Four Essays in Historical and Institutional Economics and Economic Development

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Abstract

In Chapter 1, we propose a theory to explain the poor performance of Jamaica relative to the other former British West Indian sugar colonies in the post-emancipation period (post 1834). Using empirical data from the colonial Blue Books, Parliamentary Papers and other sources, we perform an interrupted time series analysis and show that the intervention in 1866, which saw the abolishing of the Planters' Assembly, and its replacement with Crown Colony rule, led to significantly higher levels of public investment on the island. Using sugar's share of exports as a proxy for the strength/presence of the plantation economy, we identify and quantify the role of the plantation interest in manipulating public investment and show that this was motivated by a desire to influence wages.

In Chapter 2, we propose an institutional and colonial origins approach to explaining the social and economic divergence among the former British West Indian sugar colonies. Specifically, we focus on the contrasting economic development among the five main sugar colonies, Antigua, Barbados, Saint Kitts, Guyana and Jamaica. We hypothesise that where colonial population density was high, labour supply was plentiful and West Indian planters received adequate labour for their plantations without the need for highly repressive institutions. This led to better institutions, lower levels of conflict, and a higher level of social cohesion which, we argue, facilitated better economic performance.

In Chapter 3 we survey the literature concerning government intervention in the African peasant sector, paying special attention to policies concerned with labour supply during the colonial period. The survey covers several African colonies and works by various scholars.

The analysis in Chpater 4 uses colonial population density, labour institutions flexibility (the average (2008-2016) 'Flexibility' score from the Global Competitiveness Index), and a measure of labour conflict (per capita number of days lost due to strikes and lockouts, averaged over the first twenty years of each country's independence) to test the relationship between historical labour availability, labour conflict and the quality of labour institutions today. We find a persistent and significant positive relationship between the quality of labour institutions and colonial labour availability, and a negative relationship between conflict and the quality of institutions in 53 former tropical colonies.

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Dedication

This thesis is dedicated to my parents Alban and Elizabeth Olivier. Their immense sacrifices brought me here. They continue to take me forward...

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To my first investors, my parents Alban and Elizabeth Olivier: because I owe you more than I can ever return. Many Thanks!

My Father, late A. Olivier, who passed away during the first year of my research: To me, you will always represent the very definition of grit and dedication to family. I will miss your multiple personalities, the perfect examples of stoicism and joyfulness.

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And finally, if an acknowledgement is an effort to show due gratitude to those who have supported me, then I regret that there is someone that I cannot acknowledge. Not to the extent that she deserves. Not with the full allotment of deserved words. They would not fit in this small section. For that, an additional chapter would be required. So instead, I will simply say, to Amy Gorgone, you will always be the defining chapter in my life. This work is by my hands, but by your heart. You kept me grounded.

Thanks for all your encouragement!

Author's declaration

I hereby declare that this thesis is my own work, and the material contained in this thesis has not been submitted for a degree at any other university. The work contained in this thesis is original and all sources are acknowledged as in the Bibliography.

Junius Olivier
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Introduction

Research in the area of development economics have very often cited the historical factors that underpin development today. For developing economies these historical factors seem to be especially relevant, given the renewed focus on the role and persistence of institutions in affecting economic development. Among the set of developing countries, those that share a history of European colonialism are heterogenous in many dimensions, but a large number of them have in common the fact that they inherited institutional forms left over by their former colonisers. Recent papers, such as Acemoglu et al. (2001), have pointed to the importance of these colonial institutions for the economic (under)development of these states today. Colonial institutions, the authors argue, act as the catalyst for much of the variation in economic development observed among many developing countries today. The prevailing definition is by North (1991, p.97) who describes institutions as "the humanly devised constraints that structure political, economic, and social interaction. They consist of both informal constraints (sanctions, taboos, customs, traditions, and codes of conduct), and formal rules (constitutions, laws, property rights)."

By identifying both the informal and formal characteristics of institutions, North's definition is particularly useful for understanding the nature of institutions. First, the idea that informal relationships are part of the structure of institutions implies that the historical experiences which inform customs, traditions, and codes of conduct are crucially important to how institutions function. Second, the formal rules of institutional frameworks, as identified by North, are often the product of institutions of government, and so, the exercise of these rules depends largely on the quality of governance. Yet, the subtler differences in institutions of governance between countries have yet to be fully exploited in the elucidation of their role in economic development. Rothstein and Teorell (2008, p.165) have helped address this problem, offering a concise definition of the quality of governance as the "impartiality of institutions that exercise government authority." This definition suggests that the outcomes from institutions of governance may not necessarily reflect a preference for fair and just distribution of government resources. This begs the question of whose interests might institutions of government reflect? The answer to this question lies in an examination of both the history of a country's institutional framework and the motives of those wielding political and policy making power.

In the chapters that follow, we delve into the histories of post-colonial states to

uncover the origins of economic and institutional divergences and link them to the interactions between economic and political actors who, in their actions throughout the history of these countries, have shaped the institutional environment in which economic policy is conducted. The focus of this thesis is on the colonial era. This is motivated by the undoubted relevance of that period to economic and institutional development across a broad cross-section of countries. Moreover, the immense diversity in colonial policy allows us to study the economic consequences of different policies and institutions on a broad scale. These four essays treat the recent histories of these former colonies as being crucial for how they developed.

Chapter 1 takes a close look at the motives underlying the elites' choice of institutions. It examines the consequences for institutions of governance — and the policies that emerge out of these institutions — when the governing class is also part of the set of entrepreneurial elite. This feature is particularly apropos to the set of post-colonial countries. It represented the reality of colonial life for these former colonies throughout the colonial period and, in some cases, even today. The chapter conducts this examination by carrying out a comparative analysis of public investment policy under two different forms of government in colonial Jamaica. Chapter 1 takes a close look at Jamaica's underdevelopment by examining the implications for public investment under two different types (and thus two differently motivated forms) of government. The findings in the chapter indicate that the underperformance of Jamaica may be due to the fact that the planter-dominated government which governed the island from the late seventeenth century (when it was acquired from Spain) to 1865 (when power was seceded to the Crown in Britain, and the island became a Crown Colony) systematically underinvested in growth-enhancing public goods. Importantly, the analysis pins down the influence of the private production motives of the planter government and argues that this significant and persistent underinvestment was part of a deliberate attempt to manipulate wage rates by underfunding human and infrastructural development and redirecting revenues towards coercive ends.

Chapter 2 endeavours to explain the puzzling economic divergence between former sugar colonies in the British West Indies. We begin by studying the history literature from both contemporaneous and recent sources to identify the responses (and the motivations underpinning them) of the governing elite to the first significant institutional change in British West Indian society, the Emancipation Act of 1833. The information gathered from these sources suggests that that moment commenced a period of institutional divergence among the British West Indian colonies as the plantation owners used their political influence to remedy the central problem of the time, the (free) labour problem that resulted from the act. The chapter, with the aid of works by Augier (1993), Green (1991), and Bolland (1981), among others, and contemporary sources such as parliamentary papers and commission reports, argues that the institutional responses of the politically affluent planters varied with the magnitude of the labour problem they faced. Where the labour problem was particularly severe, like in the sparsely populated territories of Jamaica and Guyana, the planters responded with aggressively coercive institutions that ultimately caused these societies to develop into ones littered with con-

flict and marred by political and social instability. The rest of the chapter connects these colonial factors to current economic development by using empirical data to link the colonial labour problem to present day institutional quality. The results suggest that the institutional consequences of the responses to the colonial labour problem have persisted. In former colonies where scarce labour motivated more coercive action by the planter-dominated government during the colonial period, worse economic, social and political institutions and economic outcomes are observed today. The findings offer insight into how deeply entrenched are the institutional deficiencies that hinder economic development.

In Chapter 3 we conduct a survey of the literature beyond the West Indies. We explore similar instances of interventions by governments to cheapen the supply of labour in other colonies. Specifically, we survey the scholarly works concerning African economic history. While each colony had its own unique features, several commonalities have been identified by work in this area. By exploring some of the most prominent works, we present various scholarly points of view which serves to inform our understanding of the wider context of colonial history and its impact on peasants and broader economic development. Counter-balancing arguments from the Arrighi (1970) and Mosley (1983) are presented to offer a more complete picture of the economic history of post-colonial states. The chapter covers several African colonies including both the settler and export-oriented colonies. We present a review of Wilson (1972) which explores the case of labour in the South African gold mines, followed by Van Onselen (1976) which looks at mine labour in Southern Rhodesia. Bates (1981) and Bates (1987), which examine various colonies, round-up the chapter.

Chapter 4 builds on the survey from Chapter 3 to broaden the sample of countries considered while narrowing the outcome of interest. Using a contest success function, we analyse the theoretical implications of the historical conflict between stakeholders in the labour market of post-colonial states. More specifically, this chapter explores three questions. The first is whether former colonies in the tropical region, where labour-intensive large-scale agriculture dominated economic life, have worse labour institutions than the rest of the world today. The second question considers whether the differences in the quality of labour institutions in these tropical former colonies are a consequence of the labour problems faced during the colonial period. The final question examines whether the relationship between colonial labour availability and the quality of labour institutions today, should it exist, is unique to tropical colonies where cheap agricultural labour availability was paramount to the economic viability of the colonial systems set up in these countries. The significance of these questions to the broader research agenda of this thesis lies in the answers to these questions. Should a link exist between colonial agricultural labour availability and the quality of labour institutions in the tropical former colonies today, and if that relationship is unique to this set of colonies, then the results, quite significantly, highlight the role and persistence of the historic relationships between political and economic agents in determining the institutional outcomes we observe today. We use a wide variety of data to answer these questions. Data on the quality of labour institutions flexibility from the Global Competitiveness Index (average

score 2008-2016), as well as colonial population density (our measure of colonial labour availabitly) data from McEvedy et al. (1978) and Acemoglu et al. (2001), and post-colonial labour conflict data from van der Velden (2016) were all used to test these relationships. The results show that colonial labour availability uniquely mattered as a determinant of present day labour institutions for former tropical colonies. Furthermore, among these former tropical colonies, lower labour supply was associated with more labour conflict and worse labour institutions.

Chapter 1

Sweet Sugar, Sour Government: The Under-development of Jamaica in the Post-Emancipation Era

1.1 Introduction

In this chapter, we exploit differences in the motives of the governing elite between time periods and across countries to show that while two countries may have similar *de jure* institutions, their *de facto* institutions — driven by the desires of the governing class — may differ significantly, leading to divergent economic outcomes. More specifically, we show that while Jamaica inherited identical constitutional frameworks to the other British West Indies sugar colonies, the policy choices of the local planter elite charged with governance of the island were driven by their interest as entrepreneurial agriculturists facing a dire labour problem. The central difference between Jamaica and the other main sugar colonies was the state of labour supply. While the other colonies, such as Barbados and Antigua, enjoyed an excess supply of labour, the Jamaican planters faced a chronic labour shortage and high wages, which they sought to remedy by exercising their governmental powers.

The government in Jamaica during the early post-emancipation period (1838-1865) was monopolised by an elite group of white sugar planters who maintained private interests in the outcomes of public policy decisions, especially those that concerned the dominant agricultural sector on the island. Key among those interests was the significant labour shortage affecting the plantations once slave labour was abolished. Inevitably, the governing planter elite pursued policies that suppressed public investment in activities that would improve the lives of the masses and generate productive opportunities outside the plantation economy, as this would limit their already scarce labour supply and increase wages. As a result, Jamaica suffered from comparatively bad government

which sought to exploit the labour force and under-funded public investment in the island, while diverting significant resources to their coercive efforts in the immediate post-emancipation period. We show this by first comparing the public investment of the island under a government dominated by plantation owners (planters) to that under Crown Colony government and find that the provision of public goods to the masses was significantly lower before the constitutional change which changed the policy-making authority. Second, we compare public investment of Jamaica to that of Antigua, during and after planter rule of these islands, to show that, while maintaining identical constitutions (and thus declarative institutions[1]), the differing motives of the decision making authority (the planters) compelled very different governing priorities (procedural institutions) and reaped significantly different consequences for public investment, a key determinant of subsequent economic development. The suggestion here is that although Jamaica was constrained by the same legal framework before and after 1865, and an identical institutional framework to that of other West Indian sugar colonies, the island's planter government, facing a significantly more constrained labour supply, chose a significantly more repressive and coercive set of policies.

Among the existing literature on colonial spending, Frankema (2011) develops a framework for comparing taxation policy and colonial spending in the former British colonies of Africa. We incorporate and extend this framework by analysing the impact of the planters' efforts to manipulate wages — in a labour-scarce environment — on public investment. In short, we present empirical evidence that explicitly shows that this wage manipulation motives drove decisions on public investment and repression. In this sense, our work shares similarities with that of Dippel et al. (2015) who examined the effect of a declining British West Indies sugar industry on wages and found that declining terms of trade led to reduced coercion and higher wages in the West Indian colonies where sugar declined. Whereas Dippel et al. (2015) focus on the effect of terms of trade on repression and wages, this chapter concentrates on the provision of public goods. Furthermore, the analysis implies that the Jamaican planter government did not conduct impartial public policy, but instead was corrupted by the private interests of planters. In so doing, this chapter directly relates the plantation economy to the quality of governance in Jamaica. Also, by conducting a comparative analysis of public investment before and after the constitutional change, and between islands, the present work offers a comprehensive examination of Jamaica's post-emancipation struggles.

Carrying out the study in this way allows us to look into the underlying causes of Jamaica's stagnation since emancipation. Formerly one of the richest nations (per capita) in the western hemisphere, the island's economic development has stagnated, even relative to other sugar colonies of the West Indies (Bohls, 2014; Burnard et al., 2017). In this chapter, we present empirical insight into the factors that led to the island's poor performance, particularly the role of government in Jamaica's underdevelopment. While the historical literature has proposed explanations for Jamaica's plight, there have scarcely been any that shows explicit empirical evidence on the link between the motives

[1]Patterson (2013) explores the implications of the difference between declarative (*de jure*) and procedural (*de facto*) institutions in the context of the West Indies.

of the plantation elite (stemming from conditions in the labour market) and the public investment decisions coming out of the institution of government. Since the seminal work of Acemoglu et al. (2001), increased focus has been placed on colonial institutions and West Indian institutional and economic underdevelopment has been examined in some recent economic literature (see Henry and Miller, 2009; DaCosta, 2007). These papers, however, have largely relied on stylized facts and assumed associations in arguing either for or against the significance of institutions and governance, and do not present evidence of a systematic relationship between the two and economic outcomes.

Using an interrupted time series analysis, we show that differently motivated governments allocated expenditures in a manner that best suited their private desires. In fact, we find that the planter-dominated government of 1838-1865 allocated significantly smaller shares of total expenditure (7 percent of expenditure on average) to the provision of public goods, whereas, following a change in constitution in 1866 which saw the planters lose their power, public investment share was significantly higher (increasing by 11.5 percentage points) and grew significantly each year thereafter. In addition, a 1 percentage point increase in sugar's share of exports during planter-rule is associated with a 0.10 percentage point decrease in the public investment share of government expenditure. The analysis attributes this to the labour market conditions which motivated the planters to manipulate wages. Specifically, a 1 percent increase in the ratio of policing expenditure relative to human expenditure led to a 0.097 percent decrease in the wages of predial workers on the island. The research design and unique dataset allow us to tease out a plausible explanation for these observations. We are able to show that public spending decisions were chiefly motivated by the planters' incentives as agriculturist competing for scarce labour, aiming to manipulate wages.

The rest of this chapter is structured as follows: Section 1.2 looks at the political, economic and social history of Jamaica to provide insight in how colonial spending was organised between periods and the motivations behind its allocation. Section 1.3 repurposes the model developed by Acemoglu (2006) to provide a theoretical framework for our analysis. Section 1.4 takes a summary look at the data we collected from various sources, to provide the empirical context for our analysis. In Section 1.5, we detail our empirical strategy and conduct a quantitative analysis of our theory. Section 1.6 summarises and discusses some of the implications of our findings.

1.2 Historical Background

To provide the relevant historical context for our analysis, in this section, we describe the political structure of the island government before and after 1865, contrast the fiscal policy of the government in the two periods, and examine the differing social and economic outcomes between the two regimes.

1.2.1 The Old Representative System: Founding to 1865

Jamaica was formally acquired by the United Kingdom from the Spanish through a 1670 treaty during Britain's first wave of territorial acquisition in the West Indies. Like the rest of the British West Indies, the island was a slave society engaged in the production of agricultural plantation produce for export to the European market. As such, plantation oligarchs dominated economic life and retained control of government throughout all of the main sugar colonies — which included Jamaica, Barbados, Antigua, and Saint Kitts — for the duration of slavery and into the post-emancipation period.

The Structure of Government

This old representative system, as it has been termed, featured a Governor, appointed by the Crown in Great Britain, whose *de jure* powers afforded him responsibility for defence of the colony and the enforcement of imperial orders. He was assisted by The Council which he nominated as his advisers to serve as a second chamber for the legislature, but they had no power to initiate money bills for the administration of the colony. Under the old representative system, this was the right of The Assembly who voted annually on the expenditures and revenue generating initiatives for the colony. This branch of government comprised the elected members who represented the interest of freeholders. In the context of an early post-emancipation society such as Jamaica's, the make-up of this Assembly amounted to the propertied white planters, former slave-holders engaged in the plantation production of sugar cane.

This Assembly through its control of revenue and expenditures of the local government, wielded substantial power which they leveraged to, further still, usurp the functions of the governor and his Council. The success of the planters' Assembly in curbing and assuming the Council's power is well documented by the most notable of Caribbean historians. (Augier, 1993, p.177) speaking of the planter Assembly describes a group which"vehemently defended the political jurisdiction they had gained and even sought to encroach upon what the crown had marked out for itself." Gocking (1960, p.116-117) writes that "early in the eighteenth century, too, the Crown lost all right to initiate legislation. The Governor was limited to communicating with the legislature by speech or message." The planters' Assembly, he continues, "considered itself the local House of Commons and gradually won a large measure of recognition for its claim." This was echoed in the words of Secretary of State Newcastle, quoted in Gocking (1960, p.116), who lamented that, the Assembly;

> "under the system which has acquired the force of law in Jamaica the same body, sometimes under the name of a legislative assembly, sometimes under that of a Board of Accounts, and at other times (in conjunction with the Council) under that of a Board of Works takes upon itself all the executive as well as all the legislative functions connected with the colonial finances. It imposes the taxes, superintends their collection, votes the appropriations, expends the money voted, and audits the accounts."

These *de facto* powers, along with the constitutional right guaranteed to the plantation elite to introduce money bills exercising control of the public accounts, amounted to realization of the political planter class as, according to Augier (1993), local oligarchs who had successfully reduced the governorship to creatures of their bidding.

Fiscal Policy 1839-1865

Perhaps the criticism of the planter-dominated legislature's fiscal policy would have been withheld had the oligarch disbursed expenditures proportionately. History accounts that this was not the case. Augier (1993, p.174) contends that "the services, notably education and health which the society needed after emancipation, were scarcely provided for out of local funds." Figures from Eisner (1961) show that while government expenditure as a share of GDP did not fall with a decline in economic activity up to 1850, the upturn in the economy from 1850 to 1865 was not accompanied by increases in share of government expenditure. Of specific interest to us is expenditure on services from which the mass of the population derives particular benefit: health, infrastructure, and education. Health expenditure was relatively low compared to plantation-friendly expenditure on policing. The share of total expenditure which accrued to health remained between 4 and 5 percent from 1840-1865, while the policing share of expenditure, already substantial at 13 percent in 1839, climbed to 23 percent in 1845, before reducing slightly to 21.5 percent in 1854 and, by 1865, accounting for 17 percent of expenditures. Assessing spending on infrastructure is more difficult. While expenditure on public works remained still only a fraction spent on policing, with infrastructure's share of expenditure averaging approximately 3 percent between 1838-1865, even this share must be discounted for the fact that the planter dominated legislature largely favoured projects that were specifically geared towards aiding their plantations. Writing at the time, Underhill (1865, p.89) reported that "vast sums are spent on the main roads, and on those which lead to estates, or pens, or to gentlemen's country mansions, whilst those which lead to the villages and freeholds of the people are sadly neglected."

Augier (1993, p.178) also noted this wide disparity in expenditure, commenting that, in terms of government expenditure, "pittance [was] spent on some things and the large sums spent on others, between 1838 and 1865"; drawing a comparison between the large sums spent on immigration and the neglect of education. The Jamaican Blue Book of 1840[2] reports that there was no expenditure on education from the central government in that year, and this was the case again in 1842. There were small grants for educational purposes in 1843 and 1844 but those amount to less than 0.2 percent of government expenditure. A decade later, in 1854, education's share of total expenditure was still only 0.3 percent and averaged just 1 percent between 1860 and 1865, the eve of the abolition of the planter oligarch government. The conclusion by Augier (1993, p.178) is that the neglect of education by the planter government is explained by "the belief of the planters that widespread education was against their interest since it would quickly reduce the numbers of those willing to labour on estates."

[2]Reference available in the Primary Sources appendix.

The evidence on spending would seem to confirm the fear that Secretary of State Newcastle, quoted in Gocking (1960, p.117), raised at the time:

> such a combination of legislative and executive functions is opposed not only to the practice of this country, but to all received principles and to the practice of every country in which the science of government is understood. It involves an utter absence of responsibility on the part of those who are charged with the levying and disbursement of public money and it must involve, as there is no doubt that it has hitherto involved, extreme unfairness, looseness and partiality in public expenditure.

1.2.2 Crown Colony 1866-1962

When the persistent abuses of the planter government led to the Morant Bay Rebellion in 1865, the old representative system was abolished, and control of the island was ceded to the crown in England, represented on the island by a Governor General. The Governor would serve as the chief legislator of the island, assisted by a Council of *ex-officio* and nominated members. In 1884, a modified version of crown colony saw the introduction of a representative element to the legislature, but this elected group's power over money bills was more apparent than real, as the Governor simply carried out his duties with the aid of his Council and ensured that money bills could be introduced only by him or with his approval (Sires, 1955). This effectively ended the planters' Assembly's *de jure* powers over taxation and spending of the island.[3]

In terms of policy under the new government, Eisner (1961) observes that the constitutional change meant that under crown rule, the new administration, in contrast to the old, was interested in maintaining impartiality in the provision of basic public services such as education, infrastructure and health. The author's figures, corroborated by our data from the Jamaica Blue Books (1836-1945), provide evidence of a persistent increase in government expenditure on public services, so that in 1875, ten years after the abolition of the planters' Assembly, infrastructure spending amounted to 12.7 percent of expenditure, education's share was 3.5 percent, health 6.6 percent and policing expenditure had fallen back to (and even below) its pre-emancipation levels at 12.8 percent.[4] By 1930, social services had dramatically increased, accounting for 52.5 percent of total expenditure. This represented an eightfold increase in public works, a twenty-four times increase in education and a sevenfold increase in health expenditure between the 1860s and 1930. Evidence of the higher level of provision of public goods was also noted by Augier (1993) who describes accomplishments such as the laying of public roads, which connected isolated communities and gave peasants access to markets, the increase in health outcomes from the increased provision of public health services and introduction of the elementary public-school system under crown colony government.

[3]This is not to say that they did not retain some *de facto* power through lobbying and economic influence.

[4]See the list of primary sources in the appendix for full Blue Book reference.

While a substantial increase in public services under this form of government is reported across the historical literature, it was not free from some criticism. Observations from Augier (1993) and an analysis by Eisner (1961) both point to the fact that, though public expenditure on education and health increased markedly, the figure was never consistently above 10 percent. Nevertheless, abolishing the planter government led to significant improvements in the fairness of expenditure and represented to the masses, a neutral form of government that could protect them from the planter elite (Augier, 1993).

1.3 Theory

This chapter sets out to explain the under-performance of Jamaica after the abolishment of slavery. The central thesis of this work is that in the post-emancipation Jamaica, the entrepreneurial elite maintained a near monopoly on political power during the formative years of a free society on the island. As such, their interests as agricultural estate owners who competed with peasants for production inputs in a colony where there was excess demand for labour, undermined any impetus towards public investment. The planter class, therefore, used their political power to perpetuate a repressive state which under invested in human resources, as revenues were redirected towards the repression and exploitation of the peasant and labouring class. This exploitation was motivated by at least two considerations; the desire for direct revenue extraction from the rest of society, and the desire to manipulate the wage rate during this period.

In this section, we outline the theoretical case for our hypothesis. Conveniently, Acemoglu (2006) offers an excellent blueprint for a theoretical model investigating such a hypothesis. We, therefore, use a modified and simplified version of his model to illustrate the theoretical motivations for our argument. Our work is different to that of Acemoglu (2006) in two important ways. First, while Acemoglu (2006) focuses on predatory taxation, our interest here is in assessing the implications of the entrepreneurial elites' political power on the provision of public goods. Secondly, in the proceeding sections, we test the implications of the model with empirical data for Jamaica. More specifically, our analysis focuses on the role of the magnitude of labour problems in stimulating incentives for the governing entrepreneurial elite to adopt policies which sought to repress the wages of the former slave society by under investing in human and economic development.

1.3.1 The Political Economic Environment

Consider an economy like that of the West Indian islands after full emancipation in 1838. As in Acemoglu (2006), the island is populated by a continuum $\vartheta_e + \vartheta_m + 1$ individuals. These individuals belong to three distinct groups; the planter elite (ϑ_e), small scale farmers who we will refer to as peasants (ϑ_m), and workers of mass 1. To replicate the economic and political environment of the West Indies, we make some assumptions describing characteristics of these groups.

The first group, plantation elites, engage in the mass (plantation) production of an agricultural crop (the price of which is normalised to 1) and governance of the island in its legislative assembly which has the power to decide on public investment. Furthermore, in addition to profits from production, this group derives utility from appropriating a fixed fraction (σ) of the output of the producers in other groups. The second group (ϑ_m), the set of small scale peasant farmers, primarily former slaves or their descendants who have acquired some land, are involved in production, either for themselves or for commerce, of this agricultural crop.[5] The final class of individuals, the workers, supply their labour to the former groups, inelastically. Using m and e to denote either group or individuals within that group, each member of the elite has access to the elite specific production technology ($f(k_e, l_e)$) to produce output y_e. Thus;

$$y_e = \frac{1}{1-\beta} A_e^{\beta} k_e^{1-\beta} l_e^{\beta} \tag{1.1}$$

where y_e is the output of the planter elite, $0 < \beta < 1$ is the elasticity of output with respect to labour, A is the state of technology, k_e is the capital demand of the planter elite, and l_e is labour demand. The production function of the peasant farmer is of similar form to that of the elite except that their capacity for production depends on the level of investments by the government in human development and infrastructure in the following way, $y_m = qf(k_m, l_m)$, where $q \in [0, 1]$ so that the production function is given by

$$y_m = q\frac{1}{1-\beta} A_m^{\beta} k_m^{1-\beta} l_m^{\beta} \tag{1.2}$$

We can think of q here as the quality of human development (or infrastructure) on the island corresponding to the level of investment in public goods, which the governing elite unilaterally decides. Additionally, to keep this illustration simple, we assume that there is no cost to q. Following Acemoglu (2006), we assume that each firm within each group has a maximum scale $\lambda_j \geq l_j$ so that the most productive individuals cannot employ the entire labour force and also, that no one group can generate excess demand for labour on their own ($\vartheta_j \lambda_j \leq 1$). These restrictions on firm capacity imply that no firm or group is big enough to employ the entire labour force and is in line with the economic environment of the post-emancipation West Indies which we are interested in studying. The present work departs from Acemoglu (2006) with the implementation of three key assumptions regarding production, specific to the post-emancipation West Indian society: **Assumption (i)**: the technology of the elite is superior to that of the small-scale farmer ($A_e > A_m$), **Assumption (ii)**: agricultural production is labour-intensive ($\beta > 1/2$). **Assumption (iii)**: The elite as a group has more extensive hiring capacity than the group of peasants so that $\vartheta_e \lambda_e > \vartheta_m \lambda_m$.

The labour market clearing condition is given by Equation (4) from Acemoglu (2006)

$$\int_{j \in S_e \cup S_m} l_j dj \leq 1 \tag{1.3}$$

[5]For simplicity we represent all the different crops as one final agricultural good.

where S_j identifies the group to which individual j belongs. The total demand for labour is, therefore, given by the sum of labour demand for the two groups: $\vartheta_m l_m + \vartheta_e l_e$. Since $l_j \leq \lambda_j$, there is an excess supply of labour when

$$\vartheta_m \lambda_m + \vartheta_e \lambda_e \leq 1 \tag{1.4}$$

The timing of events in this economy is as follows; the governing planter elite decides on the level on investment in human development (by choosing q). Producers then make investments in production by choosing labour and capital to maximise profits, taking q as given.

1.3.2 The Planter's Problem

We are now ready to solve the problem of the planter elite in this society. Recall that the planter generates utility from profits from their own production and by appropriating some of the peasant farmers' production. Let $\sigma \in [0, 1]$ represent the exogenous fraction of the small farmers' production that the planters have the capacity to appropriate, we can write the utility of the planters as

$$U_e = \frac{1}{1-\beta} A_e^{\beta} k_e^{1-\beta} l_e^{\beta} - w l_e - k_e + \Omega \tag{1.5}$$

where $\Omega = \sigma y_m \vartheta_m$. Following Acemoglu (2006), we work backwards, solving first the economic equilibrium. Members of each group (planter elite and peasants) maximise their profits from production so that the objective of each producer $j \in S_e \cup S_m$ is

$$\max_{k_j, l_j} y_j - w l_j - k_j \tag{1.6}$$

From the first order conditions for this problem, the optimal choice of capital and labour, respectively, for a producer from the either of the group of elites or peasants is

$$k_j = q^{\frac{1}{\beta}} A_j l_j \tag{1.7}$$

$$l_j = \begin{cases} 0 & \text{if } w > q^{\frac{1}{\beta}} \frac{\beta}{1-\beta} A_j \\ \in [0, \lambda_j] & \text{if } w = q^{\frac{1}{\beta}} \frac{\beta}{1-\beta} A_j \\ \lambda_j & \text{if } w < q^{\frac{1}{\beta}} \frac{\beta}{1-\beta} A_j \end{cases} \tag{1.8}$$

where $q = 1$ if $j \in S_e$.

In this economy, the prevailing wage rate depends on whether the labour market is in a state of excess demand or excess supply of labour. If Equation (1.4) holds, then there is excess supply of labour and members from each of the two groups can hire up to their maximum capacity, λ_j, by paying the lowest possible wage- which we will call the subsistence wage rate, $\overline{s}$.[6] The situation is starkly different when Equation (1.4) does not hold.

[6]Here, we are assuming that the wage in case of excess labour supply there is some minimum fixed positive subsistent wage, $\overline{s}$, to rule out slavery. This has no bearing on the result either way.

With the two groups competing for labour, in an economy experiencing excess demand for labour (when equation (1.4) does not hold), the equilibrium wage rate will be determined by the smaller of the marginal product of labour of the two groups. Recall from assumption (i) that the $A_e > A_m$; it follows from the fact that $q \in [0,1]$ that $\frac{\beta}{1-\beta}A_e > q^{\frac{1}{\beta}}\frac{\beta}{1-\beta}A_m$. That is, the marginal product of labour for the elite producer is higher than that of the peasants.[7] With excess demand for labour, the elite can hire up to their maximum capacity, λ_e workers, by paying a wage equal to the net marginal productivity of the peasants. Offering a higher wage will result in smaller profits for this group. The peasants, on the other hand, are unable to offer a wage higher than this as this would result in negative profits. Moreover, given excess demand for labour, a lower wage would not form an equilibrium.

With the solution to the economic equilibrium outlined, we turn to the effect of this economy on policy in a political economy setting. We will study the implications for public policy under two states of the economy: (i) an economy in excess labour demand and (ii) excess labour supply.

1.3.3 Excess Labour Supply

In this economy Equation (1.4) holds. Labour supply exceeds demand and producers can pay the lowest possible wage, $\overline{s}$, and hire up to their maximum capacity. The objective of elite is to maximise their utility given by Equation (1.5). The maximisation problem of each member of the planter elite becomes

$$\max_{q} \left[\frac{\beta}{1-\beta}A_e - \overline{s}\right]\lambda_e + \frac{1}{\vartheta_e}\left[\frac{\sigma}{1-\beta}q^{\frac{1-\beta}{\beta}}A_m\lambda_m\vartheta_m\right] \tag{1.9}$$

Proposition 1.1 immediately follows.

Proposition 1.1. *When an economy described by Section 1.3.1 is experiencing excess labour supply, the level of public investment is $q_{es} \equiv q^* = 1$. This level of q corresponds to that under a decision maker concerned with maximising aggregate output.*

It is clear that in this state of the economy, the elite derive maximum utility by setting q as high as possible, that is $q_{es} = 1$. This makes intuitive sense. The elite derive utility from appropriation and their own production. With excess supply of labour, their profits from production (the terms before the addition sign) are unaffected by the value of q. Meanwhile, it is in their best interest to ensure that the peasants are as productive as possible so that the utility derived from appropriating their resources (the terms after the addition sign) is as high as possible. We therefore have $q_{es} = 1$ in an excess labour supply economy; investment in human development is as high as is feasible. This level corresponds to that which maximises economy wide output $Y = y_e + y_m$.

[7] This was certainly the case in the West Indies in the post-emancipation era as the sugar planters were in possession of significantly better agricultural technology and more productive land.

1.3.4 Excess Labour Demand

In this state of the economy, Equation (1.4) does not hold. Labour demand is above the supply. By assumption (i), the marginal product of labour supplied to the elite is higher than that of the peasants, and so, the equilibrium wage rate is given by the smaller; $w = q^{\frac{1}{\beta}} \frac{\beta}{1-\beta} A_m$. The planter elite can, therefore, hire up to their capacity (λ_e), leaving the peasants to hire what's left of the workforce: $\vartheta_m \lambda_m = 1 - \vartheta_e \lambda_e$, amongst themselves. The elites' objective function can be written from Equation (1.5) as

$$\max_q \left[\frac{\beta}{1-\beta} A_e - q^{\frac{1}{\beta}} \frac{\beta}{1-\beta} A_m \right] \lambda_e + \frac{1}{\vartheta_e} \left[\frac{\sigma}{1-\beta} q^{\frac{1-\beta}{\beta}} A_m (1 - \vartheta_e \lambda_e) \right] \tag{1.10}$$

Solving the first order condition for this problem yields

$$q^* = \sigma \left[\left(\frac{1 - \vartheta_e \lambda_e}{\vartheta_e \lambda_e} \right) \left(\frac{1-\beta}{\beta} \right) \right] \tag{1.11}$$

which, by the fact that $\beta, \vartheta_e \lambda_e > 1/2$, is < 1. We summarize this result in proposition 1.2.

Proposition 1.2. *When an economy described by Section 1.3.1 is experiencing excess labour demand, the level of public investment is given by* $q_{ed} \equiv q^* = f(\sigma, \vartheta_e, \lambda_e, \beta) < 1 = q_{es}$.

The implication of this result is that in an economy described by Section 1.3.1, experiencing excess demand for labour, public investment is lower than of a state in which there is excess supply of labour, such as the one described in Sections 1.3.1 to 1.3.3. The feature of note here is the role of wages in this result. Now that the planter elite and peasants are in direct competition for scarce labour, the equilibrium wage rate is determined by what the maximum the peasants are willing and able to pay (their marginal product from hiring labour). q therefore enters directly into the elites' production profit maximisation objective as well as in the revenues derived from appropriation. While the planter seeks to increase revenues by increasing q, they wish to minimize their wage costs as entrepreneurs, which requires reducing q. This wage manipulation motive manifest in a lower level of public/human investment and aggregate output as $Y(q^* < 1) < Y(q^* = 1)$.

1.3.5 Planter Presence and Public Investment

It is interesting to note the effect of the scale of the plantation economy in the labour market on public investment. We have defined ϑ_e as the number of planter elite members in our society, while λ_e represents their hiring capacity or maximum scale. The presence of the planter elite, as a group, in the labour market is, therefore, equivalent to the product of these two terms. We can define the scale of the plantation economy, therefore, as $x \equiv \vartheta_e \lambda_e$. Then from Equation (1.11) we have

$$q^*(x) = \sigma \left[\left(\frac{1-x}{x} \right) \left(\frac{1-\beta}{\beta} \right) \right] \tag{1.12}$$

Using this equation, we can examine the effect of the scale or presence of the plantation economy on public investment. Differentiating Equation (1.12) with respect to x and simplifying yields

$$\frac{\partial q^*(x)}{\partial x} = -\frac{\sigma(1-\beta)}{x^2\beta} \tag{1.13}$$

This brings us to proposition 1.3.

Proposition 1.3. *In an economy described by Sections 1.3.1 and 1.3.4, the equilibrium level of public investment, q^*, is decreasing in the presence of the plantation interest (defined as $x = \vartheta_e\lambda_e$) in the labour market.*

The intuition behind this result is as follows; in an economy such as described, with excess demand for labour, when the presence of the plantation interest in the labour market increases, this intensifies competition for already scarce labour, and so, the wage manipulation motive becomes relatively more important, putting downward pressure on the level of public investment.

1.3.6 The Theoretical Model in Context

The theoretical model presented above reflects the economic and political reality of the British West Indies sugar colonies after emancipation. Jamaica, being a sparsely populated island with large tracts of plantation land for peasant agriculture, saw the plantations suffer from a want of labour in the sugar sector. In the face of this excess labour demand, the governing planter assembly directed public resources towards manipulating the wage rate, whether it be by redirecting resources to fund repressive policing or by under investing in public infrastructure, education, and health, so as to repress the development of markets outside the sugar plantations. As the model shows, the presence of this wage manipulation motive resulted in a lower public investment and an economy-wide output level below that which is attainable in a society where governing officials are not motivated by private entrepreneurial interests which conflict public interests.

The model detailed above highlights two catalysts to plantation elite's manipulative efforts. First, their position as the legislative assembly which afforded the power to decide on public expenditure, thereby determining q, and allow them to legally appropriate from the rest of society (captured by σ).[8] Second, the overwhelming capacity of the plantation economy relative to other small scale economic activities, with which it competed for labour, stimulated labour demand in a labour-scarce environment, and motivated a political correction to the resulting high wage problem. In what follows, we test each of the propositions produced by our theoretical model. Propositions 1.1 and 1.2 are tested, first, indirectly using an interrupted time series regression, and then directly by an econometric framework which compares Jamaica and Antigua. That is, a state with

[8] One example of this is a tax used to finance immigration of indentured labourers onto the plantation, with this burden falling on the peasants.

excess demand for labour and one with excess supply, respectively. Proposition 1.3 is tested using an econometric model of public investment in Equation (1.15).

1.4 The Data

1.4.1 Description of the Data

To test the implications of the model highlighted in section 1.3, we have collected data on a wide range of variables from the yearly Colonial Blue Books of the Caribbean colonies (CBB) and other sources from 1836-1945. The CBB, available in print form at the Cambridge University Library and digitally at the British Online Archives, serve as a contemporaneous source of primary information on a multitude of statistics requested by Britain and gathered by the administrative branch of the colonial government. These books contained hand written (and for a time, typed) entries on taxes, revenues and expenditure of the central and parochial government, legislation, political franchise, local prices, and imports and exports for the post emancipation period, beginning in the 1830s to the 1940s, the eve of the post-independence period.[9] Analysis of this demanded the capture of thousands of photographs and weeks of digitizing the numerous variables we are interested in measuring. For our analysis, we are interested in the post-emancipation time period, during which sugar was still a relevant industry in Jamaica. That is from 1838 (the year of full emancipation) to 1915 (which bookend a period of unmitigated decline in the sugar industry). The data is measured annually except for 1849 where data on some aspects of expenditure were unavailable, and two years for which we were unable to confirm sugar export data. We present a summary of the relevant variables in Table 1.1.

Table 1.1: Descriptive Statistics 1838-1915

Variable	Obs	Mean	Std. Dev	Min.	Max.	Mean 1838-66	Mean 1867-1915	Source
Sugar share of exports	75	0.323	0.210	0.021	0.793	0.55	0.198	CBB & others
Pub. works share of expenditure	76	0.072	0.043	0.004	0.163	0.026	0.097	CBB
Health share of expenditure	77	0.055	0.015	0.016	0.092	0.040	0.063	CBB
Educ. share of expenditure	77	0.035	0.026	0	0.091	0.006	0.052	CBB
Policing share of expenditure	76	0.135	0.047	0.062	0.26	0.185	0.106	CBB
Log daily wage	77	-2.73	0.223	-3.06	-2.24	-2.62	-2.97	CBB & others
Log price sugar	77	2.87	0.447	1.98	3.87	3.27	2.64	Eisner (1961)

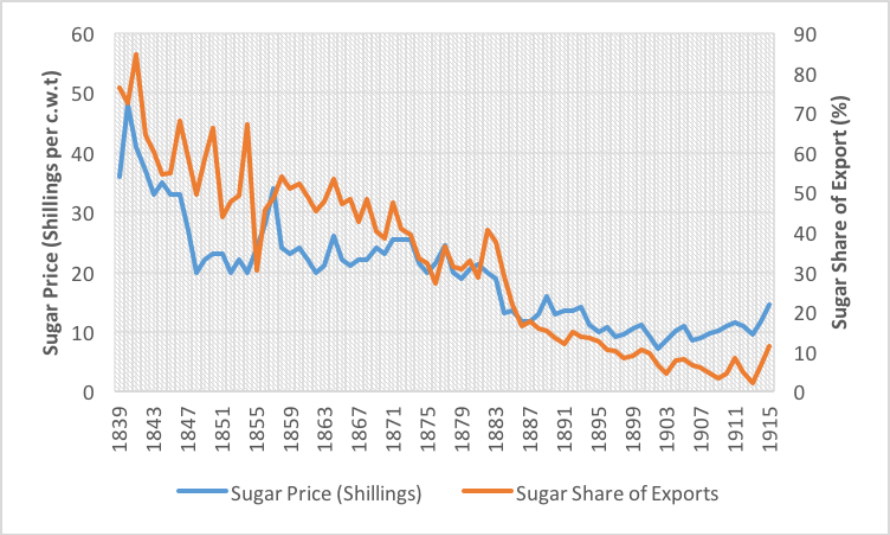
Notes: The tables gives summary statistics for the island of Jamaica for the period 1838-1915. The sources and nature of the data are detailed in the Primary Sources and Data Appendix sections in the appendices.

[9]The primary sources appendix gives details of the Blue Book references.

The Plantation Economy

To measure the state of the plantation economy of the island, we collect data on three main variables from various sources. Export and wage data for the sugar and agricultural industry were recorded in the colonial Blue Books for the years 1838-1939.[10] Where the Blue Book for a particular year was not available, we supplemented this data with records from Parliamentary Papers and Reports to the House of Commons sent to the United Kingdom occasionally.[11] Where possible, we cross-referenced data from these two sources with that available in the existing literature from history texts including, Hall (1959), Underhill (1895) and others. Price data for sugar cane on the world market is not available in the Jamaican Blue Books (JBB), and so, we retrieved price data from Eisner (1961) which reports the shilling (s) price per c.w.t. for sugar in London. Since most of the sugar, and indeed plantation produce cultivated in the West Indies was exported to Britain during this period, London prices of sugar cane effectively represented the world price. We corroborated this information with data from Deerr (1949) for overlapping years. We plot sugar share of export and world market price in Figure 1.1, for our sample period.

Figure 1.1: The Sugar Economy of Jamaica



Source: Colonial Blue Books of Jamaica (1839-1915) and Eisner (1961).

There exists, evidently, a very close relationship between the price of sugar on the world market and sugar's export share. The plantation economy of Jamaica declined steadily after 1838, falling from 79 percent of total exports in that year to just 40 percent by 1869. By 1915, sugar's share of exports was just 11 percent. This was largely due to the reduced demand for cane sugar in Europe, the passing of the Sugar Duties Act

[10] Wage data is reported in colonial pounds per eight-hour work day.
[11] See appendix for details of such primary sources including references.

of 1846, and the persistent fall in the price of sugar on the world market. In 1840, the price of cane sugar in London was reported at 48 shillings (s.) per c.w.t. but had halved to 24 shillings by 1869. The rate of decline slowed but continued during the pre-war period falling as low as 8.5 shillings in 1906 before recovering to a still dismal 14.5s. in 1915. These figures highlight the plight of the plantation elite during this period and do much to explain their desire for alternative means to maintain profitability of an enterprise in which they had sunk investments. Agricultural wages in Jamaica should be viewed in comparison to that of other territories in the West Indies. Wages in Jamaica were relatively high compared to that of the more densely populated islands of the British West Indies. The average wage on the island was 17d. for the period 1838-1915, compared to that of the densely populated Antigua (9d.), Saint Kitts (9d.) and Barbados (10d.), reflecting the relative shortage of labour for plantation work.[12]

Public Accounts

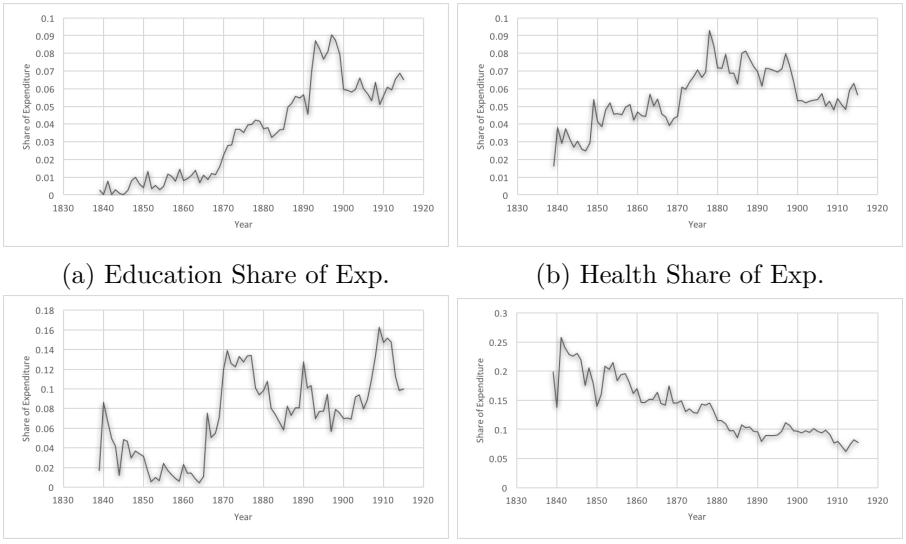
The Colonial Blue Books provide explicit details of the various components of expenditure conducted by the island governments of the various countries. Using this data, we are able to construct a data set for several key expenditure categories from 1838 to 1915 for Jamaica. Government expenditure during the colonial period is categorised into five broad headings: (*i*) administration, (*ii*) education, (*iii*) health care, (*iv*) security, and (*v*) public works. For Jamaica, over the period, these categories accounted for over 80 percent of all government expenditure. Our key expenditure categories include those that fall under human expenditure (education and health), infrastructure, and policing expenditure. Education expenditure consisted of grants to the board of education and, for some years, expenditure on specific schools or programmes. Health expenditure, on the other hand, encompasses grants to the board of health, expenditure on the individual hospitals and other sanitation expenditures. Expenditure on infrastructure comprises of spending on roads, bridges and various public infrastructure. These three heads of expenditures capture the total investment in human (health and education) and physical (infrastructure) capital over the sample period (q from the model in Section 1.3), while spending on policing was viewed, by Caribbean historians (Augier (1993); Bolland (1981); among others), as investments by the planter elite to control the black population.

The shares of these expenditure categories in total expenditure varied significantly over the period. Figure 1.2 tracks these variables over the sample period. Under planter rule (1838-1865), health and education expenditure averaged 4.1 percent and 0.067 percent respectively, while expenditure on infrastructure as a share of total expenditure was 2.5 percent, much of this reflected expenditure on roads, bridges and structures that supported sugar plantations. Policing expenditure, the aggregate of expenditure spent on prison and the police, averaged an overwhelming 19 percent of total expenditure. The composition of public expenditure changed dramatically after 1865. With

[12]Data from the Wages and Prices section of the Antigua Blue Books (1838-1915), Barbados Blue Books(1839-1915), and Saint Kitts Blue Books (1838-1886, thereafter the Leeward Islands Blue Books (1889-1915)

the planter oligarch abolished, the share of human expenditure increased to 11.5 percent of total expenditure; education's share at 5.2 percent and the health share amounted to 6.3 percent. The share of total expenditure accruing to infrastructure spending also rose dramatically to 10 percent during the period 1866-1915. In contrast, expenditure on policing as a share of total expenditure nearly halved, averaging 10 percent in this period. To arrive at total public investment, we aggregate expenditure in the three productive areas; education, health care, and public works. To ensure comparability across years, we divide the sum of these by total expenditure to derive the share of public investment in total expenditure.

Figure 1.2: Expenditure Shares 1838-1915



(a) Education Share of Exp.

(b) Health Share of Exp.

(c) Infrastructure Share of Exp.

(d) Policing Share of Exp.

Source: Colonial Blue Books of Jamaica (1839-1915).

We collect data on other controls which include revenue, climatic variables such as hurricane occurrences, and use this to control for spikes in public spending caused by damage from natural disasters. Hurricanes occurred in 6 of the years in our sample period. We also collect data on government revenue and public debt over the period as we expect these to be determinative of government expenditure. We collect population data from Bulmer-Thomas (2012) which we then used to convert these two variables in to per capita terms. A summary of these variables is also included in Table 1.1, while the sources for all data are listed in the data appendix attached to this thesis.

1.5 Empirical Analysis

Empirical support of the theoretical arguments presented in the previous section requires presentation of evidence that the governing elite in Jamaica used their power to:

(i) redirect public expenditures to repressive enterprise and under-invested in human development in an effort to (ii) manipulate factor prices (in this case, wage rates).

1.5.1 Planter Rule and Public Investment

Our first priority is to compare public investment during planter oligarch rule and the period following the constitutional change of 1866. The introduction of the new constitution in 1866 allows us to compare the fiscal policy of the oligarchical institution of government which the planter elite maintained, and that of the more neutral form of government that followed. In this section, we present evidence on the differential level of public investment during and after rule of the planter class, and the role of planter influence over the economy.

