DISCUSSION PAPERS IN ECONOMICS

Working Paper No. 10-04

The Economic Geography of Race in the New World: Brazil, 1500-2000

Justin Bucciferro
University of Colorado at Boulder

October 2010

Department of Economics

University of Colorado at Boulder
Boulder, Colorado 80309

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Justin Bucciferro[‡]
University of Colorado at Boulder

October 20, 2010

Abstract

This paper examines the economic factors behind the geography of race in the Americas. It hopes to resolve the apparent paradox that many areas once occupied by Natives are now inhabited by peoples of predominantly European and African descent. A simple model is presented in which the racial composition of the labor force depends on the feasibility of slavery (factor endowments) and the relative cost of Native and African slaves (a function of the ratio of the distance to the frontier to the slave ports in Africa). The predictions of the model are tested using a newly-created database on the racial composition of twenty Brazilian states from 1500 to 2000. The (inverse) labor cost ratio is found to be positively related to the ratio of Africans to Natives, controlling for factor endowments. The results suggest that for the average state, a 1% increase in the cost of Native labor (a 4.6 km shift in the frontier) corresponded to a 2.6% increase in the ratio of Africans to Natives (an additional 18,114 Africans), all else equal.

Keywords: Colonization, Race, Economic Development, Native Americans, Ethnic Diversity, Inequality, Economic Geography, Historical Demography, Institutions, Brazil.

[†] I am especially grateful to Murat Iyigun (my advisor), Ann Carlos, Carol Shiue, Robert McNown, Lee Alston, Francisco Barbosa, and Frank Witmer for their feedback and support. I also thank Barbara Buttenfield, David Jacks, Angela Redish, John Wallis, and Ran Abramitzky for valuable comments. Any errors are my own.

[‡] Department of Economics, 256 UCB, Boulder, CO 80309; Justin.Bucciferro@Colorado.EDU.

I. Introduction

Estimates of the Native American population of the western hemisphere circa 1500 range from 8.4 to 100 million people (Ubelaker, 1992). Over five hundred years later, some countries are of predomin

Spanish America, the pre-conquest populations were much larger and more resistant to European diseases (Symcox and Sullivan, 2005). In Brazil, one estimate suggests that the Native population decreased by two-thirds in only forty years of permanent settlement (Marcílio, 1984). On the Atlantic coast of South America, which includes Brazil, and in the Caribbean, African slaves took the place of the Natives on the sugarcane plantations and in the mines, giving these regions a strong African influence (Stein and Stein, 1970).

This paper provides a simple model to explain how the racial composition of countries in the Americas was and is determined, to some extent, by their economic organization during the colonial period. The hypothesis is that in areas with a high marginal productivity of labor, slavery was common; where slavery prevailed, the racial composition of the labor force depended on the relative cost of African and Native labor. In areas where labor was less productive, alternative labor arrangements, such as debt servitude, were adopted (Grubb, 2000). The predictions of the model are tested using historical data on the racial composition of Brazilian states from 1500 to 2000. The results suggest that the racial composition of Brazilian states over time was closely related to the relative co

simple theoretical model is provided based on the hypothesis that 1. Factor endowments determined the demand for coerced labor, a

The economic model that Portugal and Spain applied in their previous expansion would greatly influence their conquest of the New W

III. Production in Colonial Brazil

During the sixteenth and seventeenth centuries, sugar was the largest component of national output and exports in Brazil (Mauro, 1987); it was not until the 1830s that the value of coffee exports surpassed that of sugar (Bethell and Murilo de Carvalho, 1989; Klein and Vidal Luna, 2010). The first major gold strike occurred in 1695, and gold production grew at a rapid pace over the following sixty years (Mauro, 1987). Plantation agriculture (namely sugar, but also coffee, tobacco, cotton, and cacao) and mining (primarily gold, but also diamonds, minerals, and gemstones) were the two primary activities in the colonial economy.

