

# How Did the Slavery Economy Work?

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## **A shifting historiographical tradition**

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ROBERT W. FOGEL

WINNER OF THE NOBEL PRIZE IN ECONOMICS

THE  
SLAVERY  
DEBATES

A RETROSPECTIVE

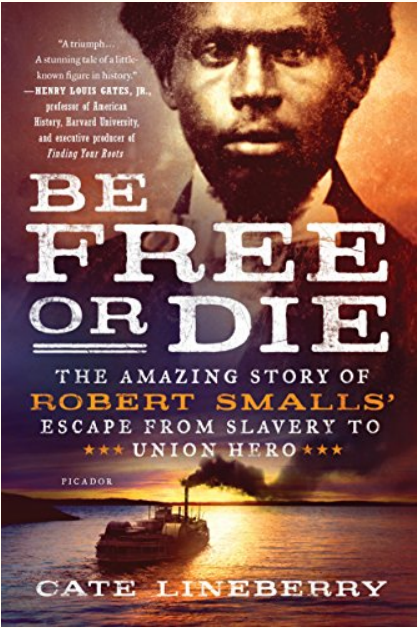
1952-1990

- Abolitionist indictment of slavery before the Civil War rested on 5 propositions:
  1. Slavery was dying.
  2. Why? Because slavery was, in general, an unprofitable investment.
  3. Why? Because the plantation system was inefficient.
  4. Slavery resulted in a stagnant Southern economy.
  5. Slavery was accompanied by harsh conditions for the typical enslaved person. Basically, a brutal life.
- Therefore, abolishing slavery would be good *both* for the whites and black persons of the south.



## Ulrich B. Phillips and the Progressive movement

- Ulrich B. Phillips (1877-1934), who held strongly racist views, publishes **American Negro Slavery** in 1918.
- Immensely influential for two generations of historians.
- Phillips accepts the first 4 propositions of abolitionists, but through careful study of letters and plantation logs, disputes the last.
- He documents that slaves, at least economically, were treated fairly well by the working-class standards of the time:
  - Enslavers had considerable power over enslaved persons.
  - But enslaved persons were not devoid of influence. The working relationship required concessions for the plantation to run smoothly.
- Modern historians have come to appreciate the degree of agency of enslaved persons.



"A triumph....  
A stunning tale of a little-  
known figure in history."  
—HENRY LOUIS GATES, JR.,  
professor of American  
History, Harvard University,  
and executive producer of  
*Finding Your Roots*

# BE FREE OR DIE

THE AMAZING STORY OF  
**ROBERT SMALLS'**  
ESCAPE FROM SLAVERY TO  
★★★ UNION HERO ★★★

PICADOR

CATE LINEBERRY

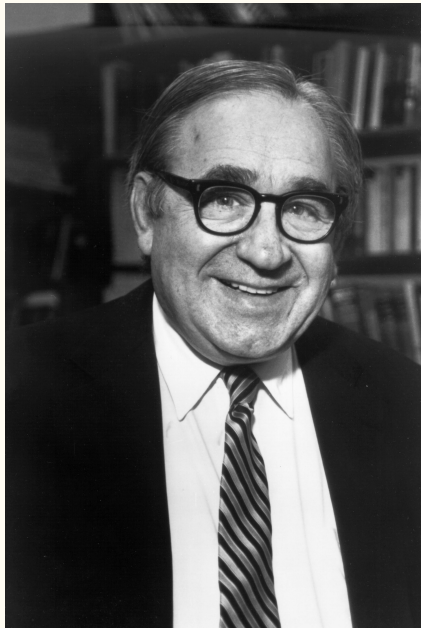
**Robert William Fogel**  
NOBEL LAUREATE IN ECONOMIC SCIENCES  
and **Stanley L. Engerman**

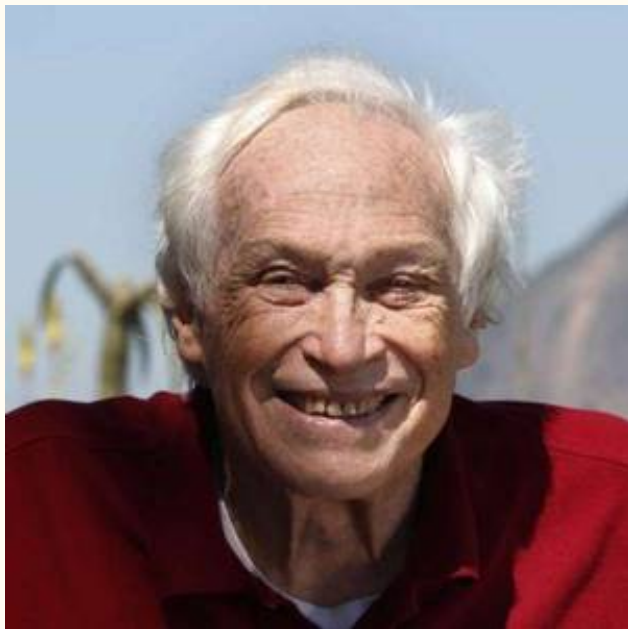
# TIME ON THE CROSS

The Economics of American Negro Slavery









# Fogel and Engerman, I

- The seminal and most influential study is **Time on the Cross** by Robert Fogel and Stanley Engerman, first published in 1974.
- Fogel and Engerman postulate 10 essential points:
  1. The purchase of an enslaved person was highly profitable with rates of return comparable to those in manufacturing.
  2. Slavery was not on the verge of extinction, it was strong economically and becoming increasingly entrenched. Only war could eliminate it.
  3. Enslavers were optimistic regarding their prospects and increasingly so.
  4. Slave agriculture was actually quite efficient and effectively managed with economies of a large-scale operation that was 35% more efficient than northern family farms.
  5. The typical enslaved person was more productive than a non coerced person.