An Interrupted Time Series Analysis

We start the discussion with a quasi-experimental approach; performing an interrupted time series analysis (ITSA). The constitutional change of 1866, which saw the ruling planter elite lose its political authority to the crown, offers us an opportunity to compare public investment levels and trends under the two regimes. Using the constitutional change of 1866 as the 'intervention', the ITSA compares the pre and post (intervention) levels and trend in public investment in the following way:

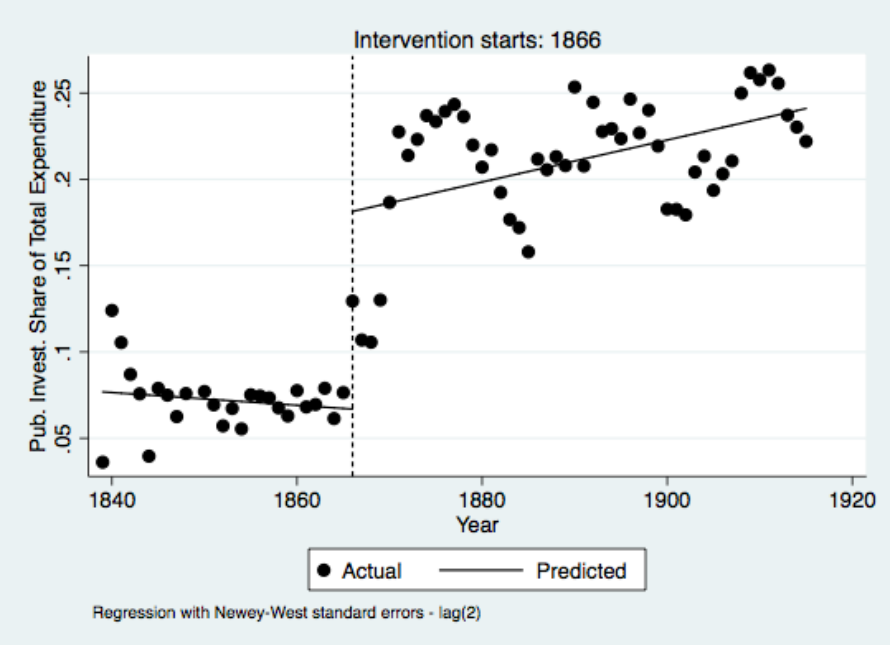
$$Public\ Investment_t = \beta_0 + \beta_1 T_t + \beta_2 Post_t + \beta_3 Post_t T_t + u_t \tag{1.14}$$

where t denotes the unit of time in years, T is a time trend measured as the number of years since 1838, $Post$ is a dummy variable equal to 0 in the pre-intervention period (1 otherwise); and is thus an indicator of whether the regime is planter oligarch or not. $PostT$ is an interaction term, the product of $Post$ and T. β_0 is the intercept, β_1 is the slope of public investment over time, during the period under planter oligarch rule, β_2 captures the change in the level of public investment after the intervention (or abolishing of the planter oligarch). Furthermore, β_3 represents the difference between the trajectory (slope) of public investment during and post planter rule. Recall from our theoretical model that propositions 1.1 and 1.2, taken together, imply that when the government, in setting the level of public investment, is not motivated by labour problems that its members face as private entrepreneurs, the level of public investment is higher. The estimation results of Equation 1.14 can therefore be thought of as equivalent to a test of these propositions. More specifically, the intervention in 1866, which saw that planter government lose direct control, can be thought of as the replacement of a government motivated in their decisions on public expenditure by the labour problem, with a government without this motive. Effectively, the new government after 1865, without the wage manipulation motive, is identical to the government that faces excess labour supply under the model in that it is not concerned with the private problem of excess labour demand. As such, comparisons of public investment in the two periods (before and after 1865) is indirectly an analysis of public investment when members of the government is concerned about their own excess demand for labour versus when they

are not. We therefore expect, in accordance with propositions 1.1 and 1.2, significantly higher public investment after 1865 versus before.

Figure 1.3 offers a pictorial illustration of this relationship for the data between 1838 and 1915, with the abolition of the planters' Assembly government occurring in 1866.

Figure 1.3: Jamaica: Share of Public Investment



We observe that in the period during the planter regime, public investment as percentage of total expenditure seemed to average around 7 percent (in this period, average public investment was 5739 pounds). Furthermore, during this pre-intervention period, there appears no discernible trend in the level of public investment, as evidenced by the relative flat slope of the public investment curve. Immediately following the abolishing of the planters' Assembly, Jamaica saw a noticeable rise in public investment in 1866. For the period 1867-1915, public investment hovered (on average) well above 20 percent of total expenditure (average public investment was reported at 57291 pounds compared to the 5739 during planter rule). This represented a magnitudinous shift from the level observed under planter rule . Moreover, unlike in the pre-intervention period (before the constitutional change), Figure 1.3 shows a clear upward trend in the share of public investment. This suggests that after the abolition of the planter government, public investment grew persistently.[13] To assess the statistical significance of these observations, we proceed with the ITS regression detailed in Equation (1.14) and present the results

[13]Interestingly, this increase in public expenditure after the intervention, though significant, still saw Jamaica lagging behind the labour-rich colonies. See Figure A1 in the appendix. We explore this further in 2.

in the panel (a) of Table 1.2.

Table 1.2: Public Investment and Planter Rule

	Pub. Invest. Share	[Confidence	Interval]
Panel (a)			
T	-0.000369	-0.0013662	0 .0006286
	(-0.74)		
$Post$	0.115***	0.0739817	0.1550567
	(5.63)		
$PostT$	0.00159**	0.0000537	0.0031167
	(2.06)		
$Constant$	0.0768***	0.0583146	0.0953641
	(8.27)		
Panel (b): Post 1866			
$LinearTrend$	0.0012	0.0000	0.0024
	(2.0351)		

Notes: Analysis conducted as an interrupted time series regression for Jamaica data between 1838 and 1915. The number of observations is 76. The sources and nature of the data are detailed in the Data Appendix and Primary Sources sections. * $p < .10$, ** $p < .05$, *** $p < .01$

These results confirm what we observe from the Figure 1.3. Controlling for the post-intervention trend, the average level of public investment share of total expenditure during planter rule, as reported by the intercept β_0, is 7.7 percent. The coefficient on the trend variable, T, is close to 0 in magnitude, at 0.00037, and is indeed insignificant at all conventional levels. This suggest that the level of public investment under the planter regime did not significantly change over the years leading up to Crown Colony intervention in 1866. However, immediately following the abolition of planter rule, public investment share of total expenditure exceeded that under planter rule by 11.5 percentage points (the coefficient on $Post$, β_2). This increase is significant at the 1-percent level. Furthermore, the positive coefficient on the interaction term $PostT$ represents a reversal in the direction of the rate of change in public investment share of total expenditure and a statistically significant (at the 5-percent level) increase in the year on year rate of change in public investment share of 0.16 percentage points (the coefficient on $PostT$, β_3) once planter rule was abolished. The implication here is that under the new constitution, the government's attitude was significantly more positive to public investments than before. In panel (b), we test the significance of the post intervention trend independently and find that this increase is sustained throughout the period, as indicated by the significant and positive coefficient (0.12) of the post-1866 trend in panel (b). Thus, after the abolishing of planter rule, public investment increased (on average) by 0.12percent each year, whereas, the investment share was stagnant, and at best decreasing yearly (on average) under planter rule. This suggests that the Crown Colony government, unlike its predecessor, made continuous efforts to improve public goods provision on the island

over the years. We may think of the period after 1865 as a proxy for the absence of planter motivations around excess demand for labour. This results, therefore, accords with propositions 1.1 and 1.2 which suggest that public investment would be lower when the choice of the level of public investment is motivated by excess labour demand versus when it is not. To see this, recall that the new government is not populated by planters with private entrepreneurial interests and so their labour demand is effectively zero whereas the previous government had excess demand for labour. As our theory suggests, public investment is thus lower under planter rule (before 1866) and higher under the new form of government (post 1865). A more direct test of these propositions is carried out in a later section when we compare the excess labour demand territory of Jamaica to an excess supply territory, Antigua.

Public Investment and the Plantation Economy

Thus far, we have provided evidence that shows significantly lower levels and rates of change in public investment as a share of total expenditure under the planter oligarch regime. While those difference are significant and consequential, it is not obvious that the planter oligarch, or indeed the presence of the plantation interest in the labour market, is instigating the under-investment in public goods. Recall from our theoretical model that proposition 1.3 implied that the greater the presence of the plantation interest, the lower the level of public expenditure.[14] The next set of results deal with testing this proposition.

To more conclusively test the implications of proposition 1.3, we propose an econometric model which includes a continuous measure of the presence of the planter oligarch or the strength of the plantation economy and use this to investigate the effect of the plantation economy on public investment. This mechanism is directly suggested from our theoretical model ($\vartheta_e \lambda_e$ in Equation (1.11)). To measure the presence of the planter elite during the two regimes, we sought a variable that, with the elite being entrepreneurial sugar planters, captures their presence in the labour market and influence over economic activity. The plantation economy monopolised all aspects of economic life in the West Indies for much of the colonial period. Figures from the Jamaica Blue Books (1838-1866) indicate that plantation exports were responsible for over 80 percent (on average) of all exports from the major islands for most of the colonial period. Sugar, more than any other crop, came to dominate the main plantation economies of the region to the extent that the plantation oligarch's power, while not easily quantifiable, was intimately linked to the dominance of sugar. We, therefore, use the share of sugar in total exports to capture the presence of the planter elite (the scale of plantation economy) and use it to test proposition 1.3.

The specific regression equation is of the form:

$$Public\ Investment_t = \alpha_0 + \alpha_1 Post_t + \alpha_2 Sugshr_t + \alpha_3 PostSugshr_t + \alpha_4 \mathbf{X}_t + \nu_t \tag{1.15}$$

[14] Remember from our theoretical framework that ϑ_e is the number of planter elite members in our society, while λ_e represents their hiring capacity or maximum scale.

where α_0 is a constant which captures the average public investment during planter rule, $\mathbf{X}$ is a vector of controls, $Sugshr$ is sugar's share of total exports of Jamaica (and serves as a measure of the strength of the plantation economy) and $PostSugshr$ is an interaction term formed of the product of $Post$ (as previously defined) and $Sugshr$ and ν is an error term.

While Equation (1.14) allowed us to show that: (i) public investment was lower under the planter oligarch regime (i.e. $\alpha_2 > 0$) and (ii) the trend in public investment was significantly different (positively) in the period following the abolition of planter oligarch rule; Equation (1.15) goes further as it allows us to pin down the role of the planter oligarch in public expenditure in two ways. (i) $Sugshr$ variable enables us to determine the effect of planter influence on public investment; (ii) the inclusion of the interaction term, $PostSugshr$, allows us to compare the effect of this influence between the two regimes. In so doing, we are able to determine whether the combination of exclusive political authority and economic production, which the planter elite enjoyed simultaneously prior to 1866, resulted in worse public investment outcomes for Jamaica. We present the results of several versions of this regression in Table 1.3.

In all regressions, we include a lagged dependent variable to control for possible serial correlation as government expenditure tends to be highly persistent over time. In addition, we calculate t-statistics using Newey-West heteroskedasticity and autocorrelation robust standard errors. R-squares are not reported with Newey-West estimations, but we do provide the F-statistic of overall significance of the model. In the first column, (1), we regress the public investment share of total expenditure on a lag of itself, a time trend and a dummy variable $Post$.[15] The time trend and our $Post$ dummy are both positive and significant.[16] This simply reiterates what we have already observed, that public investment grew significantly over time and was, therefore, much higher in the period following the abolition of planter oligarch rule.

In column (2), we introduce our measure of plantation economy or the presence of the planter elite in economic activity, $Sugshr$. This captures the effect of the plantation economy on public investment throughout the sample period. The coefficient is negative (-0.025) and significant only at the 10-percent level. This implies that increases in the strength of the plantation economy is associated with a decline in public investment share of government expenditure. Specifically, a 1 percentage point increase in sugar's share of total exports is associated with a 0.025 percentage point decrease in the share of public investment between 1838 and 1915. Though this result is informative about the influence of plantation oligarchs on public investment, our hypothesis posits that the significantly different role of the planters after the constitutional change of 1866 may be suppressing the coefficient on $Sugshr$. That is, a stronger plantation economy particularly depressed public investment during the planter oligarch rule. The differential effect of sugar share of exports on public investment share as we move from the planter oligarch regime

[15] In our estimation of Equation (1.15), our dummy variable, $Post$, is equal to 1 for year after 1869 and 0 otherwise, to allow for the lagged effect of the change in constitution on the make-up of expenditure.

[16] We also run regressions with a separate $Post$ trend ($Postt$). The results were no different and are, therefore, not reported here.

Table 1.3: Public Investment and the Plantation Economy

D.V. is Public Investment Share of Total Expenditure	(1)	(2)	(3)	(4)	(5)	(6)
Lag Pub. Inv.	0.627***	0.713***	0.698***	0.644***	0.639***	0.645***
	(7.09)	(14.44)	(19.80)	(16.02)	(11.80)	(12.09)
Post	0.0403***	0.0259***	-0.0264	-0.0119	-0.0189	-0.0192
	(2.95)	(3.98)	(-1.50)	(-0.88)	(-1.23)	(-1.20)
Time Trend	0.000213***	0.0000940	0.000333	-0.0000574	0.000961***	0.000915***
	(3.66)	(0.60)	(1.54)	(-0.19)	(5.17)	(5.05)
Sugshr		-0.0249*	-0.0994***	-0.0898***	-0.0950***	-0.0968***
		(-1.95)	(-2.81)	(-2.74)	(-3.63)	(-3.61)
PostSugshr			0.120***	0.0911***	0.0830**	0.0796**
			(3.79)	(3.85)	(2.40)	(2.23)
Real Revenue				0.0214***		
				(3.13)		
Public Debt					-0.606***	-0.614***
					(-8.38)	(-9.13)
Hurricane						0.00831**
						(2.33)
Constant	0.0304***	0.0361***	0.0701***	0.179***	0.0750***	0.0766***
	(4.99)	(3.83)	(3.34)	(3.68)	(5.24)	(5.14)
Observations	74	71	71	71	67	67
F-statistic	1540.51	1047.97	2938.07	3496.97	1646.47	1702.11

Notes: The dependent variable is public investment share of total expenditure. All regressions are Lagged Dependent Variable OLS time series regressions for Jamaica using data from 1838 to 1915. The number of observations for each regression is listed in the bottom panel. Post is a dummy variable indicating time periods after 1866. Sugshr is sugar share of export calculated as the value of raw sugar exports divided by total exports. The sources of the data and nature of the data are detailed in the Data Appendix and Primary Sources sections. * $p < .10$, ** $p < .05$, *** $p < .01$. t-statistics in parentheses.

to a more neutral form of government will serve to provide evidence that when the plantation elites held political authority, they used their economic influence to repress the population, transferring resources from the masses to themselves, by under-investing in public goods.

To see this, we run our main regression (column (3)), introducing an interaction term (between *Post* and *Sugshr*), *PostSugshr*. The coefficient on *Sugshr* now measures the effect of plantation economy on public investment during planter oligarch rule, while *PostSugshr* captures the differential effect of plantation economy on public investment between regimes (during and post planter rule). The estimation including these two variables is very interesting. The coefficient on *Sugshr* is still negative but now significantly larger, in absolute terms; at -0.10, as oppose to the -0.025 we observed previously. This suggest that during planter oligarch rule, a strengthening of the plantation economy resulted in a significant reduction in public investment as a share of total expenditure. In fact, a one percentage point increase in sugar's share of exports is

associated with a 0.10 percentage point decrease in public investment share of government expenditure. This is equivalent to a fall of approximately 1.35 percent relative to the average public investment share during planter rule, and 0.61 percent to the average from 1838-1915. Thus, during planter rule, a 1 percentage point increase in sugar's share of export reduced public investment's share of total expenditure by 1.35 percent relative to the average level of public investment in that period. This statistic is both large and highly significant. Turning to the coefficient on $PostSugshr$, the result is quite remarkable. After the abolition of planter oligarch rule in 1866, a one percentage point increase in sugar's share of exports was associated with a 0.12 percentage points higher level of public investment share than under planter rule. This differential impact is large and highly significant. Resoundingly, the negative relationship between scale of the plantation economy and public investment observed during planter rule is completely reversed. The sum of the two coefficients ($-0.10 + 0.12 = 0.02$) is positive, and so, after the abolishing of planter oligarch rule, contrary to the time period under planter rule, strengthening of the plantation economy was no longer negatively associated with public investment share. Furthermore, we calculate the t-statistic (0.65) for $(\alpha_2 + \alpha_3)$ using the variance/covariance of the estimates and find the role of the plantation economy in affecting public investment share in the post planter rule period is insignificant. Therefore, post 1866, when the planters lost their political authority, they lost the ability to act on their incentive to redirect public revenues to their own ends, in contrast to the prior period. Curiously, the coefficient on our dummy variable $Post$ is no longer significant, suggesting that the difference in public investment share levels between the two regimes is largely explained by the role of the strength (scale) of the plantation economy, offering strong support for proposition 1.3 which highlights the negative relationship between the scale of the plantation economy ($\vartheta_e \lambda_e$) and public investment.

Alternative Explanations

It is useful to consider alternative factors potentially driving the differential effect of strength of the plantation economy on public investment's share of total expenditure. In the regressions that follow, (4)-(6), we repeat the main regression with some additional controls.

We first consider that the amount of government revenue available may vary over the years, and so, one regime may have been forced into more fiscally conservative policy, which may prioritise cuts to public investment over other essential services. To control for this, we add the natural log of per capita real revenue in regression (4). The coefficient is positive (0.021) and significant. While our estimates of α_2 and α_3 fell, this reduction was slight and both coefficients remain highly significant and maintain their signs. Revenue levels, therefore, does not explain the significantly different public investment shares between regimes.

Similarly, varying levels of debt across the years may determine the make-up of public expenditure. Governments may use debt to finance public investment and so may be able to prioritise certain components of public expenditure over others at different times. Alternatively, when public debt is high, the government may be more reluctant

to spend on certain components and so higher debt levels may result in lower shares of expenditure in certain categories. In either of these cases, this approach to fiscal policy may coincide with contractions or expansions in the strength of the plantation economy and as such may be driving our results. We, therefore, include per capita public debt to the right-hand side of the regression in column (5). Here again we find that though public debt is significant in explaining some of the variation in the public investment share, our coefficients on *Sugshr* and *PostSugshr* (our measures of the scale of the plantation economy) remain largely unchanged (at -0.095 and 0.083, respectively) and significant.

Additionally, the West Indies are particularly prone to hurricanes during the wet months running from June to November. These hurricanes can cause major damage to infrastructure and, therefore, are usually followed by increases in public expenditures, particularly for infrastructure repair. Coincidentally, the sugar crop is particularly vulnerable to devastation from these hurricanes which may entirely destroy a year's yield and cause a drastic reduction in sugar exports if they deadly enough. Thus, changes in public expenditures on infrastructure may be spuriously correlated with changes in sugar's share of exports if these expenditure changes are brought about by instances of hurricanes. To rule out this problem, we include a dummy variable coded 1 if a major hurricane occurred during the year and 0 otherwise.[17] For this specification, we find that our results change little. The coefficient of the hurricane dummy is significant at the 5-percent level, with the expected positive sign. The coefficient on *Sugshr* is, however, still roughly -0.10 and highly significant, while that of *PostSugshr* is 0.08 and is still significantly different from the effect of a larger plantation economy on public investment during planter rule. These results point to a very robust estimation of the impact of the plantation economy on public investment's share of total expenditure. We consistently see that as the planter elite's strength grew, the expenditure shares allocated to public investment fell when the aforementioned class of person held political authority over fiscal policy. This is substantially different from the situation when they lost exclusive political authority after 1866. During the period after 1866, we observe that their presence, indicated by the share of the economy's exports which they control, played no role in the composition of public expenditure, as far as public investments in infrastructure, education and health are concerned.

1.5.2 Wage Manipulation

Wage Manipulation and Public Investment

Not only did our theoretical framework imply that public investment would be lower in the presence of excess labour demand, it also specifies a mechanism through which this operates. The planters manipulate wages through q in the second term of Equation (1.10). In this section, we show that the empirical evidence supports this notion and

[17] We ran this regression also with a lag of the hurricane dummy as hurricanes often occur later in the year and are accounted for by the following year's expenditures. This produce identical results to that presented in Table 1.3.

that one of the key motivations of the planter class in Jamaica, which saw them direct fiscal policy to the detriment of the populace, was the desire to manipulate wages. In the post-emancipation era, Jamaican planters, faced with a low labour to land ratio and high wages, relied heavily on the state apparatus to coerce labour from the former slaves. The police force and prison system were, therefore, crucial in enforcing predatory policies of the planter government. Financing the police to enforce the plantation order thus required substantial resources. Consequently, generating these resources meant cuts to other essential services. To examine this, we construct an order-resource ratio which expresses total spending on policing (prisons and police force) as a fraction of resource spend on human capital (education and health expenditure). Using this ratio, we are able to gain some insight into how the composition of government expenditure was manipulated to affect wages during planter oligarch rule. This endeavour motivates the following regression, estimated for the years under planter oligarch rule:

$$LnWage_t = \delta_0 + \delta_1 ORRatio_t + \delta_2 \mathbf{Z}_t + \epsilon_t \tag{1.16}$$

where $LnWage$ is the natural log of the predial wage rate, $ORRatio$ is the order-resource ratio (similar to that of Frankema (2011)) calculated by dividing policing expenditure by the sum of education and health expenditure, $\mathbf{Z}$ is a vector of controls, and ϵ is an error term. $ORRatio$ captures the multi-pronged strategy of the planter elite to manipulate wages: first, by increasing policing expenditure to enforce laws that marshal the former slaves back on to the plantations and repress rebellions and riots; second, reducing expenditure on human health and education in an effort to finance policing expenditure; and third, keep the population in a state of human capital destitution to reduce their outside options. We present the regression results of equation (1.16) in Table 1.4.

In Column (1), as a first step, we regress the natural log of the agricultural wage rate, on a lag of itself and the natural log of the price of sugar on the world market. The result echoes that found by Dippel et al. (2015) and is immediately economically counter-intuitive. If left to market forces, an improvement in the price of a commodity on the world market should drive up labour demand in that sector. This should in turn lead to higher wages. However, contrary to standard economic theory, the coefficient on the price of cane sugar, which captures the effect of an increase in sugar prices on the world market during planter oligarch rule of Jamaica, is negative and insignificant. This suggests that during planter rule, improvements in the performance of sugar on the world market did not pass through to better wages for the labouring class. If anything, workers on the island experienced a reduction in their wages.

As we move to Column (2) of Table 1.4, we introduce our order-resource ratio which measures the trade-off between policing and human resource expenditures. Interestingly, with the inclusion of the ORRatio, the results change significantly. Quite remarkably, the coefficient on the price of sugar on the world market has changed signs and is now positive (0.08) and significant at the 1-percent level. Controlling for the previous year's wage rate and the composition of public expenditure, a 1 percent increase in the price of sugar on the world market is associated with a 0.08 percent increase in agricultural

Table 1.4: Public Expenditure and Wage manipulation

D.V. is Log of the Predial Wage Rate	(1)	(2)	(3)	(4)
Lag Wage	0.754***	0.699***	0.700***	0.590***
	(8.78)	(9.28)	(9.58)	(4.25)
Ln Price	-0.0168	0.0807***	0.104***	0.150**
	(-0.49)	(3.21)	(3.13)	(2.15)
Ln ORRatio		-0.0969**		
		(-2.15)		
Ln Public Invest. Shr.			0.177**	
			(2.53)	
Ln Police Shr.				-0.243*
				(-2.04)
Constant	-0.590**	-0.923***	-0.590**	-2.112**
	(-2.33)	(-4.02)	(-2.27)	(-2.54)
Observations	31	31	31	31

Notes: All regressions are OLS time series with a lag of the dependent variable (log daily wage rate). *Ln Price* is the natural log of the price of sugar on the London Market. Expenditure shares are as previously defined. Data is for Jamaica, 1836-1866. Data sources are detailed in the Data Appendix and Primary Sources sections. * $p < .10$, ** $p < .05$, *** $p < .01$. t-statistics in parentheses.

workers' wages. Furthermore, as we hypothesised, the coefficient on the ORRatio is negative and significant at the 5-percent level. Specifically, controlling for the other regressors in the equation, a 1 percent increase in the ratio of policing expenditure to human expenditure is associated with a 0.097 percent decrease in the wages of predial workers on the island. These latest regression result suggests an interesting tug-of-war between market forces and the political economy of the plantation society. We borrow and modify the Dippel et al. (2015) illustration and depict this relationship in Figure 1.4.

Figure 1.4: Public Expenditures and Wage Manipulation

The implication here is that changes in the price of sugar on the world market affects the prevailing wage rate through two channels. For a price increase, market

forces, characterised by a want of producers to increase sugar cane supply, drives up labour demand and so bids the wage rate in the industry up. This channel is in line with standard economic theory. There is, however, a second channel in operation. This price increase makes sugar production more attractive, and so, increases the share sugar in total exports. The result is a stronger plantation presence which heavily relies on coerced labour and so, policing expenditure grows relative to human expenditure and the order-resource ratio increase, driving down wages. In regression (1) of Table 1.4, these two directionally opposed forces cancelled each other out and we observed a 0 coefficient on the price variable. Unlocking both channels by controlling for the political economy effect in regression (2) has now revealed the expected sign and relationship between commodity price and wage, predicted by market forces. Meanwhile the political economy channel provides, clear evidence of the planters' motivations for under-investing in resources that benefit the wider public: that is, wage manipulation as suggested by our theory in Section 1.3.

In columns (3) and (4) we disaggregate the order-resource ratio to examine the specific effect of expenditure on public investment and policing, respectively, on wages. The results lend further support to our wage manipulation theory. In column (3) the coefficient on public investment share is positive and significant at the 5-percent level, which suggests that a 1 percent increase in public investment lead to an 0.18 percent increase in wages, *ceteris paribus*. On the other hand, in column (4), the coefficient on the share of expenditure spent on the police force is negative and significant at the 5-percent level. This again is in accordance with our theory that financing of policing was used to coerce labour and depress wages. Specifically, the result suggests that, all other things being equal, a 1 percent increase in the share of expenditure allocated towards policing led to a 0.24 percent decrease in wages. Furthermore, these two regressions indicate that the results gathered from the regression using our ORRatio is driven by both the numerator and the denominator. We should also observe that the magnitude of the coefficient on policing is greater than that on public investment, which points to financing of repressive policing as the more effective means of wage manipulation

1.5.3 A Comparative Approach

In this section, we subject our hypothesis to deeper analytical study by not just comparing the relationship between the strength of the plantation economy and public investment in Jamaica before and after the constitutional change of 1866, but instead we adopt a comparative approach, using Antigua as a benchmark case for the excess state (and the absence of the wage manipulation motive) against which we can compare Jamaica in the two time periods. By comparing a territory which enjoyed excess labour supply to Jamaica, which experienced excess labour demand, we directly test propositions 1.1 and 1.2. What is attractive about using Antigua is the near identical political and economic history that it shares with Jamaica. Before the Emancipation Act of 1833, both islands were slaves societies in the West Indies, steeped in the production of sugar cane. After emancipation, they inherited identical political structures with powerful Legislative Assemblies populated by planters. The major difference between these two islands

during this period is what uniquely qualifies this comparison to validate our hypothesis. The land to labour ratio in Jamaica was extremely high compared to that of Antigua, resulting in severe labour shortages for Jamaica, while Antigua producers enjoyed excess supply. Data from Higman (1986, p.608) shows that in 1834, the population density of Antigua was 100.5 person per sq. km., while that of Jamaica was 27. This was reflected in a significant difference in average wages during planter governance. Figures calculated using data from the Jamaica Blue Books (1838-1865) and Antigua Blue Books (1838-1865) indicate an average predial wage during planter rule of $16d.$ for Jamaica and just $8\frac{1}{2}d.$ for Antigua.

After 1866, both islands became Crown Colonies, abolishing their powerful planters' Assemblies, putting the ultimate decision-making power in the hands of the Crown's representatives. These remarkably similar histories meant that these two islands share the required similarities and precisely the differences that we need for a valid comparison. That is, during planter rule, the only major difference between the two colonies was that Antigua enjoyed excess labour supply while Jamaica suffered excess labour demand, so the wage manipulation motive was present in Jamaica but largely absent in Antigua. This allows us to compare the fiscal behaviour of a planters' Assembly with the wage manipulation motive (that of Jamaica) to one without (like that of Antigua).[18] Quite conveniently, the fact that both islands abolished their planters' Assemblies in the late 1860s, allows us to compare the same behaviour when the wage manipulation motive is absent from the two governments to see whether there are any differential repercussions for fiscal policy, in order to verify that this was indeed what was driving any observed difference during planter rule. We expect that there is no differential effect during the post-planter rule period.

Using this approach, we can compare the difference in the pre-constitutional change relationship between plantation presence and public investment between the two countries to the post-constitutional change difference in relationship between the same. In so doing, we are comparing the effect, on public investment, of plantation presence in Jamaica (where we have argued that the government had the wage manipulation motive) during planter rule, to Antigua (where we have argued this motive was absent). This comparison is made for and between both time periods, during and after planter rule, using a (quasi) difference in difference method. In Equations (1.17) to (1.19), we detail this approach.

$$PI_t = \mu_0 + \mu_1 Sugshr_t + \mu_2 Jam + \mu_3 JamSugshr_t + \psi_t \tag{1.17}$$

$$PI_t = \mu_0' + \mu_1' Sugshr_t + \mu_2' Jam + \mu_3' JamSugshr_t + \psi_t' \tag{1.18}$$

$$\begin{aligned} PI_t = \mu_0'' + \mu_1'' Sugshr_t + \mu_2'' Jam + \mu_3'' JamSugshr_t + \mu_4'' Post + \\ \mu_5'' PostSugshr_t + \mu_6'' JamPost + \mu_7'' JamPostSugsgr_t + \psi_t'' \end{aligned} \tag{1.19}$$

[18] What we are relying on here is not the complete absence of the wage manipulation motive in Antigua, but merely the fact that this was a largely insignificant motive in Antigua, if it existed at all. One merely needs to observe the actions of this two Assemblies to verify the massive sums spent on effort to increase labour supply in Jamaica (like through immigration), while no such efforts existed in Antigua.

For years under planter rule we run regression (1.17), while for years post planter rule we run equation (1.18), and finally, we run regression (1.19) for the entire sample period (pre and post) using pooled-OLS.

In the first of these equations, (1.17), we regress public investment (PI) on the scale of the plantation economy ($Sugshr$), a dummy variable equal to 1 if the country is Jamaica (0 otherwise), and an interaction term between $Sugshr$ and Jam. ψ is an error term. This regression is designed to estimate the differential relationship between the presence of the plantation economy and public investment between Jamaica under planter oligarch rule (and, therefore, in the presence of the wage manipulation motive) and Antigua, where, we have argued, the wage manipulation motive is absent. Specifically, we test $\mu_3 < 0$: that increases in the strength of the plantation economy in Jamaica had a worse impact on public investment than the control country in accordance with proposition 1.3.

The second regression equation, (1.18), is identical to (1.17), except that it is estimated for the years after the constitutional change and, thus, in the absence of the sugar sector wage manipulation motive of the government. As such, our hypothesis for this regression is that strength of the plantation economy has no significantly different effect on public investment between the two countries: that is, $\mu_3' = 0$.

In the last of the three equation, (1.19), we pool the previous two equations using the dummy variable $Post$, which we defined earlier, and interact it with $Sugshr$ and the Jamaica dummy. In the appendix to this chapter, we show that this specification effectively enables us to test the difference in the differential effects. These equations are estimated with a time trend and lag of the dependent variable to control for potential serial correlation. We turn to the results in Table 1.5.[19]

In column (1) of Table 1.5, we estimate Equation (1.17) using data for years during which the planter oligarch governed the island (1838-1865). The coefficient on $Sugshr$ is positive and significant, which implies that in Antigua, during this period, increases in the strength of the plantation economy was positively associated with public investment share. In fact, a 1 percentage point increase in sugar's share of exports led to 0.15 percentage point increase in public investment as a share of total expenditure. From the coefficient on the interaction term $JamSugshr$, we see that this was completely different to what was on going in Jamaica. The differential effect of the plantation economy on public investment share, as we move from Antigua to Jamaica, during planter rule of Jamaica, is -0.22. The magnitude and sign of this coefficient confirm that not only was (as posited in proposition1.3) the plantation economy less conducive to public investment in Jamaica, but that, in fact, it was wholly unfavourable to public investment during the period when the planters' Assembly presided over the island. Furthermore, the coefficient on our dummy variable for Jamaica (Jam), is insignificant, suggesting that the difference in public investment share between Antigua and Jamaica during planter

[19]We initially ran simple linear regression for the time period under planter government with the Jam dummy as the only independent variable. The coefficient on the dummy was -0.122 with a t-statistics was -11.04 indicating that Jamaica had significantly lower levels of public investment during the planter governance.

Table 1.5: Wage Manipulation, Public Investment and the Plantation Economy

D.V. is Public Investment	(1)	(2)	(3)
Sugshr	0.153***	-0.096	0.153***
	(3.19)	(-1.29)	(5.59)
JamSugshr	-0.221***	0.065	-0.221***
	(-3.72)	(0.85)	(-6.50)
Jam	-0.102	-0.122	-0.102**
	(-1.20)	(-1.34)	(-2.13)
PostSugshr			-0.248***
			(-2.83)
JamPostSugshr			0.286***
			(3.08)
Post			0.069
			(0.62)
JamPost			-0.020
			(-0.17)
Constant	0.142	0.212**	0.142***
	(1.68)	(2.36)	(2.97)
Lag D.V	Yes	Yes	Yes
Time trend	Yes	Yes	Yes
Observations	57	89	146

Notes: All regressions are OLS time series with a lag of the dependent variable (Public Investment Share of Total Expenditure) and a time trend. Expenditure shares are as previously defined. Data is for Jamaica and Antigua. 1838-1915. Data sources are detailed in the Data Appendix and Primary Sources sections. * $p < .10$, ** $p < .05$, *** $p < .01$. t-statistics in parentheses. Standard errors are Newey-West HAC s.e.

oligarch rule, is largely explained by the effect of the scale of the plantation economy.[20]

The results could not be more different as we turn to the time period after the abolishing planter oligarch rule in Jamaica (column (2)). The coefficient on $Sugshr$, our measure of the strength of the plantation economy for Antigua (μ_1'), is insignificant,

[20]The *Jam* dummy is no longer significant as it was in the simple regression described in the previous footnote. This suggests that the difference in public investment shares between Jamaica and Antigua is explained by the scale of the plantation economy. That is, the presence of Jamaican planters in the economy adversely affected public investment relative to that of Antigua.

indicating no relationship between public investment share of the plantation economy during this period. More importantly, μ_3', our measure of the differential effect of the strength of the plantation economy in Jamaica, from that of Antigua, is 0.065, positive and highly insignificant. This indicates that now that the planters' Assembly is abolished on the island, the sugar economy ceased to have a negative effect on public investment share. In fact, the effect of the plantation economy on public investment was now similar to that of a society where the wage manipulation motive was absent, that of Antigua.

In column (3), we test the statistical significance of the difference between regressions (1) and (2) from Table 1.5. Our coefficient of interest is μ_7'', which we have shown to measure the difference in the differential impact of the plantation economy on public investment between the two countries, between the two periods. The point estimate, 0.29, is positive and significant at the 1-percent level, thus, confirming that the differential effect of the plantation economy is significantly more positive after the abolishing of planter oligarch rule. This result points to the affirmation of our theory that when the planter oligarch resigned from government in 1866, the surrender of power to the Crown stopped the entrepreneurial elite from dictating the government, allowing the Jamaican society and economy to behave more like one without the wage manipulation motive, like that of Antigua. Eradication of the incentive to manipulate wages thereby removed the need to under-fund human capital development and divert government revenue to repressive policing. As such, the government carried out public spending more in line with what we see from islands where this motivation never existed because of the prevailing subsistence level of wages.

In Table 1.6, we look for evidence that while wage manipulation was on-going in Jamaica during planter rule (as evidenced by the results in Table 1.4), the planter oligarch in Antigua were not so keen to use public investment to manipulate wages. To see this, we repeat the regression in Table 1.4 as a two-country panel regression. The idea here is to use the island of Antigua as counter-factual state. We have already seen that the two islands were nearly identical economically, socially, and politically throughout much of the 19th century. Both islands in 1838, when full emancipation was won, predominantly exported sugar, which made up at least 80 percent of all exports, both were governed by powerful Assemblies dominated exclusively by plantation oligarchs, and both had a population composed of 90 percent formerly enslaved Africans, who had just gained economic freedom. The one difference between the two islands was concerned with the land to labour ratio. Jamaica, being a bigger land mass, was significantly less densely populated. As a result, the island experienced chronic labour shortages and comparable higher wage rates. Thus, while the dense population of Antigua, holding no outside economic options, drove the wage rate to near subsistence level, wages in Jamaica were particularly problematic for the plantation class. For these reasons, Antigua provides the perfect benchmark against which we can compare the role of the order-resource ratio in the presence versus the absence of political economy wage manipulation motivation. The coefficients of interest here are those on the log of ORRatio and the interaction between the Jamaica dummy and the log ORRatio. These estimate the relationship between the order resource-ratio and the wage rate in Antigua, and the differential

Table 1.6: Jamaica and Antigua; Public Expenditure and Wage Manipulation

Dep. Variable	Lag Wage	Ln Price	Ln ORRatio	Jamaica x ORRatio	Jamaica	Constant	Obs.
Log Daily Wage	0.552***	0.343*	0.0365	-0.244***	0.525***	-2.542***	62
	(5.40)	(2.00)	(1.50)	(-2.69)	(3.45)	(-3.04)	

Notes: $N = 62$. The regression is estimate as OLS time series with a lag of the dependent variable (log daily wage rate). *Ln Price* is the natural log of the price of sugar on the London Market. Data is for Jamaica and Antigua, 1836-1866. Data sources are detailed in the Data Appendix and Primary Sources sections. * $p < .10$, ** $p < .05$, *** $p < .01$. t-statistics in parentheses.

relationship of the same between Antigua and Jamaica, respectively. The result is as we expected. For Antigua, where, we argue, the wage manipulation motivation was absent, there is no relationship between the order-resource ratio and the wage rate, as indicated by the positive and insignificant coefficient (0.0365) on *Ln ORRatio*. The relationship is markedly different for Jamaica. The coefficient on the interaction term is negative and significantly larger (in absolutely terms) than that of Antigua, indicating that there existed a systematically different relationship between wages and the composition of public expenditure between the two islands. Whereas the composition of expenditure played no role in wage outcomes in Antigua, for Jamaica, increases in the order-resources (policing expenditure to human expenditure) resulted in a persistent reduction in the wages of sugar cane workers on the island. Such is the difference between an excess labour supply economy (Antigua), and an excess labour demand economy (Jamaica). The wage manipulation motive is clearly present in the latter while absent in the former. We discuss the implications of these results in the next section.

1.6 Conclusion

In this chapter, we proposed a theory to explain the poor performance of Jamaica relative to the other former British West Indian sugar colonies in the post emancipation period. Our theory suggests that Jamaica's under-development was the result of repressive public policy from a repressive government in the formative years of a free society on the island. The theoretical framework identified the post-emancipation labour problems facing the planter government of the island as a key motive driving their public spending decisions in favour of repressive expenditure. We proposed that this motive led to persistent underinvestment in public goods on the island for much of the post emancipation period. Using empirical data from the colonial Blue Books, Parliamentary Papers and other sources, we performed an interrupted time series analysis and showed that the intervention of 1866, which saw the abolishing of the planters' Assembly, and its replacement with Crown Colony rule, led to significantly higher levels of public investment on the island. Furthermore, the analysis showed that, following the constitutional change, investment grew significantly year on year, whereas, under planter rule, it had remained stagnant.

Using ordinary least square regression, we explicitly show that the planters' motivations as entrepreneurial agriculturist played a crucial role in the meagre spending on public goods. We find that increases in the scale of the plantation economy were associ-

ated with significant reductions in the share of public investment in total public spending during planter rule, whereas no such relations exist after crown colony rule was initiated. We compared the results for Jamaica to that of Antigua using a pooled-OLS regression, to determine whether there are any significant differences between Jamaica and a nearly identical country where the wage manipulation motive was absent. We found statistically and magnitudinously significant differences. While the Jamaican planters' Assembly reduced public investment share as the plantation economy (scale) increased, the Antigua planters' Assembly did not, and in fact may have increased public investment. When we compare the two islands in the period after the planters' Assembly was abolished, we find no significant effect of the plantation economy on public investment share for Jamaica, and that this relationship was no longer significantly different to that of Antigua. The proposed theory, along with the historical literature, suggests two compounding effects of the scale of the plantation economy which might have led to the negative relationship with public investment in Jamaica during the era of planter governance. First, increases in the scale of the plantation economy, according to our theory, created a greater presence of the plantation interest in the labour market, and thus made labour competition and, therefore, wage manipulation more intense. This stimulated an incentive to shift government spending from public goods to repressive activities such as heavy policing, in an effort to drive down wages. Secondly, the historical literature suggests that a stronger plantation economy made the plantation elites more powerful and, therefore, more capable of lobbying for reduce public spending on services that benefited the population by improving their employment prospects.

The implications of these results should be discussed in the context of the on-going institutions, governance and economic development debate. Jamaica's early experience with crony planter government no doubt lingered and has created a culture of bad government which has persisted today. The island has some of the poorest governance quality scores for the Caribbean region, a feature which has been seen to be tightly negatively related to growth and development.[21] These observations also show that, in measuring the effect of institutions on growth, what may be most important is not the *de jure* framework but also the *de facto* nature of these institutions. By legislation and constitution, the legal framework of Jamaica has been near identical to that of its regional neighbours, yet, the operational institutions were virtually incomparable. It would seem that its history of bad governance has been manifested in a culture of government as a predatory and often repressive institution. We will more fully explore this theme in Chapter 2 were we compare institutions of governance and their relationship to the history of the sugar colonies. In light of the theoretical arguments and empirical evidence presented above, small developing states such as that of Jamaica should pay careful attention to the role of governing elites as invested entrepreneurs and interrogate the relationship between their private private interests and government policy.

[21] World Bank Governance Indicators: https://info.worldbank.org/governance/wgi.

Chapter 2

Land and Labour Endowments, Colonial Institutions and Economic Performance in the West Indies

2.1 Introduction

Why have the economies of Antigua and Barbuda, Barbados, and Saint Kitts and Nevis consistently and increasingly outperformed those of Guyana and Jamaica since independence, in spite of the fact that Guyana and Jamaica, with far superior resources, seemed much better positioned to prosper on the eve of independence? This chapter proposes an institutional and colonial origins approach to explaining the social and economic divergence among the former British West Indian sugar colonies. Specifically, we focus on the contrasting growth among the five main sugar colonies, Antigua, Barbados, Saint Kitts, Guyana, and Jamaica. What makes this sample of islands interesting is their seemingly high degree of historical, social and economic homogeneity. That these five countries were all former British West Indian colonies with a monocrop (sugar) economy populated by forced labour, and were almost completely export-oriented, presents an ideal case study of post-independence economic divergence. The novel contribution of this research is the exposition of a new mechanism to explain the divergence among the West Indies.

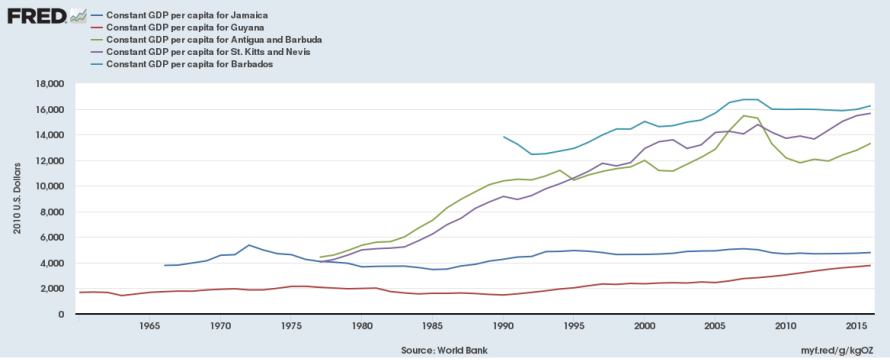
In Chapter 1, we focused on Jamaica's underinvestment in public goods during the post-emancipation period (primarily 1838-1915) and related this underinvestment to the labour market conditions faced by the planter elite. In this chapter, we expand our focus and timeline to draw connections not just within the post-emancipation period, but also between the post-emancipation and post-colonial era (1960s to present). In so doing, we show that across the five sugar colonies of the British West Indies labour availability prompted various policy interventions which were met with conflict and

rebellions, causing a persistent erosion of the quality of institutions from the colonial to the post-emancipation period.

We argue the colonial origins case by delving into the history of the territories, examining the differential impact that the Abolition Act of 1833 had on the former slave territories as the source of the first major divergence in institutional development. Our analysis effectively divides the history of these territories into three periods. The first is The Slavery Era (1619 - 1834): during this period, the countries were export oriented colonial possessions of Great Britain. They were developed as industrial monocrop plantations worked by the forced labour of Africans under the whip of absentee European planters. Slavery was a total institution. It encompassed all aspects of the lives of the labour force which made up, on average, over 90 percent of the population. This peculiar institution was employed with unvarying similarity throughout the five colonies. In the second period, The Post-Emancipation Epoch (1834 - 1960s): still part of the colonial era, the territories remained the colonial possessions of Great Britain during this period. However, the class of plantation-owning (planter) elite that developed during the years of slavery, was no longer legally able to force labour from their now ex-slaves. We identify this period as the critical point of institutional divergence. It is during this period that the colonies developed various forms of institutions as planters sought new ways of legally responding to the labour question. On the eve of emancipation, Jamaica and Guyana, with their abundance of land and other natural resources, appeared primed to develop into economic leaders in the region. On the other hand, the overly populated and comparatively natural resource poor colonies of Barbados, Antigua and Saint Kitts seemed to be destined for economic and social difficulties. Yet, the reverse occurred. By the third period, The Post-Colonial Period (1960s - Present): A wave of decolonization began with independence of Jamaica (1962), Barbados (1966), Guyana (1966) Antigua and Barbuda (1981) and Saint Kitts and Nevis (1983). During this period, the islands of Barbados, Antigua and Saint Kitts diverged remarkably from Jamaica and Guyana.

Historical accounts suggest that among the colonies, Jamaica was by far the wealthiest British possession by the late 18th century and up until the eve of emancipation in 1834 (Sheridan, 1965). However, by the end of the colonial period, the other sugar colonies had caught up to Jamaica substantially. As it stood at the end of the colonial period, data from Angus (2003) shows that the colonies had similar levels of income in 1950. GDP per capita (in 1990 international $) for Jamaica was $1,352$, for Guyana $1,089$, Antigua $1,782$, Saint Kitts $1,386$ and Barbados $2,123$ (Angus, 2003). Starting from these broadly similar levels of income, with independence in the 1960s, economic development in these territories followed starkly different paths. Figure 2.1 tracks the economic progress of the islands from the 1960s onwards. A casual look at the graph illustrates the dramatic differences in the economic progress of the colonies. While income levels were similar in the 1950s, by 2008 the densely populated former colonies (Barbados, Antigua and Saint Kitts) enjoyed income levels of over $US\$14,000$, while the sparsely populated former colonies (Jamaica and Guyana) languished at under $US\$6,000$. The difference in per capita income between these two sets of colonies had moved from between $US\$500$ and $US\$800$ to over $US\$8,000$.

Figure 2.1: Real GDP per Capita 1960-2010



We believe that the origins of this divergence lie in the post-emancipation colonial period. Where planters faced a severe labour problem at emancipation (1834), as in the case of the low colonial population density countries like Jamaica and Guyana, they responded harshly with more coercive policy interventions. This created intense conflict and weakened social cohesion. Where the labour problem was less severe, as in the high colonial population density territories of Barbados, Antigua and Saint Kitts, the planters' response was less aggressive. This facilitated the development of a relatively free society with less conflict and stronger social cohesion. When independence occurred in the 1960s, the group of high colonial population density islands, found themselves much abler (socially and institutionally) in spite of their relative lack of resources, to take advantage of their democratic status, and thus grew faster and more robust (socially and economically) than the fragmented countries of Jamaica and Guyana.

Our empirical results support this theory. We use slave population density data from Higman (1986) for the year 1834 (the eve of emancipation) to proxy for colonial labour availability for eleven former British territories of the West Indies. The measure of institutional quality for these eleven territories comes from the World Governance Indicators[1] and is the average score for each country for the period 1996-2013. Our analysis in this chapter relies of both OLS and two-stage least square (2SLS) regression methods to highlight the causal impact of colonial labour availability on the quality of institutions today. Both the OLS and 2SLS approaches confirm that higher levels of colonial labour supply are associated with higher scores for institutional quality today. In addition, our instrumental variable regression results suggest that an increase in institutional quality scores of 0.01 is associated with 1.23 percent higher income per capita among the West Indian territories today.

The rest of this chapter proceeds as follows: the next section (2.2) surveys the current economic and historical literature on institutions and economic performance as well as work on the divergence among the former West Indian colonies. Section 2.3 presents our analytical framework which describes our hypothesis. Section 2.4 provides empirical

[1]See reference in the data appendix.

support for our hypothesis using various OLS and two-stage least square instrumental variable regressions. Section 2.5 summarises and concludes the chapter.

2.2 The Existing Literature

On History, Institutions and Development

There has been, in the recent economic development literature, more emphasis on the study of the role of institutions on economic performance. Acemoglu et al. (2001), perhaps more than any other paper, has effectively shown that there is a strong causal relationship between the quality of institutions and economic performance. The authors theorize that differences in mortality rates faced by European settlers across the various countries that they colonised, led them to employ different types of colonial policies which in turn created different sets of institutions. According to Acemoglu et al. (2001), where Europeans enjoyed low mortality rates, they tended to form settlements which replicated the institutional setup of the colonising country.[2] On the contrary, in countries where they suffered from high mortality rates, the colonial objective moved from settlement to exploitation with little regard for creating growth-enhancing institutions. Our paper differs from Acemoglu et al. (2001) in several ways. First, unlike Acemoglu et al. (2001), we do not seek to prove a causal relationship between institutions and economic growth. We accept this relationship as true and, instead, we focus on the mechanism that led to a divergence in the choice and quality of institutions among the West Indian sugar colonies. Secondly, as it is clear that planters faced similar mortality rates across the West Indian territories, we contend that variations in early 17th century European settler mortality rates cannot adequately explain the institutional and economic divergence within the region. In light of this, we explore a new mechanism: population density at the time of legal emancipation in 1834. Thirdly, we survey the historical data and economic literature to develop a theoretical framework within which an analysis of the relationship between historical factors, institutions, and economic divergence among the West Indian sugar colonies may be conducted. In addition, we adopt an econometric approach to show a systematic relationship between population density on the eve of emancipation (our measure of colonial labour supply) and institutional quality.

