

Empirical evidence that the social relations of production matter: the case of the ante-bellum US South

Eric A. Nilsson*

1. Introduction

Central to Marxian social theory is the claim that the social relations of production have meaningful effects on social behaviour. This claim has provided a framework for the interpretation of a wide range of phenomena, from the increased rate of economic growth experienced by Europe after the fifteenth century (Marx, 1977), to the relative poverty of many non-Western countries in the post-WWII era (e.g. Amin, 1976), to the development of hierarchical control within factories (e.g. Marglin, 1974).

Surprisingly, missing from the large Marxian literature is any direct empirical test of this fundamental claim. No attempt has been made to quantify the size of the effect the social relations of production (hereafter, SRP) on economic behaviour relative to that of other economic and non-economic forces in any particular historical circumstance. Certainly no attempt has been made to subject this claim to the possibility of empirical rejection.

This paper subjects the claim that the SRP have meaningful effects on economic behaviour to a direct empirical test. More precisely, it tests one particular concrete form of this claim: that the SRP have a meaningful effect on the inter-regional pattern of production. This particular claim is integral to much of the literature on international trade and economic development produced within the Marxian tradition (e.g. Luxemburg, 1951). This literature, however, generally does not stray beyond providing a proliferation of 'Marxian interpretations' of observed trade and development patterns; it certainly does not subject the claim that the SRP have a meaningful effect on the inter-regional pattern of production and trade to empirical testing.

2. The region and social relation of production studied

Testing this claim requires various data: data on the extent of the various SRP within a set of geographical regions, data on the inter-regional pattern of production within these different regions, and data on all the other non-SRP related determinants of the inter-regional pattern of production within each of these different regions. This third type of data is needed to isolate econometrically the independent effect of the SRP and (in

Manuscript received 3 June 1991; final version received 27 November 1992.

*California State University, San Bernardino. I would like to thank the reviewers of this journal for their many helpful suggestions and Sam Bowles for his comments on an earlier draft.

addition) to compare the size of the effect of the SRP relative to all other possible determinants of the pattern of production.

One historical region furnishes all of the required data: the ante-bellum US South. We therefore use this region for our empirical test. The 1860 *Census of Population* provides data that permit us to derive reasonable quantitative measures for the extent of slave SRP and for the extent of other SRP for each county within the ante-bellum South in 1860. The 1860 *Census of Manufacturing* and *Census of Agriculture* provide data that permit us to construct measures of the specialisation in the production of various commodities for these same counties.

Direct measures of the third type of data we require—measures of all the other non-SRP related determinants of production—are not found in the census data. But because of unique historical circumstances, a reasonable proxy for what the inter-regional pattern of production would have been in 1860 in the absence of slavery can be found in the published census data. We will discuss this proxy extensively below.

A wide variety of different SRP existed in the ante-bellum South: independent commodity production, capitalism and, most notably, slavery. The data permit us to derive fairly good quantitative measures for the extent of slave SRP, but less adequate measures of the extent of other SRP. As a consequence, we shall develop below hypotheses which link the extent of slave SRP with a particular pattern of production in the ante-bellum US South. After that, we shall turn to testing these hypotheses using the available data.

3. Social relations of production and the pattern of production

We now develop a theory which links slave SRP to a particular pattern of production and trade. The existing Marxian-influenced literature on the economics of slave SRP has been primarily concerned with arguing that slave SRP retarded economic development (technological advance, industrialisation, income growth), that this SRP promoted soil exhaustion (and so fostered expansionist tendencies), and that slavery in the New World served as a form of primitive accumulation for capitalist regions.¹ This literature has not aimed to produce a detailed account of the operations of a slave SRP at the level of a single industry, something that is necessary to develop an explicit theory linking slave SRP and the pattern of trade. However, interspersed throughout this literature are comments which, when joined together, serve as a core of such a theory. This theory linking slave SRP with a particular pattern of trade has two distinct components.

First, we take as given that a region will tend to specialise in the production and trade of commodities for which producers in that region have a relative price advantage.² Of

¹ See, for instance, Mandle (1981), Genovese (1967), and Williams (1944). A portion of the Marxian-influenced literature on slavery has been as concerned with methodology as it has with analysing the economics of the slave SRP (e.g. Hindess and Hirst, 1975; Feiner, 1986). A much more extensive non-Marxian literature on slavery exists (e.g. Gray, 1933; Russel, 1938; Bateman and Weiss, 1981; Fogel, 1989). Engerman (1978) notes that many similarities exist between the Marxian and the non-Marxian writings on slavery.

² This is a fairly non-controversial statement, particularly since we have not said what determines prices. While many have attacked the notion of comparative advantage (e.g. Carchedi, 1986), even they have implicitly accepted that relative prices do play a key role in determining regional patterns of production. While arguments made by neoclassical economists invariably place relative prices at the centre of the analysis, it would be reductionist to say that all arguments invoking relative prices are neoclassical arguments.

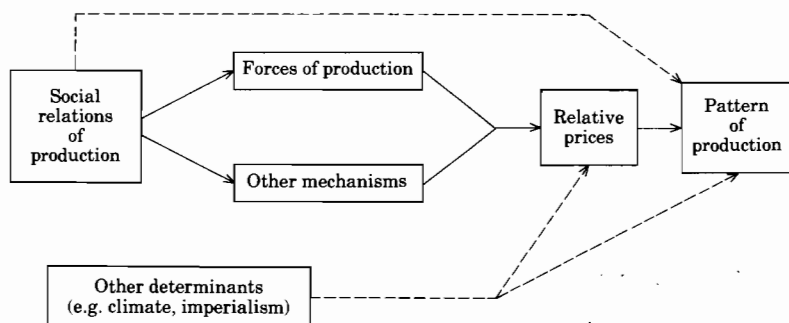


Fig. 1. Social relations of production and the pattern of production.

course, acceptance of this claim does not imply acceptance of the completely separate assertion that such specialisation benefits all regions, classes, or individuals partaking in inter-regional trade. Nor does this claim imply that other forces—for instance imperialism in its various guises—do not also shape the pattern of trade.

Second, we argue that in the US ante-bellum South slave SRP had a systematic effect on relative commodity prices in the region. In order to isolate the effect of slave SRP, in what follows we take as exogenously fixed all other possible determinants of the relative prices within a region (climate, imperialist intervention, access to raw materials, the available equipment, tools, and machinery, the level and distribution of domestic income, government policies, and so on).

Slave SRP exists when three criteria are met: (1) direct producers and their labour power¹ are owned by their master; (2) direct producers do not own the means of production that they use; and (3) direct producers do not own the output they produce. Slave SRP affected relative prices in the ante-bellum US South through a variety of mechanisms. As will be argued below, some of these mechanisms involve the forces of production; what is critical though is that the effect of slave SRP on the forces of production is commodity specific. Figure 1 provides an overview of the determinants of the pattern of production. The solid lines represent links which are central for this particular empirical project while the dotted lines represent determinants of the pattern of production which we do not discuss explicitly.