What was the nature of production on a sugarcane plantation or in a goldmine? The three main inputs in either economy were land, labor, and capital. Land was the abundant factor; capital and labor were scarce. Capital was limited to the personal wealth and connections of the settlers. Labor, on the scale required, could only be obtained through coercion of the Natives or by importing African slaves. In both sectors, Native labor was initially used and then substituted by African slaves. The production technology of each sector will now be considered in detail, beginning with sugarcane production.

i.) Sugarcane Production

The general process of sugarcane production was quite uniform throughout Brazil. According to Schwartz (1987), sugarcane needs to grow for fifteen to eighteen months before it can be harvested; it can be cut again after another nine months. At harvest, gangs would cut the cane, perhaps 4,200 canes a day per man; the women would tie the cane in bundles. At the mill, the cane juice would be expressed, then moved through copper kettles in which it was purified, and then put in molds to be purged (a process in which molasses is removed and the remaining sugar crystallizes). After drying, the sugar was separated by quality, crated, labeled, and sent to port.

According to Blume (1985), the size of an early sugar plantation ranged from 10,000 to 13,000 hectares (100 to 130 km^2). The plantation owner leased the land to *lavradores* who owned their own slaves and basic tools; the *lavradores* then processed their cane at the owner's mill. Subsistence crops were cultivated through sharecropping contracts on marginal parts of the plantation; slaves had to produce their own food. Sugarcane cultivation, and processing to a lesser extent, was extremely labor-intensive. A large plantation employed 120 to 160 slaves in the fields and about 20 whites; another 40 slaves were employed in the milling process.

A single *lavrador* usually worked one 6.1 hectare (ha) *partido* with 20 slaves. Based on an average cane yield of 53.51 tons/ha and a 5% recovery rate, each slave would have produced 51 *arrobas* (one arroba≈32 pounds) of sugar (Blume, 1985). Combined with data on the prices of sugar and African slaves from Schwartz (1987), this suggests that the average value of output per slave between 1608 and 1751 was about 57$018 Réis a year, compared to an average price per male slave of 63$889 Réis. The only major technological innovation during the colonial period was the introduction of a mill press with three vertical rollers at the turn of the seventeenth century. These were less reliant on water and led to a large expansion in the number of plantations (Schwartz, 1987).

ii.) Gold Production

Gold production, on the other hand, began on a much smaller scale. Some *hereirof ere le BT/TT0 1 Tft*

The level of technology (Λ) determined overall productivity. Total output (Y) for each sector i ($i \quad P,M\}$) in period t can be represented using the following Cobb-Douglas production function:

(1)

net mortality (a_i, n_i) and, potentially, flight or manumission.[4] This model will consider the transition of the stock of African and Native slaves in sector i in time t (A_{it}, N_{it}) in terms of new investment (I_{it}^{A} , I_{it}^{N}

(4) K_{it} : $_{i}$ p_{it} it

African to Native workers ($A_{i,t+1}/N_{i,t+1}$). The "race ratio" reacts negatively to increases in the price of African workers (p_{it}^{A}) and positively to increases in the price of Native workers (p_{it}^{N}). Finally, the ratio reacts positively to an increase in the share of African workers in production (γ_i) and negatively to the share of Native workers (τ_i). It is also clear from equation (5) that a decrease in the Native population (N_{it}) would increase equilibrium demand for African labor (A_{it}^{*}), *ceteris paribus*, and vice-versa. All intermediate steps for solving the model above are shown in Appendix I.

The population growth rates will not affect the estimation of equation (5) in the following section, provided that this ratio is, in fact, constant. The evidence suggests that the Native population declined at a faster rate than the African population on the plantations and in the mines (n_i

During the early phase of settlement, the coast supported large Native populations and their labor was easily obtained through barter or enslavement. The relatively low price of Native slaves during the sixteenth century is documented in the will of Governor Mem de Sá (1569), who valued his African slaves at thirteen to forty times more than unskilled Native slaves (Hemming, 1987). When new settlements were established a century later in the interior, at a comparable distance to the ever-shifting frontier, Native labor was also many times less costly than African labor. For example, the price of renting Native labor from the Jesuit missions in 17th century Pará was fixed at only two and a half yards of cloth per month – almost valueless for barter (Hemming, 1987).