This is not the first work to consider the link between factor endowments and economic outcomes today. Papers by Engerman and Sokoloff (1997, 2002) have also explored this idea. The authors argue that colonial factor endowments had a significant impact on the institutions and development of economies in the Americas. They posit that colonies that were well suited for high-value large-scale agricultural production motivated the use of slaves, leading to a large share of the population in slave labour. According to their hypothesis, large-scale plantation slavery, comprised of large slave holdings and scale economies of agriculture, led to a vastly unequal distribution of wealth and power and set the economies of these territories on different development paths. While our paper

[2] In the context of Acemoglu et al. (2001), measures of institutions used focused on property rights and rule of law.

also grants a substantial role to factor endowments in the present day institutional and economic outcomes, there exist a few key differences between the present paper and Engerman and Sokoloff (1997, 2002). First, we focus on divergence among the former British West Indian colonies while Engerman and Sokoloff (1997, 2002) looked at divergence among the larger sample of American colonies. Secondly, we do not support the idea that it is merely large-scale slavery and plantation agriculture that are responsible for the divergent outcomes in the British West Indies. Instead, we hypothesise that the differences in long-term development paths in the West Indies are due to the relative availability of labour to land in the post-slavery period. The fact that the long-term economic development of the former colonies diverged, cannot be explained by differences in the scale of slave plantations as all the colonies in our sample suffered from near total enslavement of their populations. We argue that the key source of institutional divergence can be found in the post-emancipation period, with the response of the plantation elite to their respective labour problems. Thirdly, in addition to evidence from the historical literature, unlike Engerman and Sokoloff (1997, 2002), we conduct an econometric analysis to show that our thesis is supported by the data. We do, however, agree with Engerman and Sokoloff (2002) to the extent that they suggest a degree of path dependence in the relationship between history and economic outcomes today, which we will address later in this chapter.

There are a few other notable papers that deal with this research area. Specific to the West Indies, Dippel et al. (2015) explore the role of international terms of trade in inducing institutional changes which then act upon labour market outcomes. The authors observe that falling sugar prices on the world market weakened the power of the 19th century West Indian planter elite in territories with low sugar suitability. This, they explain, led to an easing of the coercive apparatus of the planter class and, as a result, wages in these colonies increased by 20 percent and incarceration rates were cut in half. In colonies with high sugar suitability, the planter elite were able to maintain their political clout, thus, existing coercive institutions did not change and fall in sugar prices was passed on to the labouring class with wages falling by 24 percent. Like Dippel et al. (2015), we explore the nexus between coercive institutions and wages. However, unlike their work, we do not narrow our focus to the role of international markets. We focus on the exogenously determined labour problem which led to differences in the choice of institutions, not the effect of the terms of trade on the ability of the planter to maintain his coercive instrument. More specifically, our theory posits that these small, high colonial population density islands were endowed with labour to land ratios which, in the political economic environment of the time, favoured the development of a relatively free labour market. Thus, any changes in the price of output would be reflected in the price of labour through the existing free market mechanisms. On the other hand, sugar colonies endowed with less labour relative to land suffered from 'unfree' labour markets during the years of sugar dominance.

To understand why institutional oppression of labour meant the oppression of West Indian society and its economic development, one must study the annals of Caribbean history. The very existence and character of West Indian economy and society is a by-

product of labour relations. Cross (1988, p.1) writes, "the history of the Caribbean can be defined as the history of labour." The paramount importance of the labour question is recognised in the writings of Bolland (2001, p.3) who states, "... in the aftermath of Emancipation in the British Caribbean the interrelated struggles for control of labour and land constituted the central political issue of these societies." Any paper attempting to study the role of institutional and economic development of these territories without considering the industrial relations that characterise these former colonies and their role in the formulation of institutions and economy, runs the risk of interpreting as exogenous, policy decisions that are endogenous to the institutional and political economy framework in which these policies are set. Henry and Miller (2009) is such a paper. The authors reject the thesis of Acemoglu et al. (2001) and argue that, for the case of the economic divergence between Barbados and Jamaica since independence, variation in institutions was not the fundamental cause. They argue that the two island nations inherited an identical set of institutions, involving Westminster-style parliamentary democracies and the English Common Law, which accorded strong protection of private property, an element crucial for the long term economic prosperity. As a further point of institutional similarity, they highlight that both countries consistently held "free and fair elections with no unconstitutional transfers of power" and maintained in their governments the English-built machinery of administrative justice with the use of the Privy Council as their highest court of appeals (Henry and Miller, 2009, p.263). We take issue with Henry and Miller (2009) on two fronts.

First, the authors misinterpret ideological similarity for functional homogeneity. That Barbados and Jamaica shared similar parliamentary styles and constitutions on paper, does not automatically translate to a functionally identical set of institutions. Indeed, Patterson (2013, p.1) recognises this, stating that the set of institutions between Barbados and Jamaica were only "superficially similar" and that, contrary to the Jamaican case, Afro-Barbadians inherited "an efficient pre-independence system institutionally attuned to the challenges of development." Patterson (2013, p.25) highlights the crucial difference between "declarative and procedural institutional knowledge"; in light of this, the misguided amalgamation of the two, summarises the analytical deficiencies of Henry and Miller (2009). Secondly, by failing to consider the link between the differences in the pre-independence realities of the two islands and their post-independence political economy climates, the authors leave their analysis susceptible to a critical oversight: the endogeneity of economic policy to the broader institutional framework in which it is set. That Barbados and Jamaica employed very different economic policies (the former favouring a free market economy with only moderate government control and the latter opting for democratic socialist and nationalist policies with heavy government control) is not independent of the heterogeneous procedural institutional framework the islands inherited from their colonial histories. Our present work takes this into account, embedding institutional choice within the peculiar differences of the West Indian colonies' historical context.

Among the few economic papers which consider the role of historical factors in the institutional development and subsequent divergent economic paths of West Indian ter-

ritories, DaCosta (2007) stands out. The author conducts a case study of the two sugar territories that experienced the greatest differences in economic prosperity, Barbados and Guyana. He observes that crucial to how these two countries developed were differences in the length of undisturbed colonial rule which led to a smooth path to independence for Barbados and a more turbulent path for Guyana. Furthermore, differences in settlement conditions, geography and land distribution as well as in labour policies in the pre-independence period manifested in differences in the development of institutions and the country's economic development. Though similar to DaCosta (2007) in its theoretical premise, our work differs from this earlier work in two very important ways. First, DaCosta (2007) considers only two territories in isolation. In so doing, the author is unable to present a comprehensive analysis of the divergence in the wider Caribbean. Secondly, though DaCosta (2007) explores the historical context as an influencing factor, he fails to formally identify, as we have done, a mechanism through which the colonial history determined institutional quality and economic performance.

Another notable paper on the issue of institutions and economic divergence in the West Indies is Grenade and Lewis-Bynoe (2010). The authors' paper echoes the arguments of DaCosta (2007) in both approach and theoretical premise and so differs from our present work in much the same ways. The cross-disciplinary literature contains relevant papers. Recently, Patterson (2013) presented a sociological perspective on the divergent paths of Jamaica and Barbados. The history literature, specifically, Bolland (2001), Cross (1988), Higman (2010), and McLewin (1987) have extensively reviewed the role of post-emancipation industrial relations in the formation of a modern society and economy in the West Indies. These works all lend support to our more economics-centred approach to the divergence question.

On Conflict

Colonial conflict is a key factor in the causal chain linking labour availability to institutional quality today. The economics and political science literature have produced several influential papers on the causes of conflict within societies. The seminal paper by Collier and Hoeffler (1998) investigated the economic roots of civil wars and found that several variables help explain both the duration and probability of occurrence of this form of conflict. They begin with the simple idea that occurrence of rebellion is determined by the balance of the cost versus the benefits of engaging in rebellions and construct a formal theoretical model in which the onset of such a conflict is determined by proxies for the benefits and costs of civil wars, namely, the taxable base, the size of the population, income per capita and a measure of coordination costs. Some of the conclusion drawn from this work carry relevance for our present discussion. First, one of the implications of their formal model is that individuals engaged in conflict are prepared to accept longer conflicts if the perceived benefits are greater. This rings true for the present study in two ways. First, the persistence of conflict in colonies with weaker supplies of labour is related to the fact that where labour was scarce, there was: (i) more to be gained by planters from coercion relative to the cost of that coercion than in territories where labour was abundant, and (ii) where land was abundant, there was

more to be gained by workers from rebelling against the planters and engaging in their own peasant production. Thus, the observation that conflicts were more likely to occur and last longer in labour-scarce territories is consistent with the model postulated by Collier and Hoeffler (1998).

The empirical results of Collier and Hoeffler (1998) also produce some findings which are useful in explaining the onset of social instability in the West Indies. The authors found that wealthier countries had lower risk of such conflict and attribute this to the higher opportunity cost of rebellion. Again, this opportunity cost motive can be seen to be present in the West Indies in the sense that in labour-scarce territories there existed a much lower opportunity cost to conflict than in labour-rich territories where lost wages from conflict periods could not easily be supplemented by peasant production. Ethno-linguistic fractionalisation was also a significant positive predictor of conflict, and Collier and Hoeffler (1998, p.571) note that, statistically, the danger of conflict peaks "when society is polarised into two groups." This again bears some significance for the case of West Indies in that West Indian societies were explicitly characterised into two groups — the governing and entrepreneurial plantation elite, and former slaves and their descendants. This, however, does not explain why some of West Indian territories (that is, the labour-scarce ones) had far higher levels of social instability than others (that is, the labour-abundant ones) as all the British West Indian territories were divided into these two distinct groups. This is one area in which our work makes a contribution to explaining the history of social stability in the region.

In their revised paper, Collier and Hoeffler (2004) use indicators for grievance (ethnic or religious hatred, political repression, political exclusion, and economic inequality) and opportunity (extortion of natural resources, donations from diaspora, and subvention from hostile governments) and assess the relative strength of the two motives in explaining outbreaks of conflict. They found that the opportunities model performs better than the grievance model in predicting the outbreak of civil war for their sample of countries. More specifically, in terms of the opportunities model, primary exports (a proxy for finance of rebellions) increase the risk of conflict, and indicators of the cost of rebellion and military power also show statistically significant power in determining the risk of conflict. Meanwhile, most proxies involved in the grievances model were insignificant. None of the indicators for the dominance of one ethnic group were significant. Collier and Hoeffler (2004) admit that this might be because some of the proxies in the opportunities model may be correlated with unmeasured grievances. They conclude that the risk of conflict is determined by elements of both models.

The nature of social unrest in the British West Indies during the post-colonial period was not the same as that being analysed by Collier and Hoeffler's civil war study, but there are important implications coming from their work for our present work. First, their work suggests that opportunity is a key factor in determining the risk of conflict. Our study of the history of the West Indian territories supports this idea. The scarcity of labour relative to land in the sparsely populated West Indian territories offered rebels greater opportunity for economic gain. Rebelling against the coercive efforts of planters was much more attractive where the avoidance of plantation work allowed individuals

the time to cultivate their own land. Conversely, while Collier and Hoeffler (2004) found that, for the grievance model, proxies like political repression were weak predictors of the risk of conflict for their sample — likely owing to the fact that some opportunity proxies also proxy for grievances — our qualitative analysis of the link between labour availability, interventions and social unrest in the colonial period is able to draw a strong connection between grievances and conflict.

This connection is often bi-causal, a situation first pointed out by Alesina and Perotti (1996), and controls for which are incorporated into our econometric model below. In investigating the relationship between inequality and investment, the authors highlight political instability (measured by an index compiled through principal component analysis on indicators of stability) as the channel through which this relationship operates. Furthermore, while political instability may affect the level of investment, as it potentially increases the risks and therefore the expected returns from investment, investment, through its consequences for economic prosperity, may reduce the risk of political instability. Using a two-stage least square analysis to control for this simultaneity, Alesina and Perotti (1996) show that a strong negative and robust relationship exists between political instability and investment. Their work is useful to our present study for at least two reasons. First, it provides a useful template for analysing social unrest and its impact on economic outcomes and institutions as a two-way process. In our discussion of the social unrest in the West Indies during the colonial period, it becomes useful to our understanding to not only highlight the ways that social unrest has adverse effects on economic and social institutions, but to also account for the possibility that social and economic institutions perpetuate social instability. Second, the significant link between political instability and economic performance, suggested by the results of Alesina and Perotti (1996), offers support to our proposition that the labour problem, by causing higher levels of social unrest, has adversely affected economic outcomes. The difference is that while their work focuses on investment, we see the role of this conflict playing out in its effects on the long-term development of growth-enhancing institutions. We highlight the effect on institutions because we believe the pervasive nature of labour problems in the West Indies, and their impact on the social and economic organisation of present day West Indian society is best observed through the quality of institutions that emerged in the post-emancipation period.

Nafziger and Auvinen (2002) also offer a significant contribution to the social conflict literature. The authors analyse how four main factors (economic stagnation, income inequality, competition for natural resources and ethnicity) contribute to humanitarian emergencies. Their article is a qualitative one, but it relies on a survey of the existing quantitative literature to draw some valuable conclusions. First, the authors, like Alesina and Perotti (1996), discuss the nature of the relationship between conflict and economic and political factors as a bi-causal one. They observe that while economic growth and political decay can lead to incidences of conflict, conflict may also lead to economic stagnation and decay political institutions. The second source of conflict discussed by Nafziger and Auvinen (2002) is economic inequality which, as noted in Alesina and Perotti (1996), increases instances of conflict. Nafziger and Auvinen (2002) also note that

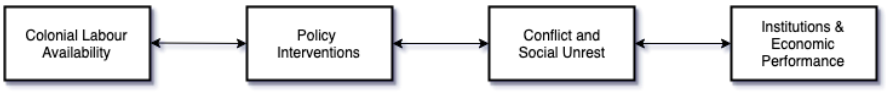
for inequality and conflict relationship as well, there exists a tendency for bi-causality. Furthermore, the authors explicitly highlight the role of historical discrimination and colonialism in determining inequality through its implications for taxation and public expenditure among other factors. This draws obvious parallels to our present work and helps to place the present study in the existing literature as a more precise examination of this relationship with our focus on the colonial British West Indies. The third source of conflict noted by Nafziger and Auvinen (2002) is competition for natural resources. Previous to Nafziger and Auvinen (2002), Collier and Hoeffler (1998) discussed natural resources (the share of primary commodities in exports) in the context of financing rebellions. With all territories in the West Indies during the period relying on primary exports for over 90 percent of their exports, we cannot attribute the higher social unrest in labour-scarce countries to differences in primary exports, but still, this factor is useful in understanding why the region as a whole was prone to social unrest. We do, however, conduct a deeper empirical analysis of labour conflict and colonial factors in Chapter 4.

Taken together, this literature offers strong support for our theory on the relative state of post-colonial West Indian societies. The grievances stoked during colonial rule, the onset of the labour problem and interventions undertaken to augment the labour market in response, all carry implications for social stability and institutions today.

2.3 An Analytical Framework

A systematic analysis of the role of colonial labour availability in explaining present day economic performance of former British West Indian territories requires a framework that pins down the relationship between the two. In this section, we introduce a chart to describe our theory. The flow chart in Figure 2.2 illustrates how colonial labour availability is linked to present day institutions and economic performance.

Figure 2.2: Chain of Causation



There are two features which bear highlighting in this chain. The first is that the relationships as presented recognise the simultaneous nature of the factors in this chain, and the second is that of implied persistence in the form of institutions from the colonial period to present day. We address persistence and path dependence in Section 2.5.1. In what follows, we consider each node of the above chain and draw on the histories of the colonies to make the argument for the relationship as expressed in Figure2.2.

Colonial Labour Availability

The first node of the chain of causation presented above is colonial labour availability. The key factors in the production process were land and labour. Before emancipation,

labour supply was kept stable through the total institution of slavery across all islands. However, with the abolition of this institution, the relative availability of these two factors became the catalyst for divergent social and economic trajectories among the colonies. Table 2.1 which reports the cross-sectional characteristics of the colonies of the British West Indies, shows the wide variation in colonial population density, which proxies for labour supply. For our five sugar colonies, Barbados, Antigua and Saint Kitts had

Table 2.1: Characteristics of B.W.I Colonies

Colony	Year Founded	Population 1836	Area (km^2)	Pop Density
Antigua	1632	35188	282	125
Barbados	1629	105812	430	246
Guyana	1803	66561	11094	6
Jamaica	1655	381951	11234	34
Saint Kitts	1628	21578	191	113
Saint Lucia	1803	17005	630	27
Saint Vincent	1763	26659	386	69
Grenada	1763	17751	341	52
Dominica	1763	16207	772	21
Trinidad	1797	34650	4950	7

Notes: Source: Dippel et al. (2015)

over 100 persons per square kilometre while Guyana and Jamaica had 6 and 34, respectively. The other colonies fell somewhere between the low figure in Guyana and that of Saint Kitts. In colonies with low labour to land ratios, the governing planter elite faced a dire labour problem that they sought to rectify through abuse of the political power to enact repressive policies. These policies, in turn, helped to mitigate the extent of the labour problem faced by the planters by forcefully increasing their labour supply. Hence, the proposed bi-causal relationship between labour availability and policy interventions.

Policy Interventions

Interventions by the planter government into the labour market took several forms. Among the most potent of these interventions was legislation around taxes, immigration and the police. Phillips (1994, p.1369) identifies twelve types of legislation aimed at

controlling labour. These laws generally involved legislation around trespassing and ejectment, the Master and Servants Act of 1838, franchise laws and policing. Other forms of intervention included the implementation of Apprenticeship (which involved forced labour for up to eight years after emancipation), taxation, and laws concerning immigration, specifically indentured labour. Tables 2.2 and 2.3 outline incidents of these interventions, their duration, severity, and the observed consequences for our five sugar colonies. We show that intervention of one form or another was present throughout the colonies but that the degree of severity (ranked as very severe, severe, moderate and low) varied across colonies and with the extent of the labour problem faced. In Guyana and Jamaica interventions like indentured migrant labour were present but absent in the labour-rich colonies of Antigua, Barbados and Saint Kitts. Apprenticeship was rejected in Antigua and ended early in Barbados and Saint Kitts, before mounting pressure led to its reluctant end in Jamaica and Guyana. Taxation was comparatively heavy in Guyana and Jamaica as well. Laws concerning the electoral franchise, prisons and policing served to restrict access to the franchise from the the masses and so keep repressive labour laws in operation. The extent of its severity is reflected in the variations of the vote share observed. While these actions were all influenced by the labour problem at hand, they in turn affected available labour supply by helping to garner forced or otherwise coerced labour. Reactions to these interventions varied with the severity with which they (the interventions) were enforced. There was frequent and violent opposition in Jamaica and Guyana leading to frequent bouts of social unrest. The planters often responded to social unrest with more legislation and repressive measures causing interventions to both determine (and be determined by) social unrest. This is represented by the bi-directional connection between the second and third nodes of Figure 2.2.

Table 2.2: Labour Market Interventions: Jamaica and Guyana

			Jamaica			Guyana		
Intervention	Description	Political, Social and Economic Consequences	Implemented?	Duration	Severity	Implemented?	Duration	Severity
Institution of Apprenticeship	Former slaves were forced to provide unpaid labour to their former masters for a minimum number of hours per week.	An increase in the labour supply above what it would have been under a system of wage labour. Protests were carried out by former slaves.	Yes	1834-1838	Very severe (Williams, 2001). The required number of hours was 40.5 and heavy flogging and other forms of punishment reported. The island reluctantly ended the system early, only after pressure from the termination by Barbados and Saint Kitts.	Yes	1834-1838	Very Severe. The required number of hours was even 45 and the whip was in use.
Institution of Indentured Servitude	Under indentureship, labour was imported, primarily from India, between 1838 and 1917. Contracts were particularly oppressive and wages of immigrants were significantly lower than the market rate so as to put downward pressure on wages of locals.	An increase in the supply of cheap labour as indentured servants were contracted at lower wages for a period of five years. There was also significant conflict between immigrants and locals. Heavy taxation, appropriated from the public purse, was used to finance immigration.	Yes	1838-1917	Severe. Contracts were very oppressive and immigration funds diverted resources from public investment. During the period over 36,000 migrants were imported.	Yes	1838-1917	Very severe. Guyana had the most indentured servants. There was constant conflict between immigrants and locals and as much as 19 percent of public expenditures was used for immigration (Adamson, 1972).
Taxation	Various forms of repressive taxation were put in place to try to coerce labour back onto the plantations by increasing their cash demand. The main forms of taxation were poll taxes, stamp duties, and (most importantly) import duties.	Increased labour supply by forcing some labourers back onto the plantations. Generally reported to have impoverished local peasants.	Yes	1838-1930s	Very severe. The level of taxes rose dramatically after emancipation and took various forms. In the 1860s import duty on fish and rice was as much as 30 and 40 percent (Underhill, 1895).	Yes	1838-1930s	Severe. Taxes targeted the labourers and were generally very high. Duties on fish and rice were as much as 13 percent (Murray, 1970). This helped to further impoverish the poor and force them back onto the plantation, increasing their supply of cheap labour.
Legislation Regarding Trespassing and Ejectment	Former slaves could be ejected from their birth homes after a week's notice. Failure to vacate would lead to imprisonment. The idea behind this was to prevent peasants from buying land and force them to provide regular labour to the estates in exchange for tenancy. Rents would then be deducted from their wages, thus securing regular labour and lower real wages (Paget and Farley, 1964).	This served to temporarily increase the labour supply and reduce the wages that planters had to pay.	Yes	1839-1900s in various forms	Very severe. Rents charged were as much as 48 percent of wages (Bolland, 1981).	Yes	1839-early 1900s	Severe. Although peasants could continue to occupy dwellings for free in exchange for labour, efforts to restrict acquisition of land by peasants were intense. DaCosta (2007) notes the colonial origins of the high concentration of land ownership in Guyana versus the wide dispersion in Barbados after emancipation.
Master and Servant Acts	Passed by all Caribbean governments in the post-emancipation era, these acts sought to regulate labour relations to the great disadvantage of the workers.	Helped to maintain a more steady supply of labour for planters through repressive contracts. Frequently caused arrests of workmen for minor breaches and generated many disputes.	Yes	Up to 1939	Very Severe. In Jamaica, the Master and Servant Act allowed planters to legally repress workers, using the police and prisons to enforce the repressive terms of contracts.	Yes.	Up to 1939	Very Severe. Guyana, like Jamaica, relied heavily on such legislation as the abundant supply of land meant that freemen were not willing to commit to plantation labour. Punishment for minor breaches were common and regular (Murray, 1970).
Franchise Laws	Laws concerning electoral franchise were another source of power for the planter in coercing labour onto plantations. By ensuring that former slaves were unable to vote, planters guaranteed their monopoly power on laws concerning labour and policing.	Frequently caused social unrest leading, to economic problems. In addition, planter interest, not that of the general public, continued to dominate economic policy as we have seen in Chapter 1.	Yes	1838-1930s	Very Severe. Much of the population was ineligible to vote several decades after emancipation. In 1861 only 0.41 percent of the population was registered to vote. Figures for this intervention are from Murray (1970, p.56).	Yes	1838-1930s	Very severe. Much like Jamaica, most of the population was ineligible to vote until after the 1930s. In 1881 only 0.52 percent was registered to vote.
Prison and Policing	The planters use the police and legal system of prisons and courts to coerce the population back onto the plantations. Imprisonment was regularly used to punish small infractions against repressive vagrancy laws, breaches of contract and other offenses defined by the planter legislature through police and prisons acts.	This was a source of great conflict in the West Indies. Bolland (1981) cites policing as one of the crucial elements for increasing planter labour supply and suppressing labour rebellions. Such aggressive policing often caused social and political unrest.	Yes	1834-onward	Very severe. The governments use of police to shepherd a labour supply was perhaps the most aggressive in the West Indies. Anderson and Killingray (1991) note that annual policing bills were specifically used to prevent the peasant from marketing his crops.	Yes	1834-onward	Severe. The extent of the labour problem in Guyana, being similar to that of Jamaica, meant that policing was needed to effectively coerce both locals and indentured immigrants.

Notes: The details of interventions are from various sources, including Phillips (1994), the Colonial Blue Books of British Caribbean Colonies (1836-1945), Bolland (1981) and Underhill (1895).

Table 2.3: Labour Market Interventions: Antigua, Barbados & St. Kitts

			Barbados			Antigua			Saint Kitts		
Intervention	Description	Political, Social and Economic Consequences	Implemented?	Duration	Severity	Implemented?	Duration	Severity	Implemented?	Duration	Severity
Institution of Apprenticeship	Former slaves were forced to provide unpaid labour to their former masters for a minimum number of hours per week.	An increase in the labour supply above what it would have been under a system of wage labour. Protests were carried out by former slaves.	Yes	1834-1837	Low. Corporal punishment was almost nonexistent and the system worked better for both planter and former slave than it did in Jamaica (Hovey, 1838).	No	-	-	Yes	1834-1838	Moderate. Some protest action was reported in the early days of apprenticeship but the system was generally less severe. The island joined Barbados in ending the system early.
Institution of Indentured Servitude	Under indentureship labour was imported, primarily from India, between 1838 and 1918. Contracts were particularly oppressive and wages of immigrants were significantly lower than the market rate so as to put downward pressure on wages of locals.	An increase in the supply of cheap labour as indentured servants were contracted at lower wages for a period of five years. There was also significant conflict between immigrants and locals. Heavy taxation, appropriated from the public purse, was used to finance immigration.	No	-	-	No	-	-	No	-	-
Taxation	Various forms of repressive taxation were put in place to try to coerce labour back onto the plantations by increasing their cash demand. The main forms of taxation were poll taxes, stamp duties, and (most importantly) import duties.	Increased labour supply by forcing some labourers back onto the plantations. Generally reported to have impoverished local peasants.	Yes	1838-1930s	Low. The import duties in Barbados, for example, were reported to be 6.5 percent on fish and rice (Murray, 1970), compared to the 13 percent in Guyana and the rate of 40 percent in Jamaica.	Yes	1838-1930s	Low. Import duties, for example, compared favourably with that of Jamaica and Guyana. In the 1860s the import duty on fish and rice were only 66 percent and 16.6 percent that of Jamaica, respectively, according to calculations from the Colonial Statistical Tables (1870).	Yes	1838-1930s	Low. In Saint Kitts as well, import duties, for example, compared favourably with that of Jamaica and Guyana. In the 1860s the import duty on fish and rice were both 33 percent that of Jamaica.
Legislation Regarding Trespassing & Ejectment	Former slaves could be ejected from their birth homes after a week's notices. Failure to vacate would lead to imprisonment. The idea behind this was to prevent peasants from buying land and force them to provide regular labour to the estates in exchange for tenancy. Rents would then be deducted from their wages thus securing regular labour and lower real wages(Paget and Farley, 1964).	This served to temporarily increase the labour supply and reduce the wages that planters had to pay.	Yes	1839- early 1900s	Low. Rents charged were around 20 percent of wages and workers often occupied homes rent free (Bolland, 1981).	Yes	1839- onward in various forms	Low. Issues concerning ejectment and trespassing were comparatively rare on the island.	Yes	1839- onwards in various forms	Low. Similar to the situation in Antigua.
Master and Servant Acts	Passed by all Caribbean governments in the post-emancipation era, these acts sought to regulate labour relations to the great disadvantage of the workers.	Helped to maintain a more steady supply of labour for planters through repressive contracts. Frequently caused arrests of workmen for minor breaches and generated many disputes.	Yes	Up to 1939	Moderate. These acts were also enforced in Barbados, but were far less repressive than acts in Jamaica. With workers willing supplying labour to the estates as their outside options were few, the Barbadian planters did not need to rely too heavily on such coercion.	Yes	Up to 1939	Moderate. Similar to Barbados.	Yes	Up to 1939	Moderate. Similar to Barbados.
Franchise Laws	Laws concerning electoral franchise were another source of power for the planter in coercing labour onto plantations. By ensuring that former slaves were unable to vote, planters guaranteed their monopoly power on laws concerning labour and policing.	Frequently caused social unrest, leading to economic problems. In addition, planter interest, not that of the general public, continued to dominate economic policy (Murray, 1970).	Yes	1838-1930s	Moderate. Comparatively significantly better than Jamaica and Guyana. In 1887 the ratio of enfranchised to total population in Barbados was close to three times that of Guyana.	Yes	1838-1930s	Moderate. Comparatively much better than Jamaica and Guyana.	Yes	1838-1930s	Comparatively better than Jamaica and Guyana. Even in 1855 the ratio of individuals registered to vote to the total population was twice what Jamaica was able to achieve in 1864.
Prison and Policing	The planters used the police and legal system of prisons and courts to coerce the population back onto the plantations. Imprisonment was regularly used to punish small infractions against repressive vagrancy laws, breaches of contract and other offenses defined by the planter legislature through police and prisons acts.	This was a source of great conflict in the West Indies. Bolland (1981) cites policing as one of the crucial elements for increasing planter labour supply and suppressing labour rebellions. Such aggressive policing often caused social and political unrest.	Yes	1834-onward	Moderate. In a post-emancipation society, even in the colonies with adequate labour, aggressive policing was still needed. In this regard the colony of Barbados was not remarkably different from Guyana, though with fewer rebellions, Barbadian society was more cohesive in their relationship with planter police.	Yes	1834-onward	Moderate. Similar to Barbados.	Yes	1848 onward	Moderate. Similar to Barbados.

Notes: The details of interventions are from various sources including, Phillips (1994), the Colonial Blue Books of British Caribbean Colonies (1836-1945), Bolland (1981) and Underhill (1895).

Conflict and Social Unrest

Inevitably, responses to oppressive labour extraction varied with the degree of oppression exerted and the individual characteristic of the colonies. Throughout the post-emancipation period and up to the end of colonisation, the history of the British West Indies was punctuated with bursts of revolt, collective action and defiance through various means. Bolland (1995) provides a comprehensive account of the series of labour rebellions that populate the history of the British West Indies. There existed some form of labour unrest every year throughout the West Indian colonies. Bolland identifies three serious waves of rebellion in the century after emancipation and up to independence. These waves occurred in the periods 1895-1910, 1917-1925 and 1934-1939. Citing the persistence of planter domination and labourer subordination which continued to characterise labour relations in the colonial period, Bolland (1995, p.3) concludes that "the labour relationship... [carried with it the] old traditions of resistance to slavery" which served as a "basis for new tactics and the emergence of a new political culture." As has been the theme of this thesis, we identify that, conspicuously, some of the sugar colonies had significantly higher levels of rebellion than others. Bolland identifies ten serious disturbances in the five sugar colonies between 1884 and 1905. Of these ten, five occurred in Jamaica (1884, 1894, 1895, 1901 and 1902) and four in Guyana (1889, 1896, 1903 and 1905) with the solitary one, among the densely populated sugar colonies, occurring in Saint Kitts in 1896. Barbados and Antigua were completely free of any serious disturbances in that period. Prior to that period, the most significant labour rebellion occurred in Jamaica in 1865 and was followed by strikes in 1867, 1868 and 1878. Consistenly, these strikes "were directed against low wages" (Bolland, 1995, p.7). Other rebellions in 1901 and 1902 occurred over land and taxes that labourers found particularly oppressive towards their class. These rebellions often ended with several fatalities and other injuries, with survivors sentenced to lengthy imprisonment of up to seven years.

As for Guyana, Bolland (1995, p.12) describes the rebellions occurring in the colony between 1889 and culminating with the Ruimveldt Riots of 1905 as "some of the largest and most persistent disturbances." Guyana also experienced "the most serious (rebellions) in the British Caribbean in the period before the first World War" (Bolland, 1995, p.14). Figures indicate that 100 disturbances classified as strikes or riots occurred between 1886 and 1889. Prior to this period, disturbances, like the one in Leonora in 1869, were of a smaller scale and often unorganised. Just as it had been in Jamaica, in Guyana, in all periods from emancipation to 1938, the rebellions were lit with the recurring theme of "de facto wage reductions and intensified exploitation" (Bolland, 1995, p.15). As for the densely populated territories, Barbados and Antigua were consistently the most peaceful of the sugar colonies. One would have expected that, with the population pressure and low wages that prevailed in these colonies, rebellions would be frequent. Speaking of the two territories, Bolland (1995, p.111 and p.166) notes their description: "Barbados has a reputation for being orderly and conservative" and Antigua was "one of the quieter areas of the regions." When there was activity in Antigua, it was duly described as "labour unrest, though not a labour rebellion" (Bolland, 1995,

p.166). Furthermore, even in Saint Kitts, where a few rebellions did occur, the numbers were significantly less than in Guyana and Jamaica. This is indicative of the fact that, puzzlingly, the more densely populated areas where, in theory, the labourer should face the lowest wages, were the most peaceful of the sugar societies. Cundall (1906) was one of the first pieces of literature to comprehensively document instances of serious disturbances in the British West Indies during the first 75 years after emancipation. In Table 2.4 we present an overview of all the major disturbances in the five main sugar colonies (between 1838 and 1906) as outlined by Cundall (1906). The table details the year, type of conflict, reported cause of the conflict and outcomes of the conflict. There were in fact many more disturbances such as strikes throughout the period, as we have noted above, but those listed in our table are viewed in the historical literature as the most serious during the first 75 years.

Of all thirteen major disturbances identified during the period, only two occurred in the labour-rich colonies and even in one of those two, the cause was not labour related. The disturbance in Barbados in 1876 was, contrary to the theme of resistance to government in the labour-scarce colonies, in support of the form of government and the constitution by which the island had always been governed. In terms of the rest of the disturbances, what is interesting to highlight is that the reported cause of all disturbances bares some resemblance to the modes of intervention identified in Tables 2.2 and 2.3. Many of the disturbances had their origins in issues of wages, immigration, policing and political repression. In Guyana in particular, the wages issues were central, while political and policing causes were often the catalyst for riot and rebellion in Jamaica. The final column details some of the outcomes observed in the immediate aftermath of these disturbances. Invariably, the result was often imprisonment, loss of life and the erosion of social cohesion. In a few instances, wage reductions were won, but the full outcomes of each incident cannot be precisely identified in the short-term. This is because the effects of such persistent unrest are cumulative and can only be fully realised in the long-term institutional changes which took place. In this sense, social unrest both as a response to and a cause of the policy interventions identified above, led to institutional change which has persisted today. In turn, the quality of institutions which developed during the colonial period, the nature of the law and legal system, labour and land institutions also had a significant role to play in stirring resentment, animosity and social unrest, a feature represented by the bi-directional relationship between social unrest and institutional quality identified in Figure 2.2.

Beyond the incidences of unrest documented above, the labour unrest of the 1930s deserves special mention, perhaps representing the culmination of the long history of repression and unrest around the labour problem in the colonies. During this time, there was an unrest of some form in all five of the sugar colonies. Work by Bolland (2001) has identified several causes of the 1930s labour rebellions, including low wages, the restrictions on collective bargaining, political repression under franchise laws, and general economic distress. The earliest outbreaks of what would become a region-wide rebellion was documented by Hart (2002) to have occurred in Guyana and Jamaica in 1934 and 1935, respectively. In Guyana a Leonora Plantation strike in Demarara in

Table 2.4: Major Disturbances in the British Sugar Colonies 1838-1905

Country	Year	Type Conflict	Cause	Outcomes
Jamaica	1841	Riot	Wilmot (1990) has linked the root cause of this festival day riot to political conflict and the planters' quest to coerce labour.	There were at least two deaths and several individuals were wounded. The army was called out and the riot was suppressed. Public investment share of total expenditure fell 1.8 percentage points the following year. Wages increased by 4.1 percent
Guyana	1856	Riot	Anti-Portuguese immigration sentiment. According to Chan (1970), locals regarded the Portuguese as a threat to the level of wages.	Several were killed and several more were wounded. The riot left an even more fractured relationship between the immigrants and locals. There was no change in the wage rate reported the following year, immigration expenditure share went up from 7 to 10 percent.
Jamaica	1859	Riot	Resistance to taxation. Since emancipation the planters had consistently levied higher taxes on the peasant population to finance plantation interests. Sherlock and Bennett (1998) notes that the tollage was another such tax and it incited a fierce resistance.	No official numbers on the wounded and injured could be cited, but the riot was very serious and spread to several areas. The riots was part of the eventually successful effort to repeal the toll gate legislation in 1863.
Jamaica	1859	Riot	Trespass. The result of the active Trespass and Ejectment act, the riot came about from a dispute over ownership of land claimed by a peasant farmer.	Three were killed and several others were injured. The militia was called in and by the time the riot was quelled there were over 100 arrests. Wages fell 27 percent but public investment share grew by 1.3 percentage points the following year. Policing expenditure share also grew from 7 to 8 percent.
Jamaica	1865	Rebellion	Political dissatisfaction. The black and coloured population had grown increasingly frustrated with the governing planter elite's suppression of their political rights and franchise, and their partiality to plantation interests. This boiled over into the worst rebellion in the post-emancipation era.	The worst rebellion since emancipation. 608 individuals were killed and 34 others were injured. This rebellion led to the successful overthrow of the oligarchic planter government, and the institution of a new, fairer constitution. An immediate increase in public investment in education, health and infrastructure was evident. Public investment share grew from 6 percent to 19 percent, policing expenditure share of total expenditure also grew by 1.3 percentage points the following year.
Barbados	1876	Disturbances	Political resistance. Cundall (1906) describes this as an unusual case in the West Indies where the people sided with the planter government against the imperial legislation for the creation of the one federative governing body for all of the Windward Islands.	At least 40 individuals were killed or wounded. These disturbances and the sentiment that accompanied them eventually won over and Barbados left the Federation in 1885.
Guyana	1889	Riot	Anti-Portuguese sentiment. According to Cundall (1906), this riot was indicative of the tension between the two factions (local blacks and immigrants) since the 1856 riot mentioned above.	Five individuals were shot in the riot which lasted four days. The relationship between the two worsened, adding to the social tensions existing in the Guyanese society at the time. There was no change in the wage rate reported the following year.
Jamaica	1894	Riot	Anti-police sentiment. A few regional soldiers and civilians joined together in rioting against the police force on the island. The police had historically been used as a coercive apparatus by the state's planter-government and so, sentiment toward law enforcement was always negative.	Several individuals were wounded and the tension between the public and police worsened. No real change in public investment share, policing expenditure share, or wages.
Saint Kitts	1896	Riot	Anti-Portuguese sentiment. Black workers felt that they were being cheated out of wages by a Portuguese estate owner. Their anger evolved into widespread discontent in the city of Basseterre where they burned and looted Portuguese-owned property.	At least 4 people were killed and 150 were arrested. Resentment toward the Portuguese population grew.
Guyana	1896	Riot	Dissatisfaction with wages. In response to a reduction in wages on sugar estates, the population of indentured immigrants rioted, burning down cane-fields.	3 persons were killed and an unknown number were injured. The government intervened to stop an inquest into the unrest by stipendiary magistrates who were charged with looking after the welfare of labourers. There was no change in the wage rate reported the following year.
Jamaica	1902	Riot	Anti-police sentiment. The decades of tension between the police who were seen as the enforcement arm of the plantation class and the black population culminated in a riot over the treatment of civilians by the police. According to Cundall (1906), the riot was also connected to resistance to an impending property law tax.	2 individuals were killed and 9 were injured. The relationship between the legal system and the black population continued to fray. Public investment share also rose by 3 percentage points the following year. No change in policing share.
Guyana	1903	Riot	Dissatisfaction with wages. The riot began on a plantation in Berbice and was in connection to the perceived efforts of plantation owners to lower workmen wages.	5 individuals were killed and many more were injured. Resentment toward the plantation class among the working population grew. Wage rate remained the same the following year.
Guyana	1905	Riot	Dissatisfaction with wages. Wage discontent started with wharf workers but soon spread to the Ruimveldt estate, along with widespread anger from the labouring class.	Over 148 person were arrested, 8 killed and 103 were injured. The state relied on the police force who were also attacked and injured, worsening the animosity between the police and workers. 2 British warships with soldiers arrived to quell the riots. No reported change in wage rate resulted the next year.

Notes: The sources of data on the occurrence of disturbances is Cundall (1906). Data from the Caribbean Colonial Blue Books for the country in question and the year after the conflict was used to calculate changes to wages and government spending where mentioned. See appendix for references.

September 1934 was immediate followed by a strike involving 2,000 workers at Uitflugt Plantation. Before the unrest could settle, this was followed by another strike on Booker Plantation and shortly after, in 1935 another strike on the Leonora Plantation which Hart (2002) attributes to a demand to reverse a wage reduction which occurred in 1930. The strikes in Jamaica started in 1935 on a banana plantation. This triggered a period of the most prolonged and serious disturbances on the island since 1865 (Bolland, 1995). These strikes spread throughout the Caribbean and lasted until 1939 by which time many deaths had occurred, but discussions had began and progress made toward new franchise and trade union laws which led to full democratisation in the 1940s and 50s in most territories. Nevertheless, as will be discussed in Section 2.5.1, the quality of these institutions, once established, and the nature of institutional change still reflected the persistence of the ills of the historical labour struggle.

Institutions

We have already established that institutions were both a response to and a cause of social unrest. In this section we look more closely at the final node in our chain of causation, institutions and economic development.

In the post-emancipation period, "the former masters sought new forms of [labour] coercion [while] the former slaves sought new forms of freedom" (Bolland, 1981, p.592). The extent to which the objectives of the planter elite and the former slaves were at odds depended heavily on the labour problem. Where labour was scarce relative to land, former slaves saw opportunities to engage in productive life outside the plantations. Where labour was plentiful and land scarce, the former slaves depended on the plantations for steady work. Working on the plantations was, therefore, mutually beneficial for planter and former slave in these territories. The historical record tells that in the former case (where labour was scarce), economic, legal and political institutions, and social stability were much worse off than in the former case.

Labour Institutions

Perhaps the most affected by the history of slavery, the set of labour institutions which developed in the post-emancipation period carried lasting consequences for labour relations and economic development in the Caribbean region. Among those institutions was Apprenticeship. Apprenticeship was instituted as further oppression in attempt to retain near complete control of the population across the British West Indies. Under this institution, former slaves were required to supply 40 hours of unpaid labour to their former masters. During these 40 hours, the planter was to provide apprentices with the customary rations that they received as slaves, and any labour provided surplus to this mandatory time was to be compensated. Holt (1992, p.56) writes that "the relationship between the planter and the worker was much the same as that between master and servant" during apprenticeship. This relationship was legislated to last for a maximum period of six years as the former slaves transitioned into 'proper citizens.' The introduction of apprenticeship proved the first significant institutional divergence among the West Indian colonies. Planters in labour-rich Antigua rejected the system outright

and proceeded to full emancipation. In contrast, planters in low colonial population density territories aggressively and often violently guarded the new system to prevent further loss of their property than that which had already been suffered at emancipation. The Jamaican plantocracy moved to intensify the level of repression of the labourers, increasing the severity of their tasks while taking away their consignments, "insisting that people who demanded their freedom should be deprived the indulgences of slavery." (Green, 1991, p.132).

In addition, while the use of the whip was retired in labour-rich colonies, Jamaica and Guyana retained the use of the whip during apprenticeship, as a coercive instrument with which to extract compliance from the apprentices. This practice was indicative of more aggressive institutional labour repression which would become rampant in the colonies where labour shortage was a major concern. The potential for higher degrees of institutionalised oppression in low colonial population density territories was evident as early as 1840 and was expressed by Green (1991, p.136) when speaking about Jamaica. He commented that "even insolence by an apprentice towards superiors could serve as sufficient cause for whipping when a presiding magistrate was in collusion with local planters." This collusion between magistrates, who were supposed to protect the labourers, and the planters was not rare but was indeed the norm. Green (1991, p.141) notes that the view of magistrates across the colony was that they amounted to little more than purchased instruments of the planters, who they [the planters] "lavishly patronized" and even in rare cases where the magistrates refused (as in the case of Guyana's J. A. Allen), they were "threatened and even prosecuted on the planters' behalf on a variety of trumped up charges." Green (1991, p.141) laments that these practices resulted in the judicial system of these labour-scarce colonies being discouraged from "too zealous a defence of the rights of apprentices."

The events contrasted starkly with the outright rejection of apprenticeship by Antigua and the decision to terminate the system early by Barbados and Saint Kitts. Green (1991, p.160) explains that this decision was taken for economic practicality as "the losses which planters anticipated by early termination were more tolerable" than the cost of the system. This served as early indication of the tone that labour relations (which was in part and parcel ubiquitous with West Indian life) would take in high density colonies as opposed to that in low density colonies. When these two colonies did decide to end the Apprenticeship system, it was because the decision of Antigua, Barbados and Saint Kitts to terminate the system made it incumbent upon the labour-scarce colonies to do the same as it eroded critical support for the system and rendered its abolition inevitable. "A submission [that] was distinguished by an unparalleled expression of rage [by the Jamaican planters]" (Green, 1991, p.159).

Following the end of apprenticeship, Indentured Servitude was instituted by the planters of labour-scarce Guyana and Jamaica. The planters in Barbados, Saint Kitts, and Antigua found that such an institution was unnecessary in their colonies. This form of labour institution proved a potent form of labour reppression. Under the indentured labour scheme, from 1834 to 1918, over 500 000 immigrants, primarily from India and China, were brought to the West Indies, to labour under specified contractual terms. The

Table 2.5: (Indentured) Migrants into the British Caribbean Sugar Colonies

Source of Migration	Destination of Immigrants				
	Antigua	Barbados	Guyana	Jamaica	Saint Kitts
India (1838-1918)	-	-	238,909	36,412	-
Madeira (1835-81)	2,527	-	32,216	379	2085
Africa (1834-67)	-	-	14,060	11,391	455
China (1852-84)	100	-	13,533	1,152	-
Europe (1834-1845)	-	-	381	4,087	-
Other (1835-67)	-	-	1,868	519	-
Total	2,627	-	300,967	53,940	2877

Source: Roberts and Byrne (1966, p.127).

motivation for this method of oppression rested purely in the intentions of the planter oligarchy to guarantee themselves a category of persons who were legally bound to the plantation. Table 2.5 details the statistics concerning indentured arrivals to the British West Indies.[3]

It is unsurprising that of the five main sugar colonies, Jamaica and Guyana took 99.8 percent of the indentured servants while it was virtually absent in the labour-rich colonies. By 1911, six years before indentureship ended, 40 percent of the Guyanese population was made up of indentured servants and their descendants (Bulmer-Thomas, 2012). Though this form of recruitment was not enough to significantly alter the labour to land ratio faced by the planter, it was effective in securing him cheap labour through stringent contract specifications. The initial terms of the contract required nine to ten hours of work per day (two more than was required from apprentice during that time) for a wage of 16 cents plus food allowances, compared to the 32 cents daily wage of the emancipated worker (Adamson, 1972). Contracts were stipulated for a period of five years.

Historians describe indentured labour in the West Indies as an oppressive institution for several reasons. The treatment of indentured servants have been described as being as inhumane as slaves.[4] There were several reasons for this. First, the scheme was heavily financed from public revenue extracted from the non-planting population. Adamson (1972, p.107) notes that, in order to finance the deficits created during the indentured period, the planter dominated legislature increased direct taxes while lowering the export tax on their sugar produce. He notes that the new tax ordinance doubled the tax and excise on goods consumed in high frequency by the emancipated workforce. Figures from the period indicate that the cost of the indentured scheme at once amounted to 19.7 percent of public revenue. In effect, the ex-slaves were paying for their replacements.

Secondly, indentured labour was particular oppressive to the servants. Controls governing labour and earnings changed regularly in favour of the planters (Adamson,

[3]Table 2.5 is sourced from Roberts and Byrne (1966).

[4]The death rate among indentured workers peaked at 64.8 per thousand in 1861-63 according to Adamson (1972).

1972). An example of this is the abolition of the right to commute which usually came at the end of the third year of indentured servitude.[5] The planters argued that commutation deprived them the benefits of having trained their servants who would then turn away and accept higher contracts from other plantations. In response, the plantocracy took action to eliminate this possibility and further established re-indenture at the end of the initial contract, without the possibility of changing employers for the servants (Adamson, 1972). An 1870 Commission of Inquiry described this as a means of keeping indentured servants "as a whole out of the free labour market."[6] The constraints were not limited to the control of movement. Adamson (1972, p.11) notes that, 56 percent of indentured servants were not earning the legal weekly minimum wage. This is exacerbated by the fact that indentured workers earned about half as much as the creole field workers.

Enforcement of these oppressive labour terms was also engrained in the political and legislative institutions of the Guyana and Jamaica. Adamson (1972, p.11) comments that as a result of his broad legislative power and vaguely defined laws, the planter was able to wield a legal weapon over his indentured servants, sufficiently potent to obtain a conviction against them "every week and any week in the year." He argues that this served to physically contain the indentured workforce and force them into accepting lower wages, deplorable working conditions and prevent desertion and strike. Planters often changed the laws governing the work ordinance under which the indentured servants had been contracted, to their benefit. The effect of these changes often amounted to a doubling of the duration of prison sentences (Adamson, 1972). It was no comfort that there was a sharp contrast between the available instruments for prosecution of the indentured workforce and the forms of protection offered to this vulnerable population. Even where the indentured workforce was able to bring a matter against a planter, the case was to be heard by two Justices of the Peace, who were themselves planters.[7] Indeed, by its end in 1917, the effect of the indentured scheme was not only the institutional oppression of a large share of the population, but also the ethnic fragmentation of the society of these colonies. Undoubtedly, the length and severity of such a system had lasting effects on the culture of labour relations, and labour institutions in these territories.

The forms and nature of labour relations highlighted above explain the puzzling relationship between sugar prices and wages, observed in the post emancipation period. In Figure 2.3, we plot an index of wages against an index of sugar prices in the sugar colonies for the 40-year period following emancipation.[8] Our theory in Section 2.3 suggests that the planter class used their power and wealth to depress wages. As a result, increases in the wealth and power of the planter class should be followed by reductions in wages. The main source of planter wealth was revenue from sugar. Increases in the price of sugar are thus expected to increase planter wealth. According to our theory,

[5]Indentured servants were initially allowed to pay a fixed sum of money to terminate their contracts early.

