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Change in the plantation system: American South, 1910–1945

Nancy Virts

Department of Economics, California State University, Northridge, Northridge, CA 91330, USA

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Abstract

Many questions have not been answered about the tenant plantations in the twentieth century. This paper uses county level data from special plantation censuses taken in 1910 and 1945 to examine changes in the geographic distribution of plantations and how production was organized on them. Although the percentage of land in tenant plantations went down in the South during this period, it increased in some areas and decreased in others. In the areas where it increased, cotton production also increased. This result suggests that in some circumstances plantations had an advantage over small farms.

Keywords: Plantations; Tenancy; Agriculture

Plantation organization after the Civil War was different than it had been before. Not only was the labor force free, but a significant portion of most large landholdings was worked by tenant labor instead of wage labor. Because of this change in the way labor was organized plantations after the Civil War were not as efficient as plantations during the slave era.[1] I have argued elsewhere using state level data that tenant plantations continued to be important producers of cotton and because they

E-mail address: Nancy.Virts@csun.edu

[1] Plantation tenants did not usually work together in gangs as slaves did on plantations. James Irwin finds that the decline in per capita output in the South between 1860 and 1880 is better explained by the end of the gang labor system than the increase in leisure time taken by former slaves. See Irwin (1994).

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were managed as single units, some economies of scale were possible on them. My work is part of a larger literature that emphasizes the efficiency of the tenant plantation (see Aiken, 1998; Alston, 1999; Irwin and O'Brien, 1998; Prunty, 1995; Virts, 1991). There is also a large literature that emphasizes the effect of the market and political power exercised by the owners of large amounts of land and its possible effects on southern development (see Alston and Ferrie, 1993; Mandle, 1978; Shugg, 1937; Weiner, 1975; Whatley, 1987).

However, many questions remain to be answered about tenant plantations during the first half of the twentieth century. Were plantations equally important in all parts of the region commonly referred to as the "Plantation South?" Did they become gradually less important as might be expected if small farms were equally efficient at producing cotton, or were there areas where plantations became more important, suggesting an advantage for large-scale agriculture? How did the way production was organized on them change during this period?

In this paper I use county level data from special plantation censuses taken in 1910 and 1945 to examine changes in the geographic distribution of plantations and how production was organized on them. The term "tenant plantation" is used to refer to a landholding with at least five tenants, managed and operated as a single unit. This was the definition used by those who studied the plantation system of agricultural production in the early twentieth century as well as the 1910 Census of plantations (see Brannen, 1924; Brooks, 1914; Woofter, 1936). Although the definition of plantation used in the 1945 Census is differs in some ways from that used in 1910 (see below), it also emphasized central management.[2]

Plantation tenants had a variety of different types of rental contracts. Some rented for fixed rent. Some were share tenants who provided their own livestock and paid a share of the crop as rent. The sharecropper did not own his livestock and paid a larger share of the crop as rent than the share tenant who did. He also had less independence than either the share tenant or the fixed renter. In several southern states the legal status of the sharecropper was the same as a wageworker (see Book, 1937; Woodman, 1979). While no Census reported data on prevalence of different types of tenure arrangements on plantations, other studies of the plantation system suggest that sharecropping was the most common.

The average size of a plantation with five to nine tenants was 577 total acres and 289 improved acres in 1910 and 574 total acres and 211 crop acres harvested in 1945. With a typical family size between five and six people the average supply of tenant labor would be between 12 and 16.[3] Plantations also hired wage labor. In 1910 about

[2] "... [The plantation] involves supervision of cropper or tenant operations, and central control of such items as sale of products, work power, machinery and equipment, crop rotation, or purchase of supplies." 1945 Census of Agriculture, p. VIII.

[3] This calculation assumes a labor force participation rate between 46 and 50% which is that calculated by Ransom and Sutch (1977) for the black population in 1870. By 1945 decrease in the average household size suggests that labor force from tenant labor declined to 12–16, but the amount of hired labor probably increased. Although the Census did ask questions about labor, enumerators had a great deal of difficulty counting both hired labor which tended to be seasonal and unpaid family labor. As a result there is no reliable direct data on labor. See Virts (1991, p. 386).

25% of improved acres were cultivated with wage labor. In 1945, almost 40% of crop acres harvested were worked by wage labor.

Although there are studies of the importance of the plantation system in specific counties, there are none that address these questions for the South as a whole. The regular agricultural censuses provide no information on these large landholdings because each tenant farm was recorded as a separate farm regardless of whether it was part of a larger unit or not. As a result much of the existing literature relies on some kind of proxy measure of the extent of the plantation system (see Alston and Ferrie, 1989 for example).

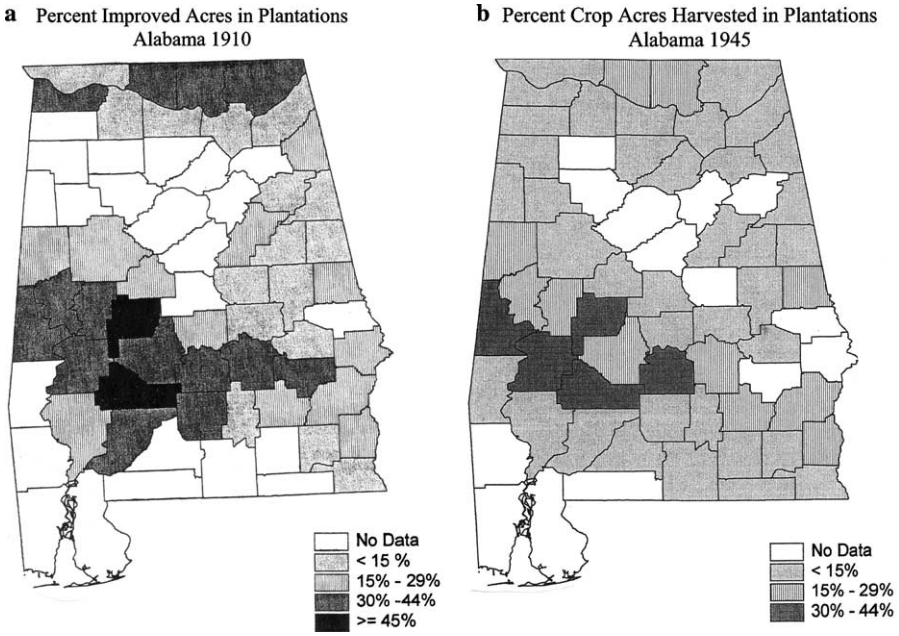
The county level data reveals diversity within the plantation region, not apparent from the state level statistics. In some states there was no clearly defined plantation region. Plantations accounted for about the same percentage of improved lands in most counties and coexisted with smaller farms. In other states with the same percentage of land in plantations, most land cultivated in plantations was part of clearly defined region where most counties had a large percentage of land in plantations. The common proxy measures often used to measure the extent of the plantation system miss most of this diversity and give a misleading view of this region.

During the period from 1910 to 1945, the percentage of acres in plantations fell in the South as a whole. Total acres in farms declined for all types of farms, but the decline in acres in plantations was larger than the decline in smaller farms. However, there were areas where plantations increased in importance relative to smaller farms. Plantations tended to become more important in areas where land value was high and they were able to specialize in producing high quality, high yield cotton. In the areas where plantations became more important the production of cotton increased even though it declined in the South as a whole.

