonial African politics. However, they rarely spell out predictions about spatial variation in identity salience at the subnational level. Here again, differences in colonial resource regimes had long-term effects.

According to Bates (1983, p. 152), ethnic groups act as "coalitions which have been formed as part of rational efforts to secure benefits created by the forces of modernization." Where these benefits take the form of excludable pork or club goods, incentives for ethnic mobilization and boundary-making are particularly strong (Fearon 1999; Wimmer 2013). The individual payoffs for ethnic insiders are maximized when outsiders remain effectively excluded.

In short, ethnic identities can be constructed as effective barriers to entry that prevent outsiders from fully enjoying the benefits of in-group collective action (Chandra 2004; Caselli and Coleman 2013). As outlined above, colonial benefits of modernization clustered in resource-rich areas, trading hubs, and national capitals. Spatially varying institutions and production modes provided greater potential for ethnic mobilization in cash crop regions than in mining towns, capitals, or rural hinterlands. Motivations and opportunities explain why this was the case.

In colonial cash crop zones, economic and political advancement required control over land, capital, output, and loyal clients. As most of these areas were under some form of indirect rule, descent-based social networks played powerful roles. Sara Berry (1993)'s detailed case studies illustrate how colonial institutions created incentives for small-scale producers and local elites to continuously invest in these extended kinship coalitions. Similar forms of rule and social organization prevailed in non-cash crop farming regions (Berry 1993).

However, two closely related processes explain stronger incentives for ethnic mobilization in cash crop areas. First, the material stakes were higher in cash crop producing than in other agricultural areas. Second, in-migration heightened competition for only initially abundant land and led to greater local diversity. Under these conditions, the locally incumbent sons of the soil had a clear motive to reinforce ethnic boundaries as soon as their needs for migrant labor had been satisfied (Boone 2014). In the more directly ruled cash crop zones of colonial settler agriculture, indigenous groups faced similar incentives. The stakes to succeed white settlers were high. Where non-local groups were backed by land-owning governments, the sons of the soil lost out. They tended to form identity-based coalitions to fight internal colonization by government-sponsored ethnic strangers (Weiner 2015; Fearon and Laitin 2011; Boone 2017). The Kenyan Kalenjin identity has its roots in anti-Kikuyu land rights mobilization (Boone 2014).

On the opportunity side, early elite formation and collective action experience were crucial. Competent elites and their information and patronage networks allowed for more effective sanctions against out-group competitors and in-group defectors (Fearon and Laitin 1996; Habyarimana et al. 2007). Formal education, especially in mission schools, provided a more constructivist opportunity for identity activation (Weber 1976; Anderson 1981). Missionaries translated bibles into local vernaculars. They actively standardized indigenous languages to more efficiently spread the Christian gospel (Posner 2003). They were, in short, part-time linguists and ethnographers. Instruction was in local language. Some of the most talented African students emerged as influential constructors of ethnic identities. Mission boys such as Samuel Johnson (1921) and Jomo Kenyatta (1938) wrote political ethnographies of the Nigerian Yoruba and Kenyan Kikuyu. Both were, in a word, early ethnic nationalists.

Mining cities, trade hubs and national capitals were home to the same or even more valuable goods of modernity. The more direct form of rule, however, implied less opportunities for community-based organization. Nonetheless, colonizers tried to keep in-migrants legally tied to their tribal homelands (Cooper

1996). As a consequence, identity-based competition for jobs, tribal improvement organizations, and ethnic institutions were common in mining cities. In the Northern Rhodesian Copperbelt, the government actively promoted tribal institutions (Posner 2005, ch. 2).

Such attempts at blocking urban detribalization reveal that countervailing forces were present. The need to suppress labor mobilization suggests strong incentives for class-based action. Life in mining towns implied inter-ethnic contact and — relative to cash crop areas — more cross-cutting cleavages. Diverse migrants outnumbered local sons of the soil. The lands and mines were under government or company but never under communal control. Effective collective action against oppressive labor regimes required inter-ethnic cooperation. The 1930s and 1940s saw cross-ethnic labor movements and a series of strikes in mining regions – the 1935 Copperbelt Strike just one of them (Cooper 1996).

The unique resource endowments and institutional regimes in cash crop areas provided the – relatively speaking – strongest incentives for ethnic mobilization and boundary enforcement. Despite all assimilationist talk of a civilizing mission, European commerce and Christianity did not result in new masses of British liberals and French republicans. Instead, European colonialism turned peasants into tribesmen. Chapter 9 uses geocoded survey data to show that respondents in colonial cash crop areas are particularly likely to identify in ethnic terms despite, or perhaps because of, higher levels of urbanization, education and ethnic diversity. Analyzing data on inter-ethnic marriages as a more behavioral measure of identity salience yields similar results.

6.4 ARMED CONFLICT

The colonial legacies of unequally distributed economic opportunities, political representation, and ethnic identity salience have direct implications for where and when to expect armed conflict. Economic and political inequalities between ethnic regions "set in motion a comparative process of group worth" (Horowitz 1985). Emotionally charged and more often than not European-spread stereotypes of progress vs. backwardness or modern affectation vs. martial authenticity came to taint inter-group relations. Groups with little access to economic opportunities or political power were particularly likely to develop grievances against the incumbent order. Under the colonial setup, economic and political advancement was tightly linked to the central state.

Soon after independence, incumbents began to use the inherited institutional framework for ethnic and regional favoritism (Franck and Rainer 2012; Burgess

et al. 2015; Hodler and Raschky 2014*a*; Kramon and Posner 2016). Economically or politically disadvantaged groups could thus plausibly heap blame on incumbent ruling coalitions (Cederman, Gleditsch and Buhaug 2013). The notion that it was their "turn to eat" served as basis for group mobilization (Branch, Cheeseman and Gardner 2010). Cederman, Gleditsch and Buhaug (2013) show how horizontal inequalities and the associated grievances spur collective action despite disadvantaged groups' limited opportunity structures or lack of previous mobilization. Colonial resource regimes provide a unique opportunity to endogenize the horizontal inequalities at the heart of their theory.

The economic advantages of cash crop and mineral regions reduce their motivations to forcefully change the prevailing order. The greater political representation of cash crop groups has similar effects. Where cash crop groups are politically excluded, peaceful interaction modes are likely to prevail. Incumbents need reliable local intermediaries to effectively develop, tax, and control cash crop areas (Kasara 2007; Baldwin 2015; Roessler 2016). Overt repression and excessive taxation risk to kill the golden goose (McMillan 2001).

The resulting formal and informal bargains may or may not include governmental powersharing. This bargaining mechanism does not travel to mining zones. Governments need less local cooperation to exploit mineral resources. Point resource revenues are easier to capture and repression of local resistance rarely threatens continued production (Christensen 2018; Le Billon 2001). Governments that aggressively distribute away from source areas or repress local populations risk violent backlash. Hunziker and Cederman (2017) show that petroleum extraction in the home areas of politically marginalized ethnic minorities causes secessionist wars.

None of this implies that cash crop areas remain stable islands of peace and prosperity. Local ethnic cleavages and competition for land hold sufficient potential for distributional conflict (Boone 2014). Such conflicts tend to remain more localized and rarely escalate into full-blown ethnic rebellion for secession or central state capture (*ibid.*). Where valuable agricultural land becomes scarce and populations increasingly dense and diverse, sons of the soil are pitted against ethnic strangers (Green 2012; Côté and Mitchell 2017; Boone 2017). If droughts, crop diseases or falling prices reduce the available surplus, local ethnic violence becomes a real possibility. Under these circumstances, economic shocks do not merely imply falling incomes and reduced opportunity cost of rebellion. Instead, they spur genuinely political and thoroughly ethnicized distributional contests. Inter-group comparisons and inequalities matter. At local levels too.

In Chapter 10, I use ethnic group-level and more fine-grained conflict event data to test these predictions.

Part II

TESTING THE ARGUMENT

7

THE EMPTY PANORAMA: COLONIAL ORIGINS OF SPATIAL INEQUALITY

> *All routes which used to lead westward should now be directed to the south, this line will link the rather infertile but densely populated lands of the Upper Volta with those of the lower Ivory Coast which are very fertile, but are underpopulated. In the north there are the hands, in the south the riches. Can take another million men. Only the railway can bring them.*
>
> Raphaël Antonetti, Colonial Governor of Côte d'Ivoire (1918–1924).
> Quoted in Crowder (1968)

At the heart of the development crisis across many states in Africa is the problem of spatial inequality (African Development Bank 2015).[1] The unequal distribution of public infrastructure and services, state capacity, and economic opportunities within African countries is a significant barrier to market integration, economic growth, and social cohesion. Spatial inequality – especially where it overlaps with ethnic identity cleavages – is associated with poor public goods provision and violent conflict (Alesina, Michalopoulos and Papaioannou 2016; Cederman, Weidmann and Gleditsch 2011). What accounts for spatial inequality in Africa? This chapter sets out to answer this question.

I build on a growing empirical literature that investigates the causes of geographic economic equilibria. With respect to the African context, three broad strands can be distinguished. One emphasizes the enduring effects of locational fundamentals that shape human settlement patterns, state formation, and development. Important first-nature factors such as geography, environmental conditions and disease have been shown to predict variation in population densities, economic production, trade, and state capacity (Sachs, Mellinger and Gallup 2001; Herbst 2000; Alesina, Michalopoulos and Papaioannou 2016; Fenske 2014; Alsan 2015; Henderson et al. 2017). A second literature stresses the importance of human history and examines the effects of historical political

1 This chapter is based on joint work with Philip Roessler (College of William & Mary), Nicolas van de Walle (Cornell), Kyle Sorlie Titlow (University of Arizona), and Rob Marty (World Bank). Phil, Nic, and I initiated the project, Kyle and Rob contributed to data collection and organization, Phil wrote the theory section of several previous working paper versions, and I designed and implemented all empirical analyses.

centralization, global economic changes, war and conquest (Gennaioli and Rainer 2007; Michalopoulos and Papaioannou 2013; Nunn and Wantchekon 2011; Nunn 2008; Huillery 2009; Jedwab and Moradi 2016). A third strand focuses on contemporary institutions and governmental spending patterns to explain the unequal subnational allocation of public goods and economic potential (Kasara 2007; Franck and Rainer 2012; Hodler and Raschky 2014*b*; Burgess et al. 2015).

In this chapter, I advance this research program in several important ways. First, I build a comprehensive geospatial dataset of the economic organization of the late colonial state. These data allow me to map out colonial resource extraction and separate its long-term effects from underlying geographic conditions. While there is general consensus that European colonialism brought about extractive national institutions (Young 1994; Acemoglu and Robinson 2010; Lange, Olmstead and Rhode 2009), there is more debate on colonialism's effects on what Boone (2003) calls the political topography of the African state, i.e. spatial variation of state structures and capabilities. Jeffrey Herbst (2000) has famously argued that there is a striking continuity in spatial patterns of state power since the precolonial period. Recent studies leveraging new geospatial methods come to a similar conclusion, attributing the persistence of long-run patterns of political and economic development to underlying geography (Alesina, Michalopoulos and Papaioannou 2016) or pre-colonial institutions (Michalopoulos and Papaioannou 2013). In striking contrast, a growing literature on the long-term effects of historic investments points to exogenous effects of colonial rule (Huillery 2009; Cagé and Rueda 2016; Jedwab and Moradi 2016; Jedwab, Kerby and Moradi 2017). These studies suggest that colonialism has shifted spatial patterns of development in important ways. Jedwab and Moradi (2016) and Jedwab, Kerby and Moradi (2017) show for Ghana, Kenya, and the whole continent that colonial railroads transformed the distribution of urban centers in Africa. What misses from this new set of studies, however, is a general account of the political geography of colonialism. Why did the colonial state invest in some places but not in others? I fill this important gap in the literature. In doing so, I isolate the effects of colonial resource regimes on long-term inequality from mere geographic or precolonial factors.

In the theory chapter above, I have argued how fiscally constrained and extractively minded colonial governments channeled limited investment to the source areas of cash crop and mineral production. Investments in railways, roads, power generation plants, and other public goods were higher in resource-

rich regions. Many of these areas were previously undeveloped due to lacking accessibility for long-distance trade and heavy disease burdens. Resource production and the associated colonial investments led to economic growth, increasing population densities, and over the long haul, rising living standards. Increasing returns from initial investments and their coordinating function in attracting follow-up investments and economic activity produced strong path-dependent effects (Krugman 1991a,b). The initial advantage from the colonial age set these zones on track for relatively higher levels of development throughout the post-independence period. The result are persistent or even growing spatial inequalities between colonial cash crop and mining regions on the one hand and resource-poor areas on the other. Throughout the colonial age, governments tended to narrowly specialize in a limited number of commodities and potentially viable production regions. Colonial cash crop production occurred in less than 13 percent of grid cells with above-median cash crop suitability. Many potentially productive areas were left fallow. Beyond the cash crop and mineral enclaves, areas were either neglected or designated as labor reserves. In both cases, public service provision was minimal (van de Walle 2009). Even worse, labor reserves were intentionally underdeveloped to serve the mining enclaves and settler plantations (Berg 1965; Cordell and Gregory 1982). Previously flourishing centers of regional and Trans-Saharan trade that happened to be unsuitable for cash crop or mineral production declined (Newbury 1966; Moseley 1992).The consequence was a legacy of stark inequality. Beyond the capital city, "an empty panorama" emerged and was punctuated only by the few economic enclaves on which the fiscal health of the colony depended (Fanon 1963). As Crowder (1968) notes:

> "The railways and later the tarmac roads, tell the tale most clearly: simple feeders linking areas that produced the crops and minerals Europe needed with the ports on the coast. There was little attempt to develop communications in such a way that the internal as distinct from the export economy of the colonies would be stimulated... Development took place only in those areas that were of interest to the Metropolitcan economies, with the result that vast areas of West Africa remained untouched by the colonial regime until the beginning of economic planning in the 1940s."

The rest of this chapter proceeds as follows. First, I describe the colonial commodity data I use throughout this dissertation. Second, I outline my empirical strategy and present results on the effect of colonial resource extraction on local infrastructure at independence and long-run spatial inequality. To address

endogeneity concerns, I either include or match on a rich set of geographic and historical control variables. In addition, I employ a spatial instrumental variable approach that uses agro-climatic cash crop potential as plausibly exogenous predictor of actual production. Two additional sets of analyses explore the causal mechanisms that account for long-term persistence and investigate the implications for country-level spatial inequality.

7.1 DATA

I test the long-run effects of the cash crop revolution and colonialism on subnational variation in development in Africa using a granular geospatial dataset on primary commodity production from the late colonial period. The dataset includes detailed information on the geographic source location of more than 95 percent of exports in 1957 across 34 states in sub-Saharan Africa, as drawn from the map produced by (Hance, Kotschar and Peterec 1961). The dataset covers nine groups of cash crops, 19 minerals and metals, petroleum, as well as forest, animal and manufactured products. It identifies 9'517 unique geocoded production points. Each primary commodity production point represents a value of $289,270, standardized in 1957 U.S. dollars. Figure 7.1 plots the data.

Unfortunately, the Hance, Kotschar and Peterec (1961) map does not include detailed source material to justify the placement of production points. As with most historical maps, this raises questions about random or systematic measurement error. If measurement error is random, any estimated effects will be attenuated towards zero. If William Hance and his team systematically drew points closer to cities, railroads, and other more developed places, there is potential for upwardly biased coefficient estimates. To alleviate this concern, Philip Roessler and I collected additional subnational data on colonial export production. More specifically, we used colonial statistics, administrative maps, and secondary sources to assemble a district-level dataset covering the most important export commodities of 28 African colonies, Ethiopia, and Liberia. It includes all mineral or crop resources that contributed at least ten percent to the country's overall export value.[2] We standardize production values in 1960 US$ using the UN International Trade Statistics Yearbook.

As a validation exercise, I aggregate the data in Hance, Kotschar and Peterec (1961) to the administrative units for which we have collected our own data and check correlations. Figure 7.2 plots the results. The first row correlates the district totals of export production in each dataset. The second row only looks

2 See Appendix for dataset documentation and primary sources used.

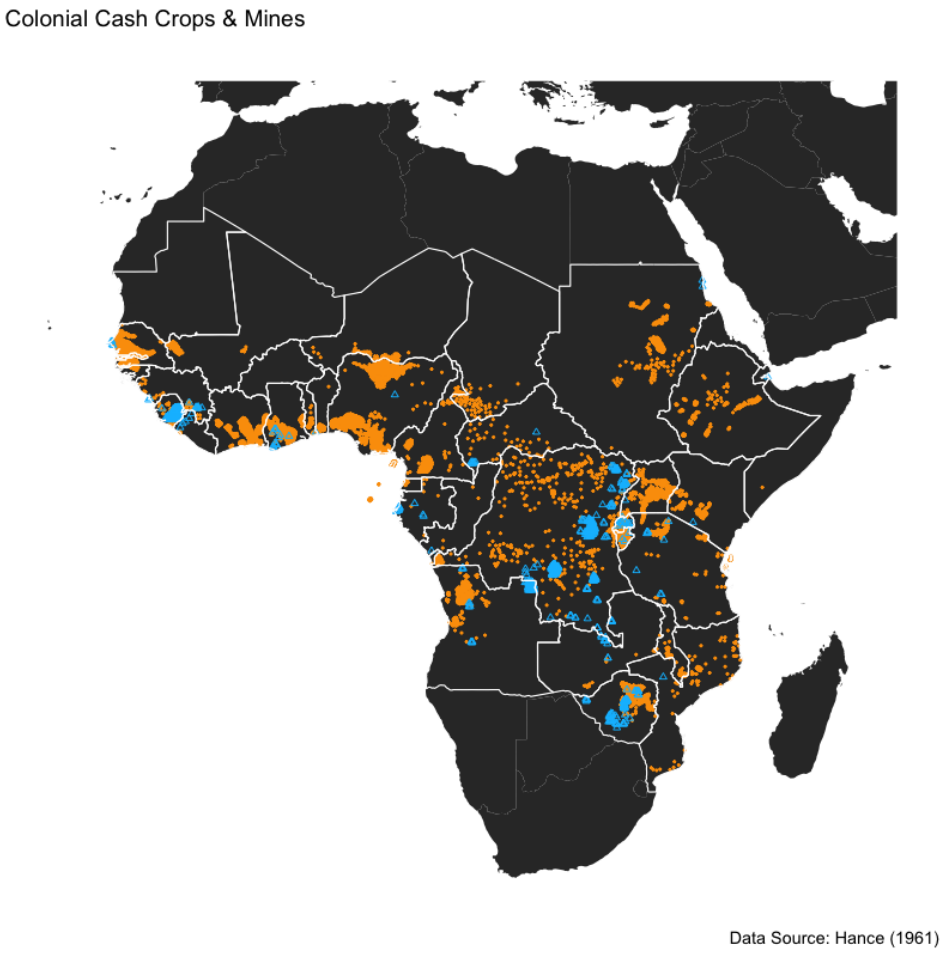

Figure 7.1: Production Locations of Colonial Cash Crop and Mineral Exports (Source: Hance, Kotschar and Peterec (1961))

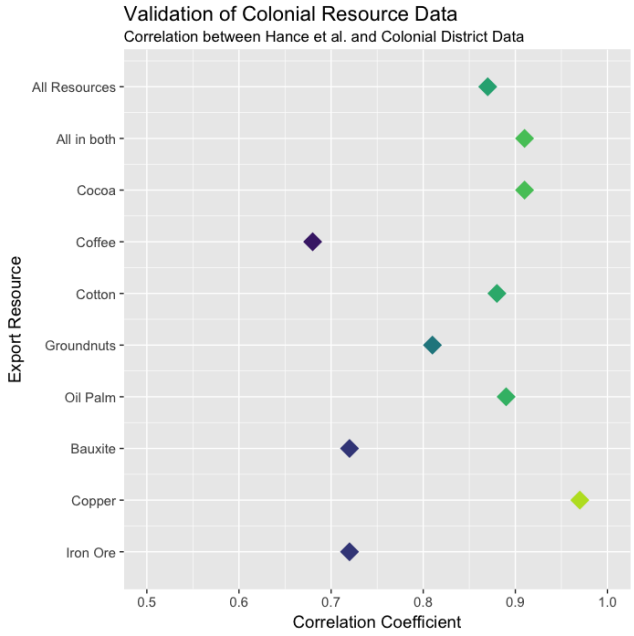

Figure 7.2: Validating Colonial Resource Data

at those resources that are represented in both datasets. The other rows plot correlations for the most important individual resources that are contained in both sources. The correlations between the district totals amount to about 0.9, whereas the other coefficients range from 0.68 to 0.97. These results increase my confidence in the accuracy and precision of the spatially more fine-grained Hance, Kotschar and Peterec (1961) data. I aggregate the Hance points to a spatial grid with 25 × 25 km resolution. The grid uses a Lambert conformal conic projection. For each grid cell, I code dummies indicating whether or not that cell saw colonial cash crop or mineral production.

To test the agglomeration and path dependent effects of colonial extraction, I focus on two sets of outcomes. The first covers the near-term infrastructural investments that colonial governments made after conquest to extract primary commodities and bring them to market. Infrastructure outcomes include paved and improved roads, railways, and power generation stations. The data is digitized from historical maps or taken from replication data provided by Michelin (1965, 1967, 1969), Jedwab and Moradi (2016), and the Economic Commission for Africa (1972). I expect these infrastructures to cluster around areas of natural resource extraction. Longer-term outcomes used in this chapter include contemporary road density (Jedwab and Moradi 2016), the newest generation of satellite-derived luminosity data (Román et al. 2018), and an asset-based proxy of household wealth taken from all geocoded survey rounds of the Demographic and Health Surveys (DHS, USAID (2012)). I code binary indicators of transportation and electricity infrastructure and calculate the mean wealth of all households located in a grid cell. The household wealth score is standardized to mean 0 and standard deviation 1. Figures 7.3 and 7.4 plot all four infrastructure-related outcome variables.

7.2 RESEARCH DESIGN

My baseline models take the following form:

$$Y_{ic} = \alpha_c + \beta \, \text{Resource Dummy}_{ic} + \gamma \, X_{ic} + \epsilon_{ic}$$

Y_{ic} is the outcome Y for cell i nested in former colony c. The coefficient of interest is β identifying the effect of colonial cash crop or mineral production. The fixed effects α_c control for all unobserved geographic and historical confounds at the level of colonies and enable an intuitive interpretation of coefficients as

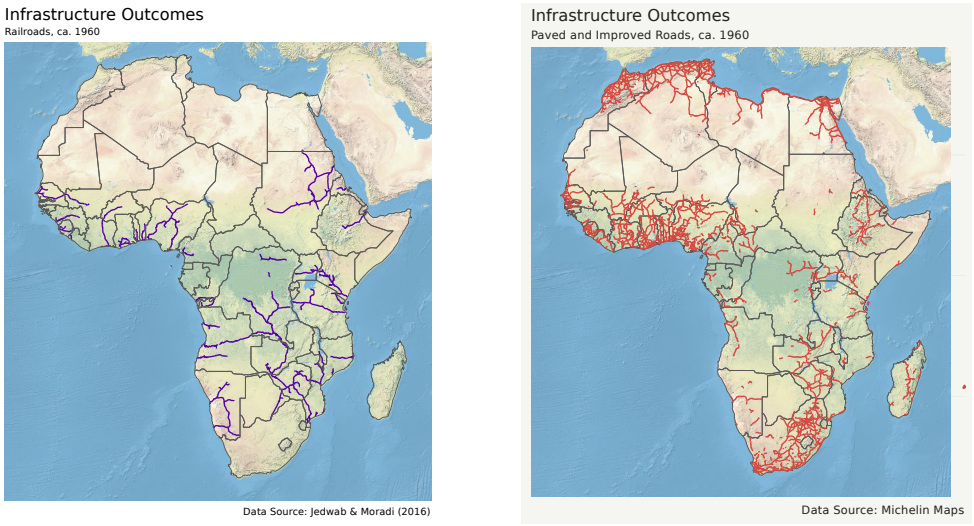

Figure 7.3: Infrastructure Outcomes: Railways & Roads

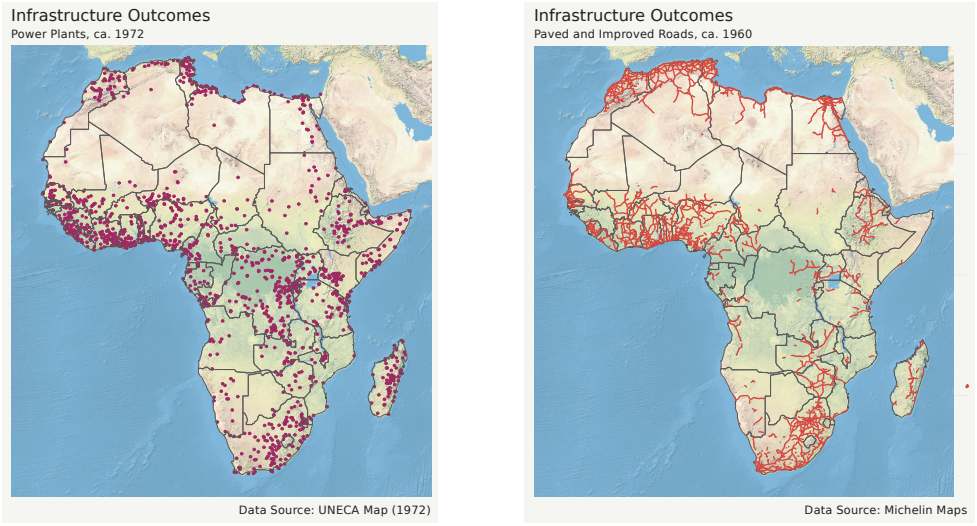

Figure 7.4: Infrastructure Outcomes: Power Plants (1972) & Roads (1998)

measures of spatial inequality (i.e. cell-level deviation from the country/colony mean). X_{ic} contains a set of pre-treatment control variables and ϵ_{ic} is the error term. All models are estimated via OLS. Most outcome variables are also binary and coefficients can therefore be interpreted as the extensive margin effect on the linear probability of having, for example, a power plant in a given cell.[3] Uncertainty estimates are based on Conley standard errors with a distance cutoff at 400 km (Conley 1999). The errors thus allow for smoothly decaying spatial correlation within the radius of a circle that roughly corresponds to the mean country size in my sample.

To reduce omitted variable bias at the subnational level, X_{ic} includes a set of geographic and historical control variables that may plausibly correlate with both resource extraction and subnational development outcomes. To capture the importance of locational fundamentals, I add a general agricultural suitability score (Ramankutty et al. 2002), a measure of terrain ruggedness (Shaver, Carter and Shawa 2016), mean elevation and slope (FAO/IIASA 2011), a malaria stability index from Kiszewski et al. (2004), and predicted TseTse fly suitability from the FAO Animal Health and Production Division. Furthermore, I control for each cell's centroid distance to the closest sea cost and navigable rivers. I also control for a number of potential historical confounds. These include distances to the colonial capital city, other cities with more than 1'000 inhabitants in 1900 (Jedwab and Moradi 2016), as well as precolonial trade and explorer routes (Ajayi and Crowder 1985). I match cell centroids to the ethnic group areas in Murdock's (1967) map to assign measures of exposure to the slave trades (Nunn and Wantchekon 2011), precolonial political centralization (Michalopoulos and Papaioannou 2013), and historical reliance on agriculture (Murdock 1967; Nunn 2008).

As an alternative strategy to account for observable confounds, I use nearest-neighbor propensity score matching to non-parametrically select two (four) plausible counterfactual cells for each cash crop (mineral) cell in my data. I match on all control variables discussed above and a cash crop-specific suitability score from the FAO GAEZ database. I then rerun my baseline models on the resulting datasets that only contain treated and counterfactual cells that are comparable in terms of geographic and precolonial baseline covariates. Figure A.1 illustrates covariate balance before and after the propensity match. Cash crop and mineral production were far from randomly distributed across African regions but the matching procedure successfully chooses subsets of grid cells

3 I prefer the linear probability model over more traditional binary choice models due to its intuitive interpretation of coefficients as marginal effects as well as its versatility in terms of accommodating fixed effects, instrumental variables, and spatial parameters.

that are comparable to treated units along an extensive set of pre-treatment geographic and historical variables.

Both of these strategies may still yield biased estimates if *unobserved* confounds varying within countries make an area more likely to produce cash crops and simultaneously lead to more infrastructure investment and economic activity. Colonial infrastructure causing cash crop production rather than vice versa also leads to bias. I address these threats to causal inference by estimating 2SLS-IV models instrumenting observed cash crop production with the mean agro-climatic suitability score across the eight most important African cash crops (cocoa, coffee, cotton, groundnuts, oil palm, tea, sugarcane, and tobacco). Cash crop suitability is a valid instrument if it predicts actual production and at the same time does not influence infrastructure and subnational development through any other casual pathway. Cash crop suitability clusters in agriculturally productive areas and, especially in the case of forest-zone tree crops, relatively close to the coast. However, all models control for general agricultural suitability, historical agriculture, and distance to coast. Conditional on these covariates, the exclusion restriction seems defensible. The general agricultural suitability variable combines information on precipitation, temperatures, sunshine hours, soil carbon density and soil pH values (Ramankutty et al. 2002). As such, cash crop suitability measures the ecological niche for specific crops conditional on generally favorable agro-climatic conditions.

Nonetheless, spatial clustering in both my instrument and development outcomes poses an additional threat to the exclusion restriction (Betz, Cook and Hollenbach 2017). While cash crop suitability may be exogenous, it is far from randomly distributed in space. Betz, Cook and Hollenbach (2017) demonstrate how spatial dependence can lead to IV estimates that are severely more biased than supposedly naive OLS regressions. This situation arises where spatial patterns are more similar between instrument and outcome variable than between outcome and the endogenous predictor. I follow Betz, Cook and Hollenbach's advise and estimate spatial 2SLS models that include a spatial lag of the dependent variable instrumented with first- and second-order spatial lags of the exogenous baseline controls. To construct the spatial lags, I rely on a nearest-neighbor matrix that codes the 50 closest cells as neighbors and weights their influence by the inverse of the logged kilometer distance. I do not row-standardize the connectivity matrix to avoid distorting the distance weights (Elhorst 2010). My choice of the spatial connectivity matrix is, of course, somewhat arbitrary. As a robustness check, I re-estimated all spatial IV

models with different neighborhood matrices. Results from these replications are presented in Appendix Figure A.2.

The upper panel of Figure 7.5 provides a visual illustration of my research design. The leftmost map overlays cash crop suitability (low values in blue, high values in green) with the cash crop points from Hance, Kotschar and Peterec (1961). Colonial cash crop production clearly clustered in suitable areas but remained far from exploiting all high-suitability areas. Nevertheless, first-stage F statistics greater than ten indicate that suitability strongly predicts production.[4] The map in the center plots cash crop and mineral points alongside colonial rails (green lines) and paved or improved roads (yellow lines). The visual correlation is obvious. I use instrumented cash crop production to check whether this correlation has a plausibly causal interpretation. Finally, the map on the right adds contemporary luminosity at night. Again, a strong visual association emerges and suggests long-term persistence.

7.3 BASELINE RESULTS

The lower panel of Figure 7.5 summarizes my main results. The coefficients show a positive and significant association between colonial resource extraction and subnational infrastructure and development outcomes across all 30 models. The associated regression tables are presented in Appendix Tables A.2–A.7. My baseline models indicate that colonial cash crop cells had a 19 percentage points higher chance of having a quality road in 1960, a 13 percentage points higher probability of being crossed by a railway, and a five percentage points greater likelihood of hosting a power generation plant in 1972 than non-cash-crop cells. These advantages persist until today as indicated by a 15 percentage point higher probability of having a quality road in 1998, a 21 percentage points higher likelihood of emitting night lights in 2015, and about one-tenth of a standard deviation greater household wealth in cash crop areas. The results from the instrumental variable regressions are never significantly different from the baseline OLS coefficients and suggest that my estimates are unlikely to be driven by omitted variables, reverse causation or measurement error. Quite strikingly, the coefficients on the cash crop dummy are comparable in size to the effects of colonial mineral production. Only in the case of power plants and household wealth, the mineral coefficients are significantly larger, which is likely due to the more urban and industrialized contexts in former or still producing mining cells.

4 See Appendix Tables A.2–A.7.

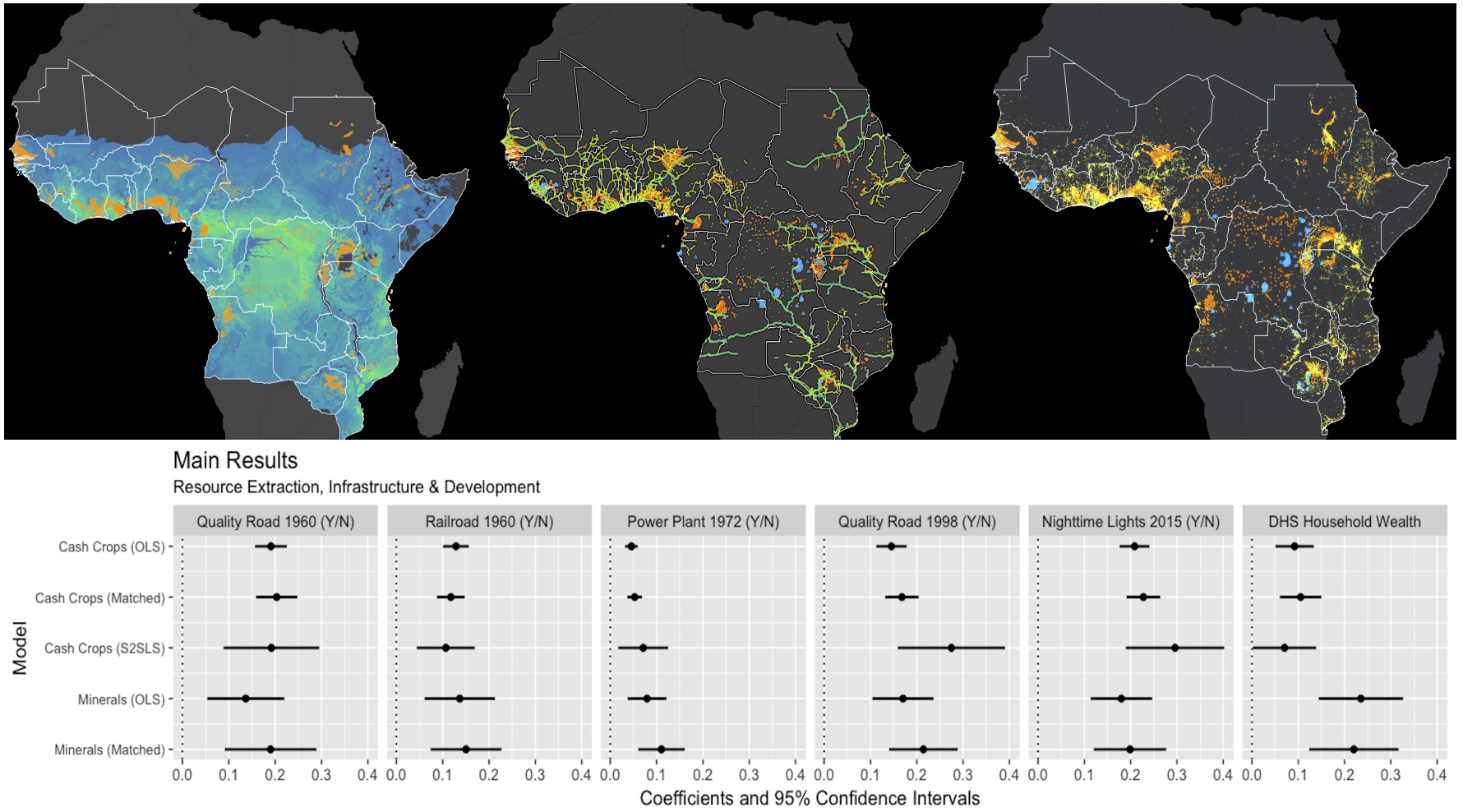

Figure 7.5: Data, Research Design & Results

One potential problem with a causal interpretation of these findings relates to the cross-sectional nature of my data. Unfortunately, I cannot pin down when cash crop or mineral production started and whether infrastructure investments followed or preceded resource extraction. While the IV strategy addresses this concern, the estimated effects may still not be representative of the entire sample. The IV estimates capture local average treatment effects of the subsample that complies with treatment assignment, i.e. cells in which suitability predicts actual production. If preexisting infrastructure makes some suitable cells more likely to take up the cash crop treatment, the complier population may consist of cells that are particularly likely to develop. In Chapter 5, I have described how cash crop production sometimes only took off after railways reached fertile hinterlands, which raises the spectre of reverse causation. In other cases, however, railways were explicitly constructed to facilitate export agriculture. The Northern line in Nigeria, Ugandan feeder lines from e.g. Busoga to the main Kisumu-Mombasa line, and the Tanzanian line to Mwanza on the cotton-rich shores of Lake Victoria are prime examples (Hogendorn 1975). The Germans went as far as to name their lines in Togo after the commodities they were intended to transport. Besides cocoa, cotton, and palm-oil ("Ölbahn") lines, there were an iron and even a coconut line (Crowder 1968). In these cases, preexisting cash crop production or correctly assessed potential clearly *caused* railway construction.

