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Regional Variations in Antebellum Southern Agriculture

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Regional Variation in the Antebellum Southern Economy

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Project Title: Regional Variation in the Antebellum Southern Economy

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Considerable attention has been devoted to the economy of the antebellum South. The economic interest in this time period stems from the desire to understand the unique institution of slavery, our past more fully by reconstructing a more accurate image of that society, and the different paths of nineteenth century development as experienced in the northern and southern economies. Previous studies have viewed the Southern economy using levels of aggregation ranging from individual farms to county-level to region-wide. However, such aggregation has generally followed geo-political boundaries of states or groups of states. The purpose here is to measure and examine the Gross Farm Product of the 1860 antebellum Southern economy by major crop regions---regions which often crossed geographical and political boundaries. It is possible to aggregate counties to form an economic region with defined boundaries, and then use the county-level agricultural data to examine the economy of this region.[1] This process has not yet been used at length by other economists.

Several economic historians have spent a great deal of time focusing on the antebellum economy of the U.S. and calculating aggregate measures of Gross Farm Product for the nation and geo-political regions. The methodology necessary to compute antebellum Gross Farm Product, along with the concept of regional analysis, is based upon these previous works. Frederick Strauss and Louis Bean were the first to develop this methodology for antebellum economies in their work *Gross Farm Income and Indices of Farm Production and Prices in the United States, 1869-1937.* Marvin Towne, Wayne Rasmussen, and Robert Gallman later modified and employed this methodology to examine the growth of agriculture over the course of

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[1] In *Without Consent or Contract: The Rise and Fall of American Slavery*, Robert Fogel asserts that agriculture accounted for approximately 75% of antebellum Southern output (99). Using Gross Farm Product to analyze the Southern economy therefore serves as a rough approximation of its total output.

the Nineteenth Century. Two of Gallman's papers relevant to this topic are "Commodity Output, 1839-1899" and "Self-Sufficiency in the Cotton Economy of the Antebellum South." "Commodity Output, 1839-1899" served to give an approximate reconstruction of the Nineteenth Century U.S. Gross Domestic Product. Towne and Rasmussen, from the Department of Agriculture, wrote *Farm Gross Product and Gross Investment in the Nineteenth Century*, again examining the national antebellum economy. More recently, Robert Fogel and Stanley Engerman have written *Time on the Cross: The Economics of American Negro Slavery* and *Without Consent or Contract: The Rise and Fall of American Slavery*. In these books the authors analyze the history and development of the general Southern economy and the economics pertaining to the plantation setting. The focus in these recent works has moved away from the South wide or national antebellum economies and concentrates on the more specific economies of slave farms and plantations, along with their relative efficiencies. *Without Consent or Contract* has three subsequent volumes of "technical papers." The first volume is entitled "Markets and Production" and contains 16 collected papers by 14 authors on various aspects of the antebellum economy, catagorized under "Markets for Human Capital," "Skill Formation under Slavery," or "The Productivity of Slave Agriculture and Southern Economic Growth." The third volume, "Evidence and Methods," includes discussions by 18 contributors on details necessary for antebellum economic analysis. This paper utilizes the methodology developed and employed by the above authors in order to analyze crop regions---economies smaller than the national or South wide regions analyzed in the past, but larger than the micro-level farm economies examined by more recent studies.

The antebellum South had four main cash crops which were grown in large quantities and exported, both to the rest of the U.S. and internationally. These cash crops---cotton, tobacco, cane sugar, and rice---had the tendency to be grown in particular areas of the South, forming more specific crop regions. Due to the high concentration of a main cash crop in a particular locale, the general regions are easily identifiable if one sorts through the data. While there has been much attention to the national antebellum economy, general areas of the South, and the cotton-producing areas, specific borders have not been set. These set boundaries would allow for a more detailed analysis of these individual sub-economies.

There are several reasons why the antebellum Southern economy should be viewed from this alternate method, defining crop regions with specific county borders and calculating the regional Gross Farm Products and average commodity output. First of all, some of the conclusions reached about the pre-Civil War Southern economy are based upon generalizations of the uniformity of the Southern economy. The regionally-defined method proposed here in a sense moves to the next step, testing these generalizations of what the South was like. Second, this method allows for the comparison or grouping of producers of "like goods." In other words, a cotton-producer in South Carolina should have more in common with a cotton-producer in Louisiana than with a rice-producer in South Carolina. This method will allow for such collections to be made and analyzed beyond one or two primary commodities; perhaps the results will call this assumption into question. Third, since the data have not been compiled in this manner before, the results may raise additional questions previously unasked. For instance, what similarities or differences are noticed when comparing the composition of crop regional output? Can these similarities or differences be explained by the research already conducted? Fourth,

each of the cash crops used to define regions in this paper involved different production methods and resources. These differences in agriculture, labor, organization and other factors should all have some impact on the economic structures of the areas and on their subsequent development.

This paper is not intended to be a comprehensive study of the regional variation topic. The primary intention of this paper is to define the crop regions of the 1860 South and begin some initial economic analysis on these regional sub-economies based on calculating their Gross Farm Products. Because this technique is, for the present time, only being conducted for the year 1860, only matters relevant to such a "snapshot" approach will be discussed. Some of the questions that will arise cannot (and perhaps should not) be speculated upon at length without a time series approach and will therefore not be developed here in considerable depth.

Defining Crop Regions

The first step necessary in this process is to define the crop regions of the 1860 South. Other research leads one to expect four main cash crops produced during this time period: cotton, tobacco, rice, and (cane) sugar. These particular crops were often large export goods. Rice and sugar, due to their agricultural and climatic requirements, were difficult to cultivate in North America; these two crops were therefore produced in large quantities only in small areas of the U.S. Cotton and tobacco, on the other hand, were noted for their less-constrained growing conditions. Cotton and tobacco are largely believed to have been the main crops of the South as a whole, while rice and sugar were important only in smaller regions.

