

Announcements

- Don't forget to work on your literature review (due April 11th)
- The literature review should be roughly three to five pages and include proper citations
- It should cover the relevant literature related to your topic
- It should also include a brief discussion of the empirical evidence you are planning to use
- Midterm 2 grades are posted
- See the email for summary statistics and approximate letter grade cutoffs
- Remember that the final will not be cumulative (it will cover everything from slavery to the end of the course)

The Traditional Economic View of Slavery

Up until the 1970s, the traditional view of the economics of slavery could be summarized as follows:

- Slavery was an unprofitable investment
- Slavery was a dying institution
- Slave labor was economically inefficient
- Slavery retarded the growth of the southern economy
- Slavery provided extremely poor living conditions for the typical slave (in terms of consumption, health and physical abuse)

Time on the Cross

- Fogel and Engerman challenged several aspects of the traditional view
- Several points had already been conceded (the profitability of purchasing slaves, the role of slaves in industry and cities)
- The big controversy centered around the claims of efficiency and slave welfare
- The strongest objections were to the following assertions:
 - Slave plantations were more efficient than farms using free labor
 - The rate of expropriation was low and the material living conditions decent for slaves
 - Punishment was used less often than previously assumed
 - The family was the basic social unit under slavery

The Task System vs The Gang System

- There are two general approaches to using slave labor on a farm: the task system and the gang system
- The task system:
 - Each slave is assigned an amount of work to get done by the end of the day (perhaps longer)
 - The work might require several different actual tasks
 - Amount of work was proportional to ability (hand rating)
 - Example: the day's work might be to plow, seed and hoe a certain area of land
- The task system could be implemented on any size of farm

The Task System vs The Gang System

The basic characteristics of the gang system used on plantations:

- Slaves were divided into groups (gangs) with specialization of tasks
- These groups might be based on skill and ability
- The division of labor within a gang made a member responsible for a precise task but also made performance dependent on the actions of the others in the gang
- The gangs were typically composed of 10 to 20 slavehands and headed by a single driver
- In many ways the gang system was achieving for plantations what the assembly line would accomplish for manufacturing

The Task System vs The Gang System

There are a few different explanations for why the gang system could lead to greater efficiency:

- Sorting slaves by physical capability led to greater productivity through exploiting comparative advantages
- Direct supervision in gang system produced greater effort than incentive structure of task system
- Steady and intense pace of work under the gang system (keep up to the people ahead you, don't get in the way of people behind you)

Gang System Efficiency: Comparative Advantage

An example of comparative advantage:

- Suppose that a strong slave can plow one acre per day or pick 50 pounds of cotton per day
- Suppose that a weak slave can plow one quarter of an acre per day or pick 25 pounds of cotton per day
- Notice that the strong slave has an *absolute advantage* in both tasks and a *comparative advantage* in plowing

Gang System Efficiency: Comparative Advantage

Total output with both slaves divided their time evenly between tasks:

$$\text{Plowed acres} = \frac{1}{2} \text{ day} \cdot 1 \text{ acre/day} + \frac{1}{2} \text{ day} \cdot \frac{1}{4} \text{ acre/day} = \frac{5}{8} \text{ acres}$$

$$\text{Cotton picked} = \frac{1}{2} \text{ day} \cdot 50 \text{ lbs/day} + \frac{1}{2} \text{ day} \cdot 25 \text{ lbs/day} = 37.5 \text{ lbs}$$

Gang System Efficiency: Comparative Advantage

Total output having weak slave specialized in picking and still aiming for $\frac{5}{8}$ acres plowed:

$$\text{Plowed acres} = \frac{5}{8} \text{ day} \cdot 1 \text{ acre/day} + 0 = \frac{5}{8} \text{ acres}$$

$$\text{Cotton picked} = \frac{3}{8} \text{ day} \cdot 50 \text{ lbs/day} + 1 \text{ day} \cdot 25 \text{ lbs/day} = 43.75 \text{ lbs}$$

Gang System Efficiency: Steady and Intense Pace

own supervisor.¹ Upon many estates of small dimensions the owner would lead the plow-gang, making his own furrow, and requiring the negroes to keep pace with him, while his son would do likewise with the hoe-gang. Or if the planter spared himself from the manual labor, he would oversee the work either in person or through a hired overseer, or in many cases through a reliable slave whom he constituted foreman or “driver” and vested with authority subordinate to his own. In some localities, as in most of the Carolina rice district, the negroes instead of being worked strictly in gangs were given tasks of hoeing or plowing a specified area for each day.