- Continuation:
  6. Enslaved persons employed in the industry were as or more productive than their white counterparts. On the eve of the Civil War, enslaved persons in urban areas were increasing at a more rapid rate than in the countryside.
  7. The enslaved family was a stable unit. It was in the economic interest of enslavers to encourage that stability. Sales were largely composed of entire family units or of family members who were at an age when they would normally leave the family. There is little evidence of sexual abuse.
  8. The material condition of enslaved persons compared favorably to those of free industrial workers.
  9. The rate of output expropriation of enslaved persons was in the neighborhood of 10%.
  10. The Southern economy was not stagnating, but growing quite rapidly. Italy did not achieve similar per-capita income levels until the eve of World War II.

## Fogel and Engerman, III

- Fogel and Engerman argued that Phillips' first 4 points were incorrect.
- Slavery was repugnant, but it did not fail economically.
- In fact, slavery produced high profits that prolonged an immoral system.
- Slavery also did not cause economic stagnation, but it excluded enslaved persons from sharing in that growth.
- Slavery was a deeply dehumanizing system, who created a culture of violence that pervaded all society, even those who did not own enslaved persons.
- However, the relationship between enslaved persons and enslavers involved interdependence and reciprocal accommodations.

## Fogel and Engerman, IV

- Failure to respect certain rights of enslaved persons would result in low productivity. Often “overtime pay” or other benefits would be offered as incentives.
- There was also a vibrant slave economy. With their free time, enslaved persons produced crops and earned money from their sale.
- Fogel and Engerman followed the cliometricians, who entered the debates over the characteristics of slavery in the 1960s.
  - Employ economic, mathematical, and statistical methods to the study of slavery. Kicked off by the “**The Economics of Slavery in the Ante Bellum South**” (1958) by Alfred Conrad and John Meyer, when they were assistant professors at Harvard.
  - Cliometricians were not welcomed by historians or the defenders of Phillips views: “If cliometricians were asked to write a history of the crucifixion, they would begin by counting nails” (Genovese).

# Occupations

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# The Southern economy as a slave society

- Slave labor is an essential element of the Southern economy, both rural and urban.
- Enslaved person worked mainly in the fields: around 73% of males and 80% of females were field laborers.
- However, some enslaved persons also in skilled occupations.
- In the city of Charleston, 27% of adult enslaved males were skilled artisans.
- Not just true of urban environments, but on plantations as well. In fact, 7% of management positions on plantations were held by enslaved persons and around 12% were skilled craftsman.
- Proportion in skilled or management much lower than for white males.



## Work among field laborers

- Among field laborers, the work was varied and included planting and harvesting of a variety of crops, animal husbandry, land improvement, and maintenance of equipment.
- Cotton took up about 34% of labor effort, but the caring for livestock also took a sizable fraction of time, 25%.
- The plantation was a multiproduct establishment, which cultivated a wide variety of crops and produced much of its own clothing.
- Also, an incentive system was used in order to stimulate effort: extra food, clothes, free time, etc. for those who completed their tasks on time.
- Although violence was used as punishment and was essential to the running of the plantation.

## Demographic changes

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# The redistribution of enslaved persons

- The switch from tobacco to cotton results in a huge change in the geography of enslaved persons.
- Share of enslaved persons in Virginia and Maryland falls from 56% in 1790 to 35% by 1820 and to a mere 15% by the Civil War.
- This migration is due to the worlds tremendous demand for cotton. The industrial revolution primarily involves cotton.
- From 1790 to 1860, U.S. production rises from 3000 bales to 4.5 miles bales.
- The lower and western part of the south was more conducive to growing cotton.
- Railroads and steam powered vessels made it relatively low cost to ship cotton to ports for export.

## Expansion to the West

- 835,000 enslaved persons are shipped west between 1790 and 1860.
- 85% come from Maryland, Virginia, and Carolinas.
- 5% go to Alabama, Mississippi, Louisiana, and Texas.
- 84% of enslaved persons migrated with their enslavers and 16% through domestic slave trade.
- Without minimizing the importance and cruelty of the domestic slave trade, the idea that Virginia produced enslaved persons largely for export via the slave trade is not accurate.

# THE LEDGER AND THE CHAIN

HOW  
DOMESTIC  
SLAVE  
TRADERS  
SHAPED  
AMERICA

JOSHUA D. ROTHMAN



## Domestic slave trade

- Enslaved persons sales averaged around 2,700 a year.
- Further, a majority of sales in New Orleans were of enslaved persons already on Louisiana plantations implying that the east-west movement of enslaved persons only marginally accounted for total sales.
- In 1860, about \$3 million is earned by the old south through sales, less than 1% of the gross value of agricultural produce.
- Per enslaver, the average profit from the sale of enslaved persons was approximately \$4 per year.
- On average, it can be inferred that only one enslaver in 22 sold an enslaved person in any given year, and many of those were sales of enslaved persons from a deceased owner.