Five regions, therefore, were formed at the onset of this paper--one for each of the cash crops and an "other" region, composed of the counties that did not produce significant quantities of one or more of those four commodities. Later, however, it was discovered that there were three distinct tobacco regions (one in Kentucky and Tennessee, one in Virginia and North Carolina, and one in northern Missouri), resulting in a total of seven regions when one takes the "other" counties into account. There have been other historians or economists that have formed general commodity regions. Sam Bowers Hilliard compiled a book of maps (*Atlas of Antebellum Southern Agriculture*) showing production output for the South for several main crops and livestock, topographical information, maps forming a scatterplot of large plantations, and other information. While Hillard's maps served as a helpful guide, they would ultimately not serve my specific purposes. The regions he formed display the areas of great concentration of a commodity, but the areas used ranges of output---such as 15,000 to 30,000 bales of cotton per square mile. Often these ranges were too broad for determining specific boundaries for the regions. Instead, a specific minimum output for each of the four cash crops was employed: 1,000 bales of cotton, 10,000 pounds of tobacco or rice, 1,000 hogsheads of cane sugar and/or 10,000 gallons of cane molasses. Output figures were obtained from historical census information.

The 1860 federal agricultural census is available for the thirteen Southern states: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, Missouri, North Carolina, South Carolina, Tennessee, Texas, and Virginia.[2] The census data were organized by alphabetically listing the counties within each state, followed by the output of each of the 49

[2] Maryland and Delaware were considered Southern states in 1860 because slavery was legal. However, since these states did not produce significant amounts of agricultural products, they were not included here.

individual commodities for each county.[3] These figures were then summed, giving a state total of each major type of crop and livestock for that year. The county level data was directly obtained from a copy of the 1860 federal agricultural census (in volume format) and then entered into spreadsheets.

Once the data was entered, the 1,107 Southern counties were combined into one file. Each row contained the state abbreviation, the county name, and physical quantity data entailing how much of each commodity this county produced in the 1859 to 1860 season. The counties were then sorted by each of the four main cash crops (cotton, tobacco, cane sugar, and rice), arranging the counties from the lowest to highest producer of each commodity. This process scattered the counties so that they were no longer identifiable by its state affiliation, which is why the state abbreviation had been attached to the counties prior to this step. From that point the lists of sorted counties were used to mark those counties fulfilling the minimum output requirements (mentioned earlier) onto a map. The map used was a current county-level map of the U.S.; each of the major crops was assigned a different color.

Once the counties from each of the sorted lists were shaded on the map, the regions were relatively clear, although confused near the borders. There were many areas that overlapped, producing more than the minimum requirement of two or more of the four main cash crops. For example, southern Louisiana produced large quantities of cotton, rice, cane sugar and cane molasses. Parts of Tennessee and North Carolina grew large amounts of both tobacco and

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[3] Several of the columns were not entered into Gross Farm Product computations. Some of them, such as improved acreage and manufactures were not relevant to an agricultural measure of output. Others, such as honey, beeswax, and silk cocoons, were minor commodities for which no 1860 price could be found. Many economic historians are wary of census information on animals slaughtered, so meat commodities were computed by slaughter-to-live ratios instead.

cotton. Some counties on the east coast were big producers of cotton, cane molasses, and rice. In these cases, the borders of each region by examining the specific output figures for these counties' cash crops. The crop (cotton, tobacco, etc.) that composed a higher percentage of a county's Gross Farm Product was defined as its main cash crop. The methodology behind the Gross Farm Product is discussed in the following section.

There were still some counties, however, that seemed like they should belong to the forming pattern, but were as of yet not accounted for on the map. Often the case was one of "new" counties, those formed after 1860.[4] Since the mapped regions were only a rough visual, intended primarily to help the reader, the drawn or shaded region lines were not intended for complete geographic accuracy. Employing an 1860 county level map would be more accurate visually, but the result would not be much different from the regional images given in this paper. What is more important is the names of the counties within these regions, as it is the county borders which define the specific regional borders and the county data that leads to the crop region aggregate production figures.

The other reason that some counties remained unshaded, though they seemed to clearly belong to the crop region, was that these counties produced less than the set minimum output quantities for the cash crop of that region. For example, there were several counties in Alabama and Georgia that produced less than 1,000 bales of cotton, but were located in the middle of the cotton region. In this case, the minimum output requirement was dropped. In the case of a tobacco region apparent from northwestern Tennessee up through the western half of Kentucky,