I offer two more systematic responses to valid concerns about reverse causation or an unrepresentative complier population. First, I run reduced form models that test for a direct effect of cash crop suitability on infrastructure and development outcomes. Figure 7.6 plots coefficients and confidence intervals. Effects on all outcomes remain positive and significant at the 95% or 90% confidence levels. The coefficient in the railway model suggests that a one standard deviation higher suitability for cash crops is associated with a one percentage point higher probability of having a railway. This effect is significant at the 5% level. Second, the excellent railway data provided by Jedwab and Moradi (2016) allows to distinguish rails that were built for mining or mineral purposes. In Appendix Table A.9, I present results from models that exclude mining and military lines, which are unlikely to be caused by cash crop-related considerations. The OLS, matched, and S2SLS results for cash crops persist. Mineral cells no longer have a significant effect.

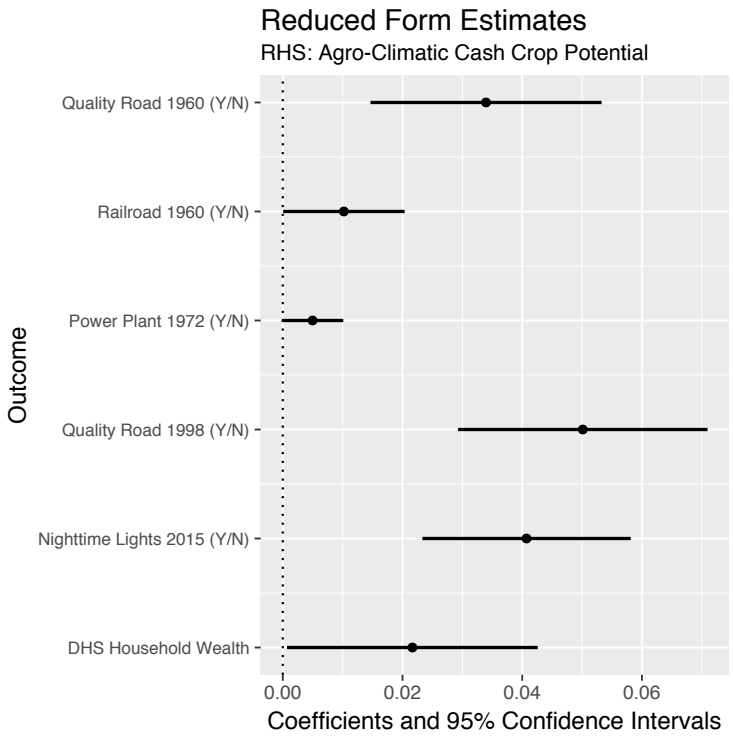

Figure 7.6: Reduced Form Estimates

7.3.1 *Causal Mediation Analysis*

These results immediately raise questions about the underlying causal mechanism. What explains the remarkable persistence of spatial inequality across the African continent? Do colonial resource enclaves continue to produce and benefit from the very same resources that led to infrastructure investment in the colonial age? Or have increasing returns and the coordinating effects of these investments led to increasing population densities, economic agglomeration, and – not necessarily resource-related – development? I perform a casual mediation analysis to investigate these alternative mechanisms. More specifically, I use a FAO estimate of crop production value in 2000 at the cell level to test the serial correlation mechanism (FAO/IIASA 2011). To investigate true path dependence, I conduct a factor analysis of 1960 rails, roads, and 1972 power plants. I take the first principal component of these three variables as proxy for the path dependency mechanism. I then estimate demediated controlled direct effects (CDE) of the cash crop dummy as described in Acharya, Blackwell and Sen (2016). The difference between the baseline coefficient and the CDE can be interpreted as the part of the total effect that is mediated by the respective causal pathway.

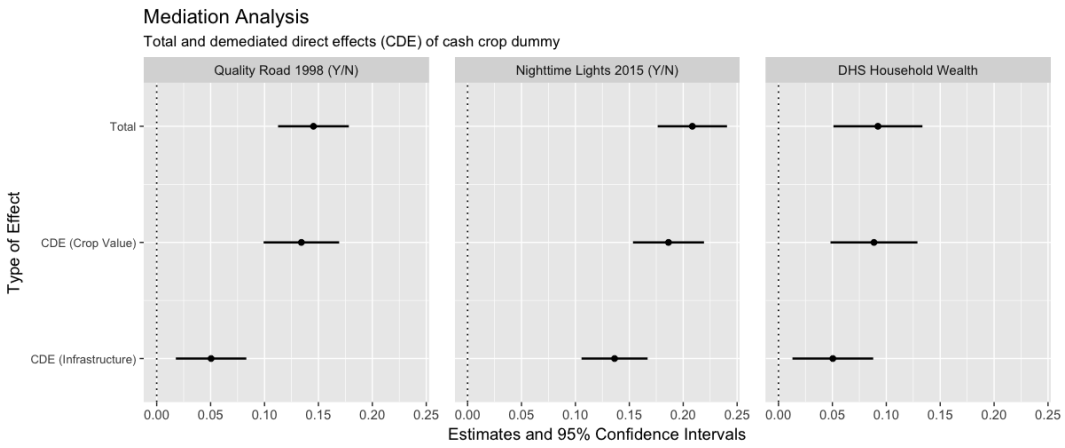

Figure 7.7: Causal Mediation Analysis

Figures 7.7 and 7.8 summarize the results. The direct cash crop effects remain much larger if I demediate present-day outcomes with respect to contemporary crop production values than with respect to the early infrastructure factor. This suggests that a larger share of the total effect is mediated by the agglomerating effects of infrastructure investments than by a mere persistence of colonial resource economies. In fact, 65% of the cash crop effect on roads, 35% of the effect on night lights, and 45% of the effect on household wealth are due to early advantages in infrastructure whereas only 4% – 11% of these effects seem to be mediated by a continued advantage in agricultural productivity. In the presence of endogenous predictor variables, mediation analyses may yield biased results. In a recent methodological working paper Dippel et al. (2017) propose a variant of mediation analysis that is able to incorporate instrumental variables. I implement their method and replicate the naive mediation analysis described above. Results are presented in Appendix Figure A.3 and are very much in line with the previous analysis.

7.3.2 *Heterogeneity Analysis*

To investigate potential scope conditions of the path dependent effects just described, I run additional models. First, I distinguish between imperial powers and rerun the baseline OLS models on British, French, Belgian, and Portuguese subsamples. The cash crop effects rarely differ significantly between French and British colonies. The only exception is a slight advantage of French-ruled cash crop cells in terms of early electricity supply. Some of the Portuguese and Belgian cash crop effects are substantively small or turn insignificant. This may have to do with more coercive strategies, unfavorable soils, or the smaller

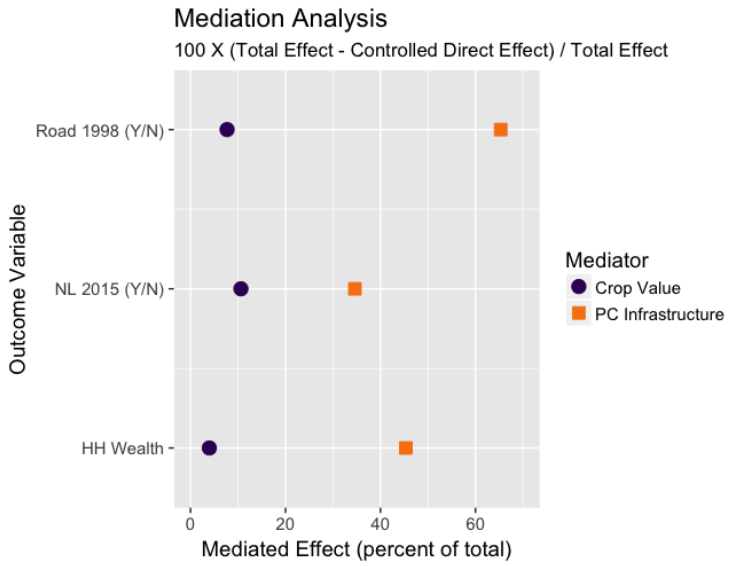

Figure 7.8: Shares of total effects related to specific mechanism

number of grid cells on which these models are estimated. As for colonial mining, only the British subsample yields consistently large and significant estimates. The French simply did not have much large-scale colonial mining. The small and insignificant effects on early infrastructure in mineral-rich Belgian and Portuguese colonies are more surprising. Again, this may be due to particularly undevelopmental forms of colonial rule. Nevertheless, even in these cases, the long-term effects on night lights and household wealth are positive and significant. This suggests increasing returns or a post-colonially prospering mining sector.

Second, I probe for differences between the five most important colonial cash crops cocoa, coffee, cotton, oil palm, and groundnuts. Results are reported in Appendix Figure A.8. With the exceptions of oil palm in the railroad and contemporary road models as well as cotton in the power plant model, all five crop dummies have positive and significant effects on early independence infrastructure as well as contemporary roads and nightlights. In the household wealth models, the groundnut and cotton dummies yield insignificant effects. This seems in line with Tosh's observation that annual savannah crops imply harder trade-offs between food and cash crop production than the perennial fruit trees of the humid forest zones.

Third, I run models that interact the colonial resource dummies with average country-level democracy levels, conflict incidence, and commodity export dependence between 1960 and 2000. I also test for differences between coastal and landlocked countries. Figures 7.10 and 7.11 report the results from models with luminosity as outcome variable. None of the potential moderators

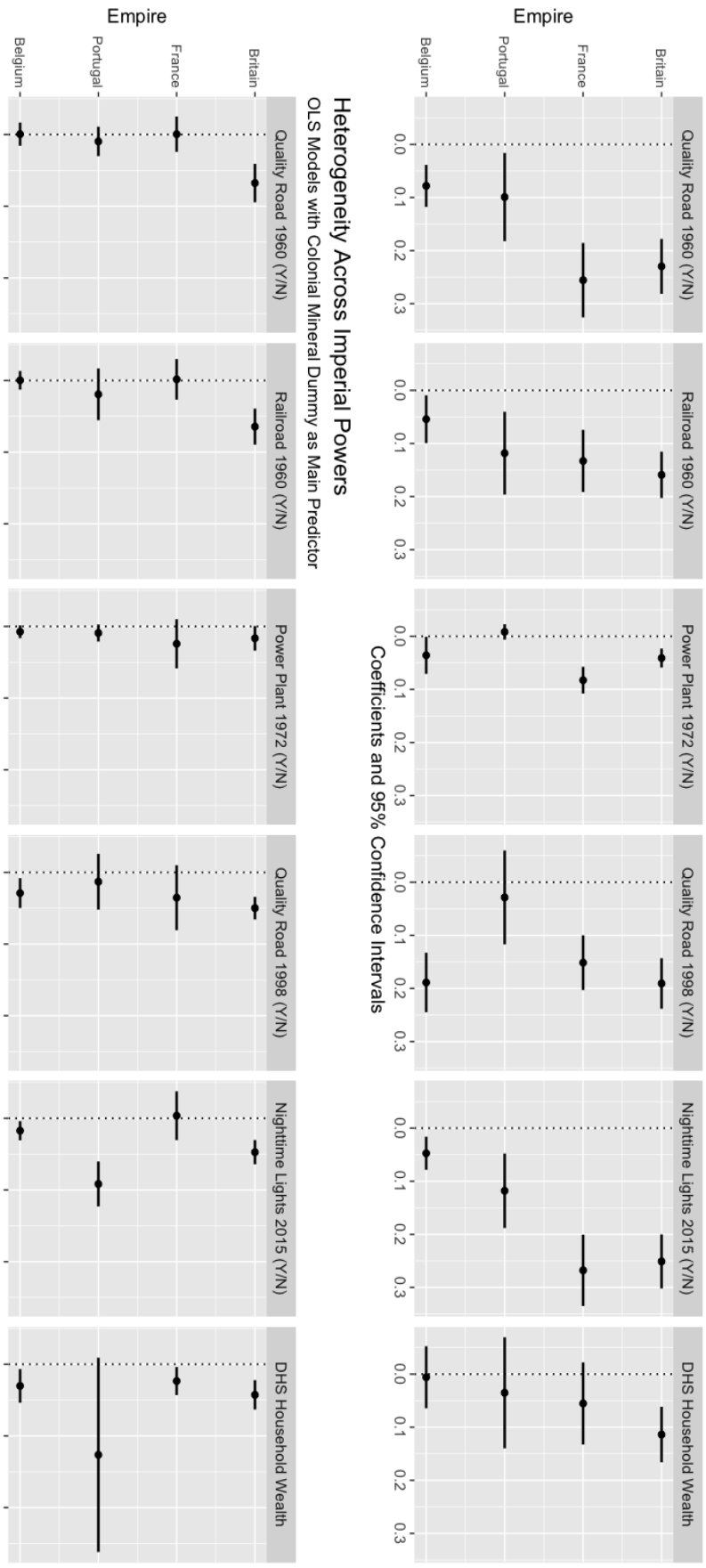

Figure 7.9: Heterogeneity across Empires?

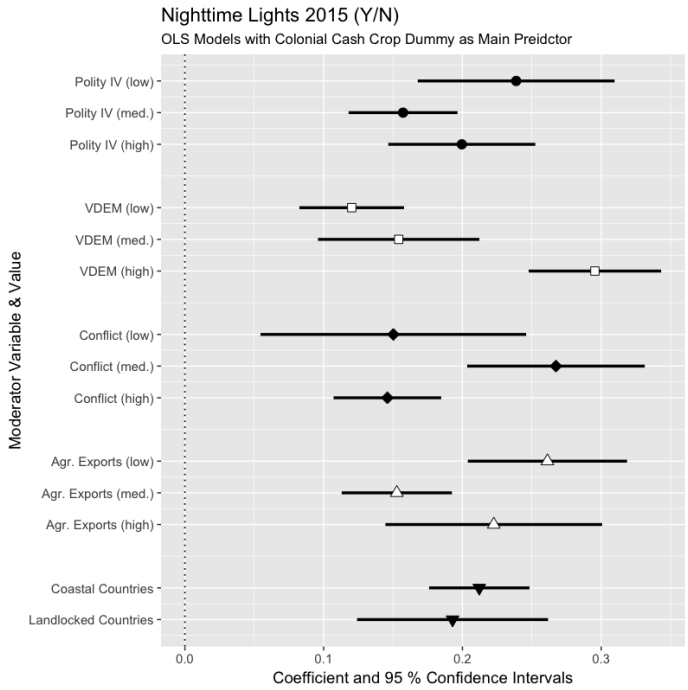

Figure 7.10: Heterogeneity Analysis Cash Crops

systematically alters the degree of path dependence. If anything, cash crop enclaves appear to have stronger effects in more democratic contexts. However, this finding is sensitive to the operationalization of democracy and may be driven by high democracy levels in particularly productive former cash crop colonies. In Appendix Figures A.4 – A.7, I repeat the heterogeneity analysis for household wealth and contemporary roads. Again, there are hardly any systematic difference across post-colonial contexts. Somewhat surprisingly, the wealth and road results indicate stronger persistence of mining effects in countries that are less dependent on mining exports. In addition, high conflict incidence turns the cash crop effect on household wealth insignificant. War appears as the great but destructive leveller that reins in at least cash crop-induced spatial inequality (Scheidel 2017). The implications are uncomfortable. Conflict reduces inequality to low absolute levels, but democracy levels do not seem to have a more positive equalizing effect. In short, the path-dependent effects of colonial resource regimes appear strong and relatively universal across a large subset of African countries.

7.3.3 *Implications for Country-Level Spatial Inequality*

To better gauge the implications of my findings for overall patterns of spatial inequality in Sub-Saharan Africa, I use the distribution of cash crop-related

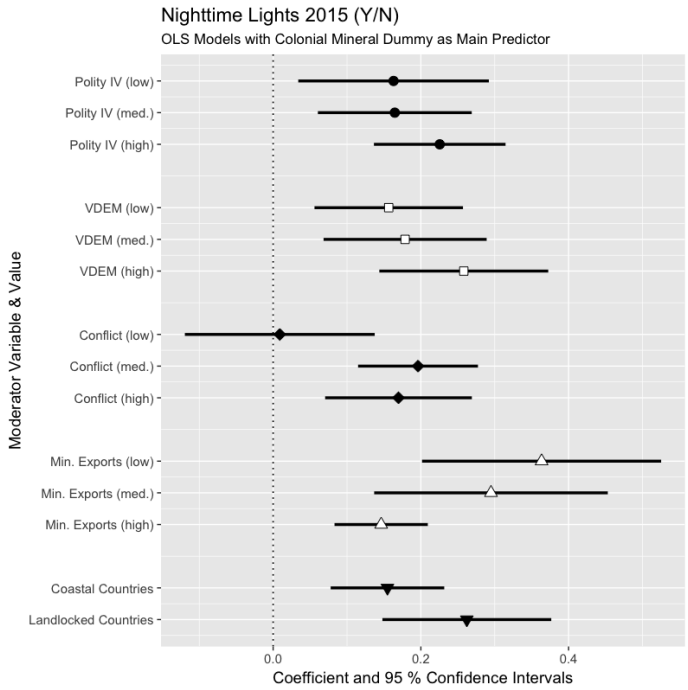

Figure 7.11: Heterogeneity Analysis Minerals

export values across 25 km grid cells to calculate country-level Gini coefficients of colonial cash crop inequality for all countries in my sample. Figure 7.12 shows a strong and positive correlation between this measure of colonial cash crop inequality and a similarly constructed night lights Gini for the year 2015. The positive association remains if I remove the small-country outliers Rwanda, Burundi, and Gambia (lower panel).

The blue dots in 7.13 show the R^2s of linear regression models of four different night light Ginis on the cash crop Ginis. Between 28 and 47 percent of the variation in contemporary light inequality is accounted for by the distribution of colonial export crops more than 60 years ago. The purple squares show how much of light inequality is explained by inequality in geographic endowments. I follow Alesina, Michalopoulos and Papaioannou (2016) and operationalize geographic inequality as the first principal component of Gini coefficients of agricultural suitability, elevation, distance to coast, temperature, and precipitation. The proportion of variance predicted by the cash crop Gini is greater than or of similar magnitude as the R^2 of the geographic inequality factor. The correlation between these two inequality measures is 0.54 indicating that geographic fundamentals explain substantial parts of the spatial distribution of colonial cash crops. Nonetheless, adding the cash crop Gini to a model that already includes the geographic inequality measure increases the proportion of variance explained by values between 0.07 and 0.21. Above and beyond

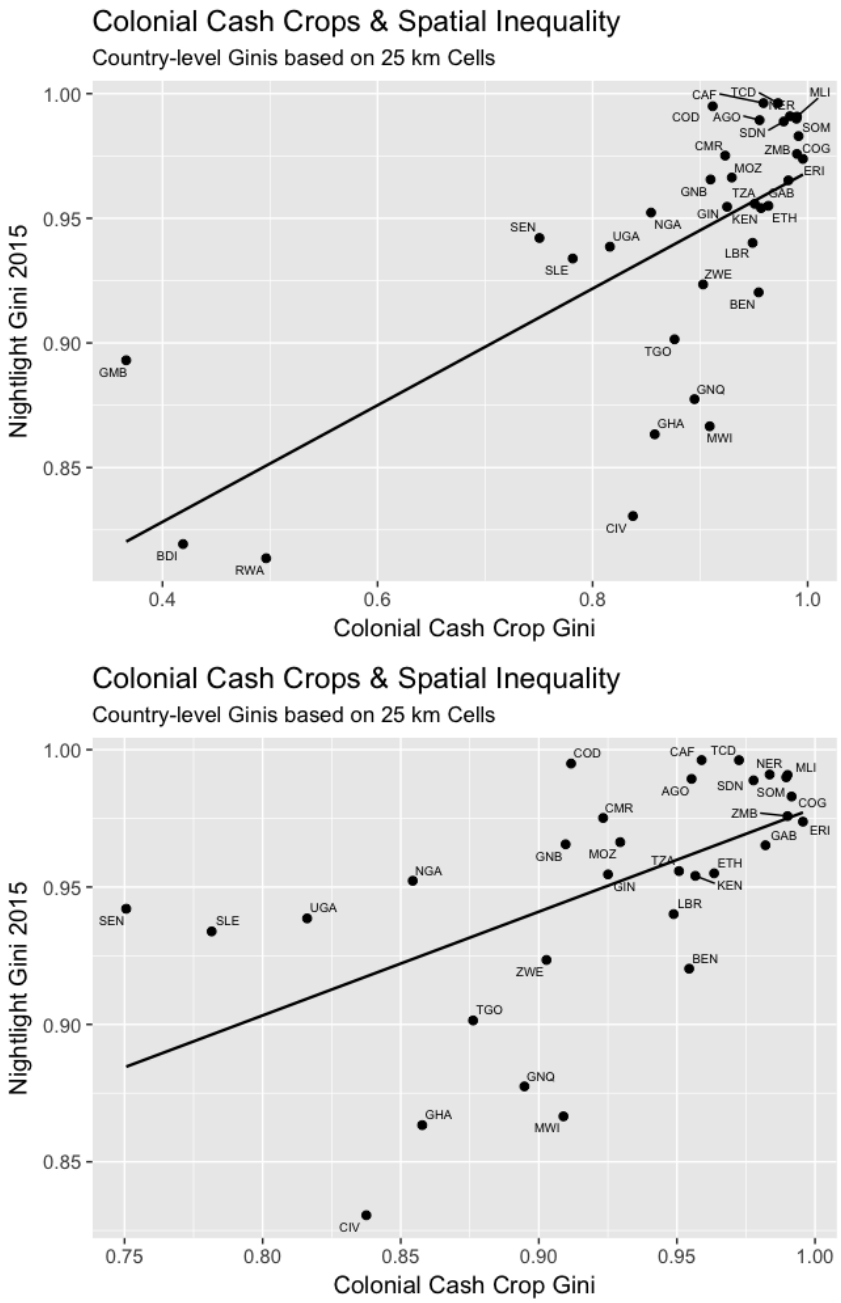

Figure 7.12: Spatial Gini Coefficients at the Country Level 1/2

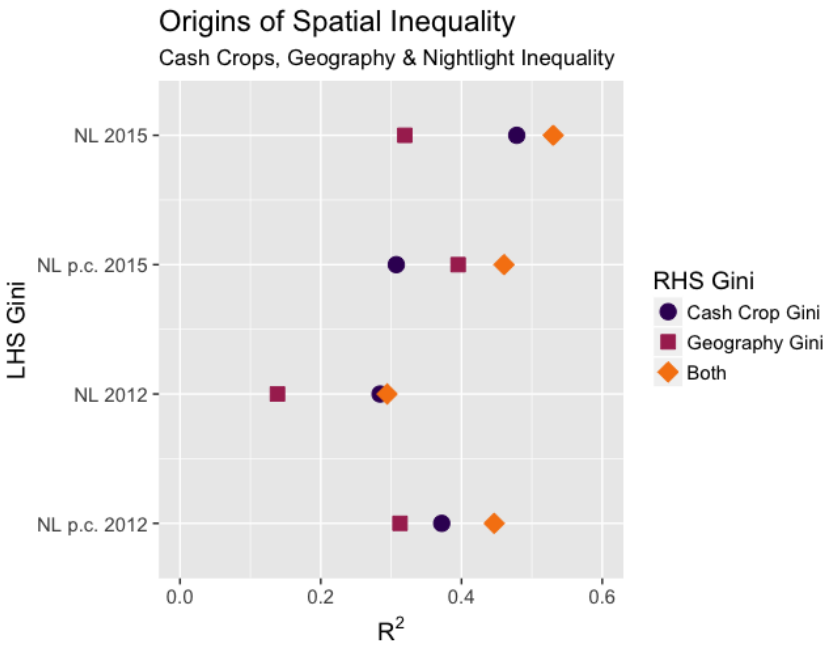

Figure 7.13: Spatial Gini Coefficients at the Country Level 2/2

amplifying pre-existing inequalities in geographic endowments, the cash crop revolution and European colonialism shifted economic activity to areas that became profitable for cash crops but would not have developed otherwise. These shifts likely undermined geographically well-endowed regions where no cash crops could be grown.

7.4 CONCLUSION

Five thousand years after the transition to sedentary agriculture, Africa experienced another important agricultural revolution – the transition to commercial export agriculture. Specialization in cash crop production boosted household wealth of smallholder farmers, induced large-scale population movements and urbanization, and propelled a boom in transportation infrastructure. That this economic transition also spurred the imperial conquest of Africa, however, had pernicious consequences on state development. Mercantilist economic policies, repressive labor practices and *de jure* and *de facto* controls on the location of agricultural production negated the economic integration and broader impacts that might otherwise have resulted. In colonial mining areas, economic opportunities for Africans were severely restricted. Nonetheless, infrastructure investments, urbanization, and in-migration produced important clusters of economic agglomeration that persist until the present day. The economic organi-

zation of the colonial state caused deep and enduring inequalities that continue to hinder political and economic development. The next chapter explores whether colonial resource regimes caused similarly universal and persistent political inequalities.

8

A FIELD RIPE FOR HARVEST: COLONIAL CASH CROPS AND POLITICAL POWER

What explains differential access of African ethnic groups to central state power? In this chapter, I argue that the spatial distribution of colonial export commodity production had powerful effects on different ethnic groups' representation in post-colonial ruling coalitions. In Chapter 6 I have proposed two mechanisms that may explain political advantages for cash crop producing groups. First, the early rise of an African commercial and political elite in cash cropping regions produced a pool of educated candidates for political office who commanded sufficient patronage resources to assemble effective political coalitions. The more communal form of land and labor regulation and profitable export production further increased the power of local elites. Early confrontations with cartelistic European merchants and colonial governments led to instances of successful collective mobilization. The Ivorian Syndicat Agricole Africain established in 1944 was led by future president Félix Houphouët-Boigny who became, at the same time, the perhaps richest cash crop farmer in the colony (Widner 1993). The long-time Tanzanian minister Paul Bomani was the managing secretary and founder of two African cash crop cooperatives south of Lake Victoria (Eckert 2007).

Second, the supply of capable elites from cash crop areas was matched by incumbent demands for reliable local intermediaries. Controlling production and directly taxing diffuse agricultural resources is difficult. However, export crops can be taxed indirectly through trade taxes and marketing boards. African rulers frequently rely on local intermediaries to regulate access to farmland, maintain support, and assure acquiescence to indirect taxation of cash crop exports (Kasara 2007; Boone 2003). Local intermediaries are less crucial in mineral or food producing regions. Capital-intensive point resources are easier to directly control and tax (Le Billon 2001). Locally traded agricultural resources provide lower revenue potential and cannot be taxed at the port. Therefore, incumbents face stronger incentives to coopt cash crop elites than candidates from mineral or staple crop producing regions. The attractiveness and mobilizational potential of ethnic cash crop elites is likely to vary with the market value and revenue potential of the resources their constituents produce.

In the empirical part of this chapter, I combine the spatial data on colonial export production from the previous chapter with pre-existing ethnic group-level information on political representation (Francois, Rainer and Trebbi 2015; Vogt et al. 2015). I show that ethnic groups with colonial cash crop production were, on average, represented 7 years longer in post-colonial cabinets than their mineral or food producing counterparts. Instrumental variable models suggest that this effect is causal. I complement these cross-sectional results with an analysis of how plausibly exogenous changes in global cash crop prices affect individual ethnic groups' political power over time. I find that rising prices increase cash cropping groups' cabinet shares. No such effects are found for mineral resources or non-export crops. I further show that the results are unlikely to be driven by unequally distributed colonial investments in education (Ricart-Huguet 2018.), specifically British legacies of indirect rule (Crowder 1964), or mere cooptation schemes that exploit cash crop regions to the benefit of supposedly more powerful urban constituencies (Bates 1981; Kasara 2007).

My findings speak to two important strands of the literature. First, I contribute to the understanding of political representation and ethnic coalition building in Sub-Saharan Africa. While many studies have outlined the consequences of unequal representation in terms of material well-being and armed conflict (see e.g. Franck and Rainer 2012; Horowitz 1985; Cederman, Gleditsch and Buhaug 2013), we know less about the origins of ethnic ruling coalitions. A recent literature has begun to fill this gap. (Roessler 2011, 2016) has shown how the threat of coups in weakly institutionalized coalition regimes may motivate ethnic exclusion. Francois, Rainer and Trebbi (2015) formalize parts of Roessler's argument but argue that African rulers' need to balance external and internal threats result in relatively representative coalitions. On the empirical end, both accounts agree that ethnic groups' population size affects their threat potential and, in turn, chances of inclusion. Roessler and Ohls (2018) show that geographic proximity to the capital city is equally important.

In the present chapter, I add economic aspects to the picture. This is in line with Arriola (2013*b*,*a*), who stresses the fundamental role of capital and business support in effectively mobilizing inter-ethnic opposition coalitions in multi-party elections. In contrast to Arriola, I focus on the historical roots of mobilizational capacity and do not restrict my focus to electoral contexts. In addition, my analysis is at the individual group rather than the coalition or country level. Wucherpfennig, Hunziker and Cederman (2016) argue that British indirect rule led to better representation of geographically remote groups

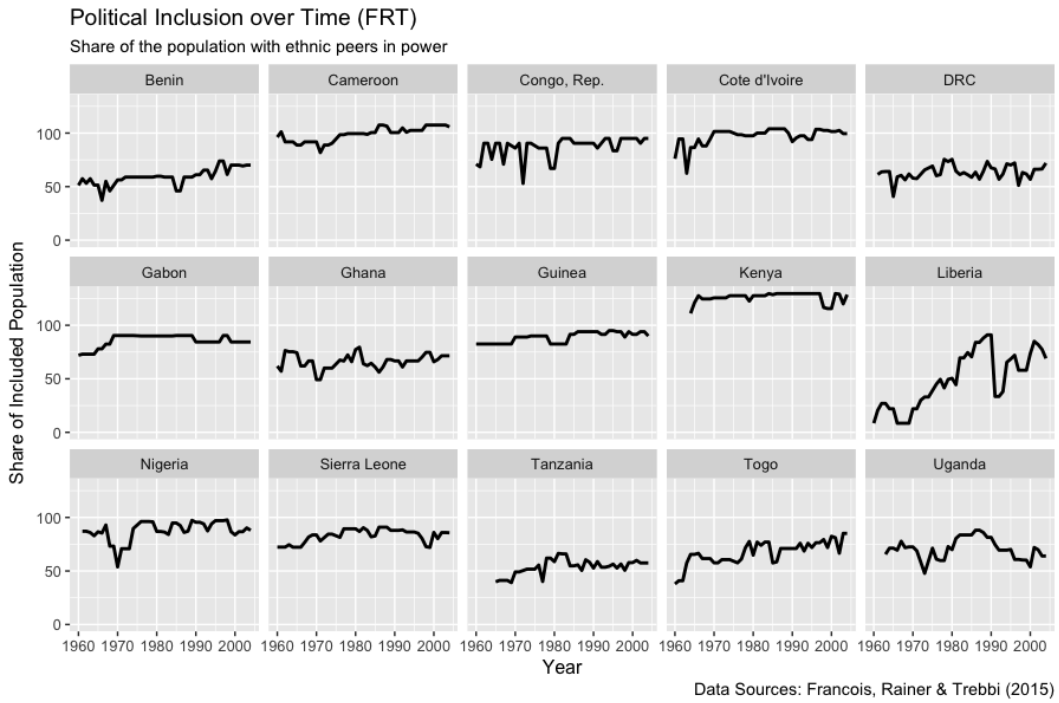

Figure 8.1: Political Inclusion 1960–2004 (Source: Francois, Rainer and Trebbi (2015))

than French direct rule. My resource-related results do not vary with respect to metropolitan identity.

Second, I contribute to the broader literature on colonial legacies. A series of empirical studies has investigated the economic effects of colonialism at the country and subnational levels. In a pioneering set of studies, Acemoglu, Johnson and Robinson (2001, 2002) attribute cross-country differences in economic development to extractive or inclusive colonial institutions. At the subnational level, scholars have pointed out more positive legacies of colonial investments in education, health and physical infrastructure (Huillery 2009; Jedwab and Moradi 2016; Cagé and Rueda 2016). I highlight political rather than economic legacies. Moreover, I show that the relevance of political resource legacies varies over time.

In the following section, I describe the data used in this chapter. I then proceed with two empirical parts in which I explain my cross-sectional and time-varying research designs and present quantitative results. The last section concludes.

8.1 DATA

I use ethnic group-level data on political representation and the colonial resource data discussed in the previous chapter to empirically assess my theoretical claims. The main data source is the "ethnicity of ministers" database compiled by Francois, Rainer and Trebbi (2015, henceforth FRT). Their data codes individual cabinet ministers' ethnic affiliation for 15 African countries. The countries covered are Benin, Cameroon, Côte d'Ivoire, Democratic Republic of Congo, Gabon, Ghana, Guinea, Liberia, Nigeria, Republic of Congo, Sierra Leone, Tanzania, Togo, Kenya, and Uganda. For each country, at least 90 percent of all ministers are coded. The data covers the years 1960–2004.

Francois, Rainer and Trebbi (2015) mainly rely on the ethnic group lists by Fearon (2003) and Alesina et al. (2003) to decide on the universe of relevant groups per country. In some cases, they deviate from these previous group lists and choose more fine-grained ethnolinguistic categories. For each ethnic group-year contained in the cabinet data, one can assess whether a group is represented at all, and if yes, how many and which cabinet portfolios it controls. Figure 8.1 plots the yearly shares of the national population that is represented by at least one co-ethnic minister. Representation shares vary between countries and over time.[1]

An alternative source that I use in robustness checks is the Ethnic Power Relations (EPR) dataset coded by Vogt et al. (2015). The EPR data has broader geographic and temporal coverage than the FRT data. They code access to central state power for the global universe of politically relevant ethnic groups. A group is deemed politically relevant if one of the following two conditions is satisified: (1) A political organization such as a party or armed group claims to represent the ethnic group or (2) the group is subject to state-led discrimination. A group's political power status is coded as categorical variable ranging from "discriminated" to ethnic "monopoly" rule (Cederman, Wimmer and Min 2010). As such, the information is less fine-grained than the FRT minister data. Temporal changes in EPR-coded power status are typically associated with big political events such as coups d'Etat, successful rebellions, or elections. This limits the EPR data's usefulness for analyses that seek to exploit more gradual temporal variation in political power distributions.