We now discuss the link between slave SRP and relative prices. First, free (i.e. non-slave) Southerners generally preferred to seek out their own land on which to work instead of joining already existing production units: both free farmers and capitalists faced a severe labour constraint. Slave masters, however, could gather together in a single place as many slaves as they could purchase. It is widely recognised² that, as a consequence, only slave masters were able to organise production units achieving high levels of specialisation. But only the production of certain commodities benefited from

¹ 'Labour power' is the ability to work while 'labour' is the actual amount of labour expended. Marx argued that the source of profit in capitalism was the difference between the exchange value of labour power of the worker and the exchange value of the commodities produced by the labour of the worker. Marx's use of this pair of concepts (labour, labour power) to analyse capitalism does not imply that these two concepts can only be used to analyse capitalism. The distinction between labour and labour power exists across all SRP. Social relations of production differ, however, in the role (and importance) the labour-labour power distinction plays in the economy (cf. Cohen, 1978, pp. 40–5). Part of our analysis of slave SRP will be based on the difference between the labour and the labour power of the slave. That is, the amount of work performed by a slave is a variable which depends on a variety of circumstances.

such high levels of specialisation.¹ As a consequence, the relative prices of such commodities would have been lower in slave regions than in non-slave regions.

Second, slaveholders were able to use forms of labour extraction not utilised by producers employing free labour: work gangs driven by overseers or task-slavery backed up by corporal punishment for those not meeting their quotas. Such labour systems made slaves provide more labour per hour than they would otherwise have provided. Free workers were understandably not willing to stay in production units using such unpleasant forms of labour extraction.² Not all commodities could be produced using such methods, but where slave SRP existed the relative prices of such commodities would have been lower than in identical regions lacking this SRP.

Third, because slaves did not own the means of production or the output they produced, they had little reason to treat them with care. Further, the use of coercion to elicit work from slaves provoked them to damage intentionally the tools they used and the product they produced. This resistance increased production costs above what they would otherwise have been. While workers within capitalist enterprises might also resist in similar ways, it cannot be doubted that the levels of resistance found in slave production far exceeds that found in capitalist production (Genovese, 1967; Kolchin, 1987). Under slave production in the ante-bellum US South, the relative prices of goods that were relatively fragile and/or that were produced with relatively fragile tools would have been higher than would have been the case in non-slave production.

Fourth, because slaves did not own their own labour power, they had less incentive than did free workers to develop new skills or to learn complicated tasks as they could not be certain that their masters would reward them fully for their increased abilities. In fact, slaves often intentionally worked at skill levels far below their own true abilities; while slaves could be forced to work hard, they could not be forced to work skillfully (Gray, 1933; Genovese, 1967). This suggests that under slave production the relative prices of goods that were more effectively produced with skilled labour would have been higher (relative to non-slave regions) than those that were more effectively produced with unskilled labour.

Finally, slave SRP reduced the relative price of labour power below what it would have been in the absence of this SRP. The existence of cheap labour reduced the relative prices of commodities that required relatively large quantities of labour for their production. While this argument is almost invariably developed using the marginal productivity theory of pricing, almost any theory of pricing will lead to the same basic result.³

Some of the above mechanisms involve slave SRP shaping the forces of production. For instance, slave SRP contributed to scale economies (in certain commodities) and to reduced labour skills (the effect of which differed by commodity). These are changes in

¹ That is, the division of labour is limited not only by the extent of the market but also by the social relations of production. According to Marx, 'The cultivation of Southern export crop, i.e. cotton, tobacco, sugar, etc., by slaves is only profitable so long as it is conducted on a mass scale by large gangs of slaves . . .' (1973, p. 341). Phillips (1906), Gray (1933), Fogel and Engerman (1974), and many others have made similar observations.

² Aptheker (1963) and Ransom and Sutch (1977) make this point in different ways.

³ Indeed, Marx explicitly stated that decreases in wages spurred cost-minimising producers to use labour-intensive methods of production (Marx, 1977, p. 516, 791). This is an implicit nod towards the assertion that lower labour costs lead to comparative advantage in the production of labour-intensive commodities: if lower labour costs within an industry lower the costs of labour-intensive methods of production within that industry, region-wide lower labour costs must lower the relative costs of commodities produced most effectively using labour-intensive methods of production.

the forces of production, the effect of which is commodity specific. Reduced output coming from slaves' lack of care of tools and from resistance to slave conditions might also be represented as a retardation of the forces from production, the effect of which was, again, commodity specific. However, the commodity-specific effect of slave SRP on the level of labour (work effort) provided does not represent any change in the forces of production. This is simply because labour power, and not labour itself, is a force of production. Labour is productive activity, not part of the forces of production (e.g. Cohen, 1978, pp. 40–5).

Based on the above, we can state the following. The presence of slave SRP within production units in the ante-bellum South had a predictable effect on relative prices: the relative prices of commodities benefiting from high levels of specialisation, of commodities that could be produced using various coercive methods of production, of commodities relatively immune to resistance, of commodities that would be produced effectively using unskilled labour, and of commodities requiring relatively labour-intensive methods of production would all have been lower in that production unit than they would have been in the absence of slave SRP. We label as 'slave commodities' those commodities that have their relative prices reduced by slave SRP.

Production units using slave SRP had 'comparative advantage' in these slave commodities. If trade occurred between two production units which are identical except for the presence of slave SRP in one, the slave production unit would tend to specialise in the production and trade of slave commodities while the non-slave production unit would tend to specialise in non-slave commodities.¹

4. Hypotheses to be tested

Within each sub-region of the ante-bellum US South (states, counties, farms) a variety of SRP could be found: slave, capitalist, independent commodity, patriarchal, and perhaps others. Each production unit using slave SRP, however, had comparative advantage in the production of slave commodities. We can restate the hypothesis of the previous paragraph as: the greater the extent of slave SRP (relative to other SRP) in a region, the greater that region's comparative advantage in slave commodities.

What were these slave commodities? In the ante-bellum South, cotton production appears to have benefited from high levels of specialisation, could be easily organised using unskilled gang labour, and was relatively unaffected by resistance on the part of slaves (Gates, 1960; Fogel and Engerman, 1974). Further, cotton production was relatively more labour intensive than was the production of most other commodities, particularly manufactures. Cotton was well suited for slave production.

A wide variety of different manufactures were produced in the US in the middle of the nineteenth century. In general, these manufactures were more capital and skill intensive and were more subject to resistance than were most agricultural goods. The distinct advantage of slave SRP from the slaveholder's point of view—the ability to use the gang system and high levels of coercion to produce high levels of unskilled labour—was not useful in the production of a wide array of manufactures. Manufactures were

¹ This is not intended to be a complete theory of the causes and consequences of inter-regional specialisation. Instead, it merely isolates the way that slave SRP can shape the inter-regional pattern of production through its effect on relative prices. This theory can conceivably be fleshed out in a way which is consistent with the labour theory of value or with some other theory of value. It also could conceivably be made consistent with equal or unequal exchange, with balanced or unbalanced trade, or with even or uneven development. But important as these phenomena are, they are not the concern of this paper.

generally poorly suited for slave production compared to most agricultural commodities, particularly cotton.