In the settlements, Native labor soon became scarce. According to Pedro Calmon (1939), "on the coast of Bahia and Pernambuco, the substitution of Native slaves by African was most rapid during the decade of 1590-1600," p. 347 [author's translation]. In a letter to the King of Portugal in 1617, the Bishop of Lisbon wrote, "in the whole district [of the city of Maranhão], there is not a single Indian village left. Within a hundred leagues of Pará there is not a single Indian who is not at peace or has not been domesticated by the Portuguese, whom he fears even m17 377.7594 Tm(m)Tjs77729 0 0 12 470.oh(m)Tj11.97729ingthaeaguslc

that, consistent with the historical evidence, the coastal city is far enough away from the frontier such that African slaves are relatively less expensive than Native labor. In the city in the interior, the proximity to the f

The discussion above supports the assertion that the ratio of the price of Native labor to the price of African labor in settlement *i* in time *t* (p_{it}^N/p_{it}^A) is a function of the ratio of the travel costs to the frontier to the travel costs to Africa. Of course, the transport costs are increasing with distance. Also, the cost of traveling by sea was much lower than traveling by land; however, mortality rates during the sea voyage were high (Galeano, 1971).[6] It follows that the price ratio of Africans and Natives is some function of the ratio of the distance to the frontier to the slave ports in Africa – in fact, it could simply be equal to the ratio of the distances times some factor capturing the markup, the relative cost of land and sea travel, and the attrition of slaves during the trip from Africa.[7] This is represented by the following equation:

$$(6) \qquad (p_{it}^N/p_{it}^A) = f\,(d^F_{it}/d^A_i) = \eta_i\,(d^F_{it}/d^A_i)$$

The term d^F_{it} is the distance from the principle city of settlement *i* in time *t* to the frontier, d^A_i is the distance from that city to the po8o9D 369 0 0 14/TT0 1 1 T5s6959 0 698 367.07149 4-oriTn7.9523

The following section will descri

Table I. Data Coverage by Race over Time[†]

Period	Obs. # "European"	Obs. # "African"	Obs. # "Native"

The estimates of the Native population in some Brazilian settlements during the colonial period are based on the following logic: 1. Natives previously living in areas settled by the Portuguese were incorporated into the local economy, and, 2. The natural growth rate of Native populations in the settlements was negative due to the effects of disease and enslavement, therefore, 3. The population of Natives living in Portuguese settlements could only be maintained or increased by bringing in more Natives from the interior.

A brief historical account supports these conclusions. Following Brazil's discovery, the Portuguese bartered Europeans goods with the Natives in exchange for food and labor, but by 1549, there is evidence of Native enslavement (Marchant, 1942). The Portuguese (and French) presence led to hostilities with the Natives, creating a vicious cycle of warfare and enslavement that vacated many Native villages by the end of the sixteenth century. Natives were forced to relocate to *aldeias* where they provided food and other services for the colonists. The effect of European diseases was devastating: according to Marcílio (1984), the Bahian smallpox epidemic of 1562-65 may have claimee

The data was combined to estimate the number of Native Americans in each settlement as follows: assuming that the natural rate of increase of the un-acculturated Native population was negative in the magnitude suggested by Rosenblat, then it follows that the number of Natives in a settlement in any period was roughly equal to the number of un-acculturated Natives in the new regions settled since the previous period. The estimates obtained using this methodology are surprisingly close to the number of Natives recorded by contemporary observers when such data is available.[10] The data are only included in the database when other data is unavailable. In total, these estimated figures comprise 49 out of 312 points, or 15.7 percent, giving a total of 156 observations.

ii.) Estimating the 'Missing' African Population

As with the Native population, the African population is also under-reported over the course of Brazilian history, albeit to a lesser extent. In a separate work entitled "Food, Drugs, and Gold: Coerced Labor in Colonial Brazil," the author examines the labor requirements in the sugar and gold sectors, as well as the importation of African slaves, in order to estimate the African workforce in each settlement during the colonial era. This work identifies a close association between the labor requirements in these two sectors and the observed African population. As with the Natives, the flow of Africans into the settlements can also be used to project a possible population range.