1 The implausibly high representation shares for Kenya result from imprecisely measured population shares in Francois, Rainer and Trebbi (2015). Getting population shares right is more important for their own analysis than for the present purpose where group size just serves as a control variable.

In many African countries, EPR codes broad ethnic coalitions as politically relevant. Two prime examples include "Notherners (Mande and Voltaic/Gur)" in Côte d'Ivoire or "Kalenjin-Masai-Turkana-Samburu" in Kenya. The smaller number of groups per country implies less cross-sectional variation to exploit. In addition, the political mobilization of broad ethnic coalitions may be endogenous to some of the political processes I study in this chapter. On a more positive note, the EPR data captures more tangible forms of political representation than token cooptation of one or two elites in ministerial cabinets. More importantly, the accompanying GeoEPR data provides shapefiles that map out each group's main settlement areas (Wucherpfennig et al. 2011). This allows me to straightforwardly match the geographic resource data from the previous chapter to politically relevant ethnic groups.[2]

Unfortunately, the FRT data does not provide any spatial information on ethnic home regions. However, most of the FRT groups are clearly linguistic in nature. I make use of this feature and match all but four of the 265 African ethnic groups in FRT's sample to the Ethnologue language encyclopedia (Lewis 2009). Ethnologue lists all 7097 known and non-extinct languages of the world and provides information on their hierarchical relationships and common origins. Where the FRT data codes a larger language group such as the Nigerian Yoruba or Tiv speakers, I assign all sub-languages of the broader language cluster to the respective FRT group. The World Language Mapping System (WLMS 2017) provides geographic point and polygon data that locate all Ethnologue languages in space. I use the spatial union of all WLMS polygons assigned to the respective language cluster to define ethnic homelands for all 261 successfully matched FRT groups. In a final step, I aggregate the colonial resource point data described in Chapter 7 to the FRT and GeoEPR polygons. Figure 8.2 shows the resulting ethnic map for the FRT sample. The black country contours in the background represent all former colonies used in the previous chapter. The colored country and group polygons highlight the restricted FRT sample.

8.2 CROSS-SECTIONAL ANALYSIS

In the first set of analyses, I test whether group-level cash crop endowments translate into higher levels of political representation across the entire post-colonial period. For this general test, I employ a cross-sectional research design. For each ethnic group, I calculate the share of years between 1960 and 2004

2 Appendix Figures B.2 and B.3 provide descriptive summaries of country-level EPR inclusion rates over time and mean group-level inclusion over the entire post-independence period.

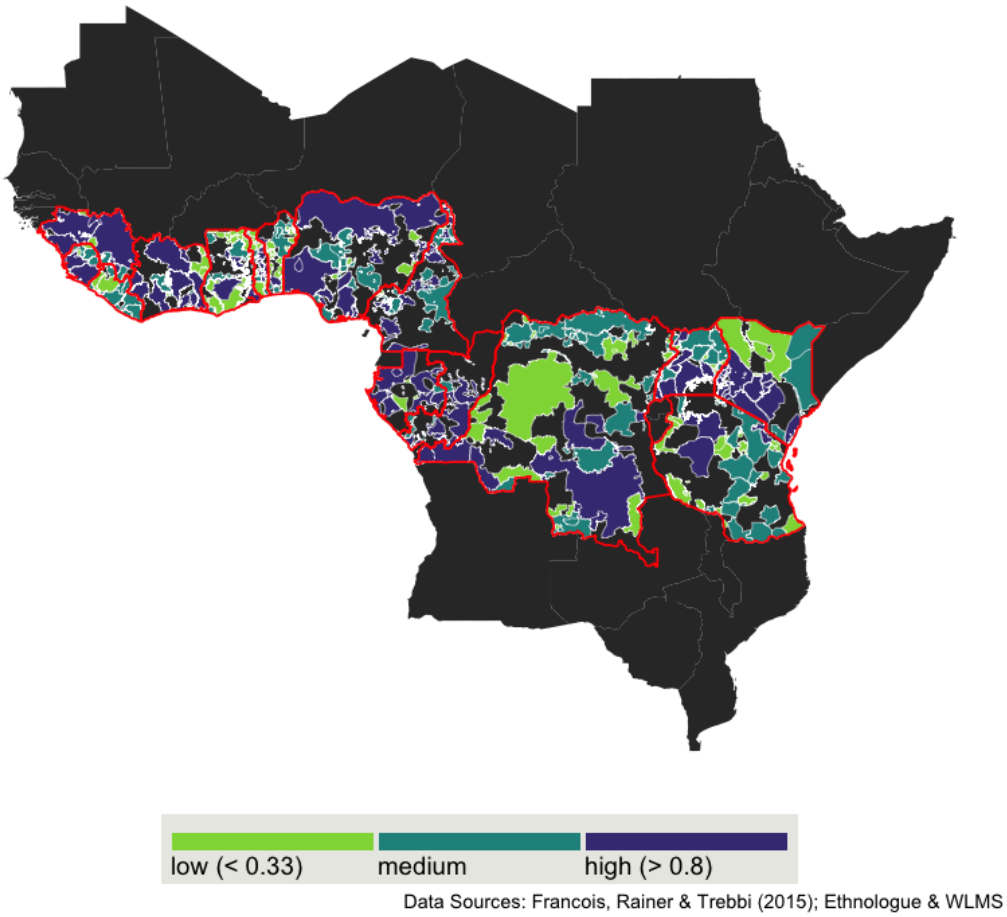

Figure 8.2: Mapping Cabinet Data to Language Polygons.

Color codes indicate the share of years between 1960 and 2004 an ethnic group was represented in the national cabinet (Sources: Francois, Rainer and Trebbi (2015); WLMS (2017)).

with at least one minister (*Represented (Y/N)*). In addition I calculate the mean of each group's minister share across all post-colonial cabinet years (*Government Share*). These two variables serve as main dependent variables in the analyses below. I use cabinet shares instead of raw minister counts to net out significant temporal and cross-country variation in cabinet size (Arriola 2009).

8.2.1 *Research Design*

The baseline specifications take the following form:

$$Y_{ic} = \alpha_c + \beta \, \text{Colonial Cash Crops}_{ic} + \gamma \, X_{ic} + \epsilon_{ic}$$

The unit of analysis is ethnic group i in African country c. Y_{ic} is one of the two political representation outcomes mentioned above. The main coefficient of interest in the model is β. It captures the effect of colonial cash crop endowments. I choose two different operationalizations for the cash crop variable. The first is a dummy indicating if ethnic group i's settlement area contains at least one point cash crop production. The second operationalization is continuous and codes per capita values of cash crop production within each group polygon. I express cash crop values in 1960 USD[3] and use a 1960 population grid from Klein-Goldewijk, Beusen and Janssen (2010) to standardize production values by ethnic group size.[4] α_c is a vector of country fixed effects that controls for unobserved, time-invariant differences between post-colonial states. I only compare ethnic groups located within the same country and thus effectively account for country-level variables such as metropolitan identity or landlocked location.

X_{ic} is a vector of ethnic group-level baseline controls that may correlate with both cash crop production and political power. It includes a group's share in the national population, mean elevation and terrain slope, agricultural suitability, distances to coast and capital as well as two variables from Murdock's (1967) Ethnographic Atlas: Precolonial political centralization and historic reliance on agriculture.[5] I estimate all models via OLS and use Conley (1999)

3 Historical resource price data comes from (Jacks 2013)

4 Table B.5 in the Appendix shows that standardizing production values by polygon area or not at all does not alter the results.

5 Elevation and slope grids come from FAO/IIASA (2011) and are aggregated by using the polygon means. Agricultural suitability data is from Ramankutty et al. (2002). Centroid distances to coast and capitals based on own calculations. The Ethnographic Atlas (EA) variables were matched to the digitized version of Murdock's (1959) "Tribal Map of Africa" by Nathan Nunn (2008). I transform Murdock polygons to a 5km $\times$ 5km raster and then aggregate EA variables to the WLMS and GeoEPR polygons used in this chapter.

standard errors with a distance cutoff of 400 km (ϵ_{ic}). The errors thus allow for smoothly decaying spatial correlation within the radius of a circle that roughly corresponds to the mean country size in my sample.[6]

The baseline specification just outlined yields unbiased estimates if my colonial cash crop proxy is conditionally exogenous to political power. If particularly powerful ethnic groups managed to get cash crop production going in the colonial age, or some third, unobserved group-level variables affect both cash crop production and the odds of post-colonial representation, coefficients will be biased. While X_{ic} contains the most obvious geographic and historical confounds, unobserved differences in mobilization potential may still affect my estimates. I address these potential threats to inference by instrumenting colonial cash crops with agro-climatic soil suitability scores from the FAO's GAEZ database (FAO/IIASA 2011). The instrumental variable strategy needs to satisfy three conditions to yield valid causal estimates. First, the instrument has to be relevant and predict actual cash crop production with sufficient precision. Second, treatment assignment (i.e. the geographic distribution of cash crop suitability) has to be exogenous to the outcome variable. Third, the exclusion restriction requires that the instrument only affects the outcome through the endogenous treatment or actually measured covariates included in the model.

The first condition can be tested by running the following first-stage regression:

$$\text{Colonial Cash Crops}_{ic} = \alpha_c + \delta\,\text{Cash Crop Suitability} + \gamma\, X_{ic} + \epsilon_{ic}$$

A first stage F statistic greater than the, admittedly arbitrary, threshold value of 10 indicates sufficient instrument strength. I show below that this is the case. The second condition is also met. Soil and climatic characteristics are clearly exogenous to any political and economic activities. The exclusion restriction is threatened by two alternative causal pathways. First, particularly fertile soils may have historically led to higher population density, complex forms of social and political organization, and, consequently, greater mobilization potential. Second, cash crop suitability, especially for tree crops clusters in humid forest zones, which are, at least in West Africa, relatively close to the coastal trading hubs.

These alternative pathways can, fortunately, be measured and included in the set of control variables. As for the first alternative pathway, all models control for *general* agricultrual suitability. The data comes from Ramankutty et al. (2002)

6 Table B.6 replicates my baseline models with country-clustered standard errors. Significance levels remain the same.

and is based on a complex model with various soil and climate-related inputs. It combines information on precipitation, temperatures, sunshine hours, soil carbon density and soil pH values. I additionally control for mean elevation and terrain slope that may also affect agricultural potential. To account for the second alternative pathway, I control for the logged distances between each group polygon's centroid and the closest seacoast or the respective national capital. The historic agriculture and political centralization variables control for early agricultural intensification or political organization that may have been related to native crops such as oil palm, coffee, or cotton. Conditional on these covariates, the exclusion restriction is likely to be met.

8.2.2 *Results*

Table 8.1: Cash Crops and Political Inclusion (1960-2004)

	Represented (Y/N)		Gov. Share (log)	
Colonial Cash Crops (Y/N)	0.156***		0.336***	
	(0.038)		(0.093)	
Cash Crop Value per capita (log)		0.022***		0.049***
		(0.006)		(0.014)
Country FE	Yes	Yes	Yes	Yes
Baseline Controls	Yes	Yes	Yes	Yes
Observations	260	260	260	260

Notes: Linear models estimated via OLS. The sample means of the dependent variables are 0.56 (columns 1–2) and 0.057 (columns 3–4). Control variables include ethnic groups' population shares, mean elevation and terrain slope, soil and climatic suitability for agriculture, centroid distances to coast and capital city, precolonial reliance on agriculture and precolonial political centralization. Conley errors with distance cutoff of 400km in parentheses. Significance codes: *p<0.1; **p<0.05; ***p<0.01

Table 8.1 presents my baseline results from simple OLS regressions. The first two columns use the share of years included as the dependent variable. The coefficient on the colonial cash crop dummy is positive and highly significant. Multiplying the coefficient with the 45 years between 1960 and 2004 indicates that, on average and all else equal, groups with colonial cash crops were represented 7.02 years longer in post-colonial cabinets than their non-cash cropping counterparts. The level-log specification in the second column yields an equally positive and significant coefficient estimate. Doubling the per capita value of colonial cash crop production (+100%) is associated with a

Table 8.2: Minerals and Political Inclusion (1960-2004)

	Represented (Y/N)		Gov. Share (log)	
Colonial Mining (Y/N)	-0.031		-0.106	
	(0.060)		(0.155)	
Colonial Mineral Value p.c. (log)		0.000		0.001
		(0.009)		(0.026)
Country FE	Yes	Yes	Yes	Yes
Baseline Controls	Yes	Yes	Yes	Yes
Observations	260	260	260	260

Notes: Linear OLS models. The sample means of the dependent variables are 0.56 (columns 1–2) and 0.057 (columns 3–4). Control variables include ethnic groups' population shares, mean elevation and terrain slope, soil and climatic suitability for agriculture, centroid distances to coast and capital city, precolonial reliance on agriculture and precolonial political centralization. Conley errors with 400 km distance cutoff in parantheses. Significance codes: *p<0.1; **p<0.05; ***p<0.01

representation gain of one additional year. Columns 3 and 4 use the logged government share of ethnic groups as outcome.[7]

Both the binary and the continuous cash crop proxies have positive and highly significant coefficients. The substantive effect of the dummy variable in the log-level specification of column 3 can be expressed in percentage terms as $100 \times (exp(\beta) - 1)$. Cash crop groups thus had, on average, 39.93 percent more ministers than non-cash crop groups. The fourth column suggests that a 100% increase in per capita production values translates into a 5% higher cabinet share. This first set of results is in line with my theoretical argument that cash-crop producing groups are overrepresented in post-colonial ruling coalitions.[8]

Table 8.2 repeats the same set of analyses for colonial mineral export production. The coefficients on the colonial mining dummy are substantively small, negatively signed, and far from significant. The per capita mining value variable in columns 2 and 4 yields relatively precisely estimated null effects. Table 8.3 replaces colonial cash crop or mineral production with estimated per capita values of food crop production. To that end, I use two geospatial datasets that contain grid-level information on the potential to grow or actual production of specific crops. The first is the FAO GAEZ database that, in addition to raw suitability scores, estimates potential crop yields per hectare. For each ethnic polygon, I weigh the mean yield of maize, sorghum, and wheat by their 1960

7 The distribution of raw government shares is extremely right-skewed. I therefore take the log of cabinet shares and add a small constant to keep zero-valued observations in the sample.

8 Figure B.1 in the Appendix plots coefficient estimates and confidence intervals of 45 yearly replications of the first model in Table 8.1

Table 8.3: Food Crops and Political Inclusion (1960-2004)

	Represented (Y/N)		Gov. Share (log)	
Staple Crop Value p.c. (FAO, log)	-0.032**		-0.094**	
	(0.016)		(0.041)	
Staple Crop Value p.c. (M3, log)		-0.054**		-0.106**
		(0.022)		(0.048)
Country FE	Yes	Yes	Yes	Yes
Baseline Controls	Yes	Yes	Yes	Yes
Observations	259	259	259	259

Notes: Linear OLS models. The sample means of the dependent variables are 0.56 (columns 1–2) and 0.057 (columns 3–4). Control variables include ethnic groups' population shares, mean elevation and terrain slope, soil and climatic suitability for agriculture, centroid distances to coast and capital city, precolonial reliance on agriculture and precolonial political centralization. Conley errors with 400 km distance cutoff in parantheses. Significance codes: *p<0.1; **p<0.05; ***p<0.01

world market prices (Jacks 2013). For other important and mostly locally traded African staple crops such as cassava, millet, plantains, or yam, the standard sources do not contain world market prices. Fortunately for the purpose at hand, maize and sorghum are the two most important food crops in the 15 countries in my sample.[9]

The second dataset is the M3 data by Monfreda, Ramankutty and Foley (2008) which contains global maps of the harvested area, yield and production volumes of 175 crops around the year 2000. In contrast to the FAO GAEZ data that only uses soil and climatic characteristics as inputs, the M3 data combines similar information with satellite-derived data on actual croplands and subnational statistics on production volumes to assign global agricultural output to a 5×5 arc minute grid. I use the maize, sorghum, and wheat production grids to calculate, for each ethnic homeland, an estimated production value for the year 2000. I than re-express this value in 1960 USD and divide by 1960 population. Production in 2000 may, of course, be endogenous to political events. However, actual production estimates are arguably closer to real output than the total agro-climatic potential from the GAEZ data. Table 8.3 shows that groups with high staple crop production or potential are significantly less likely to be politically included. The effects are substantively even larger than for colonial cash crop production. The results from Table 8.1 seem clearly specific to cash crops and do not just reflect high agricultural productivity.

9 I calculated the total harvested area of each of the 175 crops contained in the M3 dataset (Monfreda, Ramankutty and Foley 2008) within the spatial union of all 15 countries. Maize is planted on 115'000 km^2 of cropland, sorghum on 77'011 km^2 and wheat on 2'536 km^2.

Table 8.4: Instrumenting Cash Crops (1960-2004)

	Represented (Y/N)		Gov. Share (log)	
Cash Crops (Y/N), fitted	0.313**		0.537*	
	(0.128)		(0.292)	
Cash Crops p.c.× price (log), fitted		0.041**		0.071**
		(0.017)		(0.036)
Country FE	Yes	Yes	Yes	Yes
Baseline Controls	Yes	Yes	Yes	Yes
First-Stage F	17.51	19.18	17.51	19.18
Observations	260	260	260	260

Notes: Instrumental variable models estimated via 2SLS. The sample means of the dependent variables are 0.56 (columns 1–2) and 0.057 (columns 3–4). Control variables include ethnic groups' population shares, mean elevation and terrain slope, soil and climatic suitability for agriculture, centroid distances to coast and capital city, precolonial reliance on agriculture and precolonial political centralization. Conley errors with 400 km distance cutoff in parentheses. Significance codes: *p<0.1; **p<0.05; ***p<0.01

Table 8.4 contains results from the instrumental variable models estimated via two-stage least squares (2SLS). The first-stage F statistics are well beyond the critical threshhold and indicate sufficient relevance of the suitability instrument despite controlling for general agricultural suitability. All second-stage coefficients are positively signed and significant at conventional levels. The estimated causal effects are 1.4 times to twice as large as in Table 8.1. However, due to the two-stage setup, I lose precision and the 95% confidence intervals of the estimates always contain the OLS point estimate from Table 8.1. In other words, I fail to reject the hypothesis that the *causal* effect of colonial cash crop production is significantly different from the naïve OLS effects.[10] Colonial cash crop production at the ethnic group level causally affects the likelihood of representation in post-colonial ruling coalitions.

8.2.3 *Causal Mechanisms & Alternative Explanations*

As discussed in the theory chapters of this dissertation, colonial cash crop production is likely to be a compound treatment. In addition to the actual production of crops, colonial investments and institutions as well as local community structures and mobilization strategies emerged. My theoretical argument holds that a combination of early elite formation, collective action

10 Table B.7 in the Appendix reports the 2SLS-IV analysis with country-clustered standard errors. Standard errors and significance levels hardly change. Table B.8 reports reduced form estimates and shows that raw cash crop suitability or potential yields multiplied by 1900 world market prices significantly increase representation in post-colonial governments.

Table 8.5: Controlling for Educational Investments

	Represented (Y/N)		
Colonial Cash Crops (Y/N)	0.144***	0.141**	0.142**
	(0.040)	(0.067)	(0.068)
No. Missions in 1924 (log)	0.033		-0.004
	(0.024)		(0.032)
Male Share with Secondary Educ.		0.373**	0.373**
		(0.148)	(0.149)
Country FE	Yes	Yes	Yes
Baseline Controls	Yes	Yes	Yes
Observations	260	133	133

Notes: Linear OLS models. The sample means of the dependent variable is 0.56. Control variables include ethnic groups' population shares, mean elevation and terrain slope, soil and climatic suitability for agriculture, centroid distances to coast and capital city, precolonial reliance on agriculture and precolonial political centralization. Conley errors with 400 km distance cutoff in parantheses. Significance codes: *p<0.1; **p<0.05; ***p<0.01

experience, and strategic calculations by incumbent rulers explain cash cropping groups' advantages. Without data on the identities of pre-independence African elites, political organization, and instances of mobilization, I cannot directly test the supply-side mechanisms. Note that my account of early elite formation stresses African opportunities for accumulation and the corresponding desire for formal education and upward mobility.

Ricart-Huguet (2018.) argues otherwise. In his view, the spatially varying supply of colonial education investments explains the district-level availability of suitable candidates for political office. He uses numbers of public and missionary teachers per colonial district and two cross-sections of cabinet ministers' birthplaces (1960–1970 and 1990–2010) to estimate the effect of education investments. Results indicate that districts with higher education investments are overrepresented in post-independence governments. As fascinating and convincing as these findings are, they face two limitations. First, educational investments are likely endogenous to cash crop production. Second, the explicit claim that colonial and post-colonial governments mainly rely on formal education as recruitment criterion seems incomplete. I argue that incumbents' needs for reliable local intermediaries and indirect tax revenues from cash crop areas are similarly important factors. Again, it is hard to directly test these mechanisms. What I can do, however, is to rerun my baseline models and account for educational investments and the availability of skilled candidates.

I use Roome's (1924) map of Christian missions in 1924 and, as a proxy for early educational investment, count the number of missions per ethnic group polygon.[11] To more directly approximate the supply of educated elites I use DHS survey data (USAID 2012). More specifically, I use all available DHS survey rounds in which male respondents were interviewed in any of the 15 FRT countries. I first restrict the sample to all surveys that contain information on respondents' ethnic identity. As a result, I lose Liberia, Congo-Brazzaville, and Tanzania. To assign survey respondents to FRT groups, I then match the ethnic information from DHS to FRT via Ethnologue's linguistic categories.

In a third step, I code, for each FRT group, the share of respondents born before 1960 with at least some secondary education. The calculations are based on a total of 25'544 respondents and the mean secondary education rate across all ethnic groups is about 35%. Not all FRT groups are represented among DHS respondents, which implies further restrictions in sample size. Nonetheless, Table 8.5 shows that my results are stable to including the logged mission count, male education shares, or both of these variables in the model. The coefficients on the more direct and survey-based proxy is positive, substantively large and highly significant. Despite losing half of all observations, the cash crop effect is only minimally smaller and remains significant at the 95% confidence level. This suggests that early cash crop elites' commercial and political rather than mere educational clout is likely to explain my findings.

As discussed above, native cash crop revolutions tended to happen later in non-British colonies. I have argued that opportunities for capital accumulation and political mobilization in cash crop areas arose due to relatively indirect forms of rule. One might suspect that indirect rule of cash crop regions was more common in British than in non-British colonies. On the ground, however, similar structural conditions led to similar colonial strategies, at least from the 1920s onward. To more formally assess this claim, I rerun my baseline models and interact the binary and continuous cash crop proxies with a British Empire dummy. Results are presented in Table 8.6. The coefficient on the constitutive cash crop terms remain positive and highly significant. They show the estimated effects for non-British colonies. The coefficients are 26–27% smaller than in the baseline specifications from Table 8.1. However, the interaction terms are never significant. In line with my theoretical arguments, I cannot reject the hypothesis that the cash crop effect is the same in former British and non-British colonies.

As a further robustness check, I replicate the cross-sectional baseline models based on EPR data on political inclusion. I use the GeoEPR polygons to assign

11 Roome's map has been digitized by Nathan Nunn (2010).

Table 8.6: British vs. Non-British Colonies

	Represented (Y/N)		Gov. Share (log)	
Cash Crops (Y/N)	0.116***		0.244**	
	(0.043)		(0.101)	
Cash Crops (Y/N) × British	0.077		0.178	
	(0.062)		(0.173)	
Cash Crop Value p.c.		0.017***		0.040***
		(0.006)		(0.014)
Cash Crops p.c. × British		0.011		0.021
		(0.010)		(0.024)
Country FE	Yes	Yes	Yes	Yes
Baseline Controls	Yes	Yes	Yes	Yes
Observations	260	260	260	260

Notes: Linear OLS models. The sample means of the dependent variables are 0.56 (columns 1–2) and 0.057 (columns 3–4). Control variables include ethnic groups' population shares, mean elevation and terrain slope, soil and climatic suitability for agriculture, centroid distances to coast and capital city, precolonial reliance on agriculture and precolonial political centralization. Conley errors with 400 km distance cutoff in parantheses. Significance codes: *p<0.1; **p<0.05; ***p<0.01

cash crops to ethnic homelands. Politically relevant EPR groups and their respective polygons are time-varying. For the present purpose, I restrict the sample to all groups that were already coded as relevant in the first year after independence. The resulting dataset contains 195 ethnic groups nested in 32 African countries. Table 8.7 reports my findings. The coefficients on the colonial cash crop dummy are positively signed but 60% smaller than in Column 1 of Table 8.1. They do not reach statistical significance. This may have to do with the larger ethnic polygon size and less fine-grained spatial variation than in the linguistic FRT polygons. The continuous measure of per capita production values indicates a positive effect that is significant at the 90% confidence level, regardless of whether I cluster errors by country or use Conley's (1999) method. The coefficient size is practically identical to what I find in Table 8.1. Similar results from two independently collected data sources on political representation should increase our confidence that there is an effect.[12]

12 I do not report IV estimates based on EPR data, since first-stage instrument strength is clearly insufficient. Again, this is likely due to a smaller sample of relatively large ethnic polygons that include productive cash crop zones as well as larger rural hinterlands that are unsuitable for cash crops.

Table 8.7: Cash Crops and EPR Political Inclusion (1960-2013)

	Share of Years Included (EPR)			
Colonial Cash Crops (Y/N)	0.066	0.066		
	(0.082)	(0.074)		
Cash Crop Value per capita			0.023*	0.023*
			(0.014)	(0.013)
Country FE	Yes	Yes	Yes	Yes
Baseline Controls	Yes	Yes	Yes	Yes
Country-Clustered SE	Yes	No	Yes	No
Conley Errors (400 km)	No	Yes	No	Yes
Observations	195	195	195	195

Notes: OLS and 2SLS-IV models. The sample means of the dependent variable is 0.54. Control variables include ethnic groups' population shares, mean elevation and terrain slope, soil and climatic suitability for agriculture, centroid distances to coast and capital city, precolonial reliance on agriculture and precolonial political centralization. Country-clustered standard errors in parentheses. Significance codes: *p<0.1; **p<0.05; ***p<0.01

8.3 ANALYZING CHANGES OVER TIME

The cross-sectional results just presented strongly support my theoretical claims. It remains to be tested if temporal changes in the market value of colonial cash crops translate into variation in political representation. The bargaining mechanism proposed above suggests that cash crop groups' mobilizational potential and incumbent rulers' incentives to include cash crop elites in ministerial cabinets vary with the economic value of the underlying resources. Tax potential and the need for local intermediaries to ensure smooth production and surplus extraction are greatest when cash crop prices are high. Only when returns on local land, labor, and capital are high will cash crop elites have sufficient patronage resources to ensure the continued loyalty of their, more often than not, ethnically defined constituencies.

8.3.1 *Research Design*

I test these claims by estimating the following time-series cross-sectional model:

$$Y_{ict} = \alpha_{ic} + \delta_{ct} + \beta\,\mathsf{Cash\ Crops\ Weights}_{ic} \times Price_t + \epsilon_{ict}$$

Y_{ict} is one of two political representation outcomes. The first is a dummy coded one for all group-years with at least one minister. The second is a

group's logged minister count. The model includes both ethnic group (α_{ic}) and country-year (δ_{ct}) fixed effects. Group fixed effects net out all time-invariant group-level factors. Cross-group differences in geographic or population size, coastal location, levels of colonial investments or resource production, and pre-colonial or colonial political mobilization are thus accounted for. In short, I approximate a difference-in-differences setup where temporal changes in an ethnic group's political status are explained by temporal changes in the market value of that group's natural resources. Country-year fixed effects control for all temporal shocks and trends at the country level. Changes in, for example, regime type, cabinet size, and national economic policy are contained in δ_{ct}. This is the reason why I operationalize the continuous representation outcome as raw minister count instead of government share as in the cross-sectional models above.

The main predictor variable is an interaction term between ethnic group-level cash crops and a logged index of crop-specific world market prices. The cash crop price data comes from Jacks (2013). I restrict the analysis to the five most important colonial cash crops that are unambiguously coded on the historical map by Hance, Kotschar and Peterec (1961). For each ethnic group, I calculate the interaction by taking an annual weighted mean of the five cash crop prices. In the baseline specifications, I use the individual crops' shares in the respective group's total colonial export value as weights. In other words, I weight cash crop prices by the economic importance of each crop in a group's total export production, regardless of the group's overall contribution to country-level exports. This operationalization translates Bazzi and Blattman's (2014) country-level approach to the group level and is, theoretically speaking, most relevant for the supply-side mechanisms of elite formation and mobilization.

In Appendix Table B.9, I replicate the analysis with weights based on per capita and total cash crop values, which are arguably more relevant for the demand-side factor of national revenue potential. The results remain essentially the same. Due to the fixed effects setup, no constitutive terms of cash crop weights or raw price indices are needed. To check whether any results are truly specific to cash crops, I run similar models that use global mineral and food crop prices as an exogenous source of temporal variation in ethnic groups' resource potential. Figure 8.3 plots the price indices for all three resource types.

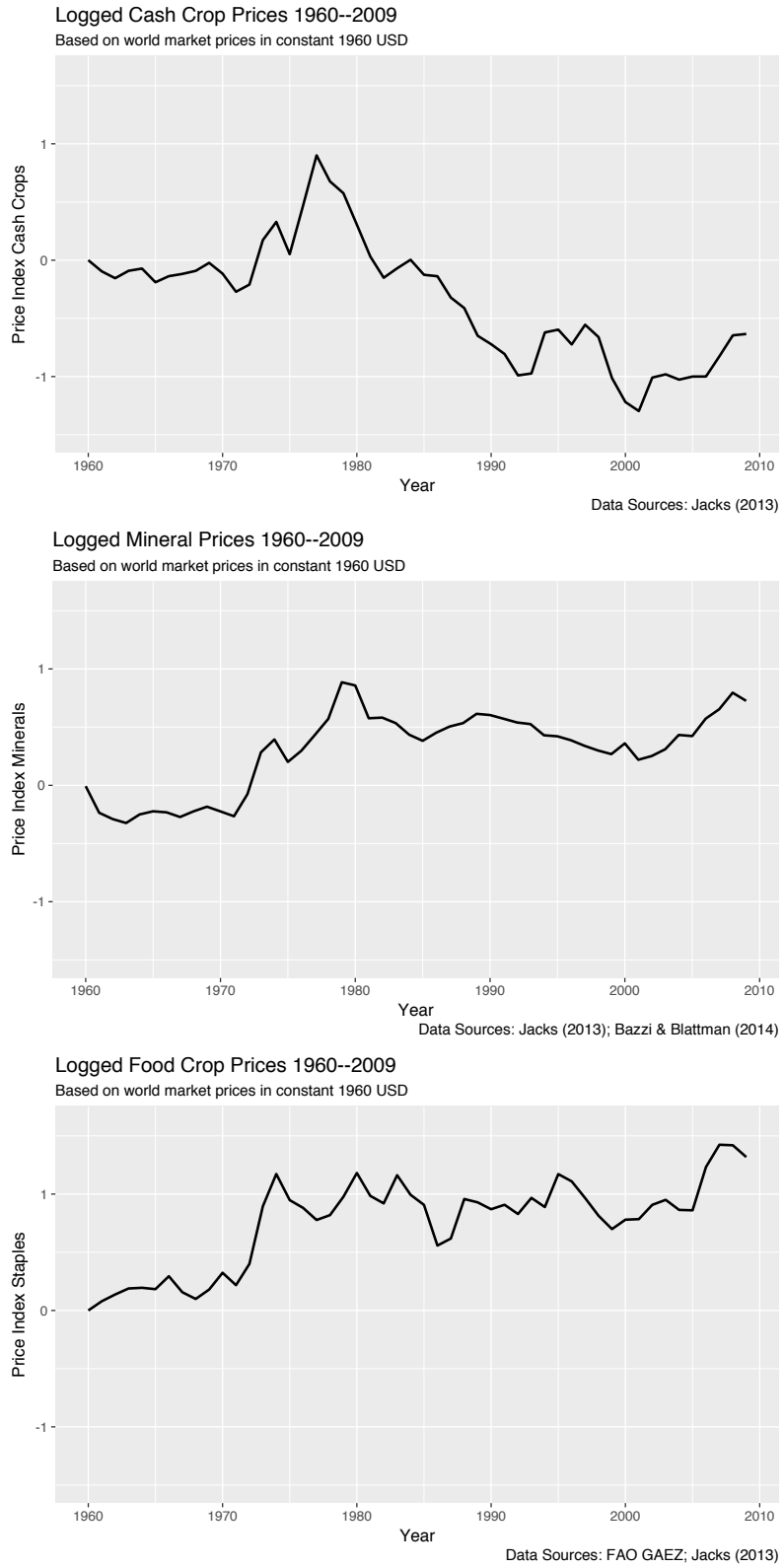

Figure 8.3: Logged Price Indices of Cash Crops, Minerals & Food Crops, 1960–2004

Table 8.8: Cash Crop Prices & Political Inclusion (1960-2004)

	Represented (Y/N)		Minister Count (log)	
Cash Crop Weights × Price (log)	0.094**	0.087**	0.624**	0.594**
	(0.038)	(0.041)	(0.274)	(0.300)
Country FE	Yes	Yes	Yes	Yes
Baseline Controls	Yes	Yes	Yes	Yes
Controls × Year Dummies	No	Yes	No	Yes
Observations	10,706	10,664	10,706	10,664

Notes: Linear OLS models. The sample means of the dependent variables are 0.56 (columns 1–2) and 1.47 (columns 3–4). Control variables in columns 2 and 4 are the same as in the crosss-sectional models above. Two-way clustered standard errors in parentheses: Ethnic group and country-year clusters. Significance codes: *p<0.1; **p<0.05; ***p<0.01

8.3.2 *Results*

Table 8.8 presents a first set of cash crop results. The first two columns are based on linear probability models with a binary representation dummy as dependent variable. Columns 3 and 4 use the logged minister count as outcome. Columns 1 and 3 include no other predictor variables than the group-specific cash crop price series. Columns 2 and 4 add interactions between all eight control variables from the cross-sectional setup and 44 year dummies. This allows for time-varying effects of the baseline controls. All four coefficient estimates are positive and significant at the 5% level. Substantively speaking, a doubling of cash crop prices is associated with a roughly nine percentage points higher probability of political representation. This amounts to a 17% increase relative to the mean of the dependent variable at 0.56. Columns 3 and 4 suggest that a 100% increase in the world market value of an ethnic group's cash crops implies 60% more ministers. Put differently, a group with previously two cabinet members is expected to get at least one additional minister.

