

The Economics of Slavery

The influences of slavery on economic development

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Abstract

In modern times slavery is heavily debated, although slavery was abolished officially a long time ago in the Western World. Therefore it is important to examine what the relationship has been between slavery and economic development. This thesis provides an overview of the possible influences and consequences of slavery in the development of the former colonies in the New World. Moreover, this relationship between economic development and past use of slave labor is tested and further analyzed on how they influenced each other. The results show that it is likely that slavery had any impact on the development of the former colonies. However, it cannot be said with certainty in what way or to what extent slavery has influenced current economic development.

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1. Introduction

In 1981, Mauritania was the last country in the world that legally abolished slavery. In most parts of the world slavery was officially abolished almost a century earlier. The last country in the New World that abolished slavery was Brazil in 1888. In the history of the former colonies in the New World, which encompasses the countries on the western hemisphere, slavery has played an important role. Some influences of slavery in the New World are even nowadays still noticeable. One that is easily to notify is the presence of people with African and European roots in the American society. Engerman and Sokoloff argue that slavery also had its influence on the economic development and economic inequality in these countries (Engerman & Sokoloff, 2002, 2006; Sokoloff & Engerman, 2000). The aim of this thesis is to determine what the influences of slavery have been on the economic development and whether they are still evident nowadays. To this end, a more detailed theoretical and empirical analysis is needed.

The research problem of this thesis therefore is: *Has slavery influenced the economic development of countries in the New World and does it still influence the economics today?*

First, to get a better insight into the topic of this thesis, it necessary to understand what is meant by slavery and what the reasons have been for the colonists in the New World to use slave labor. According to *Encyclopædia Britannica*, slavery can be defined as: "a condition in which one human being was owned by another". Furthermore, a slave was considered by law as property, or chattel, and was deprived of most of the rights ordinarily held by free persons (Slavery, 2012). The reasons for using slave labor by the colonists were mainly economic reasons; these were partly determined by country specific characteristics. These characteristics or factor endowments (such as climate, soils, and the density of native populations) were important determinants for the use of slave labor in the colonies (Engerman & Sokoloff, 2002). So when alternative forms of labor were scarce, resources plentiful, and the market for goods elastic, the usage of slave labor became very appealing for the colonists in the New World (Temperly, 1977).

This thesis will also investigate the existence of a relationship between slavery and income, and whether the present day economic inequalities in countries in the New World can be subscribed to slavery. The proportion of slaves to the total population of countries will be compared with the current gross domestic product (GDP) as an income measure and the scale of economic inequality. Therefore, the question to be answered is as follows:

Do countries with a higher proportion of slaves compared to the total population in history have a higher or lower current per capita GDP? Additionally, how does slavery influence the economic inequality in these countries?

Subsequently, the consequences and effects of the legal abolition of slavery on current per capita GDP will be discussed. This abolition brought an end to the legally codified gross inequality intrinsic to slavery (Engerman & Sokoloff, 2002); but did this necessarily led to a more equal distribution of the GDP among the population? Could the elite maintain their privileges or received the broad mass of the population more economic opportunities after the abolition? These questions remain to be answered. It is also important to look how the general economy of a country reacted to the abolition, whether countries were able to hold their competitive positions in the world market, or did they lose it to other countries that abolished slavery later in time?

Finally, empirical research will be conducted where the relation between slavery and current income is tested using regression analysis. Nunn (2007) also tested for this relationship between past use of slave labor and current income. This model is slightly modified for the purpose of this thesis.

The next chapter will describe and summarize the available literature on 'The Economics of Slavery' and will elaborate on the background of the problem statement of this thesis and will help to answer the main research question. The third chapter will describe factors influencing the abolition of slavery and the consequences of the abolition of slavery. The fourth chapter consists of an empirical research, in which the relationship between current income and slavery will be tested.

2. Literature review: The Economics of Slavery

This chapter will discuss the different views concerning the role of slavery in the economic development and how it has caused the inequalities of wealth in the former colonies in the New World. Important papers on the relationship between slavery and economics have been written by Engerman and Sokoloff (1994, 2002, 2005, 2006) and Nunn (2007).

First it is important to look at what the reasons have been for the use of slavery. In most parts of the New World resources were plentiful and labor scarce. Thus when the Europeans took possession of the countries in the New World, there was a lack of proper workers who could work on the plantations and in the settlements (Temperly, 1977). Primarily the natives have been taken as slaves, but they were not strong enough and very sensitive to the diseases that the colonists brought with them from Europe. Therefore slaves were brought from the central and western parts of Africa to the New World, where slavery or serfdom existed long before the first Europeans began to trade slaves between America and Africa.

Other reasons for the use of slave labor instead of free labor, with which the European immigrants are meant in particular, were the differences in the cost of labor. Slavery was in fact providing relatively cheap labor for the plantation holders compared to the costs of free labor, and due to their access to slave labor, they had the opportunity to improve their international competitiveness. However, the use and need of slave labor was not in every part of the New World the same. These differences in the use of slave labor can be explained by looking at different elements. Factor endowments (such as soils, climates, and the density of the native population) or natural resources are one of the elements that influenced the use and need of slave labor, another element that influenced the use of slave labor were the differences in the profitability and the productivity between slave labor and free labor.

2.1 Factor endowments

Engerman and Sokoloff argued in their papers that the different paths of development of the countries in the Americas can be explained by looking at the initial differences in factor endowments, that are related with the different levels of inequality in wealth, human capital and political power, which in turn resulted in differences in the use of production based on slave labor (Engerman & Sokoloff, 1994, 2002, 2005, 2006; Sokoloff and Engerman, 2000).

Engerman and Sokoloff (2002) distinguished three types of New World colonies to explain their view on the role of factor endowments on the development of the colonies. They argued that the colonies that later became the United States and Canada were unusual in the New World. This because their initial factor endowments (such as soils, climates, and the density of native population) led them toward paths of development with relatively equal distributions of wealth and human capital and a more homogeneous population in comparison to the vast majority of New World Colonies (Engerman and Sokoloff, 2002). The three types of New World colonies that Engerman and Sokoloff have distinguished are described below.