Tobacco production was relatively labour-intensive and did not require expensive equipment or special soil (Gates, 1960). In this sense, it was a good slave crop. But tobacco was relatively fragile and required a high degree of care and skill. Slaves working on tobacco plantations could not be driven very hard (compared to slaves working on cotton plantations) or else the reduction in the quality of labour and an increase in resistance could have very dire consequences on the tobacco crop (Russel, 1938, p. 18). As cotton was a better slave crop than tobacco, where cotton could be grown (as in the Cotton South) slave SRP would be associated with less tobacco production than would otherwise have been the case.

Two hypotheses relating slave SRP to the pattern of specialisation can be derived from the above discussion. First, the greater the extent of slave SRP (relative to other SRP) in a region, the greater the production of cotton relative to manufactures. Second, the greater the extent of slave SRP (relative to other SRP in a region), the smaller the production of tobacco relative to cotton.

Marxian hypotheses

Statistical evidence in favour of the above two hypotheses would represent only incomplete evidence in favour of the Marxian claim that the SRP have a *meaningful* effect on regional specialisation. For the Marxian claim to be valid, not only must the effect of the SRP on specialisation be statistically significant, this effect must be large enough so that it achieves economic importance. Further, many Marxian theories give the social relations of production causal priority over other economic forces.

Therefore, we offer three alternative forms of the basic Marxian claim. First, the *weak Marxian hypothesis* is that the SRP had an effect on regional specialisation that achieved both statistical significance and economic importance. Second, the *strong Marxian hypothesis* is that slave SRP had a larger effect on specialisation than did the other determinants of regional specialisation. Finally, the *essentialist Marxian hypothesis* is that the effect of slave SRP on regional specialisation was the overwhelming dominant determinant of regional specialisation. Below, we shall treat each of these three hypotheses in a way that will permit us to subject them to empirical verification or rejection, first, in the case of specialisation in cotton relative to manufactures and, second, in the case of specialisation in tobacco relative to cotton.

Related empirical work

The existing Marxian-influenced work on slavery has not yet provided detailed statistical studies of particular aspects of slavery. To find statistical work related to the concerns of this paper we must turn to the much larger non-Marxian literature. Empirical work within this body of literature has not tested directly the hypothesis that slave SRP shaped the pattern of production in the ante-bellum South. Some of this work, however, sheds indirect light on this hypothesis.

One extant body of empirical work attempts to discover whether slaveholders were profit maximisers by comparing rates of return on investments in slaves with other non-slave investments (e.g. Conrad and Meyer, 1958). This empirical work clearly suggests that slaveholders allocated their resources in response to profit opportunities. But though slaveholders did seek high profits, they apparently did not seek maximum profits. Bateman and Weiss (1981) provide evidence that risk-adjusted rates of return on

manufacturing investment exceeded those on slave agricultural investments. They interpret this as suggesting that slaveholder *culture* (by disparaging non-agricultural investment) promoted specialisation in agricultural commodities beyond levels dictated by underlying comparative advantage. However, this work does not provide direct evidence as to whether slave SRP was one source of this underlying comparative advantage nor does it indicate the size of the effect of slavery on regional specialisation relative to other possible sources of comparative advantage.

A second body of work has dealt with the question of whether slave farms were more efficient (sic)¹ than free farms (e.g. Fogel and Engerman, 1971). It has generally been concluded that total factor productivity of slave farms exceeded that of free farms. While suggestive, this finding does not provide direct evidence that slave SRP shaped comparative advantage, as this work is based on the estimation of *aggregate* production functions and not on the attempt to trace the relationship between slavery and specialisation in the production of particular commodities.

5. Empirical tests

Our empirical test uses US census data for the counties found in the five states of the 'Cotton South': South Carolina, Georgia, Alabama, Mississippi, and Louisiana. These states were selected in order to focus on a region with a broadly homogeneous climate and soil. The data came from the 1860, 1870 and 1880 *Census of Population*, *Census of Agriculture*, and *Census of Manufacturing*.

The hypotheses we test all relate the relative extent of slave SRP within a region to a particular pattern of specialisation for that region. The censuses provide us with data on the quantity of various commodities produced within each of the counties of our data set. From this we can construct measures of specialisation in the production of commodity *X* relative to commodity *Y* by calculating the ratio (quantity of *X*)/(quantity of *Y*).

In the ante-bellum US South (unlike in, say, ancient Rome), slave labour almost invariably involved the slave working with means of production owned by the master to produce output owned by the master. The number of slaves, therefore, gives a good measure of the amount of slave SRP in a county. We shall, therefore, use the proportion of a county's population that was enslaved as our measure of the relative extent of slave SRP in that county.²

¹ Much controversy was generated by the use of the term 'efficiency' to denote the level of total factor productivity (e.g. Gutman and Sutch, 1976). It now seems fairly well accepted in the non-Marxian literature on slavery that the greater total factor productivity of slave farms was due to the fact that slaves were coerced into providing more work effort per hour than was provided by free farms (e.g. Fogel, 1989). This is not greater efficiency (output per unit input) but the extraction of more input (i.e. labour effort) per hour.

² Not every moment of a slave's week or day was spent labouring within the slave SRP. Some of the slave's time was spent in household production (in which the slave used means of production the slave family controlled to produce output which the slave family owned). Still, the number of slaves in a county gives a good measure of the amount of labour performed within the slave SRP: a county containing twice the number of slaves as another county was likely to have twice the amount of slave SRP within it than the other county.

Following a long tradition within Marxian theory, this paper defines slave SRP by referring to certain property relations. An alternative definition might require that slaves, in addition, also produce surplus labour (Feiner, 1986). But because it appears that the proportion of slaves employed in tasks not producing surplus labour (e.g. butlers) was not closely related to the number of slaves in a region (Fogel, 1989, pp. 46–52), the proportion of enslaved individuals in a population bears a strong positive correlation with the number of slaves performing surplus labour within a population. Therefore, the quantitative measure we use in the text is also a good measure for the relative extent of slave SRP according to the second, more restrictive, definition.

Slave SRP and specialisation: initial evidence

Table 1 presents data on the extent of slave SRP and regional specialisation in all counties in our data set for which data exist for all variables for both 1860 and 1880 ($N=179$). Averages for all counties and for the first and last quartiles (counties ranked in descending order according to the proportion of slaves in the population) are reported for the year 1860. For comparison, data from 1880 are also reported. It can be seen that areas with a greater extent of slave SRP produced far more cotton than did areas with a lesser extent of slave SRP. What is more relevant to the regional pattern of specialisation, of course, are ratios of the level of production of different commodities. The ratios of the county averages indicate more clearly that high levels of slavery were associated with specialisation in cotton production relative to manufactures and relative to tobacco production. A similar conclusion is reached by comparing data from 1860 with that from 1880, a period after the elimination of slavery from the US South.