Price changes in the order of magnitude of 100% are far from uncommon. Cocoa prices almost halved between 1960 and 1965, doubled until 1969, halved again in 1971, and increased more than fivefold until 1977. They then went into a long decline that reached its bottom in 2000 at less than one tenth of 1977 values. Between 2000 and 2010, cocoa prices almost tripled. The results in Table 8.8 have a plausibly causal interpretation if global cash crop prices are exogenous to economic and political developments within the countries and groups in my sample. This assumption is threatened where individual countries or groups contribute significant shares to global cash crop production

Table 8.9: Mineral Prices & Political Inclusion (1960-2004)

	Represented (Y/N)		Minister Count (log)	
Mineral Weights × Price	-0.004		-0.021	
	(0.065)		(0.491)	
Number of Active Mines		-0.015		-0.125
		(0.025)		(0.193)
Country FE	Yes	Yes	Yes	Yes
Baseline Controls	Yes	Yes	Yes	Yes
Controls × Year Dummies	No	No	No	No
Observations	10,966	10,966	10,967	10,967

Notes: Linear OLS models. The sample means of the dependent variables are 0.56 (columns 1–2) and 1.47 (columns 3–4). Control variables in columns 2 and 4 are the same as in the crosss-sectional models above. Two-way clustered standard errors in parentheses: Ethnic group and country-year clusters. Significance codes: *p<0.1; **p<0.05; ***p<0.01

and are thus able to influence world markets. The only two countries in my sample that have, at times, produced more than 5% of global crop-specific output value are Ghana and Côte d'Ivoire (both cocoa). In Appendix Table B.10 I rerun the analysis but drop all Ghanaian and Ivorian observations from the sample. If anything, coefficient estimates get larger.

Table 8.9 summarizes results based on colonial and more recent mining data. The predictor variable in the first row is the mineral equivalent to the cash crop variable from Table 8.8. As Jacks (2013) does not provide price series for all minerals on the Hance map, I add price data from Bazzi and Blattman (2014). The prices are weighted in the same way as described for cash crops above. The coefficients in columns 1 and 3 are very close to zero and far from statistically significant. Just as in the cross-sectional analysis, the value of colonial mining resources does not affect ethnic group-level political representation. However, global demand for minerals changes over time and Africa has seen a couple of veritable post-independence mining booms. New deposits were discovered and mines opened up in different locations than in the colonial age. To rule out the possibility that more contemporary mining leads to political representation, I use the industrial MinEX Consulting database that codes time-varying information on known mineral deposits as well as mine opening and closing years (MinEx 2018). I calculate the number of active mines for each ethnic polygon-year and rerun the models. Coefficients in Columns 2 and 4 remain negative, small, and insignificant. Neither colonial nor more contemporary mining activities are associated with group-level representation in ministerial cabinets.

Table 8.10: Adding Staple Crop Prices (1960-2004)

	Represented (Y/N)		Minister Count (log)	
Cash Crops × Price		0.098***		0.638**
		(0.038)		(0.271)
Minerals × Price		0.009		0.072
		(0.066)		(0.495)
Staple Crops × Price	0.040	-0.003	-0.436	-0.713
	(0.365)	(0.360)	(2.584)	(2.551)
Country FE	Yes	Yes	Yes	Yes
Baseline Controls	Yes	Yes	Yes	Yes
Controls × Year Dummies	Yes	Yes	Yes	Yes
Observations	10,924	10,924	10,924	10,924

Notes: Linear OLS models. The sample means of the dependent variables are 0.56 (columns 1–2) and 1.47 (columns 3–4). Control variables in columns 2 and 4 are the same as in the crosss-sectional models above. Two-way clustered standard errors in parentheses: Ethnic group and country-year clusters. Significance codes: *p<0.1; **p<0.05; ***p<0.01

Last but not least, I analyze the effects of price changes for the staple crops maize, sorghum, and wheat. I use the mean potential yields of these crops in each ethnic group polygon to construct a group-specific food crop price index. Geospatial data on potential yields is taken from FAO/IIASA (2011). Columns 1 and 3 of Table 8.10 show no significant effects of ethnic groups' food cropping potential on political representation. The coefficients are small and their sign varies with the operationalization of the dependent variable. Columns 2 and 4 estimate models that include group-level price indices of colonial cash crops, minerals, and food crop potential alongside each other. The results remain the same as in previous specifications.

8.3.3 *Implications for Rural Living Standards*

The cash crop effects on political representation raise an important follow-up question: Do cash crop producing constituencies benefit from having ethnic peers in power? The literature is divided. On the one hand, there is robust empirical evidence for ethnic favoritism in public goods provision (Franck and Rainer 2012; Burgess et al. 2015; Kramon and Posner 2016). On the other, Bates (1981) and Kasara (2007) argue that African governments tend to distribute away from rural cash crop producers. According to Bates (1981), rural constituencies have a hard time to mobilize. As a result, urban unrest is the far greater danger for African rulers. They exploit the supposed political weakness of cash

Table 8.11: Cash Crop Values, Political Representation & Rural Infant Mortality

	Infant Mortality		
	(1)	(2)	(3)
Cash Crops × Price (log)	-0.994**	-1.013**	-0.995**
	(0.395)	(0.399)	(0.399)
Represented (Y/N)		0.157	
		(0.631)	
Minister Count (log)			0.212
			(0.596)
Cash Crop Value × Represented (Y/N)		0.031	
		(0.121)	
Cash Crop Value × Minister Count			-0.002
			(0.100)
Ethnic Group FE	Yes	Yes	Yes
Country-Survey-Round-Cohort FE	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes
Observations	617,151	617,151	617,151

Notes: Linear probability models estimated via OLS. The sample mean of the dependent variable is 10.76 infant deaths per 100 live births. Observations are weighted to ensure equal weights for each ethnic group. Control variables include mothers' education, age and age squared, as well as newborns' sex, a twin dummy, birth rank, and birth rank squared. Standard errors clustered by ethnic group in parentheses. Significance codes: *p<0.1; **p<0.05; ***p<0.01

cropping regions to heavily tax their production and subsidize urban food and fuel consumption. Incumbent presidents may well coopt cash crop elites as useful partners in crime. However, the bulk of the cash cropping population is expected to lose out.

Kasara (2007) provides pioneering quantitative evidence that politically represented cash crop groups face higher tax burdens on their output. Does the representation of cash crop elites merely serve as a tool to exploit their rural constituencies? Or is there evidence for *real* ethnic representation that yields tangible material benefits? The two mechanisms are not incompatible. The crucial question is whether extractive governments leave any surplus in producing regions or at least match taxation with *local* public goods. Local producers are likely to quit cash cropping in the face of excessive taxation. As a consequence, extreme interpretations of a cash crop-financed urban bias seem implausible.

The implications for rural living standards can be tested. I use DHS data on infant mortality rates as a proxy for the well-being of rural constituencies (USAID 2012). Infant mortality rates likely react to changes in both individual households' incomes and local public goods such as health clinics and medical staff. The DHS surveys contain the complete birth histories of all female respondents with at least one child. This allows me to construct a pseudo-panel data set with information on individual infants' birth years and their survival or death. Geocoded survey rounds with information on infant mortality are available for all but one country of the FRT sample (Congo-Brazzaville). I use the geographic coordinates of DHS survey clusters to assign infants to ethnic group polygons.[13] I construct a mortality dummy that is coded 100 for all infants who have died in the first twelve months after their birth. The resulting dataset contains 879'922 infants, 617'151 of them born in rural survey locations.

I use the rural subset to estimate simple linear probability models of infant mortality. The unit of observation is the individual infant nested in an ethnic group polygon, which is, in turn, nested in an African country. The group-specific cash crop price index serves as main independent variable. The goal is to test whether rising cash crop prices translate into higher chances that rural infants in producing regions survive. If all surplus is distributed away from cash crop regions, we should not expect an effect. All models contain ethnic group fixed effects and country-survey-cohort dummies. Group fixed effects ensure that I only exploit temporal variation in ethnic group's mean infant mortality rates. The country-survey-cohort dummies imply that I restrict comparisons to

13 As an alternative strategy, one could match infants to ethnic groups by the mother's stated ethnic identity. However, my goal is to measure rural living standards in producing regions rather than living standards of out-migrants with roots in cash crop regions.

infants who were born in the same year and country and whose mother was interviewed in the same DHS survey round. This accounts for temporal shocks at the country level and potential changes in survey methodology. In a second step, I interact group-specific cash crop prices with political representation variables from the FRT data. If the higher tax burdens documented by Kasara (2007) are not matched with local public goods, we would expect negative and significant interaction terms. The number of interviewed mothers and their reported infants varies drastically across groups. I therefore weight all observations by the inverted sum of infants per ethnic group. This ensures equal weights for each FRT group and is in line with my interest in group-level rather than individual effects.

Table 8.11 reports results for the rural subsample. The constitutive term of group-specific cash crop values is always negative and significant. A doubling in cash crop prices reduces infant mortality rates in rural producing areas by one percentage point (10% of the mean mortality rate in my sample). While rural constituencies may be heavily taxed, they clearly benefit from rising values of their resources. Some surplus remains at the site of production. The interactions with the binary and continuous representation variables yield small and insignificant coefficients. Kasara (2007) may be right in claiming that politically represented cash crop regions face higher tax burdens. However, representation does not alter the effect of rising prices on rural constituencies' infant mortality rates. The most likely explanation is that taxation is matched with local public goods provision.[14]

8.4 CONCLUSION

Figure 8.4 graphically summarizes my main findings. In short, colonial cash crops and their changing market values have consistently positive and significant effects on ethnic groups' representation in ministerial cabinets. Effects of mineral resources and staple crops are never positive or significant. Instrumental variable results and the exogenous nature of world market prices suggest that the cash crop effects are causal. Neither agricultural productivity nor resource wealth *per se* cause political inclusion. The cash crop-specific effects are best explained by a bargaining process between cash crop elites and incumbent

14 Appendix Tables B.11 and B.12 repeat the analysis for the entire dataset and the urban subsample. Rising cash crop prices do not reduce infant mortality in ethnic cash crop regions' urban centers. The results for the complete sample are very similar to what I find in the rural subsample.

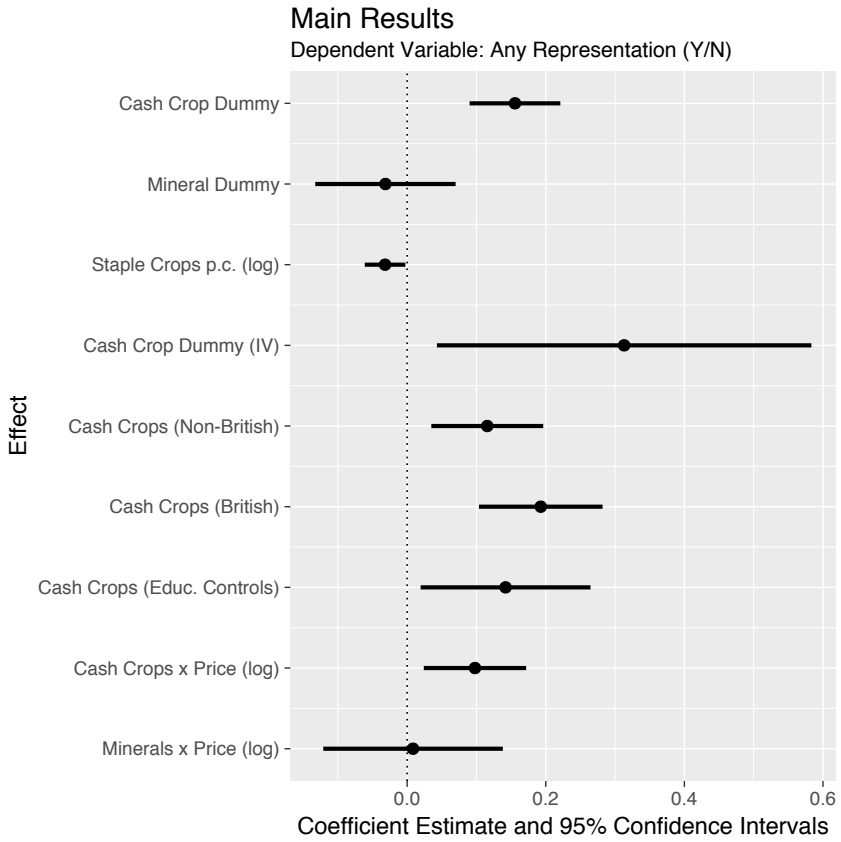

Figure 8.4: Main Results

rulers. The specific institutional setup of the colonial age gave cash cropping groups an early advantage in terms of elite formation and political mobilization.

Incumbents' desire to tax cash crop exports without stifling production makes them likely to include elites from production regions in their ruling coalitions. Local intermediaries ensure political support, acquiescence to indirect taxation and perhaps, as Baldwin (2015) has argued, efficient provision of local public goods. Capital-intensive mines can be controlled and taxed directly without the assistance of local intermediaries. Locally traded staple crops provide less revenue potential. In addition, states without effective local tax bureaucracies have a hard time to extract food crop-based revenues. Production and trading need to be monitored and taxed at the local level.

These general features of different resource types likely explain why I find no systematic differences between British and non-British colonies. Metropolitan ideologies and their institutional legacies matter less where colonial and post-colonial rulers face similar challenges and opportunities in terms of revenue collection and political survival. As such, representation in African ruling coalitions is a more complex phenomenon than the efficient recruitment of qualified candidates for political office. Colonial investments in education may matter but are unlikely to be the main storyline. Elite bargains about government representation are a genuinely political rather than mere economic phenomenon. Somewhat ironically, I use data on economic resources and market prices to drive home this point.

9

PEASANTS INTO TRIBESMEN: CASH CROPS AND ETHNIC IDENTITY SALIENCE

Politically salient ethnic identities are perhaps the most frequently blamed cause of generally low levels of development and civil strife in Sub-Saharan Africa (Horowitz 1985; Alesina et al. 2003). In this chapter, I empirically examine how colonial resource regimes led to relative differences in ethnic identity salience within countries. In Chapter 6, I theorize how the unique combination of communal rule, in-migration of ethnic strangers, and local competition for scarce and unequally distributed benefits of colonial modernization led to particularly politicized ethnic identities in colonial cash crop regions. As land became less abundant, revenues dwindled, and in-migration continued, locally dominant sons and, perhaps to a lesser extent, daughters of the soil faced strong incentives to enforce ethnic boundaries. Shoring up identity barriers served as a useful strategy to exclude outsiders and maximize per-capita gains of in-group members (Fearon 1999).

I have shown in the two previous chapters, that cash cropping regions are more developed and better integrated in central state governments. According to classical modernization theories, higher levels of education, formal employment, urbanization, wealth, and political representation at the national level should gradually replace ethnic with broader national identities (Deutsch 1953; Anderson 1981; Gellner 2008). Eugene Weber (1976) has famously described how formal education, compulsory service in military "schools of the nation", market integration, and road and railway construction turned Breton, Gascon, and Alsatian "Peasants into Frenchmen." In line with second-generation modernization theorists, I argue that things have played out differently in the Sub-Saharan African context (Bates 1983; Melson and Wolpe 1970; Calhoun 1993; Posner 2005). Modernization in export agriculture may have raised living standards, education levels, and ambitions in the national political arena. However, indirect rule, local diversity, and inter-group competition turned cash-cropping African peasants into tribesmen.

In mining towns, classical modernization forces, more direct forms of rule, and cross-cutting incentives for class-based mobilization prevented similarly ethnicized contests for scarce resources. Indirect rule through supposedly tribal institutions also prevailed in non-cash cropping rural areas and may

have politicized previously fluid identity categories (Mamdani 1996). However, lower levels of in-migration and less resources to compete for imply *relatively* lower identity salience than in cash crop regions. My theoretical approach is in line with both constructivist and instrumentalist theories of ethnicity (Chandra 2012; Posner 2005). I regard ethnic identities as situation-bound and potentially malleable. My focus on inter-group competition for local economic opportunities is closer to the instrumentalist school than to more sociologically-minded constructivist theories (Hobsbawm and Ranger 2012; Vail 1989). This does not negate the relevance of constructivist mechanisms. In Chapter 6, I discuss a literature that points to the important roles of missionary education and publishing in African languages (Vail 1989; Posner 2003). My sole claim is that inter-group competition for economic resources matters above and beyond alternative causes of identity formation.

The analysis below speaks to a recent empirical literature on the causes and consequences of salient ethnic identities. Daniel Posner's (2005) seminal work has shown how political competition and electoral institutions make some identity-based coalitions more viable than others. Amanda Robinson (2016) examines the effects of modernization and colonial legacies on survey respondents' ethnic versus national identification. In two additional articles, she shows that residential segregation at the subnational level is associated with an ethno-centric trust premium towards co-ethnics (Robinson 2017*a*) and that ethnic boundaries create market imperfections (Robinson 2017*b*). Under weak institutions, shared ethnicity and the associated trust may facilitate intra-ethnic market transactions but impede inter-group commerce. Aker et al.'s (2014) study on Niger and Nigeria suggests that ethnic boundaries within countries are associated with similar price differentials across local markets as national boundaries.

In the analyses below, I show how ethnic competition within colonial cash crop regions may have created the trust premia and market imperfections highlighted by these studies. Cervellati, Chiovelli and Esposito (2018.) take a long-term epidemiological view and argue that ethnic diversity and identity salience are rational evolutionary responses to limit Malaria transmission. I move beyond these studies in several important aspects. First, I explicitly test the ethnic competition mechanism at the subnational rather than the national level. Second, I complement studies on the effects of political and electoral competition at the national level (Eifert, Miguel and Posner 2010) with an explicit analysis of local economic competition.

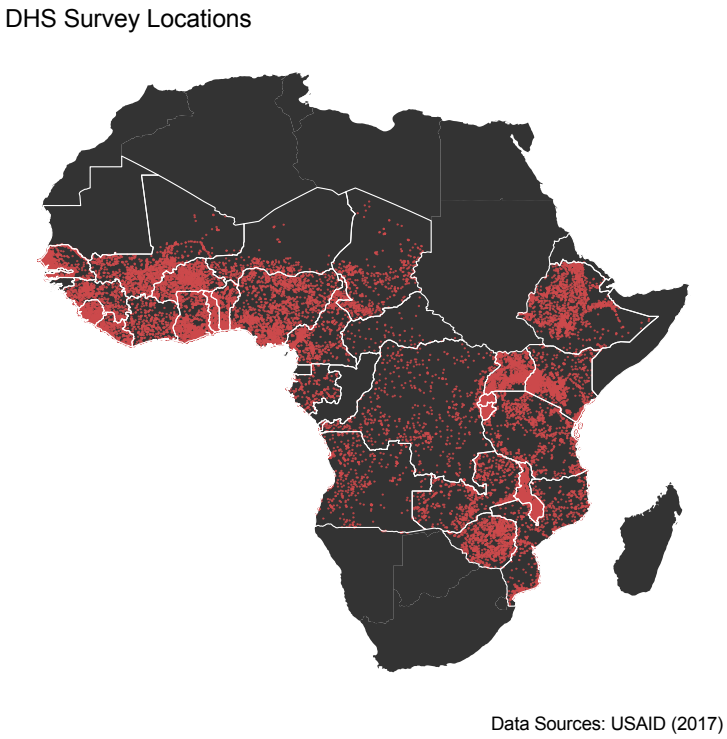

Figure 9.1: Unique DHS Survey Locations used in this Chapter

Third, I move beyond forced-choice survey measures of ethnic versus national or occupational identification. Individuals have multiple identities and surveys that force them to prioritize one over others may yield inaccurate responses (Robinson 2016). Social desirability bias is a serious concern. Despite the much-cited importance of ethnicity in Africa, only 13% of Afrobarometer respondents report stronger ethnic than national identification. To address these concerns, I follow Cervellati, Chiovelli and Esposito (2018.) and use a more behavioural measure of ethnic identity salience: Inter- and intra-ethnic marriages from a large sample of couples surveyed by the Demographic and Health Surveys (USAID 2012).

In the remaining parts of this chapter, I present the data, methods, and empirical results of my analysis of ethnic identity salience. In an additional empirical section, I test whether higher identity salience in cash crop regions plausibly works as a strategy to exclude ethnic strangers from economic benefits. The final section concludes.

9.1 DATA & METHODS

The DHS data I use in this chapter has two main advantages over Afrobarometer survey data on ethnic identification. First and foremost, it includes a larger

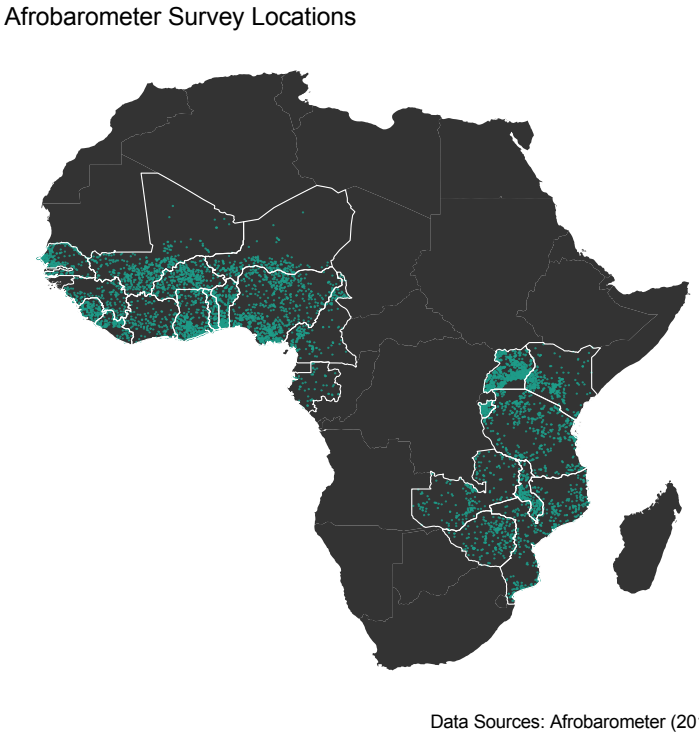

Figure 9.2: Unique Afrobarometer Survey Locations used in this Chapter

number of respondents interviewed in significantly more survey locations that are more evenly spread across the territories of a greater number of African countries. Figures 9.1 and 9.1 plot the unique geocoded survey locations of both survey projects. The DHS data allows to link female and male survey respondents who are married to each other. I construct a dataset that contains all couples from geocoded survey rounds and restrict the sample to observations that contain information on the ethnic identity of both wife and husband. Coding ethnic endogamy from the raw DHS data on ethnic identities is problematic (Cervellati, Chiovelli and Esposito 2018.). Ethnic categories sometimes change from survey round to survey round. In addition, raw ethnicity categories would treat all marriages across some identity line as inter-ethnic, regardless of the cultural, geographic, or linguistic distance between wife's and husband's ethnic groups. In the Nigerian context, marriages among different Yoruba subgroups are arguably less exogamous than a Hausa-Igbo liaison.

In joint work with Carl Müller-Crepon from ETH Zürich and Nils-Christian Bormann from the University of Exeter, I match all publicly available datasets on African ethnicity to the Ethnologue language trees (Lewis 2009).[1] We use Ethnologue's linguistic hierarchies as a translation and aggregation scheme

1 Vanessa Kellerhals and Paola Galano Toro from ETH Zurich continue to provide excellent research assistance.

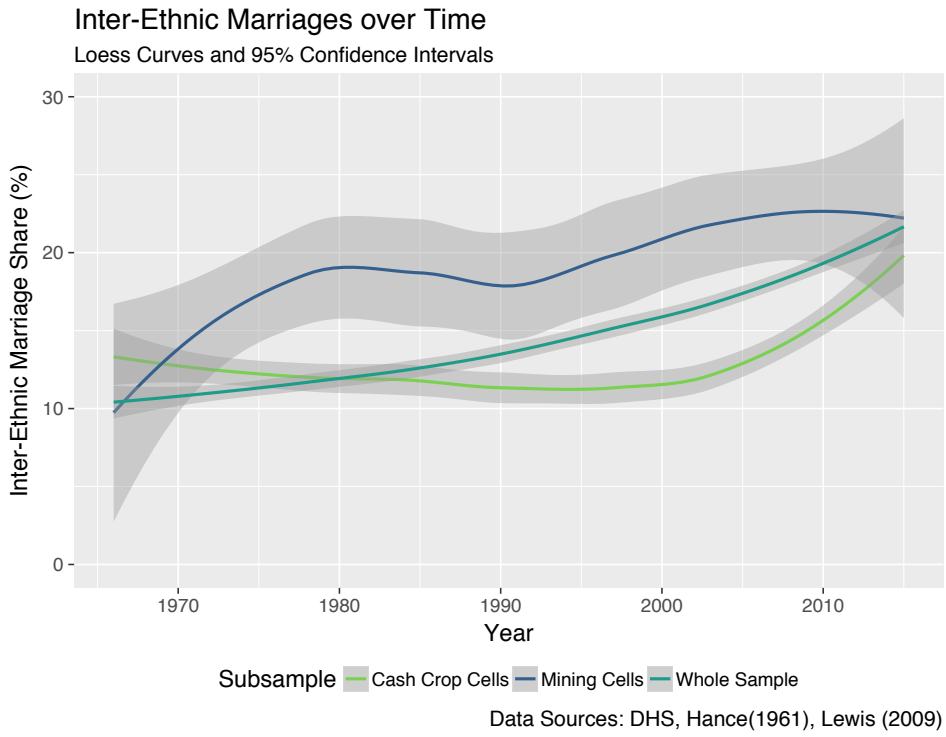

Figure 9.3: Inter-Ethnic Marriage in Africa, 1966–2015
(Based on Ethnologue Level 14)

that enables ethnic matches at various levels of linguistic granularity. The goal is to release an R package that allows researchers to match individual-level data from the DHS, Afrobarometer, or the IPUMS census samples to ethnic group level datasets like EPR (Vogt et al. 2015), AMAR (Birnir et al. 2018), PREG (Posner 2004*a*), Francois, Rainer and Trebbi's (2015) minister data, as well as to spatial data on settlement regions such as GREG (Weidmann, Rød and Cederman 2010), GeoEPR (Wucherpfennig et al. 2011), the WLMS (2017) polygons, and Murdock's (1959) map.

For the present purpose, I use the match between DHS and Ethnologue to code, for each couple, inter-ethnic marriage dummies at all 16 levels of Ethnologue's linguistic hierarchy. In the analysis, I use a total of 157'506 couples with information on the ethnicity of both partners and successful matches to Ethnologue. Figure 9.3 takes DHS information on each couple's stated marriage year and plots smoothed time-series of mean inter-ethnic marriage rates at level 14 of the Ethnologue tree. The figure distinguishes the whole sample from the cash crop and mining cells described in Chapter 7. Inter-ethnic marriages have been more common in colonial mining areas than elsewhere. This seems in line with my argument and classical modernization theory. Between 1985 and 2013, inter-ethnic marriage was significantly less likely in colonial cash crop regions

than in the whole sample. Both the cash crop subset and the total sample reveal a strong increase in inter-ethnic marriages throughout the past decades.[2] The following analyses probe whether these descriptive differences persist when subjected to more rigorous econometric testing.

9.2 ANALYSIS & RESULTS

My empirical strategy is closely related to the cross-sectional design from Chapter 7 of this dissertation. I assign all DHS couples to the 25 × 25 km grid used above. I then code binary and continuous measures of the colonial cash crop and mineral treatments. The continuous predictor is the log cell value of mineral or cash crop production in 1960 USD. I use the very same set of cell-level geographic and historical baseline controls as in 7. I further add both partners' age and age-squared as individual-level control variables and add dummies for the wife's rank number in polygamous households. I estimate fixed effects linear probability models with inter-ethnic marriage dummies at various linguistic levels as dependent variable. Fixed effects are at the level of country-specific survey rounds to net out unobserved differences between countries and over time within countries that were surveyed more than once. Marriage year fixed effects account for the rising temporal trend in ethnic exogamy and other general temporal trends that equally affect all countries and couples in my sample. Standard errors are clustered at the country-survey level.

To address endogeneity concerns, I again estimate instrumental variable models based on cash crop-specific agro-climatic suitability. As colonial cash crop regions tend to be more educated, urban, and economically advanced, I expect IV estimates to be larger than simple OLS coefficients. Classic modernization forces potentially work against the proposed ethnic competition mechanism.[3]

Table 9.1 presents my baseline results for level 14 of the Ethnologue language tree. A 100% higher colonial cash crop value is associated with a 1.35% lower probability of inter-ethnic marriages. The dummy regression in Column 3 suggests that, on average and all else equal, colonial cash crop cells have

2 The fast rise in the last couple of years of the observation period may have to do with the changing composition of the sample. The DHS program surveys different countries in different years. Some countries have not yet been surveyed in the latest rounds and others lack from the older iterations.

3 At the present stage of this project, I do not yet account for the potential problems of spatial dependence in geographic IV designs highlighted by Betz, Cook and Hollenbach (2017). With the significantly larger couple sample and canned routines for spatial regression models, I hit computational walls. While I'm working on a solution, the IV results have to be seen as preliminary and may perhaps constitute an upper bound of the true causal effect.

Table 9.1: Colonial Cash Crops and Inter-Ethnic Marriage

	100 × Inter-Ethnic Couple (Y/N)			
	LPM	2SLS-IV	LPM	2SLS-IV
Cash Crop Value, log	-1.353**			
	(0.639)			
Cash Crop Value, log (fitted)		-6.654***		
		(2.410)		
Cash Crop Dummy			-1.721**	
			(0.822)	
Cash Crop Dummy (fitted)				-11.849***
				(4.418)
Country-Survey-Round FE	Yes	Yes	Yes	Yes
Marriage Year FE	Yes	Yes	Yes	Yes
Baseline Controls	Yes	Yes	Yes	Yes
Individual-Level Controls	Yes	Yes	Yes	Yes
First-Stage F	–	17.62	–	22.81
Observations	129,681	121,343	129,681	121,343

Notes: OLS and 2SLS-IV linear probability models. The inter-ethnic marriage dummy is coded at level 14 of the Ethnologue language tree. Its sample mean is 14.88. Baseline controls include soil and climatic suitability for agriculture, malaria ecology, tsetse fly suitability, terrain ruggedness, log distances to coast, capital, navigable waterways, precolonial trade routes, cities in 1900, as well as the historical proxies for precolonial stateness, reliance on agriculture, and exposure to the slave trades. Individual controls are both wife and husband's and age squared as well as the wife's rank in polygamous households. Standard errors are clustered at the level of the country-specific survey round. Significance codes: *p<0.1; **p<0.05; ***p<0.01

1.72 percentage points less inter-ethnic couples than their non-cash cropping counterparts. This amounts to an 11.6% drop compared to the sample mean of 14.88. Instrumental variable estimates are orders of magnitudes larger. At the present stage, the IV results have to be interpreted with caution, as I do not yet adequately account for spatial dependence as in Chapter 7. Figures 9.4 and 9.5 plot the estimated effects for all language levels.

Table 9.2 adds additional explanatory variables. The first two columns include the colonial mineral dummy and a cell-level FAO estimate of total crop production values in the year 2000. This is the same proxy that I used in the mediation analysis of Chapter 7. The goal is to isolate the colonial cash crop effect from generally high agricultural productivity. Both the mineral and the crop production variable enter with positive and significant coefficients. The cash crop effects remain negative and significant. Columns 3 and 4 add 'bad controls', i.e. post-treatment variables that may be related to colonial cash crop production and the ethnic salience outcome. I control for the modernization factors of urbanization, household wealth, and female education.

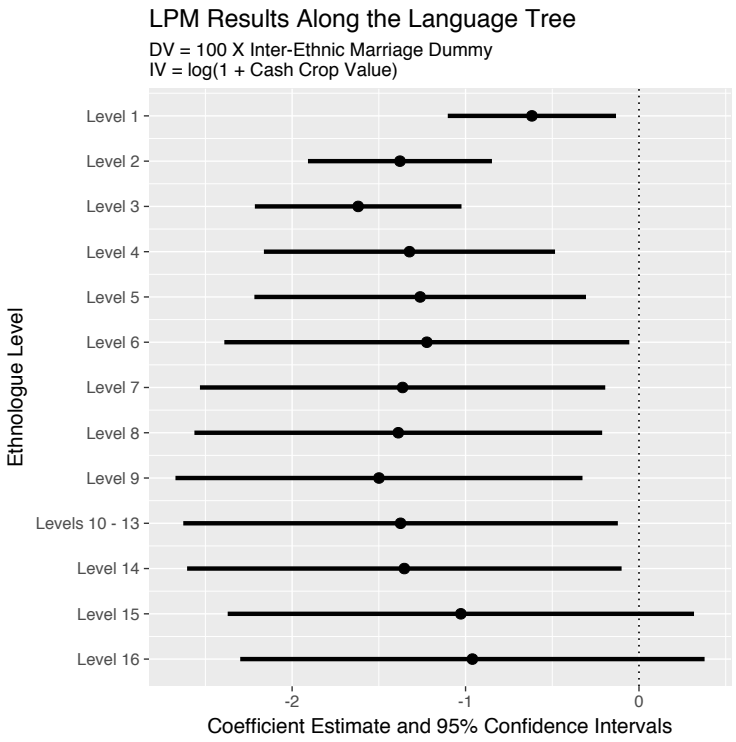

Figure 9.4: LPM Results across all Levels of the Ethnologue Tree

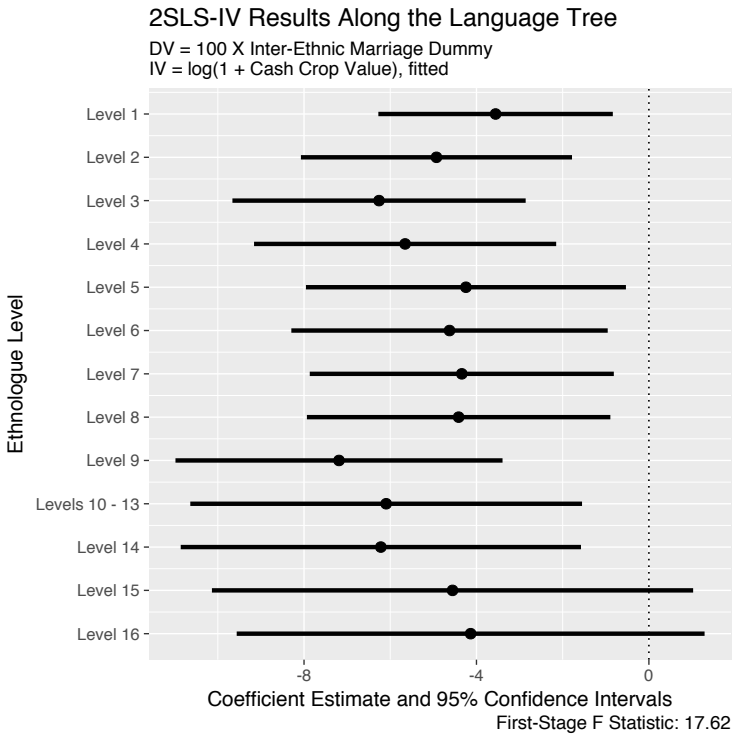

Figure 9.5: 2SLS Results across all Levels of the Ethnologue Tree

Table 9.2: Adding Minerals and Bad Controls

	100 × Inter-Ethnic Couple (Y/N)			
Cash Crop Value, log	-1.554**		-1.091**	
	(0.648)		(0.499)	
Mineral Value, log	2.439***		0.606	
	(0.787)		(0.594)	
Cash Crop Dummy		-2.070**		-1.484**
		(0.834)		(0.695)
Mineral Dummy		4.147**		-0.709
		(1.899)		(1.286)
Agric. Prod. Value (log)	1.215**	1.208***	0.311	0.325
	(0.473)	(0.468)	(0.385)	(0.379)
Urban Dummy			2.521***	2.600***
			(0.591)	(0.595)
2nd HH Wealth Quintile			0.475	0.466
			(0.410)	(0.407)
3rd HH Wealth Quintile			0.429	0.408
			(0.480)	(0.479)
4th HH Wealth Quintile			2.028***	2.031**
			(0.781)	(0.790)
5th HH Wealth Quintile			5.477***	5.534***
			(0.936)	(0.955)
Primary Educ. (Wife)			0.767	0.743
			(0.721)	(0.733)
Secondary Educ. (Wife)			2.301**	2.257**
			(1.106)	(1.125)
Higher Educ. (Wife)			3.621*	3.558*
			(1.987)	(2.017)
ELF			24.084***	24.149***
			(1.823)	(1.839)
Ethnic Polarization			-11.442***	-11.678***
			(3.311)	(3.326)
Country-Survey-Round FE	Yes	Yes	Yes	Yes
Marriage Year FE	Yes	Yes	Yes	Yes
Baseline Controls	Yes	Yes	Yes	Yes
Individual-Level Controls	Yes	Yes	Yes	Yes
Observations	129,681	129,653	109,756	109,737

Notes: OLS linear probability models. The inter-ethnic marriage dummy is coded at level 14 of the Ethnologue language tree. Its sample mean is 14.88. Baseline controls include soil and climatic suitability for agriculture, malaria ecology, tsetse fly suitability, terrain ruggedness, log distances to coast, capital, navigable waterways, precolonial trade routes, cities in 1900, as well as the historical proxies for precolonial stateness, reliance on agriculture, and exposure to the slave trades. Individual controls are and age squared of both wife and husband as well the wife's rank number in polygamous households. Standard errors are clustered at the level of the country-specific survey round. Significance codes: *p<0.1; **p<0.05; ***p<0.01

All these variables enter with the expected positive sign and are mostly significant. This is in line with modernization theories and supports recent findings from Robinson (2016). I also add DHS-derived cell-level measures of ethnic demography. First I calculate a Herfindahl index of ethnolinguistic fractionalization (Alesina et al. 2003). Second, I construct a measure of ethnic polarization along the lines of Montalvo and Reynal-Querol (2005). Fractionalization predicts higher inter-ethnic marriage rates whereas polarization has a large and significant negative coefficient. The ELF effect is in line with the contact hypothesis and Robinson's (2017*a*) findings on segregation. The polarization effects suggests more salient group boundaries where roughly equally-sized groups compete for resources (Esteban and Ray 2008). Adding these variables slightly reduces the size of the cash crop effects, yet does not change their sign or significance levels.

