ARE FACTOR ENDOWMENTS FATE?*

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ABSTRACT

In recent theories of comparative development, the role of institutional differences has been crucial. Yet, what explains comparative institutional evolution? We investigate this issue by studying the coffee exporting economies of Latin America. Although homogeneous in many ways, they experienced radically different paths of economic (and political) development, which is conventionally traced to the differential organization of the coffee industry. We show that the different forms that the coffee economy took in the 19th century was critically determined by the legal environment determining access to land, and that different laws resulted from differences in the nature of political competition and the backgrounds of political elites. Our analysis suggests that explanations of institutional differences that stress economic

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fundamentals can only be part of the story. At least in the economies that we study, while geography, factor endowments and technology are clearly important, their implications for the institutional structure and thus development are conditional on the form that political competition takes in society. For interesting variations in economic outcomes, endowments are not fate.

Keywords: institutions, organization, development, inequality, political economy

JEL Code: O1, N5, Q1, H0, K2

RESUMEN

El papel de las diferencias institucionales ha sido crucial en las teorías recientes del desarrollo comparativo. Pero ¿Qué explica las diferencias comparativas en la evolución institucional? En este trabajo investigamos este asunto estudiando las economías exportadoras de café en Latinoamérica. Aunque similares, estas economías experimentaron diferentes modelos de desarrollo económico (y político) convencionalmente explicados en relación con su diferente organización de la industria cafetera. Este artículo muestra que las diferentes formas adoptadas por la economía cafetera en el siglo XIX estuvieron especialmente determinadas por el entorno legal del acceso a la tierra y de las diferentes leyes resultantes de las diferencias en la naturaleza de la competición política y de la formación de las elites políticas. Nuestro análisis sugiere que las explicaciones de diferencia institucional que presionan los fundamentos de la economía pueden ser sólo una parte de la explicación. Al menos en las economías que hemos estudiado, mientras la geografía, la dotación de recursos y la tecnología son claramente importantes en la explicación, sus implicaciones sobre la estructura institucional y, en consecuencia, sobre el desarrollo, dependen de la forma de competición política adoptada por la sociedad. Para las interesantes variaciones de los resultados económicos los recursos no son el destino.

Palabras clave: instituciones, organizaciones, desarrollo, desigualdad, Economía política

1. INTRODUCTION

Recent research on comparative economic growth and development has moved beyond explanations that focus on preferences and technology within a fixed set of institutions and organizational structures. Instead, much of the recent focus has been on institutional and organizational variables, such as well-defined property rights (North and Thomas 1973; Knack and Keefer

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1995; Barro 1997; Engerman and Sokoloff 1997; Hall and Jones 1999; Acemoglu *et al*. 2001, 2002), and particular financial and legal institutions (see Levine 1997; LaPorta *et al*. 1998).

While the move away from traditional economic fundamentals is a major conceptual change, we are far from understanding exactly why and how different societies have come to generate or sustain different sets of institutions or organizations. Some of the recent research on this question has borrowed from the powerful set of ideas developed in the context of the «staple thesis» due to Baldwin (1956), Watkins (1963) and Hirschman (1958, 1977). These studies argued that certain patterns of factor endowments led to certain types of crop production and patterns of farm organization and land distribution. The organization of agriculture had large effects on whether or not the economy developed, particularly working through the composition of demand. The more recent literature develops the institutional side of this thesis, arguing that factor endowments also have a powerful impact on institutions. The work of Engerman and Sokoloff (1997) has been particularly important. In their argument comparative development in the Americas can be explained by how factor endowments shaped institutions, which then persisted in time.

In this paper we aim to demonstrate that, even within Latin America, there are important variations in economic and political outcomes and institutions that cannot be attributed to differential factor endowments. To do so we examine comparative development in a relatively narrow group of countries, namely the coffee exporting economies of Latin America. Although we focus on Colombia, Costa Rica, El Salvador and Guatemala, we later discuss pertinent evidence from Brazil, Nicaragua and Venezuela. What motivates our study is that two countries (Colombia and Costa Rica) organized their coffee production and exports in very different ways than the other two (Guatemala and El Salvador). The major difference was (as shown in rows 2 and 3 of Table 1) that the first two developed coffee primarily via smallholders whereas the latter two did so via large plantations. The distinguished Costa Rican historian, Ciro Cardoso (1977) noted that

> …[s]triking differences can be easily perceived between the history of coffee cultivation in Costa Rica — with its early origins, and the absence of any large scale process of land concentration, and its effects on the organization of the labor market — and the Guatemalan and Salvadorean experiences — … which exhibited features of land and labor control altogether different from those found in Costa Rica (p. 165).

In all other respects, however, the four countries were very similar, starting from similar levels of development, a common colonial history, language and religion, virtually identical climates, topographies, factor endowments and technologies with the same dominant export crop (rows 7-9 of Table 1 document the importance of coffee). Yet, despite all these

TABLE 1
CHARACTERISTICS OF FOUR COFFEE EXPORTING COUNTRIES: A TIMELINE

	Costa Rica	Colombia	Guatemala	El Salvador
Land privatization	1820-1840	1870-1900	1870s	1870s
% of coffee grown in farms <10 hectares	42.2	61	13.1	13.5
% of coffee grown in Farms >50 Hectares	37.5	14	79.5	58.1
GDP per capita PPP 1995	5850	6130	3340	2610
HDI rank 1994	33	51	117	112
Continually democratic since	1948	1958	1996	1992
% of coffee exports in total exports, 1900	76	49	56	83
1929	58	55	77	93
% of coffee exports in GDP	19	8	17	18
% of adults literate 1900	36	34	12	26
1910	50	40	13	26
1930	67	52	19	27

PPP, purchasing power parity.
Sources: Data on land distribution for Costa Rica (1955), El Salvador (1940), Guatemala (1966) are from Paige (1997, p. 60, Table 1). For Colombia (1932), from Safford (1995, pp. 126-128, Tables 2 and 4). All data on coffee exports are from Bulmer-Thomas (1994). Data on literacy are from Thorp (1998).

similarities, the former two countries have achieved a level of per capita GDP, about double that of the latter two, rank much higher in terms of the human development index and have been considerably more democratic (rows 4-6 of table 1). Roseberry (1991) noted,

> …the remarkable variation in social, economic and political structures and processes among coffee producing regions, the radically distinct structures of landed property … encountered in Brazil, or Costa Rica or Colombia (p. 353).

That many of these differences in economic and political outcomes stem from the differences in the way the economy, particularly land ownership, was organized, is widely argued in the literature in the contexts of individual countries. For instance, McGreevey (1971), Murphy *et al*. (1989) and Thorp (1991) all apply the staple thesis to Colombia to link the distribution of land in the coffee sector to demand patterns and industrialization. Alternatively, the different economic outcomes could be explained by the fact that small-holder production is generally thought to be more efficient than plantation production of coffee[1]. Nevertheless, such an argument, even if plausible, is not necessary to explain the differences in income per capita since the evidence also suggests much more rapid factor accumulation in Costa Rica and Colombia, particularly in human capital. The last three rows of Table 1 show the adult literacy rates in 1900, 1910 and 1930. These numbers demonstrate the large lead of Colombia and Costa Rica in human capital. This lead persisted and in 1980 the literacy rates in these four countries were 91, 85, 54 and 64 per cent. Authors such as Engerman and Sokoloff (1997) and Bourguignon and Verdier (2000) have argued that greater land inequality will lead to lower incentives for political elites to invest in education. In terms of political outcomes, the dominant approach to understanding why Costa Rica is more democratic than the rest of Central America follows the intellectual tradition of Moore (1966) and stresses the differential organization of agriculture, particularly coffee (Gudmundson 1995; Paige 1997; Yashar 1997).

Having deduced such sweeping implications from the organization of the coffee economy, one wants to treat this as endogenous. Clearly, it cannot be differences in factor endowments or technology that determine this (in contrast to the much discussed distinction between wheat and sugarcane). In addition, greater land inequality in Guatemala or El Salvador cannot obviously be accounted for by different colonial traditions. The one plausible explanation, which emerges from Lockhart and Schwartz (1983), Engerman and Sokoloff (1997) and Acemoglu *et al*. (2002), would be the greater density of indigenous people in Guatemala and El Salvador. These scholars argue that the colonial system was more exploitative where population densities of indigenous peoples were higher and there is a close connection between this early exploitation and subsequent patterns of land inequality (e.g. Lockhart, 1969).

Yet there are problems with this argument. As we have shown later, the density of indigenous peoples was as low in 19th century Nicaragua as it was in Costa Rica; yet, the organization of the coffee industry was much closer to that which developed in Guatemala and El Salvador. Moreover, once we look more deeply into the proximate determinants of the organization of the coffee economy, we find that this is due to the processes by which land was allocated in the 19th century. In all of the countries we consider, coffee expansion took place to a large extent on land which had not been acquired by Spaniards during the colonial period. Indeed, the patterns

[1] An extensive literature argues that smallholder coffee production is relatively efficient and that this is a classic example of the inverse relationship between farm size and productivity (see Yotopoulous and Nugent 1976; Berry and Cline 1979; Bulmer-Thomas 1994, p. 95). Griffin (1976) found that coffee yields in Guatemala were twice as large on farms of less than 7 hectares compared to those of over 224 hectares. This appears to be because there are no scale economies and coffee tending and picking are very labor intensive and need great care (high-quality coffee requires that ripe berries be picked one by one from the bushes). Thus, smallholders have much better effort incentives than plantation workers.

of landownership and different organizational forms in the coffee industry are not due to the direct effects of colonialism, since the coffee trade did not become important until after the 1820s and did so largely on land that was previously unoccupied. This is in fact more generally true of Latin America than is often realized. Bulmer-Thomas (1994) noted,

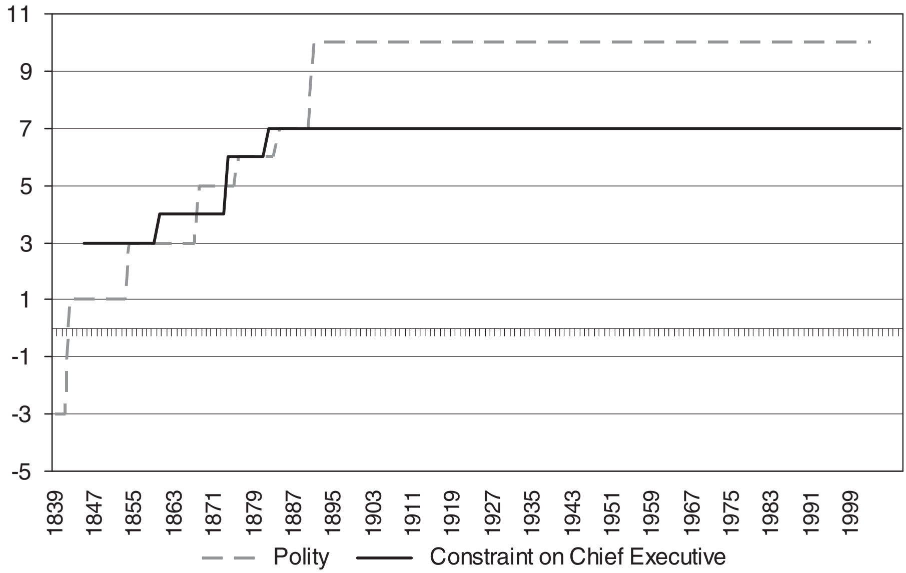
> The area in private ownership in the 1820s was only a fraction of the area in private ownership in 1914. The increase over nearly a century was enormous and would have provided many opportunities to alter the concentration ratio if the new lands in private ownership had been allocated more equally. The failure owed more to the balance of political power … than to inherited colonial patterns (p. 93).