The way production was organized on plantations changed during this period. Although it is well known that the organization of tenant plantations changed drastically with the adoption of the cotton harvester in the 1950s (Kirby, 1983), this paper suggests some of these changes began earlier. On average, the size of plantations increased and the amount of land in the home farm, that part of the plantation cultivated by wage labor, became more important. In addition, the use of croppers relative to other types of tenants seems to have increased. Much of this change appears to be due to mechanization. Plantations were ahead of other farms in use of tractors and trucks.

Most of the manuscripts of the 1910 agricultural census are no longer in existence, and statistics were published only at the state level.[4] However, Brannen (1924) used the county level data from 1910 extensively in his 1924 report, ''Relation Of Land Tenure To Plantation Organization.'' Brannen divided the southern counties covered in the 1910 Plantation Census into the following categories based on the percentage of improved land in plantations, more than 44% of improved land in plantations, 30–44% of improved land in plantations, 15–29% of improved land in plantations, and less than 15% of improved acres in plantations. The map in his report is the only

[4] The only manuscript schedules from the 1910 Plantation Census still in existence are the 39 schedules from Georgia plantations enumerated by Robert Preston Brooks. See Brooks (1914) and Alston and Higgs (1982, p. 342).

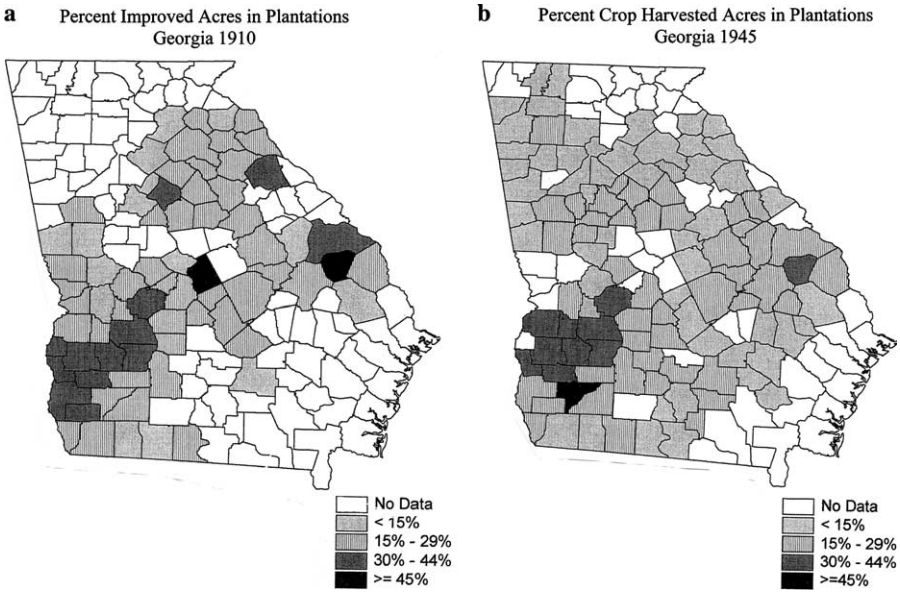


Map 1.

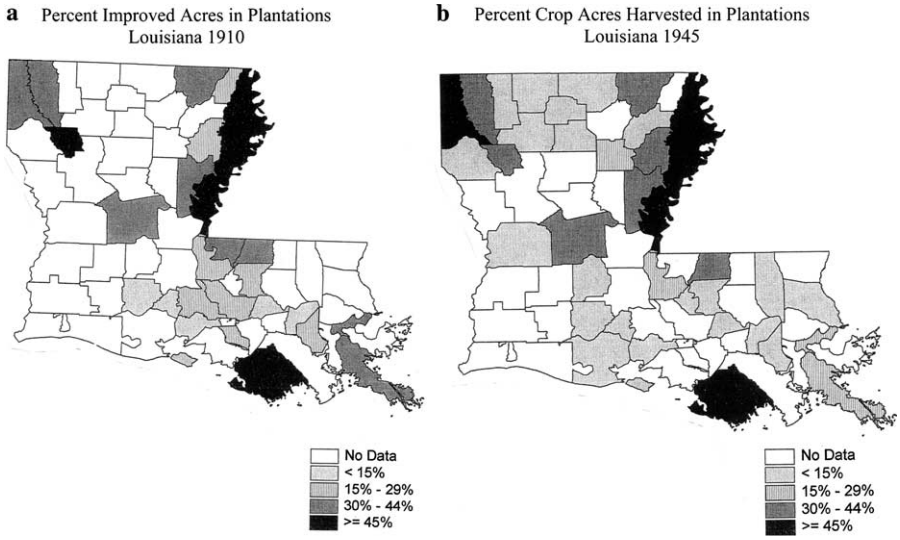
county level data available before 1945 on the extent of the plantation system for the South as a whole. Maps 1a, 2a, 3a, 4a, and 5a in this paper were reproduced from Brannen's report.

Several adjustments had to be made to put the 1945 data in a form to comparable with the 1910 data. In the 1945 Census, a multiple unit was defined as "one in which two or more subunits are handled as a single farm." Although the 1945 Census reported some results for multiple units by the number of subunits at the state level and for farming areas within each state, it does not do so at the county level. An estimate of the percentage of crop acres in plantations for each county in 1945 was calculated based on the distribution of crop acres harvested reported by farm size for multiple units. All land in multiple units above the average size of a multiple unit with 5–9 subunits was assumed to be in a plantation.[5] In 1945, the part of the plantation operated by the plantation owner with wage labor, known as the home farm, was included as one of the subunits. As a result the 1945 category of 5–9 subunits includes some farms with four tenants that would not have been considered plantations in 1910. This bias is offset by the fact that the cut off used is the average size of all farms with between five and nine subunits, leaving out those farms with five or more tenants of below average size.

[5] The average size of multiple units with 5–9 subunits was reported by type-of-farming areas for each state.