Table 9.3 aggregates colonial cash crop and mineral values, agricultural productivity, as well as ethnic fractionalization and polarization at the level of Murdock's historical ethnic group polygons. The OLS results remain strikingly similar to previous specifications. The IV effect is still more than twice as large as the naive OLS coefficient but the spread seems less drastic than in the cell-based models. The most likely explanation is less spatial correlation in the instrument and endogenous regressor at coarser spatial resolutions.

To check whether the findings on inter-ethnic marriages travel to alternative operationalizations of ethnic identity salience, I use the well-established Afrobarometer survey measure on ethnic vs. national identification (Afrobarometer 2018). I construct a dataset of almost 90'000 geocoded survey respondent who were asked the forced identity choice item in rounds 3–6 of the Afrobarometer survey. I code a dummy variable identifying all respondents who identify more strongly in ethnic than national terms and estimate fixed effects linear probability and logistic regression models. The cell-level resource variables and the geographic and historical control variables remain the same as above. At the individual level, I account for respondents' age, age squared, and sex. Table 9.4 summarizes the results. A 100% higher cell value of colonial cash crop production is associated with an about 0.7% higher likelihood that post-colonial survey respondents report stronger ethnic than national identities. The colonial mining term enters with negative sign but does not reach conventional significance levels. The logit models show the same pattern. Average marginal effects are practically indistinguishable from the marginal effects of the linear models. The Afrobarometer results clearly support my previous analysis and theoretical argument.

Table 9.3: Aggregating Colonial Resources at Coarser Spatial Units

	100 × Inter-Ethnic Couple (Y/N)			
	LPM	2SLS-IV	LPM	LPM
Cash Crop Value, log	-0.803***		-0.971***	-0.923***
	(0.296)		(0.276)	(0.255)
Cash Crop Value, log (fitted)		-2.114**		
		(1.003)		
Mineral Value, log			1.947***	1.093**
			(0.702)	(0.476)
Agric. Prod. Value, log			1.037*	0.853*
			(0.439)	(0.385)
Urban Dummy				5.200***
				(0.698)
2nd HH Wealth Quintile				0.652
				(0.408)
3rd HH Wealth Quintile				0.751
				(0.528)
4th HH Wealth Quintile				3.002***
				(0.908)
5th HH Wealth Quintile				7.821***
				(0.994)
Primary Educ. (Wife)				0.642
				(0.839)
Secondary Educ. (Wife)				2.198*
				(1.166)
Higher Educ. (Wife)				3.456*
				(2.028)
ELF				11.080***
				(1.731)
Ethnic Polarization				-15.485***
				(3.294)
Country-Survey-Round FE	Yes	Yes	Yes	Yes
Marriage Year FE	Yes	Yes	Yes	Yes
Baseline Controls	Yes	Yes	Yes	Yes
Individual-Level Controls	Yes	Yes	Yes	Yes
First-Stage F	–	26.41	–	–
Observations	129,681	129,653	129,681	109,737

Notes: OLS and 2SLS linear probability models. The inter-ethnic marriage dummy is coded at level 14 of the Ethnologue language tree. Its sample mean is 14.88. Baseline controls include soil and climatic suitability for agriculture, malaria ecology, tsetse fly suitability, terrain ruggedness, log distances to coast, capital, navigable waterways, precolonial trade routes, cities in 1900, as well as the historical proxies for precolonial stateness, reliance on agriculture, and exposure to the slave trades. Individual controls are and age squared of both wife and husband as well the wife's rank number in polygamous households. Standard errors are clustered at the level of the country-specific survey round. Significance codes: *p<0.1; **p<0.05; ***p<0.01

Table 9.4: Afrobarometer: Ethnic vs. National Identities

	Ethnic > National ID (Y/N)			
	LPM		Logit	
Cash Crop Value 1957 (log)	0.736**	0.732**	0.066**	0.066**
	(0.308)	(0.309)	(0.026)	(0.026)
Mineral Value 1957 (log)		-0.271		-0.049
		(0.285)		(0.030)
Country FE	Yes	Yes	Yes	Yes
Baseline Controls	Yes	Yes	Yes	Yes
Individual-Level Controls	Yes	Yes	Yes	Yes
100 × Avg. Marginal Effect	–	–	0.734	0.730
Observations	86,037	86,037	86,037	86,037

Notes: OLS linear probability models and fixed efefcts logit. The sample means of the dependent variable are 12.94 (Columns 1 and 2) and 0.1294 (Columns 3 and 4). Baseline controls include soil suitability for agriculture, malaria ecology, tsetse fly suitability, terrain ruggedness, log distances to coast, capital, navigable waterways, precolonial trade routes, cities in 1900, as well as historical proxies for precolonial stateness, reliance on agriculture, and exposure to the slave trades. Individual controls are, age squared, and sex. Standard errors clustered at the level of administrative districts. Significance codes: *p<0.1; **p<0.05; ***p<0.01

9.3 ETHNIC STRANGERS AS SECOND-CLASS CITIZENS?

Both direct survey responses and the more behavioral measure of spouse choice suggest more salient and politicized ethnic identities in colonial cash crop regions vis-à-vis mining zones, cities, and other agriculturally productive areas. I regard inter-ethnic competition and the associated use of identity barriers to exclude the out-group from modernization benefits as most plausible theoretical mechanism. In what follows, I provide suggestive evidence in favor of this mechanism. More specifically, I use our Ethnologue-based ethnic matching scheme to match individual DHS respondents to historical ethnic homelands as coded by George Peter Murdock (1959). The match allows to assess whether survey respondents reside inside or outside the historical homeland of the ethnic group they state to identify with.

A similar distinction between historic ethnic movers and stayers has been used by economists to separate the cultural transmission of historical traits and values across generations from location-specific factors. Nunn and Wantchekon (2011), for example, demonstrate that the trust-reducing effects of ethnic ancestors' exposure to the slave trades also affect Afrobarometer respondents who reside outside their ancestral homeland. In the present application, I am less interested in the cultural transmission of ethnic identity salience beyond cash

crop producing homelands. The mechanism I propose is likely to be linked to local cash crop economies and may not travel with people who leave to urban centers, mining zones, or elsewhere. Instead, I use the ethnic mover-stayer distinction to assess whether colonial resource regimes created systematic differences in well-being between sons and daughters of the soil an in-migrating ethnic strangers.

If sons of the soil use ethnic identity barriers to exclude ethnic strangers, one can expect that the positive effects of historical and present-day cash crop production on local living standards are greater for ethnic stayers than for in-migrants or their descendants. Note however, that the mover and stayer subsamples are unlikely to be directly comparable. People who migrate (or whose parents or grandparents did) typically move to economic opportunity. They rarely come from the least wealthy and uneducated subpopulations of their area of origin. Extremely poor people tend to stay where they are. As a result, ethnic movers can be expected to have higher average living standards than ethnic stayers. In the following analysis, I test whether this gap is smaller in cash crop regions than elsewhere.

To that end I use four DHS survey measures of economic well-being. At the household level, I examine an asset-based household wealth proxy and electricity access. At the individual level, I code dummies for secondary education and skilled non-agriculutral employment. I estimate OLS and linear probability models with country-survey-round fixed effects and the baseline and individual-level covariates discussed above. At the household level, I calculate the share of ethnic movers across all interviewed household members. Not surprisingly, the household share of ethnic movers is bimodally distributed with gravity points at 0 and 1. At the individual level, I code an ethnic stranger dummy. In each model, I interact cell-level colonial cash crop and mineral values with the ethnic mover indicators.

Table 9.5 summarizes my findings. As expected, ethnic movers in non-resource areas are, on average, significantly better off across all four outcomes. They have an almost 0.2 standard deviation higher level of household wealth, a 6.4 percentage point greater chance to be connected to the electricity grid, and more than 3 percentage points larger probabilities of having some secondary education or a skilled non-agricultural job. In the most general sense, individual or ancestral internal migration seems to pay off. The constitutive terms of colonial cash crop and mineral production suggest strong positive effects on local ethnic stayers. In cash crop regions, sons and daughters of the soil have 0.17 standard deviations higher household wealth than ethnic stayers in

resource-poor regions and similarly significant advantages in terms of electricity access, education, and skilled employment. Except for education, the positive effects in colonial mining areas are even larger. The negative and significant interaction terms in rows 5 and 7 provide evidence that the developmental effects of colonial cash crop production are smaller for ethnic in-migrants and their descendants. The interaction terms with the mining variable yield relatively precisely estimated null effects.

Table 9.5: Well-Being of Ethnic Movers and Stayers

	DHS Survey Item			
	HH Wealth	Electricity	Sec. Educ.	Quality Job
Ethnic Movers (HH Share)	0.196***	0.064***		
	(0.026)	(0.010)		
Ethnic Mover (Y/N)			0.034***	0.032***
			(0.007)	(0.006)
Cash Crop Value (log)	0.165***	0.061***	0.061***	0.023***
	(0.027)	(0.012)	(0.009)	(0.005)
Mineral Value (log)	0.235***	0.071***	0.046***	0.040***
	(0.025)	(0.010)	(0.008)	(0.005)
Movers × Cash Crops	-0.108***	-0.036***		
	(0.030)	(0.012)		
Movers × Minerals	-0.018	0.002		
	(0.021)	(0.019)		
Mover × Cash Crops			-0.038***	-0.025***
			(0.008)	(0.006)
Mover × Minerals			-0.006	-0.011
			(0.008)	(0.007)
Country-Survey-Round FE	Yes	Yes	–	–
Country-Survey-Cohort FE	–	–	Yes	Yes
Baseline Controls	Yes	Yes	Yes	Yes
Individual-Level Controls	–	–	Yes	Yes
Observations	389,589	461,227	829,369	737,743

Notes: OLS linear probability models. The sample means of the dependent variables are Baseline controls include soil and climatic suitability for agriculture, malaria ecology, tsetse fly suitability, terrain ruggedness, log distances to coast, capital, navigable waterways, precolonial trade routes, cities in 1900, as well as the historical proxies for precolonial stateness, reliance on agriculture, and exposure to the slave trades. Individual-level controls are age, age squared, and sex. Standard errors are clustered at the level of the country-specific survey round. Significance codes: *p<0.1; **p<0.05; ***p<0.01

Figures 9.6 and 9.7 plot the estimated marginal effects of colonial cash crop and mineral production for ethnic stayers and movers in colonial export areas. Even in cash crop areas, the point estimates for ethnic strangers are positive across three of the four models. However, three mover effects are statistically

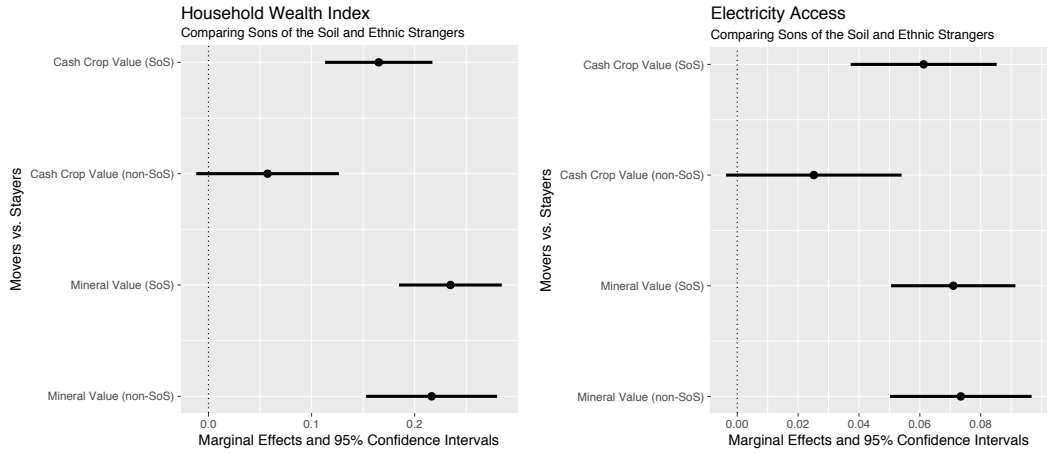

Figure 9.6: Sons of the Soil and Ethnic Strangers at the Household Level

indistinguishable from zero and all four plots suggest that the local sons of the soil benefit to greater extents from historical or ongoing cash crop production. No such differences are found for colonial mining areas where both local populations and ethnic strangers seem to benefit in equal measure.

Appendix Table C.3 shows results from reduced form models that replace actual colonial cash crop production with potential yield estimates from the FAO GAEZ database weighted by cash crop prices in 1900. The interaction terms with the ethnic stranger variables remain negative and significant. Table C.4 defines movers and stayers based on the ethnolinguistic WLMS polygons already used in Chapter 8. The results remain similar. These findings are compatible with exclusionary or discriminatory economic strategies by sons of the soil aimed at maximizing in-group members' payoffs. While I cannot directly operationalize these local coalition strategies, the results suggest that identity-based competition and horizontal inequalities also matter at more local levels than the national political arena. This seems in line with Sara Berry's (1993) work on how legacies of indirect rule motivate African cash crop farmers and rural populations more generally to invest in symbolic capital to gain or maintain status in locally dominant descent coalitions.

9.4 CONCLUSION

Where economic well-being is tied to ethnic in-group status and out-group members remain effectively excluded, identities are highly likely to become politicized. Locally dominant sons of the soil shore up identity-based barriers to entry. Ethnic strangers often have a hard time to fully assimilate across highly salient boundaries and may choose to strengthen their out-group identity as

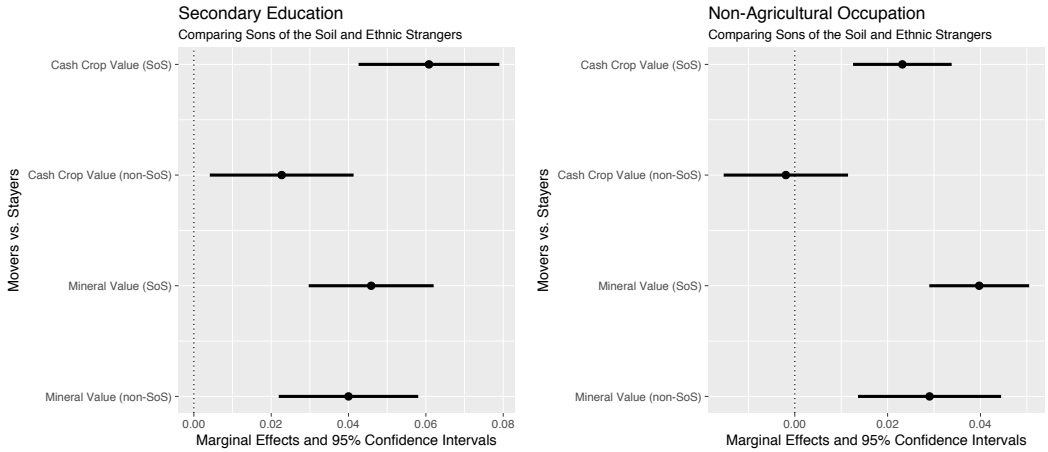

Figure 9.7: Sons of the Soil and Ethnic Strangers at the Individual Level

a potential base for countermobilization. Boone (2014) presents case-study evidence for the relevance of this mechanism across a considerable number of land-related ethnic conflicts in various Sub-Saharan African countries. In this chapter, I have provided quantitative evidence that ethnic boundaries are indeed more relevant in colonial cash crop areas than elswehere. In the final empirical chapter of this dissertation, I connect the dots from the previous chapters and examine how economic and political inequalities as well as salient ethnic identities may explain variation in armed conflict at the ethnic-group and more local levels.

10

INEQUALITY, SHOCKS & VIOLENCE: BEYOND OPPORTUNITY THEORIES OF VIOLENCE

What do the findings from the previous three chapters imply for violent conflict across Sub-Saharan Africa? The quantitative literature distinguishes between economic and grievance-related theories to explain onset, incidence, and duration of civil wars and more small-scale and local patterns of intra-state violence. On the economic side, one can usefully distinguish between opportunities and motivations. The opportunity cost mechanism holds that falling incomes or generally low living standards facilitate armed groups' recruitment efforts due to the lack of viable economic alternatives (Collier and Hoeffler 2004). The weak state mechanism similarly stresses opportunities and the feasibility of rebellion (Fearon and Laitin 2003; Collier, Hoeffler and Rohner 2009; Tilly 2017). Natural resource dependence has been argued to both weaken (Fearon 2005) and strengthen (Bazzi and Blattman 2014) state capabilities to deter or quell rebellion. As far as economic motivations are concerned, the rapacity mechanism suggests that greedy rebels aim to capture lucrative natural resources or the state as the ultimate prize (Collier and Hoeffler 2004; Ross 2015).

Grievance theories of rebellion do not negate the relevance of opportunity structures or material motivations for armed mobilization. However, they stress how frustration with unjust treatment by the central government or large gaps to economically dominant social groups may provide motivations for armed action that go deeper than mere greed or cool-headed cost-benefit analysis (Gurr 1970; Horowitz 1985; Cederman, Gleditsch and Buhaug 2013; Cederman, Weidmann and Gleditsch 2011). Empirically separating these mechanisms is difficult. Economic backwardness and political exclusion may spur grievances but are also consistent with low opportunity costs. In addition, low-status ethnic groups are often found in remote locations where state penetration is limited (Cederman, Buhaug and Rød 2009). Ethnic rebellion for central state power can potentially be motivated by self-serving rapacity or emotionally charged struggles to redress justified grievances (Peterson 2002; Wood 2003). In this chapter, I examine whether the logic of colonial resource regimes provides insights into the relevance of these mechanisms in the Sub-Saharan African context.

I start with a group-level analysis of ethnic conflict onset. I have shown in previous chapters that colonial cash crop regions are more developed, have better infrastructure, and are better represented in national governments. Both grievance and opportunity cost theories would expect ethnic groups from colonial cash crop regions to be less likely to challenge the state in center-seeking or secessionist civil wars. Mining regions tend to be richer but not necessarily politically represented. Any opportunity-cost or grievance-related conflict-reducing effect of mining wealth is thus likely to be attenuated by a lack of corresponding levels of political inclusion. In short, comparatively poor and underrepresented ethnic groups from regions without colonial export production can be expected to be most frequently involved in full-blown ethnic rebellion. Chapter 9 has pointed to particularly salient local-level ethnic cleavages in cash crop regions. Where sons of the soil compete with ethnic strangers for scarce and excludable benefits of the local agricultural export economy, more smaller-scale forms of ethnic violence may ensue. In a second set of empirical analyses, I use geocoded conflict event data to test the plausibility of this argument against the various economic opportunity and rapacity mechanisms just outlined.

10.1 GROUP-LEVEL ANALYSIS & RESULTS

At the ethnic group level, I replicate previous analyses by Cederman, Gleditsch and Buhaug (2013) and Cederman, Wimmer and Min (2010). I use the newest version of the EPR dataset (Vogt et al. 2015) and regress group-level ethnic conflict onset on measures of inclusion in the central government as well as recent downgrades in political status. I estimate pooled logit and linear probability models with and without country fixed effects. Control variables include demographic group size, the number of previous conflicts, country-level population and per capita GDP, and a cubic polynomial of the years since last conflict. Standard errors are clustered at the country level.

I add colonial cash crop and mineral values per sqkm by aggregating the Hance data used in previous chapters to the ethnic group polygons provided in the GeoEPR dataset (Wucherpfennig et al. 2011). Table 10.1 summarizes the results. Group-level cash crop endowments are associated with significantly reduced odds of ethnic conflict onset. 100% higher colonial cash crop values predict a 0.4–1.5% reduction in conflict risk. Effect sizes vary between specifications and are generally larger in the logistic and fixed effects specifications. Colonial mineral values never turn out significant. The sign is mostly negative but switches to positive in the fixed effects logit model. In line with my argu-

Table 10.1: Group-Level Conflict Onset

	Ethnic Conflict Onset			
	LPM		Logit	
Cash Crop Value per sqkm (log)	-0.548**	-0.884**	-0.813*	-1.959*
	(0.250)	(0.397)	(0.492)	(1.177)
Mineral Value per sqkm (log)	-0.577	-0.071	-0.511	1.890
	(0.727)	(0.845)	(1.270)	(3.743)
Politically Included (t-1)	-1.650***	-1.483***	-1.489***	-1.471***
	(0.428)	(0.406)	(0.319)	(0.308)
Downgraded (t-1)	6.195***	6.397***	1.913***	2.137***
	(2.254)	(2.265)	(0.293)	(0.328)
Country FE	No	Yes	No	Yes
Group-Level Controls	Yes	Yes	Yes	Yes
Country-Level Controls	Yes	Yes	Yes	Yes
100 × AME (Cash Crops)	–	–	-0.880	-2.092
100 × AME (Cash Crops, Incl.= 0)	–	–	-1.484	-3.395
100 × AME (Cash Crops, Incl.= 1)	–	–	-0.367	-0.890
Observations	6,743	6,743	6,743	6,743

Notes: OLS linear probability and logistic regression models. The sample means of the dependent variable are 0.927 (Columns 1 and 2) and 0.009 (Columns 3 and 4). Control variables include demographic group size, number of previous conflicts, country-level population and per capita GDP, and a cubic polynomial of the years since last conflict. Country-clustered standard errors in parentheses. Significance codes: *p<0.1; **p<0.05; ***p<0.01

ment, only colonial cash crops are associated with a significant reduction in conflict risk.

The established findings from the quantitative grievance literature remain intact. The conflict-reducing effect of political representation is only marginally reduced by including colonial cash crops as a potentially omitted factor that drives both inclusion and low risk of ethnic rebellion.[1] In the logit models, marginal effects depend on the values of the other explanatory variables. I use this feature to calculate marginal effects of group-level cash crops for politically included and excluded groups (see bottom panel of Table 10.1). The conflict-reducing cash crop effect appears larger for excluded than for included groups. This may have to do with the generally low probability of rebellion during times of inclusion or the bargaining mechanism discussed in Chapter 8. Where cash crops continue to provide lucrative sources of government revenue and incumbent regimes need local intermediaries to indirectly rule cash crop areas, the bargaining space for peaceful solutions is large — regardless of whether cash crop elites are upgraded to the central government or not.

I refrain from making strong causal claims about the models in Table 10.1. The limited African subsample and the broad EPR definitions of ethnic groups and geocoded homelands make an instrumental variable analysis of cash crop effects infeasible. Wucherpfennig, Hunziker and Cederman (2016) use plausibly exogenous variation in metropolitan ruling strategies vis-a-vis geographically remote ethnic groups to identify a causal effect of political exclusion on ethnic civil war. The contribution of the present dissertation to this literature is the focus on colonial resource regimes as historical cause of both political and economic horizontal inequalities. Whether low levels of grievances, high opportunity costs, local state presence, or bargaining between incumbents and cash crop elites drive the association between cash crop endowments and low group-level conflict remains to be tested in more detailed qualitative or quantitative studies. However, the logic of colonial resource regimes offers clear insights into the causes and mechanisms that drive more local forms of violence.

10.2 CROSS-SECTIONAL ANALYSIS AT THE CELL LEVEL

To investigate the local level implications of colonial resource regimes on armed conflict, I aggregate all events from the Armed Conflict Location and Event

1 Appendix Tables D.1 and D.2 show separate models for cash crops and the political representation variables.

dataset (ACLED) to the 25×25 km grid used in Chapters 7 and 9 (Raleigh et al. 2010). ACLED is the most widely used dataset to analyze local-level conflicts in Africa that remain below the UCDP project's 25 battle death threshold of organized civil war.[2] I use ACLED's event categorizations to code, for each grid cell, the share of years between 1997 and 2017 with at least one ACLED event and further distinguish between organized battles, state or rebel violence against civilians, riots, and protests. I first run cross-sectional OLS models with country-fixed effects that are analogous to my analysis of infrastructure and development outcomes in Chapter 7. Geographic and historical control variables are exactly the same. Once more, I use Conley standard errors with a 400 km distance cutoff.

Table 10.2: Cross-Sectional Results

	100 × Share of Years with ACLED Conflict				
	All	Battles	OSV	Riots	Protests
Colonial Mineral Dummy	3.706***	1.073	2.541***	1.141*	1.789**
	(1.378)	(0.752)	(0.941)	(0.582)	(0.704)
Food Crop Value 2000 (log)	0.086***	0.038***	0.048***	0.019**	0.012**
	(0.022)	(0.013)	(0.013)	(0.009)	(0.006)
Pop. Dens 2000 (log)	0.763***	0.420***	0.456***	0.226***	0.195***
	(0.117)	(0.073)	(0.076)	(0.037)	(0.032)
Colonial Cash Crops (Y/N)	2.597***	0.708**	1.631***	1.129***	0.959***
	(0.418)	(0.288)	(0.310)	(0.185)	(0.158)
Country FE	Yes	Yes	Yes	Yes	Yes
Cell FE	No	No	No	No	No
Country-Year	No	No	No	No	No
Observations	25,978	25,978	25,978	25,978	25,978

Notes: Linear probability models estimated via OLS. The sample means of the dependent variables are 2.03 (Any Event), 0.98 (Battles), 1.07 (OSV), 0.44 (Riots), 0.56 (Protests). Baseline controls include soil suitability for agriculture, malaria ecology, tsetse fly suitability, terrain ruggedness, log distances to coast, capital, navigable waterways, precolonial trade routes, cities in 1900, as well as historical proxies for precolonial stateness, reliance on agriculture, and exposure to the slave trades. Conley errors with 400 km distance cutoff in parentheses. Significance codes: *p<0.1; **p<0.05; ***p<0.01

In addition to the colonial cash crop and mineral dummies, I include a proxy of logged food production values for the year 2000. This proxy multiplies estimated production volumes of maize, wheat, and sorghum from the M3 data (Monfreda, Ramankutty and Foley 2008) with global market prices from the year 2000 Jacks (2013). I further include logged population densities from a grid provided by Klein-Goldewijk, Beusen and Janssen (2010). Protest and

2 See Berman and Couttenier (2015), Berman et al. (2017), and McGuirk and Burke (2017) for recent applications.

riots occur more frequently in urban and densely populated areas and I want to safeguard against the risk that population densities determine all results. Perhaps more problematically, the media report-based ACLED data may suffer from systematic reporting bias in favor of events in more densely populated places with better infrastructure (Weidmann 2015, 2016; Eck 2012). Controlling for population density partially addresses this problem yet is unlikely to completely solve it. The cross-sectional results reported below should therefore be interpreted with an appropriate amount of caution.

Table 10.2 reports the first set of results from simple OLS regressions. Colonial minerals, cash crops, contemporary food crop production, and high population densities significantly increase the odds that ACLED reports battles, violence against civilians, protests, or riots. Assuming for the moment that these results do not merely reflect unequal reporting patterns or unobserved omitted variables, more violence in better endowed places seems difficult to square with opportunity cost and state capacity mechanisms. People in agriculturally productive regions, in mining centers, or cities tend to be richer than the country average. As I have shown in Chapter 7, infrastructural state penetration is higher in former mining and cash crop cells.

Table 10.3 implements the spatial instrumental variable approach described in Chapter 7. Agro-climatic soil suitability for the most important African cash crops serves as instrument and I use a inverse distance weighted 50-cell nearest neighbor matrix to construct spatial lags of both the outcomes and exogenous baseline controls. The size and significance level of the cash crop coefficient remains comparable to the simple OLS models. Colonial cash crop cells have a 2.68 percentage points higher likelihood of seeing ACLED-coded events. This amounts to a 132% effect relative to the sample mean. Only the effect on organized battles becomes smaller and loses significance. This is consistent with my argument that violence in colonial cash crop areas rarely escalates to the level of full-blown organized rebellion against the central state. The coefficients on the instrumented spatial lags of the dependent variables illustrate that conflict events are clearly clustered in space. Whether the effects on one-sided violence, riots, and protests are due to reporting bias, simple rapacity, or relate to the ethnic competition mechanism from Chapter 9 remains to be answered. I thus move on to a time-varying analysis that uses weather and price shocks as plausibly exogenous sources of variation.

Table 10.3: Cross-Sectional Results (IV)

	100 × Share of Years with ACLED Conflict				
	All	Battles	OSV	Riots	Protests
Colonial Minerals (Y/N)	3.012**	0.501	2.077**	1.732**	1.106*
	(1.399)	(0.792)	(0.913)	(0.687)	(0.571)
Food Crop Value 2000 (log)	0.037***	0.037***	0.005	0.010	
	(0.020)	(0.012)	(0.012)	(0.005)	(0.009)
Pop. Dens 2000 (log)	0.587***	0.304***	0.349***	0.168***	0.198***
	(0.086)	(0.048)	(0.055)	(0.029)	(0.033)
W × Event	0.006***				
	(0.001)				
W × Battle		0.008***			
		(0.001)			
W × OSV			0.006***		
			(0.001)		
W × Riot				0.004***	
				(0.001)	
W × Protest					0.004***
					(0.001)
Colonial Cash Crops (Y/N), fitted	2.680***	0.432	1.682**	1.239***	1.572***
	(1.011)	(0.673)	(0.689)	(0.410)	(0.479)
Cell FE	Yes	Yes	Yes	Yes	Yes
Country-Year FE	Yes	Yes	Yes	Yes	Yes
First-stage F (W × Y)	32.91	30.18	29.63	17.88	29.74
First-stage F (Cash Crops)	11.52	11.52	11.52	11.52	11.52
Observations	25,978	25,978	25,978	25,978	25,978

Notes: Linear probability models estimated via spatial two-stage least squares. The sample means of the dependent variables are 2.03 (Any Event), 0.98 (Battles), 1.07 (OSV), 0.44 (Riots), 0.56 (Protests). Two-way clustered standard erorrs (cell and country-year) in parentheses. Significance codes: *p<0.1; **p<0.05; ***p<0.01

10.3 ECONOMIC SHOCKS AT THE CELL LEVEL

Following recent work from the subnational quantitative conflict literature, I estimate time-series cross-sectional models of conflict incidence at the cell level. I first focus on weather shocks. As opposed to positive price shocks that may increase conflict via the rapacity effect or reduce it via the opportunity cost mechanism, droughts unambiguously reduce producer incomes and appropriable crop output. If droughts affect prices of locally consumed crops, they unambiguously raise them and thus reduce real local incomes. Conflict-enhancing effects of droughts cannot be explained by the rapacity mechanism.

In addition, relatively short-term fluctuations in weather conditions are unlikely to significantly reduce state capacity. Lower opportunity costs for producers and consumers, rising grievances, or local ethnic competition remain plausible candidates underlying drought-induced conflict effects.

10.3.1 *Climate Shocks*

Table 10.4: Droughts, Crops & Violence

	100 × ACLED Event Dummies				
	All	Battles	OSV	Riots	Protests
Share of Drought Months (t-1)	-1.376***	-0.427**	-0.954***	-0.366***	-0.730***
	(0.346)	(0.198)	(0.236)	(0.114)	(0.212)
Drought × Cash Crop Dummy	1.417***	0.721**	1.213***	0.359	0.745**
	(0.507)	(0.314)	(0.358)	(0.236)	(0.305)
Drought × Food Crops 2000 (log)	0.059**	-0.008	0.045**	0.022**	0.050**
	(0.029)	(0.016)	(0.020)	(0.010)	(0.020)
Drought × Pop. Dens. 2000	0.299***	0.244***	0.197***	0.039	0.035
	(0.085)	(0.058)	(0.062)	(0.038)	(0.047)
Cell FE	Yes	Yes	Yes	Yes	Yes
Country-Year FE	Yes	Yes	Yes	Yes	Yes
Observations	864,220	864,220	864,220	864,220	864,220

Notes: Linear probability models estimated via OLS. The sample means of the dependent variables are 2.03 (Any Event), 0.98 (Battles), 1.07 (OSV), 0.44 (Riots), 0.56 (Protests). Two-way clustered standard errors (cell and country-year) in parentheses. Significance codes: *p<0.1; **p<0.05; ***p<0.01

To operationalize droughts, I use monthly gridded temperature data from the University of East Anglia's Climate Research Unit (Harris et al. 2014). Following Witmer et al. (2017), I construct a temperature anomaly index that compares the most recent four months of the data with the distribution of temperatures in the very same months across the 30 previous years (TI4). A 30-year moving window allows for some long-term human adaptation to changing climate (Witmer et al. 2017). The choice of a four-month interval is based on a suggestion by Harari and La Ferrara (Forthcoming.) who argue that this temporal resolution is appropriate to capture seasonal climatic variation. In a next step, I calculate the yearly share of months with TI4 values more than one standard deviation above the mean across the previous 30 years. A one-year lag of the TI4-based drought variable serves as exogenous shock variable in my models. My operationalization is in line with a growing consensus in the climate-related conflict literature that temperature-based indicators yield more

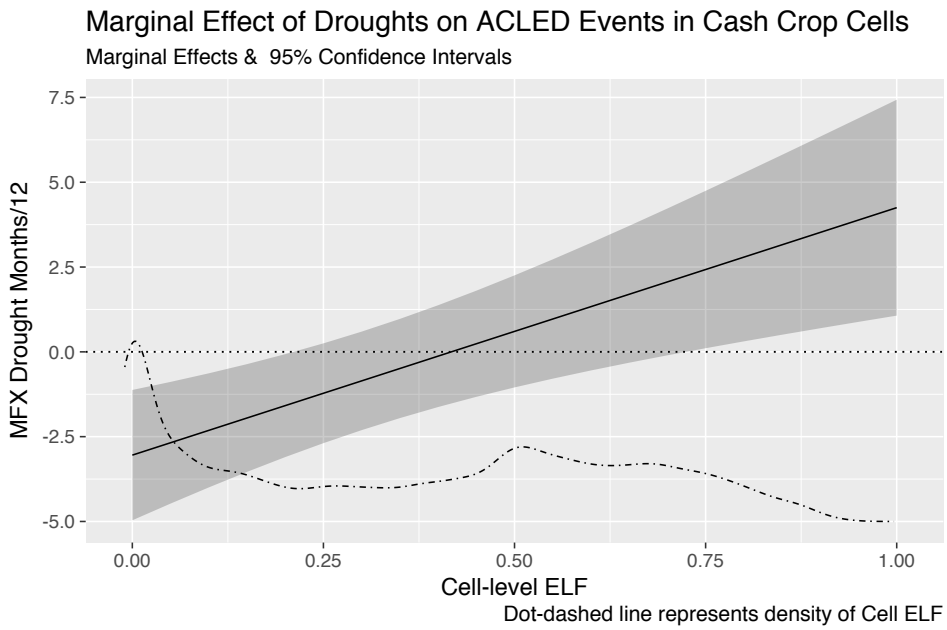

Figure 10.1: Drought, Diversity & Conflict in Cash Crop Cells

consistent results than precipitation levels (Maystadt, Calderone and You 2014; Witmer et al. 2017; Burke, Hsiang and Miguel 2015). This may have to do with the fact that heavy rain does not only increase crop yields but also makes rural areas less accessible for state forces (Rogall 2017).