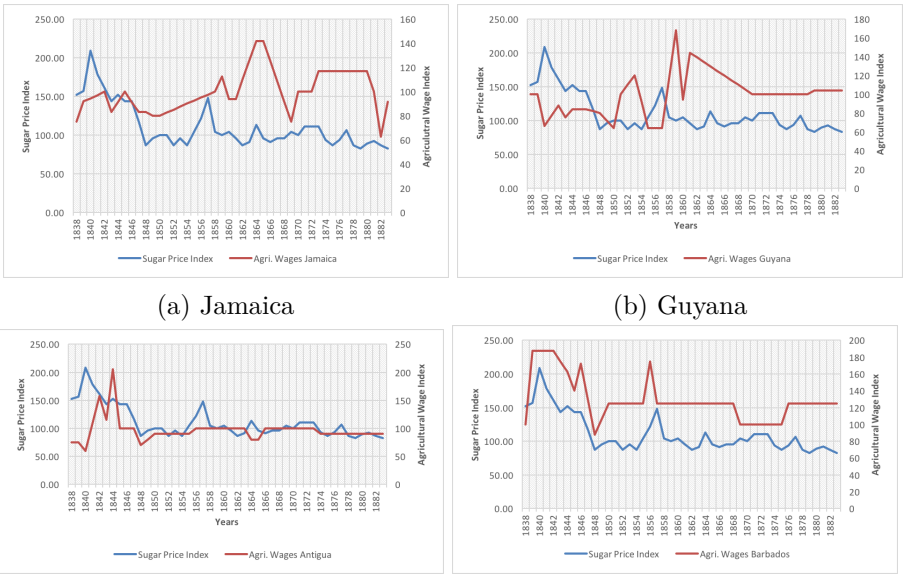
[6]Page 72 of the Report of the Commissioners Appointed to Enquire into the Treatment of Immigrants in British Guiana. See the primary sources bibliography for full citation.

[7]Adamson (1972) found that it was normal for even independent magistrates to contrive with planters to abuse labour laws.

[8]Data for Saint Kitts was unavailable.

in low density colonies with dire labour problems, this will likely result in a lowering of wages. In this way, the planter is able to subvert the free labour market, and we may fail to observe the standard economic relationship in which an increase in the price of a commodity results in and increase in the wages of workers involved in its production. The relationships in Figure 2.3 reveal this puzzle in our low historical population density colonies.

Figure 2.3: The Sugar Colonies: Wage and Prices Index Comparison



(a) Jamaica (b) Guyana

(c) Antigua (d) Barbados

Source: Bulmer-Thomas (2012)

A visual inspection of these graphs immediately reveals two things. First, the price of sugar series leads that of wages. Secondly, there is a major difference in the relationship between the two indices, between the low and high colonial population density territories. For Jamaica and Guyana (our low population density colonies), the two indices seem to move in contrast with each other. That is, for Jamaica and Guyana, there appears to be a negative association between the price of sugar on the world market and wages of local agricultural workers. Specifically, when the price of sugar on the world market increases, this increase is not passed on as an increase in wages for local labourers. Instead, workers' wages seem to fall. The opposite may be observed when we examine the relationship for our high colonial population density territories, Antigua and Barbados. There, the two indices seem to move in tandem. Increases in the price of sugar on the world market are followed by increases in local agricultural workers' wages. To ascertain the existence of these associations, we calculate the Pearson Correlation Coefficient for the two indices, for each of our four colonies. We found that a significant negative correlation existed between the price of sugar index and agricultural wage index for Jamaica (-0.328) and Guyana (-0.132), but a positive and significant relationship

was present in Antigua (0.677) and Barbados (0.322). These differences support our theory that explains the puzzle as being the result of responses to the contrasting labour situations existent in the colonies. This directly relates back to our findings in Chapter 1, where we showed that the wage manipulation efforts of the planter led to labour market relationships between wages and prices that was counter to standard economic theory. There were political, thus, political economy channels in operation. We reasoned that when sugar is doing well, the planters' relative wealth and power improves and, in colonies with labour problems, he is incentivised to use that wealth to artificially reduce the wages of labourers. The opposite occurs when sugar market conditions turn against his sugar commodity. On the contrary, in the colonies free from labour problems, the significant positive correlations between sugar performance and wages display the standard free economy relationship of higher wages with increased sugar price. We reason, therefore, that in contrast to the labour-scarce colonies of Jamaica and Guyana, a free labour market was in operation in the labour-rich colonies. The absence of a free labour market in Jamaica and Guyana, and its presence in Barbados and Antigua, we conclude, has hurt the economic development of these two large territories relative to the latter two islands.

Land and Property Rights Institutions

With the eventual termination of apprenticeship, planters seeking to control their labour required new instruments. Coincidentally, that which motivated the introduction of slave labour to the West Indies was still the central issue that divided the response of the powerful elite in the low and high colonial population density territories. As long as territories were sufficiently scarcely populated, land was accessible outside the plantations, and the wage necessary to induce labour to remain on the plantations would be well beyond the profit maximising level. Coercion (physical and institutional) was therefore necessary. In the post-emancipation period, this meant that labour was forced to live in a society with conditions akin to that of slavery. While in Barbados, Antigua and Saint Kitts, the population was plentiful and land scarce, the situation was the reverse in Jamaica and Guyana. Planters therefore needed extreme measures to force labour onto the plantations. They quickly reasoned that this would also require control of the availability of land. This was the fundamental source of the tension that would arise between the existing planter class and newly freed men during the transition to wage labour. Paradoxically, this transition amounted to nothing more than the transition from one system of labour control to another, lasting over a century.

Lord Howick anticipated the need for land control on the eve of emancipation.[9]. He notes:

> *The emancipation of the slaves in Jamaica... and British Guyana if unqualified by any corrective provisions, would at once bring them into the state already described as characteristic of the inhabitants of countries imperfectly settled. If at liberty to follow their own inclination, it may be confidently*

[9]See page 168 of the appendix to the *Fourth Report From the Select Committee on Sugar and Coffee Planting*. See bibliography containing primary sources for full appendix.

> *predicted that they would not be allured from the occupation of land, to engage in steady cultivation and manufacture of sugar for any wage the planter could offer them... Where soil is capable of cultivation would support a number of persons far more numerous than the actual inhabitants, large tracts of good land are unappropriated... Even those who are totally destitute of capital may purchase on very easy terms... The natural tendency and the invariable result of this state of things is to raise wages on manual labour far beyond what may be termed the proper level.*

The words of British Lords at the time mirrored the attitude of the colonial office which sympathised with planter's plight and argued for the development of land policy to control labour. Lord Glenelg, quoted in Holt (1992, p.72), recommended that action be taken to prevent squatting of public land and that land prices should be raised sufficiently high so as to price lands "out of the reach of persons without capital." This sort of land control was duly followed by the planters who collectively refused to sell land to the labouring population and actively sought laws which restricted the sale and purchase of land to/by the labouring classes of Jamaica and Guyana. In 1850, for example, the planters restricted access to land with a law that placed land out of the reach of the labouring class by introducing heavy taxation on plots of land sold to groups of ten or more individuals in Guyana. Because the labourers could not generate the capital (on their own or in too small a group) to purchase land, this strategy was specifically aimed at ensuring that they could not collectively own land either. In 1938, the effects of these laws were still in operation. Stanley Engerman in Sheridan (1996, p.306) noted that the planters were aware that "without the coercion created by the absence of free land, few ex-slaves would be willing to work for others." To remedy this problem, in low density areas where plenty of land was available, "the land tax ... was intended to raise the cost and increase difficulties in land acquisition starting in 1836 and continuing until well into the twentieth century" (Engerman in Sheridan (1996, p.301)). Engerman identifies the words of Lord Howick as a telling example of the intentions of much of the land policy designed in the West Indies in the post emancipation era: "... in order to pay this tax or this rent, the Negroes will be under necessity of working for hire in the cane-field."[10] This example of institutionalised coercion typified much of the policies adopted where land to labour ratios were not favourable to the planter elite. This form of systematic repression resulted in the under-development of land tenure regimes in land abundant territories. In high colonial population density territories like Antigua and Barbados, virtually all land was already owned and the need for such institutional oppression was not so great. There was also wide-spread legal land ownership on legal freehold which ensured and sustained the development of far superior land tenure institutions which could be inherited in the post-colonial period.

In Jamaica and Guyana, the persistence of these land tenure institutions which developed as an oppressive and coercive instrument of the planter, is highlighted by Besson (2003) and Palmié (1995). The authors observe that the land tenure policy today, both

[10]Lord Howick as quoted by Engerman in Sheridan (1996, p.308).

legal and unofficial, has its origins primarily in the culture of slavery which defined the 19th century. Besson (2003, p.39) credits the dual land regime existing in the West Indies today, described by a coexistence of an official land tenure regime with roots in European land law, and an "unofficial family land regime among emancipated slaves and their descendants." The prevalence of family land "constituted an informal and extra-legal institution outside the bounds of colonial law" and was particularly high in low density territories (Olwig, 1995, p.3). Besson (2003, p.41) notes: "like Jamaica, British Guiana (now Guyana), the largest of the British Caribbean territories, manifested themes of post slavery village settlements including unofficial land tenures originating in slave culture and reflected the constraining impact of state/planter legislation on the flight from the estates." So entrenched was planter land restriction policy in the land tenure system of the modern Caribbean that both the 1897 Royal Commission and, thirty-three years later, the Moyne Commission, set up to address labour unrest in the British West Indies in the 1930s, made explicit recommendation that land policy reform be an essential feature in resolving the contemporary social and economic ills of the West Indies.[11] The persistence of repressive land institutions was also recognised by Stolberg and Wilmot (1992) who showed that these constraints in land settlement schemes lasted, and were evident even up to the post-colonial period. One of the economically paralysing facts about unofficial land tenure is that it is an "unofficial transformation of official freehold tenure" which implies that this form of land tenure was absent of legal documentation and other modes of legally satisfactory validation (Besson, 2003, p.47) . This made land relatively indivisible in property rights and thus could not be leveraged by an individual for credit, rendering the tenure capitally unproductive. In Barbados, Antigua and Saint Kitts, with small land to population ratios and where land was coveted and almost entirely owned in legal documentation, there developed wide-spread legal ownership during emancipation which ensured continuity in the post-colonial era. Land was therefore more widely held as productive capital and became part of domestic wealth around which domestic investment could be generated.

Repressive land tenure regimes were further supported by a mechanism of wage-rent system throughout much of the British West Indies. As has been the general pattern, the severity of this scheme ranged from mild —in labour-rich territories—to extreme in low density regions. Jamaica, for example, introduced the Ejectment and Trespass Acts, "reinforced by a virtual veto on selling land to former slave" (Besson, 2003, p.40). Under the wage-rent system, the land-owning planter class effectively tied the tenancy of provision grounds and cottages, which had customarily been the residence of former slaves for generations, to employment on their plantations. Bolland (1981, p.595) explains that this scheme "combined the roles of employer and landlord on the one hand and that of employee and tenant on the other." This was a useful tool for the planter for several reasons. In the first instance, planters were able to secure labour at a low cost by requiring work from labourers for the continued tenancy of provision grounds and house. Secondly, by setting artificially high rents, the planter was able to reduce the cost of labour by deducting rents from wages. The varied severity with which the

[11] See the primary sources appendix for full citation.

system was applied in different territories was based on the extent of the labour problem, and is typified by the contrast between Barbados and Jamaica. Less burdened by the labour problem, planters in Barbados often allowed labourers to continue to occupy small provision grounds and houses rent-free while they remained on the plantation for work for at least five days a week. Where a worker failed to meet this condition, rent deducted amounted to less than 20 percent of his wages, on average (Bolland, 1981). Contrast this with the case of Jamaica, where planters faced low supply and high wages. Bolland (1981) reports that it was customary for rent to be charged per person. This practice siginificantly increased the family's rent expense. Bolland (1981) estimated that rent amounted to 48 percent of wages in Jamaica. Historians have argued that the wage-rent system may have been particular successful as a coercive instrument because of the sentimental value that former slaves and their descendants attached to lands where they had been born and their ancestors buried. However, such was the severity of the abuse in Jamaica that, in spite of this attachment, labourers abandoned plantation tenancy forcing planters to eventually end the system as labourers fled to squat on available land.

This history supports our theory that institutions (in this case institutions of property rights), which are crucial for economic development, failed to optimally develop in the plantation society where the labour-capital conflict was fiercest.

Legal, Penal and Political Institutions

Effective control over land and labour in the post-emancipation period required political power. Fortunately for the planter class,

> *the political structure of the two colonies embodied the development of slave societies over a period of a century and a half. Membership in elective bodies, franchise laws, the allocation of duties between executive and legislative branches of colonial government and the Home Government remained essentially unaltered by the act of emancipation... That is, the planters, working through the institutions of government, could have passed laws whose aim and result could have been a program with a direct impact on the sugar sector of the economy* (McLewin, 1987, p.66).

The self-perpetuating oligarchies, as Bolland (2001) describes them, protected themselves from demise with ever-evolving franchise laws which, created by the planters, sought to promote and protect planter interest. In the immediate post-emancipation period, franchise laws across the region required the possession of a minimum value of land and wealth which the formerly enslaved population and their descendants were systematically barred from obtaining. As a result, only the wealthiest planters and merchants were eligible for representation in the assemblies where laws were passed that affected a population from which over 80 percent were not eligible to vote. Evidence of the sustained political power of the planters can be found in reports from elections occurring in several territories in the post-emancipation period. In Jamaica in 1840, the total number of votes neared $2,200$ from a population of about $400,000$. Twenty-four years later, in 1865, the number of individuals eligible to vote was 2143 according to

voter rolls, with 1,457 votes cast.[12]

In Guyana, in the immediate post emancipation period, the number of persons voting amounted to less than 1 percent of the population and included solely the class of planters and merchants. The quality of laws passed inevitably reflected the economic interest of the planter and conflicted with that of the labouring population. McLewin (1987, p.80) writes, "It was a matter of economic interest, not political party, which determined the quality of Jamaican legislation after emancipation... The result was the complex machinery continued to do the job it was built for — the maintenance of a slave society, whether *de jure* or *de facto*." While this is true for all of the former British West Indian territories, the degree to which the interest of the planter and the labourer conflicted was determined by the severity of the labour problem which was, in turn, determined by the density of the labouring population. Wrong (1923) documents several changes in the franchise laws in the British West Indies in the post emancipation era, which McLewin (1987, p.76) describes as having been "to the disadvantage of the small freeholder and tenant." These franchise laws would remain in effect well into the 1930s, when labour rebellions finally toppled the plantocracy.

McLewin (1987, p.84) documents the link between the politically powerful planter and the institutions of administrative justice for the case of Jamaica. He observes that, "the assembly could not only formulate economic policies ... but that such policies could also be actually carried into effect — to the extent that courts were called upon by law to function as a coercing agency for the errant field labourer... the mode of punishing and of coercing can be transferred with relative ease from the whip of the field to the bars of the jail." A crucial part of that link, which allowed planters to use the legal institutions to repress and coerce the free labour force was that for much of the colonial period, judges were chosen by the elected planter elite from the class of planters and merchants. McLewin (1987, p.85-87) further notes that, although there were few avenues of appeal against planter favoured court decisions, the necessary financial qualifications placed it out of the reach of the labourers. He laments that "given the structure of the judicial system it was not possible for the labourer to obtain a fair trial as local magistrates acted so as to promote mercantile and planting interests."

Because of the vast amounts of free land, the Guyanese and Jamaican planter were more likely to lose their labour than the envied, densely populated and fully cultivated territories of Barbados, Antigua and Saint Kitts. This necessitated the use of stronger policing systems through the courts and penal system, and the drafting of more aggressive laws to control all aspects of the life of the free labourer. McLewin (1987, p.101) recognises that "the administration of justice in Guyana was subject to the same abuses of which existed in Jamaica. The potential for reintroduction of 'slavery' through coercion of the law and criminal penalties was generally recognised." He further points out that, of the 227 laws passed between emancipation in 1838 and 1865, the governor at the time observed that "most of the them [the laws] had... in their relation to the labouring class, been either onerous, restrictive or oppressive" (McLewin, 1987, p.175). Where it was necessary, such legislation included "laws to restrict emigration and 'vagrancy'

[12]Data sourced from McLewin (1987).

laws, various forms of taxation to pressure people into wage labour..., and the development of systems of prisons, magistrates and police to punish those who broke the new labour laws" (Bolland, 1981, p.594). Breaches of labour contracts, in forfeit of which the labourer would lose his tenancy, were reinforced by imprisonment with hard labour for workers found in violation, regardless of how small the worker's infraction may be. The history literature reports that most of the sentences for petty acts such as "careless use of fire and abuse of cattle, could be punished with up to three months' imprisonment with hard labour" (Bolland, 1981, p.595). Penalisation through hard labour was extremely prevalent where labour was scarce, and prisons served to stock the plantations with labour. In some territories, planters used the allure of salary advances and truck shop credit to perpetually keep the labourers in debt and bind them to the plantation (Bolland, 2001). To avoid imprisonment for debts, labourers were forced to agree to exploitative work contracts.

Bolland (2001) identifies the masters and servant laws within the legal system as intending, through its codified system, to control the free labour force under threat of imprisonment and hard labour for breaching terms of their already exploitive contracts. The enforcement of these codes was the main duty of administrative institutions, the justice system and governments. Bolland (2001) observes that, though the means of oppression had changed, the dynamic of the relationship between the dominated and the dominant essentially remained the same after emancipation. He writes, in the post-emancipation period, "the problem of policing labour [moved]... from the individual planters... to the apparatus of the state" (Bolland, 2001, p.69). Indeed, while all territories suffered from some level of oppression backed by persistent institutions developed to extract reliable and cheap labour from their populations, there were, however, wide variations in the severity, totality, and thus consequences of these institutions and their effect on the long-term economic and social development of the former British West Indian colonies.

The close relationship between institutions and economic development has long been established. To see this, consider the various forms of institutions that developed in the post-emancipation period. Among the most relevant are; labour institutions, land tenure (property rights) institutions, legal institutions, economic institutions, and political institutions. It is straightforward to argue that while some of these can facilitate (or discourage) productive investments that lead to better economic outcomes, some also affect the quality of society. For example, while property rights and economic institutions — such as those of trade and commerce— can facilitate the functioning of markets and encourage productive investments that stimulate economic growth (North and Thomas, 1973; Acemoglu et al., 2001), these and other institutions — such as legal, labour and political institutions— act to keep society stable through the imposition of accountability, political stability, and the rule of law, all of which are essential for social cohesion. A more cohesive and stable society is, in turn, more conducive to economic growth and development (Easterly et al., 2006). In the next section, we proceed by examining the post-independence institutional and economic divergence, which we have linked to the labour problem between the low and high colonial population density territories.

2.4 The Empirical Analysis

2.4.1 Post-Colonial Institutional Quality

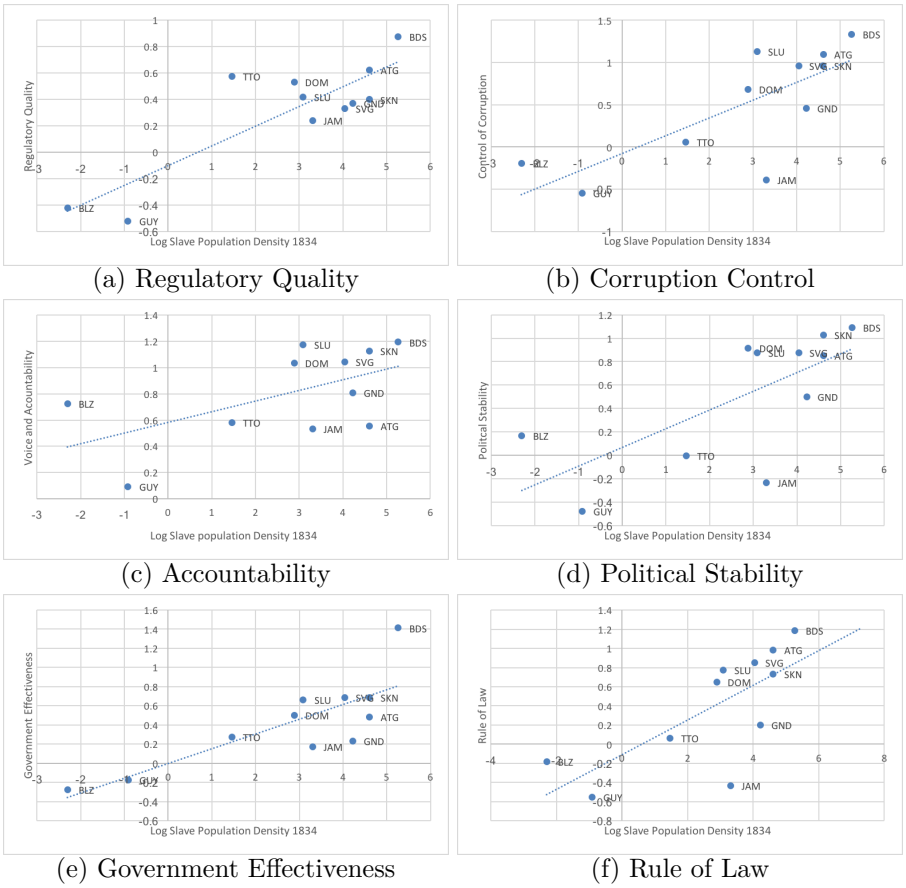
The central thesis of this chapter is that the former West Indian sugar colonies with lower population densities — and thus lower labour availability — developed worse institutions and economic outcomes. To assess the validity of this conclusion, in this section, we broaden our sample to include the remaining plantation colonies and plot the population density of the former British West Indian colonies at the time of emancipation against various measures of institutional quality.[13] Our measure of institutions comes from the World Bank's Worldwide Governance Indicators (WGI). According to the World Bank (2015) website, "these aggregate indicators combine the views of a large number of enterprise, citizen and expert survey respondents in industrial and developing countries. They are based on over 30 individual data sources produced by a variety of survey institutes, think tanks, non-governmental organizations, international organizations, and private sector firms."[14] We average the scores over the period 1996 to 2013 for each of the six indicators. Colonial population density is calculated as the number of slaves per square kilometre as at the year of emancipation (1834). These data were retrieved from Higman (1986). Figure 2.4 depicts the relationship between our various measures of institutions and our measure of labour availability.

From our plots, we observe a clear and consistent positive relationship between the quality of institutions and labour availability. Specifically, territories with higher level of labour availability during the colonial period enjoy better quality institutions today. This relationship is observed for all of our measures of institutions. Consistently, Barbados, Antigua and Saint Kitts are situated in the top right-hand corner of the graph, the mid-level colonial population density islands lie in the middle, and Jamaica and Guyana record the lowest quality of institutions. This relationship remains robust to the exclusion of outlying countries. Table B1 in the appendix reports the correlation coefficients between our measure of labour availability and institutional quality today. It appears that the strongest correlation with colonial population density is observed for regulatory quality, while the weakest correlation is reported for accountability. Nevertheless, these correlations are highly significant and are all strongly positive, supporting our theory that territories with more abundant labour developed better institutions.

To further inform our analysis, we conduct a regression of institutional quality on colonial population density. Given the nature of causation and potential endogeneities as discussed above, we perform both OLS and two-stage instrumental variable regressions to ensure valid inference can be made from our results. Here again, we proceed with the sample of eleven British West Indian plantation colonies. As we are examining the relationship within the sample of former West Indian colonies, the sample size is rather small, but there is much valuable information to be acquired from such an exercise. Furthermore, given that we observe no major outliers in our plots, the small sample

[13] See appendix for full names of all countries in the sample.

[14] We provide a description of each indicator of institutional quality in the Table B9 in the appendix. See Kaufmann et al. (2011) for further details on methodology.



(a) Regulatory Quality (b) Corruption Control

(c) Accountability (d) Political Stability

(e) Government Effectiveness (f) Rule of Law

Figure 2.4: Colonial Labour Availability and Institutions Today

Source: The World Bank Governance Indicators and Higman (1995).

size should produce valid conclusions, especially as our theory is concerned only with variations in institutional quality and the role played by labour availability during the colonial period among the former West Indian colonies. Another advantage of this sample is that there exists a great degree of homogeneity in many dimensions among the colonies in our sample. Each of these colonies are former British territories located in the Caribbean basin. They are all former slave economies with plantation societies involved largely in the cultivation of agricultural crops during the colonial period, and have since maintained similar economies, based on tourism, in the post-colonial period. These similarities ensure that we are able to minimise the effect of omitted factors which include cultural, geographic and historical differences, and make this regression analysis a worthwhile exercise.

In addition to colonial population density, we introduce control variables to account for other explanations of institutional quality. First, we use average real GDP per capital from 1977-2014 to control for the role of income in determining the quality of institutions in the region. The reason is clear; it is generally accepted that countries

with more income are able to invest more in institutional development. Secondly, given the central role of colonial population density to our thesis, we would like to address changes in population in the post-emancipation era. Figures B1, B2, and B3 in the appendix shows the trajectory of birth rates, death rates and total population in the first 60 years after emancipation. Population increased in all countries but the relative positions of Guyana and Jamaica (for example) as low population density territories remains for the entire period. We can see this by comparing population density of our labour-rich colonies in 1834 to that of Jamaica and Guyana several decades later. In 1836 the population density of Antigua, Barbados and Saint Kitts were 125, 246, and 113 per square kilometre, respectively. Jamaica and Guyana, at the end of the period (in 1900), had population density of 66 and 27 persons per square kilometre respectively, still far from becoming sufficiently densely populated to suggest that they had become labour-rich. This applies generally across the West Indian colonies. Furthermore, we expect that even after 1900, when the labour problem eased, the effects of the colonial struggle, along with the conflicts, divisions and the institutions it provoked, would persist. We discuss this idea a further in Section 2.5.1. Nevertheless, we include different measures to control for population change in our regressions. These include population change from emancipation at two intervals (1850 and 1900) and the rate of natural increase (calculated as birth rate minus death rate) averaged over the period 1836-1900.

Third, Engerman and Sokoloff (1997, 2002) have argued that it is large scale plantation slave use, which saw slaves held in large holdings, that has led to the poor institutional outcomes among former slave states. In Section 2.2, we explained that we believe that this cannot account for variations in institutional quality within the former West Indian colonies as all these territories suffered near full enslavement of their populations. Nonetheless, to rule out the idea that our results are simply proxying for the effect of slavery, we follow Nunn (2008) and introduce controls for the size of slave holdings into each of our regressions. Including a measure of the distribution of slaves by slave holding size in the regression effectively tests our labour supply hypothesis against that of Engerman and Sokoloff (1997, 2002). If Engerman and Sokoloff (1997, 2002) are correct, we should see countries with higher concentrations of large slave plantations have consistently, and significantly, lower institutional quality today. While data limitations do not permit us to incorporate policy interventions and conflict directly into our regressions, we believe that the evidence highlighted in the forgoing section which explains the chain of causation, supplements for this and allows us to confidently estimate a parsimonious relationship between colonial labour availability and institutions today.

OLS Regression

Our first exercise involves an OLS regression of our measure of institutional quality on colonial population density (our measure of colonial labour availability). In general, the regression takes the following form:

$$I_i = \alpha_I + \beta_I S_i + \mathbf{X}_i' \gamma_I + \epsilon_{Ii} \tag{2.1}$$

where i is a country identifier and I is an indicator of institutional quality.[15] S captures colonial labour supply in the post emancipation era and is measured as the log of slaves per square kilometre in 1834, $\mathbf{X}_i'$ is a vector of controls and includes such variables as country income (average GDP per capita (1977-2014)), and an indicator of the scale of slavery that the country suffered, measured as the percentage of a country's total slaves held on plantations of a particular size, as suggested by Nunn (2008).[16] Both colonial population density and income are entered in the regressions after taking their natural logs. Data on the share of slaves on holdings of particular sizes is taken from Higman (1995). An overview of this data is available in Table B2. The OLS results are reported in Tables B3 to B8 in the appendix.

These results are supportive of our hypothesis. Regardless of which measure of institutions we adopt, in Column (1) of each of the tables, the simple regression of institutional quality on colonial labour supply reveals a strong positive and significant relationship between the two. The results also indicate that, on average, colonial labour supply alone explains over 54 percent of the variation in the different measures of institutional quality. In Column (2) of each table, we control for present day income and found not only that our results remain largely unchanged, but also that, in the presence of the colonial labour supply regressor, income has no significant relationship with the quality of institutions in the former British West Indian territories today.[17] There is only one measure of institutions (Voice and Accountability) where the inclusion of GDP per capita has rendered colonial labour supply as a determinant insignificant. Nevertheless, for regulatory quality in particular, the role of colonial labour supply as determinant of the quality of this form of institution remains significant at the 1-percent level, even in the presence of a control for countries' incomes. The particularly robust positive relationship between regulatory quality and colonial labour supply is worth highlighting as it speaks directly to our theory which argues that the regulatory framework as an economic institution, in these post-colonial territories, developed out of the culture of repression of local enterprises that would challenge plantations for economic inputs. It, therefore, follows that the regression results reveal a strong positive relationship between colonial labour supply as an economic input, and regulatory quality. This suggests that the regulatory institutions are better where there was less competition for economic inputs.

In Columns (3)-(6), we include measures of the scale of plantation slavery to test the Engerman and Sokoloff (1997, 2002) hypothesis. In all but two measures of institutional quality, when we control for colonial labour supply, we see no support for the negative relationship between large-scale slave plantations and institutional development, as proposed by parts of the Engerman and Sokoloff (1997, 2002) hypothesis. Where their hypothesis is supported, as is the case in Column (6) of Table B4, we observe that an

[15] We will individually test the six previously highlighted measures of institutional quality.

[16] We have three size categories: slave holdings consisting of 1 to 10 slaves, 11 to 200 slaves, and 201 or more slaves. The particular category used as our holding size indicator is made known in the results table.

[17] In a later section, we examine the causal relationship running from institutions to income using a 3SLS instrumental variable regression to address any potential endogeneity issues.

increase (1 unit) in the percentage of total slaves who were held in the largest holdings (200 or more) is associated with lower (-0.0105) regulatory quality, significant at the 5-percent level. Furthermore, in Column (3) of Table B7, the results indicate that an increase in the percentage of total slaves who belonged to the smallest holdings (10 or less) is associated with a significantly higher level (0.0279) of voice and accountability while, in Column (6), increases in the fraction of total slaves held in the largest holdings is associated with lower (-0.0203) voice and accountability today. Yet, even where there is evidence supporting the idea that large-scale plantation slavery was a key determinant of institutional development, the role of colonial labour supply is not diminished. In fact, for all six measures, including where we have failed to see support for Engerman and Sokoloff (1997, 2002), the positive relationship between labour availability and institutional quality remains significant. These results offer evidence of something interesting. They suggest that it is not merely a history of plantation slavery, nor the scale of historical slavery that is key for institutional quality today but, in fact, it is the extent of the labour problem, and how those who have the power to set up institutions responded to the labour problem that the termination of slavery presented. In Column (6) of each table, we add controls for population, percentage change in population between 1834 and 1850 and between 1834 and 1900, as mentioned above. Among these controls, only the percentage change in population between 1834 and 1850 was significant on occasion. In all regressions, the natural log population density in 1834 (our measure of colonial labour supply) remained a significant determinant of the quality of institutions. In all cases, higher levels of colonial labour supply is associated with higher values of the institutional quality index. This suggests that the effect of the labour problem was present until the turn of the century, despite the increases in population. In column (7) we add a control for the natural increase in population (calculated as birth rate minus death rate and averaged over the period 1838 to 1900). The results remain unchanged.

2.4.2 Instrumental Variable (IV) Regression

In the previous subsection we estimate the relationship between our measures of institutional quality and colonial population density as given by Equation (2.1). While describing the relationships in this linear way is useful for easily explaining the process, a fundamental understanding of the nature of this relationship requires a closer examination of the problem with a non-linear approach so as to capture the endogeneities that may be involved in such a process. First it is important to note that a key determinant of current institutions is early (colonial) institutions which we are not able to include in the regression in Equation (2.1) and so, it forms part of the error term. That is, $\epsilon_{Ii} = \delta_I \xi_i + \phi_{Ii}$; where ξ_i is our measure of colonial institutions and ϕ_{Ii} is a measure of other factors encompassed in the error term, ϵ_{Ii}, from Equation (2.1). In addition, it may be plausibly argued that colonial institutions are also determined by colonial labour supply (S). This would suggest that $corr(\epsilon_{Ii} \neq 0)$ and thus we have a form of endogeneity in the regression described by Equation (2.1) which would lead to

bias estimates. This relationship can be specified as follows:

$$\xi_i = \alpha_\xi + \beta_\xi S_i + \mathbf{X}'_i\gamma_\xi + \omega_{\xi i} \tag{2.2}$$

where $\mathbf{X}'_i\gamma_\xi$ is a vector of covariates and ω is an error term. To see this, consider the response of the planter elite to the labour shortages as we described in Section 2.3. Furthermore, while the labour problem helped determine the types of colonial institutions, it may be plausibly argued that colonial labour supply was also determined by colonial institutions, resulting in the simultaneous determination of ξ and S (see Figure 2.2). The evidence for this argument can be seen in the outcomes of conflicts, institutions of forced labour, and policies which facilitated expropriation of land from former slaves so as to force them into plantation labour and thus increase the labour supply, as highlighted in Tables 2.2, 2.3, and 2.4.

Let us represent the square nodes in Figure 2.2 with the following symbols: ξ for early institutions, C for conflict, P for policy interventions, and S for colonial labour supply. We expect some form of simultaneity might exist in the relationships between these factors. First, consider the relationship between ξ and C, it is entirely plausible that while the intensity of conflict during colonial period led to poorer institutional outcomes, the quality of these institutions also played role in the reproducing conflict during the period. Our discussions in Section 2.3 point to the responses of the labouring class to the legal system and its institutions as well as responses to the institution of labour indentureship. This means that while the relationship may run from conflict to institutions ($C \to \xi$), it may also run from institutions to conflict($\xi \to C$). The same goes for conflict and policy interventions. As we have highlighted in Tables 2.2 and 2.3, the many policy interventions of the planter government to increase labour supply was met by revolts and other conflicts ($P \to C$), but these policy interventions themselves were in some cases also a response to the conflict that the planters faced ($C \to P$). Finally, the relationship between labour supply and colonial-era policy interventions may also be simultaneous in the sense that, while the planters who faced labour problems were motivated to implement various policies to help curb it ($S \to P$), the nature of policies implemented may also attract or repel labour. This suggests that the reverse relation is also possible ($P \to S$). One such example is how the immigration policy, mentioned in Section 2.3, increased the labour supply which, once increased, may cause adjustments to the level of repression.

In the presences of the omitted variables and simultaneity described in this section, regression estimates may be biased. We provide a mathematical description of the omitted variable bias (OVB) in the 4 appendix. The presence of both this form of endogeneity and simultaneity would mean that simply including measures of early institutions in the regression in Equation (2.1) would not work to reduce the bias. Instead we use an instrumental variable approach to correct for both simultaneity and OVB. Through this method, we can isolate variations in colonial labour supply across the sugar colonies which are independent of early institutions and use this as a regressor in a two stage least square regression of current institutions on colonial labour supply. Three requirements must be satisfied under this approach (Angrist and Pischke, 2008). First, the

instrument (which we shall denote as Z) must be as good as randomly assigned. Second, it must satisfy the exclusion restriction. That is, it must not have a direct effect on the dependent variable except through its relationship with the instrumented variable. Third, there must exist a first stage relationship between the instrumented variable and the instrument. A suitable instrument would eliminate the correlation with the error term in Equation (2.1) and reduce the bias ($\kappa_I \rho$ as highlighted in the appendix to this chapter) to zero, resulting in $\mathbb{E}(\hat{\beta}_I) = \beta_I$. Thus we would have unbiased estimates.

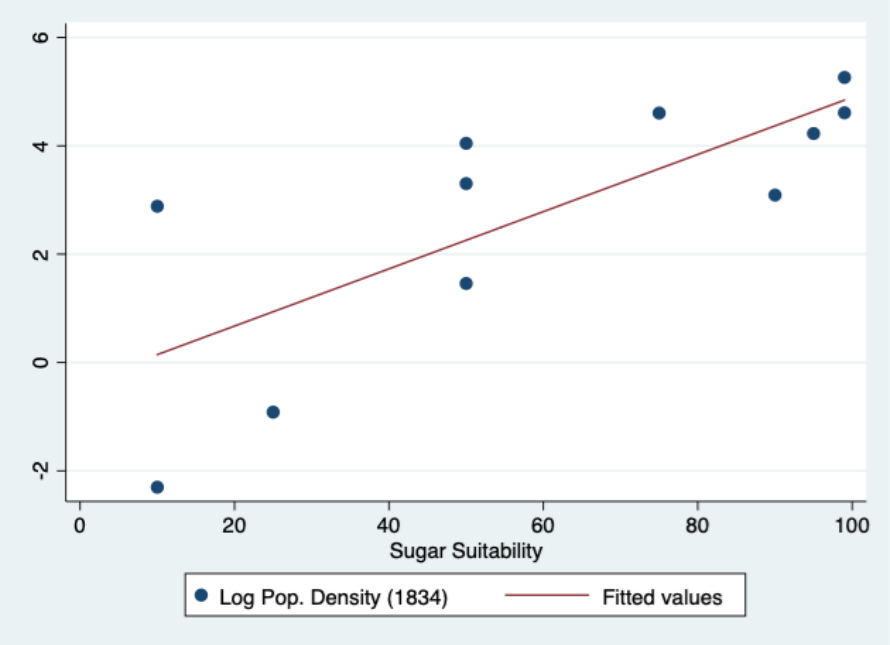
The Instrument (Z)

One such instrument is the soil suitability for sugar in the West Indies. What makes sugar suitability a potentially suitable instrument is first and foremost the fact that it is completely exogenous. More specifically, soil suitability is determined by agro-climatic factors and so is not endogenous to any of the variables highlighted in the above regressions, as such, it satisfies the requirement that the instrument be as good as randomly assigned. What motivates our use of sugar suitability as an instrument is that we suspect it shares the necessary first stage relationship as highlighted above. More specifically, we expect that the higher the fraction of a country's total arable land that is highly-suited for sugar production, the higher the concentration of slaves introduced per square kilometre of land during the slave trade. Thus, we expect that there exists a positive first stage relationship between the percentage of land highly suited for sugar production and our measure of labour supply (population density in 1834, at the end of slavery). A casual look at the plot in Figure 2.6 indicates this strong positive relationship. We can test this relationship directly but we first explain the construction of our sugar suitability variable.

Data for this variable was acquired with the help of the authors of Dippel et al. (2015) who use both climatic and soil data to classify soil suitability at a very fine spatial resolution (which is not typical of standard databases). The approach divides the territories into 604 square metre cells and assess the suitability of each cell for sugar cultivation. The authors use six factors well documented to be important for sugar production to classify sugar suitability: temperature, rainfall, elevation, soil pH, slope, and soil texture. Weights are then assigned to each factor according to the specifications constructed in Jayasinghe and Yoshida (2010) to aggregate the factors into an index score for each cell of land. Within each cell, they classify each factor into four bins, each bin reflecting one of: highly suitable, moderately suitable, moderately unsuitable and highly unsuitable. An example of the classification can be made with the rainfall, according to the authors, "rainfall in the ranges of 950–1100 or 1500–1990 is moderately suitable for sugar cane, rainfall in the ranges of 800-950 or 1990–2500 is moderately unsuitable for sugar cane, and rainfall in the ranges below 800 or above 2500 is highly unsuitable for sugar cane" (Dippel et al., 2015, p.29). A full description of the methodology to generate the sugar suitability data can be retrieved from their paper. Using this data, our sugar suitability variable measures the proportion of the cells for each country that is highly suitable for sugar cane according to this index.

Our two-stage instrumental variable regression is, therefore, described by what fol-

Figure 2.6: Sugar Suitability and Colonial Population Density



Source: Sugar Suitability data from Dippel et al. (2015) and Pop. Density from Higman (1995).

lows.
The First Stage: the regression of colonial labour supply on the proportion of land highly suitable for sugar.

$$S_i = \mu_S + \lambda_S Z_i + \nu_{Si} \tag{2.3}$$

The Second Stage: is the structural equation which uses the first stage to regress our measure of institutions today (I) on instrumented colonial labour supply.

$$I_i = \mu_I + \lambda_I S_i + \mathbf{X'}_i \theta_I + \nu_{Ii} \tag{2.4}$$

The exclusion restriction implied by our instrumental variable approach is that, conditional on the other explanatory variables included in the regression, the share of total land highly suitable for sugar has no significant direct effect on the quality of institutions today, other than through its effect on colonial labour supply. To the extent that sugar cultivation determined whether (and how many) slaves were imported to the territories, and the fact that sugar was only significant as a colonial-era crop and has not been a major crop in the West Indies for most of the 20th century, we have no major concerns around the exclusion restriction. We think it reasonable to argue that the effect of sugar suitability on present day institutions plausibly goes through what it meant for labour supply in the colonial period and the colonial institutions which developed to control it in the post-emancipation period. We present the results of the two stage least square estimation in Table 2.6.

Results: Two Stage Least Square Regression

Table 2.6: Instrumental Variable Reg. of Institutions on Colonial Labour Supply

	Panel A: Two Stage Least Square Dependent Variable					
	Government Effectiveness	Regulatory Quality	Rule of Law	Control of Corruption	Voice & Accountability	Political Stability
Log Pop. Density (1834)	0.174***	0.169***	0.212***	0.268***	0.087**	0.172***
	(0.042)	(0.024)	(0.065)	(0.070)	(0.040)	(0.063)
% of Slaves on holdings >200	-0.011*	-0.014***	-0.015	-0.019*	-0.014**	-0.014
	(0.006)	(0.004)	(0.010)	(0.010)	(0.006)	(0.009)
Constant	0.205	0.171	0.143	0.182	0.883***	0.362
	(0.159)	(0.092)	(0.246)	(0.264)	(0.152)	(0.237)
R-square	0.73	0.89	0.62	0.65	0.56	0.59

Panel B: First Stage for Log. Population Density (1834)			
% of Land Highly Sugar Suitable	% of Slaves on holdings >200	Constant	R-square
0.051**	0.0311	-0.93	0.50
(0.015)	(0.046)	(1.34)	

Notes $N = 11$ for all regressions. The sample consist of 11 former British West Indian territories. A full list of the countries is presented in Table B10 in the appendix. All regressions are estimated as cross-sectional two stage least square regressions and include a control for population change between 1838 and 1900. Robust standard errors are in parentheses. The measures of institutional quality are the mean scores (1996-2013) of governance indicators obtained from the World Bank's World Governance Indicators. A higher score indicates better quality institutions. Sugar suitability data is from Dippel et al. (2015) and slave holding data is from Nunn (2008). * $p < .10$, ** $p < .05$, *** $p < .01$. In addition, with only one instrument for one endogenous regressor (log. pop density), the model is exactly identified (that is, k instruments for k endogenous regressors).

Panel A of Table 2.6 reports the two stage least square estimation of institutions today on colonial labour supply as measured by the log of colonial population density (Equation (2.4)). As with the OLS estimates, we use several different indicators of current institutions to check that the relationship is robust to different measures of institutions. The estimation of the first stage relationship (Equation (2.3)) is presented in Panel B. The coefficient of interest in Panel B is that on % of land highly suitable for sugar (λ_S from Equation (2.3)). The coefficient is 0.051, positive and significant at the 5 percent level, indicating a strong first stage relationship as required for the instrumental variable regression.[18] Indeed, the positive sign confirms our reasoning from the previous subsection where we hypothesised a positive relationship between sugar suitability and colonial population density.

[18]Hall et al. (1996) found that, in search of a strong instrument, it is not enough that the F-statistic is significant at the typical 5-percent or 10-percent level. Instead, as recommended by Stock et al. (2002), the F-statistic on the instrument should also exceed 10. We test our instrument using the *estat firststage* command developed for this purpose. The F-statistic on our instrument is 11.56 and significant at the 1-percent level ($Prob > F$: 0.0073), and therefore meets the threshold for a strong instrument, as proposed by Stock et al. (2002).

The resulting second stage regressions in Panel A all confirm the nature of the relationship between colonial labour supply and current institutions. In each of these regressions we include a control for the scale of plantation slavery (as this was significant in some of the OLS regressions) to ensure that our measure of colonial labour supply is not simply acting as a proxy for the effect of large scale plantation slavery on institutions today. The results reaffirm the conclusions made from the OLS regressions. No matter which measures of institutions used, the instrumental variable regression reports a positive and highly significant relationship between the measure of institutions and log colonial population density in 1834. In the first of these regressions, our measure of institutions (I in Equation (2.4)) is Government Effectiveness. The coefficient on our measure of colonial labour supply (λ_I form Equation (2.4)) is 0.172 and significant at the 1-percent level. This suggests that greater labour supply in the colonial period is associated with better quality of institutions today. When we use Regulatory Quality as our measure of institutions, the result is similar with a positive and highly significant coefficient of 0.169. In fact the same can be said for Rule of Law (where λ_I is 0.212), Control of Corruption ($\lambda_I = 0.268$), and Political Stability ($\lambda_I = 0.172$). The measure of the present day institutions with the weakest relationship to colonial labour supply is Voice and Accountability but it remains positive and strongly significant (at the 5-percent level). The significance of our control for the scale of plantation slavery varies with our choice of measure but retains the negative relationship that we observed from the OLS estimates. Including different control variables for the size of slave holdings and a control for current income (as we did in the OLS regressions) does not change our results.[19] The coefficients are, in some cases, smaller (though not significantly) than that obtained from the OLS regressions, indicating that our fear of positive bias resulting from the proposed simultaneity between colonial labour supply and early institutions, which are both important for institutions today, may have been well-founded. Nevertheless, the qualitative results for our several measures of institutions from both the OLS and IV regressions, support the idea that greater colonial population density (our measure of colonial labour supply) is associated with a significantly higher levels of institutional quality in the West Indies today.

Post-Colonial Social and Economic Development

We have seen compelling evidence of the role of colonial labour supply as a determinant of institutions in the former British West Indies today. In this subsection, we turn our focus to the economic and social outcomes of the former sugar colonies, comparing the high colonial labour supply colonies of Antigua, Barbados, and Saint Kitts to the low colonial labour supply territories of Jamaica and Guyana in the post-colonial period. Data on selected indicators are available in Table 2.7.

A cursory glance at the data reveals an obvious pattern; colonies with higher population density during the colonial period seem to enjoy significantly better socio-economic

[19] Current income was not significant in any of our IV regressions. A control for population change between 1838 and 1900 is included in the regressions and its coefficient in each regression is $0.03, 0.08, 0.05, 0.11, 0.03$, and 0.006, respectively, and never significant.

Table 2.7: Selected Social and Economic Indicators

	Country	GDP per Capita 2014 (PPP)	Avg. GDP per Capita Growth Rate 1960-2014	Debt to GDP 2014 (%)	Foreign Direct Invest. (2014) (% GDP)	Labour Force Participation (2014)	Life Expectancy (2014)	Literacy Rate (2014)	Homicide Rate (Avg.) 1995-2014	HDI Rank (2014)
Low Pop. Density	Jamaica	8053	0.00	132	4.2	63	76	88	44	96
	Guyana	6892	1.35	51.2	7.7	61	66	88	17	121
High Pop. Density	Barbados	15297	2.28	100.4	11.2	71	75	99.7	9	59
	Antigua	19521	4.08	102.1	12.7	77.1	76	99	10	61
	St. Kitts	15021	3.46	79.8	13.9	77	76	98.7	25	73

Source: Penn World Tables (PWT 8.0) and the World Bank.

outcomes, on average. Jamaica's and Guyana's levels of GDP per capita are significantly lower than that of high colonial population density colonies. Furthermore, the two low colonial labour supply colonies experienced a lower average growth rate over the post-colonial period. As of 2014, the high colonial population density former colonies enjoyed significantly higher foreign direct investment, with Saint Kitts recording FDI of 14 percent of GDP, while Jamaica received the lowest at 4.2 percent. The areas of literacy, violence and human development show similar patterns. While Barbados (99.7), Antigua (99) and Saint Kitts (98.7) record near 100 percent literacy among its adult population, Jamaica (88) and Guyana (88) trail behind their Caribbean counterparts. Jamaica (44) recorded the highest yearly average homicides per 100,000 persons over the period 1995 to 2014, while Antigua and Barbados showed the familiar patterns of peace and social cohesion that they enjoyed during the colonial period, with an average of 10 murders per 100,000 persons per year over the same period.

The divergence in these social and economic outcomes between our two groups of former colonies remains consistent with that observed throughout the colonial period. In Chapter 1, we showed instances of economic repression as far as public goods provision was concerned. At this point we should note that, interestingly, the increase in public expenditure after the intervention in Jamaica in 1866 though significant, still saw Jamaica lagging behind the labour-rich colonies. See Figure A1 in the appendix. The disparity in the trends of public investment in education and health in Jamaica, compared with Antigua and Barbados, were fairly apparent. We do not have a full data series for St. Kitts but data points for health and expenditure shares at the end of each decade from 1860 to 1900 were 9, 17, 11, 17, 15, and 10, respectively, and higher than Jamaica's in each of those periods.[20] Today, for almost every socio-economic indicator, the low colonial population density territories fared worse than the high, just as they did during the colonial period. These observations, along with the empirical results, form the basis of our argument that responses to the labour problem during the colonial period fostered the development of institutions that have perpetuated the old traditions of violence and resistance, and labour and economic repression in those former colonies.

[20]Note that Figure A1 only uses the health and education expenditure shares for this comparison as we did not have consistent time series data for infrastructure spending for all colonies, whereas Figure 1.3 includes infrastructure shares for Jamaica.

Table 2.8: 3SLS Regression of Income on Institutions

	Coefficient	Standard Error	z-Statistic	R-square
Log GDP per Capita (2013)				0.39
Government Effectiveness	1.258***	0.472	2.66	
Constant	8.445***	0.237	35.51	
Government Effectiveness				0.65
Log Pop. Density	0.157***	0.045	3.45	
Constant	-0.008	0.147	-0.06	
Log Pop. Density				0.57
Sugar Suitability	0.053***	0.0137	3.83	
Constant	-0.382	0.9367	-0.41	
Observations				11

Notes $N = 11$. The sample consist of 11 former British West Indian territories. A full list of the countries is presented in Table B10 in the appendix. The regression is estimated as cross-sectional three-stage least square. The measure of Government Effectiveness is the mean score (1996-2013) of governance indicators obtained from the World Bank's World Governance Indicators. A higher score indicates better quality institutions. Sugar suitability data is from Dippel et al. (2015). * $p < .10$, ** $p < .05$, *** $p < .01$.

We more formally test the effect of the colonial labour problem on economic outcomes today using a three-stage least square instrumental variable regression (3SLS). Again, the sample size here is extremely small as we are studying a small region, so caution must be exercised in interpreting the results beyond the context of the West Indies, or as anything but simply indicative. Our 3SLS regression involves regressing country level income observed in the West Indies today on the quality of institutions which is instrumented by colonial labour supply which is itself instrumented by sugar suitability, as described in the sections above. The measure of institutional quality chosen for this exercise is government effectiveness as we feel this measure best captures the broad institutional functions necessary for development. Results with other measures are qualitatively the same. The results are presented in Table 2.8.