Rather, the structures of landownership are due to the differential evolution of the law relating to property rights in land in the 19th century, as the coffee boom took off. The proximate cause of the difference is that both Colombia and Costa Rica passed laws rather like the 1862 Homestead Act in the United States, protecting smallholders and allowing them to gain title to land. On the other hand, in El Salvador and Guatemala, the onset of the coffee boom induced a mass land grab by powerful political elites who took possession of both Indian and free land themselves and created large coffee plantations. Alongside such land grabs came extreme labor repression.

But why did the political elites in these otherwise apparently similar countries pursue such different strategies to exploit the potential opportunities provided by the expansion of the world coffee market in the 19th century? In our view, two factors were at work: First, politics in Costa Rica and Colombia in the 19th century was much less militarized than in El Salvador and Guatemala. Although neither Costa Rica nor Colombia practiced any sort of perfect democracy, political elites consistently used competitive elections as ways to allocate political power in both countries. Though there were conflicts, in both countries the military was small. Second, in Costa Rica and Colombia, in contrast to El Salvador and Guatemala, elites were not primarily landowners.

We can draw some direct evidence for this first hypothesis from the Polity IV data set (Marshall and Jaggers 2004). Figures 1-4 present historical data for our four countries on the Polity Index and Constraints on the Executive (both variables range from −10 to 10, with 10 being the most democratic and the most constrained). Figure 1 shows a clear picture of the consolidation of a relatively democratic and constrained state in Costa Rica from the 1850s onwards. The situation in Colombia is different, but crucially, during the years of coffee expansion in the 1870s and 1880s, we see relatively high scores for both variables. Figures 3 and 4 reveal that the situation in Guatemala and El Salvador was very different from both the Polity Index and Constraints on the Executive lying uniformly below those of Costa Rica and Colombia.

FIGURE 1
DEMOCRACY AND EXECUTIVE CONSTRAINTS IN COSTA RICA, 1839-2000



Each of these differences had important implications. In Costa Rica and Colombia the state did not have the means of coercion necessary to expropriate land and engage in systematic labor repression. Moreover, elites in these countries did not have a comparative advantage in agricultural organization, but rather in commercial activities, and therefore, they chose to control (and monopolize) finance, credit provision and exportation of the crop. Both these factors naturally led to a relative preference for smallholder production and made them willing to concede property rights to land and pass laws to protect smallholders. In El Salvador and Guatemala the composition of the elite and the militarization of the state made creating and running plantations a relatively more attractive option. Moreover, there is a natural connection between the type of coercion that characterized the labor market in El Salvador and Guatemala and the refusal of the state to invest in education. Unlike physical capital, human capital is only productive if workers exert complementary effort. But in a labor market based on coercion, workers were unlikely to believe that they would receive any return from exerting effort. In consequence, it is unlikely that there would be much payoff to landowning elites for investing in schools or the human capital of their workers.

From the available historical sources it is difficult to understand why political elites in 19th century Costa Rica and Colombia were better able to

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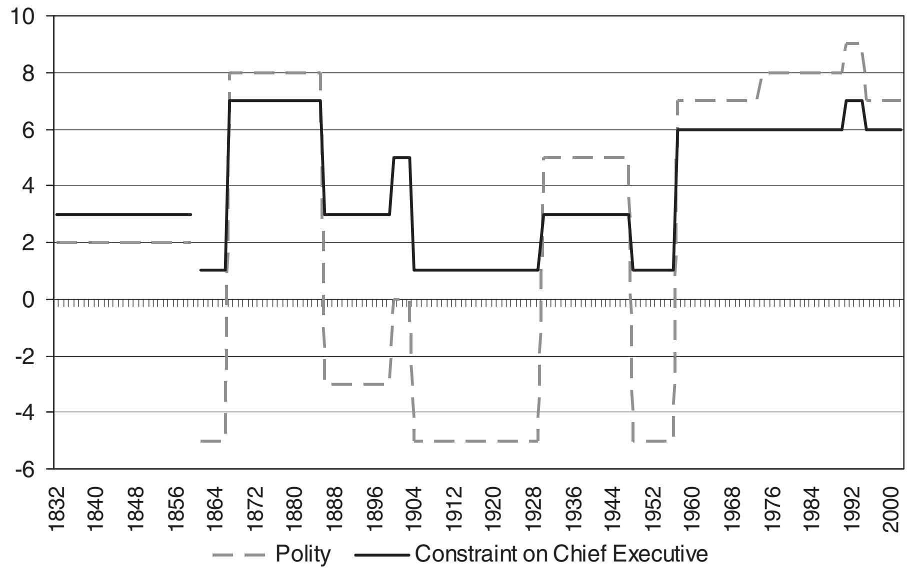
FIGURE 2
DEMOCRACY AND EXECUTIVE CONSTRAINTS IN COLOMBIA, 1832-2000



contest power using peaceful means. One clear factor seems to be that the ideological polarization between Conservatives and Liberals was weaker in these countries than elsewhere. The conventional view of the origins of political identities is that Conservatism was relatively stronger in countries central to the Spanish colonial system. Because Costa Rica and Colombia were relatively marginal during Spanish rule compared with Guatemala, this may help to explain why political opinions were less polarized. Also of clear importance was the role of interstate conflict. Colombia fought no real wars against its neighbors in the 19th century and Costa Rica was isolated at the end of the Central American isthmus. On the other hand, the other Central American nations continually invaded each other and political power struggles spilled over into interstate wars. This factor created an independent incentive to militarize, lacking in Costa Rica and Colombia.

The most likely factor that accounts for the differences in the socio-economic backgrounds of elites seems to be subtle differences in the organization of the colonial system. For example, in the case of Colombia, the presence of gold in the state of Antioquia led to a strong political class of merchants who played important roles in politics, particularly the Conservative party, exploiting and financing the expansion of the coffee trade. Similarly, although Colombia, Venezuela and Ecuador were all relatively

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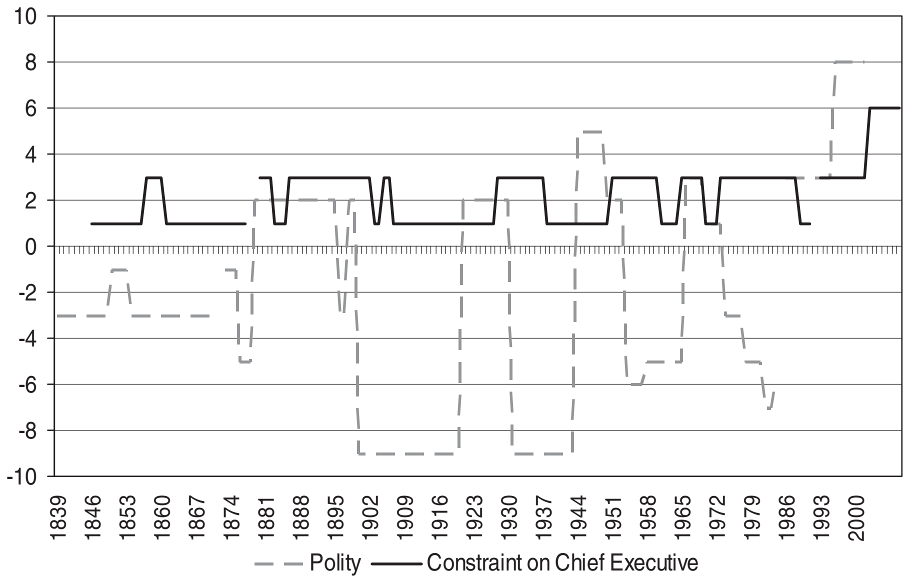
FIGURE 3
DEMOCRACY AND EXECUTIVE CONSTRAINTS IN GUATEMALA, 1839-2000

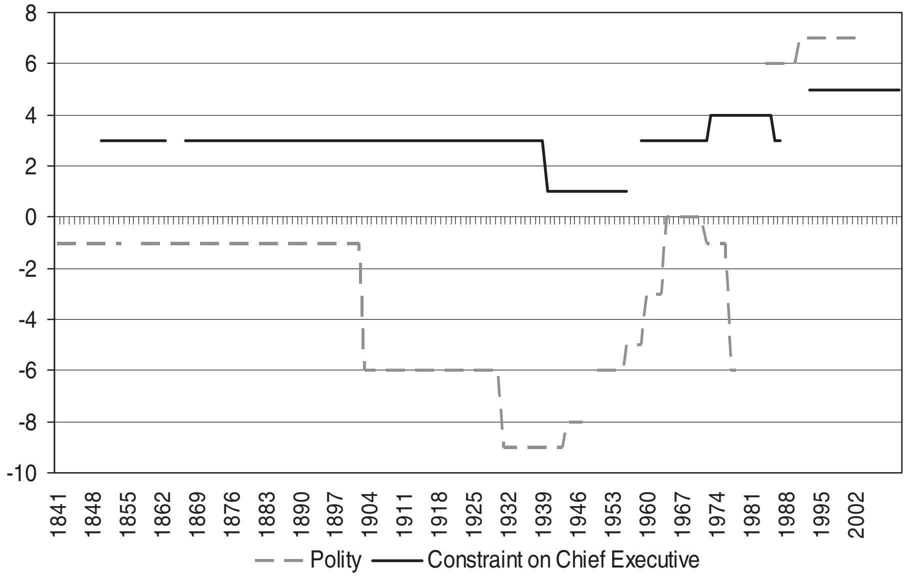


peripheral to the Spanish colonial empire, Simón Bolivar himself implied important and enduring institutional differences when he remarked that Caracas was a barracks, Bogotá a law court and Quito a convent (quoted in Deas 2004, p. 2). Indeed, the contemporary literature on the identity of 19th century Colombian politicians emphasizes the predominant role played by lawyers (Uribe-Uran 2000)[2].