The data in Table 1 do not show conclusively that slavery had a meaningful effect on specialisation because other determinants of comparative advantage (e.g. climate, soil types, preferences, income levels, access to technology) were not considered. Some or all of the apparent effect of slavery on comparative advantage might be due to these other sources of comparative advantage if the extent of slave SRP and the extent of non-slave related sources of comparative advantage were positively correlated. Further, a simple comparison of 1860 data with that from 1880 does not permit us to take into account all the changes that occurred in the US South over the two-decade period.

We turn, therefore, to regression analysis which will permit us to separate the independent effects of the SRP and of non-SRP sources of comparative advantage on the inter-regional pattern of production in the ante-bellum South. Only with such regressions can we hope to gain evidence for or against the claim that the SRP have an independent effect on the regional pattern of production. And, only with such regressions can we get information that will allow us to compare the size of the effect of slave SRP on specialisation relative to that of other sources of specialisation.

Specialisation in agriculture relative to manufactures

We first consider the effect of slave SRP on specialisation in cotton relative to manufacturing. A regression taking into account all the determinants of specialisation in cotton relative to manufactures in 1860 would take the form,

$$CM60_i = F(\text{RelSlavery}_i, \text{OSCA}60_{1i}, \text{OSCA}60_{2i}, \dots, \text{OSCA}_{ji}), \quad (1)$$

where $CM60_i$ is the ratio of quantity of cotton production to the quantity of manufactures production,¹ RelSlavery_i is the relative extent of slave SRP compared to other SRP (the proportion of the population enslaved), and $\text{OSCA}60_{1i}, \dots, \text{OSCA}_{ji}$ are j exogenous measures of other (non-slave SRP) sources of comparative advantage (OSCA) in cotton relative to manufactures. All these variables are for county i in 1860.

Unfortunately, non-slave SRP related sources of comparative advantage in 1860 for these counties ($\text{OSCA}60_{1i}, \dots, \text{OSCA}_{ji}$) are generally not observable. For instance, while data on capital and labour supply can be derived from the 1860 census, the data measures the actual slavery-influenced variables; we require data on what labour and capital supplies would have been *in the absence of slavery*. Measures of other variables

¹ The dependent variable, $CM60_i$ is unusual in that the numerator is measured in terms of 400-pound bales while the denominator is measured in dollars. Conceptually, no problems follow from this once we accept prices as the appropriate weights when aggregating heterogeneous manufactures: the dollar value of manufactures is merely the 'quantity' of the collection of heterogeneous manufactures in the county.

Table 1. *Slave social relations of production and specialisation in production*

	1860			1880
	All counties	First quartile	Last quartile	All counties
County averages				
Population	11,841	14,493	7,490	16,211
Slaves	6,023	10,338	1,415	0
Manufactures production (\$)	171,711	153,495	103,357	287,249
Cotton production (bales)	9,949	20,103	1,429	9,322
Tobacco production (lbs)	6,143	1,433	10,741	3,108
Ratios of county averages				
Slaves/population	0.51	0.71	0.19	0.00
Cotton/manufactures	0.06	0.13	0.01	0.03
Tobacco/cotton	0.62	0.07	7.51	0.33

which affect the inter-regional pattern of production, like access to technology and raw materials, labour skills, the position of the region within the world market, and so on are not available at all.

In the absence of these unobservable data, we cannot hope to isolate the independent impact that the SRP had on regional specialisation or to discover anything about the size of the impact of slave SRP on regional specialisation relative to the impact of other (non-slave SRP) related sources of comparative advantage.

Luckily, historical events provide a way to measure indirectly the combined effect of all these other sources of comparative advantage. The end of the Civil War in 1865 brought the elimination of slavery throughout the whole United States. The extent of specialisation in cotton relative to manufactures in, say, 1870 would have been determined in the complete absence of slave SRP. We propose to use the actual extent of specialisation in 1870 as a proxy for the combined effect of all non-slave SRP related sources of comparative advantage in 1860.

Without a doubt, non-slave SRP related determinants of specialisation for individual counties in 1870 were somewhat different from what they were in 1860. But *if* changes in non-slavery sources of specialisation in cotton (relative to manufactures) over the period 1860–1870 were uncorrelated with the extent of slave SRP in 1860, then using this proxy variable permits us to get unbiased estimates of the independent effect of slave SRP on specialisation. Further, *if* changes in non-slavery sources of specialisation in cotton (relative to manufactures) over the period 1860–1870 were not too large relative to variances across counties in comparative advantage, then the extent of specialisation in 1870 is a good proxy for the combined effect of all non-slave SRP related sources of comparative advantage in 1860.

An equation utilising this proxy,

$$CM60_i = G(\text{RelSlavery}_i, CM70_i), \quad (2)$$

where $CM70_i$, the actual specialisation in cotton production relative to manufactures in the same county i in 1870, replaces all the exogenous measures of other non-slave SRP related sources of comparative advantage in 1860. $CM70_i$ is defined as the ratio of cotton production to manufactures production in 1870. Because the quality of the 1880 census is generally recognised to be higher than that of the 1870 census we shall use $CM80_i$, the

actual specialisation in cotton production relative to manufactures in 1880, as an alternative indirect measure for other, non-slave SRP related, sources of comparative advantage in 1860.

Were changes in non-slave SRP related sources of specialisation over 1860–1870 (and over 1860–1880) uncorrelated with the relative extent of slave SRP in 1860? Because of the importance of this question for the interpretation of the empirical results below, we consider the answer to this question in some detail.

Marauding armies and the general disruption of economic life during the Civil War caused extensive damage to both agricultural and urban areas throughout much of the Cotton South. No clear evidence exists as to whether agricultural or manufacturing areas (which for our purposes we can consider, respectively, as mostly slave and mostly non-slave areas) suffered more. In any case, it appears that most damage in rural and urban areas was quickly repaired (Ransom and Sutch, 1977, pp. 40–55; Lebergott, 1984, pp. 243–8). In the light of this, it seems reasonable to accept that war-related changes in non-slave SRP sources of comparative advantage were not systematically related to the extent of slave SRP in 1860.

However, in many areas of the Cotton South the elimination of slavery was soon followed by the rise of sharecropping. Sharecropping and the associated merchant/credit system forced ex-slaves to use more of their resources in the production of cash crops (in particular, cotton) than would have been the case with free farmers (Ransom and Sutch, 1977, pp. 94–9): sharecropping shaped specialisation in the post-bellum period in a way very similar to that in which slave SRP shaped specialisation in the ante-bellum period. Because ex-slaves frequently became sharecroppers on land which was previously worked by slave labour, the extent of sharecropping in a county in 1870 or 1880 was positively correlated with the extent of slavery in 1860. Therefore, the use of the actual extent of specialisation in cotton production in 1870 (or 1880) as a proxy for non-slavery sources of comparative advantage in 1860 would, *ceteris paribus*, be expected to give a downward bias to coefficients measuring the impact of slave SRP on specialisation and an upward bias to coefficients measuring the effect of non-slave SRP sources of comparative advantage.