The first type of New World colonies are those with climates and soils that are well suited for the production of highly valued crops, which are characterized by extensive scale economics that are related to the use of slave labor. Their economies came to be dominated by large slave plantations and the populations by slaves of African descent. Due to the high fraction of black people and slaves in such colonies, the distribution of wealth and human capital became very unequal. When the abolition of slavery brought an end to the legal inequality, great inequality in wealth still remained because the elite were able to maintain their privileges due to the institutions that were created. As a result the broad mass of the population were still restricted from opportunities (Engerman and Sokoloff, 2002).

The second type of New World colonies includes only the Spanish colonies, think of Mexico and Peru. Which are characterized by both rich mineral resources and a substantial native population who survived contact with the European colonizers. For various reasons, these types of colonies were generating a very unequal distribution of wealth. The elite in these colonies relied on the labor of Native Americans and not on slave labor; just as the slave owners they enjoyed higher levels of human capital and legal standing. This second type of colonies was, just like the first type of colonies, greatly influenced by the factor endowments. The major export products were not agricultural, but silver and gold mined in the colonies. These mines already existed and have been used by the Native Americans prior to the Spanish settlement and have long relied on some variant of forced labor. The labor force in Spanish America consisted primarily of Native Americans, who were technically free but have been forced by diverse mechanisms to work in the mines (Engerman and Sokoloff, 2002). With these mechanisms are meant the way of influences of the Native Indian elite on the ordinary people, who thought it was a certain obligation to obey the Native Indian elite and listen to what them was told.

The third and final type of New World colonies is best characterized by the colonies in the north of America, primarily those that later became the United States and Canada. These economies were not gifted with a favorable climate and soils that could give them a comparative advantage in the production of crops. Also a substantial native population, who were able to provide labor, was not available. The growth and development of these colonies were for that reason based on European descendants, who had comparatively high levels of human capital (Engerman & Sokoloff, 2002).

Therefore, the different paths of development of the former European colonies in the New World can be characterized primarily by the initial differences in their factor endowments, and by their inequality in the distribution of wealth among the broad mass of the population, human capital, and political influence (Engerman & Sokoloff, 2005), as is seen in the three types of New World colonies.

2.2 Productivity and profitability of slavery

Traditionally it was believed that slavery would disappear as a result of the inherent superiority of free labor (Domar, 1970). This superiority, resulting from the higher motivation of the free man, was supposed to increase with a greater use of capital and with technological advancements according to Domar (1970). Furthermore, the choice between the use of slave labor or free labor simply depends on whether one of them is more productive and/or more profitable than the other at the same time.

2.2.1 Productivity

The productivity or the output of slave labor, were according to Findlay (1975) influenced by incentive payments given to slaves and the possibility of manumission¹ by self-purchase. According to Acemoglu et al (2002) the productivity and the work effort of slave labor was also influenced by important factors as geographical and climate advantages of countries. Countries have been geographically favored, when they had the access to the major natural resources, access to coastlines and from sea navigable rivers, close proximity to other successful economies, and favorable conditions for agriculture and human health (Sachs, 2000).

¹ Manumission is the act of a slave owner freeing his or her slaves

However, when the requirements in the production process became higher, the use of slave labor was more inefficient and less productive than free labor. Thornton (1994) stated: "The productivity of slaves is less than that of free labor because in slavery productivity is dissociated from economic reward" (p.33), by which is meant that they have no reason to work harder. Furthermore, the competitive disadvantages of slave labor were exposed as the production processes become more complicated, meaning higher requirements were needed. A common way of improving the productivity, especially popular among governments owning slaves, is the infliction of punishment for insufficient results. However, this approach has the disadvantage that it will increase the costs of operations and the depreciation of slaves, in terms of their productivity and market value, due to the fact that slaves are more productive when there is no fear of getting punished constantly (Thornton, 1994).

2.2.2 Profitability

There is a lot of discussion about whether slavery was profitable. According to Woodman (1963), the first question is for whom slavery was profitable. Was it for the slave, or for the slave-owner, the region, or the American economy as a whole? When looking at slave-owners or planters the central question in determining their profitability is whether they made money, and whether they make the same profits on their investment as if they had invested elsewhere. The profitability of slave labor concerns only the success or failure of slave production as a business and ignores the implications on the economy as a whole (Woodman, 1963).

According to Temperley (1977) slavery as method of production was very profitable, this due to the fact that there is substantial evidence that slavery was often very successful in providing both cheap goods and a high level of profits. However, when the production process becomes more complex the profitability of using slave labor decrease and the use of free labor will be more attractive. The profitability of using slave labor was also influenced by slave prices. When slave prices went up, and hence the profit for the slaveholder and planter went down, this was a signal for the market to discover substitutes for slave labor. It was no longer profitable or not profitable enough to use slave labor (Thornton, 1994).

The profitability of slavery is thus depending on several factors, one is the potential future capital gains, the other are the prices that have to be paid for the use of slave labor and the cost associated with the keeping of slaves. And when the production process was more complicated, slavery was no longer more profitable than the use of free labor.

2.3 Effects of slavery on the development and inequality

In several papers the role of slavery on the economic development and inequality of former colonies has been discussed, important papers are those from Engerman and Sokoloff who argued that there is a relationship between slavery and current income. According to Woodman (1963) slavery hindered the establishment of a domestic market for local industry, and consequently retarded the economic development. In the same paper, reference was made to what the British economist J.E. Cairnes argued regarding the use of slave labor. Cairnes (1863) also argued that slave labor hindered industrial and commercial development, because slaves were kept in ignorance and were thus unable to cope with machinery. This is the case because, when the slaves were getting educated and brought to the cities as industrial workers, it increased the danger of their combining to better their conditions or of their engaging in rebellion. Commerce was therefore impossible; this is due to the dangers of mutiny on the seas or desertion in free ports, as a result that the slave-owners were restrained from using their property in this work (Cairnes, 1863). Because slavery was economically expensive, it required a larger outlay of capital than free labor, no capital remained for manufacturing and commerce (Woodman, 1963). As manufacturing and commerce were important sources for the increase of capital, the shortage of these types of enterprises hindered economic growth in the colonies. This completed according to Woodman (1963) a vicious circle, emphasizing the shortage of capital and making non-agricultural occupations even more difficult to begin.