The results accord with our theory. The channel running from colonial labour availability to economic performance today appears to be relatively strong. Each of the three panels in Table 2.8 show a stage of the three-stage least square regression. The top panel is the third stage and is of main interest. It presents the regression of instrumented measure of institutions (Government Effectiveness score) on cross-country per capita income. The relationship is positive and significant at the 1-percent level. Specifically, an increase in the index score of 0.01 is associated with approximately 1.23 percent higher income per capita today.[21] In the second and third panels, the relationships being estimated are the second and first stages and they are as expected, with a positive and significant relationship between government effectiveness and colonial labour supply, and a positive and significant first stage relationship between sugar suitability and population density in 1834. Though the small sample and limited data mean that we cannot hold these results up as definitive, we nonetheless think that it does add relevant evidence to our theory that the colonial labour problems and the resulting effects on institutions have persisted. These colonial factors continue to affect the development of these territories today.

2.5 Further Discussion

2.5.1 On Path Dependence

History matters. Many economic phenomena are at least in part determined by historical forces under which their earliest incarnations developed. The work presented in this thesis recognises that. The history of the West Indies is still consequential for economic development today. By examining the role that post-emancipation labour problems have played in the development of institutions, we show that the paths that these former colonial territories were set upon, as institutions developed to respond to these problems, continue to be determined by the historical factors that shaped the choice of institutions, through which historical relationships persist. The economic literature has for a long time recognised this and, more specifically, work on path dependence has shed light on the role of history in explaining outcomes for which neoclassical approaches have struggled to account.

Some of the earliest and most influential work on path dependence was produced by Arthur (1989) who, in this hugely significant paper, describes path dependency as a situation in which a small event in history determines the path of a system. Using a simple model of competing technologies under constant, increasing, and decreasing returns, the author shows that even a historically insignificant event may result in an early advantage for a particular choice. This early advantage may prove critical to the eventual outcome in the market for these technologies when there exists increasing returns to adoption of these technologies. Describing the dynamics of this process, Arthur (1989, p.117) writes,

[21] This may seem quite large, but it is not implausible as our data on Government Effectiveness ranges from -0.27 to 1.41. Thus, an increase of 0.01 represents a significant change in a country's Government Effectiveness score.

"once an outcome (a dominant technology) begins to emerge it becomes progressively more 'locked in'; and non-ergodicity in that historical 'small events' are not averaged away and 'forgotten' by the dynamics - they may decide the outcome." This, he continues on to say, explains why an "economy might become locked-in by 'historical events' to the monopoly of an inferior technology." This happens because, in the presence of increasing returns, once a choice to adopt a particular technology is made, there are ever increasing benefits to the continued adoption of the technology which leads to the exclusion of other technologies which may in fact have been superior, but by some small and insignificant event suffered in the early stages of adoption. Because of increasing returns to adoption, there exist a positive feedback loop in the sense that adoption begets further adoption of a particular technology leading to the exclusion of competing technologies. When the initial choice of the adoption is affected by some small and insignificant event, path dependency occurs in that this has set the system on path to which it becomes increasingly locked-in. An example of this, cited by Arthur (1989, p.126), is the QWERTY keyboard; an incidence of path dependence studied in David et al. (1975).

The form of path dependence highlighted by Arthur (1989) applies beyond just technologies but also to the choice of policies and the institutions within which they are set. It is in this sense that Arthur's work applies to our study of the British West Indies. We can explain the present day procedural institutional framework of the labour-rich and labour-scarce sugar colonies as the outcome of the historical choice of both the planters and the labourers. Consider the labour-scarce colonies; the planters, facing an acute labour problem, conducted heavy intervention in the labour market, utilising coercion to extract surpluses from the labouring class. Such intervention required sunk costs from investment in law and legal systems, policing and political frameworks designed to repress the population. Once these means were adopted and costs sank, there existed increasing returns to protecting this system of extraction and coercive policies. There were persistent gains to making additional small investments to protect this regime rather than suffer the significant loses that its collapse would inflict. Thus, these institutions persisted and the institutional and economic path became locked-in. The choice of responses of the labouring class also contributed to this path. Refusing to work on the plantations, and open and violent rebellion to the efforts of the planters to force them to do otherwise, once adopted, became an institution in its own right. It played out in the fiercely antagonistic relationship between labour unions and capitalists. In Chapter 4, we explore this issue and argue that, owing to the history between these two groups, trust had been lost and compromise is shunned as potential loss of hard-fought gains against a history of oppression. Sub-optimal policies are, therefore, likely to be followed as the historical adoption of an oppositionist stance has produced gains which compromise may threaten, even when such compromises may result in a more efficient outcome. Such is the impact of path determining historical events as described by David (1994).

According to David (1994, p.205), "history matters so vitally to the form and functioning of human organizations and institutions," and the "functioning of organizations and institutions, including many legal institutions, [act] as 'carriers of history'." To ex-

plain the role of path dependence in economic phenomena, David (1994) identifies three key features of a path dependent system. The first concerns the role of history in the forming of structures of what he terms 'mutually consistent expectations' which facilitate the coordination of the actions of agents without the need for centralised direction. These mutually consistent expectations allow for the development of a system which perpetuates a course of action which becomes know as a convention. Furthermore, according to (David, 1994, p.210), "shared historical experiences and conscious perceptions of a shared past provide one of the principal means by which groups of people justifiably may form a system of consistent mutual expectations." In this way, behaviour becomes institutionalised. These institution are based on historical experiences and ,in turn, institutions carry these historical experiences forward, allowing history to affect present day economic outcomes. In the case of the British West Indies, this is self-evident. Territories with historically higher levels of government repression, conflict and labour coercion are less politically stable, as is evident from Table 2.6. Collective responses to government action are often more fierce and come from mistrust owing to the historical experience. Government is thus less effective, creating space for rent-seeking behaviour and the erosion of regulatory quality and with it, accountability. Deviation from this path is difficult as history has made the human organisations that reproduce the behaviours which lead to these outcomes into convention — a form of sunk organisational capital (David's second feature). The system thus becomes self-reinforcing, forming a cluster of interrelated and complementary institutions that lock-in a particular path (David's third feature).

This 'locked-in' state need not be inefficient, as pointed out by Liebowitz and Margolis (1995) who identify three degrees of path dependence. According to Liebowitz and Margolis (1995, p.210), a "process exhibits path dependence if an action a_o from the set A_o taken at some time t_o affects the set of choices A_n that are available at some later time t_n." In the first degree, the action is not inefficient. In second degree path dependence, the action seems *ex-ante* efficient, but is at some time $t > t_o$ shown to have been inefficient. Finally, under third degree path dependence, an action is seen to be *ex-ante* inefficient but is chosen anyway. Liebowitz's and Margolis's insight is useful for explaining the case of the institutional outcomes observed in the West Indies. The responses of the planters and ex-slaves to emancipation in the labour-rich colonies can be seen to have set these territories along a first degree dependent path in the sense that they allowed an amicable economic and social relationship to develop between the two, facilitating a rather stable transition from slave economy to free society with the majority black population inheriting comparatively high quality institutions from the white planter elite. This is identified by Patterson (2013, p.1) who explains that Barbados "during the colonial period acquired far greater learning of the procedural knowledge of effectively running institutions. Geography, ruthless elite manoeuvring, and the counter-hegemonic strategy of appropriating the institutions and culture of the white elite by Afro-Barbadians, resulted in an efficient pre-independence system institutionally attuned to the challenges of development." Jamaica (for example), on the other hand, being a labour-scare colony, the response of the planters may be argued to have set the country

upon a path which resembles Liebowitz's and Margolis's third degree path dependence. In this case, policy choices coming out of an institutional framework which developed under the conditions highlighted above are known to be inefficient but historical factors, including the nature of relationships between the legal system, government and the citizenry, preclude the choice of a more efficient alternative policy.

More recent work by Acemoglu et al. (2001) has applied the concept of path dependence to cross country difference in economic development. The argument presented in this work revolves around the idea that current institutions affect future institutions as they shape the nature and likelihood of future institutional change. In this way, this paper and other works by Acemoglu and Robinson (2000) and Acemoglu (2008) looks beyond simple lock-in effects and consider persistence in path dependence. This view helps to explain why, even though the West Indian territories are on a path that is dependent on their historical experience, we observe small and gradual institutional changes (what the authors call 'institutional drift'), but these changes still carry with them the legacies of previous institutional arrangements which are readopted in various forms. So while, in the former British West Indian colonies, white planters no longer monopolise political power and forced labour has been abolished, the institutional conventions that they spurred, especially the manipulation of governmental power towards corrupt ends, is still evident. Of this, Jamaica's and Guyana's low Government Effectiveness, Corruption Control and Accountability scores, relative to those of Antigua, Saint Kitts, and Barbados (see Figures 2.4e, 2.4b, and 2.4c), are indicative. It is in thise sense that the themes explored in Chapter 1 of this thesis carry over to Chapter 2, where we see the impact of these historical relationships on institutions today.

2.5.2 Conclusion

There are few papers that examine the economic divergence among the former British West Indian colonies. Of these papers, one of the most notable, Henry and Miller (2009), has attributed the significantly poorer performance of Guyana and Jamaica to poor economic policy. Others, such as DaCosta (2007), give a greater role to poor institutional development and unstable political relations which led to destructive, counter-productive governance and the collapse of the rule of law. This work bridges the divide between the two points of view by tracing the historical development of the West Indies. We posit that colonial labour availability was a key determinant of the economic and social development of the West Indies. Where population density was high, there was little to be gained through oppression or rebellion, and thus, industrial relations were comparatively more amicable which led to more stable economic, social and political institutions, out of which more progressive economic and social policy emerged. The theory developed in this paper presents a framework within which we have tested our hypothesis and examined its implications by studying the case of the main five British West Indian sugar colonies. The empirical analysis relies on both OLS and instrumental variable regressions to ensure robustness. Our findings, supported by the historical and empirical data, suggest that economic and social outcomes today reflect the broad patterns developed during the colonial period.

This chapter identifies several channels through which colonial factors have persisted and ultimately influenced the development of those societies in the post-colonial period. The historical evidence has been shown to support the idea that labour institutions today carry the legacy of (and resistance to) labour repression and exploitation. In societies where the labour problem was most pronounced, this has led to continually poor labour relations and instability. Similarly, institutions of property rights, particularly land tenure institutions, have continued to perpetuate the narrow ownership of land which was developed by, and was particularly useful to, planters in colonies with poor labour supply. This inequality in the distribution of land has continued to suppress development prospects and credit markets, making the development of small scale enterprise difficult. The law and legal systems have also persisted from the colonial period of exploitation. This is particularly problematic in territories where the legal system was specifically geared towards repression and exploitation. The responses to these repressive efforts have historically been violent and rebellious, still a feature of society today, and further add to the instability and lack of social cohesion in former plantation societies.

We have seen that no matter which measure of institutional quality we consider, former British West Indian territories with more available labour during the colonial period have developed better quality institutions in the post-colonial period. This implies that efforts to improve the quality of institutions and economic outcomes must identify the features of institutions today which do not act to enhance the social and economic possibilities of society, but are instead remnants of the capital-labour conflict of the colonial period. Efforts must then be made to rectify those institutional anachronisms in order to better enable economic prosperity.

Chapter 3

Literature Survey: Colonial Labour in the African Colonies

3.1 Introduction

In the previous chapters we focused on the relationship between colonial labour availability and the development of labour relations and the structure of labour institutions in the West Indies. There are, however, similar instances of such a relationship among other former colonies. In particular, the literature on the former African colonies reveals that efforts to expand the supply of cheap labour were conducted through remarkably similar practices as we have seen in the West Indies.[1] Invariably, these efforts included the use of taxation, legislation around land and movement of people, exploitative contracts and forced labour. In this chapter we survey the literature on the African colonies and show how, there too, the themes around colonial labour availability and labour repression and exploitation marred the development of labour relations. Many of these studies concern the settler economies and explore the antagonism between native peasants and European settlers engaged in production in the capitalist sector. They provide a systematic analysis of the development of this relationship and aide our understanding of the motivations underlying some of the practices that we have previously explored.

The first of these works is that of Arrighi (1970). Arrighi (1970) highlights the limits of the application of the Lewis (1954) model in terms of explaining the development of the capitalist sector in Rhodesia. He rejects wholesale application of the Lewis Model by Barber (1961) to Rhodesia, and shows that, far from market forces predominating in the siphoning of labour from the traditional sector to the capitalist sector, extra-market forces were employed by the capitalists during a period of what he terms 'capital accumulation' to widen the productivity gap between the two sectors. In so doing, he

[1] Much of the focus in the literature on the Asian colonies revolves around land revenue generation and thus, examinations of issues involving government intervention into the labour market to cheapen supply are often assessed only as an aside to colonial policy around land matters. Cases of labour supply intervention in Asia can be found in Kumar (1962), Bose et al. (1993) and Sen (2002), but do not warrant a full section of review for our purpose.

provides a very effective analysis of the extra-market forces at play in the Rhodesian case, many of which resemble those we highlighted in the development of labour institutions in the West Indies. He does not dismiss the validity of the Lewis Model entirely, but rather shows that once this process of capitalist accumulation had successfully taken place to sufficiently disadvantage the traditional sector, the market mechanism identified in Lewis (1954) predominates. This was the case for a period of two decades (1920s to mid-1940s) in Rhodesia, according to Arrighi (1970).

The second piece of literature we review in this chapter is Wilson (1972). Wilson's work represents an outstanding contribution to the explanation of the social and economic factors which resulted in the incredible growth of annual real earnings (69 percent) of whites in contrast to a fall of 1 percent in the earnings of blacks in the South African Gold mines between 1911 and 1969. For the purpose of our work, Dr Wilson's Chapter Four on the testitSupply and Demand for labour in the gold mines is particularly relevant. In it, Wilson (1972) explores the fundamental drivers of labour supply and demand, ranging from the political mechanisms utilised by a colluding group of mine owners, the role of white trade unions, and the economic forces driving the natives to and away from the mines, among other factors. Wilson (1972) also provides some empirical support for his arguments which only strengthen with his methodical approach to the analysis.

We follow the review of Wilson (1972) with a look at the work of Van Onselen (1976), which stands as one of the most significant pieces of work on forced labour in Rhodesia. Van Onselen (1976) discusses the process of labour mobilization in the context of the regional economic system within which the Rhodesian mines were operating. Indeed the Rhodesian mines were in competition for labour with those in South Africa which were offering higher wages. Van Onselen (1976) gives an account (more so than the previous two pieces of literature) of the various extra-market methods employed by mine-owners to tilt labour supply in their favour without raising the wages of workers. The work of the Rhodesian Native Labour Bureau, the corruption of Native Labour Commissioners, and predatory credit systems were just a few examples of the manipulative means through which the mining interest sought to expand their supply of cheap labour. Several of the techniques bare resemblance to the strategies employed in the West Indies and Van Onselen's exposition of these methods in colonial Rhodesia offers strong support for the systematic nature of these extra-market operations as we have described them in earlier chapters on the plantation colonies of the West Indies.

While most of the work on the development of Africa at the time was being conducted under the the umbrella of underdevelopment theory, Mosley (1983) questioned this prevailing theory, highlighting the deficiencies in these approaches in terms of the logic of the arguments presented and how they square with the empirical data. This thesis is the fourth piece of literature we review in this chapter. While the work presents an effective critique of underdevelopment theory more broadly, the aspect of Mosley's 1983 work which is most relevant to our present work is the careful observation that, while the extra-market operations conducted by the Rhodesian and Kenyan settler farmers did indeed cheapen and expand an otherwise reluctant labour supply, there is in fact

a reverse relationship running from economic factors to political forces. His analysis rightly forces us to consider the interplay between these two forces more carefully, as the nature of this relationships carries interesting repercussions for our understanding of the extent and implications of political intervention into markets.

This chapter concludes with two pieces of work by Robert Bates: Bates (1981) and Bates (1987). Bates (1981) presents a remarkable exposition of the extent and motivations of government intervention in agricultural markets. This work, more than any other, provides a detailed analysis of the operations of the sates in these markets, paying special attention to one of the key institutions affecting the peasant economy, marketing boards. Bates (1981) carefully analyses government intervention as it pertains to policies towards cash crops for export, the political dynamics of pricing policies in the food sector, and the use of non-pricing strategies in the same. He shows that efforts to protect the emerging sector from competition and revenue generation motives of the political class ultimately determine policies in these three areas to the detriment of the peasant farmer. Bates (1987) extends the scope of his previous work to consider both the colonial and post-colonial periods, bringing into focus the evolution of African societies across these two periods. His third essay in the collection is most relevant to our present study.[2]. In it, Bates (1987) examines the implications of the contrasting policies in Ghana and Kenya and explores the role of the nature of competition between peasant farming and other more commercial interest in the determination of policy. This work shows how state policy sought to allocate the benefits of production to special interest by redistributing resources away from indigenous interests.

3.2 Arrighi (1970): Rhodesia

In his seminal work on political intervention in the labour market of Rhodesia, Arrighi (1970) presents a compelling account of the development of wage labour in the African state. In his paper, Arrighi (1970) accomplishes the twin goals of providing an effective critique of the Barber (1961) and Lewis (1954) representation of the development of an African workforce and providing an alternative theoretical explanation. According to Arrighi (1970), the *a priori* assumptions of Barber (1961) callously misrepresented African countries as existing in a original state of underdevelopment which, by the model proposed in Lewis (1954), is gradually subsumed into the the capitalist sector as the process of industrialization siphons labour away from the traditional subsistence economy. Arrighi (1970) challenges this view, taking issues with several of the assumptions made by Barber (1961). Contrary to Barber's (1961) insistence that African states, up to the 1940s, experienced excess supplies of labour, Arrighi (1970) argues that in these countries the onset of capitalist development coincided with a state of labour scarcity. This meant that in order to attract workers into the capitalist sector, high wages needed to be paid to the indigenous workers, a cost that the capitalist sector was not prepared to incur.

[2]The essay is titled *Pressure groups, public policy, and agricultural development: a study of divergent outcomes.*

According to Arrighi (1970), the African peasants allocated their labour-time taking into consideration the effort-price of their decisions. More specifically, they weighed the respective effort-price of engaging in agricultural production to that of engagement in wage employment. Where the effort-price of peasant production was lower, they allocated their labour-time to agriculture and shunned wage employment. This observation by Arrighi (1970) disputes another of the claims in Barber (1961); the idea that Africans did not at first respond to opportunities in wage employment because of unfamiliarity with income improving opportunities. Using data on the cost of living index and African participation rates for Rhodesia between 1904 and 1943, Arrighi (1970) demonstrates that Africans, in several periods, altered the composition of their labour-time when so incentivised by the wage offerings on the labour market. The true reason for the low participation rates in wage labour overall, he concluded, must, therefore, lie in the discretionary nature of African participation in wage employment and the unfavourable comparison between the effort-price of this participation to that of income earnable from peasant farming.

These two factors (the discretionary character of wage employment and the relative effort-prices) meant that there did not exist a market clearing wage which allowed the capitalist sector to be profitable. Consequently, according to Arrighi (1970, p.184), "changes in wages were no longer to be the equilibrating factor in the labour market, political mechanisms became of crucial importance in closing the gaps between supply and demand for labour." The Barber (1961) and Lewis (1954) models, starting from a state of excess supply of labour and ignoring the political mechanisms at play up to the 1920s, thus, at best, provide an incomplete picture of the development of the African labour force. Here again, these political interventions are of similar mould to that seen in the British West Indies in Chapters 1 and 2. Arrighi (1970) notes several of these so-called extra-market operations in Rhodesia.

First, he identifies incidences of forced labour which he explains was widely utilized during the early days of settlement. This involved native commissioners and police engaging village chiefs and headsmen to enforce a policy that villagers were conscripted to supply work to Europeans at the minimum wage. This, in effect, eliminated the discretionary element of labour market participation as Africans had no choice in the matter. Arrighi (1970) found that much of the increases in labour supply 1908-1909 was due to this practice (as much as a 50 percent increase). In 1911, these practices were still in effect and help to significantly increase the participation rate of Africans in wage labour.

A second political mechanism identified by Arrighi (1970), in operation in the Rhodesian labour market was taxation. Again, this practice sought to make participation in the wage economy less discretionary by requiring money incomes that needed to be gained by payments from wage labour. Arrighi (1970) points out this intention by noting that payment in kind, which was traditionally accepted, were rejected for the hut tax of 10s in an effort to induce Africans into wage employment. The results of taxation as a political mechanism to drive Africans into wage labour were mixed, similar to that observed in the West Indies. Arrighi (1970) notes that taxation did not discriminate

between income from peasant production and income from wage labour and so, facing higher taxes, peasants in areas where land was abundant intensified or expanded their production of produce to generate the funds needed to pay taxes. This necessitated an increase in labour-time devoted to peasant cultivation and, in these areas, had the unintended consequence of reducing participation in wage employment.

To correct for this and alter the effort-price of participation in produce market for peasants land expropriation proved most fitting. According to Arrighi (1970, p.195), "by 1902 the African people had been expropriated from more than three-quarters of all land in the country." Such expropriation, and its consequences, proved a gradual process. Much like the practice that we have shown in the case of labour-scarce British West Indies, at first, peasants were allowed to stay on expropriated land in exchange for labour services. The reasons for allowing the Africans to initially remain on the land expropriated by Europeans is summed up by Arrighi (1970, p.608): "land was abundant and labour-scarce, so that land with no labour on it had little value." Hence the necessity for the semi-feudalistic relationship which developed from such a practice. Allowing Africans to remain on the land in exchange for labour time helped to reduce their level of discretion toward participating in wage labour in the capitalist sector. However, it had little effect on the relative effort-price of peasant production to wage employment. To affect this effort-price a take-off of European agriculture would be required. This would have the dual impact of supplying the capitalist sector with the required food surpluses and allow Europeans (no longer dependent on food surpluses from peasant farmers) to expel them from the land and therefore make wage labour (for Africans) less effort-costly relative to producing to market. Arrighi (1970) notes that such a take-off was not possible without state power being brought to bear upon the indigenous farmers.

After 1904, the state became even more directly instrumental in the strengthening of the competitive position of the European farmers. Arrighi (1970) cites the shifting of the tax burden to the African population and the fact that the composition of government expenditure had altered dramatically in favour of more public investments in European agriculture. Government assistance came in various forms. Two specifically highlighted by Arrighi (1970) were the introduction of a department of agriculture in 1903 and the establishment of central farms where European settlers could acquire knowledge and practices for local farming. Meanwhile, spending on indigenous agriculture remained negligible. As the competitive position of the European farmer strengthened, that of the African farmers weaken as the effort-price of participation in the produce market increased relative to wage labour. Still, according to Arrighi (1970), the government maintained strong support for the white farmers sponsoring grain development and engaging in state funded recruitment of extraterritorial Africans to labour on European farms. Figures from Arrighi (1970) indicate that the share of extraterritorial Africans in the labour force rose from below 50 percent in 1904 to 68 percent by 1922. These factors combined to cheapen the value of African labour and facilitate movement of Africans into reserves where land quality was poor, hastening the decline of indigenous agriculture in Rhodesia. What began as a state of excess land and discretion in terms of where

to supply their labour, by the late 1920s, had turned to a situation of labour shortage and a relatively high effort-price to participation in the produce market for Africans. According to Arrighi (1970), it was only after these conditions had become 'set-in' and an irreversible state for the indigenous people due to non-market mechanisms that the process described by Lewis (1954), in which by market operations the capitalist sector siphoned labour from the non-capitalist sector, became appropriate as a description of development of the labour force in Rhodesia.

3.3 Wilson (1972): South Africa

Wilson (1972), like that Arrighi (1970), also highlighted the presence of extra-market forces in the determination of the supply of labour in the South African gold mines. Wilson (1972) begins by identifying two major factors which influenced the supply of mine labour: recruiting organisations and the law. As far as recruiting was concerned, Wilson (1972, p.72) notes that "by widening the sources of supply, recruiting was clearly effective in holding down wages, particularly of blacks...". Relief from such wage repression should have come at the outbreak of increased competition for labour as other sectors began rapidly developing, and it did so for the white mine workers, but the aggressive response of labour recruiters who ventured further inland for cheap labour meant that the natives' wages remained low. While these factors may be argued to be market forces, Wilson (1972) uniquely identifies two types of African subsistence sector workers whose difference help explain the approaches to the extra-market activities of the Chamber of Mines.[3] The first type of worker makes a decision on whether to leave his rural peasant life behind based on whether his real earnings in the city are at least as large as that which he receives in the rural sector. Wilson (1972) likens this type of worker to that identified by Lewis (1954). The second type of worker is Wilson's migrant-labourer who works on the mines primarily to supplement the earnings which he receives from working land as a peasant farmer. For the first type of worker, efforts at cheapening the supply of labour need only focus on ensuring that the rural wage is kept as low as possible.

For the second type of worker (the migrant-labourer) "once employers have ensured that subsistence earnings are lower than the worker requires to meet all his needs it is in their interests not to allow the rural earnings to fall any lower" (Wilson, 1972, p.74). The idea here is that a wage lower than this would simply mean that the wage the migrant worker earns in the mining sector would need to be even greater. This is because the wider the gap, the higher the supplementary wage offered by the employer would need to be (or conversely, the smaller the gap, the smaller the supplementary wage can be). Interestingly, this realization motivated arguments by the employers' group against an increase in wages for migrant workers. According to Wilson (1972, p.74) "the Chamber opposed this on the grounds that, although mine wages were lower than what was generally agreed to be necessary minimum, they were in fact adequate because the Commission had, the Chamber maintained, underestimated the migrants income from land." Other arguments included the thought that if black workers were paid more, they would work less as they would quickly accumulate the supplementary funds that they needed. The more repressive efforts against the indigenous workers, however, according to Wilson (1972), came in the form of the comparatively repressive attitudes of government and the Chamber towards black unionization relative to white trade unions and influx control aided by the law.

Legislative power was regularly used to suppress black trade unions. Governments, aided by the power of white trade unions, were particularly prejudicial against black trade union activity. Wilson (1972) identified several instances where this prejudicial treatment

[3]The Chamber of Mines was founded in 1887 as mining industry employer organization.

was used to repress the wages of the indigenous Africans and ensure a steady supply of labour. One of the most significant ways, according to Wilson (1972) was the responses of government commissions to black trade union activity. One such response came in 1941 when demands for better wages and working conditions were met by a government decree explicitly outlawing all strikes by black workers under any circumstances. This was preceded by war regulation No.1425 which, according to Wilson (1972, p.78), "prohibited meetings of more than 20 persons of mine property without a permit." There existed a strong record of aggressive government repression of black workers with one example being the government's response to the 1946 strikes where "seventy men were dismissed, nine were killed and more than twelve hundred injured" (Wilson, 1972, p.79). Wilson (1972) concludes that these responses, along with the explicitly stated opposition to black trade unions represented the attitude of both prior and successive governments to the unionization of black workers. "The combination of Chamber opposition and government legislation effectively prevented its (black trade unions) re-emergence and black workers remain without countervailing weight to balance... the power of the Chamber of Mines." (Wilson, 1972, p.80).

Other legislation passed to increase the supply of labour included taxation, the Land Act of 1913, the establishment of the Labour Department which Wilson (1972, p.2) describes as having the "objective of assuring an adequate and regular supply of black labour," and the establishment of the Labour Association whose introduction was with the explicit purpose of reducing wages. Many of the legislative actions of the repressive state and private enterprises closely mirror that which we have identified in the West Indies and other African territories. According to Wilson (1972), laws aimed at controlling the movement of Africans (influx control) were among the most effective. In particular, The Natives Urban Areas Act of 1923 laid the ground work for control of the native labour force. Laws around influx control in effect made it "more difficult for labourers to move to other farms or towns in search of better wages" (Wilson, 1972, p.81). Wilson's figures show that the intensity of enforcement increased in the late 1940s. The number of convictions between 1948 and 1962 more than doubled from $176,000$ to $384,000$ and by 1969 the number of Africans convicted under laws restricting movement was $632,000$, "more than one person for every minute of the day and night" (Wilson, 1972, p.81). Overall, between 1936 and 1962 the percentage of convictions as a share of the black population had risen from 1.9 to 3.4 percent.

Regression analysis carried out by Wilson (1972) supports the hypothesis that enforcement on this scale significantly improved the supply of African labour to white producers. Furthermore, the years after 1947, which we have identified as a period of increased intensity movement control by white producers, were indeed more significantly correlated with labour supply than earlier years.

3.4 Van Onselen (1976): Southern Rhodesia

Van Onselen (1976) noted some novel methods by the South Rhodesian miners to expand their supply of labour beyond that which the free market allocated. According to

Van Onselen (1976), between 1898 and 1903, the South Rhodesian miners considered solutions to the labour problem which were of two forms; the proletarian school and the migrant school. The proletarian school considered developing a stable labour force which resided on the mines along with their families, while the migrant school wanted migrant employed at the mine under contracts but still attached to their families in rural areas. Ultimately both approaches would fail to secure an adequate supply of cheap labour as various impediments, including but not limited to the variety of outside options which the peasants enjoyed and desertion by workers, made success in acquiring required labour a near impossible tasks during this period. This failure was to be remedied during the reconstruction era (1903-1912) with the introduction of various repressive labour control instruments, including taxation, restricting access to land for peasants, legislation, contract "tickets", wage debt, and the formation of various labour bureaus.

Just as we have seen from Wilson (1972), taxation on peasants was extensively used with the purpose of increasing the cash requirements of the native population so as to drive them to seek the required cash from mines. Van Onselen (1976) too identified the contradicting forces at play in the use of taxation policy. Specifically, increases in taxation, which increased peasant demand for cash, pushed them to expand the area of land under cultivation and thus reduce the labour supply still further.[4] At first, Van Onselen (1976) explains, the Chamber of Mines proceeded to resolves this with a recalcitrant attitude, arguing for further increases in tax, lobbying the Secretary of State for a labour tax on top of the annual hut tax which the peasants already suffered. This motion ultimately failed but, as Van Onselen (1976, p.97) points out, other measures, including having tax collection, were "arranged in such a way as to spread the flow of labour to the mining and [settler] agriculture industries." As we have seen from Wilson (1972), Van Onselen (1976) also concludes that while taxation on its own was limited in its success as a labour generating device, when motivated by the intent to drive natives off the land, it was more effective in sourcing native labour. Commenting on land access, Van Onselen (1976, p.91) notes, "to maximise production of existing mines, and the labour demands of a new class of producer, the small worker, both necessitated an expanded labour force, so within Rhodesia the B.S.A took steps to increase supply. Essentially this involved restricting further access to land during a period when the peasantry was expanding its production by the sale of agricultural produce."

Other measures to induce cheap labour ranged from the introduction of legislation such as the Masters and Servants Ordinance, the Pass Laws and the Native Regulations Ordinance to the individual actions of mine employers. Such actions included the use of a ticketing system with its ambiguous terminology which was abused to unjustly lengthen the contract of labourers. Employers also held workers' wages in arrears to reduce the risk of desertion by holding back a month of the worker's wages, a sum that the employer would eventual keep if a worker fled. While this did succeed in increasing the supply of labour, nothing was more successful than the Rhodesia Native Labour Bureau (R.N.L.B) formed in 1903.

The exposition of the operation of the R.N.L.B as an extremely coercive and repres-

[4]To make tax payments, peasants needed to acquire cash as'in kind' payments were not accepted.

sive institution is one of the triumphs of the work of Van Onselen (1976) and is what, for our present interest, takes the work beyond the repressive instruments highlighted in Wilson (1972). Van Onselen (1976, p.104) identifies three tasks that the formation of the R.N.L.B. endeavoured to accomplish: "the contradiction which arose from trying to expand the labour supply during the years when the industry was also cutting black wages..., secure for the Rhodesian mining industry its share of African labour within the regional economic system... [and] channel a supply of African labour to mines within Rhodesia which, because of poor conditions or exploitative practices, could not normally secure 'voluntary' or, as it was sometimes called, 'independent' labour." To achieved these, the R.N.L.B. employed several aggressively coercive means. So ruthless were the activities of the bureau that "work secured through the R.N.L.B. became know as *chibaro* — 'slavery' or 'forced labour'" (Van Onselen, 1976, p.104). And forced labour it was indeed. The description presented by Van Onselen (1976, p.104-105) conveys as much:

> *In some districts of North Western Rhodesia between 1904 and 1910, peasants were simply rounded up by the Native Labour Commissioner's African messengers and sent to boma where they were handed over to agents of the R.N.L.B. and their black assistants, and then marched to the Southern Rhodesian mines. Those peasants who refused to go were in some cases whipped by the Native Commissioner or his black assistant, or in others had their grain-stores burnt down.*

Bureau agents also took to strategically positioning themselves to intercept vulnerable natives on route to other labour markets. One such examples of was the 'recruiting' on ferries which transported workers from region to region. In fact, according to Van Onselen (1976), in 1908 the bureau was placed in charge of these ferries where they would divert unsuspecting natives to the mines under forced labour practices.

Another means of obtaining labour utilised by the R.N.L.B. was by trapping peasants in debt in misleading schemes. Here again Van Onselen (1976, p.108-109) provides a useful description of these schemes:

> *The R.N.L.B. advanced supplies of cloth, grain and cash to the poorest members of traditional society. These men from the very periphery of the regional economic system thus started their R.N.L.B. contract with the added burden of indebtedness... One stratagem employed by agents was to intercept 'independent' workers and then, under the guise of having greater powers than they really possessed, to order them to remain one place until 'authorisation' for the continuation of their journey had been received. Once the men had waited for a number of days and exhausted their food supplies, they would be forced to accept the R.N.L.B. 'offer' of further food in exchange for a contract with chibaro.*

While such activities proved fruitful, the effectiveness of the bureau was greatly enhanced by how well it linked with other mechanisms aimed at expanding and cheapening

the labour supply. One such example, according to Van Onselen (1976), was the situation where, as the rising tax burden created for 'tax defaulters' in the African community, Native Commissioners would send these defaulters to R.N.L.B. agents. Some would suffer this fate even when the taxes had been paid. This link was strengthened with the introduction of the Pass Law which restricted the movement of natives. Not only was there a practice in some districts to only offer passes to individuals who had agreed to serve with the R.N.L.B., but also, R.N.L.B. agents themselves were licensed as 'pass officers', putting the ability of the natives to move around in search of work directly in the hands of the R.N.L.B.. Summarising the success of the bureau, Van Onselen (1976, p.114) notes: "It was the R.N.L.B. that ensured the industry its share of labour drawn from within a regional economic system in which it could not offer competitive wages. It was the supply of *chibaro-labour* which ensured that mines who could not attract a supply of 'voluntary' labour remained in continuous production."

3.5 Mosley (1983): Kenya and Southern Rhodesia

This work sought to improve the existing database on the economic history of Kenya and Southern Rhodesia (Zimbabwe), but eventually "traced certain elements of [their] economic history... over the entire colonial period" (Mosley, 1983, p.2). The more relevant elements to our present work is the political constraints on economic behaviour and the labour market during the colonial period. Mosley (1983, p.2) insists that "the historical development of the settler economies must, indeed, be seen as a process of mutual interaction between the economy and the political system...". The author pointed out the simultaneous nature of policy determination and policy variables, describing the process as a relationship running from the political system to the economy and from the economy to the political system. In so doing Mosley (1983) highlights several deficiencies in what at the time stood as the stereotypical view of the economic system of the so called 'Settler Economies'. Of this view, which characterised the settler economies as entities comprising a largely inefficient European minority bourgeois farming class whose survival was assured only by the use of the state apparatus to coerce African labour onto white farms, Mosley (1983) notes several significant contradictions.

First, Mosley (1983) uses empirical data on yields per acre from 1920-60 for Southern Rhodesia and Kenya to show that the "the stereotypical view that European agriculture in settler economies was uniformly less efficient" was indeed inaccurate (Mosley, 1983, p.172). In fact, the data confirm that during the inter-war period, maize yields for Kenya and Southern Rhodesia were only below that of Argentina when compared to other major producers. Furthermore, coffee yields in Kenya equalled that of Brazil, and tobacco yields for Southern Rhodesia were on par with that of Australia. Second, Mosley (1983) identifies the conflict which existed within the settler-producer group as a crucial contradiction to the homogeneous rural settler bourgeoisie which, at the time, the existing literature on underdevelopment theory espoused. More specifically, Mosley (1983) reexamines 'Crown land' and 'alienated land' policy to highlight the critical conflicts which arose between different types of settler-producers, and points out the importance of con-

sidering these conflicts when trying to understand the outcomes of policy intervention by the colonial government. As a third contention with the existing literature (at the time), Mosley (1983) dismantles the idea of a powerless African peasantry. The African peasantry posed significant problems for the settler-farmers on two fronts: economic and political. Using statistical evidence on African farmers' productivity, Mosley (1983) effectively argues against a uniform decline in African agriculture and that, in fact, the 1920s and 1930s saw high productivity in this sector. This, he explains, put upward pressure on the supply price of labour for settler-farmers, who had to resort to economic incentives to curb labour shortages on their farms. So too did economic concession won by the organised political action of African labourers who posed a significant industrial threat to the white settler-farmers in the 1940s.

These revelations notwithstanding, Mosley (1983, p.130) agrees that "political mechanisms of course had their place also, as was inevitable in a an environment where small-scale farmers not only could not afford to increase wages in time[s] of labour shortage, but also risk social ostracism within the local Farmers' Association if they did so...". In fact, Mosley (1983) identified several of these political mechanisms through which the white settler-farmers of Kenya and Southern Rhodesia sought to expand and cheapen the supply of labour. These mechanisms (or extra-market operations) included non-wage adjustments, legislation, recruited labour, and juvenile and female labour.

With respect to non-wage adjustment, Mosley (1983) cites the recommendations of the Southern Rhodesia Native Affairs Commission of 1910 and the Kenya Native labour Commission of 1912, which were "unanimous in their recommendations for government action to augment the labour supply" (Mosley, 1983, p.131). He notes that all European producers supported increasing taxes and restricting the land reserves available to native Africans. According to Mosley (1983), even when variations in tax rates were not used to control labour supply (after 1903 in Southern Rhodesia and after 1920 in Kenya) there was a significant increase in the intensity of tax collection by local governments who had advised staff to maximise their tax collection in years of labour shortage. Mosley (1983) points out that the specific nature of some taxes seemed to be so engineered as to have the specific purpose of expanding labour supply. He notes (p.131), that some taxes "which fell on [African] agriculture but not on labour income, were.. a more effective instrument in channeling Africans into the labour market than [others]... which did not discriminate between sources of income." Much like in the labour-scarce British West Indies during the post colonial period, these taxes and efforts to reduce the availability of land were overwhelmingly aimed at forcing labour back onto farms of European producers.

The second political mechanism, according to Mosley (1983), used to control the supply of labour in Southern Rhodesia and Kenya was legislation. He identifies three main types: 'compulsory labour legislation', 'resident labour (squatter) legislation' and 'registration certificate (pass law) legislation'. On compulsory labour, Mosley (1983, p.134) explains "administrators [commonly] made *ad hoc* requests to Chief Native Commissioners for workers for mines and farms that badly needed help," and that "state-backed recruitment organizations took a great deal of the task of securing labour for less popular employers off the shoulders of the government" in Southern Rhodesia. In terms of

resident labour legislation Mosley (1983, p.134) describes them as being "unique to the settler colonies" and explains that these policies left many Africans without land and so acted to subject them to rendering "a quota of labour if they wished to continue to occupy alienated land." Mosley (1983) also provides specific pieces of legislation which served this purpose. In Southern Rhodesia, the Private Locations Ordinance of 1908 was a form of land restriction and was complemented by a rental fee per acre of Crown land, "the net effect of the two measures being to drive many Africans living outside the reserves either back into the reserves or alternatively into employment on European farms" (Mosley, 1983, p.134). Similar motives underlie the Resident Natives Ordinance of 1919 in Kenya. The other critical piece of legislation involved registration certificates or 'passes' for Africans who ventured outside the reserves. Here again Mosley (1983, p.135) notes that "the principal function of the pass was to keep down the wages of Africans at times of labour shortage when they might otherwise have been pushed upward." These passes recorded information on the period of employment and the wage paid by a former employer and thus limited the power of an African to switch employers to bargain for a wage higher than his supply price.

Among the other measures employed in Kenya and Southern Rhodesia to expand and cheapen the labour supply was the practice of recruited labour. These were less repressive in nature than outright forced labour legislation, but were no less crucial as a means of expanding the labour supply and cheapening the supply price. Much like indentureship in the British West Indies, recruited labour practices in Southern Rhodesia and Kenya involved securing labour from outside the country on fixed-term contracts and at prices below the prevailing domestic market wages. However, as pointed out by Mosley (1983), in Kenya and Rhodesia, recruiting was carried out by private organization, whereas this was directly carried out by the government in the West Indian case. Nevertheless, these labourers, like those under indentureship in the West Indies, once recruited, were bound by the terms of their contracts and thus subjected to much of the abuses of 'unfree' labour.

In his second chapter, which deals with the political constraints on economic behaviour, Mosley (1983) makes the case that government intervention in the settler economies was endogenous to economic variables, in that intervention was a response to economic factors. He explains that the level of subsidy on maize, and to some extent the structure of export rail rates, could be seen as a "conditioned governmental response to situations of crisis" (Mosley, 1983, p.142). Similarly, the extra-market operations identified above may be described as conditioned employer response to labour shortage," which describe a crisis on the input side (Mosley, 1983, p.142). These arguments support Mosley's argument that there exist a significant simultaneous interplay between economic conditions and political mechanisms. That is, there exists, as Mosley (1983, p.2) describes, "a process of mutual interaction between the economy and the political system," and that a model which ignores this simultaneity risks painting "a picture which is the reverse of the truth." We took heed of this warning in testing our hypothesized relationship between labour supply and institutions in Chapter 2 and in our subsequent Chapter 4 with the estimation of a two stage least square instrumental

variable regression.

3.6 Bates (1981): Various African States

One of the more comprehensive analyses of state intervention into markets in former colonial states can be found in Bates (1981). The author uses a rational choice framework to explain the historical, political and economic origins of the development problems of Africa, paying explicit attention to the plight of African farmers who form part of the continent's largest economic sector. Bates's approach recognizes that government intervention in the African agricultural economy is concentrated around intrusion in three primary markets: the market for agricultural output (both cash crops produced for export and food stuff for the domestic market), the market for inputs used in the production of agricultural goods, and the market for the good which agricultural producers consume (that is, the manufactured goods from the urban sector). By investigating the government's role in manipulating the operations of these key markets and linking it to their various motivations, Bates (1981) provides much needed context for the pervasiveness of state intrusion and its consequences.

Bates's work is instructive in many respects, not least because it highlights motivations, themes and specific behaviours of state actors which carry the familiar patterns which we have previously explored in our investigation of the British West Indies. This is especially evident in his chapters one through three, where Bates discusses the states' attempts to manipulate the prices received by farmers in the export and domestic market. Describing the agricultural policies of African states, Bates (1981, p.4) notes, "they intend to transform their economies; they intend to move resources from agriculture to industry; and therefore they set prices in markets in order to capture resources from agriculture." This evokes the spirit of interventionism that we identified in Chapter 1 where we examined the revenue extraction motive behind extra-market operations conducted by the planter elite. This extraction, Bates (1981) explains, is made possible through the monopsony power of a state institution known as marketing boards, an institution with origins in the colonial period. Bates (1981, p.12) notes that "by using their market power to keep the price paid to farmer below the price set by the world market, they accumulate funds from the agriculture sector." This sort of market intervention through the use of marketing boards could be extremely potent as a source of revenue appropriation. Figures from Bates (1981, p.12) various sources show that these agencies handled as much as "90 percent of the exports of palm kernels, 80 percent of exports of coffee, 65 percent of exports of tea, and 60 percent of exports of ram cotton."

The appropriation of these revenues from indigenous farmers was exacerbated by the fact that the government, even during the colonial period, would divert the funds acquired by these boards toward, as Bates (1981, p.13) puts it, "subsidizing the acquisition of raw materials by their imperial overlords and the reconstruction of the homelands of their colonisers." Such diversions were not rare. Indeed, they were the norm during the post colonial period when the revenue imperative was strengthened by the desire of local government to acquire financial resources to reward their electorate. This amounted to

a deliberate transfer of resources from agriculture to the modern sector. Bates (1981) places marketing boards at the centre of the market intervention against the agriculture sector at the end of the post-colonial era. By that period, the functioning of these marketing agencies had strayed far from their original purpose of protecting the indigenous farmers, to maximising the size of the revenue surpluses. To this end, they had moved from subsidizing farmers to imposing taxes on the agriculture sector.

Bates (1981) identifies two other beneficiaries of the exploitation of farmers enabled by marketing agencies: the investors in industry and manufacturing, and bureaucrats. "[These] industrialists seek concessionary prices for raw materials, and both use instruments of the state to secure their needs by appropriating resources from peasants" (Bates, 1981, p.19). Describing the nature of the relationship as state-sponsored capitalism, Bates (1981) notes that marketing agencies in many African states consistently lent funds appropriated from farmers to corporations who abused this privileged financial relationship to redistribute income from farmers to industrialists. The state actors benefited from this redistribution as it meant that they could influence the types and location of projects that these funds were invested toward; "such as a plant location that is political desirable" (Bates, 1981, p.25). As for the bureaucrats who are charged with organizing the markets, Bates (1981, p.27) describes them as abusive of "their monopolistic positions so as to radically enhance their [personal] incomes." According to Bates (1981), the marketing agency bureaucrats, through their significant price setting power, were able to sustain large inefficiencies in operations. In fact, Bates (1981) sources data which indicates that between 10 and 35 percent of the differential between the price of agriculture on the world market and that received by the farmer went towards marketing board costs.

In addition to the revenue motive, there also existed, as we have touched upon, a political motive behind state intervention into the agriculture sector. This motive manifested in the governments' intrusion into the market for agricultural inputs as well as the price that farmers received for domestic food crops. We have already seen from Bates's exposition, how the state, through marketing boards, lowered the price that farmers receive from cash crops to below the world market price in order to generate revenue, but there was indeed another motive also at play. Turning to the domestic food market, Bates (1981) explains that political pressure for low-cost food, both from urban workers (the political elite's constituents) and the fact that the government as an employer faces increased wage demands when the cost of food is high, encourages the government to intervene in market operations to appease these two interests. For the farmer, this alliance between the urban worker and the government invariably means a lowering of the price he receives on the domestic food market as governments use agricultural policy to curb the demands of urban workers while avoiding higher wage bills for themselves. Writing on the matter, Bates (1981, p.35) states: "agricultural policy is thus derivative. It is devised to cope with political problems whose origins lie outside the agricultural sector. Pricing policy finds its origins in the struggle between urban interests and their governments; and in the political reconciliation of that struggle it is the rural producers who bare that cost: they are the ones who bare the burden of

policies designed to lower the price of goods."

Bates (1981) goes on to identify two major ways that African governments manipulate the price of food (the prices of farmers output): (i) through the manipulation of trade policies and (ii) through the use of government controlled marketing institutions. Bates (1981) argues that African governments manipulated trade policies in several ways which adversely affected African development. One of the key practices was the maintenance of an over-valued exchange rate to facilitate cheap imports which competed directly with the food products produced by indigenous farmers. Furthermore, according to Bates (1981), governments deliberately avoided tariff protection for farmers as they intended to keep food prices low for the urban areas which formed a key part of their electorate and banned the export of farmers' food crops when the domestic price is below the world price. With regard to marketing institutions, Bates (1981) identifies African governments' practice of creating monopsonistic marketing board for food crops much like those implemented for cash crop exporters. The practices of these institutions included buying farm produce at price-controlled (reduced) levels and the importation of competing food stuff to be redistributed at lower prices in the urban sector. This created significant competition for the local farmers, according to Bates (1981). While this kept the cost of food for urban areas low, it greatly reduced the returns to agriculture for local producers. In this sense, both the returns to agricultural capital and labour are significantly negatively altered, forcing farmers to pay lower wages —much like the wage manipulation efforts that we observed in the West Indies in Chapter 1. Furthermore, according to Bates (1981, p.43), "when the elite engages in the production of a food item, policies are not employed to depress its price."

In fact, not dissimilar to what we observed in Chapter 1, which described the setting in the British West Indies, Bates (1981) notes that governments, ran by the political elite, engaged in direct competition in agricultural production with farmers, though the motive was different. In the African case, government competition in the form of state farms was created with the immediate intent to "enter the food market and set themselves up as rivals to the peasant producer... [and] sell their products below the prevailing market prices" (Bates, 1981, p.46). The reason being that the aim of the government was to keep the electorate happy by providing cheap food. Bates (1981) reports that these farm incurred large debts and consumed disproportionately large shares of public resources in pursuit of this aim. The government further subsidized farm inputs to the advantage of the large scale elite producers. Subsidies included, "the acquisition of land for commercial farming..., tax holidays..., the development and distribution of improved seeds..." and cheap state credit to these large farms (Bates, 1981, p.49-52). These subsidies often came at the expense of the mass of peasant farmers. Describing the practice, Bates (1981, p.56) writes, "the resources allocated to these programs have been channelled to those whose support is politically useful or economically rewarding to the state — that is, to members of the elite."

Finally, government's intervention into the third market — the market for commodities consumed by the farmers from the urban industrial sector — manifests in government efforts to shield the manufacturing firms from competition. This, Bates (1981)

argues, inevitably leads to farmers paying part of the cost of industrialization. African governments find it politically advantageous to protect the manufacturing sector from competition and so impose effective and nominal protection[5] measures in aid of the industrial sector. "Few barriers are placed on the importation of goods used by the industries but protection is given to their products" (Bates, 1981, p.65). The consequence of this is an increase in domestic prices and a fall in the real incomes of the mass of the farming population. Bates (1981) concludes with the observation that the appropriation of revenue from cash crop exports by marketing agencies, depression of domestic prices of farm products for political benefit, and the implementation of policies providing effective protection to the manufacturing sector have all served to reduce farmer's real returns and enhanced the flight of capital and labour from agriculture to the manufacturing sector. This led to the under-development of African agriculture and contributed to the poor economic performance of Africa at large.

3.7 Bates (1987): Kenya and Ghana

Bates (1987) considers the case of African societies in three periods: pre-colonistion, during colonisation and during the post-colonial period. Of key interest to our research are the questions that Bates (1987) addresses during and after colonisation. Under colonisation, the author investigates how the colonial system distorted patterns of development in rural Africa. Bates (1987) looks at how colonisation biased the allocation of resources, as well as how the economic change which took place during the colonial period formed the catalyst for the nationalist movements which drove out the colonial powers. As for the post-colonial era, Bates (1987, p.2) notes that he seeks to answer three key questions. These include: "why do the states of Africa choose policy which impoverish its farmers? What influences the selection of these policies? And how do certain governments remain in power even when the adopt policies which are antithetical to the interest of most of their citizens?"