## What effect did the sales have on enslaved households and marriages?

- Fogel and Engerman analyze data from enslaved person auctions in New Orleans, the most active market, between 1804 and 1860.
- Records on thousands of sales indicate that 84% of sales involved unmarried individuals and at most 13% of sales involved destruction of marriage.
- 234 children under the age of 13 were sold per year.
- How many were orphans? Because of high mortality rates, roughly 16% of children were orphans.
- Slavers thought that keeping families together was usually a profitable strategy (more later).

## The slavery labor market

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## Two market

- Two active markets for purchasing slave labor: a purchase market and a rental market.
- For those needing to permanently increase their work force slaves were generally purchased.
- For those needing only temporary help there was an active rental market.
- Enslaved persons were a long-lived expensive asset and renting slaves was common.
- Interestingly, there does not appear to have been a speculative market in sales.
- Perhaps because transaction costs were high? Speculative sales would result in the loss of labor income and having other capital asset lie idle.
- Fluctuations in prices were rarely high enough to take the risk.
- Also, not a homogenous asset. Varying needs of owners and varying ability of the enslaved person. Prices varied widely depending on these concerns.

# The purchase market

- Enslaved person on ongoing plantations were rarely sold and that is true of enslaved persons born on a given plantation.
- Records of sales from 19 plantations with over 3,900 enslaved persons show sales of only 7 slaves over a 65 year period. Of these 6 were born on the plantation in question.
- A total of 3,300 enslaved persons were born on these plantations so the ratio of sales to birth is about 0.2%.
- Thus, the breeding of enslaved persons for sale did not exist on these plantations.

# The rental market

- The rental market was also active.
- On some occasions enslaved persons would rent themselves out, negotiating terms and operating much like free labor, but remitting a portion of the income to their enslaver.
- More common among skilled artisans and in urban areas. Why?
- In 1860, 31% of urban enslaved workers were on hire with 50% on hire in Richmond. Looking at all slave labor, rentals accounted for about 7.5% of labor.
- There also existed rental agencies that intermediated. In Richmond there were 9 such agencies.
- Many contracts were for an annual term. In that case the terms by which the enslaved person was cared for were negotiated. Often they involved a new set of clothes and shoes at the end of the engagement.
- Renters were also responsible for compensating the owner if the enslaved person got ill or escape.
- The workings of the rental market paints the picture of a flexible labor force.

## Profits and prospects

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# Profits and prospects, I

- The first serious attempt to calculate plantation profitability was made by the economists Alfred Conrad and John Meyer in 1958.
  - Prior to their work, most historians views were based on sketchy evidence and supposition.
  - Prevailing view was that plantations were unprofitable and the slave system would have crumbled under its own weight.
- Methodology is similar to deriving the return on physical assets.
  - Step 1: derive the average capital cost of an enslaved person including the tools provided, the animals used, and of course the price of the enslaved person.
  - Step 2: derive the gross revenue produced by the enslaved person using estimates of productivity and the price of cotton.
  - Step 3: derive the net revenue by subtracting maintenance and supervisory cost.

## Profits and prospects, II

- Calculate the lifetime net revenue using mortality tables.
- The return was found to be between 5 and 8%. In the older less fertile territories around 2-5% and in the more fertile areas between 10-13%.
- The calculation for enslaved female is more complex as one has to take account of the value of their offspring. They come up with between 7.1 and 8.1%.
- So even those plantations in the less productive areas earned a profit.
- The paper intensifies the debate.

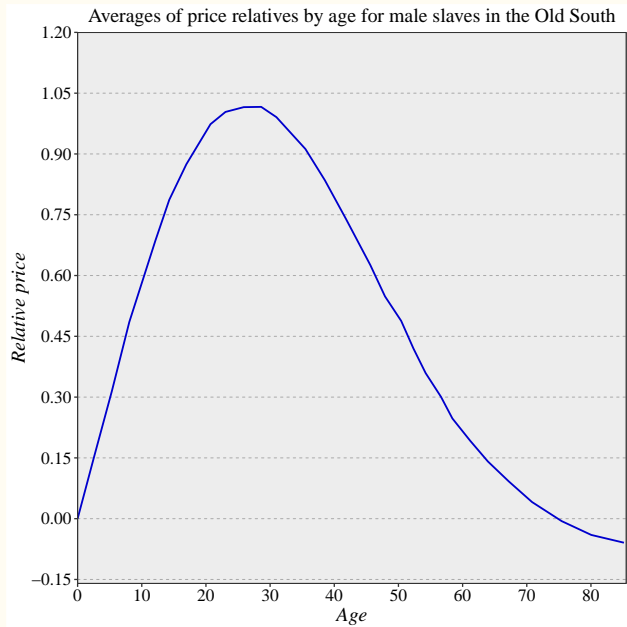
## Profits and prospects, III

- Subsequent scholars criticize some of their estimates.
- Some critics claim that Conrad and Meyer overestimated the number of children, the assumption that all enslaved persons lived the average age of life, and underestimated the costs of an enslaved person upkeep including medical care, managerial costs, and food and clothing.
- However, Conrad and Meyer also underestimated the productivity of a prime field laborers, and females and overestimated maternity costs as well as the equipment needed by young and older enslaved persons.
- They also made the erroneous assumption that the capital used by an enslaved person fully depreciated at the person death.
- The net result is that Conrad and Meyer underestimated the net return. It probably averaged around 10% and the rate of return on males and females were roughly equal.