Although it is difficult to trace these differences back to other factors, in our analysis, they clearly had important implications. In particular, contrary to the nascent literature in economics attempting to explain institutional differences, our research suggests that the equilibrium institutional structure is not uniquely determined by factor endowments and depends crucially on the nature of political cleavages and competition in society. Endowments are not fate. Possibly even more striking, our findings suggest that the literature

[2] Colombia did, of course, suffer a very important breakdown in democracy in the 1940s followed by a brutal civil war at just the time when Costa Rica became even more democratic. While our thesis cannot explain this, we believe that it is due to the fact that Colombia is much larger and more heterogeneous than Costa Rica and there are, no doubt, other important sources of variation. For instance, it is in the cattle ranching areas on the Atlantic coast where the dramatic rise of paramilitarism has been so pronounced in the last 20 years. This is driven by forces that are very different from those we emphasize in this paper.

FIGURE 4
DEMOCRACY AND EXECUTIVE CONSTRAINTS IN EL SALVADOR, 1841-2000



which follows Moore (1966) in trying to explain differences in political institutions by appealing to differences in agrarian organization places the cart before the horse. Rather, it is the pre-existing nature of politics in Guatemala and Costa Rica in the 19th century that caused the differential organizations of their coffee economies. Although, no doubt, this organization played an important role in sustaining the political conditions that led to it, it seems misleading, at least in this context, to emphasize agrarian organization as the ultimate determining factor behind different political outcomes. In a related work García-Jimeno and Robinson (2009) show how variation in politics influenced long-run political and economic development in the Americas through its impact on the allocation of frontier land.

The paper proceeds as follows. In section 2, we develop a simple model that formalizes the decision by political elites to organize the rural economy in different ways along with decisions to invest in education. The model shows how a smallholder society will encourage greater investment in education by the government and is more likely to be chosen when elites are not militarized and do not have a comparative advantage in running plantations. Section 3 then presents some historical evidence about the evolution of the coffee industry in our sample of countries. Section 4 discusses alternative hypotheses. Section 5 concludes.

2. A MODEL

We now develop a simple model to formalize our explanation for comparative development in Costa Rica, Colombia, El Salvador and Guatemala.

2.1. Fundamentals

We consider a static small open society. We assume that coffee is never consumed domestically and that when coffee is produced, the economy is completely specialized. There are two types of agents, an elite of mass one and N identical peasants. We assume that the elite are exogenously split into two factions, 'Conservatives', C, who constitute a fraction λ_C, and 'Liberals', L, who are the remaining λ_L (i.e. $\lambda_C+\lambda_L=1$)[3]. For simplicity, we set $\lambda_C = \lambda_L = \frac{1}{2}$. Each peasant i has a utility function $u(c_f^i, E)$ defined over consumption of food, c_f^i, and whichever elite faction he supports, $E \in (C,L)$. To model the dependence of utility on which faction of the elite he supports, we introduce some familiar ideas from the theory of probabilistic voting. More specifically, we assume that each peasant is ideologically disposed towards one of the two parties and that his utility is also affected by a random variable Θ, which is distributed uniformly on the interval $\left[\frac{1}{2s}, \frac{1}{2s}\right]$. Θ captures an ideological preference of peasants in general for the liberals.

For simplicity, we shall assume that the utility function is linear so that,

$$u(c_f^i, E) \equiv c_f^i + \sigma^i + \theta.$$

σ^i captures the individual-level ideological heterogeneity of peasant i in favor of the liberal party and we assume that it is distributed uniformly on the interval $\left[\mu - \frac{1}{2\phi}, \mu + \frac{1}{2\phi}\right]$ with mean μ. To model the effect of militarization on the struggle for power, we assume that μ is a function of expenditure by the elite on the military. More specifically, μ is a function, $\mu(m_L, m_C)$, where m_E is the expenditure on the military by elite faction E. We assume $m_E \in \{m,0\}$ and that $\mu(m,0)=1-\mu(0,\ m)>\mu(0,0)=\mu(m,\ m)=0$. To invest m costs m units of income. The benefits of investing in the military are not simply that they increase the probability of winning power. We shall also assume that the country in question is subject to the threat of invasion and investing in the military reduces this threat. We defer the details of this part of the model.

We assume that the elite have preferences defined over their own consumption, c_{fE}, and whether or not they are in power politically. This utility

[3] As we document in the historical section, Liberal and Conservative elites in 19th century Latin America typically had homogeneous preferences with respect to economic policy and this is how we shall model them.

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function has form $u^E(c_{fE}, B)$, where B represents the utility benefit from power. We assume that this function is also linear with

$$u^L(c_{fE}, B) \equiv c_{fE} + BD^L$$

for a Liberal, and

$$u^C(c_{fC}, B) \equiv c_{fC} + B(1 - D^L)$$

for a Conservative, where D^L is an indicator function, which is one if the Liberals have power and zero otherwise.

There are two goods, food, which is numeraire, and coffee with price q (which the country takes as given). Coffee is produced from the only two factors of production in the economy, land (of which there are N units in total, that is, the same number of units as peasants, which we assume to reduce the subsequent notation) and effort-adjusted human capital. By this we mean that individuals are endowed with human capital, possibly as a result of government investments in education, but the productivity of this human capital depends on individual effort. Thus, n units of land and ℓ workers each with h units of human capital and making symmetric effort choice $e \in \{0,1\}$ produce $Af(n, \ell(1 + eh))$ units of coffee, where $A > 0$. The idea here is that even if $e = 0$, each individual still has some minimum amount of effective labor of 1. The cost of exerting effort is 1 in terms of the consumption good. We assume that the technology for producing coffee exhibits constant returns to land, and for simplicity, we shall take f to be Cobb-Douglas with, $f(N,N(1+eh))=N^{\alpha+\beta}(1 + eh)^{\beta}$, where $\alpha + \beta = 1$.

Note that the form of the production function implies that if a plantation economy is poorer than a smallholder economy, it is not because there are diseconomies of scale. This could easily be added and be one more factor favoring a smallholder economy. In the way we formulate the model, however, the main efficiency difference between plantations and smallholder economies is that the latter create much better incentives for work effort and this influences the incentives of the elite to invest in human capital, since this is complementary with effort. Human capital is provided by a government-run education system and the cost of providing h units of human capital to all peasants is h in terms of the consumption good.

Coffee production can be organized either by a plantation system, or via smallholders. If a smallholder economy is created, we assume that each peasant receives one unit of land and thus produces $A(1 + eh)^{\beta}$. In the plantation system, the faction of the elite that has political power collectively owns the land and hires the peasants as wageworkers. Plantation production produces an output of $NA(1 + eh)^{\beta}$. Either system of landownership created organizational fixed costs for the elite, C^P for the plantation system and C^S for the smallholder system. The crucial thing is that for it to be feasible to expropriate land and create a plantation system the elite must have first militarized. Once it does this, we shall assume that labor repression is feasible and the elite can set whatever wage they want. We denote the wage they set as $\underline{w}$.

We make one more assumption about payoffs. When we introduce the political model, we shall examine a political contest or power struggle between the factions of the elite. If militarization takes place, we assume that the winning faction can exclude the losing faction from economic benefits. However, if militarization does not take place, we assume that all members of the elite share equally in profit opportunities.

Smallholders with property rights to land can produce food instead of coffee. If so, a smallholder with one unit of land and $1+eh$ units of effective human capital is assumed to produce $A(1+eh)^{\beta}$ units of food[4]. More generally, however, we want to allow for smallholders to buy land, hence the technology for food production also depends on the amount of land employed, and we assume that it is $N^{\rho+\beta}A(1+eh)^{\beta}$, where $\rho+\beta<1$.

We now consider how income is distributed in these different regimes. In a plantation system, the elite controls all the land and pays workers the wage of $\underline{w}$. The profits, denoted as $\pi^{P}(C^{P})$, are divided equally between all members of the winning faction of the elite, with profits per member of the elite faction E being,

$$\pi^{P}(C^{P}) = 2\left[qA(1+eh)^{\beta} - \underline{w}\right]N - C^{P}, \tag{1}$$

where π^{P} is indexed by C^{P}, since this will be important in the subsequent analysis when we discuss the comparative advantage of the elite.

In the smallholder system, all the land is owned by the peasants, but we assume that, rather than monopolizing land and using coercion in the labor market to set the wage $\underline{w}$ (as in the plantation system), the elite is instead the monopsony buyer of coffee from peasants. The elite buys the coffee at some price $r<q$, generating profits, $\pi^{S}(C^{S})=[q-r]NA(1+eh)^{\beta}-C^{S}$. How low can r be set? This depends on the outside options of smallholders, which we denote $\underline{V}(eh)$. Clearly, we must have $rA(1+eh)^{\beta}\geq \underline{V}(eh)$. If the price of coffee is set so low that this inequality is not satisfied, then smallholders can switch

[4] Even given an initial equal distribution of land between the peasants, one must check that it is stable. For example, imagine that there are competitive land and labor markets. Rather than just produce on his own land, a peasant might want to sell his land and go to work as a laborer. On the other side of the market, a smallholder with one unit of land might want to buy more land and hire extra workers. Note, however, that an equilibrium with active land and labor markets must involve peasants being indifferent between selling their land and working for wages and buying the land of others and hiring them as workers. Imagine peasant 1 buys the plot of peasant 2 and hires him. By diminishing returns, hiring the extra plot and worker produces less output than peasant 2 could have produced on his own. For it to be optimal to buy the plot and hire the worker peasant 1 must therefore pay less than peasant 2 could have produced on his own. Therefore, there cannot be such equilibria.

to producing food. Thus, $\underline{V}(eh)$ is partially determined by the technology for producing food. We assume that $\underline{V}(eh) = \vartheta(1+eh)^{\beta}$, where $\vartheta > 1$. The lower ϑ is, the lower is the price r that can be set. The optimal price set by the elite must satisfy,

$$r = \frac{\vartheta}{A}$$

and therefore,

$$\pi^S(C^S) = (qA - \vartheta)(1+eh)^{\beta} N - C^S. \tag{2}$$

where we index π^S by C^S. One property of the function $\pi^S(C^S)$, which is important is whether or not it is increasing in human capital. Here,

$$\pi_h^S(C^S) > 0 \quad \Rightarrow \quad qA > \vartheta.$$

We shall assume that this is true and obviously it is necessary to assume this for elites to make positive profits from smallholder economies.