Furthermore, Engerman and Sokoloff argued that the reliance on slave labor in the nation's past was important for the subsequent economic development in the former New World colonies (Engerman & Sokoloff, 1994, 2002). They argued that specialization in plantation agriculture, which were in dependence of slavery, led to greater economic inequality, which in turn resulted in economic underdevelopment. This inequality resulted in the establishment of domestic institutions that favored the elite, rather than providing the broad mass economic opportunities (Engerman & Sokoloff, 2005). Because the power was concentrated in the hands of a small elite, it negatively affected the development of domestic institutions necessary for economic growth (Engerman & Sokoloff, 2002). The elite were able to maintain their status over time, but at the expense of society, not realizing that the economic potential of the broad masses became more disadvantaged by this (Sokoloff & Engerman, 2000).

Nunn (2007) has tested two parts of Engerman and Sokoloff's hypothesis: that large-scale plantation slavery resulted in economic inequality, and that it might result in subsequent

underdevelopment. With these tests it was found that it is not the widespread use of slaves on plantations that has the greatest negative impact on development, but the use of non-plantation slaves.

Furthermore, Nunn used as a measure of economic development the per capita GDP, it was concluded that countries with a high proportion of slaves to the total population in the past have a relative lower average per capita GDP nowadays. If these countries had relied less on the use of slave labor their income would be much higher today (Nunn, 2007). But the relationship between slavery and economic development is still negative correlated according to the results of Nunn (2007). Therefore, Nunn also tested the causality that underlies the negative relationship between slavery and economic development. The chain of causality is illustrated below:

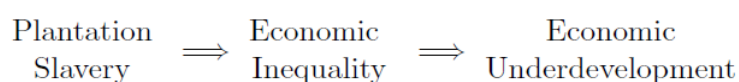


Diagram 1: Testing the channels of causality in Engerman and Sokoloff's hypothesis.

Because of the persistence of inequality overtime, past use of slave labor is positively correlated with current income and inequality. However, Nunn found that it was not possible to subscribe the effect of slavery on initial economic inequality for any of the estimated relationships between slavery and economic development (Nunn, 2007).

In chapter 4 I will empirically test whether there is also a direct relationship from slavery on current development, as measured by GDP per capita. I will look at the results of Nunn and compare them to my own outcomes. The following regression model will be used:

$$\begin{aligned} \ln \text{ Per Capita GDP} = & \alpha + \beta \text{ proportion of slaves} + \beta \text{ population density} \\ & + \beta \text{ early abolition} + \beta \text{ colonizer fixed effects} + \varepsilon \end{aligned}$$

Early abolition will be used as dummy variable and colonizer fixed effects and population density as control variables, for early abolition a 1 if abolition is before 1850 and a 0 if abolition is after 1850. Furthermore, the colonizer fixed effects will also be noted as a 1 or 0, depending on the former colonizer.

3. The abolition of slavery

This chapter discusses the different factors that have influenced the abolition of slavery and what the consequences have been of this abolition. The abolition of slavery brought an end to the legally codified gross inequality intrinsic to slavery (Engerman & Sokoloff, 2002), and with the abolition of slavery is meant the movement to end slave trade and to give the slaves their freedom. But what is meant by freedom? According to Temperley (1977) freedom meant prosperity, progress, having willing workers as opposed to unwilling ones. With the abolishment of the slave trade, the planters were no longer able to treat their bondsmen as replaceable and would be compelled to behave more humanely.

First of all, abolition of slavery should not be confused with the abolition of the slave trade. This due to the fact that the abolition of the slave trade and slavery did not take place at the same time in most countries, in the British Empire for example slave trade was officially prohibited in 1807, while slavery not until 1834 (Ray, 1989). Furthermore, the abolition of slave trade only concerns the ending of the trade in slaves, not the ending in the use of slave labor in settlements and plantations. The holding of slaves on plantations and in settlements was therefore not forbidden. The abolition of slavery did not occur at the same time in the countries of the New World, but it differed per colonizer and country. In 1834 slavery was abolished throughout the most parts of the British Empire due the British Slavery Abolition Act, while the Dutch abolished slavery in their colonies in 1863 and Brazil, the last important country in the New World that abolished slavery, in 1888 (Finkelman & Miller, 1998).

3.1 Influences on abolition

There are several different factors that influenced the abolishment of slavery. The abolition movements were influenced by the resistance of black slaves, change in economic interest, intellectual development, and the upcoming humanitarianism². Temperley (1977) stated that the abolition of slavery was a struggle between morality and entrenched economic interest.

According to Ray (1989) the abolition of slavery and slave trade by the British was not a clear economic rational movement. It was claimed that the abolition of slavery was mainly based on ethical considerations, but this is weakened by the fact that both the abolitionists as their

² According to the website <http://www.dictionary30.com/> humanitarianism is: *an ethic of kindness, benevolence and sympathy extended universally and impartially to all human beings*

opponents consistently tried to hide their motives. It was further assumed by the abolitionists that ending slavery would bring economic benefits; however, doubts emerged about the relative importance of the economic incentives and ethical limitations to the success of the movements (Ray, 1989). The abolitionists were acting from unselfish motives, while their opponents, the slaveholders, primarily from motives of self-interest (Temperley, 1977).

Economically, slavery cannot be regarded as a great success. This due to the fact that slave labor prevented the expansion of paid labor, slavery kept the wages low for those who were able to work. In general it can be said that slavery was bad for business, except for the plantation owners who made a profit by using cheap labor. But at a certain point in time the slave-owners realized that slave labor was no longer profitable and more or less voluntarily gave up their slaves in order to move to a more profitable nature of production (Ray, 1989). The abolition of slavery was also influenced by a change in economic interest, as is indicated by The Abolition of Slavery Project³. When in the 18th century the industrialization occurred and the incomes in the northern countries grew, optimistic depictions of the political and economic benefits of free labor emerged (Engerman, 1986). The interests of the Western Worlds went more towards products that required higher efficiency in the production process, achieved through the use of free trade and free labor, and therefore they were no longer primarily in need for the use of slave labor and slave based goods. The change in economic interest was also determined by the independence of the United States, due to the fact that they no longer had the need and obligation to trade with other British colonies for obtaining resources and raw materials and as a result the profits of the British decreased. Resulting in a switch of the British focus, geographically it changed from the west (the Caribbean) to the east (India). Later on also other European countries were forced to look for other sources of income in other parts of the world due to the abolition (Slavery, 2012). Drescher (1997) stated: "Ironically, the greatest contribution of the slave trade to industrialization within a Continental European economy may have occurred only after, and because of, the abolition of the British slave trade in 1807" (p.214).