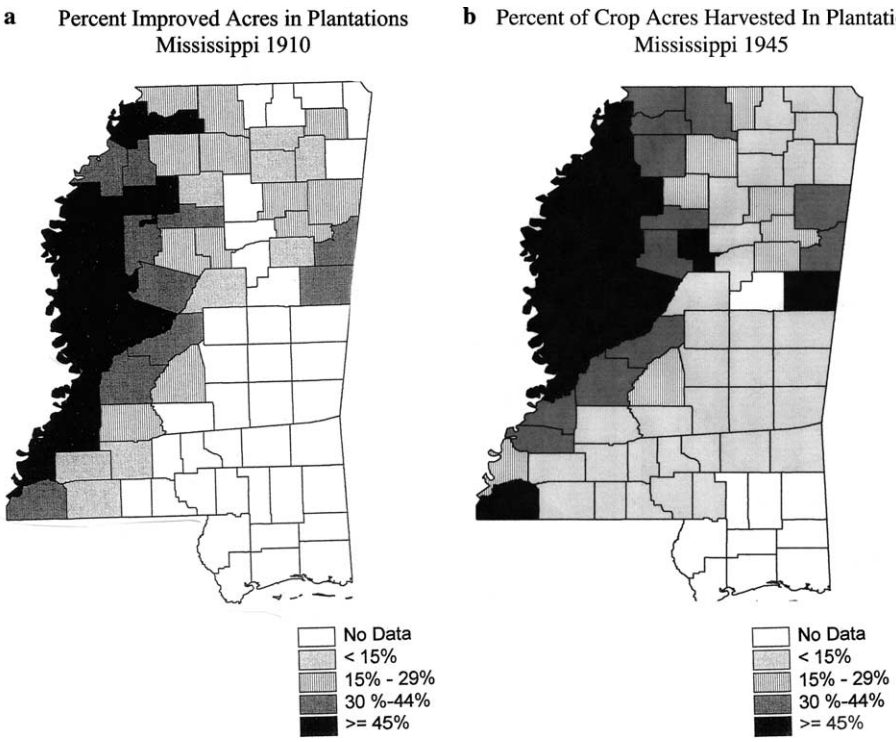


Map 2.

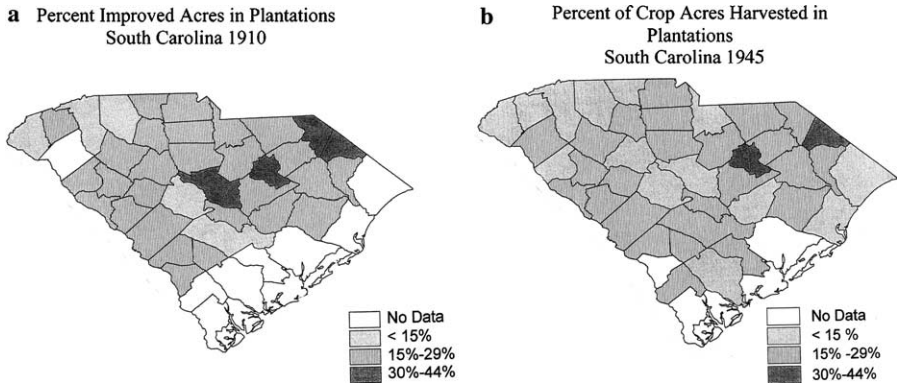


Map 3.

The use of crop acres harvested for 1945 rather than improved acres reported as used in 1910 is also a potential problem. The Census reported only the distribution of crop acres harvested for multiple units. However, improved acres can be estimated



Map 4.



Map 5.

for multiple and single units for each county by adding crop acres harvested, crop acres failed, and crop acres fallow. The percentage of improved acres in multiple units is almost the same as the percentage of crop acres harvested in multiple units,

Table 1
Percent of improved and crop acres harvested in multiple units, 1945

% land in plantations	Percent of improved acres in multiple units	Percent of crop acres harvested
45% and above	84	85
30–44%	62	63
15–29%	54	55
<15%	31	32
Total	50	51

Source. U.S. Bureau of the Census, *Special Report of Multiple Unit Operations*, 1947. Improved acres calculated by adding crop acres harvested, crop acres fallow, and crop acres failed.

52% compared to 53% for all counties. The percentage is similar regardless of how important plantations were. For counties with 45% or more crop acres in plantations, 84% of improved acres were in multiple units compared to 85% of crop acres harvested. For counties with less than 15% of acres in plantations, 31% of improved acres were in multiple units compared to 32% of crop acres harvested (see Table 1). These results suggest that the percentage of crop acres harvested for 1945 can be compared with the percentage of improved acres for plantations in 1910 without introducing a serious bias.

The estimate of the percentage of crop acres harvested in plantations in 1945 was used to construct Maps 1b, 2b, 3b, 4b, 5b. The maps show the extent of the plantations system in 1945 by county for the five principle cotton states in the South, Alabama, Georgia, Louisiana, Mississippi, and South Carolina. Maps 1–5 illustrate both the diversity of the plantation region and some of the problems associated with using the most common proxy measures of the importance of the plantation system. Because there is so little information about the extent of the plantation system between 1910 and 1945, it is tempting to assume that plantations dominated agriculture in those counties identified as plantation counties by the Census. Whatley (1987), for example, tests the hypothesis that the annual nature of contract on plantations impeded the use of tractors by comparing rates of mechanization in 1930 between those counties identified as plantation counties in 1910 and those that were not.

Although the counties included in the plantation census had on average more land in plantations than those not included, plantations were not the most important type of farm in all these counties in terms of land use. In 1910, 22% of the counties selected for the plantation census had less than 15% of improved acres in plantations, 68% had less than 30% (see Table 2). Of the 47 counties in the five cotton states selected by Brannen as typical of the plantation region for his 1910 study, only 14 counties, 10 of which were contiguous to the Mississippi River, had more than 50% of improved land in plantations.[6] 0f the 315 counties included in the 1945 Census, 52% had less than 15% of land in plantations and 82% had less than 30%.[7]

[6] The names of the counties are reported in Brannen (1924, Appendix B).

[7] The figures between 1910 and 1945 are not directly comparable because the counties selected for enumeration are not the same.

Table 2
Distribution of land in plantations, 1910 and 1945

% land in plantations[a]	1910		1945	
	Number of counties	Percentage of counties	Number of counties	Percentage of counties
45% and above	23	10	23	7
30–44%	51	22	36	11
15–29%	104	46	93	30
<15%	50	22	163	52
Total	228	100	315	100

[a]Land is improved acres for 1910 and crop acres harvested for 1945.
Source. Brannen, "Relation of Land Tenure"; U.S. Bureau of the Census, *Special Report of Multiple Unit Operations*, 1947.

The county level data for 1945 makes it clear that size of multiple unit farms varied a great deal between counties in the plantation South (see Table 3). In the counties where 45% or more land was in plantations, the average size of a multiple unit was 659 total acres, 279 crop acres harvested with 9.5 units. In these counties 84% of the land was in multiple units. Multiple units in those counties with more than 29% but less than 45% land in plantations had a much smaller average size, 550 total acres, 176 crop acres and 5.2 tenants. In those counties with the smallest percentage of land in plantations, less than 15%, the average size of a multiple unit was 267 total acres, 87 crop acres harvested with 2.9 units. In these counties most land was farmed in single unit or small multiple unit farms. The average size of single unit farms does not differ greatly between areas, especially in crop acres harvested.

This variation in size of the multiple units in 1945 suggests why the other common proxy measure used for the plantation system, a high rate of tenancy, is not a good indicator of the importance of plantations. In 1945, most counties with high rates of tenancy had small landholdings. Fig. 1 shows a plot of the percent of crop acres harvested in multiple units by the average number of units per farm by county for the five cotton states in 1945. Many counties had 50% or more of crop acres harvested in

Table 3
Farm size by region, 1945

% acres in plantations	Multiple			Single	
	Total acres	Crop acres harvested	Number of units	Total acres	Crop acres harvested
45% or more	659	279	9.5	74	31
30–44%	550	176	5.2	101	31
15–29%	394	140	3.7	103	35
<15%	267	87	2.9	88	27
Total	367	127	3.9	93	30

Source. Bureau of the Census, *Special Report of Multiple Unit Operations*, 1947.