2.2. Timing of the Game

The timing of the game is as follows:

- The factions of the elite non-cooperatively decide whether to militarize.
- An invasion by a foreign power does or does not take place.
- A political contest/election takes place, which determines which faction of the elite is in power.
- Whoever wins decides on the organization of the rural economy and how much to invest in education.
- Peasants make effort decisions.
- Wages are determined, and payoffs are realized.

The timing of the game emphasizes the «hold-up» problem created by a plantation economy and how this leads to underinvestment in human capital. Because plantation owners cannot commit not to force the wage down to zero at the last stage, workers will rationally put in zero effort in the previous stage. However, if effort is zero then the elite realize that any investment in education will be worthless so they will not invest in education.

2.3. Equilibrium

We now characterize the pure strategy subgame perfect equilibria of the above model. To do so, we proceed by backward induction.

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The last decision to be made is the effort choice by individuals. Here, given the organization of agriculture and the amount of investment made in the education system, e is determined to maximize utility. First, it is clear that however much the elite invest in education, when they are militarized and can unilaterally determine wages *ex post*, they will set $w = 0$, and peasants will get zero return on effort. In consequence, peasants will exert no effort in setting $e=0$. In this case, since education is unproductive, the elite in a plantation economy set $h = 0$. This implies that the profits from plantation production are $\pi^P(C^P) = qAN - C^P$.

When there is smallholder production, peasants exert effort, if $\vartheta(1+h)^\beta - 1 \geq \vartheta$ (using the fact that $rA = \vartheta$), which implies that peasants exert effort, if $h \geq \left(\frac{\vartheta+1}{\vartheta}\right)^{\frac{1}{\beta}} - 1$, that is, if human capital investment is sufficiently high. Anticipating such an effort decision, the elite choose the amount of investment in education as follows:

$$h^* = arg\ \max_h \{(qA - \vartheta)(1 + eh)^\beta N - h - C^S\},$$

which has the solution

$$h^* = \Big((qA - \vartheta)\beta eN\Big)^{\frac{1}{1-\beta}} - 1 \text{ if } h^* \geq \left(\frac{\vartheta + 1}{\vartheta}\right)^{\frac{1}{\beta}} - 1, \text{ or } h^* = 0 \text{ otherwise.}$$

The interesting case is where $h^* \geq \left(\frac{\vartheta+1}{\vartheta}\right)^{\frac{1}{\beta}} - 1$, and we assume this to be true from now on. We can now calculate profits from the smallholder economy to be

$$\pi^S(C^S) = (qA - \vartheta)(1 + ((qA - \vartheta)\beta N)^{\frac{1}{1-\beta}})^\beta N - C^S.$$

Having calculated the optimal investment in education for the elite as a function of the organization of the agrarian economy, we move back to this decision. However, as noted above, we simply assume that if militarization has not taken place, then it is infeasible to expropriate land and repress labor in order to have a plantation economy. Thus, a non-militarized elite always chooses a smallholder society. However, a militarized elite has more freedom to choose different systems. The plantation economy is preferred if it is more profitable or if

$$2qAN \geq (qA - \vartheta)(1 + ((qA - \vartheta)\beta N)^{\frac{1}{1-\beta}})^\beta N - \Delta C.$$

where $\Delta C = C^S - C^P$ is the comparative advantage of the elite in the plantation economy. Note that the larger ΔC, the more attractive the plantation economy. That this condition does not necessarily hold implies that even a militarized elite might create a smallholder economy. Even though it would

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be feasible to create a plantation economy, the elite has such a strong comparative disadvantage in running plantations that it forgoes the option. Nevertheless, this case does not seem very relevant historically, at least in Latin America. Therefore, we shall assume that $\pi^P(C^P)>\pi^S(C^S)$. This can be true despite the fact that output is definitely lower under plantation production. This follows from the fact that there are constant returns to scale, but that with plantation production, there is zero effort and zero investment in human capital. One can even allow for increasing returns to land and output could still be lower with a plantation economy because of the hold-up problem that this form of organization generates.

The interesting case is where $\pi^P(C^P)>\pi^S(C^S)$ to the extent that it is worth paying the cost m necessary to develop the coercive power to create a plantation economy. Nevertheless, a plantation economy could still be the outcome due to other factors even when it would not happen simply for economic reasons. Such factors could include the rents from office, or the threat of external intervention that induces militarization. Once it has happened, however, it allows a plantation economy to be constructed.

We now consider, for given militarization decisions, the outcome of the political contest between the elites. Individual i supports the Liberals, if

$$c^i_{fL} + \sigma^i + \theta \geq c^i_{fC}$$

where c^i_{fE} is the consumption of peasant i if the faction of the elite in power is E. Using standard methods, we can calculate the fraction of people who support L. To do this, define a critical value of σ^i, denoted $\tilde{\sigma}^i$, such that all individuals with $\sigma^i > \tilde{\sigma}^i$ strictly prefer to vote for L; clearly, $\tilde{\sigma}^i = c^i_{fC} - c^i_{fL} - \theta$. The proportion of the population supporting L is then,

$$\int_{c^i_{fC}-c^i_{fL}-\theta}^{\mu(m_L,\, m_C)+\frac{1}{2\phi}} \phi di = \frac{1}{2} + \phi\left(\mu(m_L, m_C) + \theta + c^i_{fL} - c^i_{fC}\right) \tag{3}$$

using the fact that the distribution of σ^i is uniform. The probability that L wins the election/contest, denoted as $P(m_L, m_C)$, is simply the probability that this fraction is greater than one half of the population, $P(m_L, m_C) = Pr\left\{\frac{1}{2} + \phi\left(\mu(m_L, m_C) + \theta + c^i_{fL} - c^i_{fC}\right) > \frac{1}{2}\right\}$, so,

$$\begin{aligned} P(m_L, m_C) &= Pr\left\{\theta > c^i_{fC} - c^i_{fL} - \mu(m_L, m_C)\right\}, \\ &= \int_{c^i_{fC}-c^i_{fL}-\mu(m_L,m_C)}^{\frac{1}{2s}} sdi \\ &= \frac{1}{2} + s\left(c^i_{fL} - c^i_{fC} + \mu(m_L, m_C)\right). \end{aligned}$$

Interestingly, for militarization to be an equilibrium outcome, it must increase the probability of winning the domestic contest. Indeed, we could even have $P(m, 0) < P(0, 0)$, which is possible, since even if $\mu(m, 0) > \mu(0, 0)$, militarizing, when the other party is not militarizing, makes the peasants worse off since a militarized party will create a plantation economy if it wins. This leads the peasants to prefer the non-militarized party.

Before moving to the initial node of the game tree, we introduce a simple assumption about the threat of foreign invasion. To keep things simple, we assume that this occurs before people vote (otherwise it would influence their voting decisions, if invasion reduced their payoffs). If neither faction of the elite is militarized, then we assume that an invasion occurs with probability $1-\phi$. If one faction of the elite is militarized and this faction comes to power, then the probability is zero while if the unmilitarized faction comes to power, the probability is still $1-\phi$. If both factions are militarized, the probability is zero. If an invasion occurs, then both factions of the elite get a payoff of zero.

We can now examine the equilibrium in militarization. Since the situation is entirely symmetric, it is clear that if one of the parties wants to militarize, the other one will also do so. Therefore, the key issue is whether

$$P(m,0)[B + \pi^P(C^P)] + (1 - P(m,0))\varphi\pi^S(C^S) - m \geq \varphi[P(0,0)B + \pi^S(C^S)]. \quad (4)$$

which has the following interpretation. Given that party C does not militarize, if L militarizes, then it wins power with probability $P(m, 0)$. In this case it gets the rent from power B and the profits $\pi^P(C^P)$ from the creation of a plantation economy. With probability $1-P(m, 0)$ it loses the power struggle, and since party C is not militarized, a smallholder economy is created if there is no invasion. Thus, the expected utility from militarizing is $P(m,0)[B + \pi^P(C^P)] + (1 - P(m,0))\varphi\pi^S(C^S) - m$. If L does not militarize, then with probability $P(0, 0)$ it wins power and rents B and in either this case or in the situation in which C wins the power struggle, it obtains profits $\pi^S(C^S)$ from the smallholder economy. Party L therefore militarizes, if

$$[P(m,0) - \varphi P(0,0)]B + P(m,0)[\pi^P(C^P) - \varphi\pi^S(C^S)] \geq m. \quad (5)$$

This says that militarization is optimal if the increase in the probability of getting the rents from power, plus the expected benefit of being able to create a plantation economy rather than a smallholder one, is greater than the cost. The benefit here also includes the reduction in the probability that an invasion occurs. Note that the lower the value of φ, the greater the probability of invasion and the greater the left side of (5). Indeed, one can see intuitively from (5) how the threat of invasion encourages militarization because φ «discounts» both the win probability with no militarization and also the profits from the smallholder economy.

If, on the other hand, C militarizes, L wishes to militarize, if

$$[P(m,m) - \varphi P(0,m)]B + P(m,m)\pi^P(C^P) - \varphi P(0,m)\pi^S(C^S) \geq m. \qquad (6)$$

Now, by our previous assumptions, $P(m, 0) - \varphi P(0, 0) = P(m, m) - \varphi P(0, m)$, so the first terms in (5) and (6) are the same. However, since $\pi^P(C^P) > \pi^S(C^S)$, it is not obvious which of these conditions is more binding. Note, however, that by symmetry, if (5) hold for L, then a similar condition must also hold for C. If both are satisfied, then militarization is a dominant strategy for both factions of the elite. Nevertheless, there can be two symmetric equilibria, if (5) does not hold but (6) does hold. In this case, both not militarizing and militarizing are equilibria (and there is also a mixed strategy equilibrium in which each arms with some probability).