The economy was centered on sugar production until the beginning of the gold rush at the end of the seventeenth century. This is reflected in the close correspondence between the estimated workforce in sugar production and the African population. For instance, given the number of plantations in Bahia/Ilhéus in 1545, 320 slaves were required – compare this with 400 Africans recorded by a contemporary document. In São Vicente, an

[10] The dataset contains a combined 18 overlapping observations for Native populations during the sixteenth, seventeenth, and eighteenth centuries. In São Paulo, the 'observed' Native population was 3,000 in 1545, 1,000 in 154r48.22984 143.3408.8

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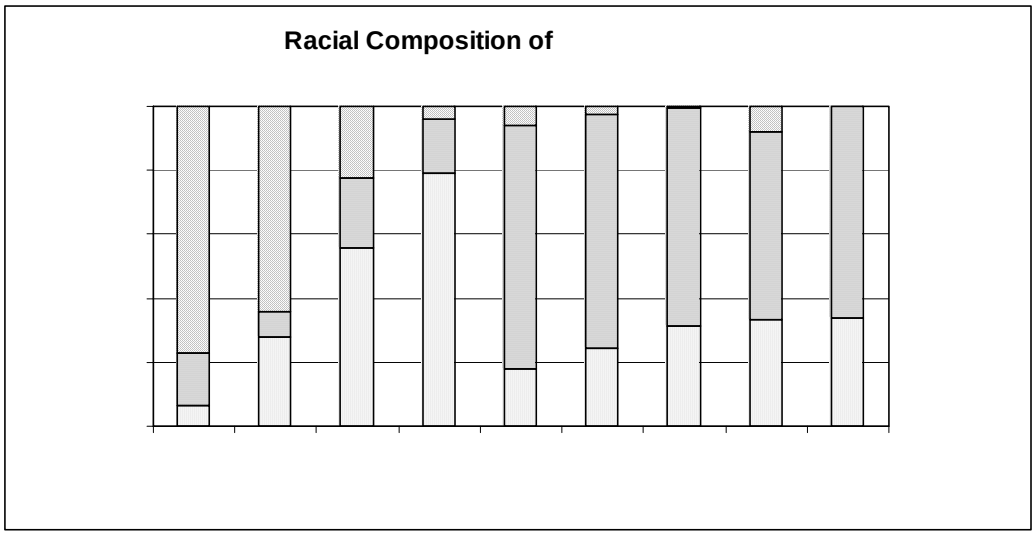
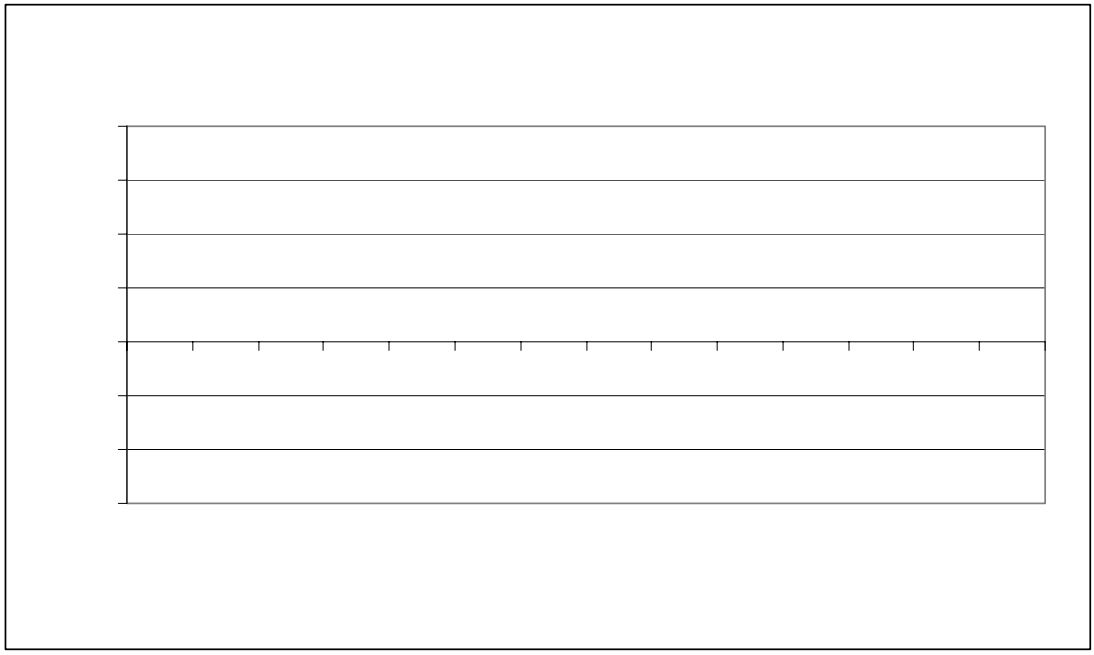
available with “mulatto” (of African and Eu