I estimate linear probability models of ACLED conflict incidence with cell and country-year fixed effects. Standard errors are clustered at the same levels. I interact the drought share variable with the colonial cash crop dummy, the year 2000 food crop variable described above, and cell-level population density to reduce concerns about systematically more accurate reporting on drought-related conflict in more densely populated cells. Table 10.5 presents the results. Almost all interaction terms are positive and significant suggesting that droughts have conflict-enhancing effects in agriculture-dependent and/or densely populated areas. The marginal effect of a one standard deviation higher yearly drought share in a cash crop cell with mean crop production value and population density on any type of ACLED event is 0.67. This translates into a 33% increase from the sample mean. However, these models do not yet allow to separate opportunity cost mechanisms from more identity-related grievance and competition factors.

Therefore, I further interact all terms in the model with the DHS-derived cell-level ethnolinguistic fractionalization index (ELF) described in the previous chapter. If drought effects are stronger in ethnically diverse colonial cash crop cells, mere opportunity-based accounts run into trouble. The triple interaction

Table 10.5: Droughts, Crops, Diversity & Violence

	100 × ACLED Event Dummies				
	All	Battles	OSV	Riots	Protests
Share of Drought Months (t-1)	-4.684**	-1.250	-3.007**	-1.225	-2.559*
	(1.969)	(0.959)	(1.269)	(0.989)	(1.358)
Drought × Cash Crop Dummy	-3.108**	-2.269***	-1.350*	-0.919	-0.877
	(1.235)	(0.844)	(0.779)	(0.606)	(0.667)
Drought × ELF	3.279	1.677	1.540	0.132	1.712
	(3.406)	(2.158)	(2.345)	(1.597)	(1.967)
Drought × Food Crop Value 2000 (log)	0.328***	-0.004	0.171**	0.176***	0.299***
	(0.116)	(0.059)	(0.077)	(0.054)	(0.081)
Drought × Pop. Dens. 2000	0.204	0.523	0.277	-0.453	-0.554
	(0.554)	(0.338)	(0.422)	(0.320)	(0.376)
Drought × Cash Crops × ELF	8.548***	5.615***	4.380**	3.382**	4.616**
	(2.659)	(1.726)	(1.786)	(1.552)	(1.803)
Drought × Food Crops 2000 × ELF	-0.550*	-0.149	-0.168	-0.324*	-0.395**
	(0.281)	(0.184)	(0.212)	(0.166)	(0.193)
Drought × Pop. Dens. 2000 × ELF	0.924	-0.158	0.018	1.407	1.241
	(1.260)	(0.739)	(1.007)	(0.885)	(1.039)
Cell FE	Yes	Yes	Yes	Yes	Yes
Country-Year FE	Yes	Yes	Yes	Yes	Yes
Observations	176,596	176,596	176,596	176,596	176,596

Notes: Linear probability models estimated via OLS. The sample means of the dependent variables are 5.61 (Any Event), 2.63 (Battles), 3.05 (OSV), 1.45 (Riots), 1.71 (Protests). Two-way clustered standard erorrs (cell and country-year) in parentheses. Significance codes: *p<0.1; **p<0.05; ***p<0.01

between droughts, ELF, and population density ensures that results do not just reflect higher urbanization levels of ethnically diverse cash crop cells. Table 10.5 reports my findings. The constitutive drought × cash crop interaction is now *negative* and significant. Droughts in ethnically homogeneous colonial cash crop cells, if anything, *reduce* conflict incidence. The triple interaction with ELF, however, more than offsets this effect at high local levels of diversity. Figure 10.1 plots the marginal effect of droughts in cash crop cells across the observed range of local-level ethnic diversity. Population density and crop production values are held at their means.

Above a local-level fractionalization score of 0.74, droughts significantly *increase* conflict risk in colonial cash crop cells. The effect at this threshold is substantively large and implies a more than 25% increase from the mean conflict value in cash crop cells. In Appendix Figures D.1–D.2, I plot marginal effects for all four specific event types. The general pattern holds across all event types,

but effects are larger and more precisely estimated for riots and protests than for more organized battles or violence against civilians. The ELF interactions with crop production values and population density are small, insignificant, and inconsistently signed. Drought-related conflict in colonial cash crop cells appears to have an identity component that is not accounted for by simplistic opportunity cost theories.

10.3.2 *Price Shocks*

In a final step of the analysis, I check whether the drought-related findings replicate when I use global commodity prices as exogenous shock variable. Price shocks allow to more directly compare the effect of economic booms and busts in cash crop, food crop, and now also mining cells. I construct weighted resource type $\times$ price interactions in the same way as in the baseline TSCS models from Chapter 8. Table 10.6 shows the results. Rising prices in colonial cash crop areas only reduce conflict risk at high levels of local ethnic diversity. Falling prices thus imply the very same pattern as the drought-based analysis. Economic downturns in ethnically diverse colonial cash crop areas increase conflict incidence. The effects are somewhat less precisely estimated but the interaction terms remain significant for the pooled event dummy, riots, protests, and marginally so for violence against civilians. The marginal effect plots in Appendix figures D.3– D.6 show that once again, the effects are more precisely estimated for the low-scale event types of riots and protests.

The estimates for other resource types are insignificant, inconsistently signed across different event types (minerals), or point in the opposite direction (food crops). Higher food crop prices seem to raise opportunity costs in ethnically homogeneous cells but induce local rapacity effects or ethnic competition in more diverse areas. This speaks directly to recent findings from Koren (2018) and McGuirk and Burke (2017) discussed in Chapter 2. More importantly however, the result that conflict-enhancing effects of economic downturns become stronger in more diverse areas of colonial cash crop production is inconsistent with a mere opportunity cost story. An ethnically less colorblind interpretation based on local inter-group competition for suddenly more scarce modernization benefits appears more plausible. In short, inter-group comparisons, ethnic grievances, and fierce identity-based competition not only matter for group-level onset of full-blown ethnic civil war. Local conflict in diverse colonial cash crop cells is likely to be driven by highly salient identity boundaries and ethnic contests between sons of the soil and ethnic strangers. The fact that shocks

produce significant effects in different directions depending on the resource type one studies alleviates concerns that systematic reporting bias drives my findings.

Table 10.6: Resource Prices, Diversity & Conflict

	100 × ACLED Event Dummies				
	All	Battles	OSV	Riots	Protests
Minerals × Price (t-1)	2.299	3.864	7.736	-3.231	-7.629**
	(9.095)	(4.115)	(6.203)	(3.166)	(3.252)
Cash Crops × Price (t-1)	2.485*	2.073**	1.743*	0.725	1.145**
	(1.308)	(0.966)	(1.024)	(0.538)	(0.494)
Food Crops × Price (t-1)	-4.402***	-2.364**	-3.435***	-1.347***	-1.079***
	(1.261)	(0.984)	(0.937)	(0.485)	(0.417)
Minerals × Price (t-1) × ELF	-2.492	-5.336	-23.067*	12.740	24.892**
	(17.552)	(8.729)	(13.213)	(8.653)	(11.005)
Cash Crops × Price (t-1) × ELF	-7.001**	-3.999	-4.252*	-3.353**	-3.492***
	(3.031)	(2.501)	(2.433)	(1.369)	(1.306)
Food Crops × Price (t-1) × ELF	6.893***	2.688*	4.600***	4.014***	2.558***
	(2.295)	(1.580)	(1.736)	(1.361)	(0.895)
Cell FE	Yes	Yes	Yes	Yes	Yes
Country-Year FE	Yes	Yes	Yes	Yes	Yes
Observations	139,084	139,084	139,084	139,084	139,084

Notes: Linear probability models estimated via OLS. Two-way clustered standard erorrs (cell and country-year) in parentheses. Significance codes: *p<0.1; **p<0.05; ***p<0.01

10.4 CONCLUSION

In this chapter, I have used insights from the previous three empirical chapters to advance the current state of the quantitative conflict literature. At the ethnic group level, colonial cash crops appear to significantly reduce civil war risks. This result does not undermine previous findings on the political exclusion and conflict nexus. Perhaps more strikingly, the findings on particularly salient ethnic identities in colonial cash crop cells from the previous chapter seem to matter for local-level conflict below the threshold of civil war. Local droughts increase conflict risk in cash crop cells but also in other regions that depend on agriculture. Only for cash crop cells, this effect is moderated by ethnic diversity. I find similarly moderated effects in the price shock analysis. Narrowly economic opportunity cost and rapacity mechanisms cannot account for this conditional relationship.

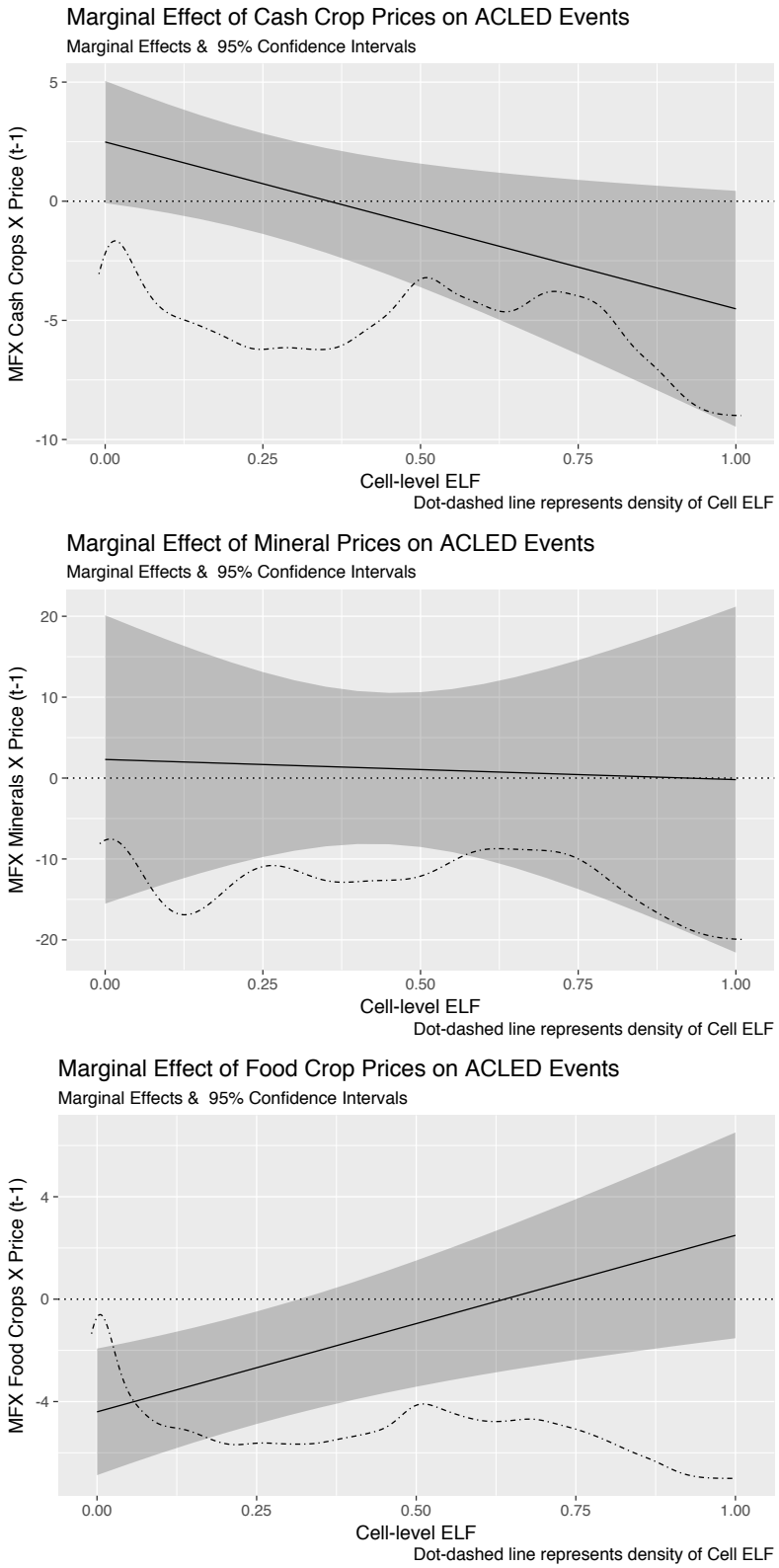

Figure 10.2: Price Shocks, Diversity & Conflict

Quantitative conflict scholars should begin to pay closer attention to the Africanist case study literature. A rich set of mechanisms that explain explicitly political and identity-based conflicts at both local and national levels has been proposed. Catherine Boone's (2014) most recent book is an excellent example. Many of the findings presented in this chapter directly relate to several of her main arguments. Beyond their long-term effects on spatial inequality, ethnopolitical representation, and identity salience, colonial resource regimes continue to shape contemporary patterns of local violence. Combining historically informed political science theories with granular geospatial data improves our understanding of the resource–conflict nexus and the underlying causal mechanisms. This chapter has contributed a first step to what seems like a promising avenue for future research.

11

CONCLUSION

Natural resources matter for economic and political development in Sub-Saharan Africa. This dissertation shows that mineral and agricultural export commodities had more fundamental and explicitly political effects than simplistic notions of the resource curse suggest. Colonial governments built spatially varying resource regimes around zones of cash crop and mineral production. Fiscal, administrative, and regulatory strategies reflected the specific production modes of these resources. The long-term effects of colonial resource regimes are striking. Both colonial cash crop and mineral areas continue to have better infrastructure and higher levels of development than their resource-poor counterparts. This effect is driven by path-dependent agglomeration effects rather than the mere persistence of cash crop agriculture. Resource-based colonial enclave economies are among the main historical causes of spatial inequality within independent African states.

The implications for ethnopolitical representation vary between cash crop and mining enclaves. Early elite formation and political mobilization as well as incumbents' need for local intermediaries cause higher representation levels among groups whose homelands saw colonial cash crop production. This legacy dynamically responds to changes in global cash crop prices. The unique combination of indirect forms of rule, local communal structures, in-migration, and contested modernization benefits led to particularly salient ethnic identities in colonial cash crop regions. Salient identities and inter-group competition produce patterns of local political violence that are hard to explain with apolitical economic theories.

Apart from work on the resource curse, my main contributions relate to three broader strands of the literature. First, my analysis adds to both the country-level and the subnational colonial legacies literature. As far as country-level theories of extractive colonialism are concerned, I provide a richer account of how extractive institutions were organized in Sub-Saharan Africa and how they continue to matter. Colonial cash crop regimes in Africa markedly differed from the Latin American cases at the heart of the extractive institutions literature (Engerman and Sokoloff 1997; Acemoglu, Johnson and Robinson 2001). In addition, I challenge the notion of the colonial state as externally imposed natural experiment. Many aspects of the colonial state endogenously emerged around

the mineral and agricultural resources with the highest revenue-generating potential. As for subnational studies on the long-term effects of unequally distributed colonial investments, I do not just investigate the effects of the spatial organization of the colonial state, but also account for its causes (Huillery 2009; Jedwab and Moradi 2016; Ricart-Huguet 2018.).

Second, I speak to debates about the continuing effects of adverse African geography (Sachs, Mellinger and Gallup 2001; Herbst 2000; Diamond 1997; Braudel 1995). I agree with Herbst (2000) that locational fundamentals and resource endowments severely affect African state-building strategies. Contrary to his account, however, I highlight how demand and technology shocks may lead to drastic discontinuities and shifts away from precolonial spatial equilibria. The 19th century cash crop revolution added a new resource type to the historical African export portfolio and allowed significant numbers of small-scale producers to enter long-distance trading. The commercial transition preceded formal colonialism and powerfully shaped its local institutional manifestations. The longer-term implications are felt until the present day. Third, I significantly advance the literature on ethnic identity formation and conflict (Cederman, Gleditsch and Buhaug 2013; Posner 2005; Horowitz 1985). The theoretical depth of this literature is rarely matched by equally rigorous and creative empirical analyses. I have taken a first step in closing this gap.

I conclude by offering some informed speculation about the relevance of my findings for both non-African contexts and future African development. In the most general sense, my theoretical arguments are applicable to other world regions and countries that depend on primary commodity exports and/or were colonized by European imperialists. Systematic analyses of the long-term effects of colonial mining and cash crop regimes in Asia and Latin America appear as a prominent avenue for future research. Work by Engerman and Sokoloff (1997) as well as recent studies on Peru (Dell 2010) and Indonesia (Dell and Olken 2017) are useful examples.

African cash crop regimes were, however, notably different from the Latin American plantation economies. The long-term consequences appear somewhat more benign – despite salient ethnic identities and local-level conflict. The tight regulation of colonial capital and output market limited the full realization of African cash crop potential. By blocking important economic linkages and positive spillover effects to other sectors, colonial governments hindered more widely shared developmental effects of export agriculture. In China, the advanced economic linkages of former cash crop regions gave them a head start in terms of reform-era modernization and industrialization (Marden

2015). I very much doubt that African cash crop regions are ready for an equally rapid and smooth transition. Salient ethnic identities and frequent distributional conflict over communally or state-controlled agricultural land are obvious challenges (Boone 2014). Land titling reforms seem necessary but extremely challenging to implement. Unless the losers of reforms are credibly compensated, distributional conflicts may become more rather than less common.

As far as the sustainability of high growth rates is concerned, the present thesis can be read as a call for historically informed afro-realism. Neither extreme pessimism nor the Africa rising take seem warranted. A significant share of the recent growth performance is related to booming mineral prices and Chinese demand. Mining tends to employ less people than agricultural or manufacturing export industries, produces less spillovers, and is vulnerable to volatile prices. On a more positive note, increasingly dense populations, the widespread use of mobile communication and banking technologies, and developing internal markets provide reasons for cautious optimism. Political reforms in Ethiopia, relatively peaceful electoral transitions of power in Nigeria and Gambia, and an increasingly active role of the African state community in sanctioning coups and other extreme abuses of power indicate quite substantial institutional progress.

During the early stages of formal "pacification", Lord Lugard (2013, p. 15) proudly noted that "treaties were produced by the cartload." Almost 100 years later, Chinese President Xi Jinping tours across Africa and signs friendship and investment treaties with local rulers. The heavy Chinese focus on resource exports and infrastructure investment mirrors many aspects of European behavior in the second half of the 19th century. One may well ask whether the Han Chinese have succeeded the Victorians in building an informal empire of free trade (Gallagher and Robinson 1953). The historical record shows that despite all contractual intentions, free trade imperialists tend to get dragged into local political conflicts. While formal Chinese conquest seems unrealistic, official support for the likes of Emmerson Mnangagwa and Paul Kagame does not exactly sound like politically neutral development assistance. Politically excluded and economically disadvantaged groups are unlikely to benefit from spatially concentrated investments in railways and mines. Inclusive reforms at both national and local levels remain the most promising strategy for widely shared development and the prevention of ethnic conflict.

Part III

APPENDIX

A

APPENDIX TO CHAPTER 7

This appendix contains additional results and tables mentioned in the main text of Chapter 7.

Table A.1: Summary Statistics (25 km Grid Cell Data)

Statistic	N	Mean	St. Dev.	Min	Max
Quality Road 1960 (Y/N)	29,117	0.127	0.333	0	1
Power Plant	29,117	0.026	0.158	0	1
Reailroad 1960 (Y/N)	29,117	0.052	0.221	0	1
Quality Road 1998 (Y/N)	29,117	0.331	0.471	0	1
Night Lights 2015 (Y/N)	29,117	0.258	0.438	0	1
DHS Household Wealth (Cell Mean)	6,764	−0.391	0.544	−2.220	3.068
Colonial Cash Crops (Y/N)	29,117	0.078	0.268	0	1
Colonial Mining (Y/N)	29,117	0.008	0.091	0	1
Colonial Cocoa (Y/N)	29,117	0.009	0.092	0	1
Colonial Coffee (Y/N)	29,117	0.019	0.136	0	1
Colonial Cotton (Y/N)	29,117	0.016	0.126	0	1
Colonial Groudnuts (Y/N)	29,117	0.014	0.119	0	1
Colonial Oil Palm (Y/N)	29,117	0.010	0.099	0	1
Cash Crop Suitability (Std.)	29,117	0.000	1.000	−1.182	3.353
Agricultural Suitability	29,117	0.236	0.252	0.000	0.999
Dist. to Navigable River	29,117	80.659	64.104	1.821	462.766
TseTse Fly Suitability	29,117	0.416	0.451	0.000	1.000
Malaria Ecology	29,117	11.841	9.775	0.000	38.081
Mean Elevation	29,117	623.892	441.531	−96.170	3,492.079
Mean Terrain Slope	29,117	1.307	1.557	0.007	17.296
Terrain Ruggedness	28,631	34.241	72.074	0.000	1,252.638
Dist. Coast	29,117	721.020	455.287	0.000	1,699.274
Dist. Precolonial Trade Route	29,117	223.792	220.147	2.883	1,475.830
Dist. 1900 City	29,117	466.226	280.152	8.852	1,515.025
Dist. European Explorer Route	29,117	164.301	159.266	2.200	882.432
Precolonial Statehood	29,117	0.131	0.327	0.000	1.000
Historical Reliance on Agric.	29,117	5.928	1.903	1.000	10.000
Slave Exports per sqkm	29,117	0.540	3.057	0.000	42.562
Dist. Capital City	29,117	588.753	339.063	2.278	1,848.702

Figure A.1: Covariate balance before and after matching

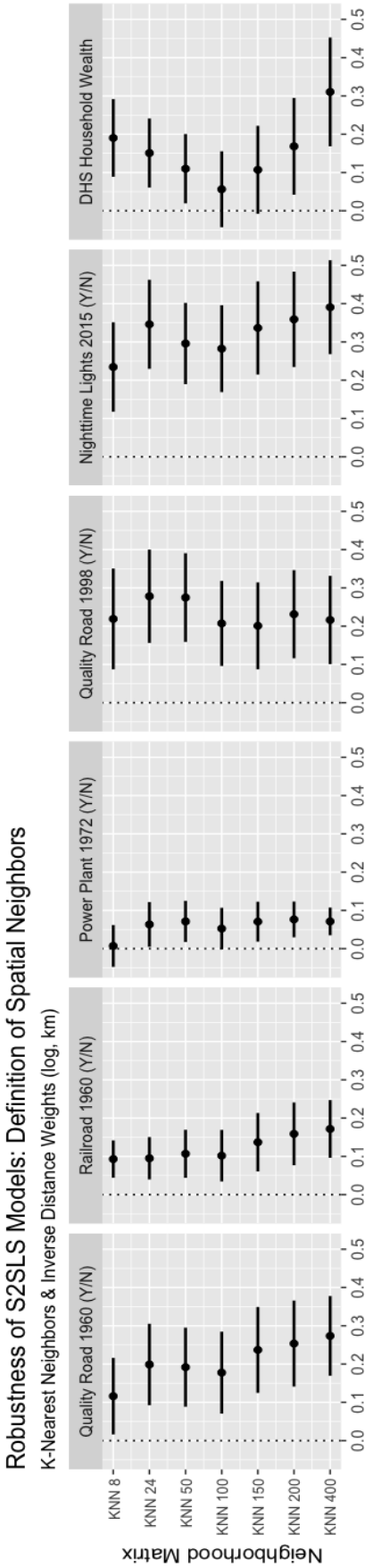

Figure A.2: Robustness: Different Spatial Neighborhood Matrices

Table A.2: Cash Crops, Minerals, and Colonial Roads

	Paved or Improved Road 1960 (Y/N)				
	OLS	Matched	S2SLS	OLS	Matched
Cash Crop Dummy	0.194***	0.178***			
	(0.017)	(0.016)			
Cash Crop Dummy (fitted)			0.209***		
			(0.053)		
Mineral Dummy				0.142***	0.116***
				(0.038)	(0.039)
Country FE	Yes	Yes	Yes	Yes	Yes
Baseline Controls	Yes	Yes	Yes	Yes	Yes
First Stage F (Cash Crops)	–	–	14.09	–	–
First Stage W×Y	–	–	28.47	–	–
Observations	28,586	4,468	28,586	28,586	1,155

Notes: Linear probability models estimated via OLS or spatial two-stage least squares. The sample means of the dependent variable are 0.13 in the full sample, 0.33 in the matched cash crop sample, and 0.21 in the matched mineral sample. Baseline controls include soil suitability for agriculture, malaria ecology, tsetse fly suitability, terrain ruggedness, log distances to coast, capital, navigable waterways, precolonial trade and explorer routes, cities in 1900, as well as the historical proxies for precolonial statehood, reliance on Agriculture, and exposure to the slave trades. Conley standard errors with 400 km distance cutoff in parentheses. Significance codes: *p<0.1; **p<0.05; ***p<0.01

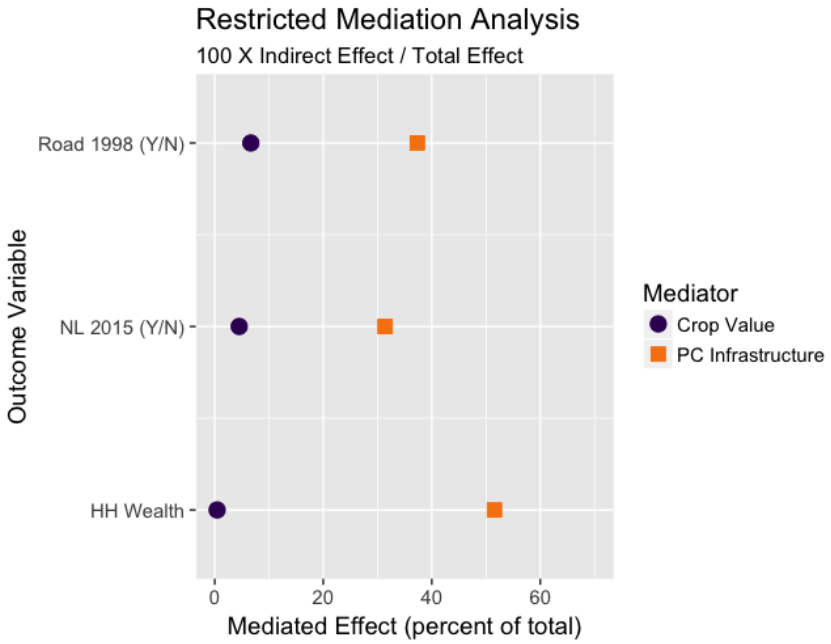

Figure A.3: Restricted Mediation Analysis with Instrumental Variables

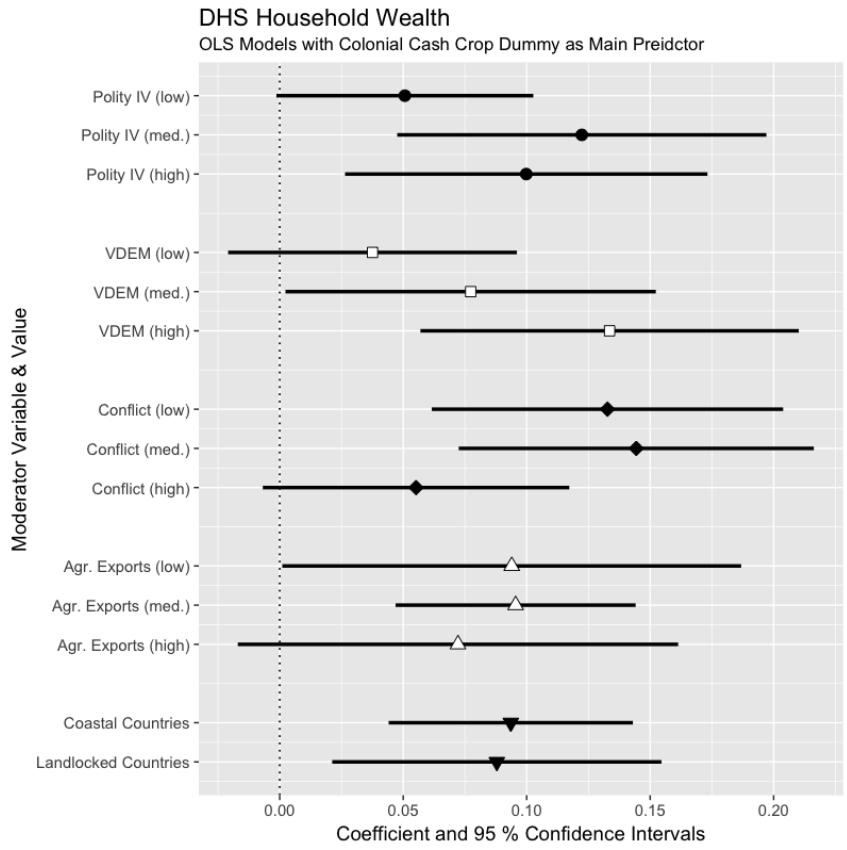

Figure A.4: Heterogeneity Analysis Cash Crops & Household Wealth

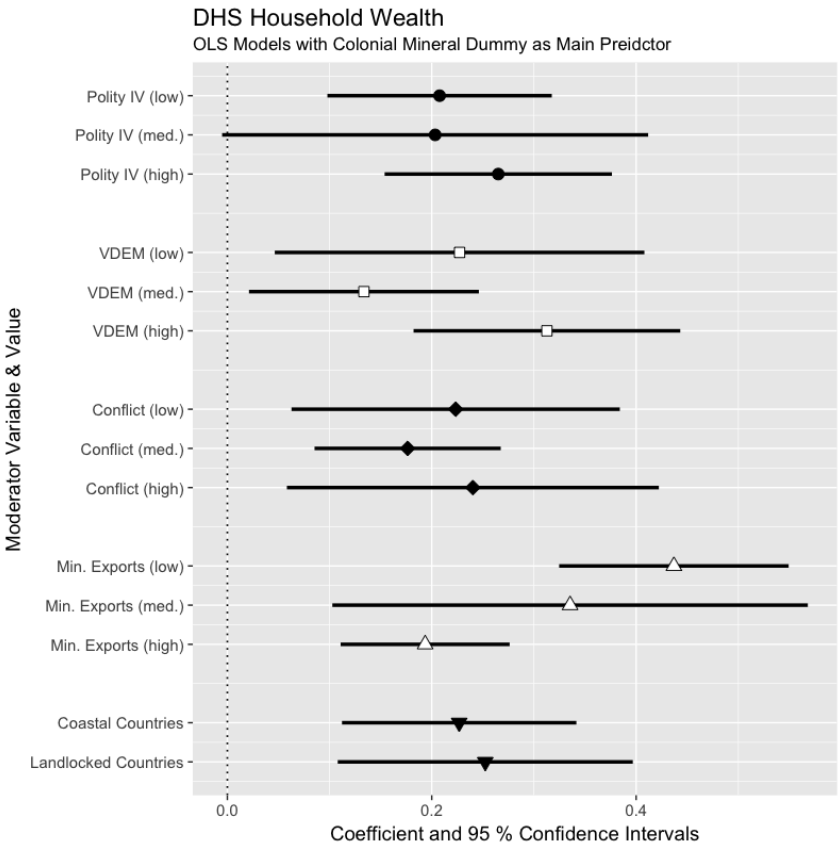

Figure A.5: Heterogeneity Analysis Minerals & Household Wealth

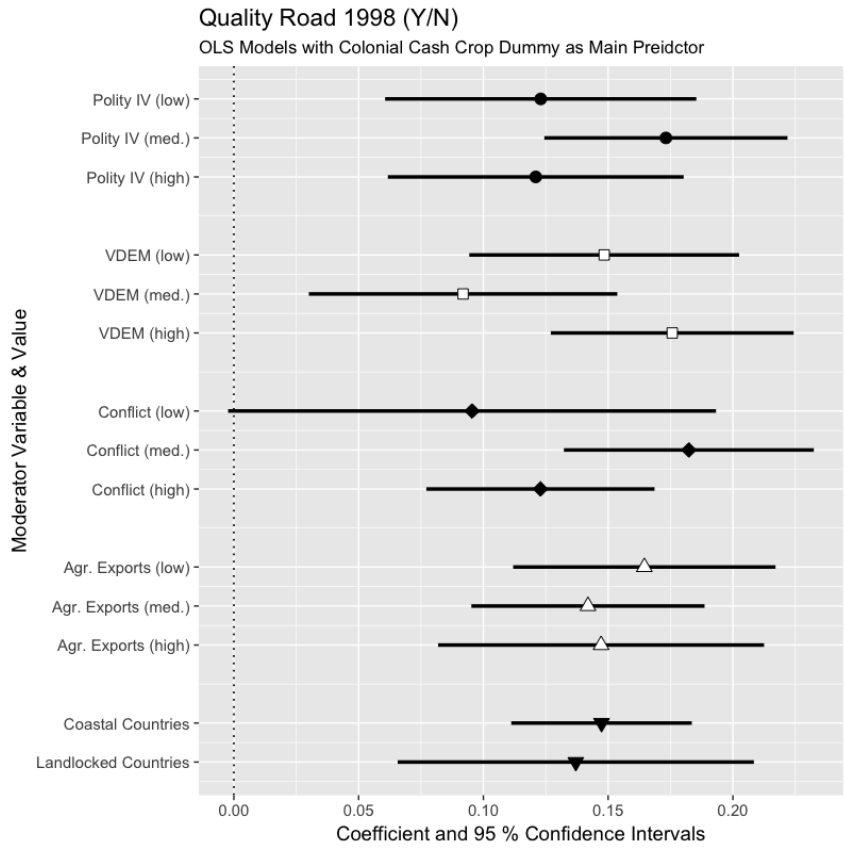

Figure A.6: Heterogeneity Analysis Cash Crops & 1998 Quality Roads

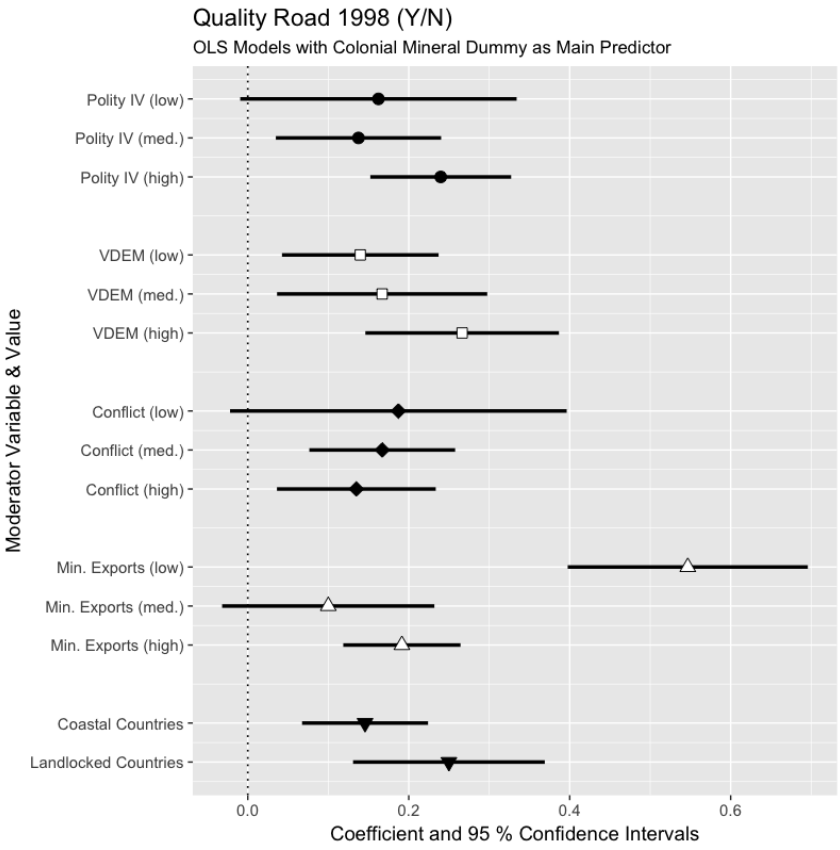

Figure A.7: Heterogeneity Analysis Minerals & 1998 Quality Roads

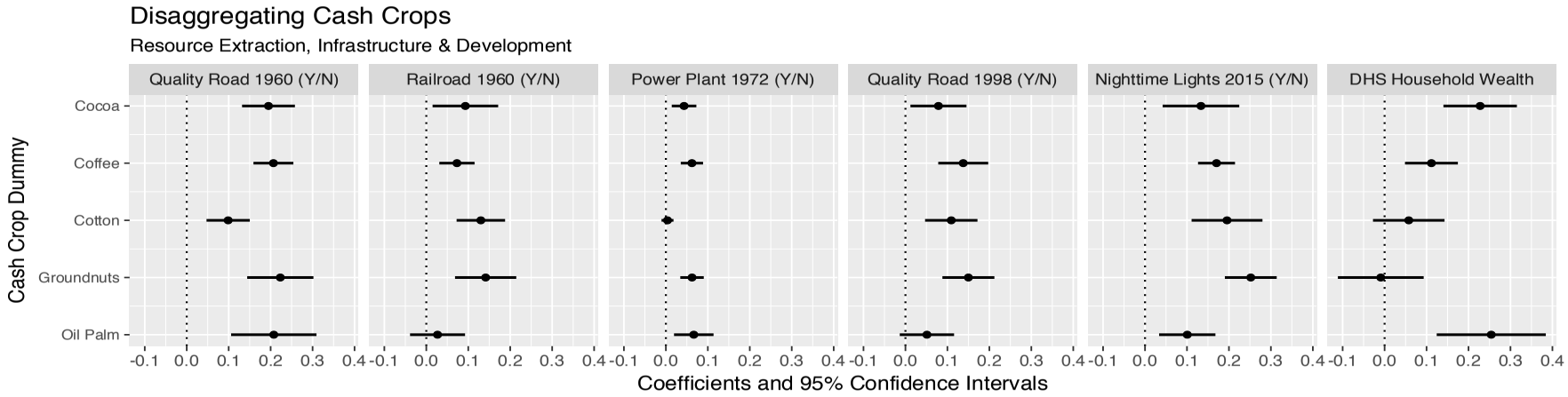

Figure A.8: Heterogeneity Analysis: Crop by Crop

Table A.3: Cash Crops, Minerals, and Electricity Generation

	Railroad 1960 (Y/N)				
	OLS	Matched	S2SLS	OLS	Matched
Cash Crop Dummy	0.127***	0.132***			
	(0.015)	(0.017)			
Cash Crop Dummy (fitted)			0.099***		
			(0.034)		
Mineral Dummy				0.126***	0.161***
				(0.043)	(0.047)
Country FE	Yes	Yes	Yes	Yes	Yes
Baseline Controls	Yes	Yes	Yes	Yes	Yes
First Stage F (Cash Crops)	–	–	14.09	–	–
First Stage W×Y	–	–	28.47	–	–
Observations	28,586	4,468	28,586	28,586	1,155