The most relevant (for our discussion) essays in the book analyze the reasons for the contrasting patterns of agricultural development and the role of agricultural factors in igniting political unrest in Africa in the colonial period. In the first of these essays, Bates (1987) studies the case of Ghana and Kenya to highlight the origins of their contrasting agricultural development. Bates (1987, p.61) notes that "in one case [Kenya], producer interests became paramount in the colonial period; in the other [Ghana], the interest of producers were sacrificed to those of other sectors."

Bates (1987) narrows the examination down to two aspects; the inputs to farming and the market for farming. Investigating the inputs to farming, Bates (1987) considered the difference between Ghana and Kenya as they related to labour, land, and capital. With regard to labour, Bates (1987, p.61-62) notes that the Kenya farmers "struggled against

[5]According to Bates (1981, p.65), nominal protection is that which is given to the price of products by the imposition of tariffs and quantitative restrictions on imports. Effective protection, on the other hand, is protection given to profits of firms. African governments preferred effective protection so as to not increase prices to politically undesirable levels.

the wage rate set in the private market" and sought to remedy this ill by endeavouring to manipulate the "public arena to set prices advantageous to themselves... much of the politics of the early period of Kenya revolved around attempts to lower the supply price of labour." (Bates, 1987, 62). He identified several instances of such behaviour on the part of the settler (European) farmers in their attempts to limit competition from government hiring, restrict the ownership of land by the native people and limit the variety of crops that the natives could grow. The settler farmers also leveraged the privileged position to pressure the government to places coercive taxes on the native population to force them into labouring in the commercial sector.

The labour market interventions, highlighted by Bates (1987), carried out by the Kenya settler farmers, closely resemble those of the European planters in the labour-scarce colonies of the West Indies. The problems of the Jamaican planter and that of the Kenyan farmer emerge from the same root cause: the abundance of land relative to people. Thus, European farmers in both areas adopted strategies around reducing the availability of land in an effort to reduce competition for labour from subsistence farming.

By contrast, the actions of the Ghanaian farmers, which Bates (1987) notes were starkly different to those of the Kenyan farmers, more closely resembled those of the planters in labour-rich West Indian colonies. He explained that the cocoa farmers of Ghana made little effort to alter the labour market of the country. The reason for this contrast,Bates (1987) explains, lies in the difference in the relationships between the commercial and subsistence sectors in the two countries. Specifically, (Bates, 1987, p.63) notes that the degree of complementarity between the commercial farming sector (producing cocoa and other cash crops) and the production of food crops was particularly high. (Bates, 1987, p.62) explains, "in establishing cocoa farms, food crops such as plantains, cocoyams, and peppers, are used to provide shading for young cocoa trees... [In addition] young cocoa trees require very little care... young trees were simply left to grow naturally." Furthermore, "the peak period of labour demand, complements, rather than rivals, the period of peak demand for labour in the production of food crops." The result was that commercial farmers in Ghana did not suffer from a want of labour and thus had no incentive to coerce labour away from subsistence activities.

The absence of this motivation to aggressively alter the free labour market was also a feature of the labour-rich West Indian colonies. The situation in the West Indies did not arise because of complementarity between the subsistence and commercial farming sector. However, because subsistence farming was not an option available to the population in these territories, labourers found that supplying their labour to plantations was a useful way to generate income. In this way, labourers in labour-rich colonies like Barbados and Antigua depended on plantations for subsistence income — they needed the planters' land to complement their labour in order to secure a means of survival.

According to Bates (1987), the development of property rights in Kenya followed a process which overwhelming favoured the commercial settler farmers. This, Bates (1987) explains, is another source of the difference in agriculture development in Kenya and Ghana. While the establishment of land rights in Kenya involved the forceful redis-

tribution of land from native farmers to white settler farmers, farmers in Ghana had to fully compensate the subsistence farmers who initially owned the land. Interestingly, the development of land rights in the West Indian territories were more similar to that of Kenya. That is, in the sugar colonies, where the formation of plantation society meant that the majority of the population were held as slaves, only the European planters had rights to land. This applied to both labour-rich and labour-scarce colonies. Yet, the actions of the planters in labour-rich colonies (like Antigua and Barbados) more closely resembled that of the Ghanaian farmers while those of the labour-scarce colonies (like Jamaica) mirror that of the settler farmers in Kenya. The reason for this difference in the West Indian planters' actions is the different realities of the labour market in labour-rich and labour-scarce colonies. More specifically, the scarcity of labour in Jamaica meant that there was strong incentive to manipulate wages, while a surplus of labour in Antigua, Saint Kitts and Barbados meant that this motive was absent. Thus, as mentioned in previous chapters, the efforts of Jamaican and Guyanese planters to keep land out of the hands of subsistence farmers were similarly made by Kenyan farmers through various land committees like that of 1905, which pressured the government to confine natives to marginal lands.

There were, however, critical differences between the plight of the Kenyan settler farmers and planters in labour-scarce Jamaica and Guyana. First, the Kenyan settler farmers faced competition from not only subsistence farming but also government employment and the railway construction sector. Secondly, the Jamaican and Guyanese planters were also members of the island government, an institution that they held a near monopoly over.[6] The Kenyan settler farmers, on the other hand, had to rely on lobbying and collective political action to have their will carried out through government. These differences meant that Jamaican planters had much lower cost in the efforts to artificially reduce the wage rate below the free market level. This fact allowed them to be very effective in this regard. The result was that the Jamaican planters were able to more easily setup and fundamentally alter institutions to advantage themselves in the labour market. Nonetheless, there are strong parallels between what we observe in the West Indies and in other colonies, such as those in Africa.

[6] Carvalho and Dippel (2016) report that over 85 percent of representatives in the Jamaican parliament were planters while a further 10 percent were of planting interests (as they were merchants).

Chapter 4

On the Manifestation of Colonial Labour Problems in Present Day Labour Institutions

4.1 Introduction

Does history determine the quality of labour institutions today? Holmlund (2014, p.62) describes labour market institutions as "policy interventions or collective organizations that interfere with wage and employment determination." The efficiency (and overall quality) of these institutions is a function of the relationships between agents in the labour market. From the previous chapters, we have seen that, for labour-scarce colonial territories, these relationships have historically been poor. Chapter 2 and Chapter 3 have shown that intervention by extra-market forces has led to institutional oppression of labour, which has fractured industrial relations. However, research on the determinants of labour institutions have largely ignored the historical circumstances from which these institutions have developed. The present chapter plugs this gap in the literature. We consider the development of labour institutions in a context that gives due consideration to the historical realities within which they evolved.

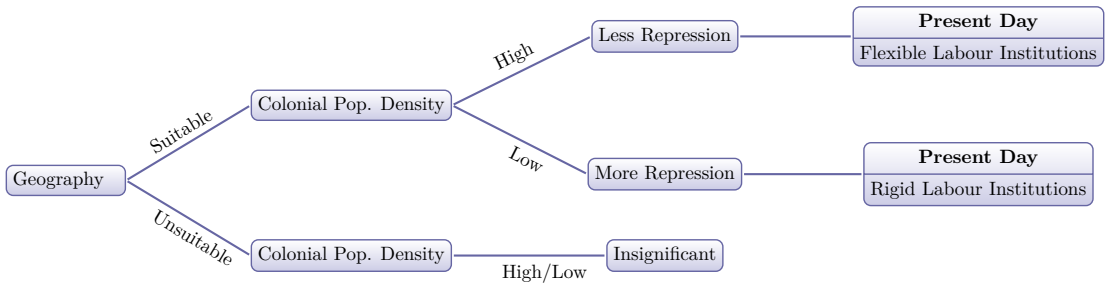
We examine the case of former European colonies located between the Tropic of Cancer in the northern hemisphere, and the Tropic of Capricorn in the southern hemisphere, otherwise known as 'tropical dependencies'.[1] Colonial writer Shaw (1906) popularized the term tropical dependency as a description of the tropical colonies in which the colonial policy of the European colonizer was invariably exploitation. The historical literature suggests that such colonies were created for economic gain rather than settlement. Their agriculturally desirable location facilitated the production of valuable cash crops, using the labour of the native populations ruled by a small number of Europeans. These colonies offered attractive opportunities for large scale production in

[1] In Figure C1 of the appendix to this chapter, we provide a list of former tropical colonies for which we have labour institutions data.

high-value European imports. As such, labour was crucial, so various forms of forced labour were introduced to help maintain a steady supply of labour. What makes this group of countries particularly interesting is that the labour issues dominated all aspects of life. Consequently, the blueprint of these societies was delimited by the demands of the production process. We exploit this historical event to show that the effect of the labour problem that emerged during this colonial era has not only persisted, but also continues to affect the quality of labour institutions today.

This research represents a departure from the current literature on the colonial origins of institutions in two important ways. First, we emphasise that historical context must be given due consideration when assessing the determinants of labour institutions. Secondly, the focus here is on institutions that affect labour, whereas property rights institutions have received overwhelming attention from institutionalists. Recent scholarship supports the 'reversal of fortune' story which proposes that more densely populated colonies motivated Europeans to develop more extractive colonial institutions, leading to growth restricting institutions today. Implicit in this theory is the idea that the abundance of a resource (in this case, labour) can motivate the development of a particular type of economic institution. In this chapter, we explore this idea and show that the reversal of fortune relationship is reversed when colonial population density and labour institutions in former tropical colonies are considered. This is because the stronger motivating factor was the abundance of highly productive land for crop production. To exploit this land, where labour was abundant, persons were willing to work for minimal compensation and without much coercion. In Chapter 2 (Figure 2.2), we laid out the channels through which colonial labour scarcity affects institutional development. We can apply this to the nature of labour institutions today as well. Where labour was scarce, extensive coercion and repression was required, leading to a historically antagonistic relationship between capitalists and the labour force. This conflict resulted in rigid industrial relations and labour market institutions. This relationship is also unique to the tropical colonies where cash crops were particular easy to grow. The simple form of this hypothesis is depicted in Figure 4.1.

Figure 4.1: Tropical Dependency Hypothesis



Simply put, we propose that where the climate and geography were suitable for large-scale cash crop production and mineral extraction (in tropical dependencies), the

need for a reliable labour force determined the very make up of society and the eventual development of labour institutions. Where the population was denser, the Europeans required less repressive devices to obtain a reliable supply of cheap labour. Harsher and more repressive methods were needed to ensure this supply where the population was sparse and labour unavailable. This led to more rigid labour relations and institutions (such as slavery and other forms of forced labour) and social conflict. These early outcomes have persisted today. Furthermore, we expect that this systematic relationship between colonial period population density and present day quality of labour institutions is non-existent for countries outside the group of tropical dependencies, because the large-scale, labour-intensive agricultural production motivation was absent. The above theory contrasts with that proposed by Acemoglu et al. (2002) because we are considering a different set of institutions. Acemoglu et al. (2002) consider institutions of private property, and suggest that where colonial populations were denser, it was more attractive for the colonial power to employ extractive colonial policy, which secured property rights for the elite and exposed the masses to expropriation. The relationship between colonial population density and labour institutions, which we propose here, works differently. As we have explained above, this is because of what population density meant for available labour and, thus, the development of labour relations and labour institutions.

A test of this hypothesis results in some interesting findings. We use OLS and two-stage least square methods to analyse the effect of the availability of labour during the colonial period (measured by colonial population density) on the present day quality of labour institutions (measured by the labour market flexibility today). Our findings indicate that while tropical dependencies had, on average, lower scores for quality of labour institutions than the rest of the world, higher colonial labour supply was associated with significantly higher levels of present day institutional quality for these tropical colonies. We also found that the systematic relationship between colonial labour availability and the quality of labour institutions (as measured by labour market flexibility) was unique to the tropical colonies. In fact, 1 percent higher colonial population density is associated with a present day labour market flexibility score which is 0.04 percent higher, relative to the mean score. When we considered other colonies and countries that were not colonised, there is no significant relationship between historic population density and scores for the quality of labour institution today. In addition, our instrumental variable regressions show that there is a causal relationship running from colonial labour availability, to post colonial labour conflict. Specifically, for tropical dependencies, we observe that a 1 percent increase in colonial labour availability was associated with a 0.64 percent reduction in the number of days of work lost due to strikes and lockouts in the post-colonial period.

This paper proceeds as follows; in the next section we explain, in a qualitative way, the channels through which colonial labour problems have manifested in present day labour rigidities. In section 4.3, we review the existing literature on determinants of rigid labour institutions. Section 4.4 makes the case for flexible labour institutions as a desirable economic feature. A theoretical model of conflict and wage expropriation — which relates colonial land-labour availability to conflict between labour market actors

— is considered in section 4.5. The data and research design are presented in section 4.6, while section 4.7 details the OLS and 2SLS instrumental variable regression results. Section 4.8 concludes the chapter.

4.2 From Repression to Rigidity

Here, we make a heretofore absent, rigorous attempt at directly connecting the colonial labour problem to present day outcomes of labour institutions. To understand this, we may partition European colonialism into two periods; New World Colonisation, which refers to the period beginning at the end of the 15th century when the Europeans colonized the Americas, and New Imperialism during the late 19th and 20th century, which refers to the colonisation of parts of Asia and the 'Scramble for Africa'.

During New World Colonisation, much of what is now Latin America and the Caribbean became tropical dependencies. Spain and Portugal, being the early colonists in the Americas, settled in areas where large numbers of native Americans were available as a substantial supply of labour, while the British were left to settle for the more sparsely populated Caribbean region (Engerman and Sokoloff, 2002). The existing labour supply among the Latin American and Caribbean colonies afforded the colonist in the more densely populated continental lands the opportunity to implement institutional controls under an *encomienda* system[2] and, later, *repartimiento*[3] over the native population. When the native population sufficiently declined, and where the numbers were too few from the onset, enslaved Africans were introduced as slave labour to the silver and gold mines as well as the coastal cash crop plantations. The escalation of the harshness and degree of repression of the introduced labour institution can, therefore, be seen to be increasing in the severity of the labour problem. In densely populated colonies like Mexico and Peru, the elites relied on indenture or similar forced labour institutions to extract labour from the natives, whereas, in sparsely populated colonies, the total institution of slavery was required (Engerman and Sokoloff, 2002). These rigid labour institutions represented Latin America's first experience with the use of labour in large scale capitalist production and was, thus, the foundation upon which labour institutions evolved.

The Scramble for Africa, also motivated by the pursuit of tropical resources, required labour-intensive production methods for imperial export. Similarly, scarce labour had to be effectively controlled to guarantee the same. Writing on the persistence of colonial institutions, Acemoglu et al. (2001) explain that a litany of extractive institutions introduced by colonial powers have persisted after independence because irreversible investments and sunk costs in their construction make abandoning these repressive institutions less attractive. We explored this path dependent behaviour in Chapter 2. Similar arguments apply to the persistence of repressive and inflexible colonial labour institutions. The culture of restrictive labour institutions has manifested in several ways which serve as hindrances to the performance of labour market institutions today. One

[2] Under this system, Spanish colonists were awarded lands and the forced labour of native inhabitants.

[3] *Repartimiento* involved the distribution of the native population to serve as labourers for Spanish colonists.

can certainly identify the imprints of this colonial legacy in labour market regulations, the political ethos of labour movements and the nature of social dialogue among actors in the labour market, all of which are intimately linked to the level of rigidity and inefficiency plaguing labour markets in former tropical dependencies.

That labour regulations today have colonial origins logically implies that these regulations were influenced by the nature of the issues faced by the designers of colonial labour institutions. This is evident in former colonies like India, where labour institutions developed under the unequal relationship between capital and labour and can trace their origins back to British colonial rule (Papola and Pais, 2007). Invariably, across the former tropical dependencies, the class of persons with the most power to shape labour institutions were colonists, and throughout these colonies they chose to pursue an agenda which protected their interests and sought to curb the labour problem. Where this problem was more severe, more drastic measures were required. Costly regulations, for example, are the reflection of the legacy of colonialism, and they introduce high levels of bureaucracy and restrict the development of smaller scale productive activities (Tokman, 2008). The attempt to restrict peasants' productive activities, in particular, was driven by the need to eliminate competition for already scarce labour. This led to the development of a system of labour laws and predatory contracts which sought to continually exploit the nominally free labour force (Bolland, 1981). The interventions highlighted in our previous chapters provide strong evidence for this conclusion. In turn, the response of labour movements against the owners of capital led to a culture of regulation which promotes inflexible labour structures that perpetuate rigidity and labour insecurity, simultaneously. It is the intersection of this exploitation and the antagonistic response to it, which served to gestate the overwhelming levels of rigidity observed in early and present-day labour market institutions in the tropical region. Among economies that fit into our tropical dependency group, according to the World Bank's Doing Business Index for 2014[4], African countries recorded the worst scores in terms of difficulty of hiring and the rigidity of working hours. In addition, these countries fare better than only South Asia where difficulty in firing workers is concerned. A composite index of these 3 sub-indices places the African labour institutions as the most rigid in the world (Alby et al., 2005). Similar levels of rigidity are found by Loayza et al. (2004) in Latin America. The authors observe that the region employs 2.6 times more regulations than the OECD countries, less than only Africa and parts of the Middle East.

This level of rigidity in labour institutions among former tropical dependencies is not, however, merely the result of a one-sided exercise of power by labour organisations or capitalist elites. It is the product of a two-sided struggle between labour and capital in which labour, through its collective effort, used its political power to advance its own interest against which capitalists have historically encroached. Among the most significant factors affecting the behaviour of labour as a collective are the strength of the labour movement and political institutions (Nelson, 1991). The conflict between colonial

[4]The World Bank Doing Business Report is published anually and can be retrieved from: http://www.doingbusiness.org/

elites and the repressed labour force has evoked an antagonistic response from organised labour in this class of colonies. This antagonism, empowered by labour's collective political power, is greater where labour was more scarce and therefore more aggressively repressed. It is easy to identify the link between labour movements, political power and labour market rigidities through an examination of the relationship between labour unions and the evolution of political parties in these former tropical colonies. Nelson (1991) describes this relationship as analogous to that of a business transaction, in which workers' cooperation is gained in exchange for influence in policy issues of interest; these policies being rigid 'protective' legislation.

For tropical dependencies, this relationship was particularly crucial. Gutkind et al. (1978) note that, continuously repressed, the African working class developed a particularly militant and nationalist labour movement which served as a reliable voting block for the political class. In many of the Latin American and Caribbean dependencies, colonial labour movements evolved into political parties which would eventually form governments capable of passing overly restrictive legislation, as in the case of Jamaica, Guyana and Peru, among others. Where the relationship was not so direct, unions still depended on the state apparatus to push through their interests in exchange for political support. In this way, labour organisations came to rely on governments, choosing political agents and statutory action in place of negotiations between unions and employers, resulting in labour legislation that was frequently in favour of protecting workers in spite of the narrow coverage of labour institutions in those developing countries (Weller, 2009). The reliance of labour movements on the state in affecting labour policy contributes to rigidities in labour institutions in several ways. First, it leads to an overcorrection of perceived inadequacies in protective labour legislation, resulting in the introduction of rigid legislation, driven by the historical conflict between agents in the labour market. Secondly, when different labour organisations support opposing political parties, this may stimulate tension between unions themselves, leading to antagonism among unions and resistance toward dialogue which would facilitate cooperation and improved flexibility. Two such examples can be seen in the West Indies: in Jamaica, where the Bustamante Industrial Trade Union (BITU) and the National Workers Union (NWU) were affiliated with the Jamaica Labour Party and the People's National Party respectively; and Guyana, where the Trade Union Congress (TUC) and Guyana Agricultural and General Workers Union (GAWU) were affiliated with the People's National Congress and People's Progressive Party, respectively (Meditz and Hanratty, 1987). Third, the tendency to bypass employer-union negotiations reduces social dialogue between labour market agents, further reduces the space for union-employer cooperation and increases reliance on rigid legislation (Weller, 2009).

This lack of social dialogue among labour market agents is the another significant channel through which colonial labour relations have persistently affected flexibility and the quality of labour institutions at large. Weller (2009), in assessing labour market institutions in Latin America, recommends as a fundamental need that labour market agents recognise all parties as legitimate stakeholders; a task which he describes as being made particularly difficult by the extensive history of conflict, extending from the colo-

nial period to present day. Jørgensen (2009) describes the Danish model, which is widely regarded as the pinnacle of labour market flexibility and worker security (flexicurity), as being built on a long history of social dialogue and a recognition of mutual interests. This is precisely what we argue that the former tropical dependencies lack. The severity of colonial labour scarcity motivated owners of land and other capital to employ repressive tactics to guarantee themselves cheap labour, triggering a militant response from the working class. This severed the channels for social dialogue and birthed a long and persistent history of labour market conflict which institutions have come to reflect. This deficiency in dialogue is evident across the tropical dependency class of colonies, while its severity varies with the intensity of historical conflict and the colonial labour problem. For Latin American countries, Weller (2009, p.16) describes the dialogue as lacking "mutual coherence and consistency over time", while for African countries, Alby et al. (2005) observed that dispute resolution is dominated by the state. Evidently, in the absence of a tradition of dialogue, agents in the labour market wait upon opportunities to advantage political favour to their one-sided ends. In this way, flexibility is hampered by poor social dialogue in multiple ways. First, recognition of the cause of rigidity and its consequences becomes a challenge when stakeholders and those who shape the institutional environment cannot come together. Secondly, where rigidities exist, agents tend to recognise these as hard fought 'gains' from years of conflict, and thus become unwilling to concede these 'gains' for unsecured rights, resulting in the persistence of rigidities. Third, without the necessary parley, achieved flexibilities become unsustainable as agents, when the opportunity arises to do otherwise, are less willing to maintain policies that were implemented without their input.

Thus, the path from a history of labour repression to present day labour rigidity is through the nature of industrial relationships which have developed over time. Historical labour repression has been the catalyst for a conflict-ridden relationship between labour market factions. This has led to the breakdown of social dialogue and a tendency for labour dispute resolutions to occur through restrictive legislation rather than employer-union negotiations, leading to high levels of rigidity.

4.3 Literature Review

The starting point of the theory in Figure 4.1 is geography. One of the earliest works to comprehensively look at the role of geography in economic development was Diamond et al. (1997). The authors review 13,000 years of human history to find the causes of unequal wealth and power distribution among countries. They argue that geographical endowments of minerals, animals and resources facilitated an early advantage for some regions. Furthermore, these endowments enabled the development of technologies which hastened progress of some countries relative to others. These technologies were more readily adaptable within ecological zones and so gave rise to higher levels of income and wealth in some zones. Diamond et al. (1997) make the case that the geographical differences ultimately determined power and economic prosperity. This work has been particularly useful to the field of economic geography.

Within the field of economic geography, there have been crucial developments in the literature which points to the significant role of geography in economic outcomes. This new economic geography school began with the work of Krugman (1991) and has developed into a major area of study. The author argues that competitive general equilibrium models do not adequately account for the spatial dynamics observed in economic growth and development. Krugman proceeds to introduce a model of new economic geography predicated on increasing returns to scale, which highlights the significant role of transport costs, the movement of productive factors, and their interaction in the organisation of economic activity. Krugman (1991) spurred a series of works which hold relevance for the analysis below.

The most significant of these works is that of Gallup et al. (1999). In it, the authors consider the role of geography in economic development and the economic disparities present in the world today. Much like our theoretical work above, their starting point is physical geography and the study of how the differences in physical geography affect economic development. They use a series of economic models and introduce the presence of geographic factors (transport costs) under the assumption that transport costs reduce the gains from trade and, therefore, act as a barrier to trade. Using these simple models, they were able to make a series of conclusions including; (i) that the growth rate is inversely related to transport costs, (ii) even small transport costs have significant adverse consequences for economic growth when the share of intermediate (imported) inputs in final demand is large, (iii) that advantages conferred by geography may be deterministic in economic outcomes well beyond the initial period in which such advantages were directly beneficial, and (iv) geography can have a potent effect on economic policy choices.

This final conclusion is most relevant for our present analysis. The theory described in Figure 4.1 proposes that differences in geographic factors (the suitability of land for cash crop production) led to differences in the choice of economic institutions concerned with labour. These institutions are tantamount to the geographically induced policy choices described by Gallup et al. (1999). The difference is that while Gallup et al. (1999) focus on policies that affect economic growth, such as the tax rate, we focus here on what it meant for labour organisation. There has been a heated debate among academics over the geographic versus institutional causes of long-run development, with researchers like Gallup et al. (1999) arguing that geography was more fundamental for economic development while, Acemoglu et al. (2001) argue for the primacy of institutions. We believe that the two interact to ultimately determine economic outcomes.

This line of research has received some recent attention from various authors. The general consensus among economists is that institutions do indeed affect long-term economic development. Yet, most economic research has almost exclusively focused on institutions that foster investment in physical capital, such as those that govern property rights and contracts. From the early institutionalism work of Veblen (1899) and Mitchell (1910), to the Post-World War II institutionalism of Kapp (1950) and Myrdal (1968), to the New Institutional Economics approach of North and Thomas (1973), and recently Acemoglu et al. (2001), much of the theoretical and empirical work has paid

keen attention to institutions of property rights. Lewis (1954), with his exposition of the dual sector model, has helped to draw more attention to the significance of labour institutions in the development process. Since Lewis's seminal work, Freeman (Freeman (1988); Freeman et al. (1998); Freeman (2007)) and Heckman (Heckman and Pages (2000, 2006); Heckman (2007)) have all contributed greatly to the research on the implications of labour institutions for economic development.

Furthermore, an invaluable body of research has developed which seeks to examine the determinants of labour institutions. The significance of such a research agenda to the process of demystifying the impact of labour institutions cannot be overstated. This research is exemplified in Botero et al. (2004). The authors construct a dataset for 85 countries to examine the determinants of the level of labour market regulation, measured by employment, collective relations and social security laws. They found that the primary determinant of a country's level of regulation is its legal origins. More specifically, the authors found that countries that have laws based on the French and Scandinavian legal systems have significantly higher levels of regulation. This result implies that for ex-colonies, the quality of labour institutions today is to a significant extent determined by their colonial history, where the legal system of the coloniser was transplanted from the mother country to the colonised territory. In this chapter, we conduct a deeper examination of this theme, though, unlike Botero et al. (2004), we focus not on the origins of laws but, instead, consider the evolution of labour relations from the historical colonial labour problem, and how it has affected the development of labour institutions today. The reason is simple, although legal systems do indeed explain a great deal of the variation in labour legislation, compliance issues, especially in developing countries, cause significant difference between what is legislated and what is practised. By looking at the issues that determined the quality of labour relations throughout the history of former tropical colonies, and investigating its effect on an index that captures the impression of stakeholders in the labour market, the approach taken in this chapter is better able to capture the reality of labour market institutions, not just according to decree, but also in practice.

Among others, Campos and Nugent (2012) have looked at the determinants of changes in the level of rigidity of labour market institutions over time. They develop a new index which captures the rigidity of labour legislation for 140 countries starting from 1960. The authors conclude that although Botero et al. (2004) is significant in explaining the level of rigidity across countries, the task of explaining the changes in the level of rigidity over time is not well explained by their approach. Instead, Campos and Nugent (2012) find evidence that the level of development and trade liberalization are better determinants of changes in the level of rigidity. This chapter differs from Campos and Nugent (2012) in so far as the outcome of interest here is not changes in the level of rigidity, but rather, the determinants of the variation in the levels of rigidity across countries.

Though empirical work on developing countries is remarkably scarce, there has been substantial qualitative work in this area. Nelson (1991) looks at the variables that determine unions' response to adjustment programmes which often involve a move towards

labour market flexibility. He notes that unions' responses to changes in labour institutions depend on several factors: the strength of the labour movement, economic cycles, and the political institutions that characterise the environment within which labour relations exist. He argues that an explanation of labour militancy against labour flexibility in developing countries accords with theory which suggests a 'humped-back' relationship between increased centralisation and militancy.[5] Specifically, he observes that most developing countries fall along the centre of the scale because, although unions are often quite small and lack significant coverage, they tend to be strong and wield sufficient political clout to affect policy. The present chapter bares resemblance to the approach taken by Nelson (1991) in the qualitative aspects through which it describes the determinants of labour institutions. We capture the rich historical context that describes the storied history that underpins the wider social and political context of relationship between key three agents (governments, unions and employers) in the labour market. However, we go one step further thanNelson (1991) by providing the empirical evidence that links this history and political context to labour market rigidity today.

There is high quality research coming out of the cross-disciplinary literature which seeks to understand present day post-colonial society as a by-product of tropical dependency.[6] Among the qualitative literature, Engerman and Sokoloff (2002) is most similar to the work of this chapter in the way it relates colonial factor endowments to 'new world' paths of development. Their work also suggests that societies continue to suffer from their pasts because institutions tended to develop in such a way that they reproduce the *status quo*. This echoes our discussions of path dependence in Chapter 2.

4.4 The Case for Flexibility

In this section, we develop the case for labour market flexibility. Thus far we have used the term flexibility (or rigidity) when referring to the quality of labour institutions without giving a clear definition of what it means for labour institutions to be flexible. A useful definition provided by Weller (2009, p.41) refers to flexibility as the "mobility of workers, fostered by the ease with which firms can hire and fire staff," and also to the "options available to these workers in a dynamic labour market." This definition may be better understood by considering the components that underlie the flexibility variable involved in the present analysis. In addition to the previously mentioned flexicurity model, there is considerable evidence that flexibility is a desired labour market feature.

Lazear (1990) is one of the earliest papers to highlight the existence of a significant negative relationship between rigid labour institutions and certain economic desirables. Examining employment protection legislation (EPL) as a form of rigidity, the author found that there existed a significant positive relationship between EPL and various

[5]The humped-back relationship cited here predicts little labour militancy at the low end of the scale, greater militancy as we move up the scale, and falling militancy at the highest levels of centralisation, resulting in an inverted U-shape.

[6]See for example Beckles (2016); Curtin (1998); Best (1968); Beckford (1999); Bolland (1981) among others.

undesirable labour market outcomes, including the level of unemployment. Subsequent work by Elmeskov et al. (1998) confirmed the link between EPL and unemployment, and also looked at the interaction between institutions and labour market policies to determine the implications of this interation for labour market outcomes. Besley and Burgess (2004) strengthened the case for flexible labour institutions. The authors analysed amendments to India's Industrial Disputes Act and found that pro-worker (rigid) regulation was associated with lower output, employment, investment and productivity in the formal manufacturing sector, while output and employment increased in the informal sector. Similar results were established by Botero et al. (2004) for a cross-section of 85 countries. The authors found that, not only was increased rigidity through collective relations legislation linked to an increase in the size of the informal sector, but also, employment in this sector rose while formal sector employment fell. Recently, Ahsan and Pagés (2009) reinforced the case for flexibility as they found similar evidence of this negative association between EPL and formal employment, using job security regulation as a source of rigidity. Furthermore, they observed that increased job security does not increase labour's share. On the back of this overwhelming evidence in favour of flexible labour institutions, several countries have made the move towards reducing rigidities.

Among the present group of tropical dependencies, the need for such action is dire as these countries suffer from the highest levels of rigidity in the world. This problem is exacerbated by the pre-existence of high informality among these countries. A large informal sector implies that even where there are gains to be had from employment protection, a significant share of the workforce remains unqualified for these gains while more workers are forced into the informal sector, reinforcing the ills of rigidity. Below, we conduct an exercise to examine the association between informality and flexibility for our sample of countries. In a comparative exercise, we first collect available information on our indicator of flexibility[7] and the size of the informal sector in these countries. Secondly, we split the countries into two groups based on whether they fall within the 50th percentile, or above the 50th percentile for each of the two variables. Specifically, countries with GCI labour flexibility score above the sample median are categorised as the high flexibility group, while those with scores below the sample median form the low flexibility group. Similarly, we define those countries with informal sectors (measured as the value of the informal sector as a share of GNP) above the median level as having comparatively high informality. Countries with scores below the median form the low informality group. Finally, we create a matrix to illustrate the association between informality and labour flexibility. The results are presented in Table 4.1 below.

The table represents information for 33 of the countries in our sample for which data on informality and institutional flexibility is available. The output from this exercise depicts a clear association between informality and flexibility. Of the sample of countries, 15 fell in the category of comparatively high flexibility. Of this sub-sample, 73 percent of countries featured a low level of informality. For the second sub-sample which consists

[7]The flexibility indicator is the measure of labour market flexibility produced by the World Economic Forum for its Global Competitiveness Index. We describe this indicator in more detail in the Data Appendix to this chapter.

Table 4.1: Informality and Flexibility

Level of Flexibility		Informality: High	Informality: Low
	High	Benin, Mali, Peru, Uganda	Burkina Fa., Cameroon, Costa Rica, Cote d'Ivoire, Jamaica, Kenya, Madagascar, Malaysia Nigeria, Nicaragua, Singapore
	Low	Bolivia, Colombia, Ethiopia, Guatemala, Honduras, Mexico, Panama, Philippines, Senegal, Tanzania, Zambia	Brazil, Dom Rep., Ecuador, Ghana India, Venezuela, Vietnam

of countries with comparatively rigid (inflexible) labour institutions, 61 percent suffered from a comparatively larger informal sector, while only 39 percent had small informal sectors. Furthermore, two thirds of the sample fall along the secondary (south-west-north-east) diagonal of the matrix, which represents a negative relationship between flexibility and informality. The evidence in Table 4.1 suggests that flexible labour institutions are associated with a smaller informal sector, while rigid labour institutions are associated with larger informal sectors. We do not speculate on whether the relationship is causal. In the current context, a causal relationship is not pertinent to the argument for flexibility. This is because, regardless of whether or not the flexibility leads to informality, or the other way around, or even if the relationship is bi-causal, what is most relevant here is that these countries have substantially large informal sectors within which a significant share of the labour force cannot access the benefits of rigid employment protection legislation. Yet, the efficiency cost of such legislation remains high. When rigidity leads to further informality, this only exacerbates the problem. Considering this, in addition to the established results linking rigidity to unemployment and lowered productivity, the case for flexibility is strong. In the section that follows, we formalise the theory linking colonial labour supply problems to rigid labour institutions today.

4.5 Conflict Theory of Wage Appropriation and Rigidity

What follows is a model that characterises the development of rigid labour institutions as the outcome of an antagonistic relationship developed in response to repression (or wage appropriation) by capitalists. This model is set in the colonial period when cash-crop labour-intensive production motivated the exploitation of former tropical dependencies. In this sense, we consider a simple agricultural economy populated by two groups, a labourer family and a capitalist family. Labourers own all the labour resources, which is equivalent to a fixed population of labourers ($\bar{N}$), while capitalists own all the land ($\bar{L}$), which we assume is in fixed supply. Members within each group are homogeneous and

have shared interests with other members of their own family. Therefore, for simplicity, we treat each group as single entities.

Labourers supply their labour, inelastically, to the capitalists who undertake production by combining land and labour according to the technology: $N^{\alpha}L^{1-\alpha}$, where N and L are labour and land demand for production and $0 < \alpha < 1$. We further assume that the agricultural economy is labour-intensive and so $N > L$. This is quite plausible as this industry, throughout the 19th and 20th century, has remained heavily supported by manual labour input.

Define a fair economy as a perfectly competitive one in which factor markets clear, so that $L = \bar{L}$ and $N = \bar{N}$, and each factor is paid the value of its marginal product. In this state of the economy, output per unit of land is given by η^{α}, $\eta > 1$, and the capitalist hires labour at a given wage rate, w, per unit of labour employed on the land.[8] His profit per unit of land is thus given by:

$$\pi = \eta^{\alpha} - w\eta \tag{4.1}$$

accordingly, the fair wage rate satisfies

$$w = \alpha\eta^{\alpha-1} \tag{4.2}$$

and the profit of the capitalist family is equal to the returns to land ownership

$$\pi \equiv r = (1-\alpha)\eta^{\alpha} \tag{4.3}$$

Suppose that the capitalist family has the power to initiate another state of the world. In this repressive world, the capitalists are able to expropriate labourer wage in the sense that they can repress wages by paying only a fraction, $(1-\tau)$, of the fair economy wage rate. This fraction is determined through conflict with the labourer family, in accordance with the following contest success function

$$\tau = \begin{cases} \dfrac{\bar{L}e_c}{\bar{L}e_c + \bar{N}e_l} & \text{if } (e_c + e_l) > 0 \\ \\ 0 & \text{otherwise} \end{cases}$$

where e_c and e_l are the effort levels invested by the capitalist and labourer families, respectively. By this specification, τ, the fraction of the wage rate expropriated by the planter, is determined by the relative efforts of each party, and the land and labour resources of each party determine the effectiveness of their efforts. Thus, the more land the capitalist family owns, and the more labour power the labourer family possesses, the more effective their respective efforts. We can divide both the numerator and denominator of the fraction by $\bar{L}$ so that we can rewrite the contest success function as

$$\tau = \begin{cases} \dfrac{e_c}{e_c + \eta e_l} & \text{if } (e_c + e_l) > 0 \\ \\ 0 & \text{otherwise} \end{cases} \tag{4.4}$$

[8] And $\eta = \frac{\bar{N}}{\bar{L}}$.

where $\eta = \frac{\bar{N}}{\bar{L}}$ and $e_c, e_l \geq 0$.

There is a cost to effort in this setting. We assume that repressing larger families is costlier for the capitalist and organising a larger family is costlier for the labourer family, so the total cost of effort for each group is increasing in the labour units per unit of land. Each party's total cost of effort is thus, $\eta e_i, i = c, l$. The capitalist family expends effort to maximise the share of the total labourer family's wage wealth (where total wage wealth is given by wn) that it can appropriate, while the labourer family seeks to minimise this expropriation. Mathematically, the capitalist chooses e_c to maximise

$$\tau w\eta - \eta e_c \tag{4.5}$$

while the labourer family attempts to protect its wage wealth in the repressive state of the economy. It thus chooses e_l to maximise

$$(1-\tau)w\eta - \eta e_l \tag{4.6}$$

This is effectively a model of wage repression. The capitalist family is able to pay a wage a fraction less than that due under a fair economy. In so doing, the capitalist family transfers a share of labourer wealth (the labourer family's total wage earnings, $w\eta$) to itself. In seeking to expropriate the labourer family's wages, the capitalist family develops a conflict relationship with the labourer family. The more intense this conflict, the more rigid their relationship. A suitable measure of this rigidity or conflict intensity is the aggregate level of conflict efforts (e_c+e_l). One may consider this an approximation of the level of rigidity of labour institutions shaped by the capitalist-labourer relationship. Through this conflict process, labour institutions are set up by the capitalists to exploit the labour force, while labourers expend effort to set up fiercely protective institutions. The solution to this model may be analysed as a Cournot equilibrium with each party choosing its respective effort levels.

After substituting equation (4.4) into (4.5), we can then derive the first order condition of the capitalist family. From the first order condition for the capitalist family's objective function given by equation (4.5), we have the best response function of the capitalist family to the effort of the labourer family:

$$e_c = -e_l\eta + (e_l\eta w)^{1/2} \tag{4.7}$$

Similarly, from the first order conditions of the objective function of the labourer family in equation (4.6), the best response function of the labourer family is

$$e_l = \frac{-e_c + (e_c\eta w)^{1/2}}{\eta} \tag{4.8}$$

Substituting equation (4.7) into equation (4.8) and simplifying yields the optimal level of labourer effort ($e_l{}^*$) in terms of labour per unit of land and the fair economy wage rate:

$$e_l{}^* = \frac{\eta w}{(\eta+1)^2} \tag{4.9}$$

Using (4.9) and (4.7) we are able to solve for optimal capitalist effort level as

$$e_c{}^* = \frac{\eta w}{(\eta+1)^2} \tag{4.10}$$

This suggests that in equilibrium, effort levels are identical, a well-established result of contest with symmetric valuations and costs. The fair economy wage rate can now be substituted into (4.9) and (4.10) to obtain the equilibrium effort levels in terms of labour per unit of land and labour's share in the fair economy:

$$e_c{}^* = e_l{}^* = \frac{a\eta^a}{(\eta+1)^2} \tag{4.11}$$

In previous sections, we developed the idea that a key determinant of the level of rigidity of labour market institutions in former tropical colonies is the historically antagonistic relationship developed between actors in the labour market. This relationship developed under attempts by capitalist landowners in these agricultural economies, facing varying degrees of labour problems, to repress wages below the fair economy level. Through the model presented in this section, we have proposed that this conflict can be modelled using a contest success function with the aggregate conflict effort level representing the degree of rigidity of the relationship between the two parties, and by extension, labour institutions. Using this model of labour market conflict, we are now able to assess the implications of labour scarcity on various outcomes, including the conflict intensity (level of rigidity) and labourer's share of aggregate wealth.

Proposition 4.1. *In the labour-intensive agricultural economy with conflict, characterised by equations* (4.1) *to* (4.11)*, the level of rigidity, proxied by conflict intensity, is decreasing in the availability of labour per unit of land.*

Proof of this proposition is straightforward. Differentiating conflict intensity ($e_c{}^* + e_l{}^*$) we have

$$\frac{2a\eta^a((a-2)\eta+a)}{\eta(\eta+1)^3} \tag{4.12}$$

which is less than zero if $\eta > \frac{a}{2-a}$. Recall that agricultural economy is labour-intensive so $\eta > 1$, which guarantees that this inequality is satisfied and so (4.12) is negative.

This is our main result. It implies that where labour per unit of land was available in larger numbers, the intensity of conflict was lower. In the present context, this suggests that territories with greater labour availability, relative to land, had better (more amicable) capitalist-labourer relations. This observation is the result of two effects. The first is with regard to the relative effectiveness of effort and the second is with regard to the value of the prize (wage rate) at stake. First, as η increases, in equilibrium, the labourer family can protect the same share of the wage rate with lower levels of effort since the effectiveness of their efforts is increased by higher levels of labour per unit of land. They thus reduce their effort level. Correspondingly, the capitalist family

maximises the fraction of the fair economy wage that it can obtain in equilibrium by choosing a lower effort level, resulting in a lower aggregate level of conflict. This implies that in territories with higher levels of labour per unit of land, the labour force was sufficiently powerful to discourage exploitation by capitalists, leading to more cooperative relationships. Secondly, as labour per unit of land increases, the marginal product of labour falls and so the market clearing fair economy wage rate is lower. This means the value of the prize at stake is lower, or in the present context, wages are sufficiently low that both the incentive to exploit the labour force and the will to protect what would, even in a fair economy, be a low prize (wage rate) are lower, resulting in lower levels of conflict.

In Section 4.2, we charted the path from repression to rigidity, and assigned a key role to the historical conflict resulting from a history of repression in these former colonies. We used historical arguments to show that the absence of social dialogue is directly related to the history of conflict between the factions in the labour market. This has led to the prevalence of rigid labour institutions. The discussion in Section 4.2, the preceding theoretical model, and the subsequent proposition, taken together, imply that in territories where labour was more widely available, there was less incentive to exploit or engage in conflict and, therefore, more amicable (less rigid) labour institutions developed. In the subsequent sections, we turn to an empirical analysis of the tropical dependency hypothesis and explore the evidence for our proposition from the simple model discussed.

4.6 The Data and Research Design

4.6.1 Measuring Flexibility

The measure of flexibility used for this chapter is taken from the Global Competitiveness Index (GCI) compiled by the World Economic Forum (WEF).[9] The GCI ranks 140 countries according to the quality of the factors that influence their productivity. The variables that comprise the index are divided into twelve "pillars of competitiveness" before they are aggregated into three sub-indices, with each pillar given a fixed weight.[10] The variable that we are particularly interested in as the indicator for labour market institutions, 'Flexibility', forms part of the seventh pillar titled Labour Market Efficiency. According to the Global Competitiveness Report:

> The efficiency and flexibility of the labour market are critical for ensuring that workers are allocated to their most effective use in the economy and provided with incentives to give their best effort in their jobs. Labour markets must therefore have the flexibility to shift workers from one economic activity to another rapidly and at low cost, and to allow for wage fluctuations without much social disruption. (Sala-i Martin et al., 2014, p.6-7).

[9]The WEF, based in Switzerland, was established as a non-profit organisation in 1971. The organisation produces a steady stream of economic and political research reports, the most comprehensive of which is the GCI.

[10]See www.weforum.org for the detailed methodology of the GCI.

By this rationale, the authors constructed a labour market flexibility indicator by aggregating the five subcomponents which include: (*i*) Cooperation in labour-employer relations, (*ii*) Flexibility of wage determination, (*iii*) Hiring and firing practices, (*iv*) Redundancy costs, and (*v*) Effect of taxation on incentives to work. There are, however, two other influential indices capturing the rigidity of labour institutions frequently used in the field. These are the Labour Market Regulations Index (LMR) constructed by the Fraser Institute and Labour Regulations Indicator compiled by the Institute of Management Development (IMD). The motivation for the use of the GCI rather than either of the other two prominent indicators of the rigidity of labour institutions is straightforward. Firstly, the GCI has significantly greater coverage than the IMD and Fraser's LMR index. Secondly, the WEF's GCI is able to capture not only *de jure* labour market institutions, but also the perceptions of actors operating within the institutional environment of these labour markets through its use of opinion surveys, coupled with a more robust methodology. Finally, while GCI uses primary data from the WEF survey, Fraser's LMR index simply makes use of the surveys of the GCI and IMD to compile its indicator and thus suffers from several methodological issues.[11]

Aleksynska and Cazes (2014) identify two main concerns with the GCI as an indicator of labour flexibility, the first of which is that there have been slight modifications to its subcomponents over some years. Consequently, comparisons over time are less reliable. However, these modifications have generally proven insignificant to the outcome of the index. Furthermore, when using the flexibility component of the index as our measure of rigidity (flexibility), we use the average from 2008 to 2016 (where there were few changes) and are not interested in comparisons over time. The second critique put forward by Aleksynska and Cazes (2014) highlights that the GCI and other measures of flexibility fail to account for the benefits of regulation, such as protection of more vulnerable workers from exploitation, increased job security and assurance of collective bargaining rights. Yet, the Danish 'flexicurity' model serves to show that the co-existence of flexibility and security is not only possible, but also symbiotic, through the arch of social dialogue.[12] For these reasons we find the WEF's GCI flexibility indicator suitable for measuring the rigidity of labour institutions across countries.

4.6.2 Descriptive Statistics

This analysis uses historical and recent data. Here, we go into more detail about the key variables.[13] All data are at the country level as further disaggregated labour institutions data are unavailable. Descriptive statistics for our key variables are presented in table 4.2 below.

Population density is the number of people per square kilometre of arable land. For the former colonies, it is taken on the eve of colonisation; the latest date for which

[11] See Aleksynska and Cazes (2014) for a critical overview of each index.
[12] See Weller (2009) for an overview of the Danish Flexicurity Model.
[13] Detailed definitions and sources are available in the Data Appendix to this chapter.

Table 4.2: Summary Statistics

	Tropical Dependencies			Rest of the World		
Variable	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.
Flexibility	60	4.453	0.574	89	4.551	0.585
Log Pop Density	60	1.145	1.358	80	2.324	2.112
Legal Origins	71	0.296	0.46	94	0.277	0.45
GDP per Capita	65	3.319	0.579	89	3.969	0.599

Notes: The source of data and full description for each variable is listed in the Data Appendix. We also describe each variable more fully below.

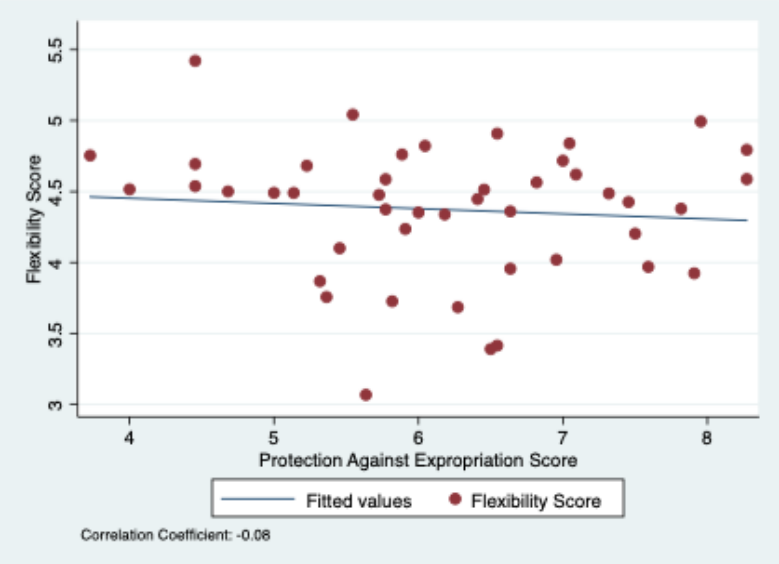
data on population density before colonisation is available.[14] For countries that were not colonised by the Europeans, we use population density in the year 1500 to show that there is no effect of historical population density on present day labour institutions outside the colonised tropics. All historical population density data is retrieved from McEvedy et al. (1978). We use the natural logarithm of this variable to account for the skewness caused by a few outliers present in the data. The use of population density is intended to capture the state of the historical relationship between the owners of capital and the labour force during colonial times. In accordance with our theory, we propose that where population was low relative to cultivable land, labour repression was more intense and led to an antagonistic relationship that saw labour institutions evolve from historically repressive to present day rigid.

Legal origin describes the origins of the country's regulatory system. Botero et al. (2004) tested English, French, Socialist, German and Scandinavian legal origins and found that French legal origin was associated with more rigid (less flexible) labour institutions. The tropical dependencies in this study are primarily of English and French legal origins. Therefore, for the purpose of this analysis, we restrict this variable to simply identify whether the legal origin of each country is French (i.e. Legal origin equal 1 if French). Data on legal origin was retrieved from La Porta et al. (1999). As a further control, we use the GDP per capita to rule out any influences that difference in the level of income across countries may have on the quality (flexibility) of labour institutions. More specifically, we use the log of average GDP per capita (constant 2005 US dollars) over the years 2000-2010, as available from the World Bank. Additional controls used in this analysis are fully described in the Data Appendix.

Previously, we contrasted our hypothesis with the reversal proposed by Acemoglu et al. (2002). We suggested that, for tropical colonies, the idea that larger native populations motivated Europeans to plunder and set up extractive institutions was not the

[14]We take data on the eve of colonisation to ensure that we are measuring the population level that the colonist found when they arrived. Year of colonisation refers to the year the first governor arrived in the territory.