The elimination of slave SRP did not instantly eliminate the effect that this SRP had on the economy. The forces of production in the post-bellum South were partly the product of ante-bellum slave SRP. Most notably, the education and occupational skills of the labour force in the post-bellum South in the years following the Civil War were partially a consequence of slavery in the pre-bellum years. Slaves generally received very little formal education and were only rarely permitted to develop skills above those required of agricultural workers, unskilled labourers, or domestic servants. Ex-slaves were, therefore, unlikely to gravitate towards skilled artisan occupations (Ransom and Sutch, 1977, pp. 15–19). This tended to promote comparative disadvantage in manufacturing production in the post-bellum South. This is a further source of downward bias for coefficients measuring the effect of slave SRP on specialisation in non-manufacturing commodities.

Further, in a hypothetical world in which slave SRP never existed, it is unlikely that the labour/land ratio in the ante-bellum Cotton South would have been nearly as high as it was. Because after emancipation most ex-slaves ended up settling on or near land they had worked as slaves, the labour/land ratio in 1870 and 1880 was largely the result of the previous existence of slavery. The relatively low price of labour power (relative to land and capital) in 1870 and in 1880 was, therefore, in large part a legacy of slave SRP and not due to exogenous non-slave SRP sources of comparative advantage. Using actual levels of specialisation ratios for 1870 and 1880 gives credit to non-slave SRP sources of

comparative advantage for this low (slave SRP caused) relative price of labour power. Again, this gives a downward bias to the estimated slavery coefficient.¹

In summary, actual specialisation data from 1870 and 1880 provide us with reasonable, but imperfect, proxies for non-slave SRP sources of comparative advantage in 1860. We can take comfort from the fact that the biases introduced by the use of these indirect measures (that we know the direction of) work *against* the finding that slave SRP had an independent effect on comparative advantage and increase the size of the estimated effect of the net impact of all non-slave SRP sources of comparative advantage on specialisation. The probability that we reject the various Marxian hypotheses when they are, in fact, true is thus increased.

Regression results. Below we present the results of regressions which assume a multiplicative relationship between the independent variables:

$$CM60_i = \alpha_0 \times RelSlavery_i^{\alpha_1} \times CM70_i^{\alpha_2} \times e_i, \quad (3)$$

where the variables are as previously defined. The coefficients α_1 and α_2 indicate the response of CM60 (measured in percentage terms) to a 1% increase in the independent variables. As the coefficients are measured in identical units we can compare the relative impact of changes in the independent variables on specialisation.²

The particular hypotheses to be tested can now be stated. Increases in the extent of slave SRP are predicted to increase specialisation in cotton relative to manufactures ($\alpha_1 > 0$) while increases in non-slave SRP related sources of comparative advantage in cotton relative to manufactures are also predicted to increase specialisation in cotton relative to manufactures ($\alpha_2 > 0$). The various Marxian hypotheses go beyond these predictions. We interpret the weak Marxian hypothesis as requiring that the coefficient measuring the effect of slave SRP be statistically significant in the predicted direction and, in addition, that the size of this effect be of at least the *same order of magnitude* as that of the other major determinants of specialisation. In other words, this hypothesis requires the rejection of the compound null hypothesis that $\alpha_1 \leq 0$ and $\alpha_1 \leq \alpha_2/10$. The second part of this compound null hypothesis says that if a 1% increase in the extent of non-slavery related determinants causes a 1% increase in specialisation, then the impact

¹ An additional source of changes in specialisation would have been changes in international relative prices faced by Southern producers. But such price movements would have been a phenomenon of the entire region and would not have been associated with the extent of slave SRP in a given county. In any case, relative prices for cotton and manufactures in 1860 and 1880 were remarkably similar (Wright, 1974, p. 611; Warren and Pearson, 1933, pp. 12-13).

One post-war change in comparative advantage did occur which was correlated with slave SRP: the expansion of roads and railroads into areas not previously well served by the transportation network. Formerly isolated, self-sufficient farming areas populated mainly by free workers became linked for the first time into wider regional, national, and world markets. However, what effect this had on comparative advantage in these regions is not clear. In any case, since this expansion of the transportation network did not occur until *after* 1870 (Weiman, 1985), specialisation measures for 1870 can still be used without fear of introducing whatever bias was caused by this change.

² An alternative approach would be to estimate regressions which assume a linear relationship between the variables, and then use beta coefficients to compare the relative effects of changes in the values of the independent variables. The multiplicative form is used because it seems more reasonable in this particular situation to assume that elasticities, rather than slopes, are constant. (That is, I believe it more reasonable to assume that a 10% increase in the extent of slavery has the same effect on specialisation regardless of the initial level of slavery rather than to assume that a 0.10 increase in the extent of slavery has the same effect on specialisation when the initial level of slavery is 0.05 as it does when the initial level of slavery is 0.85). In any case, for the data used in this study the estimated coefficients of regressions assuming a linear relationship between the variables are frequently quite sensitive to the inclusion/exclusion of certain extreme observations, though these regressions also lead to the conclusion that slave SRP had a meaningful impact on the pattern of production. The results obtained from regressions assuming a multiplicative relationship between the variables are much more robust.

of a 1% increase in slave SRP has no more than a 0.1% impact on specialisation. While there is no agreement as to what constitutes economic importance, this order of magnitude requirement seems reasonable.

Evidence in favour of the strong Marxian hypothesis—the extent of SRP had a larger effect on specialisation in cotton relative to manufactures than did the other sources of comparative advantage—would take the form of the rejection of the null hypothesis that $\alpha_1 \leq \alpha_2$. Finally, the essentialist Marxian hypothesis might be interpreted as requiring that α_1 be an order of magnitude larger than α_2 . Evidence in favour of this hypothesis would take the form of rejection of the null hypothesis that $\alpha_1 \leq 10\alpha_2$.

In the regression equations below, the level of manufactures in a county will be measured in two ways. First, data for manufactures production taken from the *Census of Manufactures* will be used. This includes only manufactures produced by manufacturing establishments (some of which used slave labour). Second, to this level of manufactures will be added the manufactures produced on farms and within households. Data for such ‘home manufactures’ are found in the 1860 and 1870 *Census of Agriculture*. Specialisation ratios using the first definition of manufacturing will be denoted as ‘CM’ while those using the second definition will be denoted as ‘CAM’.¹

Finally, it should be noted that the autoprogressive structure of equation (3) introduces an additional bias in the estimation of the regression coefficients. Comparative advantage is likely to be partially path dependent. For instance, when random factors in one period increase specialisation in cotton production in that period, this is likely to contribute to increased comparative advantage in cotton production in future periods because of the existence of lumpy capital and of processes like learning-by-doing. If comparative advantage is path dependent in this way, $CM70_t$ is likely positively correlated with the error term in 1860, e_t . This is yet an additional source of upward bias to the estimate of α_2 , and so another factor increasing the possibility of rejecting the various hypotheses when they are, in fact, true.