Uldrich Phillips, “The Origin and Growth of the Southern Black Belts” (1905)

Gang System Efficiency: Steady and Intense Pace



Slavery and Efficiency

Total Factor Productivity on Southern Farms Relative to Northern Farms (Northern Farms=100), 1860

Farm Size (number of slaves)	Old South	New South
0	98.4	112.7
1 to 15	103.3	127.2
16 to 50	124.9	176.1
51 or more	135.1	154.7
All slave farms	118.9	153.1
All farms	116.2	144.7

The Gang System and Efficiency

- The gang system allowed plantations to achieve much higher levels of output per worker than farms using free labor
- Potential efficiency gains came from specialization, assigning slaves to tasks based on ability, enforcing an intense rate of work, and creating interdependence and tension within and between gangs
- A slave in a gang system produced as much output in 35 minutes as a farmer (free or slave) using traditional methods did in an hour
- The net result of the gang system was that total factor productivity was 39 percent higher for gang system plantations than for free farms

The Gang System and Efficiency

Marginal product of slave labor by gender, in percent

	Task system	Gang system	Ratio of gang MPL to task MPL
Male	.20	.25	1.25
Female	.08	.15	1.875

Results are from Toman (2005).

Why not use the gang system everywhere?

- First, the gang system worked well for only a handful of crops: hemp, sugar, tobacco, cotton and rice
- Of these crops, the efficiency gains of the gang system were greatest for sugar, still substantial for cotton and rice, and relatively small for tobacco
- This limited the geographic area in which large slave plantations would have a big efficiency edge

Why not use the gang system everywhere?

- Another problem with the adoption of the gang system was that it was hard to implement with free labor
- The work was awful, when plantations tried to get free laborers to work in a gang system, they had to pay a premium of \$75 a year
- Problem is, the gains in efficiency only amounted to roughly \$23 a year

Getting the gang system to function

- So the efficiency gains were potentially large from using the gang system
- However, the work was so grueling that it wouldn't survive in the absence of slavery
- How did owners get the slaves to maintain such high levels of effort?
- Both punishment and rewards were used
- Punishment included whippings and loss of privileges
- Rewards included days off, material goods, better jobs

Getting the gang system to function

Stefano Fenoaltea's model of slavery and supervision:

- Distinguishes between effort-intensive and care-intensive production
- Punishment can get higher work effort at the expense of carefulness
- Rewards are better for achieving greater levels of carefulness
- Therefore, punishment gets used in effort-intensive work (plantation agriculture)
- Rewards get used in care-intensive work (real and human-capital intensive work)
- Explains patterns of slavery and patterns of punishment vs rewards across sectors

Getting the gang system to function

"[S]ince the predominant response to Emancipation was the breaking up of the gangs, rather than their reconstitution with free labor, the superior productivity of the gang slaves appears attributable specifically to their subjection to the lash, and not to conventional economies of scale."

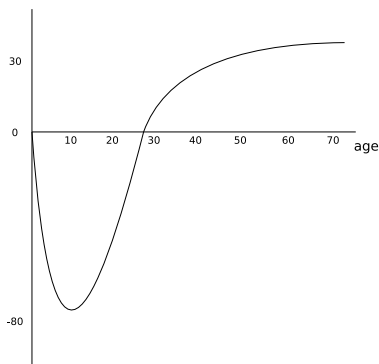
–Stefano Fenoaltea

Rates of Return on Southern Slaves, 1830-1860 (Evans, 1962)

Period	Rate of Return
1830-35	11.25
1836-40	9.5
1841-45	16.4
1846-50	14.8
1851-55	12.9
1856-60	10.8