Racial Composition of



iv.) Distance Measures

The population counts by race for each settlement in the fourteen periods are used to calculate the dependent variable: the ratio of Africans to Natives ($A_{i,t}/N_{i,t}$). The independent variable is the relative price of Native and African labor ($p_{i,t}^{N}/p_{i,t}^{A}$). As discussed, a natural proxy for the relative labor cost is the ratio of the distance to the frontier to the port-of-origin of African slaves ($d^{F}_{i,t}/d^{A}_{i}$). The distance to the frontier (d^{F}_{it}) is the more subjective of the two measures because the "frontier" has many possible interpretations. The distance to Africa (d^{A}_{i}) would be more straightforward, if not for the numerous Portuguese slave ports on the coast, points of disembarkation in the Americas, and transportation routes to captaincies in the interior.

Two different ways of measuring each distance will be considered. In each case, the distances are measured relative to the principle city in each settlement. The "frontier" is distanced as the division between the Native and Portuguese domains; the areas each group frequented, if not inhabited, and was capable of defending. The first method of determining the frontier involves tracking the establishment of new cities in the interior. The "frontier" will be 0013 han 398.45953 Tm534 o6w 11.97729 0 0 c5939 Tm(blishm)Tj11.97729BDC BT

The distance to the origin of slaves in Africa, assuming one may identify the origin, can be proxied by: 1.) The shortest distance from the principal city in each captaincy to the

	# Africans	# Natives	#Africans / #Natives	#Afr. / #Nat. No Outliers[1]	# Europeans		Distance Frontier (km)	Distance Africa (km)	Dist. Frontier / Dist. Africa
Base Data						*Measure One*[3]			
Mean	162,418	24,353	18.3	"	877,958	Mean	457	5,081	0.09
Std. Dev.	(303,684)	(33,307)	(44.5)	"	(2,679,454)	Std. Dev.	(365)	(813)	(0.08)
# Obs.	135	107	100	"	147	# Obs.	280	280	280
All Data						*Measure Two*[4]			
Mean	141,878	18,079	2,269	23.0	"	Mean	723	5,538	0.14
Std. Dev.	(287,269)	(29,385)	(18,084)	(70.0)	"	Std. Dev.	(828)	(773)	(0.18)
# Obs.	156	156	156	140	"	# Obs.	280	280	280
Base Incl. Mulatto[2]									
Mean	783,273	"	96.8	"	"				
Std. Dev.	(1,662,195)	"	(289.8)	"	"				
# Obs.	135	"	100	"	"				
All Incl. Mulatto									
Mean	679,156	"	3,504	101.9	"				
Std. Dev.	(1,568,045)	"	(23,498)	(309.1)	"				
# Obs.	156	"	156	140	"				

[3] The distance to the frontier is the great-circle distance from each state's capital to the western edge of a 241.5km-radius circle buffering the westernmost city established up until each period. The distance to Africa is the great-circle distance from each state's capital to the Bight of Benin (6°E, 4°N).

[4] The distance to the frontier is the great-circle distance from each state's capital to the frontier as mapped by Hemming (1978); a linear expansion of the frontier is assumed for intermediate periods when the frontier is unknown. The distance to Africa is the great-circle distance of each state's capital to the nearest port of disembarcation of African slaves plus the great-circle distance from that port to the city of Luanda, Angola (13°E, 9°S).

relatively elastic supply of slaves) – $d^F_{i,t}/d^A_i$ as shown in equation (6). Plugging equation (6) into equation (5) and taking logs of both sides, the hypothesized relationship is

$$\ln\left(\frac{A_{i,t}}{N_{i,t}}\right) \quad \ln\left(\frac{1 \quad _i \quad _i n_i}{1 \quad _i \quad _i a_i} \quad \frac{_i}{_i} \quad _i \frac{d^F_{i,t} \quad 1}{d^A_i}\right) \quad \ln\left(\frac{1 \quad _i \quad _i n_i}{1 \quad _i \quad _i a_i} \quad \frac{_i}{_i} \quad _i\right) \quad \ln\left(\frac{d^F_{i,t} \quad 1}{d^A_i}\right)$$

or

$$\ln\left(\frac{A_{i,t}}{N_{i,t}}\right) \quad c_i \quad \ln\left(\frac{d^F_{i,t} \quad 1}{d^A_i}\right) \qquad (7)$$

, where c_i is a constant.