Table 2 reports the results of the various estimations of regressions based on log-linear forms of equation (3).² These equations differ in the years used to provide the measure

¹ Data for manufactures largely exclude the largest part of the processing of staples: the ginning of cotton, the curing of tobacco, the cleaning of rice, and the refining of sugar. These activities took place largely on slave plantations and were largely overlooked in the census (Bateman and Weiss, 1981, pp. 93–8). Since the processing of agricultural goods could legitimately be categorised as manufacturing activities, the totals for manufactures understate the true extent of manufacturing activity. The data on manufactures should be interpreted as measuring the production of manufactures other than processed agricultural goods. In fact, this latter definition is the proper one for this empirical work, where the concern is not with the effect of slave SRP on manufacturing activities *per se* but rather with the effect of slave SRP on the production of different commodities: processed or unprocessed cotton and tobacco versus other commodities.

A further problem is the undercounting of home manufactures like shoes, barrels, and horseshoes on plantations and in non-plantation households. If undercounting were more prevalent for plantations than for non-plantation households, the estimated coefficient of $RelSlavery$ would be biased toward zero in regressions including CAM. While undercounting of plantation manufactures is well recognised (Wright, 1970), it is not known whether the magnitude of this undercounting is similar to that for non-plantation households. Additionally, manufactures produced by slaves during their ‘free time’ were undoubtedly not counted by census takers. But these were manufactures produced using non-slave SRP, this is a source of undercounting of manufactures production by non-slave SRP.

² For the five states used in this study there were 322 counties in 1860. However, the borders of many of these counties were redrawn over the period 1860 to 1880. Between 1860 and 1870 a total of 64 of these counties had their borders redrawn. Therefore, the data set for regressions in the study using 1860 and 1870 data contained only the 258 counties which retained the same borders over this period. Between 1870 and 1880 a further 40 counties had their borders altered, so the data set for regressions using 1860 and 1880 data contained only 218 counties. Further, because of missing data the actual number of observations used in any regression often fell below the number of counties with unchanged borders.

Table 2. Regression results: specialisation in cotton relative to manufactures

Regression: Dependent variable:	(1) CM60	(2) CAM60	(3) CM60	(4) CM60
Constant	-0.12 (-0.6)	-0.22 (-1.1)	0.72 (3.6)	-0.12 (-0.6)
RelSlavery	0.58 (3.2)	0.87 (5.4)	0.54 (3.1)	
ExogRelSlavery				0.58 (3.2)
Proxy measures of non-slavery sources of comparative advantage in 1860:				
CM70	0.58 (12.0)			0.62 (13.8)
CAM70		0.54 (12.3)		
CM80			0.54 (10.9)	
adj R ²	0.53	0.52	0.58	0.52
N	186	193	169	186

t-statistics are reported in parentheses.

of non-slavery related sources of comparative advantage (the suffix '70' denotes 1870 data; the suffix '80' denotes 1880 data).

In all regressions, the RelSlavery coefficient is positive at a 1% level of significance. The estimated coefficients indicate that an increase of 1% in the relative extent of slave SRP increased specialisation in cotton production relative to manufacturers by between 0.5% and 0.9%.¹ As predicted, increases in the relative extent of slavery increased specialisation in cotton relative to manufactures. This finding is robust to changes in the form of the equation (elimination of the constant term and use of a simple linear relationship between variables) and to alternative definitions of the variables.²

Interpretation of these coefficients must await consideration of one additional issue. It might reasonably be claimed that slaves were brought to areas that had non-slave SRP

¹ The RelSlavery coefficients are appropriate only for indicating the effect on specialisation of small changes in the extent of slave SRP. The estimated coefficients do not imply that a 100% drop in the extent of slave SRP led to a 50-90% drop in specialisation in cotton production relative to manufactures. It should be noted that the natural logs of the reported constant terms are biased estimators of α_0 , as is the case when log-linear regressions are used to estimate the coefficients of multiplicative equations.

² A question related to that asked in the text is, what proportion of the change in specialisation in the US South over 1860-1870 was due to manumission? To provide an answer to this question, a regression with a dependent variable equal to the *drop* in specialisation in cotton relative to manufactures over 1860 to 1870 (mean=0.08) and with independent variables of a constant and RelSlavery (mean=0.45) was estimated. The estimated RelSlavery coefficient of 0.14 suggests that in a county with an average level of slavery (0.45), the elimination of slavery was responsible for a drop in specialisation of 0.06 (0.14 × 0.45), or for 75% of the average drop in specialisation in cotton relative to manufactures over 1860-1870. However, the low *t*-statistic for the RelSlavery coefficient (1.66) indicates that this estimated effect of manumission is subjected to a large variance. (This regression was estimated after omitting three outliers from the original 196 observations. When included, these outliers had a dominant effect on the regression results and the coefficient of RelSlavery and its *t*-statistic increased greatly.)

related sources of comparative advantage in the production of cotton. While the simple correlation between RelSlavery and CM70 of 0.34 is consistent with this claim, it also indicates that multicollinearity between the independent variables is not high enough to cause a problem for the interpretation of the RelSlavery coefficient.¹

Still, a conservative empirical approach would be to grant that only that part of the variance of RelSlavery not related to variance in CM70 had an effect on comparative advantage. To do this, we first estimate,

$$\text{RelSlavery}_i = \Phi_0 \times \text{CM70}_i \Phi_1 \times \Omega_i \quad (4)$$

The purely exogenous component of RelSlavery is then isolated by creating a variable (ExogRelSlavery) equal to the estimated constant (Φ_0) multiplied by the estimated residual (Ω_i). Regression (4) in Table 2 presents the result of the estimation of an equation in the form of equation (3) in which ExogRelSlavery replaces RelSlavery. The estimated coefficients using this conservative approach are very similar to those previously reported though, as would be expected, the coefficient for CM70 is larger than before.

More important than mere statistical significance for the estimated coefficients in the above regressions is the relative size of the effect of RelSlavery on specialisation. As previously noted, the use of CM70 and CTM70 as proxy measures of other non-slave SRP sources of comparative advantage and the autoprogressive structure of the regression equations give a downward bias for the RelSlavery coefficient and an upward bias to the coefficient for non-slave SRP related sources of comparative advantage. Still, in three of the four regressions in Table 2, the estimated RelSlavery coefficient is as large as or larger than that for the proxy measure of other sources of comparative advantage. Formal testing of the weak, strong, and essentialist Marxian hypotheses however must go beyond this observation.