## Profits and prospects, IV

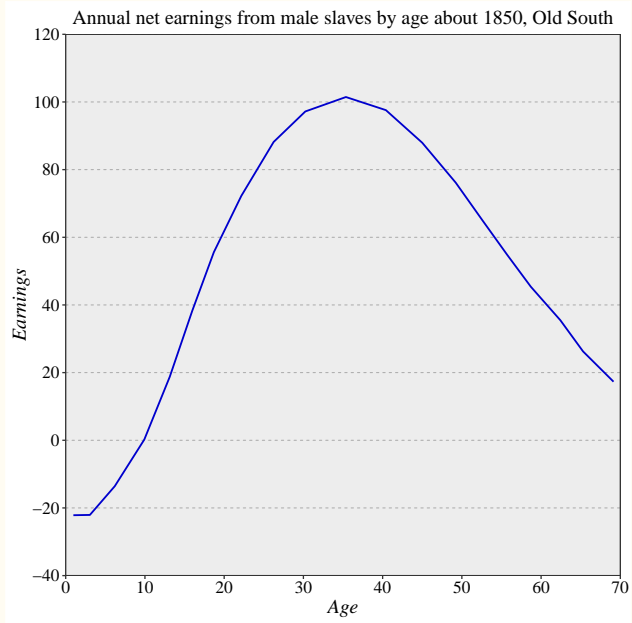
- This rate of return is comparable to rates of return in most non-agricultural businesses.
- For example, the rate of return on the 9 most profitable textile firms was around 10% (1844-53), and the rate of return on 12 southern railroads was 8.5% (1850-60).
- The prevailing view among historians in the 1950s that owning enslaved persons was largely for conspicuous consumption is not in evidence.
- Enslavers appear to have run their plantations in a very businesslike manner.
- Evidence can be seen in the relationship between the age profile on price and productivity.





## Prices over the life cycle

- Unlikely that 26 year. olds were priced twice as high as 10 year olds because they generated twice as much prestige, the previous figure is inconsistent with conspicuous consumption.
- More likely they are based on an earnings profile.
- Earnings are negative until the age of 8 and then peak at 35. And average net income remains positive until the enslaved person reaches the late 70s.



## Tasks over the life cycle

- The contention that enslavers worked their enslaved persons to death to avoid the cost of care when they are old is not born out in the data.
  - Tasks could be adjusted. Older women could care for enslaved children, be seamstresses, or spin cotton. Older men could care for the animals and implements.
  - The problem of what to do with the elderly largely arises in urban industrial sectors. It rarely occurs in an agricultural society.
- Some examples of paternalism. Some evidence of laments for enslaved persons that passed away, something that would not occur if the enslaved person was inefficient or troublesome.
- But there is also evidence of cruel punishments on the plantation. The system is inherently inhumane.

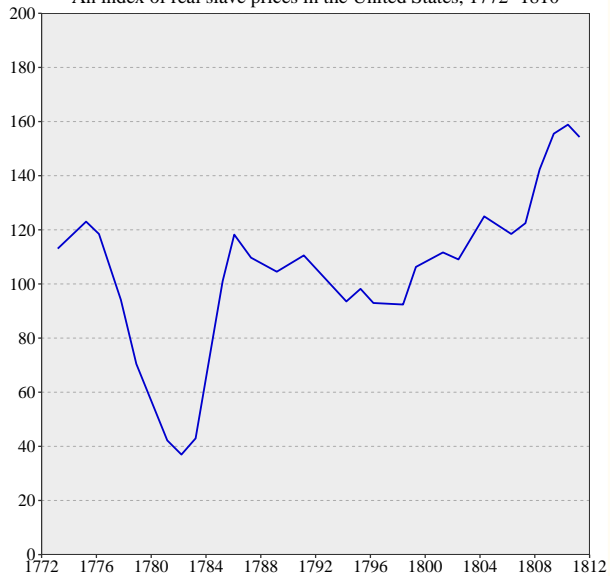
# Viability

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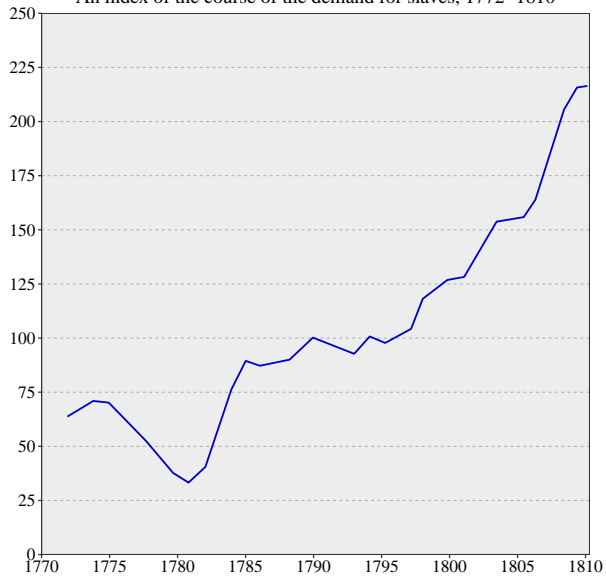
## Was slavery on the way out after the American Revolution?