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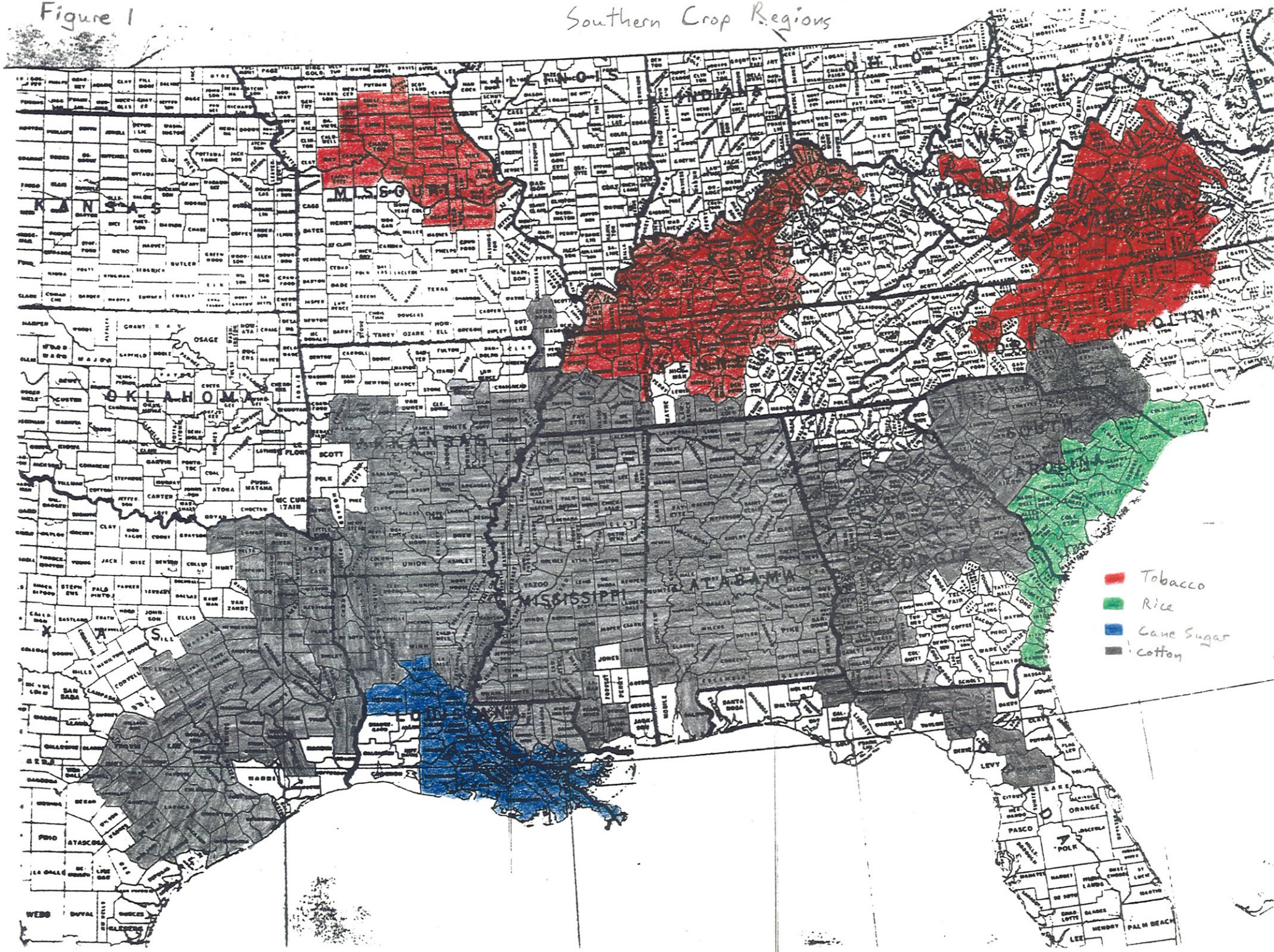
[4] There were no cases of 1860 counties no longer in existence, though the specific boundaries may have changed minimally--especially in the case of 1860 counties being split into multiple counties at a later time.

Figure 1

Southern Crop Regions



six small counties separated 14 northern Kentucky counties from the larger tobacco producing area. Though these six counties produced far less than the 10,000 pounds of tobacco per annum minimum, a decision was made to include them in the region in order to link the northern Kentucky section. Such incidents were not common.

The end result of this sorting and mapping process was seven regions. A large portion of the South was considered primarily cotton producers (the "Cotton South"), which began in central North Carolina and extended into Texas. Southern Louisiana was designated a sugar region. The rice region along the Atlantic coast included counties from Georgia, North Carolina, and South Carolina. There was a tobacco region in North Carolina and Virginia and another one in Kentucky and Tennessee. I also decided to include northern Missouri as a third tobacco region, though the sorted tobacco list indicated that these counties clearly did not produce as much as the other two tobacco regions. The seventh region was the "other" region, composed of those areas that did not produce significant amounts of the four cash crops or individual counties too isolated to be linked to the larger regions. See Figure 1 for the map of the defined crop regions.

Methodology

There are two main ways that one can compare the crop regions. The first method is to compare the levels of gross output of individual staples and the amounts of various livestock raised from region to region. However, there are two problems with this method: double-counting and the lack of a standard unit of measurement. The method employed in this paper,

Gross Farm Product, takes these factors into account. When dealing with livestock, for example, one needs to keep in mind that not all the animals were slaughtered or sold; some were needed for breeding purposes. Also, some animals produce more meat per unit of measurement compared to others. Therefore, live head counts need to be multiplied by slaughter ratios and average live weights. Animals and persons on the farms or plantations need to be fed, so feed and foodstuffs need to be subtracted in order to avoid double-counting in the gross output. For similar reasons, the amount of each crop retained for seed will also need to be subtracted. These subtractions and estimated calculations, along with subsequent measures to convert commodities into a standard unit of measurement, lead to the second method of comparing the output of crop regions---calculating Gross Farm Product.

Similar to Gross Domestic Product for modern economic purposes, Gross Farm Product is a measure of output which factors out the double-counting of products used as inputs. This is the method used in this paper. Each commodity was examined individually to estimate what proportion of that product entered Gross Farm Product for 1860. Most of these estimates were those employed by Towne and Rasmussen in their work *Farm Gross Product and Gross Investment in the Nineteenth Century*, which looked at individual commodities at a national level for each of the decade years during the nineteenth century.[5] Other economists that have used and developed this methodology are Robert Gallman, Stanley Engerman, and John F. Olson.

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[5] All of the 1860 price estimates were gathered from Towns and Rasmussen except the value of wine per gallon, not found in their accounts. The price of wine employed here was found on page 224 of *Without Consent or Contract: Evidence and Methods*.

The slaughter-to-live ratios and average live weights for livestock were taken from pages 208 and 225 of the same source.

Table 1

Output Estimate Computations and 1860 Prices Necessary to Calculate Gross Farm Products

Crops	% of Output Entering GFP	Price Per Unit In 1860 Dollars
Barley	70	0.58 per bushel
Buckwheat	69	0.52 per bushel
Corn	35.5	0.46 per bushel
Cotton	100	46.00 per 400 lbs. bale
Flax	100	0.057 per pound
Flaxseed	91	1.15 per bushel
Hay	20	8.75 per ton
Hemp	100	67.00 per ton
Hops	100	0.09 per pound
Oats	28	0.34 per bushel
Peas and Beans	60	0.73 per bushel
Irish Potatoes	83	0.37 per bushel
Sweet Potatoes	91	0.48 per bushel
Rice	100	0.0232 per pound
Rye	74	0.77 per bushel
Tobacco	100	0.086 per pound
Wheat	87	1.02 per bushel
Wine	100	1.05 per gallon
Wool	100	0.184 per pound
Sugar Products		
Cane Sugar	100	81.25 per 1,000 lbs. hogshead
Cane Molasses	100	0.273 per gallon
Maple Sugar	100	0.09 per pound
Maple Molasses	100	0.273 per gallon
Sorghum Molasses	100	0.273 per gallon

Garden products and orchard products were already reported as dollar figures in the census.