Figure 4.2: Expropriation Risk and Flexibility



full story. To get a sense of why we think that the implications of colonial population density for labour relations are important, we may take a closer look at the data. In Figure 4.2, we plot the relationship between property rights institutions[15] and labour institutions for our sample of tropical colonies.[16] The slope is close to 0 and the correlation coefficient is -0.08 with a p-value of 0.56. This indicates that, for our sample of tropical colonies, there is no discernible relationship between the standard measure of property rights institutions used by Acemoglu et al. (2001, 2002) and the measure of labour institutions.[17] This observation is important because it shows that there are differences between the types of institutions, and that having high quality property rights institutions does not automatically translate to high quality labour institutions. It is possible, therefore, to observe that under different circumstances, a particular factor may have different relationships with different types of institution. We believe that this is the case for colonial population density and labour institutions, compared with colonial population density and property rights institutions. This is because of what colonial population density meant for labour supply and labour conflict. Perhaps, for tropical colonies, higher colonial population density, beyond promoting plunder and extraction, had significant implications for labour relations, whereas in other colonies the reversal of fortune hypothesis may be more salient.

The two graphs in Figure 4.3 support this idea. In this figure, we graph the rela-

[15]Data retrieved from Acemoglu et al. (2001).

[16]We remove two outliers (one country with a flexibility score above 6 and another with a flexibility score below 3). Inclusion of the outliers does not change the result. In fact, the slope becomes even closer to 0.

[17]The corresponding correlations for other colonies and non-colonised countries are 0.64 (significant at the 1-percent level) and 0.31 (significant a the 10-percent level).

(a) Tropical Dependencies (b) Other Colonies

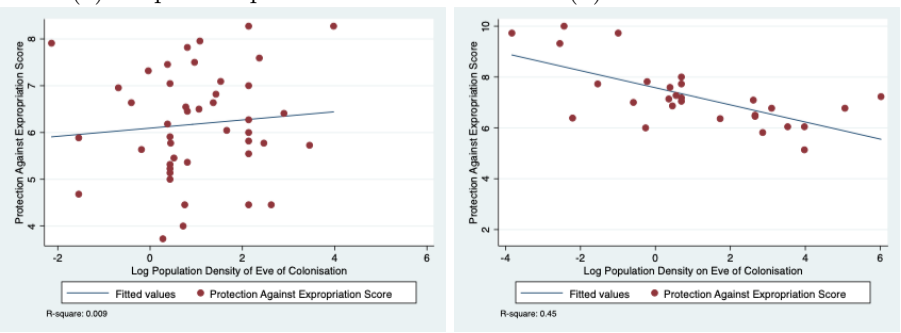


Figure 4.3: Reversal Hypothesis Revisited

tionship between colonial population density and the protection against expropriation index used in Acemoglu et al. (2001). The first of these graphs (4.3a) illustrates this relationship for tropical dependencies. The slope is flat and the r-square is 0.009, indicating that there is no significant association between colonial population density and present day property rights institutions. Thus, we do not see the reversal for tropical colonies. However, when we consider other colonies (Figure 4.3b), we see evidence of the reversal as proposed by Acemoglu et al. (2002). The slope is negative and the r-square for the simple relationship is 0.45. There is, therefore, a negative and significant (at the 1-percent level) correlation between population density on the eve of colonisation and the quality of property rights institutions today for other colonies (in line with the reversal of fortune hypothesis), but not for our tropical dependencies. There was a different mechanism at play in the tropics. Higher population meant more available labour, lower levels of colonial repression, better historical labour relationships, and a higher quality labour institutions today. The reversal of fortunes hypothesis and our own hypothesis are not necessarily mutually exclusive. Indeed, it is possible that tropical dependencies could simultaneously experience both weak property rights institutions and high quality labour institutions. As it turns out, we do not see the reversal in tropical colonies. This may be attributable to the fact that territories with greater labour supply and less labour conflict were more politically stable, and were also, therefore, less likely to perpetuate extractive colonial policy. Thus, the positives of greater labour supply may have helped to mitigate the institutional reversal, resulting in a 0 slope between colonial population density and property rights institutions where it would otherwise be negative. Alternatively, it could be that greater agricultural cash-crop production required a longer term engagement with the colonies on the part of the colonist, which was incompatible with the aggressively extractive institutions seen in other colonies.[18]

Using some descriptive plots, we may assess whether historical population density had any relation with labour institutions outside for our sample and outside of the tropical region. Figure 4.4 depicts a scatter plot illustrating the relationship between histor-

[18]Further analysis of this idea would take us beyond the scope of this chapter and is left to future research.

ical population density and labour market flexibility (conversely, rigidity) for tropical dependencies and the rest of the world (ROTW), respectively.

(a) Tropical Dependencies (b) ROTW

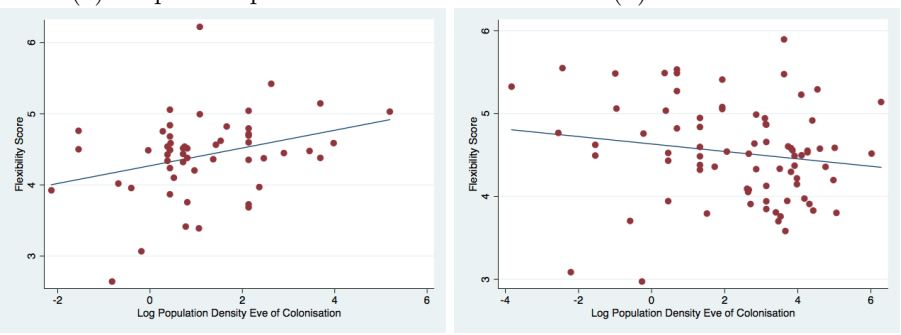


Figure 4.4: Flexibility and Historic Population Density

The plot reveals a clear upward-sloping relationship between historical population density and the level of labour market flexibility today among the colonised countries within the tropical region. Turning to the rest of the world, there appears to be no systematic relationship with flexibility. At best, Figure 4.4 reports a negative relationship between colonial population density and flexibility for countries outside of the tropical region.[19]

The sample can be further split for a more detailed comparison across different historical backgrounds. This is seen in Figure 4.5 below. We compare the plots of three different categories of countries, (*i*) Tropical Dependencies (in Figure 4.4a), (*ii*) Other Former Colonies and (*iii*) Never Colonised, and look at how historical population density relates to present day labour market flexibility.

(a) Other Former Colonies (b) Never Colonised

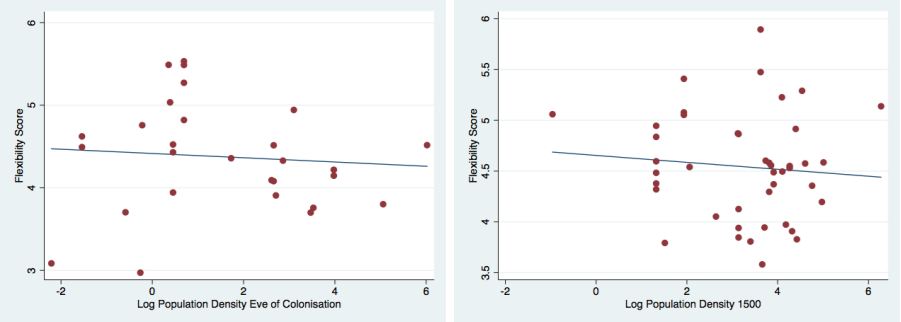


Figure 4.5: Flexibility and Historic Population Density (Continued)

There again, the evidence points to a different relationship between colonial labour supply (colonial population density) and labour institutions today across the different

[19] At this time it is important to recall that population density is recorder as at 1500 for countries that were never colonised.

categories of countries. Different to the observed positive relationship when we consider tropical dependencies, the scatter plot relating colonial population density and flexibility for other former colonies reveals no apparent relationship. This closely resembles the relationship seen in countries depicted in Figure 4.5b; that of countries which were never colonised. This confirms that the positive (upward-sloping) relationship between colonial labour availability, as measured by population density at the time of colonisation, and labour market flexibility today is uniquely observable among tropical dependencies. It is left to be tested whether the observed relationships are significant. We turn now to a closer look at data on labour conflict in the region.

Table 4.3: Post Colonial Labour Conflict

Country	Year	# of Strikes	Country	Year	# of Strikes	Country	Year	# of Strikes	Country	Year	# of Strikes
Bolivia	1982	301	Colombia	1988	251	Ghana	1978	65	Nigeria	1975	394
	1984	500		1990	283		1981	58		1992	187
	1997	22		1992	638					2006	189
Brazil	1985	843	Ecuador	1983	97	Guyana	1983	731	Haiti	1979	1751
	1986	1494		1988	126		1985	718		1980	2946
	1987	6369		1989	169		1987	497		1981	2728
	1989	4189		1990	140		1994	468		1983	2162
	1996	1258					2004	229		1985	1845

Notes: Data on the year and number of strikes in the year is from the ILO Statistical Database: https://www.ilo.org/. See Data Appendix for full reference.

In Table 4.3 we present details of some of the incidences of labour conflict observed in the tropical colonies during the post-colonial period. These data are not exhaustive. The data provide a glance at some of the more active years in a sub-sample of tropical colonies.[20] These strikes were often militant in nature, and often exacerbated the problem of weak social dialogue between workers and business interests in these territories. In Bolivia, for example, the 1980s strikes were, in part, fuelled by workers' union demands for "a majority of workers voices across governing bodies" against the idea of "equal representation between workers, labour representatives, government officials, and private businessmen... because of the fundamental role they [the workers' union] played in the President's election" (O'Niel, 2010, p.4). In Ecuador, as well, unions sought to settle disputes through government power rather than dialogue. Strikes in 1988-1990 came against the backdrop of the new president Rodrigo Borka promising to "harmonise the government and labour objectives" (Alexander and Parker, 2007, p.205). When this did not materialise, a general strike in 1988 resulted in violent clashes. Writing on the strikes listed for Nigeria, Salawu et al. (2013, p.63) concludes, "it can be seen that practically, every major demand on the part of workers for wage increase or review before and after independence in Nigeria has been settled not through collective industrial machinery, but by special commissions or tribunals." This underscores our point that a history of antagonism between labour market factions has led to the settlement of disputes through means that by-pass dialogue and cooperation. Some of the most extensive of the strikes listed in Table 4.3 occurred in Brazil. Estimates suggest that up to 3 million workers

[20]Furthermore, an individual strike may involve millions of individuals, so a smaller total number of strikes may not always mean a lower level of conflict intensity.

took part in the 1986 and 1987 strikes, but by 1989 the number was 22 million on the first day of the strike. Up to 37 percent of the urban wage-labour force was involved in strikes for social change (French and Fortes, 2005).

In the next section, we test the significance of the relationships described above, and empirically examine the role of labour conflict in the quality of labour institutions today. We employ both OLS and two-stage least square techniques to ensure that we are able to make causal inference on the proposed relationships.

4.6.3 Empirical Approach

Here, we investigate the historical origins of present day rigidities in labour institutions. First, to examine the differential impact of colonial labour supply on the tropical colonies versus the rest of the world, we specify a dummy variable regression for a combined sample consisting of tropical dependencies and the rest of the world:

$$flex_i = \beta_0 + \beta_1 LPD_i + \beta_2 TD_i + \beta_3 TDLPD_i + \boldsymbol{X}_i'\beta_4 + \varrho_i \tag{4.13}$$

where $flex_i$ is the average flexibility score (over the years 2008 to 2016) of country i from the WEF GCI. β_0 is the regression intercept, $\boldsymbol{X}_i$ is a vector of covariates, which include controls for legal origin and income. β_1, the coefficient on log of population density on the eve of colonisation (LPD), captures the effect of historical labour availability on labour market flexibility for the ROTW. TD is a dummy variable equal to 1 if country i was a tropical dependency, while $TDLPD$ is an interaction between TD and LPD. The main coefficient of interest is β_3 which measures the differential impact of colonial population density on labour institutions between tropical dependencies and the rest of the world. Consistent with our theory, we expect β_2 to be negative (tropical dependencies have lower flexibility scores), but expect β_3 to be positive (tropical dependencies with higher colonial population density have higher scores for quality of labour institutions).

However, while a regression of the form in (4.13) reveals useful information about this differential effect, it does not serve to confirm whether population density significantly impacted the flexibility of labour markets within the sample of tropical dependencies, and had no such effect for the rest of the world, as proposed by the theory in section 4.1. For this purpose, a category-wise regression as seen in equation (4.14) below is more suitable.

$$flex_i = \begin{cases} \gamma_0 + \gamma_1 LPD_i + \boldsymbol{X}_i'\gamma_2 + \nu_i & \text{if } TD_i = 1 \\ \delta_0 + \delta_1 LPD_i + \boldsymbol{X}_i'\delta_2 + \iota_i & \text{if } TD_i = 0 \end{cases} \tag{4.14}$$

where ν_i and ι_i are the error terms of the respective regression equations. Effectively, this amounts to running a separate regression for each of the two samples, Tropical Dependencies and the Rest of the World. Furthermore, conducting the regression in this way allows for simpler interpretation of the coefficients and nullifies the need for the assumption of homogeneous error variances across groups.

4.7 Results

In this section we present the results of our regressions. As highlighted by the causal chain in Chapter 2, which we continue to propose here, there may be endogeneity in the relationships between the nodes in the chain described in Figure 2.2. To ensure that our results are robust and inferences are valid, we test the relationship between colonial labour availability and present day labour institutions using OLS and instrumental variable regressions.

4.7.1 Determinants of Labour Insitutions

The theory presented in Section 4.1 predicts that historical population density had a differential impact on labour institutions between former tropical colonies and the rest of the world. As a test of this hypothesis, it is sufficient to run the regression described by (4.13) and ascertain that $\beta_3 > 0$. Table 4.4 reports the results from this exercise. t-statistics are calculated using heteroskedasticity robust standard errors.

From first column of Table 4.4, β_2 is -0.378. This suggests that tropical dependencies have, on average, significantly higher levels of labour institution rigidity (lower flexibility scores) than the rest of the world. The coefficient of interest (β_3) is the one on the interaction term. This is observed from the third row of table 4.4. The reported coefficient is a positive 0.183 with an associated t-statistic of 2.93. This result is consistent with the hypothesis presented in the introduction. It supports the view that historical population density has a stronger positive effect on the level of flexibility of labour markets in tropical dependencies, compared with the rest of the world.

In columns (2)-(4), we control for various factors by including variables that may influence the quality of labour institutions, as well as continent dummies. Botero et al. (2004) found that a country's legal origin was a significant determinant of the level of rigidity in its labour institutions. In column (2), we introduce a dummy variable (Legal Origins) which captures whether a country is of French legal origin. Consistent with the result from Botero et al. (2004), the coefficient on the legal origins is -0.378, implying that countries of French legal origin tend to have more rigid labour institutions. It is interesting to note that the authors used *de jure* measures in construction of their index, while the GCI indicator is in large part constructed from *de facto* measures (perception surveys) of rigidity. Yet the results remain consistent. The coefficient concerning the differential effect of population density for tropical dependencies, compared with the rest of world, remains significant at the conventional 5-percent level. The significance of this differential impact improves when we control for country income levels in column (3), with the coefficient increasing from 0.154 to 0.23. The inclusion of continent dummies does not affect the significance of this result.

The above results offer support to the notion that historical population density had a different effect on colonised countries from the tropical belt compared with the rest of the world. We attribute this to the labour problem which emerged as these colonies offered great opportunity for large-scale, labour-intensive extraction. Where population was scarce relative to available land, more extreme measures, such as slavery and other rigid

Table 4.4: The Differential Effect of Colonial Labour Supply on Flexibility

	(1) Flexibility	(2) Flexibility	(3) Flexibility	(4) Flexibility
Log Population Density	-0.0463	-0.0379	-0.0508	-0.0501
	(-1.23)	(-1.09)	(-1.65)	(-1.65)
Tropical Dependency	-0.378**	-0.220	-0.0504	-0.0124
	(-2.27)	(-1.32)	(-0.29)	(-0.07)
TropDep*Pop. Density	0.183***	0.154**	0.230***	0.219***
	(2.93)	(2.55)	(3.81)	(3.26)
French Legal Origin		-0.378***	-0.390***	-0.382***
		(-3.56)	(-3.77)	(-3.66)
GDP per Capita			0.347***	0.363***
			(3.68)	(3.27)
Asia				0.178
				(1.25)
Africa				0.0246
				(0.17)
Constant	4.625***	4.734***	3.360***	3.243***
	(36.93)	(40.72)	(8.47)	(6.50)
Observations	127	127	125	125
R^2	0.07	0.16	0.26	0.27

Notes: * $p < .10$, ** $p < .05$, *** $p < .01$. t-statistics in parentheses. All regressions are OLS cross-section regressions. The dependent variable is flexibility score from the GCI on a scale of 1-7 (2008-16). Higher scores indicate better (more flexible) labour markets. The sample consists of 127 countries around the globe for which data on the variables were available. More details on each variable (definitions and source) are available in the Data Appendix.

forms of forced labour, proved necessary for sustaining a reliable workforce. Over time, this led to the underdevelopment of flexible labour institutions and antagonistic industrial relations between agents in the labour market. This gave rise to, and perpetuated, a conflict culture in labour relations. Political power interacted with labour movements to embed this antagonism into labour law. In this way, colonial labour scarcity was a major determinant of the level of rigidity of present day labour institutions among tropical colonies. To the extent that other countries have higher average flexibility scores than former tropical colonies, this result implies that tropical dependencies with higher population densities have flexibility closer to that of the rest of the world.

To test Proposition 4.1, we estimate the relationship from the category-wise regres-

sion described by equation (4.14). If the proposed theory is correct, we should observe that population density on the eve of colonisation is a positive significant predictor of the level of rigidity when we consider just the sample of tropical dependencies (the $TD_i = 1$ case). That is, $\gamma_i > 0$ from the regression in (4.14). Conversely, the theory predicts that population density will not be a significant determinant of institutional flexibility for countries outside of the tropical region, because the previously mentioned conditions were absent. Therefore, the expectation is that $\delta_i = 0$ from equation (4.14). we consider three samples for the $TD_i = 0$ case. In the first instance, we restrict the sample to consider only former colonies outside the tropical belt for a more nuanced comparison. Secondly, we will consider a sample of countries never colonised. Finally, we combine the other colonies and never colonised samples to make up the rest of the world (all countries outside the tropical belt) to ascertain whether this unique relationship between colonial labour and institutions is only significant for the sample of tropical dependencies. This process simply amounts to running four separate regressions, one for each of the samples, tropical dependencies, other former colonies, the sample of countries never colonised, and the rest of the world. Table 4.5 reports the results of these regressions.

Table 4.5: Determinants of Labour Institutions

DV is GCI Flexibility Score	Tropical Dep (A)	Tropical Dep (B)	Other Colonies (A)	Other Colonies (B)	Never Colonised (A)	Never Colonised (B)	ROTW (A)	ROTW (B)
Log Pop Density	0.125**	0.133**	-0.0878*	0.0178	-0.0341	-0.0541	-0.0448	-0.0546*
	(2.63)	(2.68)	(-1.83)	(0.32)	(-0.68)	(-0.79)	(-1.21)	(-1.77)
Legal Origin		-0.305**		-0.275		-0.73***		-0.42***
		(-2.03)		(-1.13)		(-4.94)		(-2.92)
Log GDP per Capita		0.256		0.915***		0.207		0.429***
		(1.08)		(4.22)		(0.81)		(3.49)
Asia		0.0802		0.529**		-0.108		0.291*
		(0.26)		(2.26)		(-0.52)		(1.85)
Africa		0.100		0.252				-0.105
		(0.42)		(0.90)				(-0.51)
Constant	4.269***	3.559***	4.579***	0.802	4.654***	4.035***	4.632***	3.001***
	(40.76)	(4.04)	(30.23)	(0.84)	(27.14)	(4.46)	(37.35)	(5.41)
Observations	54	53	32	31	43	42	79	76
R^2	0.10	0.21	0.09	0.60	0.01	0.34	0.03	0.32

Notes: * $p < .10$, ** $p < .05$, *** $p < .01$. t-statistics in parentheses. All regressions are OLS cross-section regressions. The dependent variable for all regressions is flexibility score from the GCI on a scale of 1-7. Higher scores indicate better (more flexible) labour markets. The sample for which the regression is run is listed at the top of each column. Tropical Dep are previously colonised tropical countries, Other Colonies are previously colonised countries outside the tropical region. Never Colonised are countries not previously colonised and ROTW is a combined sample of all countries that are not tropical dependencies. More details on each variable (definitions and source) are available in the Data Appendix.

Column (A) of each regression presents the results of a simple linear regression when labour institution flexibility scores from the GCI are regressed against log of population density for the indicated sample. These results indicate that, of all the samples for which the regression was conducted, colonial population density turned out to be a significant predictor of labour market flexibility only for our sample of tropical dependencies. The

coefficient of 0.125 is positive and significant at 5-percent level with a t-statistic of 2.63. Whether we consider other colonies specifically, or the rest of the world as a whole, the evidence suggests that this relationship between colonial population density and rigid labour institutions is unique to those countries that are situated within the tropical belt, where there was extensive scope for large-scale, labour-intensive cash-crop agriculture and mineral extraction.

In the columns labelled (B), we control for the main determinants of labour institutions coming out of the literature by running the full regression described by equation (4.14). The second column, Tropical Dep (B), reports the case for the sample of tropical dependencies ($TD_i = 1$). The results indicate that γ_1, the coefficient on colonial population density, when the sample of tropical dependencies is considered, is equal to 0.133 and remains significant at the 5-percent level when legal origins and per capita income is controlled for. This suggests that, for tropical dependencies, 1 percent higher colonial population density is associated with a score for present day labour institution flexibility which is 0.03 percent higher, relative to the mean score (0.133/4.4). Consistent with Botero et al. (2004), the negative sign on legal origins suggests that countries of French legal origin tend to have lower levels of flexibility (more rigid labour institutions). The inclusion of continent dummies leaves this result unchanged. Similarly, the addition of controls when other colonies (B), countries never colonised (B), and a combined sample of the two as the rest of the world (B) are considered, does not reverse the results of the simple regression. Historic population density, in each of these samples, remains consistently insignificant (at the 5-percent level) as a predictor of flexibility today, while legal origin comes out with the expected sign and significance.

The robustness of this relationship's uniqueness to the tropical region is again strong evidence in favour of the hypothesis that the colonial labour scarcity, in a region where labour was central to the very formation of society (i.e. tropical colonies), have had a lasting impact on the level of rigidity observed in today's labour institutions. This impact, we propose, works through the historical relationship that developed between the owners of capital and the labour force, and is captured by the *de facto* workings of the labour market. For tropical colonies in which labour was sufficiently plentiful, there was a tendency for cooperation and more amicable dialogue towards the development of labour institutions. Where labour was scarce and had to be repressed, the reverse occurred.

4.7.2 Additional Controls

In order to rule out competing explanations for the relationship between colonial labour supply and the quality of labour institutions today, in this subsection, we introduce additional controls informed by the existing literature.

Population density has, by many scholars, been thought to be a proxy for the wealth of regions. The idea is that, historically, only wealthy societies could sustain dense populations. In light of this, it may be argued that our measure of colonial labour supply is capturing the effect of historical wealth on present day labour institutions. To shows that this is not the case, we control for hitorical wealth at the time of colonisation,

Table 4.6: Additional Controls and Labour Institutions

	Flexibility (1)	Flexibility (2)	Expropriation Protection (Trop. Dep.)	Exprop. Protection (Other Colonies)
Log Col. Pop. Den.	0.149***	0.089*	0.0442	-0.337***
	(2.93)	(1.80)	(0.29)	(-3.49)
French Legal Origin	-0.278	-0.230		
	(-1.79)	(-1.47)		
Log GDP per Cap.	0.133	0.040		
	(0.50)	(0.25)		
Log Urbanisation 1500	0.0287	0.024		
	(0.68)	(0.52)		
Log Pop Den 2005		0.0841		
		(1.12)		
Constant	4.129***	4.067***	6.174***	7.578***
	(4.10)	(4.25)	(26.99)	(34.81)
Observations	51	51	51	28

Notes: * $p < .10$, ** $p < .05$, *** $p < .01$. t-statistics in parentheses. All regressions are OLS cross-section regressions. The dependent variable in regressions (1) and (2) is flexibility score from the GCI on a scale of 1-7. Higher score indicate better (more flexible) labour markets. The dependent variable for the regressions in the third and fourth columns is the average protection against risk of expropriation scores reported in Acemoglu et al. (2001). The sample for these regressions is tropical dependencies in the first three regressions and other colonies in the final column. More details on each variable (definitions and source) are available in the Data Appendix.

using urbanisation data from Fink-Jensen (2005). Substantial scholarly work, including Acemoglu et al. (2002), has demonstrated a robust association between historical urbanisation rates and economic prosperity. Studying the link between historical urbanisation rates and income, the authors found that countries with 10 percentage points higher urbanization, enjoyed, on average, 46 percent greater income per capita. We, therefore, introduce urbanisation data into the regression for the determinants of labour institutions to rule out the possibility that population density is acting as a proxy for the effect of historical wealth on present day labour institutions. The results are reported in column (1) of Table 4.6.

The qualitative results of our regression of labour institutions on colonial population density remain unchanged, and the coefficient on log of colonial population density is now 0.149. It, therefore, remains that tropical dependencies with higher colonial population densities have significantly — at the 1−percent level — better (more flexible) labour institutions. Specifically, in the presence of these controls, 1 percent higher colonial population density is associated with a 0.034 percent higher score for present day labour institution quality, relative to the mean score for these tropical colonies. Furthermore, log of urbanisation rate in 1500 (which, we have argued, is a proxy for historical wealth) has no effect on the quality of labour institutions today. The coefficient is small (at 0.029) and statistically insignificant. This suggests that, controlling for historical wealth,

population density on the eve of colonisation has a significant positive effect on the quality of labour institutions today. This latest result rejects the idea that population density is measuring the effect of wealth on labour institutions, and is in favour of the theory that it captures the effect of historic labour availability on present day labour institutions in the sample of tropical colonies.

The central thesis of this chapter is that, because of the unique circumstances that existed at the time, colonial labour availability determined the nature of land-labour relationships and ultimately, the quality of labour institutions that developed through time and remain in effect today. In column (2), we introduce modern day population density into the regression to show that this relationship is uniquely shared with historical and not modern-day population. The result is as expected. The coefficients on colonial population density (0.089) and current population density (0.841) are both positive, however, the t-statistics for these two variables are 1.80 and 1.12, respectively. That the introduction of modern-day population density reduces the magnitude and significance of our colonial population density variable is not surprising due to the high level of correlation between the two. Nevertheless, there exists a positive and significant relationship between historical population density and flexible labour institutions that is absent between institutions and current population density. This accords with the proposed theory. The result suggests that it is colonial labour availability, and not just population density generally, that matters for present day labour institutions. It reinforces the idea that historical labour availability, in what turned out to be the formative years of industrial production in many of these tropical countries, was crucial for the type of labour institutions that developed.

In the third and fourth columns, we test the association between colonial population density and capital institutions as measured by the protection against expropriation risk variable from Acemoglu et al. (2001). Again, the results are as expected, colonial population density (colonial labour availability) does not influence variation in protection from risk of expropriation. The coefficient on population density in the third column is 0.044 and the t-statistic is small at 0.29. Consequently, where tropical colonies are concerned, we fail to see evidence of the reversal of fortune hypothesis which promotes the view that in high density (and thus wealthier) areas, Europeans introduced worse property rights institutions, leading to a reversal of fortune. The strikingly different relationship between population density and labour institutions supports the idea that, for these former tropical colonies, population density was a factor for the development of labour institutions through what it meant for available labour supply. Interestingly, the OLS regression in the final column confirms that for other former colonies outside the tropical belt, the reversal holds.

4.7.3 Colonial Labour Availability and Post-Colonial Labour Conflict

In Section 4.5, one of the main results of the theoretical model was the idea that colonies with lower population densities (and therefore, insufficient labour) experienced higher levels of persistent labour conflict. This is pivotal to the hypothesis that links a lack of colonial labour to rigid labour institutions today. In this section, we use a series of

regressions to provide formal evidence that this was the case.

This requires a variable that captures the state of labour relations in the immediate post-colonisation period for each country in the sample. For an overwhelming majority of countries in the sample, the post-colonisation period began between the years 1945 and 1975, at independence. To create the required variable, we collect data on lost days of work due to strikes and lockouts from the van der Velden (2016),[21] and divide this by the total population to arrive at the number of lost days of work per person due to strikes and lockout. The data are averaged over the immediate twenty-year period following the end of colonisation for which data are available. Hence, this variable captures the intensity of labour conflict in the early post-colonisation era and can be used to directly test the previously stated hypothesis. We introduce the natural log of this variable as the dependent variable in regression on colonial labour supply (population density) and other controls. Due to data availability and trimming of some outliers in our dependent variable, we lose a few observations. The results are reported in column (1) of Table 4.7.

The results strongly support the theory outlined in the previous sections. The coefficient on colonial population density (the measure of colonial labour supply) is negative and highly significant. The implication here is that, controlling for other variables included in the regression, a 1 percent increase in colonial labour supply is associated with a 0.78 percent reduction in the number of work days lost, on average, for our sample of tropical dependencies. The magnitude of this effect is large and firmly establishes that in countries with lower colonial labour supply, there existed a culture of conflict-ridden labour relations, as previously proposed by the theory in Section 4.5. This relationship is robust to the inclusion of legal origins and continental controls.

We have also argued that it was the suitability of the tropical dependencies for cash crop production that made them particularly vulnerable to the associations highlighted in the theory. In the subsequent regressions, we provide evidence of this by showing that even within the sample of tropical dependencies, those territories which enjoyed favourable climatic conditions coupled with low population density, had significantly higher levels of labour conflict than other dependencies. To do this, we collect historical rainfall data for over 30 years from the World Bank database, starting from the earliest year where monthly data on rainfall is available. This was generally for 1900-1930, but since the 30-year average level of rainfall scarcely varies, we can expect that this level of rainfall accurately reflects the average level of rainfall for much of the colonial period. We use rainfall data because it is a very simple indicator of the varying suitability of tropical areas to cash crops.[22] This approach is particularly viable as cash crops generally included coffee, cocoa, bananas, oranges, cotton and jute; production of all of which is highly positively correlated with rainfall. Sillah (2014) used panel data to analyse the impact of rainfall and rainfall variability on cash crop production and found that rainfall was a dominant and significant factor in determining cash crop output. In fact, their

[21] This variable is self-explanatory. It counts the total number of days lost due to industrial action across all sectors.

[22] Other influential papers, including Bobonis and Morrow (2014), have taken this approach.

Table 4.7: Labour Supply and Labour Conflict

	Labour Conflict (1)	Labour Conflict (2)	Labour Conflict (3)	Labour Conflict (4)	Labour Conflict (5)	Labour Conflict (6)	Labour Conflict (7)
Log Pre-col. Pop. Den.	-0.780***	4.77*					-0.519**
	(-5.40)	(1.90)					(-2.41)
French Legal Origin	-1.405***	-1.31***	-1.063**	-0.805	-0.747	-0.859	-1.022*
	(-3.47)	(-3.46)	(-2.06)	(-1.48)	(-1.35)	(-1.60)	(-1.76)
Asia	-0.142	-0.778	-0.820	-1.224	-0.846	-1.092	-0.983
	(-0.26)	(-1.18)	(-1.19)	(-1.63)	(-1.10)	(-1.57)	(-1.30)
Log Rainfall		2.616***					
		(4.44)					
Rainfall x Pop. Den.		-1.101**					
		(-2.11)					
H.Rain L.Pop. Den.			1.805***				
			(3.53)				
L.Rain H.Pop. Den.				1.252			
				(1.68)			
H.Rain H.Pop. Den.					-1.244		
					(-1.53)		
L.Rain L.Pop. Den.						-0.474	
						(-0.43)	
Constant	4.183***	-8.79***	3.160***	3.311***	3.274***	3.374***	-5.433***
	(16.88)	(-2.93)	(8.68)	(8.13)	(7.96)	(7.99)	(-10.64)
Observations	42	42	41	41	41	41	35

Notes: * $p < .10$, ** $p < .05$, *** $p < .01$. t-statistics in parentheses. All regressions are OLS cross-section regressions. The dependent variable in regressions (1)-(6) is the natural log of the per person number of days of work lost due to strikes or lockouts (averaged over the first 20-year period following independence). In regression (7), the dependent variable is the log of per capita involvement in strikes and lockouts. Rainfall is in mm and averaged over the period 1900-1930. The sample for these regressions is tropical dependencies. More details on each variable (definitions and source) are available in the Data Appendix.

results indicate that a 1 percent increase in the annual rainfall was associated with a 0.55 percent increase in the short-run, and an even larger (0.782 percent) increase in crop production in the long-run.

The idea that the combination of low population density and high cash crop suitability led to more intense labour conflict suggests that the effect of colonial labour supply on labour conflict is moderated by the relative suitability of territories for cash crop production. When land is highly suitable for cash-crop production, labour supply will have a significant negative relationship with labour conflict. However, when crop suitability is low, the influence of colonial labour supply on early post-colonial labour conflict is diminished. Thus, crop suitability (as measured by natural log of rainfall) acts as a moderator variable. To test this idea, in column (2), we introduce a continuous by continuous interaction — the product of log of colonial population density and log of average rainfall. The resulting coefficient is negative (-1.10) and significant at the 5−percent level. This represents the number of units that the slope of labour

conflict on colonial labour supply changes, given a one unit increase in rainfall. The result implies that at higher levels of rainfall, the slope of post-colonial labour conflict on colonial labour supply gets more negative. In the context of the present analysis, this means that at greater levels of rainfall, decreases in population density are associated with higher levels of conflict. This strongly supports the proposed hypothesis that it is the unique combination of cash crop suitability and low labour supply which acted as the catalyst for greater labour conflict in post-colonial territories. This notion is further confirmed by the average marginal effects estimation presented in Table C1 in the appendix. The coefficients under $\frac{dy}{dx}$ in the marginal effects table give the amount of change in labour conflict with a one unit change in log colonial population density while holding the log of rainfall constant at various values (the simple slopes). From the table, it is clear that at lower levels of rainfall the slope of labour conflict with respect to colonial labour supply is statistically insignificant, but this changes dramatically at higher levels of rainfall (log rainfall$\geq$ 4.8 in the table) where it is significant and negative. This result draws the same qualitative conclusion as that suggested by the coefficient on $Rainfall$ x *Pop.Den.*. Here again, this offers more support for the hypothesis that the effect of colonial population density is moderated by suitable climatological conditions, and lends weight to the idea that the significant relationship between population density and labour conflict measures the effect of colonial agricultural labour supply on post-colonial institutions. Specifically, at higher levels of cash crop suitability, the slope of labour conflict on colonial labour availability is significantly negative; that is, where climatic conditions are such that it favours agricultural mass production, lower availability of labour is associated with higher levels of conflict.

As further evidence of this, columns (3)-(5) test the hypothesis by means of a series of dummy variable regressions which categorise our colonies into four groups. We construct the dummy variables in the following way: we determine the four quartiles of each of the two variables (rainfall and population density) and categorise the countries into two groups, depending on which quartile they fall into for the respective variable. Next, we create a dummy variable to represent each group so that the dummy variables *H.Rain* and *L.Rain* represent territories with rainfall levels in the 4th and 1st quartile ranges, respectively. We do the same for population density to generate the dummies *H.Pop. Den* and *L.Pop. Den.* for high and low population density territories, depending on whether they fall into the 4th or 1st quartile. Finally, we interact the two sets of dummies to generate the following categories of territories: *H.Rain L.Pop. Den.* to represent countries with high rainfall and low population density (that is in the 4th quartile when it comes to rainfall and in the 1st quartile when it comes to colonial population density); *L.Rain H.Pop. Den.* for countries with low rainfall and high colonial population density, *H.Rain H.Pop. Den.* for countries with high rainfall and high population density; and *L.Rain L.Pop. Den.* for countries with low rainfall and low population density.

In column (3), we introduce the dummy variable *H.Rain L.Pop. Den.* to capture the differential effect — among tropical dependencies— of being a territory with highly suitable climatic conditions for cash-crop production, coupled with insufficient colonial labour supply. The coefficient is 1.81 and is significant at the 1−percent level. The

implication here is that low population density territories with climatic conditions more suitable for cash-crop production had, on average, 1.81 percent higher number of lost days of work due to labour disputes than the other tropical dependencies in the immediate post-colonial period. The result offers compelling empirical evidence support the assertion that it was low labour supply in highly crop-suitable environments that led to poor labour relations and institutions. This shows that not only do tropical dependencies differ from the rest of the world in that they have the unique environment and relative factor endowments which ultimately affected the development of labour relations and institutions, but also that, even within the group of dependencies, territories blessed with a fertile land resource but cursed with a low labour supply on the eve of colonisation suffered from worse labour relations.

In columns (4)-(6), to show that the result in column (3) is specific to territories with relative high rainfall but low colonial labour supply, the regression from column (3) is rerun with the dummies representing each of the remaining categories of tropical colonies. A dummy variable for tropical dependencies with relatively high colonial population density but relatively low rainfall is introduced in column (4). The results indicate that the there is no difference between this category of tropical colonies and the rest of the tropical dependencies as a whole. In column (5), the dummy variable representing the category of relatively high population density tropical colonies with higher levels of rainfall is introduced. Here again, the results suggest that there is no significant difference between this category and the rest of the tropical dependencies as a whole. The case is similar when the category of tropical dependencies with relatively low rainfall and population density is tested in column (6). We can conclude, therefore, that while higher levels of colonial labour supply generally led to better labour institutions among tropical dependencies, the tropical colonies with suitable climatic conditions but low colonial labour supply uniquely suffered from more intense labour conflicts than other tropical colonies. This highlights the importance of the colonial cash-crop production incentive, in the face of labour shortages, for the determination of the quality of labour institutions in tropical colonies. In column (7), to test the robustness of the result from column (1), a different measure of the dependent variable (labour conflict) is used. In place of the log of number of days lost due to labour disputes, the log of average number of workers (per 1000) involved in strikes and lockouts, relative to the total population, is used. Here again, the results confirm that which we observed in column (1). Among former tropical colonies, higher levels of colonial labour supply led to significantly less labour conflict in the immediate post-emancipation period. In fact, a 1 percent increase in population density is associated with a 0.52 percent decrease in the number of workers involved in strikes and lockouts.

4.7.4 An Instrumental Variable (IV) Approach

In the previous subsection, our analysis relied on OLS estimates to assess the significance of the relationships between colonial labour supply, labour conflict, and labour institutions. In this subsection, we test the robustness of these relationships by controlling for potential endogeneity between our measure of labour supply and outcome variables. In

Chapter 2, we discussed the sources of endogeneity in regressions of the form we are studying here. Much of the reasoning highlighted in Chapter 2, Section 2.4.2 applies here. We will, therefore, not repeat the discussion, but proceed to an introduction of an instrumental variable approach and repeat our core regressions to ensure that our conclusions are free from endogeneity bias. For this approach to work, we need a suitable instrument that is exogenous, correlated with our measure of labour supply, and (conditional on the controls included in the regression) has no significant direct relationship with our dependent variable.

One such variable is population density in the year 1000. According to Acemoglu et al. (2002, p.1252)[23], "instrumenting population density in the year 1500 with population density in [the year] 1000 isolates the long-run component in 1500 that is correlated with population density in 1000." Following the method of Acemoglu et al. (2002), we use population density in the year 1000 as our instrument. This instrument works as population density in 1000 is at least 500 years prior to the colonisation of any of the countries in our sample, and is, therefore, orthogonal to any European colonial policy and institutions which might have affected the supply of labour. The second reason why this serves as valid instrument is that it compellingly satisfies the exclusion restriction. As suggested by Acemoglu et al. (2002), we fully expect that any effect of population density in 1000 on colonial labour supply necessarily goes through colonial population density.

Our first two-stage instrumental variable regression repeats the regressions in the B-labelled columns of Table 4.5[24], and is of the following form:
The First Stage: the regression of colonial labour supply on the log of population density in the year 1000.

$$LPD_i = \mu + \lambda LPD1000_i + \eta_i \tag{4.15}$$

The Second Stage: the regression of labour institutions today on instrumented colonial labour supply.

$$flex_i = \gamma_0' + \gamma_1' LPD_i + \boldsymbol{X}_i' \gamma_2' + \nu'_i \tag{4.16}$$

where LPD is log population density on the eve of colonisation, $LPD1000$ is log population density in 1000, η is an error term, $flex$ is our measure of present day labour institutions, and $\boldsymbol{X'}$ is a vector of covariates. We expect that higher population density in 1000 is associated with higher colonial population density so that $\lambda > 0$. The results of this two-stage least square regression are presented in Table 4.8.

The table presents the two-stage least square regressions using the log of population density in 1000 to instrument log population density on the eve of colonisation for four

[23] Acemoglu et al. (2002) use population density in the year 1000 to instrument population density in 1500 in their famous reversal of fortune paper. See Table V on page 1250 of their article.

[24] We also conduct an instrumental variable regression counterpart to the OLS regression with all the controls as in Column (4) of Table 4.4, but we do not discuss it at length here as the following regressions more fully examines the differential relationship between colonial labour and labour institutions today in the different samples. Nevertheless, the results (similar to the OLS) are presented in Table C1 in the appendix to this chapter.

Table 4.8: IV Regression: Labour Institutions and Colonial Labour Supply

	Panel A: Two-Stage Least Square Dependent Variable Dependent Variable is Flexibility Score				
	Tropical Dependencies	Other Colonies	Never Colonised	Rest of the World	Tropical Dependencies
Log Col. Pop. Density	0.187**	0.003	-0.095	-0.052	0.186**
	(2.47)	(0.04)	(-1.19)	(-1.50)	(2.44)
Legal Origin	-0.260*	-0.141	-0.831***	-0.458***	-0.252*
	(-1.95)	(-0.58)	(-6.25)	(-3.00)	(-1.88)
Log GDP per Capita	0.045	0.840***	0.350	0.409***	0.042
	(0.20)	(3.51)	(1.45)	(3.40)	(0.18)
Asia	-0.330	0.548*	-0.116	0.259*	-0.319
	(-1.28)	(1.80)	(-0.59)	(1.65)	(-1.20)
Africa	-0.143	0.220		-0.037	-0.123
	(-0.70)	(0.66)		(-0.17)	(-0.56)
Pop. Change					-0.025
					(-0.18)
R^2	0.15	0.61	0.41	0.32	0.15
	Panel B: First Stage for Log. Population Density				
LPD1000	0.816***	0.878***	0.757***	1.062***	0.817***
	(10.35)	(16.75)	(5.65)	(22.67)	(9.99)
Legal Origin	-0.039	-0.621***	-0.335	-0.703***	-0.056
	(-0.17)	(-3.03)	(-1.23)	(-3.60)	(-0.27)
Log GDP per Capita	-0.461**	-0.414**	0.951***	0.207	-0.455**
	(-2.34)	(2.19)	(3.05)	(1.15)	(-2.18)
Asia	1.278***	0.072	-0.435	-0.825***	1.256***
	(5.46)	(0.22)	(-1.03)	(-3.93)	(6.86)
Africa	0.791***	0.248		-0.456*	0.746***
	(3.37)	(0.84)		(-1.83)	(4.06)
Pop. Change					0.058
					(0.23)
N	51	24	39	65	51

Notes: N is the number of countries in each regression. We lose a few observations as we do not have data on population density in the year 1000 for all countries. All regressions are estimated as two-stage least square regressions. The relevant test-statistics are in parentheses below the coefficients. The measure of labour institutions is the labour market flexibility score (average 2008-2016) from the World Economic Forum's GCI, which is measured on a scale of 1 to 7. A higher score indicates better institutional quality. * $p < .10$, ** $p < .05$, *** $p < .01$. All regressions were ran with constants, though they are not reported here to keep the table brief. The second-stage constants are 4.29, 1.03, 3.61, 3.11, and 4.35 respectively. The control for population change is the average of annual growth rate between 1960 and 2010.

samples of countries: our tropical dependencies, other colonies outside the tropical belt, countries never colonied, and a combined sample of all countries not in our tropical dependency sample (i.e. the ROTW). The first stage regression is reported in Panel B (corresponding to Equation (4.15)) while the second stage is reported in Panel A (Equation (4.16)). For all regressions we see a highly significant, positive first-stage relationship between the log of population density in 1000 and log population density on the eve of colonisation (colonial population density), supporting our assertion that population density in 1000 serves as a valid instrument. In the first column (for example), the coefficient on log population density in 1000 is 0.816 and the t-statistic is 10.35. As further evidence of the validity of our instrument, we present the first stage post-estimation tests of instrument validity. The test results in Table 4.9 include the first-stage adjusted r-square, Shea's partial r-square, and the F-statistics and their significance, which we can compare against the Stock et al. (2002) recommended threshold for a strong instrument.[25] The F-test statistics are always comfortably over 10 (107, 280, 31, and 513) and significant at all levels for all our first-stage regressions. The adjusted Shae's partial r-square and the standard adjusted r-square are always above 50, which suggests that we do indeed have a very strong instrument. Furthermore, in all first-stage regressions in Table 4.8, the log of colonial population density in 1000 is with the expected positive sign.

In the first column of Table 4.8, the two-stage least square regression is for the sample of countries which we have referred to as tropical dependencies. The coefficient on the log of population density on the eve of colonisation is 0.187 and significant at the 5-percent level. The result suggests that 1 percent higher colonial population density is associated with a score for labour institution quality which is 0.042 percent higher, relative to the average score for tropical colonies. This estimate supports our theory that as far as tropical dependencies are concerned, areas with stronger supplies of labour, as measured by colonial population density, enjoy significantly better labour institutions today. The coefficient of the two-stage least square regression is noticeably larger in magnitude (0.187) than that of the OLS regression (0.133) in Table 4.5. This leads us to believe that attenuation bias from measurement error, rather than upward bias from the omitted relationship between colonial institutions, colonial labour supply and labour institutions today, was the dominant form of bias in the OLS estimates. Legal origin as a determinant of labour institutions today is still significant (at the 10-percent level) among tropical dependencies. As it was in the OLS, countries with French legal origin experience more rigid (less flexible) labour institutions today. The magnitude of the coefficient has changed little from the OLS result. Furthermore, as we observed from the OLS regressions, the relationship between colonial labour supply and the quality of labour institutions today is unique to our sample of tropical dependencies.

We observe no such relationship for the sample of 'Other Colonies' (colonised countries outside of the tropical region), nor do we observe this relationship for countries that were not colonised. When we perform the regression for the rest of the world (all countries falling outside our tropical dependencies sample altogether, as seen in the fourth

[25] Stock et al. (2002) recommend that the F-test statistic exceeds 10 for an instrument.

Table 4.9: Weak Instrument Tests

Weak Instrument Test Statistics				
Sample	Adj. R^2	Shea's Adj. Partial R^2	Robust F-Statistic	Prob>F
Tropical Dependency	0.81	0.61	107	0.000
Other Colonies	0.97	0.87	280	0.000
Never Colonised	0.79	0.53	31	0.000
ROTW	0.89	0.89	513	0.000

Notes: Each of these statistics are for the excluded instrument and assess the strength of the instrument. In addition to the significance of the instrument in the first stage regression, Stock et al. (2002) recommend that the F-statistic exceed 10. A high r-square is also evidence of a strong instrument. This test was implemented using STATA's *estat firststage* command.

regression in Table 4.8), we see that the relationship between colonial population density and labour institutions today remains unique to our sample of tropical dependencies. The coefficients on colonial labour supply are 0.003, −0.095, and −0.052, respectively, and are never significant for the other samples. This lends further support to our assertion that it is colonial population density as a rough measure of colonial labour supply, rather than an indicator of other factors (such as income), that is being captured here. Nevertheless, we include a control for income (log GDP per capita, average 2000-2010) to control for the effect of income on labour institutions, and continental dummies to root out continent-specific effects in all our regressions. The results of the IV regression mirror that of the OLS in every instance. In the final column of Table 4.8, we introduce a control for population change into our main regression (from Column (1)). The variable *Pop. Change* is the average annual growth rate of population from 1960 to 2010, as reported by the World Bank. The introduction of a control for population change does not alter our findings. The coefficient on colonial population density is 0.186 and significant at the 5-percent level, indicating that the effects of colonial labour availability on labour institutions today persist even when we control for population change.

The second set of regressions which we repeat using instrumental variables to control for potential endogeneity are the key relationships from Table 4.7. The main regression in this table (Column (1)) estimates the relationship between colonial labour supply and post-colonial labour conflict. Tables 4.10 and 4.11 report the result of the instrumental variable regression counter part to this OLS regression.

In Column (1) of Table 4.11, we see the results of the first-stage regression of colo-

Table 4.10: Post Colonial Labour Conflict and Colonial Labour Supply

Two-Stage Least Square Dependent Regression			
	Labour Conflict (1)	Labour Conflict (2)	Labour Conflict (3)
Log Col. Pop. Density	-0.639**	-0.519*	-0.612**
	(-2.31)	(-1.65)	(-2.06)
Legal Origin	-1.038**	-0.759*	-0.828*
	(-2.53)	(-1.87)	(-1.82)
Asia	-0.980*	-1.156*	
	(-1.68)	(-1.65)	
Pop. Change		-0.718**	-0.366
		(-2.35)	(-1.22)
Log Rainfall			0.927*
			(1.87)
Constant	3.948***	5.326***	-0.019
	(10.78)	(11.04)	(-0.01)
R^2	0.38	0.43	0.45
N	38	38	38

Notes: All regressions are estimated as cross-sectional two-stage least square regressions for our sample of tropical dependencies. The above results are the second-stage estimates. N is the number of observations in each regression. We lose a few observations as we do not have data on population density in the year 1000 for all countries. The z-statistics are in parentheses below the coefficients. The measure of labour conflict is the log of the number of work days lost due to strikes and lockouts. * $p < .10$, ** $p < .05$, *** $p < .01$. The control for population change is the average of annual growth rate between 1960 and 2010.

Table 4.11: First Stage Regression: Labour Conflict and Colonial Labour Supply

First-Stage Dependent Variable: Log Col. Pop. Density			
	(1)	(2)	(3)
LPD1000	1.014***	0.926***	0.972***
	(7.96)	(7.18)	(6.40)
Legal Origin	-0.102	-0.295	-0.336
	(-0.38)	(-1.25)	(-1.20)
Asia	0.874***	0.925***	
	(5.01)	(4.66)	
Pop. Change		0.522**	0.417*
		(2.41)	(1.75)
Log Rainfall			-0.274
			(-0.99)
Constant	0.799***	-0.272	1.444
	(3.44)	(-0.41)	(0.91)

Notes: All regressions are estimated as cross-sectional two-stage least square regressions for our sample of tropical dependencies. The above results are the first-stage estimates. The dependent variable is population density on the eve of colonisation. The t-statistics are in parentheses below the coefficients. * $p < .10$, ** $p < .05$, *** $p < .01$. The control for population change is the average of annual growth rate between 1960 and 2010.

nial population density on the natural log of population density in 1000. The estimate is 1.01 with a t-statistic of 7.96, confirming the required first-stage significant relationship between our instrument and colonial population density.[26] Our coefficient of interest is that on the log of colonial population density in Column (1) of the second-stage results in Table 4.10. It captures the relationship between colonial labour supply (measured by instrumented population density on the eve of colonisation) and labour conflict (measured by the natural log of the number of days of work per capita lost due to strikes and lockouts). The estimate is -0.64, with an associated z-statistic of -2.31, significant at the 5-percent level. The absolute value of the coefficient is smaller than that of the OLS (-0.78), but reaffirms our finding in Column (1) of Table 4.7. That is, for our sample of tropical dependencies, territories with a larger supply of colonial labour had significantly less post-colonial labour conflict. In fact, according to our IV estimates, a 1 percent increase in colonial labour availability was associated with a 0.64 percent reduction in the number of days of work lost due to strikes and lockouts in the post-colonial period.