However, the abolition of slavery was not only driven by economic reasons. It was also influenced by the increase in resistance of black slaves due to their poor treatment and by the change in ideas of the people in the Western World against liberty and human rights, which

³ Website of The Abolition of Slavery: (<http://abolition.e2bn.org/>).

were a result of the French and American revolutions. The resistance of the black slaves was a shock for the governments of the European countries, and it allowed them to see that the maintenance costs and dangers of slavery became too high. Sometime later, also the plantation owners agreed with the abolition of slavery, because of the fear of a widespread war, Haiti taken as example where the slave revolt was successful (Engerman, 1986).

3.2 Consequences of the abolition

When the abolition brought an end to the legally codified gross inequality intrinsic to slavery, it was expected that the wealth and income would be better distributed among the entire population and that the slaves who were set in freedom had the opportunity to improve their income and social status. However, the unequal distribution of the GDP remained and this has undoubtedly contributed to the development of institutions that generally protected the privileges of the elite, which in turn limited the broad mass of the population in their economic opportunities (Engerman & Sokoloff, 2002). The elite holding their status over time came at the cost of society, not realizing the economic potential of the broad mass that was disadvantaged (Sokoloff & Engerman, 2000).

Primarily it was thought that with the abolition of slavery the profitability in the West Indies would increase, but this was not the case. The abolition of slavery was ruining businesses and caused problems for the slave-owners and plantation holders. For example, the production of sugar in the British colonies dropped enormously due to the abolition, in Jamaica even with fifty percent. However, not only the former slave-owners were affected, it also hit the people who traded and bought sugar in Great Britain, as a result of rising prices (Ray, 1989). The British suffered the most, because they were the first to abolish slave labor and slave trade officially. The abolition of slavery by the British led to an increase in the foreign slave trade and their export, where the colonies of their rivals benefited from. Due to the decrease in production the British were turning towards Cuba and Brazil for sugar, where consequently the import of slaves and export, including sugar, increased (Temperley, 1977).

Therefore, the abolition of slavery was creating more economic inequality because the elite were still able to hold their privileges and restricted the rest of the people, including the slaves that were freed, from economic opportunities. Furthermore, the countries that abolished slavery at first, suffered the most. The other countries that still allowed slavery could thus benefit, and had the ability to take over markets and increase their profits.

4. Empirical Research

This chapter will investigate whether or not economic development and past use of slaves are related with each other. As mentioned before this have been measured before by some other researchers, including Engerman and Sokoloff who argued that there is a relationship between economic development and a nation's past dependence on slave labor and this was also tested by Nunn.

For the measurement of economic development in the former colonies, the natural log of current per capita GDP will be used. Nunn (2007) used for measuring the possible relation the proportion of slaves to the total population, the population density and the colonizers fixed effects as control variables. These variables are also used in this research, but in addition the early abolition of slavery will be added and used as a dummy variable. This is to look what the effect of early abolition was on the economic development of the former colonies and what the specific effects of the different colonizers were. The population density is included in this research because Acemoglu et al (2002) showed in their paper that population density is highly correlated with per capita income. Furthermore, the differences and similarities between the results of Nunn and those of my own research will be discussed and if possible further explained.

4.1 Data

The data collected to test the relationship between current income and past use of slave labor are obtained from the World Bank and the website of Nunn. From the website of Nunn⁴ data is collected that also was used for his own research, which includes the proportion of slaves to the total population and the population density in the year 1750. From the World Bank (2012) data will be collected concerning the current per capita GDP, the years 2000 and 2010 will be taken as test years. The per capita GDP that will be used is the one that is related to the current US\$. Furthermore the years of abolition and information about the colonizers are necessary for my research, which will be gathered from Finkelman and Miller (1998).

⁴ http://www.economics.harvard.edu/faculty/nunn/data_nunn

4.2 Methodology

In order to test the relationship between current per capita GDP (economic development) of former colonies and past use of slave labor, data is necessary concerning the proportion of slaves and population density in the colonies in the past and the current per capita GDP of these colonies. For current per capita GDP data will be used from the years 2000 and 2010.

To test the relation the following regression model will be used:

$$\ln \text{ Per Capita GDP} = \alpha + \beta \text{ proportion of slaves} + \beta \text{ population density} \\ + \beta \text{ early abolition} + \beta \text{ colonizer fixed effects} + \varepsilon$$

The colonizer fixed effects will be used as control variable and early abolition as a dummy variable. The early abolition dummy has a value of 1 if abolition is before a certain period and 0 if abolition is after a certain period. The year 1850 is taken as a benchmark, thus before 1850 it is 1 and after 1850 it is 0. For the year of abolition, the year is taken when slavery was legally abolished by the governments of the colonizers. In order to measure the colonizers fixed effects also a 1 or a 0 will be used, depending on the countries former colonizer. The population density will be used as another control variable and will probably be positively correlated with the future growth potential of a country at the time, this is because migration would have been determined to a large extent by the expected future profitability of the colonies (Nunn, 2007) and is calculated by dividing the total population in 1750 by the total land area. The proportion of slaves is calculated by dividing the number of slaves by the total population in the colonies in the year 1750.

The data collected on the current per capita GDP, population density, proportion of slaves and the year of abolition will be further analyzed using regression analysis. From the results it will be concluded if the independent variables have a direct relationship with the current per capita GDP, if this is the case it can be concluded that economic development is influenced by the past use of slave labor.