Table 2

Liveweights, Slaughter-to-Live Ratios, Fluid Milk Equivalences, and 1860 Prices Necessary to Calculate Gross Farm Products

Livestock Meats	Slaughter-to-live Ratio	Average Live Weight (Pounds Per Animal)	Price Per Pound In 1860 Dollars
Working Oxen and Milk Cows	0.1666	750	0.0384
Other Cattle	0.2	750	0.0384
Swine	0.83	160	0.0489
Sheep	0.23	70	0.042

Dairy Products	Fluid Milk Equivalence Per Pound	Price Per Pound of Milk In 1860 Dollars
Butter	10 (10 lbs. of butter= 100 lbs. of milk)	0.0083
Cheese	4.76 (21 lbs. of cheese= 100 lbs. of milk)	0.0083

In order to put the various measurements between commodities (gallons, pounds, bales, etc.) into a common unit, the proportion of each staple or pounds per live weight of livestock entering GFP was then measured in 1860 dollars. All of the previously mentioned economists have used an average national price per unit for each commodity (and for each decade year between 1800 and 1900) in order to convert the Gross Farm Product of each commodity into monetary terms (value in current dollars). The 1860 price estimates (along with output ratios, slaughter ratios, and average live weights) from "Farm Gross Product and Gross Investment in the Nineteenth Century" (some of which were obtained from Strauss and Bean and Gallman's publications) were employed in this work without alteration.

Based on these conversions of the total census data, the Gross Farm Product of each region can be calculated by summing the adjusted output of each commodity; the 1860 value of each region's Gross Farm Product can be obtained by multiplying the adjusted output of each commodity by its respective price and summing this dollar amount. This method will allow us to compare the output of different crop regions to one another (and to state or national output) without double-counting inputs to production and employing unified live weight standards for livestock.

Results and Analysis

Before analyzing the crop regions' Gross Farm Products, a brief examination of the U.S.[6]

[6] The agricultural output from the 1860 U.S. territories is not included in the following data analysis. This result does not significantly alter the analysis since territorial output was minor.

and Southern Gross Farm Products may be appropriate. These larger economies should be kept in mind, using them as a backdrop for the more specific regions that this paper focuses on. The South's Gross Farm Product was just over half of the national GFP: $692 million compared to $1.2 billion for the entire U.S. Calculating the GFP for the U.S. and the shares of GFP for individual commodities gives a quick picture of the more important crops/products (see Table 3 for the census output figures and Table 4 for the 1860 values and shares of GFP pertaining to the U.S. and the Southern states).[7] Cotton and pork were the largest agricultural commodities for the country in 1860 at about 19% and 18% of GFP respectively. Indian corn (11.5%), wheat (13%), and the combination of meat from milk cows, working oxen and other cattle (11.5%) were also key products.

What these figures emphasize is the significance of cotton, which was produced almost exclusively in the South, and hogs, about two-thirds of which were raised in Southern states. Cotton was the country's chief export, accounting for over half of the crude material shipped abroad in 1860 and bringing in "nearly four times the revenues of the federal government" (Hughes, 181). The production figures reveal some possible agricultural specialization at the national level, which would follow the principle of comparative advantage. Economic theory proposes that the U.S. (and sub-economies such as crop regions) would choose to concentrate on those commodities for which the country was a relatively low cost producer on the world market, earning a larger profit from this production relative to the foregone profit of alternative production. Since the two major agricultural commodities for the nation were produced largely

[7] U.S. and Southern Gross Farm Products were computed by summing the output quantities of the appropriate states, attained from the 1860 federal state-level census information.

in the Southern states, we would expect to see even more economic dependence on these items in the aggregate South.

As reasoning predicted, these same agricultural commodities were the most important for the South as a sub-region of the nation. As Figure 2 shows, cotton output comprised a full third of the South's Gross Farm Product, pork another 19%. Indian corn was 10.3% of GFP, wheat 6.4%, and the combination of meat from milk cows, working oxen and other cattle 10%. The other main cash crops used to divide the South into crop regions---tobacco, rice, and cane products---did not account for a large share of total GFP, contrary to what one might expect. For the U.S. as a whole, tobacco was 3.1% of total GFP; rice 0.4%, cane sugar 1.6%, and cane molasses 0.3%. For the South these products composed a slightly higher share of GFP: tobacco 4.7%, rice 0.6%, cane sugar 2.7%, and cane molasses 0.6%. These figures emphasize the fact that, while these crops may have been important crops to small areas, they were still minor products in a larger setting---a setting largely dominated by cotton and livestock.

A comparison between the livestock and dairy totals should also be made between the U.S. and the South. Outside the realm of economic history there seems to be a notion that the South raised far less livestock and foodstuffs than the rest of the nation. This idea may have some tie to the notoriously large output of cotton. The data, however, show that the South had about the same percentage of GFP of livestock and dairy as the U.S. (31.3% to 34%). It should be noted, though, that these are not per capita figures, which may be more relevant when making comparisons of this nature.