- Slaved persons prices and demand were depressed in the latter years of the War and immediately thereafter.
- But both demand and prices rebound by 1785 and remain quite high in the 1790s. Between 1784 and 1795 they were about 89% of the pre-War price.
- The price decline was due to a rise in supply as enslaved persons imports hit all time highs at the time, rising by 79,000 over the decade.
- If slavery was becoming unprofitable, we would not have seen the rise in imports.
- Would it have eventually become unprofitable absent the advent of the cotton gin is an open question.

An index of real slave prices in the United States, 1772–1810



An index of the course of the demand for slaves, 1772–1810

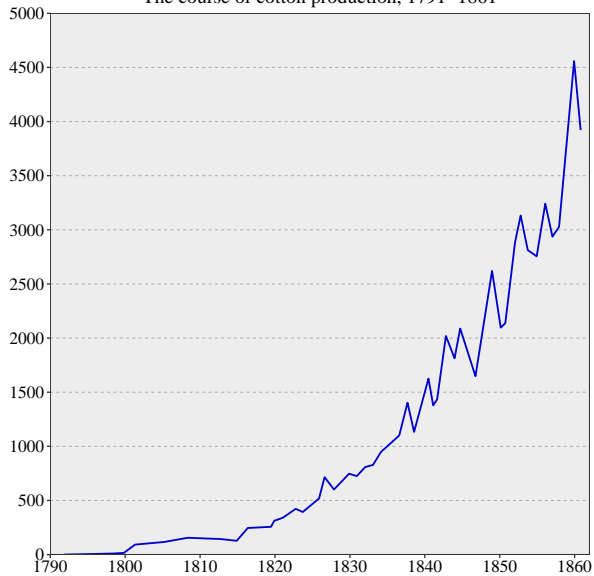




## A cotton bubble?

- Some argue that the tremendous increase in cotton production in the decade prior to the Civil War was an example of over supply and that this oversupply was making slavery unprofitable.
- But the slight downward trend in price and the large increase in supply need not signal irrational oversupply.
- It could and was due to increasing productivity.
- World wide demand for cotton was rising by 7% per year starting in 1846.
- Thus, profits were at their highest during the 1850s.
- And prices were above their trend values.

The course of cotton production, 1791–1861



## A counterfactual

- Fogel and Engerman run a counterfactual experiment.
- They regress the change in enslaved persons prices on the price of cotton, the output of cotton, the size of the labor force employed in raising cotton, the cost of a enslaved person maintenance, and the real interest rate.
- The post-War values of all these variables are known.
- Using the regression coefficients and assuming that the portion of the labor force devoted to cotton remained constant, the labor force would have grown with the growth of the black population. Also, assuming the cost share and income share of enslaved persons remained constant, they calculate the predicted path of the price of a hypothetical enslaved person.
- They conclude the price of enslaved persons would have risen by 1.4% a year from Wars end to 1890.

## Additional points, I

- Additionally, the demand for American cotton increased continually right up to WWI and the amount of land devoted to cotton production grew at 2.06% per annum, which was faster than the growth of the black population.
- Thus, the idea that available land was almost exhausted by the Civil War is groundless as is the idea that cotton growing would not have remained a highly profitable activity.
- Some have argued that the land was being depleted at a high rate.
- Just the opposite, the rate of decline was barely 0.5%.
- Planters were much engaged in developing fertilizers and ways to maintain the quality of the soil.

## Additional points, II

- Westward migration was not due to a search for non-depleted soil, but due to the tremendous growth in demand and the comparative advantage that these areas had in growing cotton.
- Technological advances such as the steamboat, which reduced transportation costs and allowed for navigation on shallower rivers as well as those with currents too strong for sail boats. More areas were in reach of port cities.
- Advances in management and organization, especially on larger plantations was improving productivity:
  - Discussions centered on proper diet, work schedules, punishments and incentives, organization of gangs, and even the construction of dwellings.
  - Goal was to create a highly disciplined, specialized, and productive labor force.

## Exploitation

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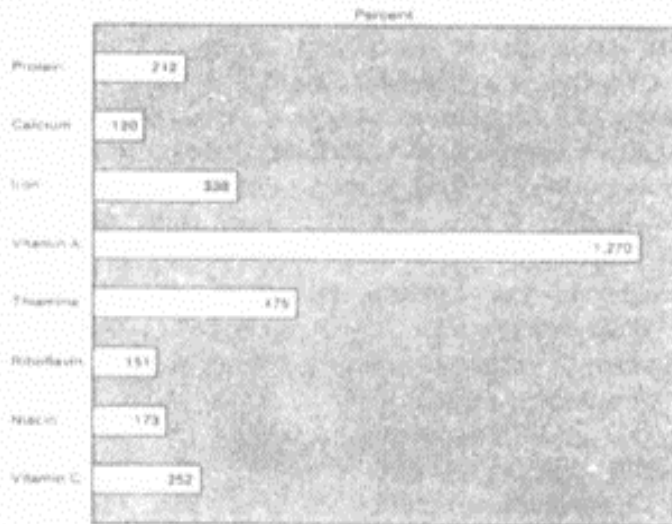
# Exploitation

- Webster's defines exploitation as:
  1. an unjust or improper use of another person for one's own profit or advantage;
  2. utilization of the labor power of another without giving a just or equivalent return.
- So on both counts enslaved persons were exploited.
- They were at times worked to exhaustion, whipped, sold at auction, separated from their families, raped, and terrorized.
- However, it is important to quantify the exploitation.
  - Not to resurrect in any way the reputation of enslavers. That would be a pointless and malicious.
  - What is important is to resurrect the lives of black persons and to see what slavery did to their lives.