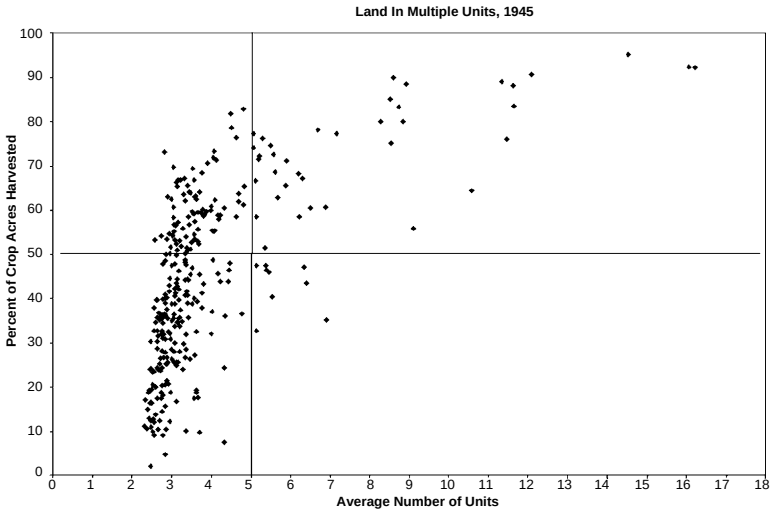


Fig. 1.

multiple units, but the average number of units per landholding was relatively small, less than four units. Because the farm owner's farm was included as one of the units, this implies that these farms had an average less than three tenants.

The fact that studies of individual plantations suggest that plantation tenants were more likely to be share croppers suggests that the percentage of sharecroppers might be a better proxy for the plantation than the percentage of tenants. Although the census of 1945 does not report the tenure status of plantation tenants, it does report the tenure status for all multiple unit farms. On multiple unit farms, 73% of the tenants were croppers and another 15% were share tenants. Only 10% of the single unit tenant farms were croppers and 34% were share tenants. Over 90% of the croppers were part of multiple units in 1945. However, the fact that the number of tenants on plantations in the five cotton states was about 30% lower than the total number of croppers suggests that there were a sizable number of croppers on smaller multiple units (see Table 4). There was quite a bit of variation between states. In Georgia, the number of plantation tenants was about 40% lower than the total number of croppers. Even if every plantation tenant was a cropper, there were almost as many croppers on smaller multiple units and single farms as on plantations. In Mississippi, the number of plantation tenants was only 13% lower than the total number of croppers, suggesting that there were probably far fewer croppers on smaller multiple farms. Although the census did not distinguish between share tenants and sharecroppers before 1920, Alston and Kauffman (1997) were able to estimate the number croppers for years 1900 and 1910. The number of plantation tenants reported in the census is 43% higher than their estimate of the number of croppers for 1910, suggesting that fixed rent and share tenants were more common on plantations in 1910 than

Table 4
Tenants on plantations as a percent of sharecroppers

State	1910			1945		
	Plantation tenants	Share-croppers	Tenants/ croppers	Plantation tenants	Share-croppers	Tenants/ croppers
Alabama	76,746	35,997	213	18,928	31,117	61
Georgia	57,003	64,160	89	25,700	59,878	43
Louisiana	29,654	27,536	108	20,849	25,221	83
Mississippi	99,432	55,493	179	84,503	97,074	87
South Carolina	43,624	30,677	142	22,253	38,116	58
Total	306,459	213,863	143	172,233	251,406	69

Sources. Alston and Kauffman, "Agricultural Chutes and Ladders," *Journal of Economic History* (1997) 464–475. U.S. Bureau of the Census, *Plantation Farming*, 1916; U.S. Bureau of the Census, *Special Report of Multiple Unit Operations*, 1947.

1945 (see Table 4). The use of croppers as a proxy measure for plantations would give a more accurate picture of the plantation system in 1945 than 1910.[8]

Most tenants were not part of plantations either in 1910 or 1945. Mississippi is the only state where more than half of the tenants were part of a plantation in either year (see Table 5). Even in 1945 many croppers were not part of plantations. It is clearly important to make a distinction between the possible effects of the type and duration of contracts used in Southern agriculture and the size of landholding. Although it was common in parts of the South for landowners with one or two tenants to refer to their holdings as "plantations," methods of production used on these farms were not the same as those used plantations with many tenants. It also seems unlikely that they exercised much political and economic influence.

The distribution of plantations at the county level shown by Maps 1–5 present a very different view of the plantation system than the state level figures reported in Table 6. In 1910, Louisiana and Georgia both had about the same percentage of improved acres (23%) in plantations and South Carolina had a slightly higher percentage (27%). However, the distribution of plantation land within each state was quite different (see Maps 2a, 3a, and 5a). In Georgia, there was a group of counties with 30–44% of improved acres in plantations concentrated in the southwest corner of the state and a few counties with more than 29% of improved acres in plantations scattered throughout the state, including two with more than 44%. Most other counties had less than 30% of improved acres in plantations. In Louisiana, most plantations were located in counties with more than 44% of improved acres in plantations clustered near the Mississippi River or in the northwest corner of the state. Even though South Carolina had a greater percentage of improved acres in plantations in 1910 than either Georgia or Louisiana, it had no counties with more than 44% of

[8] This increase in the size of the home farm and decrease in the use of tenants is also consistent with Gavin Wright's argument that the New Deal farm programs and labor regulations which raised the minimum wage had a hand in driving tenants off of the plantations. Wright (1986, pp. 198–233).

Table 5
Percent of tenants on tenant plantations, 1910, 1945

State	1910	1945
Alabama	48	17
Georgia	30	21
Louisiana	45	33
Mississippi	55	54
South Carolina	40	28
Total	44	32

Sources. U.S. Bureau of the Census, *Plantation Farming*, 1916; U.S. Bureau of the Census, *Special Report of Multiple Unit Operations*, 1947.

Table 6
Land in tenant plantations, 1910, 1945

State	Percent of improved acres, 1910	Percent of crop acres harvested, 1945 (all counties)	Percent of crop acres harvested, 1945 (counties in 1910 and 1945 census)
Alabama	31	12	14
Georgia	23	18	20
Louisiana	23	20	27
Mississippi	35	41	48
South Carolina	27	21	18
Total	28	23	26

Sources. U.S. Bureau of the Census, *Plantation Farming in the United States* (Washington, DC, 1916); U.S. Bureau of the Census, *Special Report of Multiple Unit Operations in Selected Areas of Southern States* (Washington, DC, 1947).

improved acres in plantations. Plantations were located uniformly throughout the state with no clearly defined plantation region as seen in the other two states. Most counties had between 15 and 29% of the improved acres in plantations. These three states show a similar pattern in 1945 (see Maps 2b, 3b, and 5b).

Mississippi and Alabama also had a similar percentage of improved acres in plantations in 1910. However, in Mississippi, counties in the Delta area had the highest percentage of improved acres in plantations, 45% or more, and the percentage declined rapidly the farther east the county was (see Map 4a). While there was a plantation region in Alabama located in a belt across the central part of the state (see Map 1a). Most counties had a lower percentage of land in plantations than those in Mississippi.