Table 3

Total Quantity of Agricultural Commodities Produced in 1860, Aggregated by Southern States and all U.S. States

	Milk Cows (number)	Working Oxen (number)	Other Cattle (number)	Sheep (number)	Swine (number)	Wheat (bushels)	Rye (bushels)	Indian Corn (bushels)	Oats (bushels)	Rice (pounds)	Tobacco (pounds)	Cotton (400 lbs. bales)
Total South:	3,442,354	1,178,135	8,222,922	7,050,834	20,683,491	50,080,642	4,097,684	436,899,827	33,210,139	187,160,890	375,275,793	5,385,354
Total U.S.:	8,520,872	2,204,275	14,699,215	21,590,706	33,459,138	172,034,301	21,088,970	836,404,595	172,330,722	187,167,032	434,183,561	5,386,897

	Wool (pounds)	Peas & Beans (bushels)	Irish Potatoes (bushels)	Sweet Potatoes (bushels)	Barley (bushels)	Buck-wheat (bushels)	Orchard Products (dollars)	Wine (gallons)	Garden Products (dollars)	Butter (pounds)	Cheese (pounds)	Hay (tons)
Total South:	14,807,866	11,940,153	12,036,812	39,709,051	740,113	966,097	4,639,323	416,708	3,667,847	90,759,770	1,273,351	1,872,827
Total States:	59,673,952	15,001,017	110,629,993	42,088,854	15,802,322	17,558,253	19,932,229	1,617,904	15,955,390	458,827,729	103,548,868	19,028,262

	Hops (pounds)	Dew Rotted Hemp (tons)	Water Rotted Hemp (tons)	Other Hemp (tons)	Flax (pounds)	Flaxseed (bushels)	Maple Sugar (pounds)	Cane Sugar (1,000 lbs. hogsheads)	Cane Mol. (gallons)	Maple Mol. (gallons)	Sorghum Mol. (gallons)
Total South:	26,265	50,115	3,636	11,131	1,737,000	100,313	1,675,418	230,982	14,963,996	352,649	2,786,371
Total States:	10,991,361	53,274	3,862	17,234	4,715,802	566,802	40,120,083	230,982	14,963,996	1,597,274	6,698,181

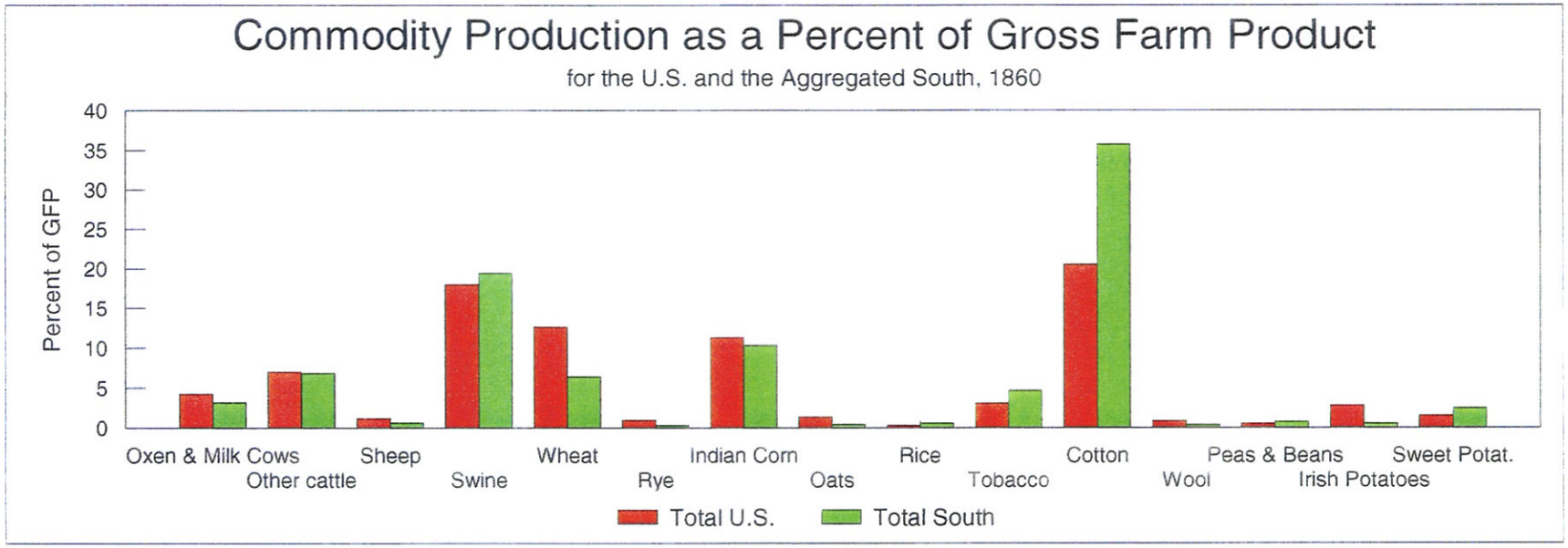
* Figures listed here are those reported directly from the Federal 1860 agricultural census. They have not been transformed into GFP measurements.