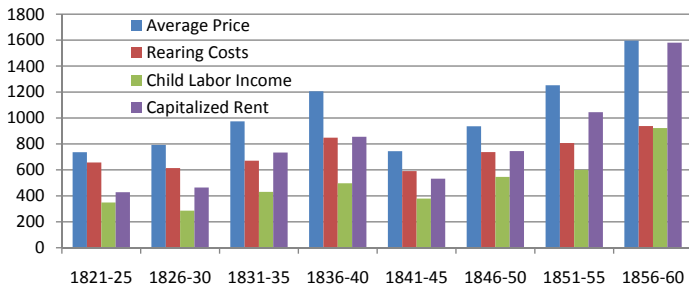
The Economic Viability of Slavery

Average Accumulated Value (in dollars) of Income
Expropriated from Slaves



The Economic Viability of Slavery

Capitalized Rent in an 18-year-old Slave



The Welfare of Slaves

- The data suggest that slavery was both profitable and would potentially continue to be profitable: slavery was working out well for slaveholders
- Another big question, with as much debate surrounding it as the efficiency and profitability of slavery, is how slaves fared under the system
- From the owner's perspective, healthy slaves were important for productivity and happy slaves may also have improved productivity
- Concerns over productivity would guide decisions about the provision of food and material goods and the extent of physical abuse taking place

The Welfare of Slaves

"I am very certain, from an attentive observation to this subject, that a negro deprived of a meat diet is not able to endure the labor that those can perform who are liberally supplied with it; and that the master who gives his field hands a half a pound of meat per day and two quarts of meal...is better compensated by slave labor than those who give the ordinary quantity."

–Virginia planter, 1837

Slave Diets

A Comparison of Diets (pounds per day)

	Least-cost diet	Fogel and Engerman slave diet	Sutch slave diet
Pork	--	0.31	0.53
Beef	--	0.15	0.1
Mutton	--	0.01	--
Butter	--	0.01	0.01
Milk	0.6	0.6	0.41
Sweet potatoes	0.25	1.12	0.72
Irish potatoes	--	0.08	0.06
Cowpeas	0.58	0.35	0.12
Corn	1.74	1.78	2.23
Wheat	--	0.12	0.12
Cost per day (cents)	4.4	8.2	8.7

Slave Diets



Based on the information you provided, this is your daily recommended amount from each food group.

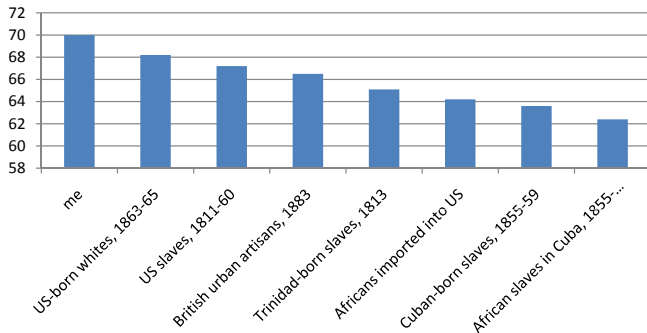
GRAINS 10 ounces	VEGETABLES 4 cups	FRUITS 2 1/2 cups	MILK 3 cups	MEAT & BEANS 7 ounces
Make half your grains whole Aim for at least 5 ounces of whole grains a day	Vary your veggies Aim for these amounts each week: Dark green veggies = 3 cups Orange veggies = 2 1/2 cups Dry beans & peas = 3 1/2 cups Starchy veggies = 9 cups Other veggies = 10 cups	Focus on fruits Eat a variety of fruit Go easy on fruit juices	Get your calcium-rich foods Go low-fat or fat-free when you choose milk, yogurt, or cheese	Go lean with protein Choose low-fat or lean meats and poultry Vary your protein routine—choose more fish, beans, peas, nuts, and seeds
Find your balance between food and physical activity Be physically active for at least 30 minutes most days of the week.		Know your limits on fats, sugars, and sodium Your allowance for oils is 10 teaspoons a day. Limit extras—solid fats and sugars—to 510 calories a day.		

Your results are based on a 3000 calorie pattern.

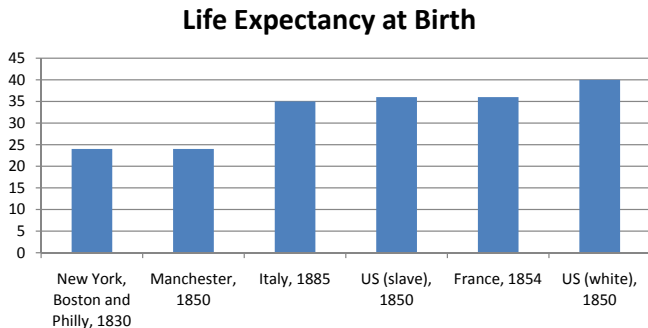
Name: _____

This calorie level is only an estimate of your needs. Monitor your body weight to see if you need to adjust your calorie intake.