Figure V presents a scatterplot of available data of the log ratio of Africans to Natives ($\ln(A_{i,t}/N_{i,t})$) – including Mulattos and removing outliers (n=140) – on the log ratio of the distance to the frontier to the 1 T12 118.63912 460.07993 Tmg ratio of the

The figure implies that, all else equal, the further a state is from the frontier relative to Africa (moving rightward on the x-axis), the greater the share of African Americans in the population (moving upward on the y-axis). Conversely, the closer a state is to the frontier relative to Africa, the lower the percentage of Africans. Consider the observation for Pernambuco in 1900 (-1.5, 1.9): the capital is nearly five times closer to the frontier than to Africa, but has almost seven times more African than Native inhabitants. This figure suggests that there is a positive linear relationship between the log ratio of 'Africans' to 'Natives' and the inverse log ratio of their "prices." If this relationship is linear, as it appears, then it is appropriate to use OLS to estimate the following equation:

$$(8) \qquad \ln(A_{i,t}/N_{i,t}) = c + \varphi \ln(d^{F}_{i,t-1}/d^{A}_{i}) +$$

The data for the initial Native population of each state in 1500 was calculated using a digitized version of an indigenous population density map by Julian Steward (1946); this was described above and shown in Appendix III. The average population density by state was calculated by overlaying contemporary political boundaries on the population density polygons; the headcount, in turn, is the average population density per state times its area.

the shifting frontier is simply capturing this historical momentum. Accordingly, the rapid expansion of the slave trade could be related to some overlooked processes evolving in Africa and Europe over time, such as the use of progressively larger slave ships or lower mortality during the passage, not the distan

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ln(Dist. Frontier/ Dist. Africa)	2.58***		2.60***	2.50***	0.46*	0.72**	0.79**
	(0.29)		(0.26)	(0.25)	(0.21)	(0.22)	(0.25)
ln(Dist. Frontier)		2.87***					
		(0.27)					
ln(Dist. Africa)		0.97					
		(1.10)					
Gold Deposits (1,000km^2)			1.59**	1.62**	1.43***	1.27***	1.24***
			(0.55)	(0.51)	(0.28)	(0.28)	(0.19)
% Suitable for Sugarcane			0.72	0.42	-0.24	-0.23	-1.96*
			(0.75)	(0.70)	(0.45)	(0.47)	(0.79)
Initial Native Population				-2.6E-6	-8.3E-6***	-7.8E-6***	-8.2E-6***
				(3.2E-6)	(1.3E-6)	(1.4E-6)	(1.5E-6)
Time					0.01***	0.02***	0.02***
					(0.002)	(0.002)	(0.002)
End of Slave Trade Dummy						-1.47***	-1.49***
						(0.36)	(0.37)

Avg. Gold ..006 Tv9.127 0 0 8.20273 410.16135 404.058 Tms 0 0 9.127 107.75499 823182 381.72163 Tm Go

Across all specifications, the coefficient on the price ratio ranges from 0.46 to 2.60 and is significant at the five-percent level in all seven estimations. Is this coefficient significantly different than one? In columns one, three, and four, the coefficient is significantly *greater* than one at conventional significance levels; however, in columns five, six, and seven, one fails to reject the null hypothesis that the coefficient on the price ratio is equal to one, as suggested by the theoretical model.

Column two demonstrates that the coefficients on the log distance to the frontier and the log distance to Africa, when estimated separately, are not significantly different. That is, one fails to r

average effect is small, in some regions (with poorer endowments) it is still the key determinant of racial composition. Another interesting result is that the coefficient on sugarcane suitability drops when the initial population is controlled for – this confirms

annual population growth rate of -0.37%.[20] The robustness of the results to changes in the natural rate of increase of the Native population will now be investigated.