The exact nature of the equilibrium is not important for the analysis of this paper, what does matter is the circumstances which lead to some militarization. There are three comparative static properties of (5) and (6) that are important for our analysis. First, if $P(m, 0) - \varphi P(0, 0) > 0$, then the left side of both these conditions is increasing in B. This would be true if the coercive benefit of investing in militarization, $\mu(m, 0) - \mu(0, 0)$ was large relative to the disutility loss that peasants experience, or if the threat of invasion is sufficiently high. If this is true, then the greater the value of being in power to the parties, the greater their incentive to militarize. The most likely interpretation on B in our context is ideological polarization. Because Guatemala and El Salvador were central areas of the Spanish colonial empire, they had much stronger Conservative interests and beliefs. Second, the left sides of (5) and (6) are also increasing in ΔC — the greater the comparative advantage of the elite in organizing and running a plantation economy, the more attractive it is to militarize. Because political elites in Costa Rica and Colombia had much less of a tradition of large landownership or labor repression, this made it less attractive for them to militarize. Finally, the left sides are decreasing in φ. The higher the external threat of invasion, the lower the value of φ and the more advantageous it is to arm. Thus, the intense interstate conflict that took place between the contending elites in Guatemala and El Salvador was a further incentive to militarize, something which then molded the evolution of the coffee economy.

3. HISTORICAL EVIDENCE

We now present some relevant historical evidence. In doing so, we do not attempt to provide a comprehensive overview but rather stress the plausibility of certain aspects which are crucial to our story: (1) the spread of coffee coincided with large changes in the legal environment determining property rights to land and these changes were primarily responsible for the subsequent pattern of landownership; (2) elites in the different countries differed in their composition and socioeconomic background; (3) there were significant differences in the extent to which political competition was militarized and the extent to which elites used relatively peaceful elections rather than warfare to allocate power; (4) the desire to control the labor supply was an important force which favored mass land expropriation by elites and the creation of plantations was complementary to extensive labor repression.

In contrast to other New World countries with rich mineral resources that were exploited by the Spanish colonizers, El Salvador, Guatemala, Colombia and Costa Rica largely lacked mineral resources (though Colombia was a partial exception with quite significant gold deposits). Commercial activities were limited to agricultural exports, but these were small before the rise of coffee. El Salvador and Guatemala were successful in indigo and subsequently Guatemala in cochineal. However, by 1880, the markets for these goods had collapsed due to the development of artificial dyes. The banana trade only began after 1900 and none had the right type of land to compete with Cuba, the Caribbean islands and Brazil in the production of sugar. Tobacco production saw a brief boom in the 1850s in Colombia, but coffee was to be the first significant export crop for any of these countries.

Independence arrived in Colombia in 1819 and Costa Rica, El Salvador and Guatemala in 1821 (see Rodriguez 1978). Between 1821 and 1824, Guatemala, El Salvador and Costa Rica were united with Mexico, and subsequently formed (along with Nicaragua and Honduras) the Central American Federation until its disintegration in 1838. Liberal free trade ideas spread from Spain in the late 18th century and in the period prior to independence; yet, these countries varied in terms of the extent to which there were entrenched forces resisting change and these new ideas. Much of the dynamics of political competition in the 19th century can be understood as a conflict between groups that favored the maintenance of the mercantilist colonial system, Conservatives, and those who favored abandoning it, Liberals[5]. At different times in different countries during the 19th century, Liberals triumphed, abolishing the colonial system and generally privatizing Indian, Church, communal and government-owned lands. This was an important precondition for coffee because it represented a large investment for which secure private property was essential. The timing of the regime change and the accompanying changes in property rights was affected by the comparative strength of vested interest in the status quo. Where these forces

[5] As Mahoney (2001, p. 53) puts it, «Early nineteenth-century liberals were generally represented by those notables and professional men who called for the creation of republican forms of government, the promotion of private property and free markets, and the removal of matters of religion from the public sphere. By contrast, early nineteenth-century Conservatives were represented by those privileged merchants and landed elites who sought the preservation of key colonial institutions, including quasi-monarchical forms of governance, restrictions on private property and free trade, and special privileges for the Church.»

were weak, as in Costa Rica and Colombia, the changes occurred earlier than they did in Guatemala and El Salvador, where the vested interests were stronger. The strength of the vested interest is significant for understanding the form that land privatization took when the Liberal revolution occurred. This is because it influenced the form taken by political competition and the extent to which it became militarized.

3.1. Costa Rica

With animosity to the church authorities for failing to allow Costa Rica to have its own bishop, and to the Guatemalan authorities and merchants for forbidding direct trade with Panama, Chile and other countries, and for suppressing tobacco production, Costa Rica provided fertile ground for Liberal ideas. Karnes (1959) shows that, from the time of independence, Costa Rica had already developed a strong Liberal movement. However, in the absence of a dominant city or town at independence, there was onsiderable rivalry and conflict among the four main population centers, Cartago (the colonial capital and center of Conservative groups), San José, Alajuela and Heredia. Each town in essence conducted its own foreign policy, seeking alliances with powerful factions in neighboring countries. This erupted into wars in 1823 and 1835, after which San José became consolidated as the capital. Gudmundson (1986, p. 4) notes, «Over the course of the transition to coffee political infighting was often violent and always vociferous. From the Carillo dictatorship (1835-1842), to the overthrow and execution of President Mora (1849-1859), to the Guardia military dictatorship (1870-1882), elite politics involved intense factional strife.» In particular, each town tried aggressively to lure in-migrants by selling them title to land in small parcels at very low prices. This competition did not end even when Carillo became dictator, as Mahoney (2001, p. 148) records «the government continued to gradually extend private landholdings to small farmers, and the state never experimented with forced labor policies.» The pattern of political cleavage then was one in which local elites attempted, first, to establish their own credentials to be the central government and, after the dominance of San José was established, to gain control of the city. As all scholars record, this process of competition involved, from the early days, an attempt to attract both labor and political support by offering property rights to land.

Although violence did not vanish from Costa Rican politics in the 19th century, and something approaching real democracy only emerged in the late 1880s and 1890s, political elites channeled their competition into relatively peaceful forms. Holden (2004, p. 96) argued that «What distinguished Costa Rica was certainly not the absence of the elements of public violence that afflicted the rest of the isthmus … but their comparative scarcity.»

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Reflecting on this period of Central American political history, Woodward (1985, p. 167) noted, «only in Costa Rica … did elections mean anything» and Gudmundson (1995, p. 158) concurred. In fact, after the War of 1823 which established San José as the capital «the new government … reacted swiftly, sharply cutting the ranks of its own army, closing the San José garrisons … That the government established a principle of civilian supremacy is at least plausible. That it was an early sign of a long and uneven trend away from the habitual violence of Costa Rica's sister republics is undeniable» (Holden 2004, p. 97).

Laws granting title and subsidies to smallholders who grew coffee were passed by the central government in 1828, 1832 and in 1840, and by 1856, all public lands had been sold off. These laws opened up the land of the central valley, which was previously *baldió* (government-owned land). This was followed in 1867 by the creation of a federal land registry. Despite some subsequent consolidation of landholdings (particularly during depressions in world prices where smallholders sold out), contemporary data continue to confirm the small average size of coffee farms (see Table 1). Cardoso (1977, p. 176) summarizes as follows «there was an absolute predominance of small farms, both of numbers and of the total land occupied.» In contrast to El Salvador and Guatemala, in Costa Rica, there was a complete absence of labor repressive laws (see, e.g. Williams 1994). Due to the early land privatization, coffee expanded rapidly and by the 1840s represented 80 per cent of exports.

Who were these Costa Rican political elites? There is a consensus in the historical literature regarding their identity. «At the time of independence, the dominant class of Costa Rica was not a landed elite, for it did not derive the majority of its wealth from agricultural ownership or from extracting surpluses from peasant producers. Instead [it was] fundamentally a merchant elite,» Mahoney (2001, p. 82)[6]. Yashar (1997, p. 56) concurred, arguing «the Costa Rican Oligarchy did not produce coffee on large estates. Instead, it … derived its economic, political and social power through control over coffee processing, credit and commerce.» This has also been documented by the careful sociological studies of Paige (1997) and Stone (1990).

These scholars also document the attempt by the Costa Rican elite to exert monopsony power over smallholders. The most famous example of this is the overthrow of President Mora by the Montealegres in 1859 because he proposed the creation of a bank to lend directly to smallholders, thus breaking the monopoly power of financiers. However, there is also recognition of, as

[6] Elsewhere Mahoney notes (2001, p. 146) «unlike the coffee oligarchy of late 19th-century Guatemala whose wealth and power were based on estate ownership, landowning per se was not the [Costa Rican elite's] defining characteristic or basis for power. Instead, the Costa Rican dominant class was a coffee elite by virtue of its control over the commercial aspects of coffee production, specifically the financing, processing and marketing of the crop.»

Gudmundson (1995, p. 162) put it «the long-standing refusal on the part of elite factions with largely merchant interests to sponsor policies restricting access to public lands.»

As the 19th century progressed, Costa Rica witnessed a dramatic expansion of human capital. Thorp (1998, Table IX.2, p. 354) showed that 36 per cent of adults were literate by 1900, and 67 per cent by 1930. Engerman *et al*. (1998, table 1) recorded literacy rates of 23.6 per cent in 1892, 33 per cent in 1900 and 64 per cent in 1925. The data in Woodward (1985, p. 173) were even more impressive, with a literacy rate of 76 per cent in 1927.

What emerges clearly from the historical literature on Costa Rica is the existence of a political elite which managed to find relatively non-militarized methods for allocating power and which did not have a history of large landownership.