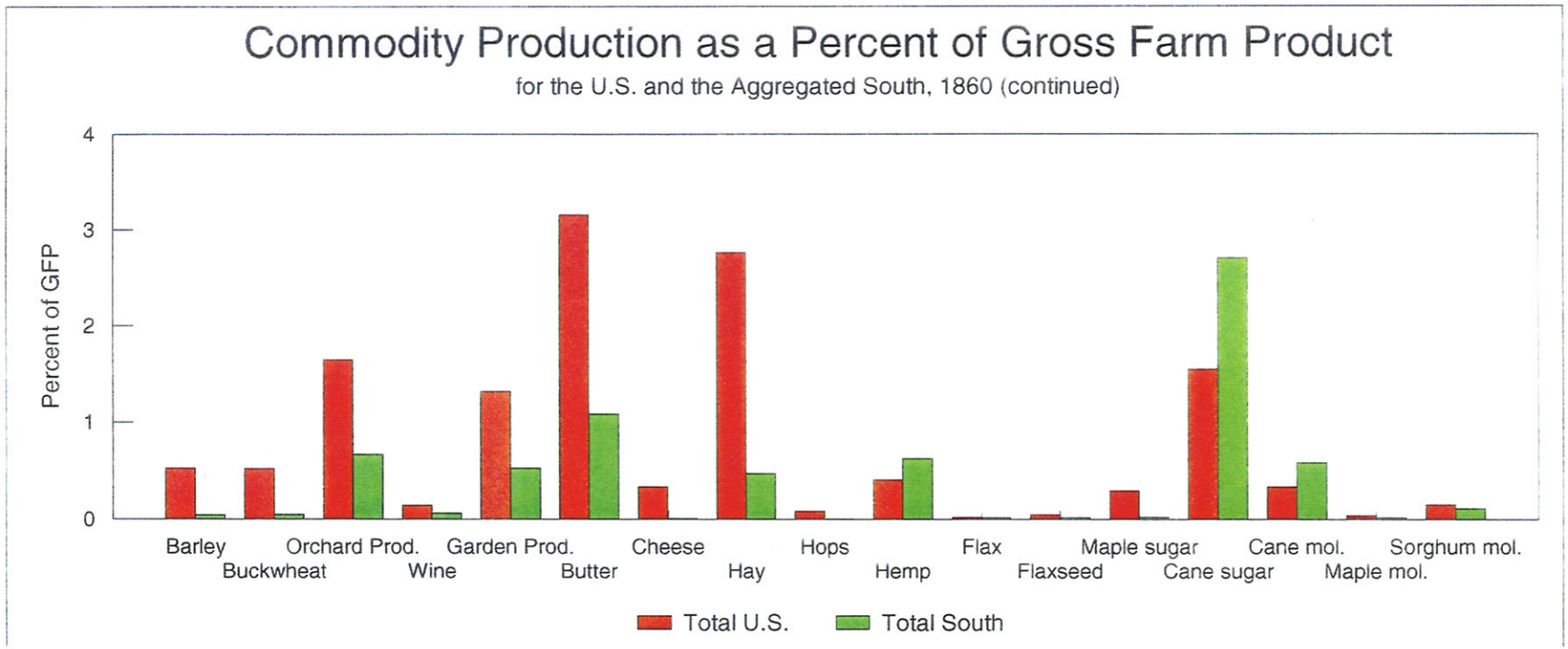
Table 4

The 1860 Dollar Value of Individual Commodities and Respective Shares of U.S. and Southern Gross Farm Products

Commodity	U.S. Dollar Value	U.S. % of GFP	South Dollar Value	South % of GFP
Working Oxen and Milk Cows	51,460,113	4.27	22,169,476	3.20
Other Cattle	84,667,478	7.02	47,364,031	6.85
Sheep	14,599,635	1.21	4,767,774	0.69
Swine	217,280,965	18.01	134,316,936	19.41
Butter	38,082,702	3.16	7,533,061	1.09
Cheese	4,092,646	0.34	50,328	0.01
Livestock and Dairy (total)	410,183,539	34.00	216,201,605	31.25
Cotton	247,797,262	20.54	247,726,284	35.80
Wheat	152,663,239	12.65	44,441,562	6.42
Corn	136,584,870	11.32	71,345,742	10.31
Tobacco	37,339,786	3.10	32,273,718	4.66
Rice	4,342,275	0.36	4,342,133	0.63
Rye	12,016,495	1.00	2,334,860	0.34
Oats	16,405,885	1.36	3,161,605	0.46
Barley	6,415,743	0.53	300,486	0.04
Buckwheat	6,299,901	0.52	346,636	0.05
Hay	33,337,515	2.76	3,281,193	0.47
Peas and Beans	6,570,445	0.54	5,229,787	0.76
Irish Potatoes	33,974,471	2.82	3,696,505	0.53
Sweet Potatoes	18,384,411	1.52	17,344,913	2.51
Orchard Products	19,932,229	1.65	4,639,323	0.67
Garden Products	15,955,390	1.32	3,667,847	0.53
Hops	989,222	0.08	2,364	0.00
Hemp (total)	4,982,790	0.41	4,347,094	0.63
Flax	268,801	0.02	99,009	0.01
Flaxseed	593,158	0.05	104,978	0.02
Wine	1,698,799	0.14	437,543	0.06
Wool	10,980,007	0.91	2,724,647	0.39
Cane Sugar	18,767,288	1.56	18,767,288	2.71
Cane Molasses	4,085,171	0.34	4,085,171	0.59
Maple Sugar	3,610,807	0.30	150,788	0.02
Maple Molasses	436,056	0.04	96,273	0.01
Sorghum Molasses	1,828,603	0.15	760,679	0.11
Total GFP	1,206,444,161		691,910,032	

Figure 2


Commodity Production as a Percent of Gross Farm Product
for the U.S. and the Aggregated South, 1860
Percent of GFP
40
35
30
25
20
15
10
5
0
Oxen & Milk Cows
Other cattle
Sheep
Swine
Wheat
Rye
Indian Corn
Oats
Rice
Tobacco
Cotton
Wool
Peas & Beans
Irish Potatoes
Sweet Potat.
Total U.S.
Total South


Commodity Production as a Percent of Gross Farm Product
for the U.S. and the Aggregated South, 1860 (continued)
Percent of GFP
4
3
2
1
0
Barley
Buckwheat
Orchard Prod.
Wine
Garden Prod.
Butter
Cheese
Hay
Hops
Hemp
Flax
Flaxseed
Maple sugar
Cane sugar
Cane mol.
Maple mol.
Sorghum mol.
Total U.S.
Total South

With these larger economies in mind, we move on to a more microeconomic inspection of the 1860 South by examining the crop regions. Once the crop regions had been defined and the economic theory behind Gross Farm Product was accounted for, the census production figures for the 33 commodities were transformed into amounts labeled in terms of their estimated 1860 values. These values and shares of regional GFP are listed in Table 5 and displayed in Figure 3. The majority of commodities were produced in quantities amounting to less than five percent of total agricultural production. Therefore, analysis was restricted to those commodities, or groups of commodities, that contributed more than five percent to a region's GFP. Below is a report on the transformed data for major cash crops, livestock, and several other crops. A discussion of potential conclusions arrived at from this analysis follows.