The null hypothesis associated with the weak Marxian hypothesis, that $\alpha_1 \leq \alpha_2/10$, can be rejected at a 1% level of significance for all four regressions in Table 2.² We can therefore accept the weak Marxian hypothesis that the SRP had an economically important effect in the case of specialisation in cotton relative to manufactures.

Were the SRP the overwhelmingly dominant determinant of specialisation in cotton relative to manufactures? Simple inspection of the reported coefficients and their associated *t*-statistics indicate this hypothesis can be rejected out of hand. Not surprisingly, the null hypotheses that $\alpha_1 \leq 10\alpha_2$ cannot be rejected in formal testing. We must reject the essentialist hypothesis. The null hypothesis that $\alpha_1 \leq \alpha_2$ also cannot be rejected for any of the regressions of Table 2 at a 5% level of significance. No evidence

¹ Some of this correlation is due to the fact that slave SRP shaped specialisation in the immediate post-bellum years. The claim that slaves were brought to areas with non-slave SRP related sources of comparative advantage in cotton production is a claim about the relationship between the independent variables, not a claim about a simultaneous relationship between the level of specialisation [the dependent variable in equation (3)] and RelSlavery. The single equation approach used in the text is therefore appropriate.

² We choose to test this null hypothesis by testing a series of null hypotheses that $\alpha_1 = (\alpha_2/n)$, where $n=2, \dots, 10$, for each regression equation. In each case, we impose the hypothesised constraint and compare the RSS of the constrained with the RSS of the unconstrained equation. The appropriate *F*-test indicates whether the hypothesis can be rejected. For instance, in the case of regression 1 for $n=1, \dots, 5$ the hypothesis cannot be rejected at a 1% significance level while for $n=6, \dots, 10$ the hypothesis can be rejected. This suggests that we can say that α_1 is at minimum one-sixth the size of α_2 at a 99% level of confidence. The results for the other regressions were similar.

Table 3. *Additional evidence of relative importance of slave SRP on specialisation in cotton versus manufacturing*

Regression: Dependent variable:	(5) CM60	(6) CM60
Constant	-1.63 (-7.0)	0.42 (-2.1)
RelSlavery	1.31 (5.8)	
CM70		0.63 (13.6)
adj R^2	0.15	0.50
N	186	186

t-statistics are reported in parentheses.

exists indicating that slave SRP had the largest impact on specialisation in cotton relative to manufactures; the strong Marxian hypothesis must be rejected in the case of specialisation in cotton relative to manufactures.

Table 3 presents additional evidence on the relative impact of the extent of slave SRP on regional specialisation. If the adjusted R^2 of regression (6) is compared with those of regressions (5) and (1), it can be seen that the addition of RelSlavery adds little additional explanatory power to the regression equation. Variance in CM70 alone seems to explain most of the variance of specialisation in cotton relative to manufactures. The same qualitative result is achieved when each of the independent variables is excluded in turn from regressions (2) and (3). The results of regression (6) might be explained, in part, by the lingering effects of the slave SRP on the comparative advantage after the legal abolition of slavery and by the larger variance of CM70 compared to RelSlavery. Still, this table provides additional evidence consistent with a rejection of the strong and essentialist Marxian hypotheses in the case of specialisation in cotton relative to manufactures.

Specialisation within agriculture

We turn now to testing the hypothesis that the greater the relative extent of slave SRP the smaller the specialisation in tobacco relative to cotton production. We utilise a regression equation which has as a dependent variable a measure of specialisation in tobacco relative to cotton and as independent variables the relative extent of slave SRP and a proxy measure of all other non-slave SRP sources of comparative advantage in 1860:

$$TC60_i = \beta_0 \times RelSlavery_i^{\beta_1} \times TC70_i^{\beta_2} \times \mu_i, \quad (5)$$

where $TC60_i$ is the measure of specialisation in agriculture in 1860, $RelSlavery_i$ is as defined previously, and $TC70_i$ is the level of actual specialisation in tobacco relative to cotton in 1870. Specialisation in all cases is measured by the ratio of the quantity of tobacco production (in pounds) to the quantity of cotton production (in bales).

Table 4. *Regression results: specialisation within agriculture*

Regression: Dependent variable:	(7) TC60	(8) TC60	(9) TC60	(10) TC60
Constant	-3.2 (-6.1)	-4.1 (-6.1)	-5.2 (-16.8)	-0.2 (-0.8)
RelSlavery	-2.3 (-6.2)	-2.8 (-6.1)	-3.4 (-11.5)	
Proxy measures of non-slavery sources of comparative advantage in 1860:				
TC70	0.4 (4.7)			0.8 (10.2)
TC80		0.3 (2.0)		
adj R^2	0.63	0.60	0.55	0.49
N	107	100	107	107

t-statistics are reported in parentheses.

The use of a proxy variable, TC70, in place of the unobserved non-slave SRP related sources of comparative advantage in tobacco relative to cotton in 1860 introduces a bias in the estimation of the RelSlavery coefficient. The newly freed slaves in the Cotton South more frequently had experience with the relatively unskilled tasks involved in cotton cultivation than with the relatively higher-skilled tasks needed to produce tobacco. The post-bellum skills of freed slaves were in large part a consequence of the ante-bellum slave SRP. Therefore, the actual level of specialisation in tobacco production in, say, 1870 gives an underestimate of non-slave SRP related sources of comparative advantage and the size of this underestimate is positively correlated with the extent of slavery. The use of this proxy variable biases the RelSlavery coefficient towards zero and makes more likely the rejection of the various Marxian hypotheses.

The predicted signs for the regression equations based on equation (5) are $\beta_1 < 0$ and $\beta_2 > 0$. Evidence in favour of the weak Marxian hypothesis would take the form of the rejection of the compound null hypothesis $\beta_1 \geq 0$ and $|\beta_1| \leq \beta_2/10$, evidence in favour of the strong Marxian hypothesis would take the form of rejection of the null hypothesis that $|\beta_1| \leq \beta_2$, while evidence in favour of the essentialist Marxian hypothesis would take the form of the rejection of the null hypothesis that $|\beta_1| \leq 10\beta_2$. As before, the biases introduced by the use of the proxy variables for non-slave SRP related sources of comparative advantage in tobacco relative to cotton and the autoprogressive form of the regression equation tend to increase the probability these various Marxian hypotheses are rejected when they are, in fact, true.

Regression results. Table 4 reports the results of the estimations of the log-linear form of equation (5). Regressions (7) and (8) differ in whether 1870 or 1880 was used as the proxy measure of non-slave SRP related sources of comparative advantage: TC70 is the ratio of tobacco to cotton production in 1870 while TC80 is the ratio of tobacco to cotton production in 1880.

In both regressions, the coefficient for the relative extent of slave SRP is negative at a 1% significance level. As predicted, slave SRP reduced specialisation in tobacco relative to cotton. This finding is robust to changes in the form of the equation (elimination of the constant term and use of a simple linear relationship between variables) and to alternative definitions of the variables.