In both years counties with the largest percentage of land in plantations tended to be clustered together. In 1910, 18 of the 21 counties with 45% or more improved acres in plantations were in the Delta region of Mississippi and Louisiana. In 1945, 21 of 22 counties with 45% or more improved acres in plantations were in this region. Some counties with a smaller but still significant percentage of land in plantations (between 30 and 44%) were also clustered together, mostly in Alabama and

Table 7
Distribution of land in plantations for counties in both 1910 and 1945 census

% land in plantations[a]	1910		1945	
	Number of counties	Percentage of counties	Number of counties	Percentage of counties
45% and above	22	11	22	11
30–44%	47	23	36	17
15–29%	93	45	72	36
<15%	46	22	75	36
Total	204	100	204	100

Source. Brannen, "Relation of Land Tenure"; U.S. Bureau of the Census, *Special Report of Multiple Unit Operations*, 1947.

[a] Land is improved acres for 1910 and crop acres harvested for 1945.

Georgia. The high percentage of land in plantations in these areas suggests that large-scale agriculture had a significant advantage over smaller farms. However, many plantations were located in other areas, where plantations made up less than 30% of the land and coexisted with smaller farms. The advantages of scale were not universal throughout the South.

When discussing what happened to the plantation system between 1910 and 1945, it is important to consider both the percentage of land in plantations and the distribution of plantations. Because the counties enumerated were not the same, a simple comparison between 1910 and 1945 is misleading. The 1945 Census included 107 counties not included in 1910. A much smaller number of counties, 20, were included in the 1910 Census but not in 1945[9] (see Table 2). Because the data from 1910 are reported for the plantation region but not by county, is not possible to remove these counties from the aggregate statistics for 1910. It is possible to remove those counties enumerated in 1945 but not 1910 from the 1945 total. Because many of the counties not enumerated in 1910 had a small percentage of acres harvested in plantations, the percentage of crop acres harvested in plantations is larger when they are removed. (Compare column 2 to 3 in Table 6.) The increase is largest in Mississippi and Louisiana. The only exception is South Carolina, which had a slightly smaller percentage of crop acres harvested if counties not included in 1910 are eliminated. Alabama showed the largest decline in the plantation system, followed by South Carolina and Georgia. Mississippi had the largest increase regardless of what set of counties is used for 1945. Louisiana had a slight increase if the smaller set of counties in 1945 is used and a slight decrease otherwise.

In spite of the lack of county level data for 1910, the change in distribution in plantations can be seen from the maps and the change in distribution of counties by category (see Table 7). In Alabama the plantation system declined most severely, from 31% of improved land in 1910 to 14% of cropland harvested in 1945. Of the 38

[9] Of these 4 were in Alabama, 10 were in Georgia, 5 were in Louisiana, none in Mississippi, and 1 was in South Carolina.

Alabama counties enumerated in both censuses, 14 had a decline in plantation land large enough to move down one category, and 4 had a large enough change to move down two categories. No county increased the percentage acres in plantations enough to move up a category. The area where plantations were important was so much smaller in 1945 than 1910 that the plantation region is almost unnoticeable (see Maps 1a and 1b).

Although the decline in the percentage of acres in plantations in South Carolina was the second largest in the plantation states, it took place uniformly throughout the state. There was not much change in the pattern of plantation distribution. No counties increased the percentage acres in plantations enough to move up a category. Of the 34 counties enumerated in both censuses seven moved down one category and one moved down two categories. In 1945, more counties had less than 15% of land in plantations and only two had more than 30% of crop acres harvested in plantations.

Although Georgia had the smallest decline in the percentage of land in plantations of the five states, there was more change at the county level than the state level statistics suggest. Almost a third of the counties common to both census, 19 out of 62, moved down a category. One county moved down two categories. The decline of the plantation system in the Piedmont section of Georgia has been documented by Raper (1968) and others (e.g., Harris, 2001). Counties with a large percentage of acreage in plantations but surrounded by areas with smaller percentage of acres in plantations appear to have declined the most. However, there were also 10 counties that increased the percentage acres in plantations enough to move up at least one category (see Maps 2a and b). The importance of the plantation in the southwestern region of the state continued to 1945.

In Louisiana, the percentage of land in plantations increased slightly from 23 to 27%. Plantations remained concentrated in the same areas in 1945 that they were in 1910 (see Maps 3a and b). In 2 of 24 counties the percentage of acres in plantations increased enough to move up from one category to another. Another six counties moved down a category and the rest stayed the same.

In Mississippi the percentage of cultivated land in plantation increased the most between 1910 and 1945, from 35% of improved acres in 1910 to 48% of crop acres harvested in 1945. Of 45 counties enumerated in both censuses 14 moved up at least one category, and only seven moved downed. Maps 4a and b show that the plantation region expanded into counties east of the Mississippi.

Mississippi plantations of 1945 were not all former slave plantations worked with tenant labor. Much of the land in the Delta was not cultivated until after the Civil War. As late as 1880, there was still enough wilderness for bear hunting to be a common pastime. Federal flood control and other improvements made it possible to bring new land under cultivation. By 1902 it was difficult for the Teddy Roosevelt's famous hunting party to find even one bear (Harris, 2001). Large farms worked with tenant labor were more successful at farming this region than small farms. These changes led one contemporary agricultural economist (Welch, 1943) to observe that the plantation was more important in the 1940s in the Delta region of Mississippi than it had been during the period of slavery.

Comparison of the maps for 1910 and 1945 suggests that the decline in the plantation system took place mostly in areas where plantations were not the dominant form of landholding in 1910. An examination of the distribution of counties by categories for both years confirms this observation (see Table 7). The number of counties with 15–44% of land in plantations decreased from 140 to 108. Most of the decrease came from counties with 15–29% of land in plantations. The number of counties with less than 15% of land in plantations increased and the number of counties with more than 44% of land in plantations stayed the same.

Other characteristics of plantation system changed during this time period as well. Plantations have long been associated with high land value and specialization in cotton. However, the statistics on land value from the 1910 and 1945 Censuses suggest that this was more true in 1945 than 1910. In 1910, over half the land in plantations was located in the two states with the lowest land value, Alabama and Georgia. Although the value per acre of plantation land in Mississippi and Louisiana was still considerably higher than that in Alabama and Georgia in 1945, the percentage of land in plantations located in these two states had declined to about 34%. Most of this decline took place in Alabama (see Table 8).

Unfortunately the 1910 census provides no information concerning cotton production on plantations. However, the percent of improved acreage in cotton and yield at the county level can be computed (see Table 9). In 1910, the counties in the three categories with the highest percentage of land in plantations had almost the same percentage of improved acres in cotton and yield. Counties with less than 15% of land in plantations had a lower percentage of land in cotton and lower yield. Without farm level data any conclusions are tentative. However, if plantations were more specialized in cotton than smaller farms in 1910, the difference was not large

Table 8
Value of plantation land and distribution of plantation acreage by state

1910	Value per acre	Percent of improved plantation acres
Alabama	$15.09	25
Georgia	$19.27	24
Louisiana	$26.60	10
Mississippi	$26.58	27
South Carolina	$26.75	14
Total		100
1945	**Value per acre**	**Percent of plantation crop acres harvested**
Alabama	$24.21	12
Georgia	$25.61	22
Louisiana	$43.44	11
Mississippi	$50.50	41
South Carolina	$38.65	14
Total		100

Source. Brannen, "Relation of Land Tenure"; U.S. Bureau of the Census, *Special Report of Multiple Unit Operations*, 1947.