Cash Crops

Let us look at the output of the four main cash crops in each region. As previously mentioned, cotton was an important commodity for the South; this situation was made increasingly evident by the large number of counties producing more than 1,000 bales per annum in 1860.[8] The area defined in this paper as the cotton region produced about 61% its GFP through cotton output. This is an extraordinary percentage when compared to the rest of the data; the highest share of GFP by a single crop in any of the regions.

[8] There were 373 counties in the cotton region as defined in this paper. That amount corresponds to nearly a third of the antebellum South (as far as number of counties, not area, is concerned). The number of counties in the remaining five crop regions are as follows: rice, 22; sugar, 26; NC/VA tobacco, 82; KY/TN tobacco, 98; MO tobacco, 33. The total number of counties in the 1860 South, excluding Maryland and Delaware, was approximately 1,100.

Two other regions had a relatively high share of total production from cotton output, while the remaining three regions' cotton share was relatively low. Cotton comprised nearly 32% of the rice region's GFP and 26% of the sugar region's GFP. The tobacco regions' production of cotton accounted for about 2.18% of the Kentucky/Tennessee Gross Farm Product, 0.15% of the Missouri area's, and 3.4% of the North Carolina/Virginia GFP. Already we can tell that there is a difference between crop regions. Cotton, the major crop of the antebellum nation, comprised more than a fourth of total agricultural output for two of the non-cotton regions, but less than 4% for the other three. Some possible explanations for these actions will be discussed later.

Rice was a relatively minor crop in every area except the rice region on the Atlantic coast. Within that small eastern region, made up of 22 counties, rice output accounted for about 22% of their total Gross Farm Product. For each of the remaining regions, the value of rice output was less than 1% of GFP. (Cotton, 0.01%; sugar, 0.4%; KY/TN tobacco, 0.0007%; MO tobacco, 0.001%; NC/VA tobacco, 0.002%.)

Levels of cane sugar and cane molasses followed in a similar fashion. The sugar region, composed of southern Louisiana counties, earned 49% of their Gross Farm Product through the production of cane sugar and another 10% from cane molasses. The other regions did not produce a significant amount of these crops. (Cotton, 0.187% and 0.097%; rice, 0.124% and 0.059%; KY/TN tobacco, 0.123% and .001%; MO tobacco, 0.145% and 0.026%; NC/VA tobacco, 0.003% and 0.007%.)

The three tobacco regions developed in this paper make an interesting comparison to each other when discussing tobacco output. While each county in these regions produced more than 10,000 pounds of tobacco in 1860, each region's total tobacco output differed significantly in relation to overall Gross Farm Product. Tobacco accounted for 14.3% of GFP in the Kentucky/ Tennessee area, but this percentage was nearly doubled for the North Carolina/Virginia region (27.7%). The Missouri area's production of tobacco accounted for merely 10% of GFP. The other three regions produced less than 1% of their GFP by means of tobacco output. (Cotton, 0.077%; rice, 0.018%; sugar, 0.007%.) It would seem that there were specialization and production choice differences even between those areas that produced a significant amount of the same cash crop. This result may call into question one of the assumptions of this paper, that of similarity between producers of "like goods." However, this result may also stem from differences in capital (such as soil quality or amount of farmable land) or competition. For example, it is possible that the northern counties of the Missouri and KY/TN regions found themselves in closer proximity to major Northern markets. If the demand in these markets was great enough to drive the price of tobacco up, the northern counties would probably have increased tobacco production the following season. If, on the other hand, supply was greater than demand, the Northern competitors might have had a greater influence on the actions of northern Missouri and Kentucky counties than those located further south.

Livestock

Another important group of commodities is the livestock, or meat, production. This group consists of the meat from milk cows, working oxen, other cattle, sheep, and hogs. Mutton

outputs were small for every crop region (the highest was 1.4%), while the pork output was the largest of the meat categories in each area (ranging from 4% to 32% of total agricultural production). Four of the crop regions had total meat outputs that accounted for roughly a quarter of their Gross Farm Products: cotton, rice, Kentucky/Tennessee tobacco, and North Carolina/Virginia tobacco. The sugar region produced a fraction of this amount, having only 8% of GFP result from slaughtered livestock. The Missouri tobacco region, on the other hand, had 45% of total output come from this group of commodities.

Other Important Commodities

Wheat was one crop that was relatively important for several of the Southern regions in 1860, which we might expect since it was fairly significant for the overall economy as well as for the aggregate South. Production of wheat for the tobacco region of Kentucky and Tennessee comprised 7% of its GFP. The tobacco region of Missouri produced a slightly lower percentage, 6.5%. The area with the highest output of wheat for 1860 was the tobacco region of North Carolina and Virginia where the commodity accounted for 19.2% of GFP. Wheat output for the three remaining regions was small: cotton region, 2%; rice region, 0.34%; sugar region, 0.001%.

Another commodity that accounted for more than five percent of several regions' Gross Farm Products was Indian corn. The cotton region's output of corn was 6.6% of its GFP. Indian corn in the rice region was 5.3%. The sugar region produced the least amount of corn among the six crop regions, only 4% of its GFP. The Kentucky/Tennessee tobacco region's production of this crop made up 12.1% of its total agricultural output. Missouri's tobacco region had the

Table 5

The 1860 Dollar Value of Individual Commodities and Respective Shares of Defined Regional Gross Farm Products