The results and conclusions from my research will be compared with the results of Nunn (2007), and if possible the differences and/or similarities will be explained. The difference that is already noticeable between the research of Nunn and of mine are the number of countries included, this due to the fact that not for every country in his database the per capita GDP in the year 2000 and/or 2010 is known, and of course that the Netherlands Antilles don't

exist anymore and hence dropped out in my sample. Also the source from which I obtained the GDP data, the World Bank, is not the same as is used by Nunn.

4.3 Results

In the figures 1 and 2 the relationship between the proportion of slaves and the per capita GDP of 2000 and 2010 is shown, where the per capita GDP is used as a measure of economic development. However, these figures give no direct conclusion about the possible relation between economic development and slavery, but they provide a good understanding of how the countries are influenced differently by the proportion of slaves. Tables 1 and 2 give an overview of the results for the possible relationship between slavery and economic development obtained using regression analysis. In table 1 the per capita GDP of 2000 is used as dependent variable and in table 2 the per capita GDP of 2010. For Cuba and Suriname no data was available for the per capita GDP of 2010, therefore for Suriname is taken the per capita GDP of 2009, but unfortunately for Cuba there was also no data available for the year 2009. For that reason Cuba was left out in the second regression analysis. Through this analysis it is the purpose to find the possible relationship between slavery and economic development.

The following countries have been included in the sample:

Antigua & Barbuda	Guyana
Argentina	Haiti
Bahamas, The	Jamaica
Belize	St. Christ. & Nevis
Brazil	St. Lucia
Barbados	Mexico
Canada	Peru
Chile	Paraguay
Colombia	Suriname
Cuba	Trinidad & Tobago
Dominica	Uruguay
Dominican Republic	United States
Ecuador	St. Vincent & Gren.
Grenada	Venezuela

4.3.1 Per capita GDP and proportion of slaves

The relationship between the per capita GDP in 2000/2010 and the proportion of slaves in 1750 are shown in the figures 1 and 2. Cuba is excluded in figure 2, as no GDP data was available.