Table 9
Percent of improved acres in cotton and yield for counties by percent of acres in plantations

	Percent of improved acres in cotton	Yield (bales/acres)
Percent acres in plantations, 1910		
45% and above	46	.37
30–44%	43	.35
15–29%	42	.40
<15%	33	.37
Percent acres in plantations, 1945		
45% and above	38	.89
30–44%	21	.73
15–29%	18	.75
<15%	18	.73

Sources. U.S. Bureau of the Census, *Plantation Farming*, 1916; U.S. Bureau of the Census, Agriculture, 1910; U.S. Bureau of the Census, *Special Report of Multiple Unit Operations*, 1947. Improved acres in 1945 were calculated by adding crop acres harvested, crop acres failed, and acres fallow for each county.

enough to show up in the county level statistics even for areas with the largest percentage of land in plantations.[10] In 1945, counties with more than 45% of land in plantations had a larger percentage of crop acres in cotton and higher yields than those counties with smaller percentages of land in plantations. There was not much difference in either yield or percentage of crop acres harvested in cotton between the counties is the three lowest categories. This is consistent with the state level statistics which show that in 1945 in Mississippi and Louisiana, plantations had much higher yield and larger percentage of land in cotton than single unit farms (see Table 10). Plantation in Georgia and Alabama, where most of the counties with lower percentage of land in plantations were located, not only had lower yields per acres than plantations in other states but the difference between the yield per acre and percent of land in cotton on plantations compared to single unit farms was much smaller. By contrast, the cotton yield for single unit farms was about the same in Alabama as in Mississippi.

It is well known that for the South as a whole, the percent of cotton acreage went down between 1910 and 1945 and cotton production declined. It is less well known

[10] The effect of the boll weevil may account for part of the difference between 1910 and 1945. The infestation began in Texas in 1892. By the time of the 1910 Census, Louisiana was completely infested and the weevil had crossed into Mississippi, although the infestation was not complete until 1914. Alabama, Georgia, and South Carolina were not infested until after the Census. One result of weevil infestation was a dramatic decline in acres in cotton and in cotton yield. Ransom and Sutch (1977) calculated that in Louisiana, the average cotton acreage was 32% lower and the average yield was 36% in the 4 years after the weevil invaded than it had been for the previous 4 years. Since 6 of the 21 counties with 45% or more acreage in plantations in 1910 were in Louisiana, the effect of the weevil on the results reported could be significant. Although state wide, acres in cotton and yield were down only slightly in Mississippi in the Census year compared to the years before weevil infestation, the impact on individual counties infested first may have been larger. However, differences in soil and climate often caused the weevils' effect to be much greater in one area compared to other nearby areas. Changes in acreage usually lagged changes in yield, making it difficult to know how much on an effect, if any, the weevil had on statistics in Table 9.

Table 10
Cotton growing in the plantation region, 1945

State	Single units	All multiple units	Plantations
Alabama			
Yield per acre	0.69	0.73	0.71
% of cropland in cotton	21.26	24.72	27.55
% state cotton crop	66.15	33.85	15.29
Georgia			
Yield per acre	0.60	0.66	0.68
% of cropland in cotton	15.42	17.55	18.36
% of state cotton crop	49.13	50.87	21.72
Louisiana			
Yield per acre	0.64	0.81	0.85
% of cropland in cotton	17.36	36.45	39.21
% of state cotton crop	45.87	54.13	38.85
Mississippi			
Yield per acre	0.69	0.87	0.91
% of cropland in cotton	27.31	40.78	43.99
% of state cotton crop	26.07	73.93	56.26
South Carolina			
Yield per acre	0.76	0.88	0.92
% of cropland in cotton	21.84	27.44	29.69
% of state cotton crop	39.95	60.05	28.59

Source. Bureau of the Census, *Special Report of Multiple Unit Operations*, 1947.

that the yield per acre increased dramatically during this period. In the counties common to the 1910 and 1945 Census, the percent of improved land in cotton declined from 40 to 21% and yield per acre increased from .38 bales per acre to .77 bales per acre, an increase of over 100%. There were a number of factors behind the increase in yield. During this period cotton production in the southwest expanded. Government intervention in the cotton sector, in the form of loans to farmers in distress and acreage restrictions, increased. Also the migration of black labor out of the South led to substitution of capital for labor.[11] The net result was that cotton production declined only about 10% in the South declined overall. However, it increased in those areas where the plantation became more important. Those counties where the percent acreage in plantations increased enough to move up at least one category had a smaller decrease in the percentage of improved acreage in cotton and a larger increase in yield than those that did not. The net result was 31% increase in cotton production between 1910 and 1945. Those counties whose classification did not

[11] The increase in yield was the result of a more than one factor. The migration of African Americans out of the South that began after 1910 led to a labor scarcity which prompted landowners to substitute capital for labor increasing yield. See Wright (1986, pp. 198–274) and Mandle (1992). AAA restriction on the acreage that could be planted in cotton also contributed to the increase in yield.

change had a larger decrease in acreage and smaller increase in yield leading to a 12% decline in cotton production. The decline in cotton production was 25% for those counties where the decrease in importance of the plantation system was large enough to move them down at least one category (see Table 11). Those counties with the highest percentage of acreage in plantations in 1945 had a lower decline in percentage of acres in cotton and higher percentage increase in yield than those with lower percentage of acreage in plantations. The net result was a 107% increase in cotton production between 1910 and 1945. Cotton production declined for counties with a smaller percentage of land in plantations (see Table 12).

These statistics suggest that the decline of the plantation system was largest where land values were low and was associated with the decline in cotton production. The boll weevil is part of the explanation of why this happened. The weevil had a different effect on plantations in Louisiana and Mississippi that were infested earlier than the rest of the South. Although the weevil's destructive power was the same, it hit Louisiana and Mississippi at a time that cotton prices were increasing, before cotton production in the west expanded. Although cotton production decreased 12% in Mississippi between the censuses of 1910 and 1920, cotton prices increased enough as a result of increase demand for cotton during World War I, that the value of the state's crop increased. When the weevil hit the rest of the South the war was over and the demand for cotton had decreased. Price and production fell at the same time

Table 11
Changes in percent of improved acreage in cotton, yield, and cotton production, 1910–1945

Change in percent acres in plantations, 1910–1945	Change in percentage of acres in cotton (%)	Change in yield (bales/acres)	Percentage change in cotton production (%)
Positive	−15	.46	31
No change	−19	.40	−12
Negative	−22	.37	−25

Sources. U.S. Bureau of the Census, Thirteenth Census of the United States, "Agriculture," 1916; U.S. Bureau of the Census, Agriculture, 1910; U.S. Bureau of the Census, *Special Report of Multiple Unit Operations*, 1947.