3.2. Guatemala

Guatemala had been the seat of colonial power in Central America and had a very strong Conservative merchant guild in the *Consulado de Credito*. However, even in the pre-independence Bourbon period, some landed groups, particularly the Indigo Growers Society, founded in 1794, became early adherents to liberalism (see Wortman 1982, Woodward 1965). Woodward (1966, p. 27) documents that following the conventional wisdom, «Conservatives represented the wealthy, established families of the late colonial period, whereas Liberals represented more especially the upper-middle sector, professional classes.» Following the brief union with Mexico, the Central American Federation came to be controlled by Liberals after 1829. President Francisco Morazán moved the capital to San Salvador to escape the Conservative influence in Guatemala, which was ruled by Mariano Gálvez as Governor. The Liberal state was highly militarized and «Gálvez divided the state into four *comandancias*, with a general over each, and thereafter military government was characteristic» (Woodward, 1985, p. 103). During this period and subsequently there were incessant interstate conflicts between Guatemala, El Salvador, Honduras and Nicaragua. Woodward (1985, p. 171) concluded that «The peculiar problem … was the constant meddling of governments in the affairs of their neighbors, meddling which contributed to the almost constant turmoil on the isthmus.»

The Liberal-controlled Central American Federation was destroyed in 1838 by the army of Rafael Carrera who ruled Guatemala pretty much as a dictator until 1871. During this period, he reintroduced Conservatism and the policies of the colonial era. Carrera and subsequent rulers kept themselves in power by the use of force and he was prepared to invade other countries at the first whiff of liberalism.

Only in 1871 was the Conservative Carrera regime finally overthrown by the Liberals, led initially by Garcia Grenados and after 1873 by Rufino

Barrios. These regimes, and those that followed them, were as militarized as that of Carrera. Woodward (1985, p. 166) noted,

> Central American historians have referred to the period as the "Age of Dictatorships." New constitutions paid lip service to the republican principals of earlier Liberals, but in fact the institutions that evolved provided for centralized, executive-run governments, with the military as the real arbiter of public affairs. Not surprisingly, military men tended to dominate the presidencies.

These Liberals pushed through land privatization, although this was protracted and bitterly contested. Between 1871 and 1883, nearly one million acres of land were privatized and it was only then that coffee developed rapidly. The aim of this was the formation of large estates (see McCreery 1994, p. 203; Mahoney 2001, pp. 120-123). Unlike the Costa Rican Liberals, the Guatemalan Liberals of the late 19th century were different from those of the 1820s. «The major transformation of Liberalism concerned the individuals who made up the core of Liberal supporters. During the mid-19th century, the class composition of this faction became similar to that of the Conservatives» Mahoney (2001, p. 69; see also Woodward 1984, pp. 292-293 and Gudmundson and Lindo-Fuentes 1995, pp. 82-90, in support of this view).

The coercive power of the Liberal state was also used to help large landowners gain access to labor. While Liberals did not invent forced labor in Guatemala, the onset of large-scale coffee production induced them to codify and increase the efficiency of such a system through a reconstituted *mandamiento* and debt peonage[7]. Liberal land policies attempted to undermine the subsistence economy of the highland Indians and force them into the wage economy (Williams 1994). Menjivar (1980) argues that the ejidos and communal lands were eliminated «to increase labor supply by denying access of such labor to land.» McCreery's (1976, pp. 456-460) analysis is similar, suggesting that, «taking away or reducing the land belonging to Indians was an effective way of creating a low wage labor force … In the 1870s and 1880s, insufficient cheap labor was a … barrier to the expansion of coffee. The incorporation into the latifundia of Indian village lands … helped to create rural unemployment by forcing families into marginal areas or leaving them without access to sufficient land. Such conditions were precisely those prerequisites to the laws of vagrancy and debt servitude favored by the Liberals for mobilizing the cheap labor.»

[7] *Mandamiento* was a system in which employers could request and receive up to sixty workers for 5 days of wage work. These workers could be forcibly recruited unless they could show from their personal workbook that such service had recently been performed satisfactorily (see McCreery 1983).

Compared to Costa Rica, literacy rates lagged well behind those in Costa Rica. Thorp (1998) showed the adult (over 15 years) literacy rate was 12 per cent in 1900, 19 per cent in 1930 and 29 per cent in 1950[8]. Engerman *et al.*'s (1998) data are consistent, showing literacy rates of 11.3 per cent for 1893 and 15 per cent for 1925.

In short, the evidence is consistent with our claim that Guatemalan elites assumed and maintained power through a strong military and were well versed in labor repression and running large farms.

3.3. El Salvador

As noted above, while Liberal elites in the immediate post-independence period in both Costa Rica and Guatemala were not primarily landowners, the picture was different in El Salvador where, even in this period, a substantial proportion were literate (Gudmundson and Lindo-Fuentes 1995; White 1973, p. 62). From colonial times, the country had been carved up into communal and ejidal lands constituting about two-thirds of the land area, with large private haciendas (of between 1000 and 45,000 acres) accounting for the remaining third of the land. Despite the fact that the two types of land were generally in close proximity, the forms that agricultural operations took were strikingly different. The communal and ejidal economy was almost entirely subsistence, while the haciendas were commercial (see Browning 1971). Following the collapse of the Central American Federation, El Salvador came under the control of the Carrera regime in Guatemala, and as Lindo-Fuentes (1990, p. 133) puts it, Carrera and his successor Cerna «were always available to fight against Liberal excesses in El Salvador.»

The succession of Conservative regimes fell in 1871 with the victory of the moderate Liberal Santiago González who ruled until 1876. Rafael Zaldívar then ruled until 1885 and instituted the most radical period of Liberal reform. In 1882, all communal lands were abolished and this led to a redistribution of about 40 per cent of all agricultural land[9]. Browning (1971, p. 151) argued, «the reforms arose from the struggle between different social groups to claim the benefits of the land, and not from the efforts of an enlightened minority to increase the efficiency of the economy.» As in the Guatemalan case, scholars point to the close relationship between the control of land and labor. Paige (1997, pp. 106-107) noted about the Salvadorean case, «the land concentration created a large proletariat and semi-proletariat of agricultural wage laborers … The Liberal land reform had eliminated subsistence based on traditional agriculture.» Williams (1994, p. 124) said,

[8] This last increase owes much to the creation of (a soon to be aborted) democracy in 1945 in Guatemala.

[9] This figure is from Browning (1971, pp. 191-192). Others put it lower, for example, Lindo-Fuentes (1990, p. 130) argues for a figure of about 25 per cent. See also Menjivar (1980, p. 60).

«through the use of force, squatting was held in check and the landless … became dependent on coffee growers for survival.» A system of «agricultural judges» was created in 1881 to enforce restrictive vagrancy laws intended to impede labor mobility and trap workers on coffee estates.

Compared with Costa Rica and Colombia, El Salvador, like Guatemala, has a very poor record of human capital accumulation. The adult literacy rate was 26 per cent in 1900, 27 per cent in 1930 and 42 per cent in 1960 (data from Thorp 1998).

3.4. Colombia

Colombia is a much larger and more diverse nation than any of the three Central American ones under study. Yet, despite having inegalitarian patterns of landholding on the northern plains (the *tierra caliente*) devoted to cattle grazing, the development of its coffee industry is remarkably like that of Costa Rica. As with Costa Rica, Colombia was relatively peripheral during the colonial period (the Viceroyalty of Nueva Grenada being established as late as 1739), and the Liberal revolution occurred relatively early with the presidency of José Hilario Lopez in 1849. In 1850, the Indian lands were abolished, government was radically decentralized, and in 1861 church lands were seized.

In Colombia, there was the same cleavage between Liberals and Conservatives as in the other countries we study; although there was conflict between these groups, this had little to do with land or other economic policy issues[10]. In fact, even before 1849, the Conservative regime under Mosquera had reduced tariffs, and the reform of Indian lands had begun as early as the 1820s. Thus, even in the «Regeneration period», after 1885, when the Conservatives regained power under Rafael Nuñez, there were no reversals in the land policies (e.g. LeGrand, 1986). As Bergquist put it (1978, p. 10), «In the late 1840s and early 1850s, under the aegis of the Liberal party, import-export interests acquired preponderant political power, and the initial success of their laissez faire economic reforms won approval or acquiescence from upper-class leaders identified with both political parties.»

While some measures occurred earlier[11], two main laws of 1874 and 1882 were designed to allow farmers (*colonos*) to gain title to open government-owned land, which, comprising about 75 per cent of the land area of Colombia, included all of the area which was subsequently to become the

[10] Palacios (1980, p. 27) summed up the consensus view by arguing «the economic aspects of the mid-century reforms produced relatively little disagreement among political leaders» (Bushnell, 1993, provided a good overview).

[11] McGreevey (1971, p. 129) noted that in 1843 the government passed legislation, which ceded *baldió* to settlers who farmed it productively.

major coffee-growing areas of Antioquia, Caldas and Quindio (Parsons 1949; LeGrand, 1986). Before this time, the major driving force behind land laws was the desire of the state to gain revenue (see Deas 1982). LeGrand (1986, p. 13) noted, «from 1820 to 1870, *baldios* legislation primarily reflected the fiscal preoccupations of the Colombian government. Subsequently, in the 1870s and 1880s, a significant reform of public land policy occurred: the aim of promoting the economic exploitation of frontier areas through free grants of land gained precedence.» LeGrand documented this in detail, noting «only in Costa Rica … did legislation in the nineteenth century also encourage homesteading on the part of native settlers» (p. 17). She added (p. 15), «it might seem surprising that in a continent where politics was the province of elites, a land policy so apparently responsive to peasants' interests became law.» She concluded that the policy emerged precisely because Colombian political elites were not large landowners and saw the commercial advantages of promoting smallholder production, «if the public land reform of the 1870s and 1880s grew out of the government's desire to stimulate rural production, it also responded to the economic interests of the politicians themselves and the social groups they represented.»