Slave Heights Relative to Other Groups



Slave Longevity Relative to Other Groups



The Health of Slave Children

- Along the dimensions of food consumption, adult height and longevity slaves didn't appear to be drastically behind other population groups
- Where the welfare of the slave population does look quite poor is among newborns and young children
- Newborns had very low birth weights, there were high rates of infant mortality and health problems persisted through early childhood
- Possible explanations:
 - Work patterns of mothers
 - Disease environment
 - Diets of slave children

Slave Mortality Rates

Mortality Rates per Thousand in the Antebellum Period

Age group	Slaves	Entire US population
0	350	179
1 to 4	201	93
5 to 9	54	28
10 to 14	37	19
15 to 19	35	28
20 to 24	40	39

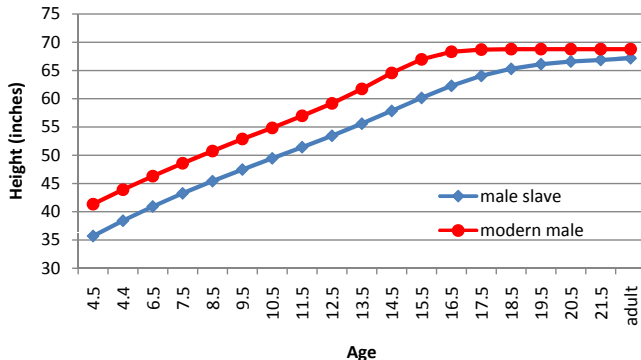
The Health of Slave Children



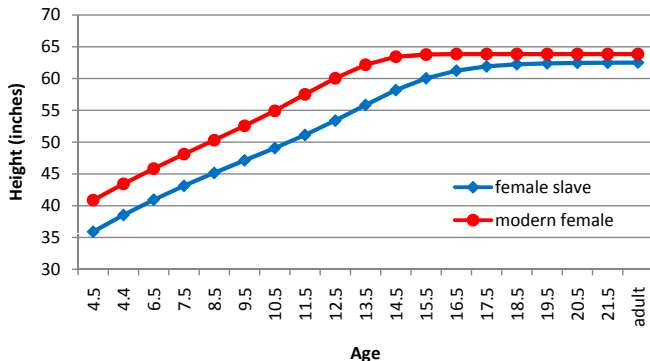
The Health of Slave Children



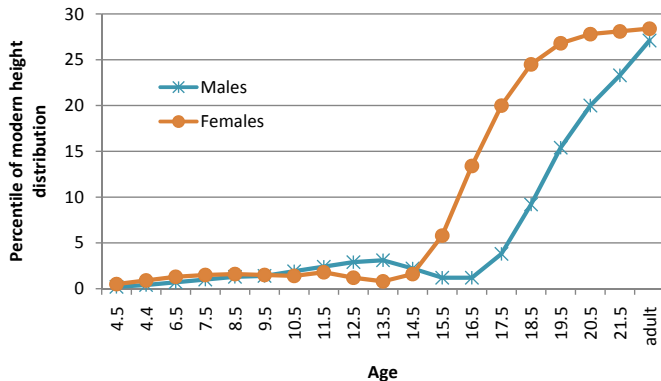
The Unusual Growth Patterns of Slave Children



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The Unusual Growth Patterns of Slave Children



The Unusual Growth Patterns of Slave Children

- So it appears that slave children experienced very poor nutrition but then substantial catch-up growth in their late teens
- This is not simply a pattern of undernourished populations (developing countries with small children tend to have small teens and adults)
- Steckel argues it is a product of poor nutrition resulting from owners' investment decisions
- The return to additional productivity from better nutrition was considered less than the cost of that nutrition for children

The Unusual Growth Patterns of Slave Children



Another Explanation: Selection

Mortality Rates per Thousand in the Antebellum Period

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