Table 12
Changes in percentage of improved acres in cotton, yield, cotton production between 1910 and 1945, by percentage of acres in plantations 1945

Percent acres in plantations, 1945	Change in percent acres in cotton (%)	Change in yield (bales/acre)	Percentage change in cotton production (%)
45% and above	−9	.51	107
30–44%	−21	.40	−12
15–29%	−25	.34	−37
<15%	−17	.35	−18

Sources. U.S. Bureau of the Census, Thirteenth Census of the United States, "Agriculture," 1916; U.S. Bureau of the Census, Agriculture, 1910; U.S. Bureau of the Census, *Special Report of Multiple Unit Operations*, 1947.

(see Vance, 1982; Woofter, 1936). Both the effect on farm income and the disruption of the banking system and other financial institutions was much more severe.

Reports from Mississippi and Louisiana suggested that plantations were better able to cope with the weevil than small holders. The first methods used to control the weevil attempted to reduce the number of weevils going into hibernation by maturing and picking cotton early in the season so as to reduce the infestation the following year. Later a poison, calcium arsenate, became available. Both methods required considerable expense and expertise to be used successfully (Helms, 1979). Planters in the Yazoo Delta region of Mississippi were able to overcome the effect of the boll weevil through "intelligent plantation management" and investments in drainage. While production decreased dramatically elsewhere in this area in increased 20% from 1909 to 1915 (Brandfon, 1967).

Reports from Georgia and Alabama where plantation land value was much lower were quite different. Large holdings on marginal land were hardest hit because the operators were in debt and did not have adequate resources to use these new methods. Banks foreclosed on these plantations in large numbers and their tenants were turned out, contributing to black migration out of the southeast between the wars. In Macon County, Georgia, the black populations declined from 11,200 to 6628 between 1920 and 1930. Owners of smaller holdings were not effected as severely because they tended to have less debt and to be less dependent on cotton. Raper (1968) describes the large number of abandoned plantations in Georgia.

It took some time for farmers in the southeast to learn to live with the weevil by cultivating cotton so that it matured early and using calcium arsenate effectively in their location. By the time they had, cotton production in the southwest, Louisiana and Mississippi was increasing, keeping prices low. The effects of the Great Depression caused this situation to persist into the 1930s. Although cotton production eventually recovered in some places in the southeast, in other places the expense of calcium arsenate and the ineffectiveness of other methods of weevil control prevented recovery. The soil in central Alabama warmed up later than in other parts of the South, and the maximum rainfall occurred during the planting and growing seasons, making it impossible to plant and mature the crop early and creating favorable conditions for the weevil (Helms, 1979; Vance, 1982). Both cotton production and the plantation system declined as a result.

The increase in quality of cotton is also an important part of the explanation of why plantations increased in some areas and declined in others. Modern plant breeding techniques which began to be applied to cotton around the turn of century, led to an increase in staple length and contributed to the increase in yield observed during this period. Because of the boll weevil, initial efforts were directed at developing at early-maturing, high yield varieties of cotton, which tended to have short staple length (Lewis and Richmond, 1968). (Staple length, i.e., the length of the cotton fibers, is one aspect of cotton quality. Longer fibers have greater strength and value.) About the same time that the supply of cotton, especially long staple cotton declined as a result of the weevil, there was an increase in the demand for long staple cotton due to its increased use in industrial applications such as automobile tires and conveyor belts. The result was a significant increase in the premium for longer stapled

Table 13
Staple length of Southern cotton 1928 and 1946

State	Percent of crop which was long staple cotton, 1928	Percent of improved acres in plantations, 1910	Percent of crop which was long staple cotton, 1946	Percent of crop acres harvested in plantations, 1945
Alabama	.2	31	7	12
Georgia	.7	23	7	18
Louisiana	13	23	45	20
Mississippi	48	35	78	41
South Carolina	9	27	30	21

Source. See Table 1 and USDA Statistical Bulletin #47; USDA Statistical Bulletin #86.

cotton (Hill, 1935; Hubbard, 1925). Eventually, as a result of the efforts of selected breeding, the staple length associated with the higher yield varieties increased.

However, the method used to market cotton in local markets discouraged the growing of high quality cotton. Because the cost of determining cotton quality was so high, cotton in local markets was priced according to the average quality of the cotton grown in the area rather than the quality of the bales.[12] This discouraged farmers from spending money on higher quality cotton seed. Most farmers acquired seed from the local gin, which was a mixture of all cotton grown in the area. The cost of buying pure cottonseed sold by plant breeders was six to eight times that of "gin run seed." The USDA was aware of this problem and promoted one-variety communities as way of improving the incentives for small farmers to use higher quality seed and produce higher quality cotton. Farmers in one-variety community committed to growing cotton of a particular variety rather than seed from the local gin, which was a mixture of all cotton grown in the area (Olmstead and Rhode, 2003). Although the one-variety communities in the South were not successful in convincing all farmers to commit to growing only the agreed on variety, the percentage of cotton crop with long staple and the yield did increase dramatically between 1928 and 1945 (see Table 13).

In spite of the rise of one-variety communities, plantations continued to have an advantage in using newly developed seed to grow high quality cotton. Plantations were more likely to own their own gins, preventing both cotton fiber and seed from mixing with lower quality cotton from other farms (see Aiken, 1998; Alston, 1999). Plantations were able to circumvent the problem in the local markets by selling their cotton in producers market where cotton was classed and sold on the basis of quality (Virts, 1991). Table 13 shows the percent of each state's cotton crop with a staple length longer than 16/17 of an inch in 1946 and the percent of crop acres harvested on plantations in 1945. Analysis of the county level data for 1945 confirms this hypothesis. Data for the percent of crop acres in plantations, percent of crop acres in cotton can be computed from the census. Because county level data on cotton quality are not available, percentage of long staple cotton grown in the gin district in which county was located is used as a substitute. The results of a series of regres-

[12] The cost of determining the quality of cotton is discussed in Virts (1991, pp. 389–391).

sion with the dependent variable, the percent of crop acres harvested on plantations in 1945 are shown in Table 14. In regression 1, the independent variable is the percent of crop acres harvested in cotton (cotper45). Cotper45 is significant and has a positive sign as expected. When the variable for the percentage of long staple cotton grown (cotlen) is added the explanatory power of the regression is increased significantly (see equation 2). It is also significant and has a positive sign as expected. Cotper45 remains significant. Analysis of results suggested that cotlen was nonlinear. When a squared term is added (equation 4), the *r*-squared increases even more. All variables remain significant.

The estimate for the coefficient of cotper45 suggests that a 1% increase in cotton acres planted in a county increased the acres in plantations by about .27%. Since the variable cotlen is nonlinear, its interpretation is less straightforward. As the percent of long staple cotton grown increased, its effect was slightly negative until it reached a minimum at around 31% and then increased at an increasing rate. Once the percent of long staple cotton grown was more than 43% the effect of a 1% increase in the percent of long staple cotton grown was larger than the effect of 1% increase in acres planted in cotton.