In the regression (2), we introduce our control for population change into the regression. The first-stage relationship remains highly significant. As for our second-stage regression, the absolute value of the coefficient on our measure of colonial labour availability falls to 0.52, but remains significant at the 10-percent level and keeps its negative sign. Legal origin is also now significant at the 10-percent level. Thus, even in the presence of a control for population change, we see that higher colonial labour availability was associated with lower levels of post-colonial labour conflict. In Column (3), we introduce rainfall into the regression.[27] The coefficient on this variable is 0.93, and its positive sign accords with what we observed in the OLS regression in Table 4.7. That is, higher suitability for cash-crop production is associated with increaseed post-colonial labour conflict.

The OLS regressions (2) and (3) from Table 4.7 estimated the relationship between colonial labour availability and post-colonial labour conflict conditional on the suitability of the country for cash-crop production. This suitability is measured by the 30-year average rainfall from 1900-1930. We attempted to repeat these regressions using the log population density in 1000 as our instrument for colonial population density. To do this, we needed an instrument for the interaction terms in regressions (2) and (3) as well. One potentially suitable instrument is an interaction between rainfall and the population density in 1000.[28] Unfortunately, this interaction does not yield the required first-stage relationship and we are unable to test the rainfall-moderated relationship between colonial population density and labour conflict with instrumental variables.[29] In the absence

[26]The corresponding F-statistic is 63, well above the recommended 10 and is significant at the 1-percent level.

[27]We have already shown that the literature (for example Sillah (2014)) finds that cash-crop production is directly dependent on rainfall levels.

[28]See Wooldridge (2010, p.143-145) which shows that interacting the exogenous regressor (which forms part of the interaction) with the instrument and including it as an instrument for the interaction term is a viable approach, provided the instrument is strong enough.

[29]The first-stage coefficient on the interaction term between the log population density in 1000 and rainfall is 2.61 and the t-statistic is 1.30 and, therefore, insignificant. We were unable to find a different

Table 4.12: Endogeneity Test

Test of Endogeneity		
	Ho: variables are exogenous	
Robust score $\chi^2(1)$	1.974	$p = 0.160$
Robust regression F(1, 38)	1.893	$p = 0.178$

Notes: The table details the results of the Durbin and Wu-Hausman endogeneity test. Yhe null hypothesis is that colonial population density is exogenous to post-colonial labour conflict.

of a suitable instrument to reproduce the instrumental variable counterparts of regressions (2) and (3) from Table 4.7, we sought to determine whether we can rely on the OLS results in Table 4.7 for these two regression. Colonial population is the potentially endogenous variable in question. We therefore test whether colonial population density (taken at the latest available date before colonisation) can be treated as exogenous in the post-colonial labour conflict regression. If it is exogenous, then we can accept the results of the OLS for these two regressions as the OLS would be more efficient in such a case. The process involves running the regression as specified in Column (1) of Table 4.10 and using STATA's *estat endogenous* command. This command implements the Durbin-Wu-Hausman test (Cameron and Trivedi, 2009, p.183). Table 4.12 reports the results of the test for endogeneity of colonial population density to labour conflict.

The null hypothesis is that the log of colonial population density is exogenous in the post-colonial labour conflict regression. From the results, we see that both test statistics are insignificant ($p = 0.16$ and $p = 0.18$). Thus, we cannot reject the null of exogeneity. This suggests that we can rely on the OLS estimations in Column (2) and (3) from Table 4.7, which concluded that the effect of colonial population density is moderated by cash-crop suitability. That is, in areas more suited for cash-crop production, having lower levels of available colonial labour is associated with significantly more labour conflict in the post-colonial period.

The above instrumental variable approaches act as an effective check on the robustness of our OLS results to potential endogeneity problems. Both approaches produce evidence to support our hypothesis, which assigns a crucial role to the impact of colonial labour issues on the outcome of labour institutions today.

4.8 Conclusion

This chapter posits an alternative theory regarding the determinants of the quality of labour institutions. It assigns a crucial role to the historical and socio-economic context in which labour relations and institutions evolved. The notion that colonial labour relations had a role to play in the development of labour institutions is strongly supported

suitable instrument for the interaction term.

by the results. We have seen a persistent and significant positive relationship between the quality of labour institutions today and colonial labour availability. That this relationship is unique to the former tropical colonies — where labour-intensive colonial exploits existed — serves as further evidence in support of the theory. Consequently, the work presented here links the relationship between labour relations and colonial labour availability to the incentives generated by the agricultural production opportunities present during the colonial period. It is useful to borrow from the natural resource curse literature to better understand this idea. The abundance of suitable agricultural land motivated an interest in cultivation which could not be readily satisfied, at any wage, by the available labour force. This led to the development of restrictive, often repressive labour institutions and the erosion of amicable labour relations over time. This is the state of relations which still characterises the labour market in ex-colonies today.

The results presented above make a meaningful contribution to the arguments surrounding the discussion around the determinants of labour institutions. The fact that historical labour problems are evidently linked to labour institutions today suggests that we must consider the historical settings in which labour institutions developed when considering labour policy. It is not incidental that the relationship between the colonial labour problem and present day labour institutions is unique to the tropical region, where labour-intensive colonial production made the availability of labour of paramount relevance to the development of society. Economists must therefore consider that the factors which determine institutional outcomes are not homogeneous across all countries. Treating them as such leads to naive cross-country comparisons which mask important effects and yield misleading conclusions. In a region such as the Caribbean, where the plantation society, still in existence, is a by-product of the forced relationship between land, labour and capital, historical labour problems and labour institutions are inextricably linked. This may not prove to be the case in societies that developed in a more 'natural' way.

Further research into this idea would prove rewarding. Despite the novel attempt of the present work, certain difficulties remain for this and future work. The unavailability of data for several of the countries in the sample of tropical dependencies means that the analysis relies on a relatively small sample size. In addition, the analysis would benefit from a suitable measure of early labour institutions. Unfortunately, such an objective measure is not available. Moreover, future research ought to look into seeking remedies to the difficulties posed by the state of current labour relations in these countries and how these solutions can be feasibly applied. With more comprehensive data and more suitable measures, this research agenda may develop significantly. Nevertheless, the results of this chapter, which uses both two-stage least square and OLS techniques, are plausibly robust and stand as a contribution to the existing literature on the determinants of labour institution.

Concluding Remarks and Further Research

Throughout its chapters, this thesis has connected institutional development to present day outcomes taking a closer look at the interests and motivations of institutional architects over a country's history. This work has focused on the colonial period due to the widely recognized relevance of this era for the institutional development of many countries. By using contemporaneous and recent evidence from the history literature and supplementing it with empirical analysis, the work presented in this thesis offers compelling evidence of a systematic relationship between colonial factors and present-day outcomes. The literature surveyed and the unique data gathered from original manuscripts help draw evidenced-backed conclusions on colonial era institutional choices and the heterogenous development paths we observe today. The chapters of this thesis each contribute to our understanding in a unique way.

Chapter 1 contributes answers to questions regarding the underdevelopment of Jamaica. It provides evidence which improves our understanding of the consequences of a political and economic system where private entrepreneurs hold a disproportionate amount of power, and economic interests that are at odds with the welfare of the mass of the population. By looking at public investment under two differently forms of government, the chapter offers empirical evidence that economic policy is, to a significant extent, determined by the institutional environment from which it originates. Chapter 2 offers a unique contribution to the scarce literature on the economic divergence of the former sugar colonies in the West Indies. In it, a comprehensive explanation is offered for the puzzling reversal in economic fortunes of Jamaica and Guyana, relative to the other British Caribbean sugar colonies. There has not yet, until now, been a rigorous systematic examination of this divergence, and no previous work, to this author's knowledge, has offered an econometric investigation of the origins and causes of this divergence. Chapter 3, with its survey of the African literature, is able to connect the theory with the experiences in other colonies. In so doing, it enhances the credibility of our arguments and shows that the relationships described in this thesis were pervasive and systematic. Chapter 4 contributes to both the historical economics literature and research on the political economy of labour institutions in post-colonial tropical states. By connecting the legacy of colonial labour relations to the nature of labour institutions today, this chapter deepens our understanding of the persistence and consequences of

a culture of conflict between economic agents. The evidence presented that colonial labour problems had repercussions for the long-term development of labour institutions through what they meant for labour relations is a novel contribution of this work.

As with all research, there are a few limitations to this thesis. Three limitations worth mentioning in the present work concern the availability of data, measurement issues and the dearth of previous research into several of the areas of focus in this thesis. Where data availability is concerned, the poor record keeping and statistical infrastructure of many developing countries, in addition to the fact that historical records are often rare and inconsistent, have made compiling a complete dataset for analysis very challenging. As such, the samples under consideration in these chapters have at times been small. This raises questions as to the validity of inferences made from the results. To ensure that the samples remained representative, every effort was made to gather as much data as possible, and meticulous and, at times, tedious work went into generating sample sizes that were as large as possible. In light of this, we are confident that the results and inferences from these essays are valid where they apply. With respect to the second limitation that has been identified, because this work is concerned with the concept of institutions, a concept that is difficult to restrict to a concise definition, it has been difficult to obtain indicators that comprehensively and precisely measure institutions or institutional quality. As much as was possible, this work relied on the existing literature for these indicators, and several different measures were used in order to ensure that this concept was effectively captured. To the limitations created by the lack of existing research; while there is a lot of literature in historical and institutional economics, theoretical and empirical work focusing on the institutional variation and economic divergence among post-colonial states is still quite rare. As a result, the present work could not draw on a wide range of theories and/or established ideas to aid in explaining some of the results of this thesis. Nevertheless, as much as possible, the findings in this work have been discussed with due consideration of the current literature, and a multidisciplinary approach was adopted to connect this thesis to as much of the scholarly work as appropriate.

This approach charts one of the possible paths forward for future research into the ideas tackled in these four essays. More collaboration with the history and sociology literature would go a long way towards understanding how institutions are affected by historical and cultural factors and how these, in turn, affect economic development. Post-colonial societies, like the ones studied in this research, still largely reflect the structures put in place during the colonial period. A deeper understanding of how their sociological characteristics interact with the economic realities offers a possible avenue to be explored with econometric rigour. Furthermore, future research should seek to carry out deeper microeconometric analysis of some of the questions raised in this research. A more disaggregated approach would offer more specific answers to how history and culture, working through institutions, continue to affect economic development. The difficulty in acquiring such disaggregated data from existing sources notwithstanding, such a project may yet be worthwhile. On that note, another avenue through which the research presented in these essays may be taken forward is in establishing a digital

database from the rare data uncovered in the course of this project. Having collected copies of the original manuscript of the colonial Blue Books for over one hundred years for several British West Indian colonies, digitizing and making this data available to persons interested in work in this field of economics will certainly contribute to this body of research. There is still much of the data collected during this research that is yet to be analysed. Doing so is expected to uncover many more interesting findings.

Data Appendix

Data For Chapter 1

Daily Agriculture Wage Rates are (sterling) wages as reported in the colonial Blue Books of the respective countries for the years as reported. Where wages were reported weekly, we divided it by 5 working days to arrive at the daily wages. Colonial Blue Books of all British West Indian territories for the years 1838-1915 (with some gaps for a few territories) are available at the Cambridge University Library and the British Online Archives.

Hurricane as used in the text in Chapter 1 is a dummy variable = 1 if the country experienced a hurricane in the year in question and 0 otherwise. Hurricane data are from Dippel et al. (2015).

Order - Resource Ratio (*ORRatio* in the text) is the ratio of policing expenditure to public investment in health and education. It is calculated by dividing policing expenditure by the sum of expenditure on human resources (i.e. health and education).

Policing Share of Expenditure (*Police shr.* in the text) is the sum of the share of total expenditure accruing to expenditure on police and prisons. Data on this is collected from the Colonial Blue Books of each Jamaica and Antigua for the years 1838-1915 available at the Cambridge University Library and the British Online Archives.

Public Debt is government debt of the territories as reported in the *Statistical Abstract for the Several Colonial and Other Possessions of the United Kingdom* for various years. Retrieved from: https://parlipapers.proquest.com.

Public Investment is the sum of the expenditure shares of **health**, **education** and **infrastructure** out of total expenditure, unless otherwise noted in the text. Data on these expenditures are collected from the Colonial Blue Books of Jamaica and Antigua for the years 1838-1915, available at the Cambridge University Library and the British Online Archives.

Real Revenue is total revenue collected by the island government for the fiscal year. It is converted to real terms using CPI data from the Bank of England's collection of

Three Centuries of Data, retrieved from:
https://www.bankofengland.co.uk/statistics/research-datasets

Sugar Price is the sterling price (in shillings (s)) per c.w.t of sugar on the London Market for the year reported. It is retrieved from Eisner (1961, p. 244-266).

Sugar Share of Export (*sugshr* in the text) is taken from the Colonial Blue Books of Jamaica and Antigua for the years 1838-1915, available at the Cambridge University Library and the British Online Archives. It is calculated as the total value of sugar exports divided by value of total exports.

Data for Chapter 2

Natural Increase is calculated as the birth rates minus death rates averaged over the period 1850-1900. Data on birth and death rates is from Bulmer-Thomas (2012).

Pop. Density 1834 is the number of slaves per square kilometre in 1834. These data are from Higman (1986, p.608).

Real GDP per Capita in Table 2.8 is the log of GDP per capita (constant 2010 US$) in 2013, retrieved from FRED Economic Data. For the OLS regressions, GDP per capita is log of average GDP per capita for 1977- 2014, retried from the World Bank. See https://fred.stlouisfed.org and https://data.worldbank.org/.

Slave Holdings Data are from Higman (1995) as used by Nunn (2008). It measures the fraction of slaves in the territory who reside on holdings of a particular size.

Sugar Price Index and **Agriculture Wage Index** are, as the names suggest, a price index of sugar and an index of wages spanning various years. The data for these variables are from Bulmer-Thomas (2012), which features an online appendix of supplementary material at https://cambridge.org.

Sugar Suitability data measures the suitability of soil to sugar cane production based on geographical variables. Data for this variable comes from Dippel et al. (2015).

The following are definitions of institutional measures according to the World Bank Governance Indicators Website: info.worldbank.org/governance/wgi. Data for these measures are the collected as the average score for the period 1996 to 2013.

Control of Corruption captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.

Government Effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.

Political Stability and Absence of Violence measures perceptions of the likelihood of political instability and/or politically motivated violence, including terrorism.

Regulatory Quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.

Rule of Law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.

Voice and Accountability captures perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.

Data for Chapter 4

Flexibility is from the World Economic Forum's Competitiveness Index and is averaged over the years 2008-2016. It is measured by aggregating five subcomponents which include: (*i*) Cooperation in labour-employer relations, (*ii*) Flexibility of wage determination, (*iii*) Hiring and firing practices (*iv*) Redundancy costs, and (*v*) Effect of taxation on incentives to work. The indicator is measured on a scale of 1 to 7 with 1 being the lowest. Retrieved from www.weforum.org.

Informality is measured as the size of the shadow economy as a percentage of GDP in 2004. Data on this variable comes from Botero et al. (2004).

Labour Conflict is measured as the number of days of work (per capita) lost due to strikes and lockouts and alternatively, the fraction of the population involved in strikes and lockouts. This data is collected from van der Velden (2016) and averaged over the first twenty years of each country's independence. Data on the number of strikes (as show in Table 4.3) comes from the International Labour Organisation database: https://www.ilo.org/global/statistics-and-databases/statistics-overview-and-topics/social-dialogue/lang–en/index.htm

Legal Origins is a dummy variable = 1 if the country is of French legal origin and 0 otherwise. Data on this variable is taken from La Porta et al. (1999).

Log GDP per capita: is in constant 2005 US dollars, averaged over the years 2000-2010, as available from the World Bank. See data.worldbank.org

Population Change is the average of annual population growth from 1960 to 2010, retrieved from the World Bank website: See data.worldbank.org

Population Density on the Eve of Colonisation measures the number of persons per square kilometre of arable land on the eve of colonisation (the latest year before the arrival of the first governor or colonisation onset as identified by Lange et al. (2006). Data for this variable is taken from Acemoglu et al. (2002) and McEvedy et al. (1978).

Population Density in 1000 measures the number of persons per square kilometre of arable land in the year 1000. Data for this variable is taken from Acemoglu et al. (2002) and McEvedy et al. (1978).

Rainfall is from the World Bank Data gathered in Mitchell et al. (2004) and It is measured in mm for the period 1900-1930.

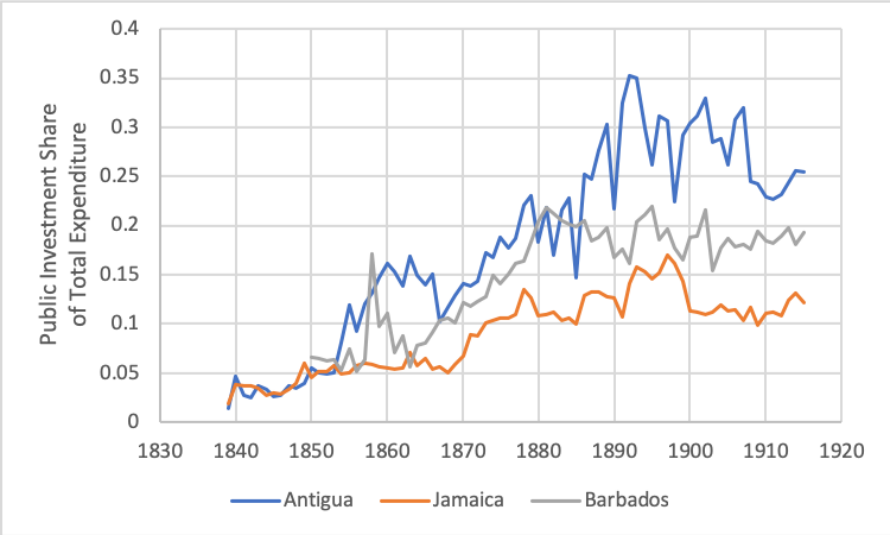
Tropical Dependency Is a dummy variable = 1 if the country is an ex-colony and falls between the Tropic of Cancer in the Northern Hemisphere at 23.43678 degrees North, and the Tropic of Capricorn in the Southern Hemisphere at 23.43678 degrees South.

Urbanisation is the Bairoch equivalent urbanisation rate in 1500 from Fink-Jensen (2005).

Sources for other data points used in the text are listed under their respective tables and figures.

Appendices to Chapter 1

Figure A1: Public Investment Share of Expenditure



Source: Colonial Blue Books of Antigua (1838-1916), Jamaica (1838-1916), and Barbados (1838-1916).

Figure A2: Jamaica Blue Book Data: Expenditure Shares & Sugar Share

Blue Book Year	Public Invest. Share	Sugar Share of Export	Education Share	Infrastructure Share	Health Share	Prisons & Policing share
1839	.0361167	.761978	.0024675	.0171993	.0164499	.
1840	.1240214	.	0	.0860507	.0379707	.1378513
1841	.1054374	.	.0078711	.0685633	.029003	.2581167
1842	.0870065	.644815	0	.0495005	.037506	.2403882
1843	.0757333	.60208	.0027659	.0415699	.0313976	.2282538
1844	.0396065	.544089	.0006801	.0120611	.0268653	.2255639
1845	.0788863	.547219	0	.0484872	.0303991	.2301674
1846	.0749468	.679569	.0027133	.0464496	.0257839	.2198666
1847	.0625417	.587592	.0080051	.0295796	.0249569	.1752612
1848	.0758801	.495086	.0099474	.0365507	.029382	.2052339
1849	.	.584889	.0058591	.	.0538708	.179131
1850	.0770591	.66284	.0041618	.0314927	.0414045	.1399288
1851	.0693605	.437019	.0133028	.0175726	.038485	.1595846
1852	.0571539	.476278	.0035684	.0055841	.0480015	.2082132
1853	.0672334	.492356	.0052165	.0100555	.0519614	.203262
1854	.0554171	.669652	.0029236	.0067589	.0457345	.2143993
1855	.0751823	.303079	.0048102	.0244161	.0459561	.1838891
1856	.0745228	.455234	.0117033	.0173982	.0454214	.1939581
1857	.0733877	.484854	.0106153	.0130852	.0496872	.1960098
1858	.0676078	.539262	.0079027	.0086367	.0510685	.1815874
1859	.0628972	.510634	.014561	.0061667	.0421695	.1616514
1860	.0775896	.522473	.0079446	.0229023	.0467428	.1704078
1861	.0681434	.489938	.0092453	.014217	.0446811	.1463466
1862	.0695426	.452178	.0109727	.014227	.044343	.1461494
1863	.0789333	.475951	.0137797	.008396	.0567576	.1517967
1864	.0614038	.535091	.0069074	.0042263	.0502702	.1518702
1865	.0764601	.471802	.0110912	.0112194	.0541496	.1636052

1866	.1294616	.483487	.0086706	.0750772	.0457138	.1441145
1867	.106923	.427842	.0120325	.0506965	.0441941	.1416266
1868	.1056201	.484197	.011483	.0550341	.039103	.1749274
1869	.13008	.401788	.0159043	.0710481	.0431276	.1452286
1870	.1866103	.383629	.0223119	.119835	.0444635	.145664
1871	.2274904	.474229	.027893	.1388566	.0607408	.1493042
1872	.2138706	.407267	.0282835	.1258435	.0597437	.130401
1873	.2231183	.394192	.0371626	.1222887	.063667	.1350002
1874	.2369311	.33478	.0370476	.1329535	.06693	.1291505
1875	.2334902	.32219	.0350877	.1276478	.0707546	.1282463
1876	.2393491	.27208	.039585	.1332852	.0664788	.1432187
1877	.243384	.36411	.039744	.1341891	.0694509	.1417966
1878	.2363568	.313129	.0422184	.1011935	.0929449	.1456351
1879	.2198311	.306057	.041586	.0939091	.084336	.1327158
1880	.2070208	.329036	.0372454	.0980804	.071695	.115072
1881	.2170701	.28585	.0378489	.10775	.0714713	.1146751
1882	.192395	.404384	.0325239	.0804333	.0794378	.109593
1883	.17672	.37541	.0344194	.073445	.0688556	.0975161
1884	.1720132	.288712	.0367404	.0663686	.0689043	.0978733
1885	.1579546	.218495	.0370299	.0581979	.0627268	.0855761
1886	.211716	.163453	.0495266	.0822207	.0799687	.1078083
1887	.2055543	.175372	.051571	.0728023	.081181	.1032931
1888	.2131138	.157726	.055588	.0804819	.077044	.1042125
1889	.2079293	.151328	.0548552	.0806784	.0723956	.0972079
1890	.2534694	.	.0565677	.1273347	.069567	.0962951
1891	.2076996	.11887	.0454671	.1008511	.0613815	.07915
1892	.2446159	.148351	.0699809	.1032438	.0713912	.0894714
1893	.227666	.137336	.0870303	.0695475	.0710882	.0891058
1894	.2293212	.135976	.0821716	.0768072	.0703425	.0890319

1895	.2235645	.124496	.0768308	.0774697	.069264	.0903491
1896	.2464723	.104068	.0810602	.0942327	.0711794	.096507
1897	.2268335	.101126	.0905212	.0566133	.079699	.1112629
1898	.2400782	.083919	.0875434	.0790551	.0734797	.1070079
1899	.2192774	.090411	.0795043	.0760375	.0637357	.097775
1900	.1827171	.104442	.0595519	.0698127	.0533526	.0965828
1901	.1825869	.097208	.0590845	.0703891	.0531134	.0941427
1902	.1794152	.067403	.0579906	.0693188	.0521058	.0977041
1903	.2041925	.045002	.05954	.0918441	.0528085	.095045
1904	.2134486	.078873	.0661528	.093666	.0536298	.1017093
1905	.193602	.080994	.05998	.0798918	.0537301	.0969177
1906	.203113	.066368	.0569123	.0890956	.0571051	.0941466
1907	.2106374	.059512	.0530971	.1074672	.0500731	.0990293
1908	.2499037	.046198	.0637438	.1332647	.0528952	.0908786
1909	.2617591	.033967	.0510672	.162796	.0478959	.0765197
1910	.2576483	.046247	.0559869	.1471794	.0544821	.079081
1911	.2632627	.084787	.0607748	.1516028	.0508851	.0704467
1912	.255567	.049016	.0593913	.1477202	.0484554	.0620492
1913	.2371623	.021468	.065398	.1126237	.0591406	.0734505
1914	.2302308	.065568	.0688752	.0983131	.0630424	.0819194
1915	.2219806	.114952	.0652526	.1002298	.0564982	.0773698

The Comparative Approach

From (1.19), consider the effect of the strength of the plantation economy on public investment for Jamaica and Antigua before the pre-constitutional change. That is:

for Jamaica, we set $Post = 0$ and $Jam = 1$ and differentiate PI with respect to $Sugshr$:

$$\frac{\partial PI}{\partial Sugshr} = \mu_1'' + \mu_3'' \tag{A1}$$

for Antigua, we set $Post = 0$ and $Jam = 0$ and differentiate PI with respect to $Sugshr$:

$$\frac{\partial PI}{\partial Sugshr} = \mu_1'' \tag{A2}$$

Thus, the difference in the slope (effect of the strength of the plantation economy) between Jamaica and Antigua during planter rule is given by (A1)−(A2)= μ_3''.

Similarly, we can derive the effect of the plantation economy on public investment in the post-constitutional change period as:

for Jamaica, we set $Post = 1$ and $Jam = 1$ and differentiate PI with respect to $Sugshr$:

$$\frac{\partial PI}{\partial Sugshr} = \mu_1'' + \mu_3'' + \mu_5'' + \mu_7'' \tag{A3}$$

for Antigua, we set $Post = 1$ and $Jam = 0$ and differentiate PI with respect to $Sugshr$:

$$\frac{\partial PI}{\partial Sugshr} = \mu_1'' + \mu_5'' \tag{A4}$$

thus, the difference in the slopes for the two countries in the post-planter rule period is given by (A3)−(A4)= $\mu_3'' + \mu_7''$.

And so, finally, we have the difference in the differential effect between post-constitutional change slopes and pre-constitutional change slopes as:

$$\mu_3'' + \mu_7'' - \mu_3'' = \mu_7'' \tag{A5}$$

We see, therefore, that μ_7'' measures the difference in the differential effect of the strength of the plantation economy on public investment, between Jamaica and Antigua, between periods. If, in fact, $\mu_3'' < 0$ and $\mu_7'' > 0$, then the differential effect of the presence of the plantation economy between Jamaica and Antigua before the constitutional change of 1866 has shrunk in the post-1866 era. In other words, compared with Antigua, a stronger plantation economy had a more positive effect on public investment in Jamaica after the constitutional change than it did before the constitutional change.

Appendices to Chapter 2

Table B1: Correlation Between Population Density and Institutional Quality Measures

	Regulatory Quality	Corruption Control	Accountability	Political Stability	Government Effectiveness	Rule of Law
Pop. Density	0.8530***	0.7594***	0.5663*	0.6963**	0.8055***	0.7314**

*, **, ***, indicate significance at the 10%, 5% and 1%, respectively.

Table B2: Percentage of Slaves Held by Holding Size

	Holding Size		
Country	1 to 10	11 to 200	201 or more
ATG	9.1	54.7	36.2
BDS	19	61.6	19.4
BLZ	47.5	40.2	12.3
DOM	14.9	75	10.1
GND	10.4	62.9	26.7
GUY	6.1	63.6	30.3
JAM	8.7	55.4	35.9
SKN	11	66.2	22.8
SLU	17.5	73.4	9.1
SVG	8.7	53.4	37.4
TTO	26.1	70.3	3.6

Numbers in the cells are the percentage of total slave population in 1830. Source: Higman (1995).

In the presences of endogeneity caused by correlation between the independent variable and the error term, the OLS regression of institutions today on population density in the colonial period would be biased in the following way:

$$\mathbb{E}(\hat{\beta}_I) = \mathbb{E}\Big[\beta_I + \kappa_I \frac{\sum_i (S_i - \bar{S})\xi_i}{\sum_i (S_i - \bar{S})S_i} + \frac{\sum_i (S_i - \bar{S})\phi_{Ii}}{\sum_i (S_i - \bar{S})S_i}\Big]$$

$$= \mathbb{E}(\hat{\beta}_I) = \beta_I + \kappa_I \mathbb{E}\Big[\frac{\sum_i (S_i - \bar{S})\xi_i}{\sum_i (S_i - \bar{S})S_i}\Big]$$

$$\mathbb{E}(\hat{\beta}_I) = \beta_I + \kappa_I \rho \tag{B1}$$

where κ_I is the coefficient on the omitted variable ξ in the regression (2.1) and $\rho = \mathbb{E}\Big[\frac{\sum_i (S_i - \bar{S})\xi_i}{\sum_i (S_i - \bar{S})S_i}\Big]$. The bias is thus $\equiv \kappa_I \rho$.

Table B3: Government Effectiveness and Colonial Labour Supply

Dependent Variable is Government Effectiveness	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log Pop. Density (1834)	0.155***	0.127**	0.161**	0.122**	0.152**	0.192**	0.224**
	(4.08)	(3.07)	(2.53)	(2.70)	(3.11)	(2.95)	(2.48)
Log GDP Per capita		0.0497	0.0318	0.0488	0.0288		
		(1.38)	(0.71)	(1.28)	(0.69)		
% of Slaves on Holdings of:							
1 to 10			0.00823				
			(0.73)				
11 to 200				0.00362			
				(0.37)			
201 or more					-0.00864		
					(-0.98)		
Pop %Δ1850						0.609	0.517
						(0.97)	(1.00)
Pop %Δ1900						-0.049	
						(-0.37)	
Natural Increase							-0.004
							(-0.26)
Constant	-0.00211	-0.168	-0.309	-0.374	0.0556	-0.787	-0.827
	(-0.02)	(-0.95)	(-1.16)	(-0.64)	(0.19)	(-1.11)	(-1.03)
Observations	11	11	11	11	11	11	11
R-square	0.649	0.645	0.623	0.603	0.644	0.578	0.572

Notes $N = 11$ for all cross-section regressions. The sample consist of 11 former British West Indian territories. A full list of the countries is presented in Table B10 in the appendix. All regressions are OLS cross-section regressions. t-statistics are in parentheses. The measure of institutional quality is the mean score 1996-2013 for Government Effectiveness, obtained from the World Bank's World Governance Indicators. A higher score indicates better quality institutions. Slave holding data is from Nunn (2008). * $p < .10$, ** $p < .05$, *** $p < .01$.

Table B4: Regulatory Quality and Colonial Labour Supply

Dependent Variable is Regulatory Quality	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log Pop. Density (1834)	0.150***	0.112***	0.139***	0.103***	0.143***	0.226***	0.290***
	(4.90)	(4.49)	(3.73)	(4.17)	(6.38)	(4.86)	(5.57)
Log GDP Per capita		0.0675**	0.0533*	0.0658**	0.0420*		
		(3.12)	(2.04)	(3.16)	(2.19)		
% of Slaves on Holdings of:							
1 to 10			0.00652				
			(0.98)				
11 to 200				0.00682			
				(1.29)			
201 or more					-0.0105**		
					(-2.61)		
Pop %Δ1850						0.037	0.882**
						(0.09)	(2.95)
Pop %Δ1900						0.117	
						(1.27)	
Natural Increase							-0.022*
							(-2.29)
Constant	-0.101	-0.326**	-0.438**	-0.714*	-0.0537	-0.681	-1.417**
	(-0.92)	(-3.06)	(-2.81)	(-2.25)	(-0.41)	(-1.40)	(-3.05)
Observations	11	11	11	11	11	11	11
R-square	0.697	0.846	0.845	0.858	0.910	0.751	0.830

Notes $N = 11$ for all cross-section regressions. The sample consist of 11 former British West Indian territories. A full list of the countries is presented in Table B10 in the appendix. All regressions are OLS cross-section regressions. t-statistics are in parentheses. The measure of institutional quality is the mean score 1996-2013 for Regulatory Quality, obtained from the World Bank's World Governance Indicators. A higher score indicates better quality institutions. Slave holding data is from Nunn (2008). * $p < .10$, ** $p < .05$, *** $p < .01$.

Table B5: Rule of Law and Colonial Labour Supply

Dependent Variable is Rule of Law	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log Pop. Density (1834)	0.181**	0.147**	0.226**	0.148*	0.180*	0.246**	0.334**
	(3.22)	(2.31)	(2.43)	(2.10)	(2.34)	(2.86)	(2.70)
Log GDP Per capita		0.0605	0.0191	0.0608	0.0334		
		(1.09)	(0.29)	(1.02)	(0.51)		
% of Slaves on Holdings of:							
1 to 10			0.0190				
			(1.15)				
11 to 200				-0.00107			
				(-0.07)			
201 or more					-0.0112		
					(-0.81)		
Pop %Δ1850						1.590*	1.090
						(1.99)	(1.54)
Pop %Δ1900						-0.211	
						(-1.22)	
Natural Increase							-0.013
							(-0.57)
Constant	-0.109	-0.311	-0.637	-0.250	-0.0216	-1.800*	-1.830
	(-0.54)	(-1.14)	(-1.63)	(-0.28)	(-0.05)	(-1.99)	(-1.66)
Observations	11	11	11	11	11	11	11
R-square	0.534	0.494	0.513	0.422	0.471	0.580	0.516

Notes $N = 11$ for all cross-section regressions. The sample consist of 11 former British West Indian territories. A full list of the countries is presented in Table B10 in the appendix. All regressions are OLS cross-section regressions. t-statistics are in parentheses. The measure of institutional quality is the mean score 1996-2013 for Rule of Law, obtained from the World Bank's World Governance Indicators. A higher score indicates better quality institutions. Slave holding data is from Nunn (2008). * $p < .10$, ** $p < .05$, *** $p < .01$.

Table B6: Corruption Control and Colonial Labour Supply

Dependent Variable is Control of Corruption	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log Pop. Density (1834)	0.211***	0.182**	0.275**	0.181*	0.228**	0.291**	0.370**
	(3.50)	(2.60)	(2.71)	(2.33)	(2.76)	(3.34)	(2.86)
Log GDP Per capita		0.0512	0.00278	0.0509	0.0140		
		(0.84)	(0.04)	(0.78)	(0.20)		
Percentage of Slaves on Holdings of:							
1 to 10			0.0223				
			(1.23)				
11 to 200				0.00121			
				(0.07)			
201 or more					-0.0154		
					(-1.04)		
Pop %Δ1850						1.844*	1.189
						(2.27)	(1.60)
Pop %Δ1900						-0.236	
						(-1.36)	
Natural Increase							-0.010
							(-0.41)
Constant	-0.0762	-0.247	-0.629	-0.316	0.151	-2.06*	-1.972
	(-0.35)	(-0.83)	(-1.48)	(-0.32)	(0.31)	(-2.26)	(-1.71)
Observations	11	11	11	11	11	11	11
R-square	0.576	0.513	0.543	0.444	0.518	0.661	0.581

Notes $N = 11$ for all cross-section regressions. The sample consist of 11 former British West Indian territories. A full list of the countries is presented in Table B10 in the appendix. All regressions are OLS cross-section regressions. t-statistics are in parentheses. The measure of institutional quality is the mean score 1996-2013 for Control of Corruption, obtained from the World Bank's World Governance Indicators. A higher score indicates better quality institutions. Slave holding data is from Nunn (2008). * $p < .10$, ** $p < .05$, *** $p < .01$.

Table B7: Accountability and Colonial Labour Supply

Dependent Variable is Voice & Accountability	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log Pop. Density (1834)	0.0814*	0.0792	0.196***	0.0760	0.139**	0.166**	0.131*
	(2.06)	(1.65)	(4.04)	(1.44)	(3.23)	(3.48)	(2.05)
Log GDP Per capita		0.00400	-0.0567	0.00337	-0.0451		
		(0.10)	(-1.68)	(0.08)	(-1.22)		
% of Slaves on Holdings of:							
1 to 10			0.0279**				
			(3.24)				
11 to 200				0.00258			
				(0.23)			
201 or more					-0.0203**		
					(-2.62)		
Pop %Δ1850						1.309**	0.588
						(2.95)	(1.60)
Pop %Δ1900						-0.122	
						(-1.29)	
Natural Increase							0.0151
							(1.23)
Constant	0.582***	0.569**	0.0906	0.422	1.094***	-1.032*	-0.473
	(4.11)	(2.78)	(0.45)	(0.62)	(4.31)	(-2.06)	(-0.83)
Observations	11	11	11	11	11	11	11
R-square	0.320	0.151	0.612	0.037	0.510	0.621	0.615

Notes $N = 11$ for all cross-section regressions. The sample consist of 11 former British West Indian territories. A full list of the countries is presented in Table B10 in the appendix. All regressions are OLS cross-section regressions. t-statistics are in parentheses. The measure of institutional quality is the mean score 1996-2013 for Voice & Accountability, obtained from the World Bank's World Governance Indicators. A higher score indicates better quality institutions. Slave holding data is from Nunn (2008). * $p < .10$, ** $p < .05$, *** $p < .01$.

Table B8: Political Stability and Colonial Labour Supply

Dependent Variable is Political Stability	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log Pop. Density (1834)	0.160**	0.146*	0.266**	0.147*	0.198**	0.225**	0.267*
	(2.91)	(2.22)	(3.08)	(2.01)	(2.66)	(3.32)	(2.29)
Log GDP Per capita		0.0242	-0.0379	0.0244	-0.0184		
		(0.42)	(-0.63)	(0.40)	(-0.29)		
% of Slaves on Holdings of:							
1 to 10			0.0286				
			(1.86)				
11 to 200				-0.000744			
				(-0.05)			
201 or more					-0.0176		
					(-1.31)		
Pop %Δ1850						1.998**	0.907
						(3.17)	(1.35)
Pop %Δ1900						-0.291*	
						(-2.15)	
Natural Increase							0.002
							(0.12)
Constant	0.0674	-0.0134	-0.503	0.0289	0.443	-1.93**	-1.441
	(0.34)	(-0.05)	(-1.40)	(0.03)	(1.00)	(-2.72)	(-1.38)
Observations	11	11	11	11	11	11	11
R-square	0.484	0.370	0.519	0.280	0.421	0.700	0.502

Notes $N = 11$ for all cross-section regressions. The sample consist of 11 former British West Indian territories. A full list of the countries is presented in Table B10 in the appendix. All regressions are OLS cross-section regressions. t-statistics are in parentheses. The measure of institutional quality is the mean score 1996-2013 for Political Stability, obtained from the World Bank's World Governance Indicators. A higher score indicates better quality institutions. Slave holding data is from Nunn (2008). * $p < .10$, ** $p < .05$, *** $p < .01$.

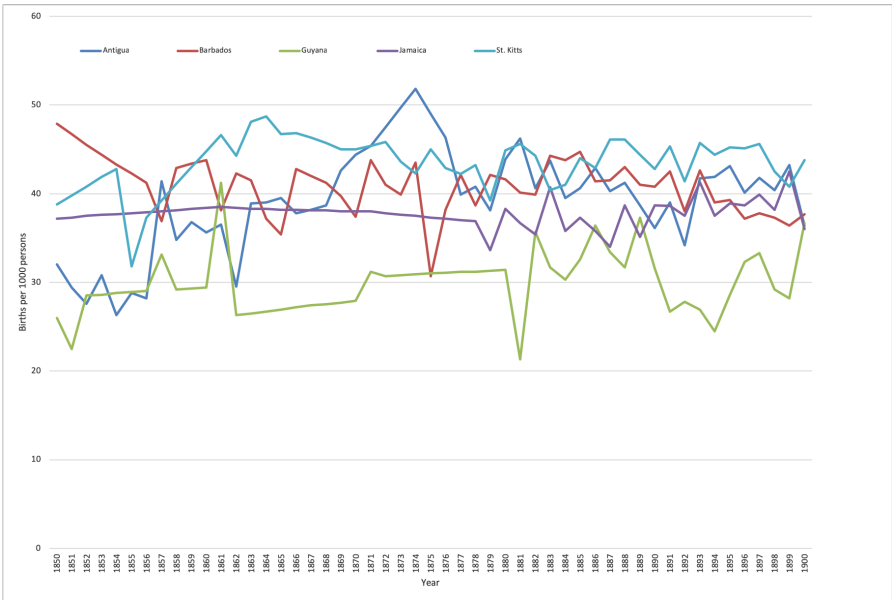
Table B9: World Governance Indicators

Indicator	World Bank's Description (All Indicators are measured on a scale from -2.5 (weak) to 2.5 (strong))
Voice and Accountability	Voice and accountability captures perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.
Political Stability and Absence of Violence	Political Stability and Absence of Violence/Terrorism measures perceptions of the likelihood of political instability and/or politically motivated violence, including terrorism.
Government Effectiveness	Government effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.
Regulatory Quality	Regulatory quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.
Rule of Law	Rule of law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.
Control of Corruption	Control of corruption captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.

Table B10: The Former British West Indies Colonies in Our Sample

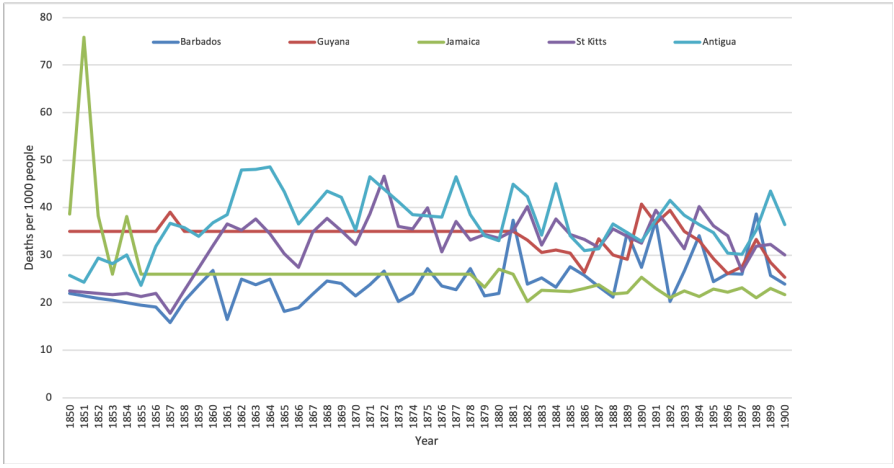
Country Code	Country
ATG	Antigua and Barbuda
BDS	Barbados
BLZ	Belize
DOM	Dominica
GND	Grenada
GUY	Guyana
JAM	Jamaica
SKN	St. Kitts and Nevis
SLU	Saint Lucia
SVG	Saint Vincent and the Grenadines
TTO	Trinidad and Tobago

Figure B1: Birth Rates in the Five Sugar Colonies



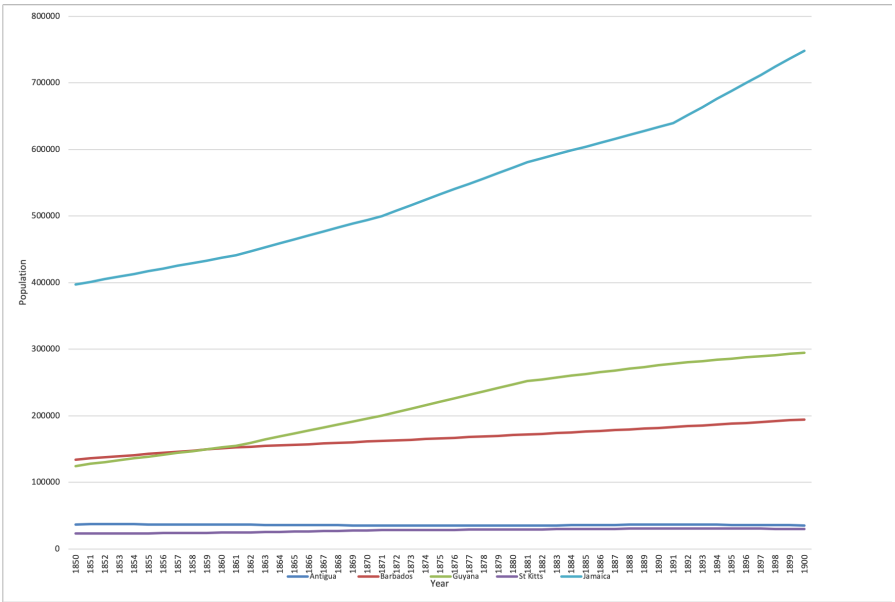
Source: Bulmer-Thomas (2012).

Figure B2: Death Rates in the Five Sugar Colonies



Source: Bulmer-Thomas (2012).

Figure B3: Population in the Five Sugar Colonies



Source: Bulmer-Thomas (2012).

Appendices to Chapter 4

Table C1: Marginal Effect of Population Density at Various Values of Log Rainfall

	$\frac{dy}{dx}$ w.r.t. Log Pop. Den.)		$\frac{dy}{dx}$ w.r.t. Log Pop. Den.)		$\frac{dy}{dx}$ w.r.t. Log Pop. Den.)		$\frac{dy}{dx}$ w.r.t. Log Pop. Den.)		$\frac{dy}{dx}$ w.r.t. Log Pop. Den.)		$\frac{dy}{dx}$ w.r.t. Log Pop. Den.)
1) at 2.2	2.349	2) at 2.4	2.129	3) at 2.6	1.909	4) at 2.8	1.688	5) at 3	1.468	6) at 3.2	1.248
	(1.72)		(1.69)		(1.65)		(1.60)		(1.54)		(1.47)
7) at 3.4	1.028	8) at 3.6	0.807	9) at 3.8	0.587	10) at 4	0.367	11) at 4.4	0.146	12) at 4.4	-0.0741
	(1.38)		(1.25)		(1.08)		(0.82)		(0.42)		(-0.28)
13) at 4.6	-0.294	14) at 4.8	-0.515**	15) at 5	-0.735***	16 at 5.2	-0.955**	17) at 5.4	-1.176**	18) at 5.6	-1.396**
	(-1.54)		(-3.17)		(-3.77)		(-3.57)		(-3.30)		(-3.09)
$N = 42$											

t statistics in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Log Rainfall is from the World Bank Data gathered in Mitchell et al. (2004) and is measured in mm for the period 1900-1930. Data for population density on the even of colonisation (or in 1500) is taken from Acemoglu et al. (2002) and McEvedy et al. (1978).

Table C2: IV: The Differential Effect of Colonial Labour Supply on Flexibility

	Flexibility
Log Col. Pop. Density	-0.0568*
	(-1.84)
TropDep*Pop.Density	0.245***
	(2.94)
Tropical Dependency	-0.188
	(-1.19)
Legal Origin	-0.365***
	(-3.63)
GDP per Capita	0.282***
	(2.62)
Asia	0.0677
	(0.51)
Africa	0.0163
	(0.11)
Constant	3.648***
	(7.80)
Observations	113
R^2	0.25

z statistics in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The regression represents the IV counter-part to the regression in Column (4) of Table 4.4. The coefficient concerning the differential effect of population density for tropical dependencies, compared with the rest of world, is 0.245, larger than that of the OLS (0.219), and remains significant at the 1-percent level. This suggests that for tropical dependencies, higher colonial labour supply has a positive and significant differential effect on labour institutions today compared with the rest of the world.

Figure C1: Former Tropical Colonies

Country
Angola
Burundi
Benin
Burkina Faso
Bahamas
Belize
Bolivia
Brazil
Barbados
Brunei Darussalam
Central African Republic
Cote d'Ivoire
Cameroon
Congo, Rep. Of
Colombia
Costa Rica
Dominican Rep.
Ecuador
Ethiopia
Gabon
Ghana
Gambia, The
Guinea-Bissau
Guatemala
Guyana
Honduras
Haiti
Indonesia
India
Jamaica
Kenya
Madagascar
Mexico
Mali
Myanmar
Mozambique
Mauritania
Mauritius
Malawi
Malaysia
Niger
Nigeria
Nicaragua
Panama
Peru
Philippines

Country
Paraguay
Rwanda
Senegal
Singapore
Sierra Leone
El Salvador
Suriname
Chad
Togo
Timor-Leste
Trinidad & Tobago
Tanzania
Uganda
Venezuela
Vietnam
Zambia

Primary Sources

1. Caribbean colonial statistics from the British Empire, 1824-1950, the British Online Archives: https://microform.digital/boa/collections/73/caribbean-co lonial-statistics-from-the-british-empire-1824-1950.
   We made use of the following Volumes from this collection
   —Blue Books of Antigua, 1828-1887.
   —Blue Books of Barbados, 1839-1947.
   —Blue Books of British Guiana (Guyana), 1868-1938.
   —Blue Books of Jamaica, 1836-1945.
   —Blue Books of Leeward Islands, 1889-1945.
   —Blue Books of Saint Christopher (St. Kitts), 1828-1886.

   Where a year was missing, we retrieved original copies from the Cambridge University Library under the Royal Commonwealth Society Collection. Copies can also be found at the National Archives, Kew Colonial office under reference number: CO 323/1683

2. Colonial Reports. These are annual surveys from the Governors of the various colonial territories beginning in 1845. Other names for these surveys include: Governor's Report (1845-1850); Past and Present State of Her Majesty's Colonies (1851-1866); Report Transmitted With the Blue Book (1867-1880) and thereafter, Colonial Reports. They are Parliamentary Papers and retrievable from: https://parlipapers.proquest.com.

3. Statistical Abstracts for the Colonies, (1850-1945). These were alternatively called: Statistical Abstract for the Several Colonial and Other Possessions of the U.K.; Abstracts for the Protectorates; and Abstracts for the Several British Overseas Dominions and Protectorates. Produced annually, these abstracts cover area, population, revenue, expenditure, public debt, shipping, imports, exports, duties and other miscellaneous data. These are also available at: https://parlipapers.proquest.com.

4. Statistical Tables Relating to the Colonial and Other Possessions of the U.K. (1850-1910). These were produced annually but covered data on three years (the year

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