Notes: Linear probability models estimated via OLS or spatial two stage least squares. The sample means of the dependent variable are 0.05 (Columns 1,3, and 4), 0.14 (Column 2) and 0.10 in Column 5. Baseline controls include soil suitability for agriculture, malaria ecology, tsetse fly suitability, terrain ruggedness, log distances to coast, capital, navigable waterways, precolonial trade and explorer routes, cities in 1900, as well as the historical proxies for precolonial statehood, reliance on Agriculture, and exposure to the slave trades. Conley standard errors with 400 km distance cutoff in parentheses. Significance codes: *p<0.1; **p<0.05; ***p<0.01

Table A.4: Cash Crops, Minerals, and Electricity Generation

	Power Plant 1972 (Y/N)				
	OLS	Matched	S2SLS	OLS	Matched
Cash Crop Dummy	0.046***	0.038***			
	(0.006)	(0.007)			
Cash Crop Dummy (fitted)			0.058**		
			(0.024)		
Mineral Dummy				0.085***	0.053**
				(0.022)	(0.023)
Country FE	Yes	Yes	Yes	Yes	Yes
Baseline Controls	Yes	Yes	Yes	Yes	Yes
First Stage F (Cash Crops)	–	–	14.09	–	–
First Stage W×Y	–	–	28.47	–	–
Observations	28,586	4,468	28,586	28,586	1,155

Notes: Linear probability models estimated via OLS or spatial two stage least squares. The sample means of the dependent variable are 0.03 (Columns 1,3, and 4), 0.07 (Column 2) and 0.07 in Column 5. Baseline controls include soil suitability for agriculture, malaria ecology, tsetse fly suitability, terrain ruggedness, log distances to coast, capital, navigable waterways, precolonial trade and explorer routes, cities in 1900, as well as the historical proxies for precolonial statehood, reliance on Agriculture, and exposure to the slave trades. Conley standard errors with 400 km distance cutoff in parentheses. Significance codes: *p<0.1; **p<0.05; ***p<0.01

Table A.5: Cash Crops, Minerals, and Contemporary Roads

	Paved or Improved 1998 (Y/N)				
	OLS	Matched	S2SLS	OLS	Matched
Cash Crop Dummy	0.149***	0.139***			
	(0.018)	(0.020)			
Cash Crop Dummy (fitted)			0.272***		
			(0.064)		
Mineral Dummy				0.176***	0.195***
				(0.035)	(0.036)
Country FE	Yes	Yes	Yes	Yes	Yes
Baseline Controls	Yes	Yes	Yes	Yes	Yes
First Stage F (Cash Crops)	–	–	14.09	–	–
First Stage W×Y	–	–	28.47	–	–
Observations	28,586	4,468	28,586	28,586	1,155

Notes: Linear probability models estimated via OLS or spatial two stage least squares. The sample means of the dependent variable are 0.33 (Columns 1,3, and 4), 0.55 (Column 2) and 0.44 in Column 5. Baseline controls include soil suitability for agriculture, malaria ecology, tsetse fly suitability, terrain ruggedness, log distances to coast, capital, navigable waterways, precolonial trade and explorer routes, cities in 1900, as well as the historical proxies for precolonial statehood, reliance on Agriculture, and exposure to the slave trades. Conley standard errors with 400 km distance cutoff in parentheses. Significance codes: *p<0.1; **p<0.05; ***p<0.01

Table A.6: Cash Crops, Minerals, and Contemporary Night Lights

	Paved or Improved 1998 (Y/N)				
	OLS	Matched	S2SLS	OLS	Matched
Cash Crop Dummy	0.206***	0.199***			
	(0.019)	(0.018)			
Cash Crop Dummy (fitted)			0.331***		
			(0.063)		
Mineral Dummy				0.188***	0.171***
				(0.041)	(0.048)
Country FE	Yes	Yes	Yes	Yes	Yes
Baseline Controls	Yes	Yes	Yes	Yes	Yes
First Stage F (Cash Crops)	–	–	14.09	–	–
First Stage W×Y	–	–	28.47	–	–
Observations	28,586	4,468	28,586	28,586	1,155

Notes: Linear probability models estimated via OLS or spatial two stage least squares. The sample means of the dependent variable are 0.33 (Columns 1,3, and 4), 0.55 (Column 2) and 0.44 in Column 5. Baseline controls include soil suitability for agriculture, malaria ecology, tsetse fly suitability, terrain ruggedness, log distances to coast, capital, navigable waterways, precolonial trade and explorer routes, cities in 1900, as well as the historical proxies for precolonial statehood, reliance on Agriculture, and exposure to the slave trades. Conley standard errors with 400 km distance cutoff in parentheses. Significance codes: *p<0.1; **p<0.05; ***p<0.01

Table A.7: Cash Crops, Minerals, and Household Wealth

	Mean DHS Houeshold Wealth				
	OLS	Matched	S2SLS	OLS	Matched
Cash Crop Dummy	0.155***	0.160***			
	(0.023)	(0.025)			
Cash Crop Dummy (fitted)			0.088**		
			(0.041)		
Mineral Dummy				0.433***	0.462***
				(0.071)	(0.079)
Country FE	Yes	Yes	Yes	Yes	Yes
Baseline Controls	Yes	Yes	Yes	Yes	Yes
First Stage F (Cash Crops)	–	–	13.88	–	–
First Stage W×Y	–	–	47.94	–	–
Observations	6,668	2,658	6,668	6,668	524

Notes: Linear probability models estimated via OLS or spatial two stage least squares. The sample means of the dependent variable are −0.39 (Columns 1,3, and 4), −0.26 (Column 2) and −0.26 in Column 5. Baseline controls include soil suitability for agriculture, malaria ecology, tsetse fly suitability, terrain ruggedness, log distances to coast, capital, navigable waterways, precolonial trade and explorer routes, cities in 1900, as well as the historical proxies for precolonial statehood, reliance on Agriculture, and exposure to the slave trades. Conley standard errors with 400 km distance cutoff in parentheses. Significance codes: *p<0.1; **p<0.05; ***p<0.01

Table A.8: Reduced Forms: Raw Cash Crop Suitability

	Outcome					
	Road '60	Rail	Plant	Road '98	NL '15	Wealth
Cash Crop Suitability	0.034***	0.010**	0.005*	0.050***	0.041***	0.022**
	(0.010)	(0.005)	(0.003)	(0.011)	(0.009)	(0.011)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Baseline Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	29,117	29,117	29,117	29,117	29,117	6,764

Notes: Linear probability models estimated via OLS. The FAO cash crop suitability variable is standardized to mean 0 and standard deviation 1. Baseline controls include general soil suitability for agriculture, malaria ecology, tsetse fly suitability, terrain ruggedness, log distances to coast, capital, navigable waterways, precolonial trade and explorer routes, cities in 1900, as well as the historical proxies for precolonial statehood, reliance on Agriculture, and exposure to the slave trades. Conley standard errors with 400 km distance cutoff in parentheses. Significance codes: *p<0.1; **p<0.05; ***p<0.01

Table A.9: Cash Crops, Minerals, and a Subset of Rails

	Non-Military & Non-Mining Rails 1960				
	OLS	Matched	S2SLS	OLS	Matched
Cash Crop Dummy	0.072***	0.062***			
	(0.015)	(0.012)			
Cash Crop Dummy (fitted)			0.098***		
			(0.032)		
Mineral Dummy				-0.005	-0.014
				(0.012)	(0.019)
Constant			0.046		
			(0.046)		
Country FE	Yes	Yes	Yes	Yes	Yes
Baseline Controls	Yes	Yes	Yes	Yes	Yes
Observations	29,575	4,468	29,575	29,575	924

Notes: Linear probability models estimated via OLS or spatial two stage least squares. The sample means of the dependent variable are 0.016 (Columns 1,3, and 4), 0.058 (Column 2) and 0.032 in Column 5. Baseline controls include soil suitability for agriculture, malaria ecology, tsetse fly suitability, terrain ruggedness, log distances to coast, capital, navigable waterways, precolonial trade and explorer routes, cities in 1900, as well as the historical proxies for precolonial statehood, reliance on Agriculture, and exposure to the slave trades. Conley standard errors with 400 km distance cutoff in parentheses. Significance codes: *p<0.1; **p<0.05; ***p<0.01

B

APPENDIX TO CHAPTER 8

This appendix contains additional results and tables mentioned in the main text of Chapter 8.

Table B.1: Summary Statistics (FRT CS Data)

Statistic	N	Mean	St. Dev.	Min	Max
Represented (Y/N)	261	0.559	0.347	0	1
Minister Share	261	5.697	7.333	0	44.796
Cash Crop Dummy	261	0.575	0.495	0	1
Mineral Dummy	261	0.134	0.341	0	1
Cash Crop Value p.c.	261	6.898	14.497	0	103.162
Mineral Value p.c.	261	4.444	26.482	0	367.144
Food Crop Value p.c. (M3)	260	9.041	17.091	0	183.317
Food Crop Value p.c. (FAO)	260	32.549	57.129	0.568	613.846
Agro-Climatic Cash Crop Suitability	261	0.221	0.086	0.036	0.451
Potential Cash Crop Yield at 1900 Prices	261	1.166	0.592	0.091	2.656
Group's Pop. Share	261	5.725	6.526	0.400	39
Agro-Climatic Suitability for Agriculture	261	0.393	0.223	02	0.864
Mean Elevation	261	612.660	501.275	13.288	2,224.026
Mean Slope	261	1.944	1.496	0.086	9.105
Distance to Coast, km	261	447.777	367.788	0.147	1,621.755
Distance to Capital, km	261	392.869	347.486	4.855	1,890.071
Number of Missions in 1924	261	2.563	6.046	0	60
Male Share with Secondary Educ.	134	0.347	0.240	0	1
Precolonial Agriculture	260	7.058	1.149	1.731	10
Precolonial Stateness	260	1.298	0.771	0	3
British Empire Dummy	261	0.487	0.501	0	1

Table B.2: Summary Statistics (FRT TSCS Data)

Statistic	N	Mean	St. Dev.	Min	Max
Represented (Y/N)	10,967	0.560	0.496	0	1
Minister Count	10,967	1.475	2.271	0	20
Cash Crop Value (1e6 1960 USD)	10,967	3.662	15.899	0	358.967
Mineral Value (1e6 1960 USD)	10,967	1.641	8.736	0	131.417
Pot. Food Crop Value p.c. (1e6 1960 USD)	10,924	57.005	112.491	0.023	1,491.309
Group's Pop. Share	10,967	5.796	6.568	0.400	39
Agro-Climatic Suitability for Agriculture	10,967	0.390	0.222	0.001	0.864
Mean Elevation	10,967	595.414	493.442	13.288	2,224.026
Mean Slope	10,967	1.922	1.483	0.086	9.105
Distance to Coast, km	10,967	441.976	366.378	0.147	1,621.755
Distance to Capital, km	10,967	391.806	347.286	4.855	1,890.071
Precolonial Agriculture	10,924	7.075	1.134	1.731	10
Precolonial Stateness	10,924	1.297	0.770	0	3
Cash Crop Price Index	10,967	1.681	1.861	0	5.751
Mineral Price Index	10,967	0.296	1.008	0	6.417
Food Crop Price Index	10,924	5.317	0.341	4.605	5.807

Table B.3: Summary Statistics (DHS Data)

Statistic	N	Mean	St. Dev.	Min	Max
Infant Death	922,386	10.911	31.178	0	100
Cash Crop Value (Mio. 1960 USD)	856,986	11.148	26.563	0	358.967
Represented (Y/N)	856,986	0.806	0.395	0	1
Minister Count	856,986	3.460	3.313	0	20
Mother's Education	922,363	1.659	0.794	1	4
Mother's Age	897,285	23.901	6.203	10	49
Birthorder	922,386	3.228	2.204	1	18
Female	922,386	0.489	0.500	0	1
Twin or higher multiple birth	922,386	0.035	0.184	0	1
Urban Survey Cluster	922,386	0.302	0.459	0	1
Year	922,386	1,992	8.499	1,960	2,004

Table B.4: Summary Statistics (EPR Data)

Statistic	N	Mean	St. Dev.	Min	Max
Represented (Y/N)	265	0.546	0.437	0.000	1.000
Cash Crop Dummy	266	0.534	0.500	0	1
Cash Crop Value p.c.	254	4.561	10.455	0.000	100.250
Group's Pop. Share	266	0.184	0.213	0.0002	0.980
Agro-Climatic Cash Crop Suitability	266	2,806.023	1,485.459	0.000	6,276.021
Agro-Climatic Suitability for Agriculture	255	0.299	0.226	0.0001	0.892
Mean Elevation	255	658.371	447.870	14.199	1,811.228
Mean Slope	255	1.650	1.378	0.088	7.087
Distance to Coast, km	266	558.412	436.564	7.237	1,623.732
Distance to Capital, km	266	435.305	362.427	16.636	1,812.852
Precolonial Agriculture	255	5.928	1.984	1.000	10.000
Precolonial Stateness	253	1.453	0.882	0.000	3.000

Table B.5: Standardizing Cash Crop Values by Area or Not at All

	Represented (Y/N)		Gov. Share (log)	
Cash Crops per sqkm (log)	0.015***		0.034***	
	(0.004)		(0.010)	
Cash Crop Value (log)		0.009***		0.020***
		(0.002)		(0.005)
Country FE	Yes	Yes	Yes	Yes
Baseline Controls	Yes	Yes	Yes	Yes
Observations	260	260	260	260

Notes: Linear models estimated via OLS. The sample means of the dependent variables are 0.56 (columns 1–2) and 0.057 (columns 3–4). Control variables include ethnic groups' population shares, mean elevation and terrain slope, soil and climatic suitability for agriculture, centroid distances to coast and capital city, precolonial reliance on agriculture and precolonial political centralization. Conley errors with 400 km distance cutoff in parantheses. Significance codes: *p<0.1; **p<0.05; ***p<0.01

Table B.6: Robustness: Country-Clustered Standard Errors

	Represented (Y/N)		Gov. Share (log)	
Colonial Cash Crops (Y/N)	0.156***		0.336***	
	(0.034)		(0.084)	
Cash Crops per capita × price (log)		0.022***		0.049***
		(0.006)		(0.014)
Country FE	Yes	Yes	Yes	Yes
Baseline Controls	Yes	Yes	Yes	Yes
Observations	260	260	260	260

Notes: Linear models estimated via OLS. The sample means of the dependent variables are 0.56 (columns 1–2) and 0.057 (columns 3–4). Control variables include ethnic groups' population shares, mean elevation and terrain slope, soil and climatic suitability for agriculture, centroid distances to coast and capital city, precolonial reliance on agriculture and precolonial political centralization. Country-clustered standard errors in parentheses. Significance codes: *p<0.1; **p<0.05; ***p<0.01

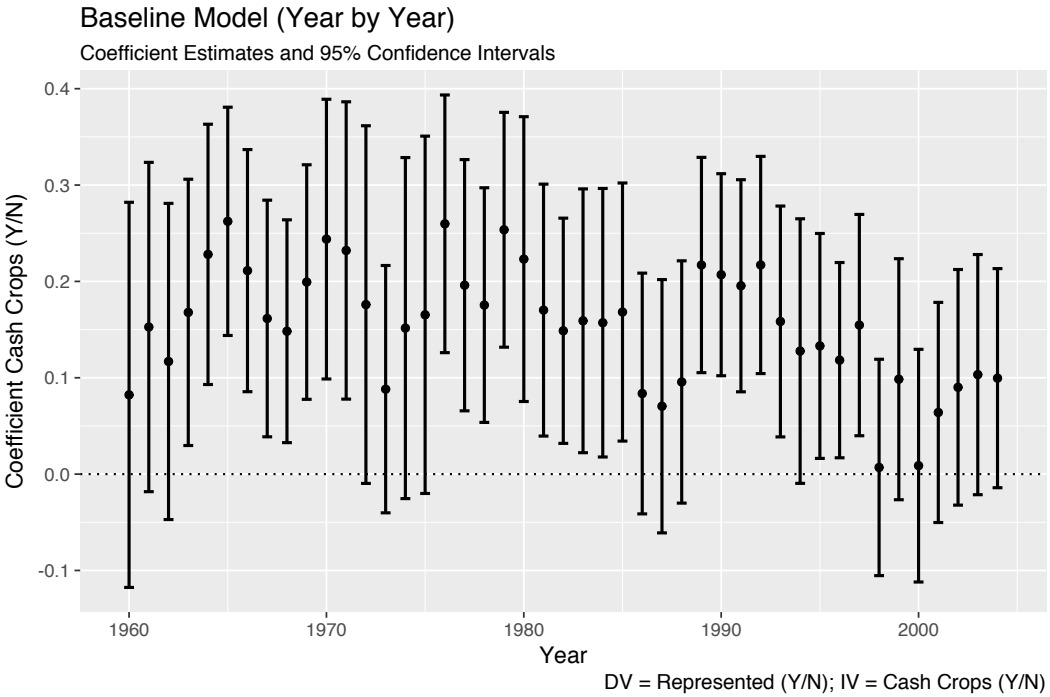

Figure B.1: Year-by-Year Estimates of the Baseline Model in Column 1 of Table 8.1

Table B.7: 2SLS-IV with Country-Clustered Standard Errors

	Represented (Y/N)		Gov. Share (log)	
Cash Crops (Y/N), fitted	0.313**		0.537**	
	(0.155)		(0.258)	
Cash Crops p.c. × price (log), fitted		0.041*		0.071**
		(0.022)		(0.036)
Country FE	Yes	Yes	Yes	Yes
Baseline Controls	Yes	Yes	Yes	Yes
First-Stage F	21.96	20.99	21.96	20.99
Observations	260	260	260	260

Notes: Instrumental variable models estimated via 2SLS. The sample means of the dependent variables are 0.56 (columns 1–2) and 0.057 (columns 3–4). Control variables include ethnic groups' population shares, mean elevation and terrain slope, soil and climatic suitability for agriculture, centroid distances to coast and capital city, precolonial reliance on agriculture and precolonial political centralization. Country-clustered standard errors in parentheses. Significance codes: *p<0.1; **p<0.05; ***p<0.01

Table B.8: Reduced Form Estimates

	Represented (Y/N)		Gov. Share (log)	
Cash Crop Suitability	0.620***		1.063**	
	(0.225)		(0.432)	
Pot. Cash Crop Yield × price in 1900		0.081**		0.152**
		(0.033)		(0.060)
Country FE	Yes	Yes	Yes	Yes
Baseline Controls	Yes	Yes	Yes	Yes
Observations	260	260	260	260

Notes: Linear OLS models. The sample means of the dependent variables are 0.56 (columns 1–2) and 0.057 (columns 3–4). Control variables are the same as in the baseline and IV models above. Conley errors with 400 km distance cutoff in parentheses. Significance codes: *p<0.1; **p<0.05; ***p<0.01

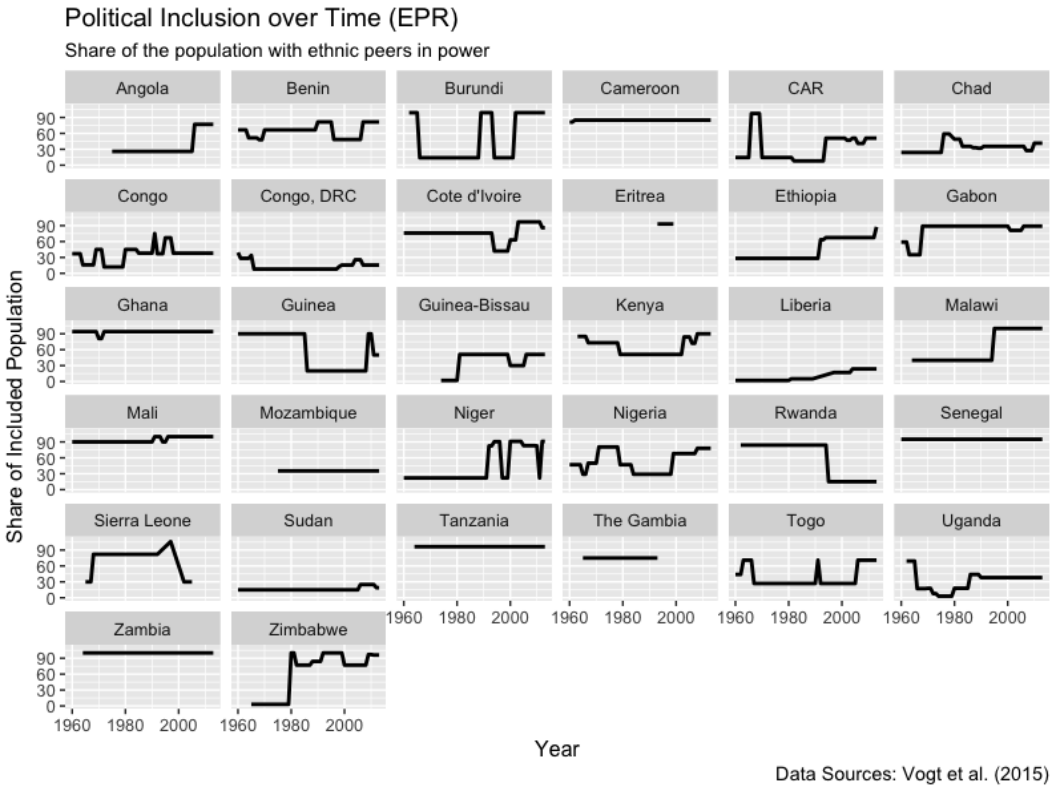

Figure B.2: Shares of Politically Represented Population over Time (EPR Data, 1960–2013)

Table B.9: Scaling Price Effects by Cash Crop Levels

	Represented (Y/N)		Minister Count (log)	
Cash Crop Value × Price (log)	0.066**		0.429**	
	(0.027)		(0.205)	
Cash Crop Value p.c. × Price (log)		0.066**		0.428**
		(0.027)		(0.206)
Country FE	Yes	Yes	Yes	Yes
Baseline Controls	Yes	Yes	Yes	Yes
Observations	10,967	10,967	10,967	10,967

Notes: Linear OLS models. The sample means of the dependent variables are 0.56 (columns 1–2) and 1.47 (columns 3–4). Control variables in columns 2 and 4 are the same as in the cross-sectional models above. Two-way clustered standard errors in parentheses: Ethnic group and country-year clusters. Significance codes: *p<0.1; **p<0.05; ***p<0.01

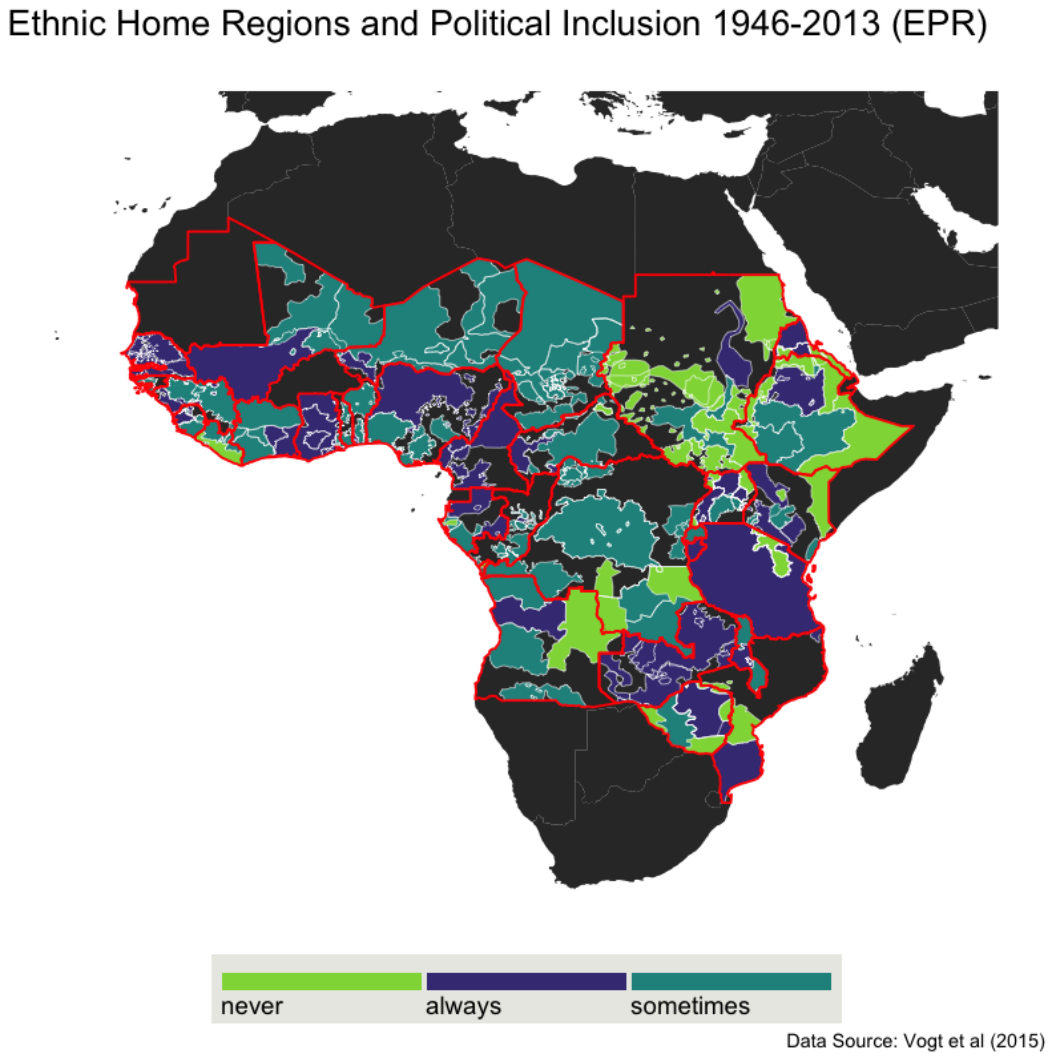

Figure B.3: Share of Years with Political Inclusion, 1960–2013 (EPR Data & GeoEPR Polygons)

Table B.10: Dropping Ghana and Côte d'Ivoire

	Represented (Y/N)		Minister Count (log)	
Cash Crop Weights × Price (log)	0.124***	0.110**	0.763**	0.742**
	(0.039)	(0.048)	(0.311)	(0.332)
Country FE	Yes	Yes	Yes	Yes
Baseline Controls	Yes	Yes	Yes	Yes
Controls × Year Dummies	Yes	Yes	Yes	Yes
Observations	9,471	9,428	9,471	9,428

Notes: Linear OLS models. The sample means of the dependent variables are 0.56 (columns 1–2) and 1.47 (columns 3–4). Control variables in columns 2 and 4 are the same as in the cross-sectional models above. Two-way clustered standard errors in parentheses: Ethnic group and country-year clusters. Significance codes: *p<0.1; **p<0.05; ***p<0.01

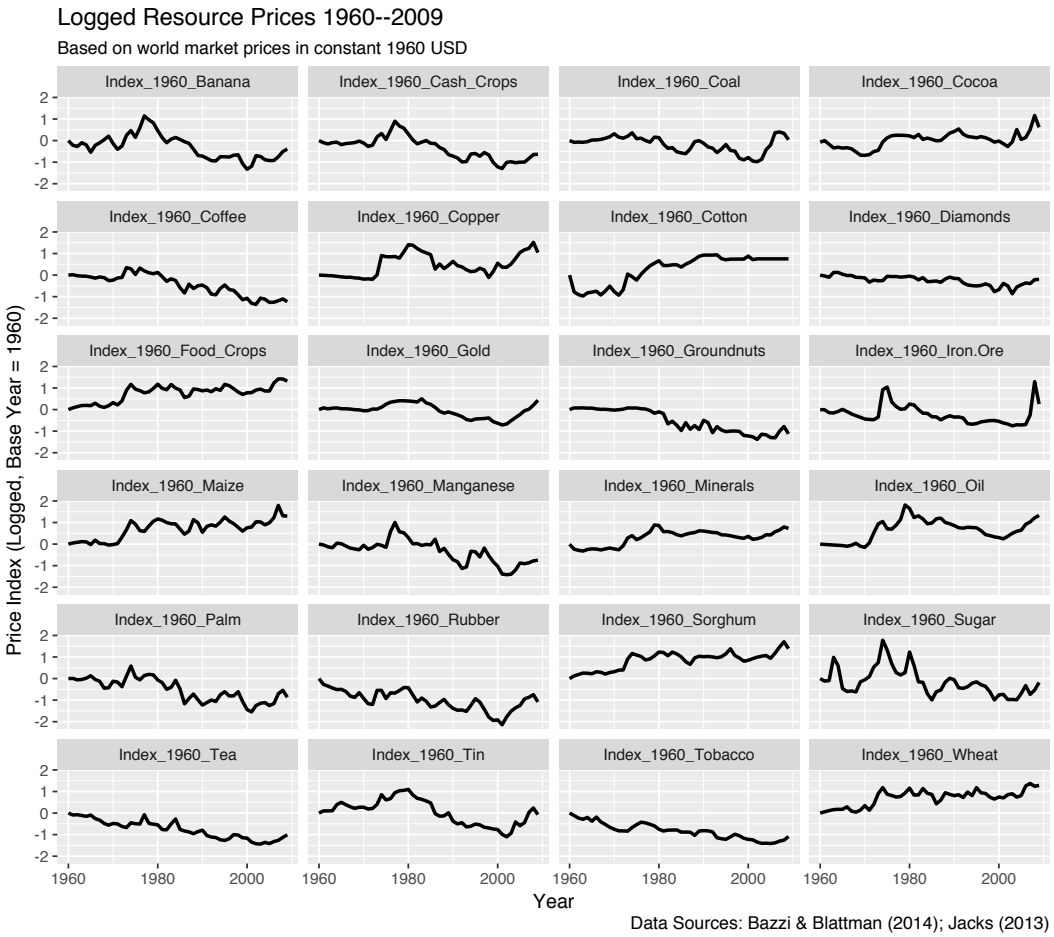

Figure B.4: Logged Price Indices of Individual Crops & Minerals, 1960–2009

Table B.11: Cash Crop Values, Political Representation & Urban Infant Mortality

	Infant Mortality		
	(1)	(2)	(3)
Cash Crops × Price (log)	0.547	0.625	0.588
	(0.575)	(0.579)	(0.587)
Represented (Y/N)		-0.453	
		(0.947)	
Minister Count (log			-0.295
			(0.778)
Cash Crop Value × Represented (Y/N)		-0.095	
		(0.179)	
Cash Crop Value × Minister Count			-0.050
			(0.126)
Ethnic Group FE	Yes	Yes	Yes
Country-Survey-Round-Cohort FE	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes
Observations	262,771	262,771	262,771

Notes: Linear probability models estimated via OLS. The sample mean of the dependent variable is 10.76 infant deaths per 100 live births. Observations are weighted to ensure equal weights for each ethnic group. Control variables include mothers' education, age and age squared, as well as newborns' sex, a twin dummy, birth rank, and birth rank squared. Standard errors clustered by ethnic group in parentheses. Significance codes: *p<0.1; **p<0.05; ***p<0.01

Table B.12: Cash Crop Values, Political Representation & Infant Mortality

	Infant Mortality		
	(1)	(2)	(3)
Cash Crops × Price (log)	-0.812**	-0.820**	-0.822**
	(0.390)	(0.391)	(0.393)
Represented (Y/N)		-0.085	
		(0.635)	
Minister Count (log)			-0.221
			(0.631)
Cash Crop Value × Represented (Y/N)		0.019	
		(0.119)	
Cash Crop Value × Minister Count			0.025
			(0.101)
Ethnic Group FE	Yes	Yes	Yes
Country-Survey-Round-Cohort FE	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes
Observations	879,922	879,922	879,922

Notes: Linear probability models estimated via OLS. The sample mean of the dependent variable is 10.01 infant deaths per 100 live births. Observations are weighted to ensure equal weights for each ethnic group. Control variables include mothers' education, age and age squared, as well as newborns' sex, a twin dummy, birth rank, and birth rank squared. Standard errors clustered by ethnic group in parentheses. Significance codes: *p<0.1; **p<0.05; ***p<0.01

C

APPENDIX TO CHAPTER 9

This appendix contains additional plots and tables mentioned in the main text of Chapter 9.