Yet, the passage of these laws also took place in the midst of heated political party competition that revolved around elections. As Bushnell (1971) documented, universal male suffrage was introduced in the 1850s with perhaps 46 per cent of adult males voting in the 1856 Presidential election, an extraordinarily high number for any country in the 19th century. While the 1863 constitution led to restrictions on suffrage, there is little doubt that the changes in the land laws took place in the context of support mobilization by the parties and elections continued to be the preferred method of allocating political power. Such elections were far from perfect, fraught with violence and often quite extensive fraud (see Chaves *et al*. 2009). Nevertheless, as the Polity data suggest, they are qualitatively very different from how power was allocated in Guatemala and El Salvador, particularly during the Liberal Republic between 1850 and 1885. As in Costa Rica, landownership was not the distinguishing feature of the political elite in Colombia (see Twinam 1982, for evidence on the important Antioquian case)[12]. Instead, it was «a combination of commerce, office holding, and diverse investments in urban and rural real estate,» (Gudmundson 1986, p. 57). Palacios (1980) documented this in great detail, arguing that «merchants were in the forefront of development, and their participation was decisive for the future of coffee,» (p. 25) and that in the case of the coffee bourgeoisie

[12] Safford (1972, 1978) and Delpar (1981) offered important studies of the origins of Colombian political party elites. Regional loyalties, as in Costa Rica, were also important with the Liberal heartland being in Santander and the Conservative one in Antioquia. The strengthening of these regional power bases was part of the Liberal revolution, Dix (1987, p. 19) noting that «the liberal constitution of 1863 carried federalism almost to its logical extreme by according the Colombian states many of the attributes of sovereignty.»

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«capital no longer went into control land and labor, but to control the internal coffee market» (p. 145)[13].

Colombianists have also noted the desire to monopolize land to gain control of the labor supply. LeGrand (1986, pp. 38-39) claimed, «the problem of labor scarcity helps to explain why entrepreneurs tried to monopolize tracts of public lands much larger than they could possibly put to use. Only by restricting the free access of peasants to … lands, thus depriving them of an alternative economic base, could the landowning classes hope to tie them to the estates.» However, in Colombia such a strategy did not work. Palacios (1980) explicitly discussed how the smallholder economy destroyed monopsony power of landowners (p. 103), but added «no sooner was he [the small and medium cultivator] established on the slopes of the central cordillera than he was integrated into the network of monopsonistic purchase» (p. 141). He developed this argument in great detail demonstrating that «the system of purchasing and processing the coffee for export … showed a high degree of concentration, and powerful financial control was exercised by the commercial houses in the interior,» (p. 153); moreover, «the coffee [was] thus acquired at monopsony prices» (p. 157)[14].

As Table 1 records (data from Thorp 1998), the literacy rate in Colombia was 34 per cent in 1900, 52 per cent in 1930 and 62 per cent in 1960. Engerman *et al*. (1998) found literacy rates of 32 per cent for 1918 and 56 per cent for 1938. McGreevey's data (1971, p. 234) also showed that there was a significant relationship between educational performance and land distribution within Colombia. The areas where smallholders dominated were those with the greatest educational attainment. For example, in 1874, Antioquia's schooling rate (per cent of children in school as percentage of total population) was 189 per cent of the average, while in 1918, Antioquia's literacy rate was 131 per cent of the average. This is consistent with the data presented by Helg (1984, pp. 30-31) showing that while in 1918 the average literacy rate was 32.5 per cent, it was 45.7 per cent in Caldas and 39.2 per cent in Antioquia, while in 1922, Caldas and Antioquia had the highest and second highest proportion of children in school of any states.

[13] The leading scholar of Colombian economic history, Luis Ospina Vasquez (1955, p. 128) argued «The wealthy, important, and influential class [of colonial Colombia] was not the landlords but rather the merchants and officials … That spirit of the 'feudal landlord' … has served to explain the entire process of economic life in Latin America, even in those nations in which the wealthy classes' aversion to the countryside and agriculture comes to have aspects of a sickness, and in which the 'feudal' latifundium is perfectly exceptional or unknown and even the hacienda in its typical form is rare.»

[14] The main cartel of coffee purchasers in Medellin, the «*Negocio de X y Y*» (where X stood for coffee and Y for hides) purchased about 65 per cent of all the coffee produced in Antioquia (Palacios, 1980, p. 156).

3.5. Other Countries: Brazil and Venezuela

We now briefly consider pertinent evidence from Brazil and Venezuela. The comparison with Brazil is complicated by several factors. First, it had a different colonial master, and therefore different colonial institutions. Second, following independence, Brazil became an empire with an emperor and not a republic, and thus had very different political institutions until 1888. Third, slavery was very important in Brazil until its abolition in 1888, following which large-scale immigration from southern Europe occurred. Neither slavery nor immigration was of any significance in our other countries. Finally, the type of coffee grown in Brazil tends to be of lower quality, since the coffee berries are normally stripped rather than picked from the bushes. This makes harvesting much less quality intensive. Moreover, the big coffee states of Sao Paulo and Parana are much flatter and have different topographies from Central and Andean America. These last two factors may allow for larger-scale economies.

Nevertheless, despite these complicating factors, the basic evidence from Brazil is consistent with our analysis to the extent that a large existing planter class controlled the process of land colonization in their own interests. The Brazilian state, however, was much less militarized than those we have studied, and possibly, in consequence, labor repression was relatively low[15]. Factually, the average size of coffee farms in Brazil was and is large. Moreover, Brazil has a dismal record of human capital accumulation. For example, the literacy rate was 14.8 per cent in 1890 and 30 per cent in 1930 (Engerman *et al*. 1998). What are the reasons for this situation? The historical literature explains the heavy land concentration in Brazil by the dominance of landed interests and the planter class. During the colonial period, and until 1850, land was either squatted (*posses*) or occupied on the basis of huge grants from the state (*seismarias*). As the long-run feasibility of the slave economy vanished, the Brazilian government wanted to develop a new system of property rights in land with the most significant legislation being passed in 1850. «The bill … was based on the assumption that where access to land was easy, it would be impossible to get people to work on the plantations … The only way to obtain free labor … would be to create obstacles to landownership, so that the free worker, unable to get land, would be forced to work for others. Therefore, the traditional means of access to the land-squatting, tenancy, sharecropping should be limited, and unused land should revert to the imperial government as public property and then sold at a high enough price to make it difficult for newcomers to buy,» Costa (1985, pp. 82-83). For example, Dean (1971, p. 606) describes how landed interests derailed any attempt to promote widespread access to land in the 19th century

[15] One reason for the absence of militarization may have been the fact that there was no war of independence in Brazil.

Brazil, concluding that while some elements in the government «sought consciously to deal with land concentration and to counter the power of the great landowners. The final failure of these efforts is an interesting example of the difficulty of reform from within a political system dominated by the landed elite.» Most analysts argue that it was precisely the interests of the coffee planters that were served by the 1850 bill (see, e.g. Alston *et al*. 1999, Ch. 2) and Costa (1985, p. 84) noted, «it seemed clear that the bill served the interests only of the planters of Rio, São Paulo, and Minas, the coffee land.» This legislation then served as the basis for the expansion of the Brazilian coffee industry and led directly to the dominance of large-scale plantations[16].

The Venezuelan coffee economy has received little attention from scholars. However, the existing research suggests the following evolution of the industry. Coffee expanded in the 19th century as squatters moved into frontier and government-owned lands. They did so, in most cases, without ever gaining formal title to their lands. In this process, elites participated for the most part not as landowners but as providers of credit and purchasers of the crop (see Roseberry 1983, Ch. 3; Yarrington 1997, Ch. 3). The period until 1899 was one of vigorous competition between rival Liberal and Conservative parties with strong regional divisions, disputed elections and relatively frequent civil wars. Indeed politically, Venezuela looks remarkably similar to Colombia in the 19th century. For example, Lombardi (1982, p. 177) suggests that it was precisely intra-elite competition for support, which stopped the introduction of forced labor laws in the 1840s. After 1899, however, things changed dramatically with the two long dictatorships of Cipriano Castro from 1899 to 1908, and Juan Vicente Gómez from 1908 to 1935. During this autocratic period, the old political parties were destroyed and the central state was greatly strengthened and militarized. One result of this was major changes in land laws that apparently led to significantly increased land concentration. Yarrington (1997, pp. 5-6) documents that during the Gómez dictatorship «the decline of household economies in Duaca resulted from the elite's sudden, wholesale expropriation of public and Indian lands.» He shows that in this region, the smallholder economy that had grown up in the 19th century was destroyed[17].

[16] In the 1891 constitution, significant powers were reserved for its different states. Sao Paulo (and to a lesser extent other southern states) was somewhat unique in that it enacted a new land law that made it much easier to register private land and then used the provision of land rights in small parcels as a means of attracting labor from Europe to take up coffee cultivation. Once this happened, farm size decreased sharply (Nugent and Saddi 2004). Earlier in Sao Paulo, and generally elsewhere, property rights in land were difficult to obtain and coffee was generally produced on large farms with slave or ex-slave and other tied labor.

[17] Available data on farm size are consistent with this. For example, de Janvry (1981, p. 75, Table 2.4) recorded that in 1970, 50 per cent of coffee farms in Venezuela were over 100 hectares, while the corresponding numbers for Colombia (1959) and Costa Rica (1970) were 9 and 26 per cent, respectively (for Guatemala (1950) and El Salvador (1961) the numbers were 94 and 46 per cent, respectively).

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For our purposes, the usefulness of the Brazilian and Venezuelan cases is that they both underscore the importance of politics in determining the structure of the coffee economy. In Brazil, where landowners dominated politics both during the Empire and the Old Republic (1889-1930), land laws favored the consolidation and maintenance of large plantations. In Venezuela, the coffee economy of the 19th century appears to have been close to that of Colombia or Costa Rica, but the consolidation of the long dictatorship after 1899 put this process into reverse. Once the military took control of the state, there was mass land expropriation of smallholders. Yarrington (1997, p. 211) concludes, «the agrarian history of Duaca … points to the connection between politics and agrarian change. Changes in the prevailing system of land and labor did not simply represent the cumulative effects of market or demographic forces; rather, the transformation of Duaqueño society grew out of political changes at the local and national level.»

4. ALTERNATIVE THEORIES

We now discuss other possible interpretations of the evidence presented in the last section and argue that our theory provides the best fit. We concentrate on the most important hypotheses, which are not obviously inconsistent with the evidence provided. Nevertheless, it is worth noting that by examining only a subset of the countries, several scholars have proposed untenable theories. For example, Hirschman (1958, 1977) argued that there was something different about coffee that led to smallholder production with all its beneficial effects. This is clearly inconsistent with the evidence from El Salvador and Guatemala. On the other hand, Thorp (1991), in her comparison of Colombia and Peru, argued that the better performance of Colombia was due to smallholders, but that this difference originated in topographical differences. Yet, this is inconsistent with the accepted view in the literature on coffee that there are no significant topographical differences between the countries we study, yet smallholder production was limited to Costa Rica and Colombia (e.g. de Graaf, 1986)[18]. Other scholars of a particular country often attribute land laws to Liberal ideology (e.g. the discussion of Colombia in Osterling 1989, p. 69). Yet, our comparative study shows that there was no simple connection between Liberal ideology and the form that the land privatization took.