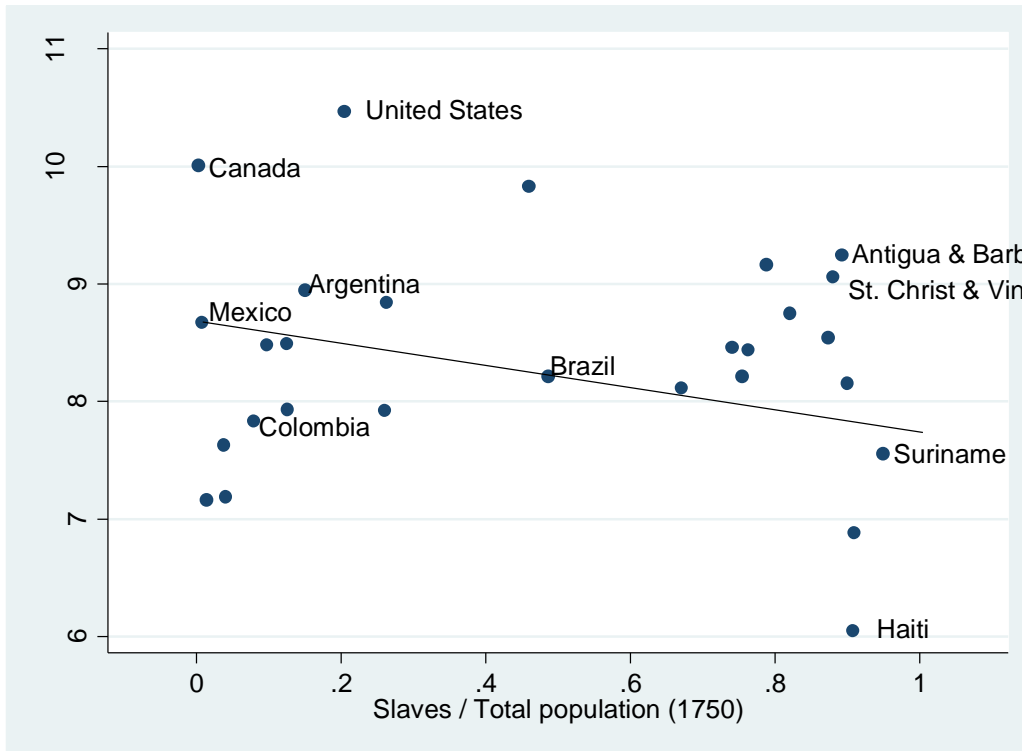


Figure 1: Proportion of slaves and per capita GDP 2000

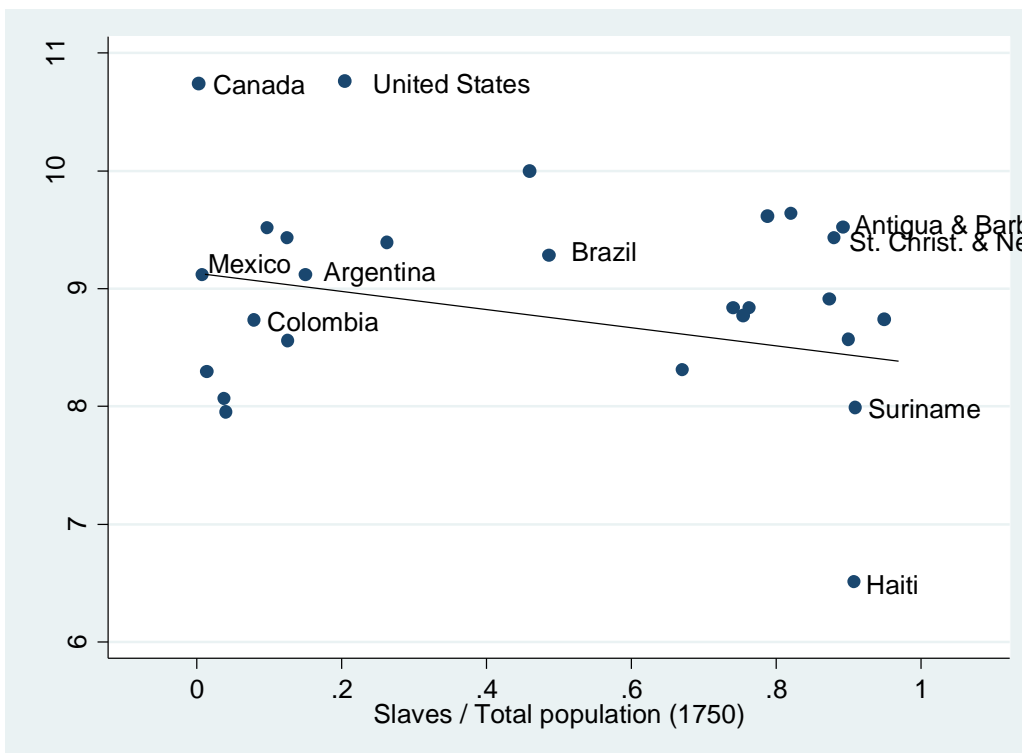


Figure 2: Proportion of slaves and per capita GDP 2010

From the figures 1 and 2 it is seen that Suriname, with a rate of 94%, has the highest proportion of slaves to the total population in the past, and one of the smallest current per capita GDP. When looking at Canada, it is seen that they have one of the lowest proportion of slaves in the past and one of the highest per capita GDP of the countries. However, as is seen by taking a more precise look at the figures 1 and 2, it cannot simply be concluded that a higher proportion of slaves to the total population automatically means lower current per capita GDP. It can be said that in general countries with relative low levels of slaves in the past have a relative higher per capita GDP, but there are exceptions like Antigua and Barbuda. They had a high proportion of slaves in the past, but have nowadays a relatively high current per capita GDP, with almost 90% and a per capita GDP of 9.5 in 2010. On the contrary there are also countries with relative low levels of slaves in the past, most of them Spanish colonies, which have a per capita GDP around or below the average nowadays. This can partly be explained by the greater use of Native Americans in most of the former Spanish colonies, instead of slaves from Africa. Only Haiti's economy is really negatively influenced by the proportion of slaves, they had a relative high proportion of slaves and now have a low current per capita GDP, this could partly be explained by their early independence of their colonizer in 1804 as a result of a successful slave revolt. Nevertheless, more factors have to be tested before we can conclude something more about this relationship and that will be done below.

Variable	Mean
Per capita GDP 2000	8,382107
Per capita GDP 2010	8,986919
Proportion of slaves	0,479469
Population density	0,1952351

4.3.2 Relation per capita GDP and slavery

The following tables will provide an overview of the regression analysis that has been done in order to find the betas and their significances. Before this regression analysis was performed, it was expected that the proportion of slaves would have a negative impact on the per capita GDP and the population density a positive impact. The population density was expected to be positive because, according to Nunn (2007) both voluntary as forced migration would have been determined by the expected future profitability of the colonies, the labor would have been migrated to where the current and future returns were the highest. As is mentioned before, the betas of the proportion of slaves were expected to be negative. This due to the fact that when we look at the data, in general most countries with higher proportion of slaves to the total population have a lower current per capita GDP than countries with lower

proportions and since these countries in general have greater economic inequality. Therefore, the betas of the proportion of slaves to the total population and the population density were expected to be significant with the per capita GDP. However, there is no clear expectation concerning the outcome of the beta of early abolition and the associated significance of the beta. Because it is uncertain whether or to what extent early abolition influenced economic development. The outcomes of these regression analyses are shown in the tables 1 and 2, and will be discussed subsequently.

Table 1: Slavery in 1750 and per capita GDP 2000

Dependent variable: Per capita GDP	1	2	3
Fraction of slaves	-3,10 *** (0,75)	-3,47 *** (0,73)	-3,48 *** (0,74)
Population density	-	0,69 * (0,36)	0,68 * (0,37)
Early abolition	0,26 (0,37)	-	0,22 (0,35)
Colonizer fixed effects	yes	yes	yes
R-square	0,53	0,59	0,60
Number of observations	28	28	28

Table 2: Slavery in 1750 and per capita GDP 2010

Dependent variable: Per capita GDP	1	2	3
Fraction of slaves	-3,10 *** (0,70)	-3,38 *** (0,70)	-3,44 *** (0,69)
Population density	-	0,61 * (0,34)	0,59 (0,34)
Early abolition	0,43 (0,34)	-	0,41 (0,33)
Colonizer fixed effects	yes	yes	yes
R-square	0,54	0,57	0,60
Number of observations	27	27	27

First some notes on the tables 1 and 2: The tables are reporting estimates of the equation that has been mentioned earlier in chapter 4.2. The dependent variables are the natural log of per capita GDP in 2000 and 2010. Coefficients are reported with standard errors in brackets. ***, ** and * indicate significance at the 1, 5 and 10 percent levels. The proportion of slaves is the number of slaves in the population divided by the total population, measured in 1750. The population density is the total population in 1750 divided by the land area. The colonizers fixed effects are control variables capturing whether the colonizer was from Portugal, England, Spain or the Netherlands. Three different tests were done, one including early abolition (1), one including population density (2) and one including all variables, the full specification (3).

As expected the betas of the proportion of slaves are negative, meaning that a gain in the proportion of slaves will result in a decline of the per capita GDP. It is also seen that when population density is left out, the beta of proportion of slaves is less negative. This is so because the population density in some way determines the need for slaves. Furthermore, it can be seen that in general countries with a high proportion of slaves in the past have a lower per capita GDP than countries with a low proportion of slaves, but it does not apply for all the countries. This due to the fact that even countries with a relative high percentage of slaves in the past have a more than average per capita GDP, such as Antigua and Barbuda, and that there are countries with a relative low proportion of slaves in the past who have a per capita GDP under the average. It is also seen in the tables 1 and 2 that all the betas of the proportion of slaves are significant. The values of the significances are all quite high, at 1% (0.000) in all three the tests. This means that it is very likely that the per capita GDP is influenced by the proportion of slaves and this confirms my earlier expectations about the negative impact of the proportion of slaves on the economic development.