- The idea that enslaved persons were malnourished has no empirical support.
- Two staples of the enslaved persons diet were corn and pork, because they could be stored and eaten year round.
- Other typical foods were beef, mutton, chickens, milk, turnips, peas, squashes, sweet potatoes, apples, plums, oranges, pumpkins, and peaches.
- Foods that could not be produced on the plantation, but were frequent additions to enslaved persons diet were salt, sugar, and molasses.
- Less frequent, but not uncommon, provisions included fish, coffee, and whiskey.
- The daily caloric intake exceeded that of free persons in 1879 by roughly 10%.
- Relative to 1964 recommended nutrition guidelines, the typical enslaved person diet contained 110% more protein than the recommendation and was high in other nutrient categories.



**The Nutritional Value of the Slave Diet: Average Slave Consumption of Various Nutrients in 1860 as a Percentage of Modern Recommended Daily Allowances**



# Housing

- Data on housing is more scarce.
- From evidence in the 1860 census, it appears that a typical enslaved household contained 5.2 persons compared with 5.3 for whites.
- Most enslaved persons lived as a single household, but the quality of the housing stock is not well documented.
- From traveler's accounts, there seems to have been a lot of variability ranging from 3-4 room stone houses to one room log cabins without windows.
- The typical house was wooden, about 18ft by 20ft, with a stone chimney, no glass windows only shutters, with raised floors constructed of planks.
- While that does not appear to be overly accommodative, it contained more space than a typical house in New York City in the 1890s, and it was at a time when most of rural America lived in log cabins.

- Regarding clothing the typical issue was:
  - For a man, 4 cotton shirts, 4 trousers – 2 of cotton and 2 of wool, one or two pairs of shoes.
  - For women, 4 dresses per year or the material to make 4 dresses, and a hat.
  - Shoes were generally made of good caliber leather.
- Not much else is known other than enslaved persons augmented their clothing with purchases made through their earnings on the plantation.

## Medical care

- Medical care was not in general withheld, and it was also up to the standards of the time, which is to say not good.
- Large plantations had their own hospitals and a full-time nurse. Physicians were regularly called upon to treat enslaved persons, usually the same doctor that tended to the plantation owners family.
- For health reasons, cleanliness was enforced. A sick enslaved person is an unproductive enslaved person.
- The best care was reserved for pregnant women.
- The infant mortality rate was 183 per 1000, around 20% higher than the white rate of 146 and 4% higher than the infant death rates of southern whites of 177.
- Common reasons for infant mortality were whooping cough and cholera.

- Life expectancy in 1850 was lower than that of white Americans and Englishmen, but comparable to Frenchmen and the Dutch, and higher than Italians of approximately the same period.
- It was also higher than those living in Boston, New York City, and Philadelphia in 1830.
- Suicide rates among enslaved persons were extremely low and significantly less than the white population.

# The family, I

- One central organizational structure on plantations was work gangs that allowed plantations to achieve efficient means of production.
- The other was the family generally housed in a single family house.
  - Allotments of food were by family.
  - Strong family attachments encouraged, which made it less likely that an enslaved person would seek freedom by running away.
  - By allowing de facto ownership of the house, plots of land for growing vegetables, and small livestock among other things, the planter class created an economic stake for the enslaved person.
  - And that stake varied with the person's productivity.

## The family, II

- Planters relied on the family for the raising of children, although nurseries were provided while mothers were out working in the field.
- Planters provided rewards for marriage and punishment, usually whippings for adultery and even at times for divorce.
- While enslaved persons' marriage was illegal under most state laws, it was legal under plantation law and provided status to enslaved persons (similar to the divide between manor law and the law of the crown).
- The black family was unmistakably nuclear and patriarchal.

# Sexual exploitation, I

- Hard to measure. For instance, many forms of sexual exploitation do not lead to children.
- Genetic estimates on southern blacks indicate that 1 or 2% can trace their ancestry to a white father.
- There were mixed-race person in the south, but they were concentrated among free blacks in cities of which it is estimated comprised 39%, compared with 20% of urban enslaved persons and to 9.9% of rural ones.
- So between 1620 and 1850, the fact that only 7.7% of blacks were of mixed-race speaks to a limited amount of cross-racial sex. One was counted as of mixed-race if you were 1/8th black.
- Sexual exploitation would undermine morale and discipline and be harder to keep secret than a mistress.
- Overseers who violated sexual mores were generally punished and often fired. They would have great difficulty being reemployed as an overseer.



## Sexual exploitation, II

- As far as we can tell, black prostitution was rare. Data from Nashville, the only city for which data is available, shows that only 4.3% of prostitutes were black even though 20% of the population was black. All of the women prostitutes were free and light skinned. No enslaved persons involved.
- Nonetheless, “fancy” trade existed.
- A enslaver could earn a higher return from a female field worker.
- The average age of an slaved mother conceiving her first child was 22.5. Black families strictly guarded their daughters from sex out of wedlock. Rather than promiscuous mores, enslaved persons appear to have been rather conservative in their mores.