Consider a range of Native population growth rates, ranging from positive ten percent to negative ten percent. If the annual natural rate of increase of the Native population over this period were positive one percent, than an initial Native population of 100,000 in 1500 would have increased to 14.5 million by 2000. Conversely, if the average rate of decline of the Native population were negative one percen

Table IV. Robustness of Results to Native Population Growth Rates[+]			
Growth Rate	Coefficient	Std. Error	R-Squared
+10%	-1.02	1.68	0.004
+5%	0.82	0.83	0.008
+4%	1.20	0.67	0.023
+3%	1.58*	0.51	0.063
+2%	1.96*	0.38	0.16
+1%	2.35*	0.29	0.31
+0.1%	2.71*	0.31	0.344
-0.1%	2.79*	0.32	0.336
-1%	3.14*	0.43	0.27
-2%	3.55*	0.58	0.20
-3%	3.95*	0.76	0.16
-4%	4.36*	0.94	0.13
-5%	4.78*	1.13	0.11
-10%	6.92*	2.12	0.07

[+]Results from specification in column (3) of Table III, Section VI, with ordinary standard errors: ln(#African/#Native) = c + φ ln(Dist. Frontier/Dist. Africa) + ζ_1Gold + ζ_2Sugarcane. *Significant at 1%.

The results in Table IV suggest that only by assuming an unrealistically high natural rate of increase of the Native population, of four percent or more, does the distance ratio cease to be significant. As one relaxes the assumption of a relatively large negative population growth rate (movi12 265.94099 251.6998 790a3001 l482.87997 325.32f505 52ID 69 >>BDC B 5

VIII. Conclusion

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As hypothesized, the (inverse) labor cost ratio is significantly related to the ratio of Africans to Natives, controlling for factor endowments. Controlling for additional variables, such as time, output prices, the end of the slave trade, or spatial autocorrelation does not eliminate this relationship. Across all seven specifications, the ratio of the distance to the frontier to the distance to Africa is positively correlated to the racial composition of states over time and highly significant. The results fail to discredit the mechanism suggested in the formal model. They are strengthened by restricting the dataset to published statistics and/or omitting the mulatto population. Furthermore, they are robust to alternative assumptions regarding the rate of decline of the Native population and different measures of the distance to the frontier or to Africa.

The evidence supports the overall theory that the origins of the distribution of race in the New World are in the colonial economy. Across the sample of

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Appendix II. Data Sources and Construction of the Demographic Database

Marcilio (1984) and Calmon (1939). The European population of Bahia after re-settlement is indicated in *Documentos Historicos* (XXXVIII) – also see Johnson (1987) and Ribeiro (2000). Primary sources for the African population are *As G*

1950) by Serafim

The data for Brazil ca. 1825 is from Joaquim Norberto de Souza e Silva, *População Geral do Império*, and Antonio Rodrigues Velloso de Oliveira, *Memória* –see Marcílio (1984) and Calogeras (1938). Complementary data for this period is from Goulart (1975), who cites the National Library archives, and Metcalf (1992), who cites the 1820 census records for Parnaíba. The statistics published by Klein and Vidal Luna (2010), from these and other sources, have the best coverage so they will be used as the sole data source for this period; please see their book for a detailed list of sources.

For the period ca. 1850, the data also comes from Klein and Vidal Luna (2010). In addition to Norberto de Souza e Silva (São Paulo, 1870), their sources include documents from Archivo Nacional do Rio de Janeiro (ANRJ) and Octávio Ianni: *As Metamorfoses do Escravo, Apogeu e Crise da Escravatura no Brasil Meridional* (São Paulo, 1962).

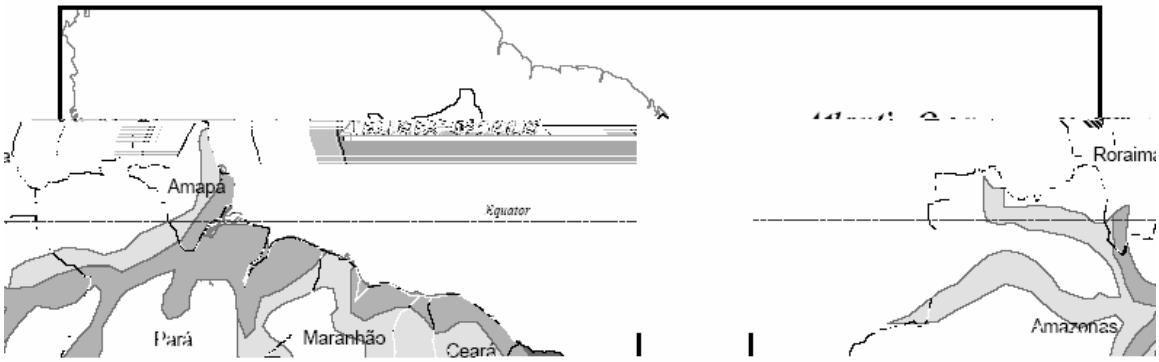
The 1872 census data is presented by Merrick and Graham (1979), *Population and Economic Development in Brazil: 1800 to the Present* and Klein and Vidal Luna (2010). The original data is available as *Census of 1872, Recenseamento da População do Império a que se Procedeu no dia 1 de Agosto de 1872* (Rio de Janeiro, 1873-1876).