Further, the size of the impact of slave SRP on specialisation in tobacco was relatively large. Even though β_1 is likely biased upwards towards zero, we can reject both the compound null hypothesis that $\beta_1 \geq 0$ and $|\beta_1| \leq \beta_2/10$ and the null hypothesis that $|\beta_1| \leq \beta_2$ at a 1% significance level for both regressions (7) and (8). The weak and the strong Marxian hypotheses can be accepted in the case of specialisation in tobacco relative to cotton. Slave SRP not only had an impact on regional specialisation in this pair of commodities that achieved economic importance, the size of this impact was larger than that of other sources of comparative advantage.

We cannot reject the null hypothesis that $|\beta_1| \leq 10\beta_2$ in the case of either regression (7) or (8). The essentialist Marxian hypothesis that slave SRP had an overwhelming dominant impact on specialisation must be rejected.

The comparison of the adjusted R^2 s of regressions (9) and (10) with that of regression (7) provides additional evidence that the impact of slave SRP was relatively large: variations in the extent of slave SRP were at least as important in explaining variations in specialisation as were variations in the extent of non-slave SRP sources of comparative advantage. But clearly the impact of non-slave SRP related sources of comparative advantage cannot be dismissed as being unimportant.

6. Conclusion

This paper has presented evidence that the social relations of production had an effect on the pattern of production within the ante-bellum US South that achieved both statistical significance and economic importance. Further, the size of the effect of slave social relations of production on specialisation in certain commodities (tobacco relative to cotton) was larger than that of other determinants of specialisation. The effect of slave social relations of production on specialisation in other commodities (cotton relative to manufactures) did not achieve such relative importance, but it was still of the same order of magnitude as the aggregate impact of other sources of comparative advantage.

The Marxian claim that the social relations of production have meaningful economic consequences appears validated for the one particular historical situation and social relation of production considered in this study. At the same time, this paper has provided evidence that the social relations of production are only one of the determinants of the inter-regional pattern of production. We might tentatively conclude that a theory of inter-regional trade that omits consideration of the social relations of production is incomplete, but so too is a theory of inter-regional trade that focuses exclusively on the impact of the social relations of production.

It remains to be seen whether this same conclusion would be reached in empirical studies of other regions, other sets of commodities, and other social relations of production. It also remains to be seen whether other Marxian claims—for instance, that the social relations of production have a meaningful impact on the growth of the forces of production—would be similarly validated in empirical studies of particular historical

situations. At the very least, this paper has shown that it is possible to test such claims directly.

Bibliography

- Amin, S. 1976. *Unequal Development*, New York, Monthly Review Press
- Aptheker, H. 1963. *American Negro Slave Revolts*, New York, International Publishers
- Bateman, F. and Weiss, T. 1981. *A Deplorable Scarcity: The Failure of the Industrialization of the Slave South*, Chapel Hill, University of North Carolina Press
- Carchedi, G. 1986. Comparative advantage, capital accumulation and socialism, *Economy and Society*, vol. 15, no. 4, November
- Cohen, G. A. 1978. *Karl Marx's Theory of History: A Defence*, Princeton, NJ, Princeton University Press
- Conrad, A. and Meyer, J. 1958. The economics of slavery in the ante bellum South, *Journal of Political Economy*, vol. 66, no. 2, April
- Domar, E. 1970. The causes of slavery or serfdom: a hypothesis, *Journal of Economic History*, vol. 30, March
- Engerman, S. 1978. Marxist economic studies of the slave south, *Marxist Perspectives*, vol. 1, no. 1, Spring
- Feiner, S. F. 1986. Property relations and class relations in Genovese and the modes of production controversy. *Cambridge Journal of Economics*, vol. 10, no. 1, March
- Fogel, R. 1989. *Without Consent or Contract: The Rise and Fall of American Slavery*, New York, Norton
- Fogel, R. and Engerman, S. 1971. The relative efficiency of slavery: a comparison of Northern and Southern agriculture in 1860, *Explorations in Economic History*, vol. 8, no. 3, Spring
- Fogel, R. and Engerman, S. 1974. *Time on the Cross: The Economics of American Negro Slavery*, Vol. 1, Boston, Little-Brown
- Gates, P. 1960. *The Farmers' Age: Agriculture, 1805-1860*, New York, Holt, Rinehart, and Winston
- Genovese, E. 1967. *The Political Economy of Slavery*, New York, Random House
- Gray, L. 1933. *History of Agriculture in the Southern United States to 1860*, Washington DC, Carnegie Institution
- Gutman, H. and Sutch, R. 1976. Sambo makes good, or were slaves imbued with the Protestant work ethic? in David, P., Gutman, H., Sutch, R., Temin, P. and Wright, G. (eds), *Reckoning with Slavery: A Critical Study in the Quantitative History of American Negro Slavery*, New York, Oxford University Press
- Hindess, B. and Hirst, P. 1975. *Pre-Capitalist Modes of Production*, London, Routledge and Kegan Paul
- Kolchin, P. 1987. *Unfree Labor: American Slavery and Russian Serfdom*, Cambridge, MA, Harvard University Press
- Lebergott, S. 1984. *The Americans: An Economic Record*, New York, Norton
- Luxemburg, R. 1951. *The Accumulation of Capital*, London, Routledge and Kegan Paul
- Mandle, J. 1981. The economic underdevelopment of the United States South in the post-bellum era, in Bairoch, P. and Levy-Leboyer, M. (eds), *Disparities in Economic Development since the Industrial Revolution*, New York, St. Martin's Press
- Marglin, S. 1974. What do bosses do? *Review of Radical Political Economy*, vol. 6, no. 2, Summer
- Marx, K. 1973. *Surveys From Exile*, New York, Random House
- Marx, K. 1977. *Capital*, Vol. 1, New York, Random House
- Phillips, U. 1906. The origin and growth of the Southern block belts, *American Historical Review*, vol. 11, no. 4, July
- Ransom, R. and Sutch, R. 1977. *One Kind of Freedom: The Economic Consequences of Emancipation*, New York, Cambridge University Press
- Russel, R. 1938. The general effects of slavery upon Southern economic progress, *Journal of Southern History*, vol. 4, no. 1, February
- Warren, G. and Pearson, F. 1933. *Prices*, New York, John Wiley and Sons
- Weiman, D. 1985. The economic emancipation of the non-slaveholding class: upcountry farms in the Georgia cotton economy, *Journal of Economic History*, vol. 45, no. 1, March
- Williams, E. E. 1944. *Capitalism and Slavery*, Chapel Hill, University of North Carolina Press

Wright, G. 1970. Note on the manuscript census samples used in these studies, in Parker, W. (ed.), *The Structure of the Cotton Economy of the Antebellum South*, Washington DC, Agricultural History Society

Wright, G. 1974. Cotton competition and the post-bellum recovery of the American South, *Journal of Economic History*, vol. 34, no. 3, September