# Punishment, rewards, and expropriation, I

- Whipping was employed on whites in the north during the 17th and 18th centuries, but fell out of favor in the 1800s.
- Whipping was the most common punishment for errant enslaved persons, but others included rescinding various privileges, confinement in stocks, incarceration, sale, and the death penalty.
- Whipping was calibrated to depend on the offense.
  - The records are sparse and basically confined to one plantation whose owner favored whipping. In this case, of the 200 slaves there were 160 whippings over a 2 year period. Roughly half the enslaved persons received a whipping over that period.
  - Many plantation instructions discouraged the use of whipping or employed it sparingly.

## Punishment, rewards, and expropriation, II

- In the north, whipping went out of fashion with the rise of capitalist economies. You could fire someone for shirking and the loss of earnings was born by the worker.
- On a plantation, firing was not an option and whipping, if not severe, was a cost effective means of discipline. Punishment practices were driven by the desire to impose the lowest loss of human capital, which the planter owned.
- The primary concern of most plantation owners was to maintain a productive work force. To that end, rewards were commonly employed.
- Prizes were given to the work gang that had the best performance on a given day or week. Prizes included clothing, tobacco, whisky, and occasionally cash.

## Punishment, rewards, and expropriation, III

- Sometimes the award involved a trip to town or an unscheduled holiday.
- If enslaved persons worked on what was their normal time off, they would generally be paid at the going rate for free labor.
- Additionally, enslaved persons that performed well were allowed to work on their own time producing goods such as shingles that they could sell for cash.
- Year end rewards were also common and could average \$15-20 per family. To put that in perspective, annual per-capita income was around \$100 in 1840.
- Rewards for good work would also come in the form of land. Records indicate that slaves could earn in excess of \$100 in a year selling the produce grown on this land.

## Punishment, rewards, and expropriation, IV

- Some owners drew up revenue sharing agreements.
- “You shall have 2/3 of the corn and cotton made on this plantation and as much of the wheat as will reward you for sowing it. I also furnish you with provisions for the year. When your crop is gathered, one third is to be set aside for me. You are then to pay your overseer his part and pay me what I furnish. You are to clothe yourselves, pay your own taxes and doctors fees...and what clear money you make shall be divided equally amongst you in a fair proportion agreeable to the services rendered by each hand. There will be an account of all lost time kept, and those that earn most shall have most.”
- There were also longer-term rewards that could take ten years to accumulate. Field laborers could become artisans, artisans might be allowed to move to town where it was easier to sell their services, drivers could move up to be an overseer.
- Moving up the hierarchical ladder came with better housing, clothing, and cash bonuses.

## Punishment, rewards, and expropriation, V

- The final, but seldom used reward, was manumission. In 1850, the rate was about 1 enslaved person for every 2,000. It could be done through philanthropy or through an agreement allowing the enslaved person to buy their freedom. Some artisans were able to accumulate the fee in 10 years, for others it took much longer.
- The reward system resulted in substantial variation in the income distribution among enslaved persons. If we define basic income as the value of food, clothing, shelter and medical care provided to enslaved persons it comes to approximately \$48.
- Based on existing records, most from Texas, outside income could vary between \$40 and \$110 for a field hand. Looking at artisans, the price of a prime-age blacksmith was \$1700, so a ten-year buyout would imply earnings of at least \$170 per year. The highest income found for an artisan was \$500 in one year.
- We should not to overstate the degree that an enslaved person could better their lifestyle. Most professions were totally off limits and the restriction was felt more deeply by the most talented.

## An estimate

- An estimate of expropriation is that it averaged 12% of an enslaved person output.
- Over the life-cycle it varies considerably and planters do not break even until an enslaved person is in their late 20s. In part, the late break even date is due to the fact that half of enslaved persons do not live to reach the break-even date. Also, income from the plantation was used to sustain unproductive elderly slaves.
- Expropriation, however, is not the only burden imposed.
- There were other methods of exploitation and tremendous violence.

- Was punishment essential? Yes, without it the gang system of agriculture would have been unsustainable.
- For example a planting gang consisted of 5 principal tasks. First strong males plowed. This kept up the pace.
- Then harrowers broke up the clods of dirt, followed by drillers who poked holes in the soil, then the planters, and finally rakers who covered the holes.
- An assembly line type of operation that was quite taxing and highly coordinated.
- Economies of scale on plantations were achieved only via slave labor.



# The economy of violence, I

- Rather than pool resources, work in gangs, and earn significantly more profits whites chose not to do this. The gains did not compensate for the intensity of the effort.
- Also, after emancipation many planters tried to replicate the gangs by offering salaries that were double what they earned as enslaved persons. No takers. The efficiency of the slave plantation could not be replicated through rewards alone.
- Force and rewards were balanced so as to get the maximum productivity for the least cost.
- Force alone would have been inefficient as the amount required would have reduced productivity and encouraged enslaved persons to run off.

# The economy of violence, II

- Overseers were given explicit instructions limiting punishment.
- “The object of all punishment should be 1st, for correction to deter the offender from a repetition of the offence, ...and 2nd for example to others, shewing them that if they offend, they will likewise receive certain punishment. And these objects and ends of all just punishments can better be obtained by certainty than by the severity of the punishment.”
- Rewards for a prime field hand were significant and resulted in the hand earning around 15% more than a free laborer.
- “the manager, therefore, should make it a point to report to the proprietor the names and characters of all those who are deserving on account of faithful attention to duty, that they may be further rewarded...”