Table C.1: Summary Statistics (DHS Couple Data)

Statistic	N	Mean	St. Dev.	Min	Max
Exogamy (L1)	157,506	0.030	0.170	0	1
Exogamy (L2)	157,506	0.058	0.234	0	1
Exogamy (L3)	157,506	0.062	0.242	0	1
Exogamy (L4)	157,506	0.075	0.263	0	1
Exogamy (L5)	157,506	0.082	0.274	0	1
Exogamy (L6)	157,506	0.090	0.286	0	1
Exogamy (L7)	157,506	0.097	0.296	0	1
Exogamy (L8)	157,506	0.101	0.302	0	1
Exogamy (L9)	157,506	0.127	0.333	0	1
Exogamy (L10–L13)	157,506	0.147	0.354	0	1
Exogamy (L14)	157,506	0.149	0.356	0	1
Exogamy (L15)	157,506	0.156	0.363	0	1
Exogamy (L16)	157,506	0.162	0.368	0	1
Colonial Cash Crop Dummy	201,245	0.225	0.417	0	1
Colonial Mineral Dummy	201,245	0.045	0.208	0	1
Cash Crop Value (Mio. 1957 USD)	201,245	0.190	0.467	0	4.335
Mineral Value (Mio. 1957 USD)	201,245	0.256	3.406	0	78.030
Cash Crop Value (Murdock Poly.)	203,889	20.008	112.898	0	789.837
Mineral Value (Murdock Poly.)	203,889	37.261	204.295	0	1,463.207
Wife's Age	238,262	30.419	8.192	15	64
Husband's Age	238,260	37.845	9.509	15	95
Primary Educ. (Wife)	238,244	0.554	0.497	0	1
Secondary Educ. (Wife)	238,244	0.205	0.404	0	1
Higher Educ. (Wife)	238,244	0.025	0.155	0	1
Household Wealth (Q2)	192,039	0.208	0.406	0	1
Household Wealth (Q3)	192,039	0.194	0.396	0	1
Household Wealth (Q4)	192,039	0.188	0.391	0	1
Household Wealth (Q5)	192,039	0.187	0.390	0	1
Ethnic Fractionalization (Cell)	157,371	0.471	0.278	0	0.931
Ethnic Polarization (Cell)	157,371	0.164	0.109	0	0.333
Ethnic Fractionalization (Murdock Poly.)	179,698	0.641	0.218	0	0.980
Ethnic Polarization (Murdock Poly.)	179,698	0.138	0.109	0	0.332
Agricultural Suitability	196,306	0.401	0.229	0	0.999
Dist. Navigable River	201,234	90.741	73.367	2.400	448.138
TseTse Suitability	201,245	0.469	0.430	0	1
Malaria Ecology	201,245	13.209	10.620	0	38.081
Dist. Coast	201,245	490.781	350.064	0	1,690.366
Dist. Precolonial Trade Route	201,245	212.266	341.465	3.083	1,962.161
Dist. 1900 City	201,245	350.251	295.020	4.268	1,982.960
Dist. European Explorer Route	201,245	176.444	215.431	2.200	1,419.285
Precolonial Statehood	186,783	1.804	0.967	0	4
Historical Reliance on Agric.	195,826	6.783	1.417	1	10
Slave Exports per sqkm (log)	199,809	1.792	6.497	0	42.562
Dist. Capital City	194,347	351.127	297.482	2.278	1,848.702
Potential Cash Crop Value 1900 (z-score)	201,211	0.439	0.880	−0.744	4.897
Marriage Year	238,211	1,994.813	10.785	1,951	2,016

Table C.2: Summary Statistics (Afrobarometer Data)

Statistic	N	Mean	St. Dev.	Min	Max
Ethnic > National ID (Y/N)	95,504	0.132	0.338	0	1
Cash Crop Value (Mio. 1957 USD)	132,491	0.428	0.807	0	6.936
Mineral Value (Mio. 1957 USD)	132,491	0.347	4.117	0	65.603
Respondent's Age	116,333	35.903	13.933	18	130
Respondent's Sex	132,479	0.501	0.500	0	1
Agricultural Suitability	126,375	0.411	0.224	0	0.987
Dist. Navigable River	132,475	80.220	67.930	2.400	375.697
TseTse Suitability	132,491	0.535	0.401	0	1
Malaria Ecology	132,491	13.541	9.949	0	38.054
Dist. Coast	132,491	435.951	356.030	0	1,653.210
Dist. Precolonial Trade Route	132,491	138.118	194.267	3.083	1,451.361
Dist. 1900 City	132,491	276.791	226.285	4.268	1,228.322
Dist. European Explorer Route	132,491	162.556	188.416	2.366	949.077
Precolonial Statehood	121,534	1.601	0.895	0	3
Historical Reliance on Agric.	127,773	6.987	1.315	1	10
Slave Exports per sqkm	129,845	2.565	7.460	0	42.562
Dist. Capital City	131,271	353.207	324.123	2.278	1,815.213

Table C.3: Reduced Form Estimates

	DHS Survey Item			
	HH Wealth	Electricity	Sec. Educ.	Quality Job
Ethnic Movers (HH Share)	0.191***	0.063***		
	(0.033)	(0.009)		
Ethnic Mover (Y/N)			0.030***	0.030***
			(0.006)	(0.005)
Pot. Cash Crop Value (1900)	-0.040	0.003	0.031**	0.004
	(0.026)	(0.013)	(0.012)	(0.005)
Movers × Cash Crops	-0.056**	-0.022*		
	(0.026)	(0.012)		
Mover × Cash Crops			-0.021**	-0.016***
			(0.011)	(0.005)
Country-Survey-Round FE	Yes	Yes	–	–
Country-Survey-Cohort FE	–	–	Yes	Yes
Baseline Controls	Yes	Yes	Yes	Yes
Individual-Level Controls	–	–	Yes	Yes
Observations	389,589	461,227	829,369	737,743

Notes: OLS linear probability models. The sample means of the dependent variables are Baseline controls include soil and climatic suitability for agriculture, malaria ecology, tsetse fly suitability, terrain ruggedness, log distances to coast, capital, navigable waterways, precolonial trade routes, cities in 1900, as well as the historical proxies for precolonial stateness, reliance on agriculture, and exposure to the slave trades. Individual-level controls are age, age squared, and sex. Standard errors are clustered at the level of the country-specific survey round. Significance codes: *p<0.1; **p<0.05; ***p<0.01

Table C.4: Robustness: Using WLMS instead of Murdock Polygons

	DHS Survey Item			
	HH Wealth	Electricity	Sec. Educ.	Quality Job
Ethnic Movers (HH Share)	0.183***	0.085***		
	(0.029)	(0.013)		
Ethnic Mover (Y/N)			0.022**	0.039***
			(0.010)	(0.008)
Cash Crop Value (log)	0.188***	0.085***	0.078***	0.026***
	(0.030)	(0.013)	(0.011)	(0.006)
Mineral Value (log)	0.173***	0.053***	0.034***	0.044***
	(0.028)	(0.011)	(0.007)	(0.007)
Movers × Cash Crops	-0.090**	-0.054***		
	(0.036)	(0.014)		
Movers × Minerals	0.075***	0.031*		
	(0.024)	(0.017)		
Mover × Cash Crops			-0.053***	-0.019***
			(0.010)	(0.007)
Mover × Minerals			0.011	-0.015**
			(0.007)	(0.007)
Country-Survey-Round FE	Yes	Yes	–	–
Country-Survey-Cohort FE	–	–	Yes	Yes
Baseline Controls	Yes	Yes	Yes	Yes
Individual-Level Controls	–	–	Yes	Yes
Observations	389,589	461,227	829,369	737,743

Notes: OLS linear probability models. The sample means of the dependent variables are Baseline controls include soil and climatic suitability for agriculture, malaria ecology, tsetse fly suitability, terrain ruggedness, log distances to coast, capital, navigable waterways, precolonial trade routes, cities in 1900, as well as the historical proxies for precolonial stateness, reliance on agriculture, and exposure to the slave trades. Individual-level controls are age, age squared, and sex. Standard errors are clustered at the level of the country-specific survey round. Significance codes: *p<0.1; **p<0.05; ***p<0.01

D

APPENDIX TO CHAPTER 10

This appendix contains additional plots and tables mentioned in the main text of Chapter 10.

Table D.1: Group-Level Conflict: Only Political Variables

	Ethnic Conflict Onset			
	LPM		Logit	
Politically Included (t-1)	-1.688***	-1.491***	-1.545***	-1.516***
	(0.431)	(0.406)	(0.311)	(0.326)
Downgraded (t-1)	6.166***	6.389***	1.870***	2.073***
	(2.257)	(2.263)	(0.288)	(0.309)
Country FE	No	Yes	No	Yes
Group-Level Controls	Yes	Yes	Yes	Yes
Country-Level Controls	Yes	Yes	Yes	Yes
100 × AME (Pol. Incl.)	–	–	-1.675	-1.622
Observations	6,743	6,743	6,743	6,743

Notes: OLS linear probability and logistic regression models. The sample means of the dependent variable are 0.927 (Columns 1 and 2) and 0.009 (Columns 3 and 4). Control variables include demographic group size, number of previous conflicts, country-level population and per capita GDP, and a cubic polynomial of the years since last conflict. Country-clustered standard errors in parentheses. Significance codes: *p<0.1; **p<0.05; ***p<0.01

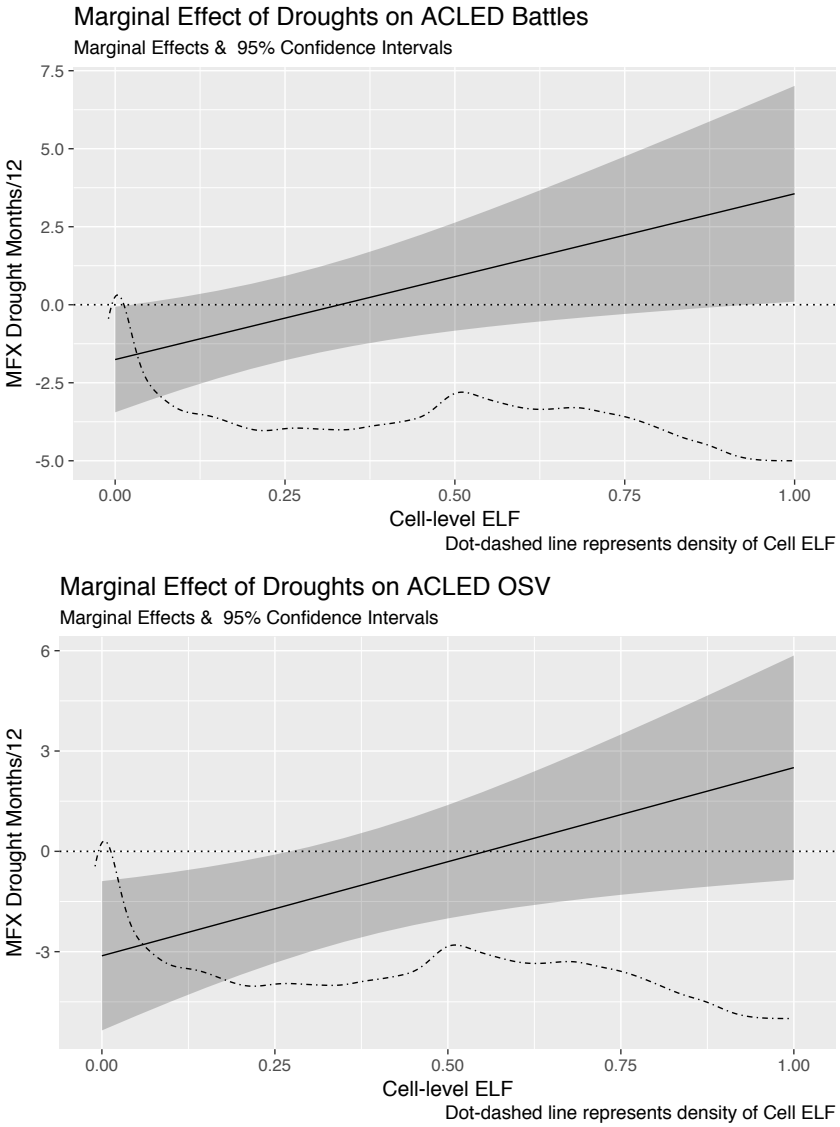

Figure D.1: Battle & OSV Effects of Droughts in Cash Crop Cells

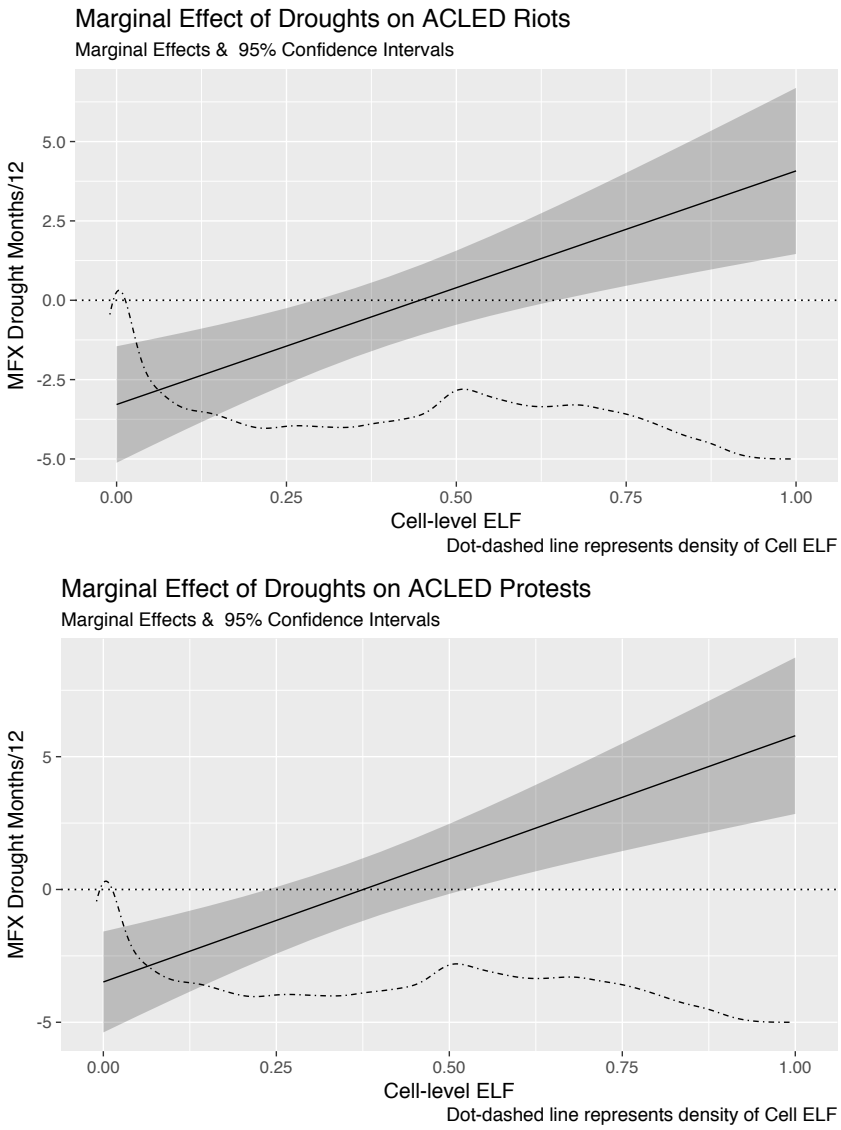

Figure D.2: Riot & Protest Effects of Droughts in Cash Crop Cells

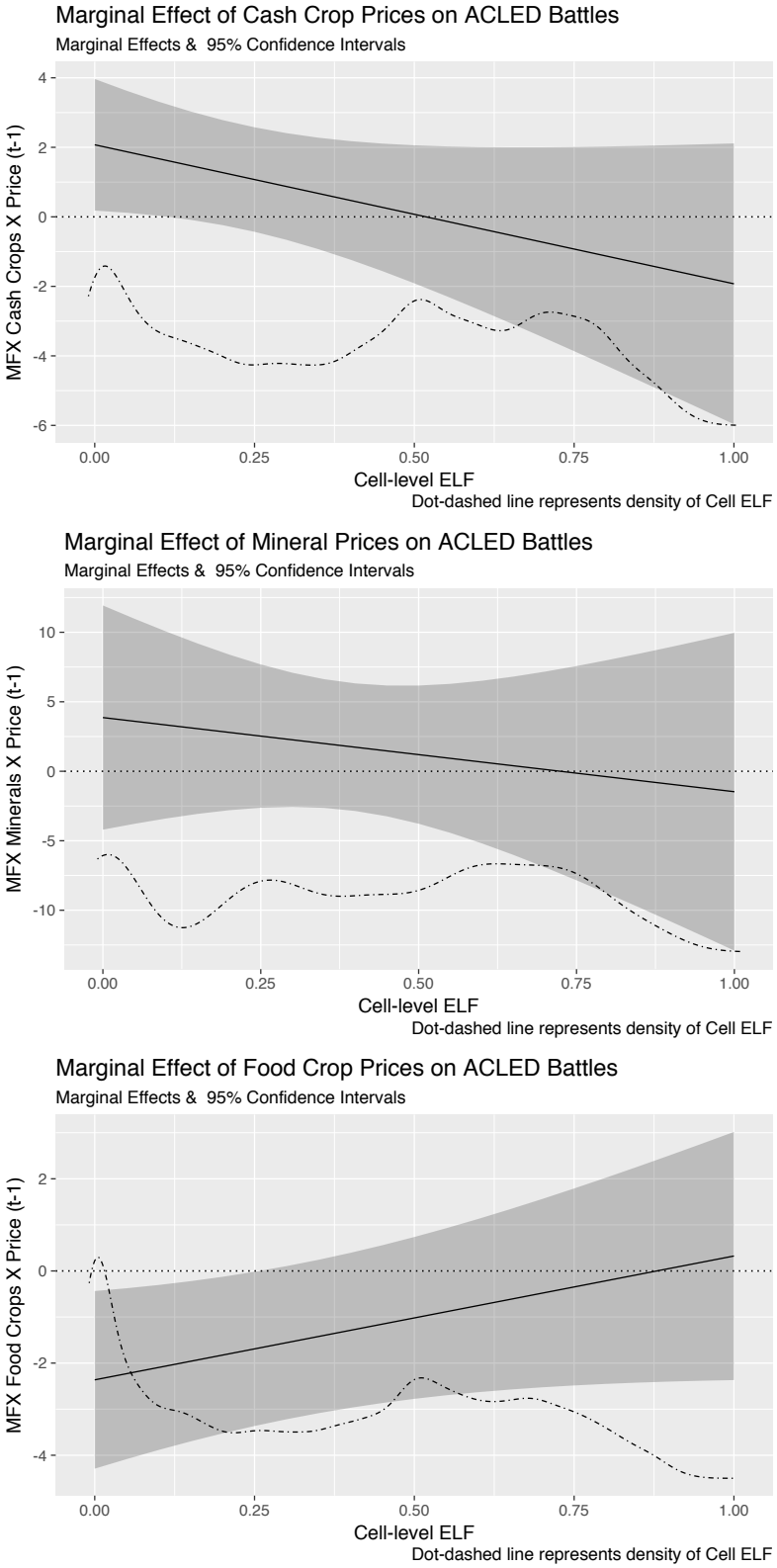

Figure D.3: Price Shocks, Diversity & Battles

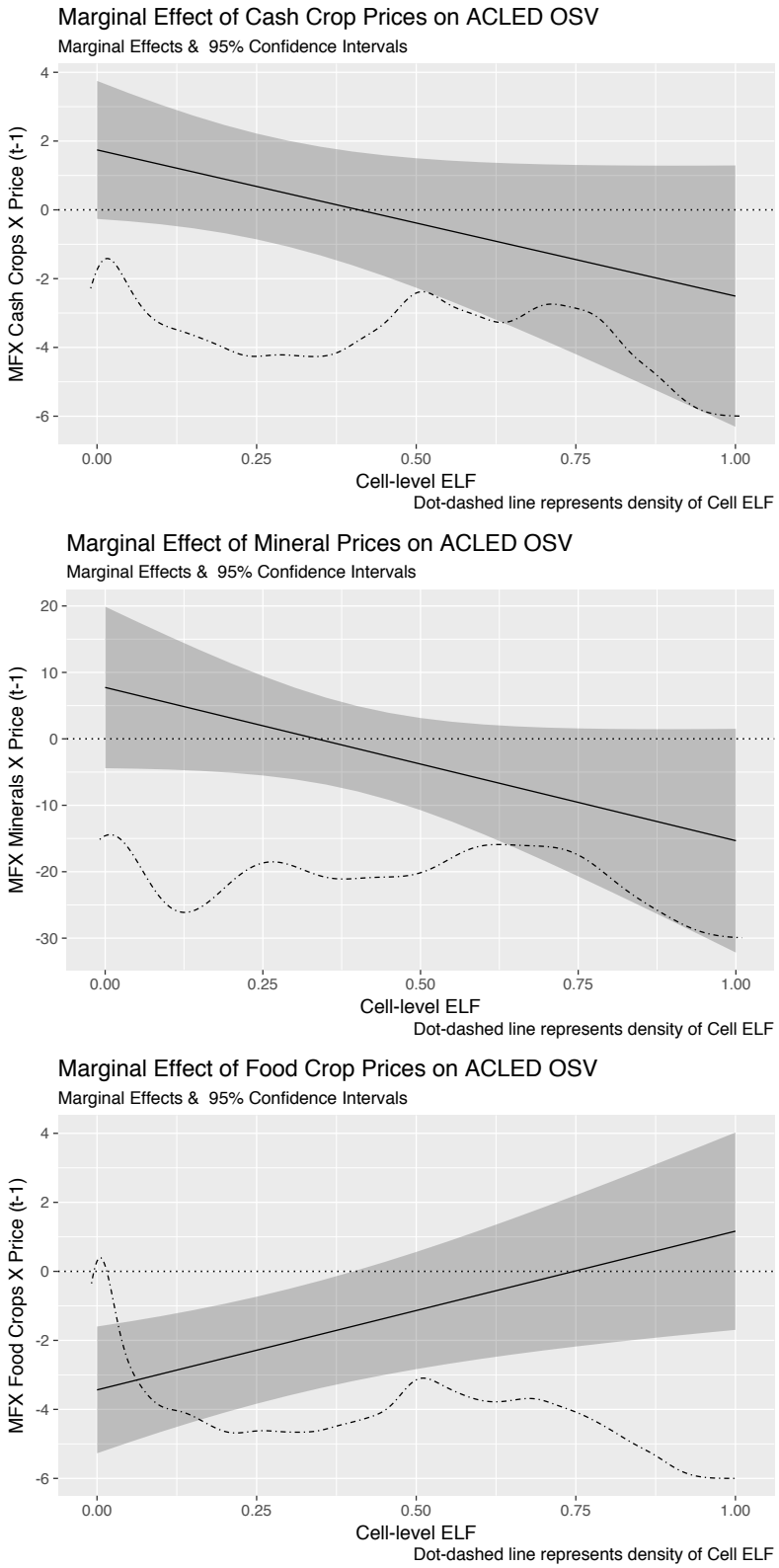

Figure D.4: Price Shocks, Diversity & OSV

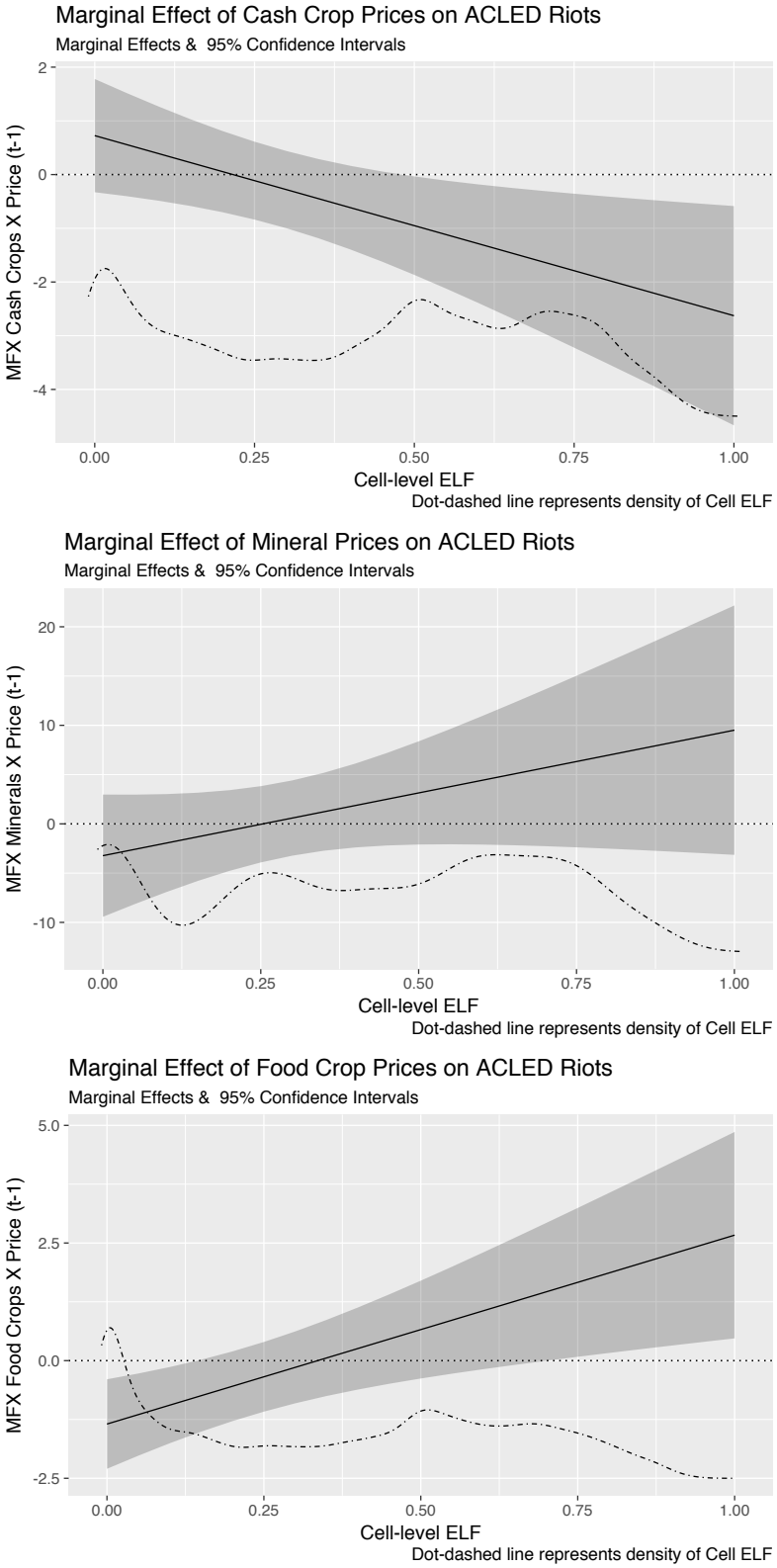

Figure D.5: Price Shocks, Diversity & Riots

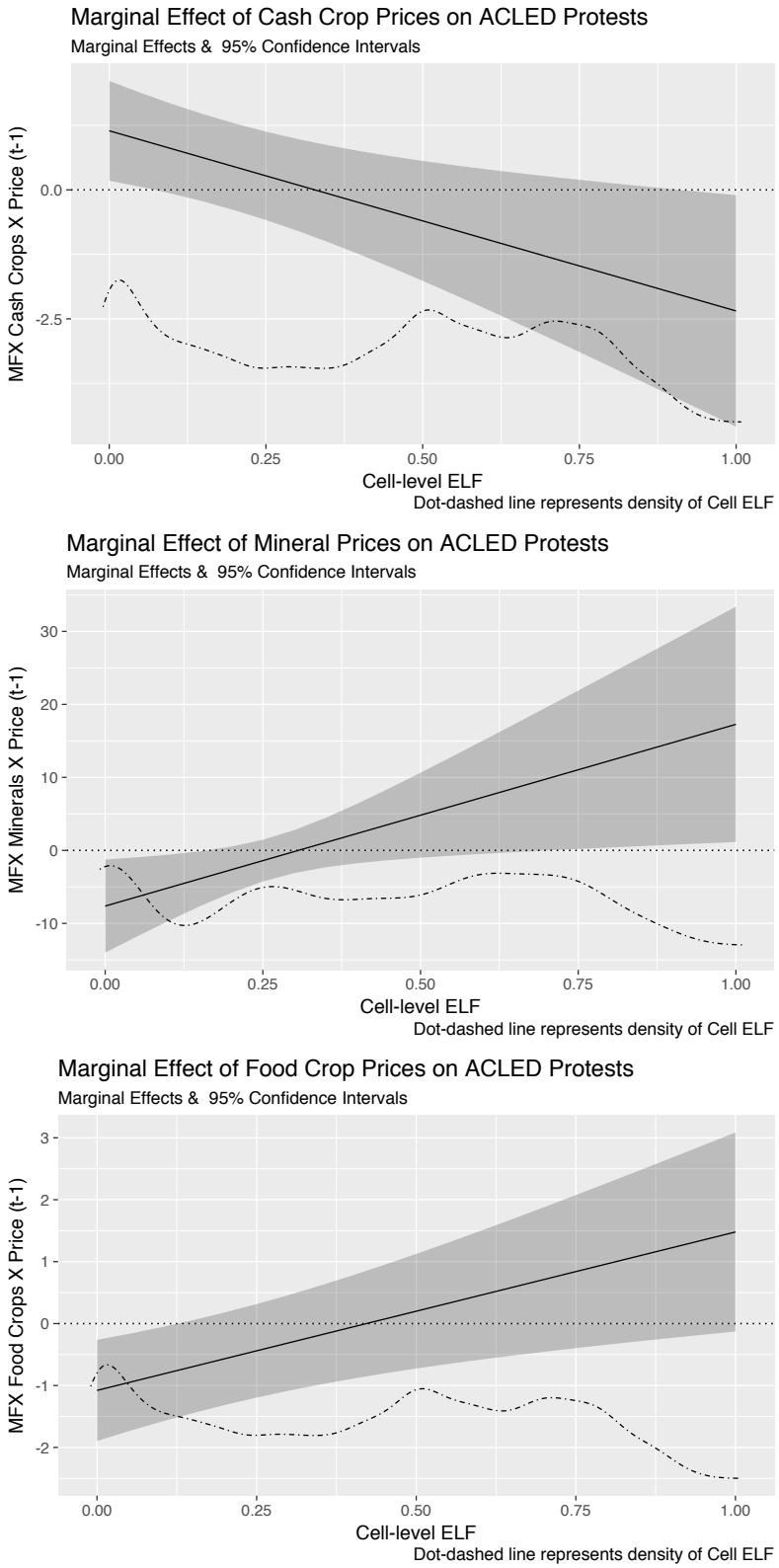

Figure D.6: Price Shocks, Diversity & Protest

Table D.2: Group-Level Conflict: Resource Variables Only

	Ethnic Conflict Onset			
	LPM		Logit	
Cash Crop Value per sqkm (log)	-0.701***	-0.864*	-1.147**	-2.247*
	(0.238)	(0.442)	(0.545)	(1.168)
Mineral per sqkm (log)	-0.749**	-0.274	-1.308	-0.936
	(0.352)	(0.482)	(1.118)	(2.449)
Country FE	No	Yes	No	Yes
Group-Level Controls	Yes	Yes	Yes	Yes
Country-Level Controls	Yes	Yes	Yes	Yes
100 × AME (Cash Crops)	–	–	-1.241	-2.410
Observations	7,124	7,124	7,124	7,124

Notes: OLS linear probability and logistic regression models. The sample means of the dependent variable are 0.927 (Columns 1 and 2) and 0.009 (Columns 3 and 4). Control variables include demographic group size, number of previous conflicts, country-level population and per capita GDP, and a cubic polynomial of the years since last conflict. Country-clustered standard errors in parentheses. Significance codes: *p<0.1; **p<0.05; ***p<0.01

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WORKING PAPERS

"Crops, Shocks, and Conflict: Beyond Opportunity-Based Explanations of Local Violence in Sub-Saharan Africa" Working Paper.

"Digging Deeper: The Long-Term Effects of Mineral Resource Extraction in Africa" (with Philipp Hunziker and Lars-Erik Cederman). Working Paper.

"The Economic Basis of African Ruling Coalitions: Cash Crops, Minerals, and Ethnic Representation" (with Philip Roessler). Working Paper.

"On the Origins of Spatial Inequality in Africa" (with Philip Roessler, Rob Marty, Kyle Sorlie Titlow, and Nicolas van de Walle). Working Paper.

"Who Benefits? How Local Ethnic Demography Shapes Political Favoritism in Africa" (with Janina Beiser-McGrath and Carl Müller-Crepon). Under Review.

"Globalization, Institutions and Ethnic Inequality" (with Nils-Christian Bormann, Nils Weidmann, and Lars-Erik Cederman). Under Review.

"Consolidating African Ethnicity Data" (with Carl Müller-Crepon and Nils-Christian Bormann). Working Paper.

"Share it or Lose it? Co-optation and Regime Stability in Multi-Ethnic Autocracies" (with Ilyas Saliba). Under Review.

GRANTS & HONOURS

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2012	ETH Zurich Excellence Scholarship & Opportunity Program M.A. Scholarship
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TEACHING

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2017	"A Modern Social Science Perspective on Ethnic Violence" (with Carl Mueller-Crepon). German National Academic Foundation. Summer School
2015 – 2016	"Methods II: Essential Mathematics, Basic Statistics, and Linear Regression." TA for Jorgen Boelstadt and Liam McGrath in M.A. level methods course at ETH Zurich.
2013 –2014	"Introduction to Conflict Research I & II." TA for Lars-Erik Cederman in introductory course for the Swiss Military Academy at ETH Zurich.

PROFESSIONAL ACTIVITIES

Peer Review	*American Political Science Review* *Journal of Peace Research*

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