The betas of the population density are positive, therefore a gain in population density will result in an increase of the per capita GDP. This is what already was expected before, due the fact that people will go to regions where the chance of present and future returns are the highest. The countries with a higher population density have a higher chance, according to the data, of higher current per capita GDP. Furthermore, the beta of population density is also significant, in the different tests is the significance lying between 5% and 10%. Only in the results with the per capita GDP of 2010 as dependent variable the population density is not significant, it is lying just above the 10% significance with 0,101. This could perhaps be

explained by the removal of Cuba from the dataset, which has an under average population density and per capita GDP. With these results it can be concluded that it is likely that the population density had also some impact on the per capita GDP and consequently the economic development of the countries in the New World. This is confirmed by the statement of Nunn (2007) that people will go to areas where there are the most economic opportunities.

The beta of early abolition of slavery is also positive, thus when there is early abolition the per capita GDP will increase with 0.43. Looking at the data, it can be seen that the countries with early abolition in general have a slightly higher current per capita GDP than the countries who abolished slavery later than the year 1850. However, the betas of early abolition are all not significant. Therefore it cannot be said with certainty that early abolition had any influence on the economic development of countries. It was not expected that the betas of early abolition were not statistically significant, but there are differences between the significances in the tests with the 2000 and 2010 per capita GDP. In 2000, the values of the significances were 0.489 and 0.528, and for 2010 they were 0.224 and 0.231. This may be caused due to the omission of Cuba in the 2010 test.

When the results of Nunn (2007) and those of my own research are compared, it can be seen that there are some differences and similarities. In both cases the betas of proportion of slaves to the total population and the population density were significant. However, in my own results the beta of population density is less significant, in the results of Nunn the significances were 1% or 5%, and in my own results just 10%. This may possibly be caused by the addition of early abolition as an extra dummy variable, or by differences in the values of the retrieved current per capita GDP. But overall it can be concluded that it is likely that there is a relationship between slavery and economic development, this due to the fact that the betas of population density and the proportion of slaves to the total population are significant and it is seen that the proportion of slaves is negatively influencing economic development. It is only not likely that early abolition had any influence, due the fact that this beta is not significant.

5. Conclusion and Discussion

5.1 Conclusion

In this thesis the possible influences of slavery on the economic development of countries in the New World has been investigated. This possible relationship was also investigated by other researchers, like Engerman and Sokoloff (1994, 2002, 2005, 2006) and Nunn (2007), who concluded that the past use of slave labor was important for the economic development. This thesis has proven that such a certain relationship exists.

In order to find this relationship between slavery and economic development, it was first important to see what the influences had been on the use of slave labor and how the use of slave labor encouraged the economic development and inequality of wealth. It was found that factor endowment and the potential profitability/productivity of slave labor influenced the use and need. The factor endowments were determining the need of slave labor, due to the fact that only countries which were rich in fertile soils and blessed with a favorable climate for agriculture really needed slaves. Furthermore the profitability and productivity of slave labor compared to free labor influenced the use of slaves. This is because the use of slave labor was only more profitable and productive than free labor when the production processes were not too complicated. But slavery has also influenced the development and the inequality in the countries, because slaves were kept in ignorance and thus were unable to use more complex machinery. When the industrialization took place in the European countries, the demand for slave labor and slave based goods changed towards goods that required greater efficiency in production, achieved through the use of free trade and free labor. Therefore, the need for slave labor declined and the slaves lost their importance. This industrialization was one of the factors that influenced the abolition of slavery, from which was expected that it would result in more opportunities and a better distribution of the GDP among the broad mass of the population. But the elite were able to maintain their economic and political influences, and the broad mass of the people were still excluded from opportunities.

From the results of the regression analysis it is concluded that the proportion of slaves and population density are related to the per capita GDP, because their betas are significant. This means that it is likely that they have influenced the economic development. Only the betas of

early abolition were not significant, which means that it was unlikely that this influenced the economic development.

There can thus be concluded that there is a certain relationship between slavery and the economic development of countries following the results. It has been proved that the proportion of slaves has influenced the current per capita GDP due the significant beta. However, it can also be concluded that the influences of slavery are still noticeable nowadays. This due to the fact that in some countries of the New World the distribution of economic and political opportunities is still unequal nowadays. These are still maintained by a small group of people and still not available for the broad mass of the population.

5.2 Discussion

In this research the papers of Engerman and Sokoloff (1994, 2002, 2005, 2006) were important for finding the influences in the need and use of slave labor, but they did not provide useful economic models for testing the relationship between slavery and economic development. Therefore, the model Nunn (2007) has been used as example and it was concluded that both test results corresponded to each other. However, the model of Nunn was not very extensive, and that is the reason why early abolition was taken as extra variable. The results showed however, that it is unlikely that early abolition had any influence, and this corresponds to what was mentioned by Engerman and Sokoloff (2002) that the abolition in fact changed nothing in the unequal distribution of GDP among the population.

In a subsequent study more variables should be taken into account as result of the insignificance of the beta of early abolition. It was namely expected that early abolition would have some impact, but this was according to the significance of the beta not the case. When more variables are included, the relationship between slavery and economic development can be examined even better. For instance the inflation and unemployment rates could then be used. This will provide a clearer view about the influences of slavery in the economic development of the countries in the New World.

Appendix

. regress GDP_00 frac_slaves1750 pop_dens1750 var11 D_1 D_2 D_3 D_4 D_5
 note: D_4 omitted because of collinearity

Source	SS	df	MS	Number of obs = 28		
Model	14.5579875	7	2.0797125	F(7, 20)	=	4.21
Residual	9.88344816	20	.494172408	Prob > F	=	0.0053
Total	24.4414356	27	.905238357	R-squared	=	0.5956
				Adj R-squared	=	0.4541
				Root MSE	=	.70297

GDP_00	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
frac_sl~1750	-3.484132	.7394772	-4.71	0.000	-5.026655	-1.94161
pop_dens1750	.6797453	.3680441	1.85	0.080	-.0879812	1.447472
var11	.2218979	.3458227	0.64	0.528	-.4994756	.9432715
D_1	-2.486786	.9769771	-2.55	0.019	-4.524724	-.4488474
D_2	-1.445111	.9581627	-1.51	0.147	-3.443803	.5535811
D_3	-.0175607	.82794	-0.02	0.983	-1.744613	1.709492
D_4	(omitted)					
D_5	-.9517776	1.051339	-0.91	0.376	-3.144833	1.241278
_cons	10.86016	.9931572	10.93	0.000	8.78847	12.93185