The population statistics for the 1900 reference period are from the 1890 census: *Sexo, Raça e Estado Civil, Nacionalidade, Filiação Culto e Analphabetismo da População Recenseada em 31 de Dezembro de 1890* published by the Statistics Office of the federal government of Brazil (Rio de Janeiro, 1898) and available at http://biblioteca.ibge.gov.br.

The data for the total populat

Appendix III: Native Population Density in 1500

Appendix IV. Areas of Brazil Settled During the First Three Centuries of Colonization



Appendix V. Descriptive Statistics

	Africans / Natives	Africans (Incl. Mulattos)/ Natives	Dist. Frontier / Dist. Africa	Gold Deposits (10,000 km^2)†	% Suitable for Sugarcane†	Initial Pop. Density (100km^2)†	Size (100$km^2$6.4577 0 0 6.45801 477.7

Appendix VI. Alternative Specifications

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ln(Dist. Frontier/ Dist. Africa)	2.20***		2.24***	1.93***	0.34	0.50	0.65*
	(0.39)		(0.36)	(0.36)	(0.33)	(0.35)	(0.32)
ln(Dist. Frontier)		2.55***					
		(0.48)					
ln(Dist. Africa)		0.63					
		(1.40)					
Gold Deposits (1,000km^2)			1.68*	1.74**	1.51***	1.33***	1.17***
			(0.72)	(0.56)	(0.33)	(0.30)	(0.29)
% Suitable for Si							

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ln(Dist. Frontier/ Dist. Africa)	**2.76*** **		**2.79*** **	**2.59*** **	**0.68** **	**0.97*** **	**1.09*** **
	(0.29)		**(0.28)**	**(0.29)**	**(0.26)**	**(0.25)**	**(0.28)**
ln(Dist. Frontier)		**2.97*** **					
		(0.35)					
ln(Dist. Africa)		**-0.29**					
		(1.68)					
Gold Deposits (1,000km^2)			**1.33***	**1.40** **	**1.22*** **	**1.03** **	**1.03*** **
			(0.55)	**(0.47)**	**(0.35)**	**(0.34)**	**(0.28)**
% Suitable for Sugarcane			**0.41**	**-0.15**	**-0.92**	**-0.84**	**-3.01***
			(0.89)	**(0.84)**	**(0.74)**	**(0.74)**	**(1.17)**
In							

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ln(Dist. Frontier/ Dist. Africa)	1.70***		1.74***	1.56***	0.12	0.39	0.48
	(0.31)		(0.26)	(0.27)	(0.24)	(0.26)	(0.27)
ln(Dist. Frontier)		1.92***					
		(0.32)					
ln(Dist. Africa)		1.03					
		(1.18)					
Gold Deposits (1,000km^2)			1.67***	1.73***	1.59***	1.42***	1.40***
			(0.49)	(0.40)	(0.30)	(0.28)	(0.20)
% Suitable for Sugarcane			1.33*	0.78	0.31	0.32	-1.67*
			(0.61)	(0.53)	(0.44)	(0.45)	(0.66)
Initial Native Population				-4.7E-6*	-8.8E-6*		

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ln(Dist. Frontier/ Dist. Africa)	0.82***		0.90***	0.85***	0.40*	0.34	0.41*
	(0.12)		(0.14)	(0.13)	(0.18)	(0.18)	(0.19)
ln(Dist. Frontier)		0.81***					
		(0.13)					
ln(Dist. Africa)		-1.34					
		(2.43)					
Gold Deposits (1,000km^2)			1.29**	1.45**	1.37**	1.19**	1.18***
			(0.60)	(0.44)	(0.41)	(0.40)	(0.31)