Plantations continued to be important in 1945 because of their advantage in growing high quality cotton. Cotton became more important in those areas where the plantations increased in importance. For counties with more than a third of the crop in long staple cotton, there was an increasing, positive correlation between the percent of long staple cotton grown and the percentage of land in plantations.

The organization of plantations changed in other ways during this period. In all states but South Carolina, the average size of plantations in total acres increased. The size of the increase ranged from 16% in Georgia to 55% in Louisiana (see Table 16). Since the Census in 1910 reported improved acres and the Census of 1945 reported crop acres harvested it is not possible to directly compare the amount of land under cultivation. Mechanization appears to be a factor behind the increase in the average size of plantation. Plantations were far more likely to have tractors, trucks, and cars than single unit farms. In 1945, almost 70% of the plantations in Louisiana and Mississippi reported at least one tractor. Over half of the plantations in the other states had at least one tractor. Less than 10% of the single unit farms in these states had a tractor. The percentage of plantations with cars and trucks was over double that of single unit farms for all states (see Table 15).

Table 14
Regression results percent of acres in plantation 1945 dependent variable (*t* statistics in parenthesis)

	1	2	3
Constant	5.22 (1.91)	6.97 (2.49)	20.95 (7.71)
Cotper45	.7183 (7.42)	.2260 (1.95)	.2740 (2.7)
Cotlen		.3564 (6.55)	−.7483 (−5.35)
Cotlensq			.0119 (8.41)
R^2	.21	.35	.52

Table 15
Mechanization in 1945

	Percentage of units reporting		
	Trucks	Tractors	Cars
Single unit farms			
Alabama	10	6	27
Georgia	15	8	42
Louisiana	17	9	33
Mississippi	12	5	25
South Carolina	9	6	52
Plantations			
Alabama	50	54	71
Georgia	61	63	86
Louisana	59	69	71
Mississippi	62	69	77
South Carolina	56	56	94

Sources. U.S. Bureau of the Census, *Special Report of Multiple Unit Operations*, 1947.

During this period there are two indications that the level of supervision and control provided by the plantation management increased. Tenant plantations had two well-defined areas, the home farm which was worked with wage labor, and the tenant farms, where the tenant and his family provided most of the labor. Both the type of tenants and the size of the home farm changed significantly. In 1910, in all states but Georgia the number of tenants reported on plantations was much larger than the number of croppers. Overall the Census reports 43% more tenants on plantations than Alston and Kauffman estimate there were croppers. In 1945, the number of plantation tenants was around 30% lower than the total number of croppers for the five states studied (see Table 4). This suggests a major change in the types of tenants common on plantations. There were many more share tenants and fixed rate tenants on plantations in 1910 than in 1945. Since share tenants and tenants who paid a fixed rent were supervised much less than croppers, this suggests that plantations were less closely supervised in 1910 than 1945.

Another indication that the nature of supervision changed on the plantation is that the percentage of land in the home farm which was worked with wage labor increased significantly during this period. The Census reported the total acres and improved acres on the home farm of plantations in 1910 (see Table 16). The 1945 Census only reported total acres and crop acres harvested for home farms in all multiple units, not plantations. Statistics on home farms were reported for each state and by type of farming area within the state, but not on the county level. Fig. 2 shows the percentage of the crop acres harvested in the home farm for each farming area by the average number of subunits in that area's multiple units. The percentage of the plantation's improved acres cultivated in the home farm for each state in 1910 is also plotted by the average number of tenants per plantations. With the exception of one state, Louisiana, percentage of acres cultivated in home farms is higher in 1945 than 1910 regardless of the average size of the farming area's multiple units.

Table 16
Home farm size

State	Total acres			Improved acres		
	Plantation	Home farm	% of total acres in home farm	Plantation	Home farm	% improved acres in home farm
1910						
Alabama	738	335	45	416	83	20
Georgia	788	317	40	431	76	18
Louisiana	605	605	67	480	200	42
Mississippi	663	302	45	402	88	22
South Carolina	899	446	50	429	97	23
	Total acres			Crop acres harvested		
	Plantation	Home farm	% of total acres in home farm	Plantation	Home farm	% of crop acres harvested in home farm
1945						
Alabama	1053	719	68	315	90	29
Georgia	914	579	63	355	123	35
Louisiana	935	687	73	324	131	40
Mississippi	821	541	66	372	151	41
South Carolina	618	419	68	253	98	39

Source. 1910 U.S. Bureau of the Census, Thirteenth Census of the United States, "Agriculture," 1916; The 1945 statistics are estimated as described in the text from U.S. Bureau of the Census, Agriculture, 1910; U.S. Bureau of the Census, *Special Report of Multiple Unit Operations*, 1947.

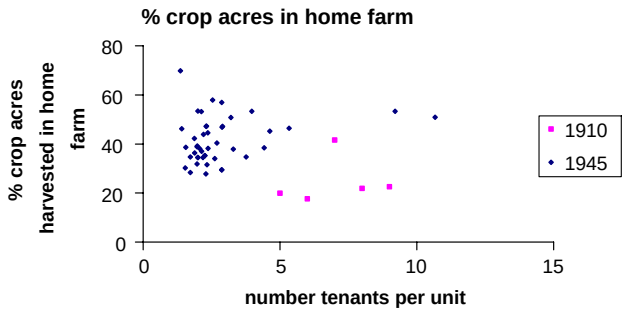


Fig. 2.

In order to make a more direct comparison between 1910 and 1945, the size of the home farms for plantations in each state for 1945 was estimated in the following way. The number of tenants on plantations was multiplied by the average acreage of tenant farms for all multiple units. Since 90% of all croppers were part of multiple units and almost 75% of the tenants on multiple units were croppers, the average size of tenant farm is the best available measure of the average size of tenant farm on a plantation. The only other available measure is average size of cropper farms on single units represents only 10% of all croppers. The size of the home farm was

calculated by taking the difference between acres on the plantations and this estimate. The results, shown in Table 16, are consistent with Fig. 2. The percentage of both plantation total acres and cultivated acres in the home farm increased between 1910 and 1945. In all states except Louisiana, the percentage of crop acres in the home farm was almost double the percentage of improved acres in the home farm in 1910. Louisiana is likely the exception because the average size of home farm on plantations there was larger than any other state in 1910.

Both the increase in the size of plantations and the increase in the percent of acreage in the home farm would be expected if mechanization reduced the monitoring cost associated with wage labor compared to tenant labor as suggested by Alston (1981). These results suggest that even before cotton harvesting was mechanized in the early 1950s, the use of tractors caused the structure of plantations to change in important ways.

The considerable variation between states and counties suggests that blanket statements about what happened to the plantations system in the South during the period between 1910 and 1945 are likely to mislead. Although the percentage of land acres in tenant plantations went down in the South as a whole between 1910 and 1945, it increased in some counties and decreased in others. The fact that the tenant plantations became more important in some areas of Mississippi and Louisiana suggests that under some circumstances large-scale agriculture had an advantage over small farms. In areas where the plantations increased in importance cotton production increased even though it declined in the rest of the South. The plantation had an advantage in producing long staple cotton. For counties with more than a third of the crop in long staple cotton, there was an increasing, positive correlation between the percent of long staple cotton grown and the percentage of land in plantations.

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