. regress GDP_00 frac_slaves1750 var11 D_1 D_2 D_3 D_4 D_5
 note: D_4 omitted because of collinearity

Source	SS	df	MS	Number of obs = 28		
Model	12.8723224	6	2.14538706	F(6, 21)	=	3.89
Residual	11.5691133	21	.550910155	Prob > F	=	0.0090
Total	24.4414356	27	.905238357	R-squared	=	0.5267
				Adj R-squared	=	0.3914
				Root MSE	=	.74223

GDP_00	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
frac_sl~1750	-3.098531	.7490097	-4.14	0.000	-4.656182	-1.540881
var11	.2567243	.3645928	0.70	0.489	-.501488	1.014937
D_1	-2.175247	1.016047	-2.14	0.044	-4.288233	-.0622612
D_2	-1.186525	1.000815	-1.19	0.249	-3.267833	.8947829
D_3	.2846231	.8569387	0.33	0.743	-1.497479	2.066725
D_4	(omitted)					
D_5	-.7734129	1.105361	-0.70	0.492	-3.072136	1.52531
_cons	10.49673	1.027834	10.21	0.000	8.359232	12.63423

. regress GDP_00 frac_slaves1750 pop_dens1750 D_1 D_2 D_3 D_4 D_5
 note: D_5 omitted because of collinearity

Source	SS	df	MS	Number of obs = 28		
Model	14.354528	6	2.39242133	F(6, 21)	=	4.98
Residual	10.0869076	21	.480328935	Prob > F	=	0.0026
Total	24.4414356	27	.905238357	R-squared	=	0.5873
				Adj R-squared	=	0.4694
				Root MSE	=	.69306

GDP_00	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
frac_sl~1750	-3.474268	.7288885	-4.77	0.000	-4.990075	-1.958462
pop_dens1750	.6926221	.3623126	1.91	0.070	-.0608481	1.446092
D_1	-1.430484	.7746365	-1.85	0.079	-3.041429	.1804606
D_2	-.3836923	.8507013	-0.45	0.657	-2.152823	1.385438
D_3	1.131692	.7457877	1.52	0.144	-.4192587	2.682642
D_4	.9472162	1.036485	0.91	0.371	-1.208273	3.102705
D_5	(omitted)					
_cons	9.903531	.7784161	12.72	0.000	8.284726	11.52234

. regress GDP_10 var11 frac_slaves1750 pop_dens1750 D_1 D_2 D_3 D_4 D_5
note: D_4 omitted because of collinearity

Source	SS	df	MS	Number of obs =	27
Model	11.8954892	7	1.6993556	F(7, 19) =	4.04
Residual	7.99109226	19	.420583803	Prob > F =	0.0072
Total	19.8865814	26	.764868517	R-squared =	0.5982
				Adj R-squared =	0.4501
				Root MSE =	.64852

GDP_10	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
var11	.4066008	.3287693	1.24	0.231	-.2815212 1.094723
frac_sl~1750	-3.436573	.6929195	-4.96	0.000	-4.886871 -1.986276
pop_dens1750	.5857276	.3397092	1.72	0.101	-.125292 1.296747
D_1	-3.067761	.9238301	-3.32	0.004	-5.00136 -1.134162
D_2	-2.09038	.8897037	-2.35	0.030	-3.952551 -.2282084
D_3	-.8759821	.7706435	-1.14	0.270	-2.488957 .7369933
D_4	(omitted)				
D_5	-1.051503	.9715307	-1.08	0.293	-3.08494 .9819342
_cons	12.00099	.9234459	13.00	0.000	10.0682 13.93379

. regress GDP_10 frac_slaves1750 pop_dens1750 D_1 D_2 D_3 D_4 D_5
note: D_4 omitted because of collinearity

Source	SS	df	MS	Number of obs =	27
Model	11.2521995	6	1.87536658	F(6, 20) =	4.34
Residual	8.63438193	20	.431719097	Prob > F =	0.0058
Total	19.8865814	26	.764868517	R-squared =	0.5658
				Adj R-squared =	0.4356
				Root MSE =	.65705

GDP_10	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
frac_sl~1750	-3.383289	.700674	-4.83	0.000	-4.84487 -1.921709
pop_dens1750	.6047139	.3438253	1.76	0.094	-.112493 1.321921
D_1	-2.818971	.9135199	-3.09	0.006	-4.72454 -.9134016
D_2	-1.863142	.8819728	-2.11	0.047	-3.702905 -.023379
D_3	-.4967856	.7163212	-0.69	0.496	-1.991005 .9974342
D_4	(omitted)				
D_5	-1.02686	.9841006	-1.04	0.309	-3.079658 1.025938
_cons	11.95034	.9346698	12.79	0.000	10.00065 13.90003

. regress GDP_10 frac_slaves1750 var11 D_1 D_2 D_3 D_4 D_5
note: D_4 omitted because of collinearity

Source	SS	df	MS	Number of obs =	27
Model	10.6451461	6	1.77419102	F(6, 20) =	3.84
Residual	9.24143531	20	.462071766	Prob > F =	0.0104
Total	19.8865814	26	.764868517	R-squared =	0.5353
				Adj R-squared =	0.3959
				Root MSE =	.67976

GDP_10	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
frac_sl~1750	-3.097975	.6965132	-4.45	0.000	-4.550876 -1.645073
var11	.4322183	.3442514	1.26	0.224	-.2858776 1.150314
D_1	-2.788447	.9533202	-2.92	0.008	-4.777038 -.799856
D_2	-1.862235	.9221827	-2.02	0.057	-3.785875 .0614043
D_3	-.6102343	.7914394	-0.77	0.450	-2.261148 1.040679
D_4	(omitted)				
D_5	-.89488	1.013861	-0.88	0.388	-3.009756 1.219996
_cons	11.68182	.948274	12.32	0.000	9.703753 13.65988

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