# Outcomes

- The effectiveness of the reward system accounts for the low incidence of slave rebellion.
- One does not see an increase in public nor private expenditure on security based on the density of the enslaved person population nor the size of the plantation.
- On a large plantation the ratio of adult enslaved persons to white males was on the order of 30 to 1.
- As well, the racist attitudes of white society, both in the South and North limited an enslaved person potential outside options. Illinois banned migration of blacks into the state.
- In fact, things may have been worse for free black persons in the North than the South. Comparing wealth of free black persons in New York and New Orleans, free black persons in New Orleans fared better.
- On a vast majority of plantations the top management positions of overseer and driver was black.
- Thus, enslaved persons played a crucial role in running the plantation.

# Paradoxes of forced labor

- Relative productivity (Fogel and Engerman, AER 1977)
- Computed as:

$$G_s/G_n = \frac{Q_s/Q_n}{(L_s/L_n)^{a_L}(K_s/K_n)^{a_K}(T_s/T_n)^{a_T}}$$

which displays relative total factor productivity.

- Fogel and Engerman's initial calculation yielded 9.2% in 1860.
- Subsequently, they did a more thorough evaluation yielding 34.7% (p 278).
- These measures may not be due to the efficiency of slavery, but to the efficiency of free southern agriculture which is also part of the statistic.

## Relative efficiency

- However, the 1860 census indicates that slave plantations were more efficient at both producing cotton and food than free farms.
- The deviation could also be due to favorable market conditions for staple crops in 1860.
- The deviation of relative productivities arises from measurement error of inputs and output, omitted inputs, neglect of potential economies of scale, organizational improvements, differences in product mixes.
- Next one wants to impute the effect of slavery. FE find evidence that enslaved persons worked more days and more hours than free farmers. Their measure of labor is in man-years not man-hours so they could be underestimating the labor input on plantations.
- That mismeasurement would show up as productivity.

## Paradoxes of forced labor

- With detailed records of 100 large estates along with evidence of over 5,000 estates in the 1860 census, they find that the slave plantations account for 96% of the southern advantage.

Indexes of total factor productivity on southern farms, by subregion and size of farm ( $G_n = 100$ )			
Size of farm as measured by the number of slaves per farm	Slave exporting states (Old South)	Slave importing states (New South)	All states in Parker-Gallman Sample (Cotton South)
0	98.4	112.7	109.3
1-15	103.3	127.2	117.7
16-50	124.9	176.1	158.2
51+	135.1	154.7	145.9
All slave farms	118.9	153.1	140.4
All farms	116.2	144.7	134.7

## Paradoxes of forced labor

- It is larger plantations that are more productive. The seemingly greater productivity in medium size plantations in the New South is likely due to an incomplete accounting of omitted products such as home manufactures.

The relationship between total factor productivity and farm size in each region (index of free farms in each region = 100)			
Number of slaves per farm	Slave exporting states (Old South)	Slave importing states (New South)	All states in Parker-Gallman sample (Cotton South)
0	100.0	100.0	100.0
1-15	105.0	112.9	107.7
16-50	126.9	156.3	144.7
51+	137.3	137.3	133.5
All slave farms	120.8	135.8	128.5

- Fogel and Engerman examine the effects of the possibility of more hours worked by enslaved persons than northern farmers, of the potentially better land of large plantations relative to small ones, and differences in product mix.
- In addition they find that large slave plantations were 48% more productive than small free farms. What accounts for this?
  - Large farms exploit complementarities in production by concentrating in one of the principle crops: cotton, tobacco, sugar, and rice.
  - Coordinated and precisely functioning work gangs working with military like precision.



# Paradoxes of forced labor

- Each member of a gang has a precise task that is coordinated with the task of others.
- Plow gangs follow hoe gangs in well choreographed precision. Like a production line coordinated by overseers.
- Time-motion studies used to increase the efficiency of picking.
- Jobs were allocated along the lines of relative efficiency. Strongest were field hands that set the pace of the task. Plow gangs manned by men in their 20s and thirties, while hoe gangs were manned by older men, boys, and prime aged women.
- Secondary crops chosen so that peak effort is complementary with cotton. Corn an excellent complement because it could be planted before the cotton and harvested before or after the cotton.

## Paradoxes of forced labor

- Productivity differences also due to the greater intensity of labor rather than additional hours worked, some of which flows from the aforementioned coordination.
- Overall, the biggest advantage of slave labor is found in sugar and the least in tobacco. No evidence that slave labor was more efficient in the cities, hence the high elasticity of demand, nor any evidence it was more efficient outside of the four staples.
- Plantations specialize in these products.
- Greater efficiency is not the same as greater good. Freedom is a highly valued good and the harm done to enslaved persons far exceeded the gains of greater agricultural efficiency.

# Conclusion

- Slavery was morally repugnant but, in the South, it was an extremely efficient production arrangement that robbed enslaved persons of the ownership of their own human capital.
- Planters were skilled entrepreneurs that used various motivational techniques to coordinate and incentivize their work force.
- Enslaved persons were highly competent and diligent workers, and entrepreneurial when given the chance.
- Families were relatively stable and the center of slave society.
- While there was widespread abuse, it had to be traded-off against decreased productivity.
- Slavery impacted many other institutions outside the plantation.

- Explaining the Relative Efficiency of Slave Agriculture in the Antebellum South, by Robert Fogel and Stanley Engerman, American Economic Review v.67, June 1977.