[18] The reason for this is that growing requirements of «mountain» coffee of the *arabica typica* variety, which these countries grow, are quite sensitive (see the discussion in de Graaf, 1986, pp. 29-32). Thus, it can only be grown in rather specific climatic zones. In particular, it must receive light throughout most of the year and 60-90 inches of rain, and have porous soils, which are not alkaline (pH score between 5 and 6) and must never experience frost. The areas of these four countries devoted to this variety of coffee are all between 2000 and 6000 feet, receive at least 70 inches of rainfall in volcanic soils which provide both the right pH value and excellent drainage (see Van Royen 1954, and for Colombia, *Instituto Geografica* Augustin Codazzi 1967).

4.1. Indigenous People and Population Density

Perhaps the most common theory of why Costa Rica is different is that, relative to other Central American countries, it had very few indigenous people at the time of the conquest (or at least after the decimation of the population by disease) and very low population density[19]. Low population density might matter because it made plantation agriculture infeasible (since there was not a large potential labor force) and that, as a result, the smallholder economy emerged. In a representative statement of this view, Bulmer-Thomas (1994, p. 95) said «some of these pockets of yeoman farming developed in parts of Latin America where the shortage of labor was so acute that no amount of manipulation of the labor market could be expected to yield an adequate wage-labor force. Such was the case in Costa Rica.» Although this argument appears less in the Colombian literature, it is certainly true that in the regions of Antioqueño coffee colonization, the population density was low. Therefore, the hypothesis can be plausibly applied to Colombia.

Telling evidence against the role of population density, however, is provided by the experience of Nicaragua. The Liberal Revolution came late to Nicaragua with the coup of José Zelaya in 1893[20]. Zelaya proceeded to privatize and expropriate land in exactly the same way as in El Salvador and Guatemala (Mahoney (2001) provides a detailed discussion). Paige (1997) documents that 50 per cent of all land privatized went to just thirty families, all of them were Liberals[21]. Moreover, according to his data, the size distribution of coffee farms is almost identical to that in El Salvador. Yet, like Costa Rica, Nicaragua was far from the Mayan highlands where the great concentrations of indigenous people were found, and as the data in Cardoso (1991, p. 39) reveal, the population density of Nicaragua was 6.8 people per square mile in 1875, almost identical to the figure for Costa Rica (6.1 in 1870). The other numbers from Cardoso (1991) are 29.2 in 1880 for Guatemala and 68.4 in 1878 for El Salvador. For Colombia, this figure is 6.39 in 1870 (author's calculations based on data from Bulmer-Thomas (1994)). Therefore, contrary to this common hypothesis, it is not low population density that differentiates Costa Rica and Colombia.

A related idea stems from the relative lack of Amerindians in Costa Rica. It could be that Indians are easier to exploit and this makes a plantation

[19] Gudmundson and Lindo-Fuentes (1995) reported that pure Indians made up only 1 per cent of the population in Costa Rica, while in Guatemala, the indigenous population was 400,000 in 1820, constituting 68 per cent of the population.

[20] The reason for the delay was that Liberalism had been somewhat discredited by its association with William Walker, an American mercenary who had ended up declaring himself President in the 1850s.

[21] As in all these countries, there was heterogeneity in Nicaragua. Charlip (2003), for instance, points out that in the area she studied (Carazo), the grip of the central state was weak and locals were able to resist land expropriation and smallholders even flourished; see Christie (1978) on heterogeneity within Colombia.

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system more attractive (perhaps because it reduces the subsistence wage). It seems clear that Costa Rica was different in this sense. Yet, as with population density, the presence or absence of Indians does not seem a good predictor of the form that organization of the coffee economy took. In particular, the proportion of both Amerindians and those of European descent in the whole population is almost identical for Colombia, Venezuela and Nicaragua (see McEvedy and Jones 1975). Yet, in Colombia, political elites passed laws promoting smallholders, whereas in Nicaragua, they expropriated land for themselves and created plantations.

4.2. Other Different Initial Conditions

One idea much discussed in the Costa Rican literature is the «rural democracy» thesis, which holds that before the rise of coffee, Costa Rica was settled primarily by «yeoman farmers» who owned their own land and created an egalitarian democratic ethos (Seligson (1980) is a famous exponent of this view). It seems likely that if this were the case, it might lead to smallholder production when coffee took off. However, the recent literature on Costa Rica has largely debunked this view (see Gudmundson 1986). Moreover, even if one were to accept this view for Costa Rica, it does not explain why smallholder production occurred in Colombia, since no such myths exist there.

Another idea given wide credence is that smallholder production occurred when there was an open frontier for settlers to move into. It was certainly true that, in both Costa Rica and Colombia, the largest areas of coffee production came to be on lands that had previously been unoccupied. However, this is also true of Guatemala where the western slopes of the central cordillera contained the best coffee-growing land. Thus, the presence or absence of an open frontier is not a good predictor of the form land privatization took.

4.3. Capital Markets

Since coffee is a large investment, it seems plausible that the nature of capital markets might be important in determining organizational form and perhaps the resulting preferred land policies of elites. For example, without reliable capital markets where smallholders could borrow, attempting to foster smallholder production might be infeasible and thus creating plantations might be the only option. This argument suggests that it could have been the greater development of capital markets in Costa Rica and Colombia that led to smallholder production. The main piece of evidence against this view is that, as a result of its position during the colonial era, Guatemala undoubtedly had the best-developed capital markets at independence of any of these countries. Yet, as noted above, the *Consulado* did not want to lend

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for the purposes of coffee production and blocked other institutional changes that would have facilitated it. While by the end of the century Costa Rica and Colombia undoubtedly had much better financial institutions, this was primarily as a result of coffee expansion.

4.4. Technological Changes Subsequent to Costa Rica's Move into Coffee

There is some suggestion in the literature that technical innovations around the middle of the 19th century, particularly in processing (e.g. the invention of the method of «wet processing»), may have led to greater scale economies. Thus, it could have been true that at the time when Costa Rica went into coffee, small-scale production was more efficient, while subsequent technical innovations had made large-scale production more efficient by the 1870s. The evidence against this hypothesis is the fact that the great expansion of smallholder production in Colombia occurred at exactly the same time as the plantation system was under construction in El Salvador and Guatemala. Thus, technological changes, even if significant[22], do not seem to have been critical in determining the differential form that the coffee organization took.

4.5. International Factors

Various authors have emphasized a variety of international factors that might help explain why the coffee industry in El Salvador and Guatemala differed so greatly from that in Costa Rica. There seem to be three arguments: (1) that the later Liberal revolution in El Salvador and Guatemala meant that there was a much greater availability of foreign capital than when Costa Rica had embarked on coffee in the 1820s; (2) immigration of foreigners played an important role; and (3) changes in the price of coffee.

It is true that in the case of Guatemala the disenfranchisement of the *Consulado de Comercio* after the Liberal revolution led the new elite to rely on foreign merchants and firms (mostly German and British) to finance part of the industry. However, the clinching evidence against all these arguments is the experience of Colombia. The most important period of coffee expansion, the great Antioquian colonization, started in the 1870s and 1880s at exactly the time when Guatemala and El Salvador moved into coffee. Moreover, Palacios (1980) documents that foreign capital was very important in the financing of the Colombian coffee industry. Yet, Antioquia has the highest incidence of smallholders in Colombia.

[22] Note here that the contemporary literature cited in the introduction uniformly argues that smallholder production is more efficient (presumably despite previous technological changes).

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Interestingly, Yashar (1997) showed in her comparison of Costa Rica and Guatemala that while both countries experienced significant immigration from Europe, particularly Germany, such immigrants went into whatever activities were dominated by local elites, «while Germans in Costa Rica played a pivotal role in processing, Germans in Guatemala privately became powerful landowners,» (p. 60). Thus, the foreigners themselves did not determine the occupational structures of elites.

4.6. Impact of State Autonomy

Mahoney (2001), in an important work, distinguished between «Radical Liberalism» in El Salvador and Guatemala and the «Reformist Liberalism» of Costa Rica. He pointed out, as we do, that these had very different manifestations with respect to property rights in land, which he then links to different class structures and subsequent paths of political development. His explanation of the different policies of the different Liberal regimes then hinged on the political strategies of the dictators, Barrios, Zaldívar and Guardia, who he regarded as being largely autonomous from local elites. In his view, the pattern of land expropriation and the creation of a plantation system in El Salvador and Guatemala can be explained by the fact that these policies were the best way for Barrios and Zaldívar to consolidate their political power. He noted that «it is certainly true that much of the time the smoothest way for Liberals to rule was to fully support oligarchic interests. However, sometimes Liberal dictators did act outside of dominant class interests» (p. 41). Nevertheless, he never really establishes why the best way to consolidate power in El Salvador and Guatemala involved mass land expropriation, while in Costa Rica, under Guardia, it meant carrying on with the promotion of smallholders. The most plausible explanation of why these dictators acted as they did was, first, that it was feasible given the highly militarized societies that they governed, and also that it was in the economic interests of political elites, which is essentially our argument.

5. CONCLUSION

In this paper, we have used the experience of the comparative economic development of the coffee-exporting economies in Latin America to shed light on the origins of differential institutional development. While Costa Rica and Colombia developed and protected relatively egalitarian smallholder economies, El Salvador and Guatemala instead created inegalitarian plantation societies. The different ways that these coffee economies were organized seems to have had significant subsequent effects on institutions and development paths, particularly the incentives of political elites to invest resources in education. In consequence, Costa Rica and Colombia

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developed more affluent and democratic societies than did El Salvador and Guatemala.

Our reading of the historical record suggests that important differences in the composition and strategies of political elites in the 19^{th} century led these societies, which were apparently similar from a structural point of view, to move onto such radically different development paths. The differential processes of economic development over the last century cannot be understood simply by an examination of the physical endowments of the countries and the technologies available, since these were all very similar. In our view, political economy factors were decisive. Our analysis suggests that the domain of theories that emphasize factor endowments as the main source of variation in institutions is limited. At least for the economies we consider, endowments were not fate.

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