	Milk Cows & Oxen	Other Cattle	Sheep	Swine	Wheat	Rye	Indian Corn	Oats	Rice	Tobacco
Cotton										
GFP $ 359,790,230										
Value of Commodity in GFP	9,097,116	21,418,934	1,380,899	55,441,036	6,692,303	284,400	23,818,135	370,124	40,744	260,107
Commodity as % of GFP	2.53	5.95	0.38	15.41	1.86	0.08	6.62	0.10	0.01	0.07
Rice										
GFP $18,721,835										
Value of Commodity in GFP	530,893	1,222,116	78,749	3,305,146	62,107	17,280	999,866	12,661	4,125,121	3,339
Commodity as % of GFP	2.84	6.53	0.42	17.65	0.33	0.09	5.34	0.07	22.03	0.02
Sugar										
GFP $36,941,977										
Value of Commodity in GFP	436,587	935,113	68,432	1,513,220	337	72	1,507,234	351	144,375	2,583
Commodity as % of GFP	1.18	2.53	0.19	4.10	0.00	0.00	4.08	0.00	0.39	0.01
Tobacco KY/TN										
GFP $90,204,619										
Value of Commodity in GFP	1,886,077	2,579,253	644,197	17,551,696	6,349,158	428,484	10,925,215	30,128,115	618	12,878,080
Commodity as % of GFP	2.09	2.86	0.71	19.46	7.04	0.48	12.11	33.40	0.00	14.28
Tobacco MO										
GFP $ 20,238,325										
Value of Commodity in GFP	902,744	1,611,971	275,621	6,402,447	1,315,064	49,635	4,811,019	141,041	206	2,009,150
Commodity as % of GFP	4.46	7.96	1.36	31.64	6.50	0.25	23.77	0.70	0.00	9.93
Tobacco NC/VA										
GFP $ 47,756,293										
Value of Commodity in GFP	1,442,461	2,225,560	399,551	8,841,388	9,116,749	252,323	4,683,307	717,117	952	13,239,559
Commodity as % of GFP	3.02	4.66	0.84	18.51	19.09	0.53	9.81	1.50	0.00	27.72

Table 5

Cotton	Cotton	Cane Sugar	Cane Molasses	Wool	Peas & Beans	Irish Potatoes	Sweet Potatoes	Barley	Buckwheat
GFP $ 359,790,230									
Value of Commodity in GFP	220,716,234	630,256	327,782	705,877	3,369,070	634,351	9,877,490	33,602	2,450
Commodity as % of GFP	61.35	0.18	0.09	0.20	0.94	0.18	2.75	0.01	0.00
Rice									
GFP $18,721,835									
Value of Commodity in GFP	5,977,286	22,425	10,646	42,302	399,397	21,747	1,438,904	17	36
Commodity as % of GFP	31.93	0.12	0.06	0.23	2.13	0.12	7.69	0.00	0.00
Sugar									
GFP $36,941,977									
Value of Commodity in GFP	9,679,182	18,004,838	3,668,119	24,001	39,794	40,678	329,654	0	22
Commodity as % of GFP	26.20	48.74	9.93	0.06	0.11	0.11	0.89	0.00	0.00
Tobacco KY/TN									
GFP $90,204,619									
Value of Commodity in GFP	1,963,234	110,988	773	372,044	140,453	534,105	855,261	82,314	4,180
Commodity as % of GFP	2.18	0.12	0.00	0.41	0.16	0.59	0.95	0.09	0.00
Tobacco MO									
GFP $ 20,238,325									
Value of Commodity in GFP	31,326	29,331	5,325	170,358	22,089	216,572	40,173	57,519	33,123
Commodity as % of GFP	0.15	0.14	0.03	0.84	0.11	1.07	0.20	0.28	0.16
Tobacco NC/VA									
GFP $ 47,756,293									
Value of Commodity in GFP	1,783,006	1,381	3,286	225,239	237,730	349,312	964,302	2,432	20,186
Commodity as % of GFP	3.73	0.00	0.01	0.47	0.50	0.73	2.02	0.01	0.04

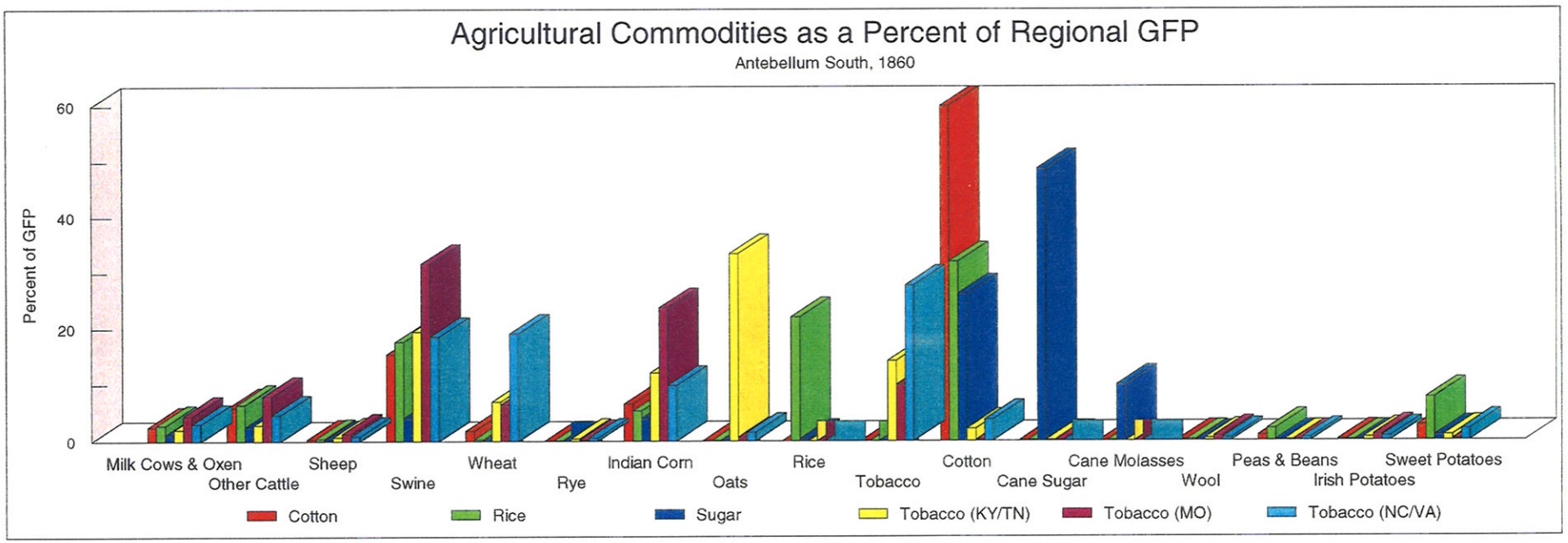
Table 5

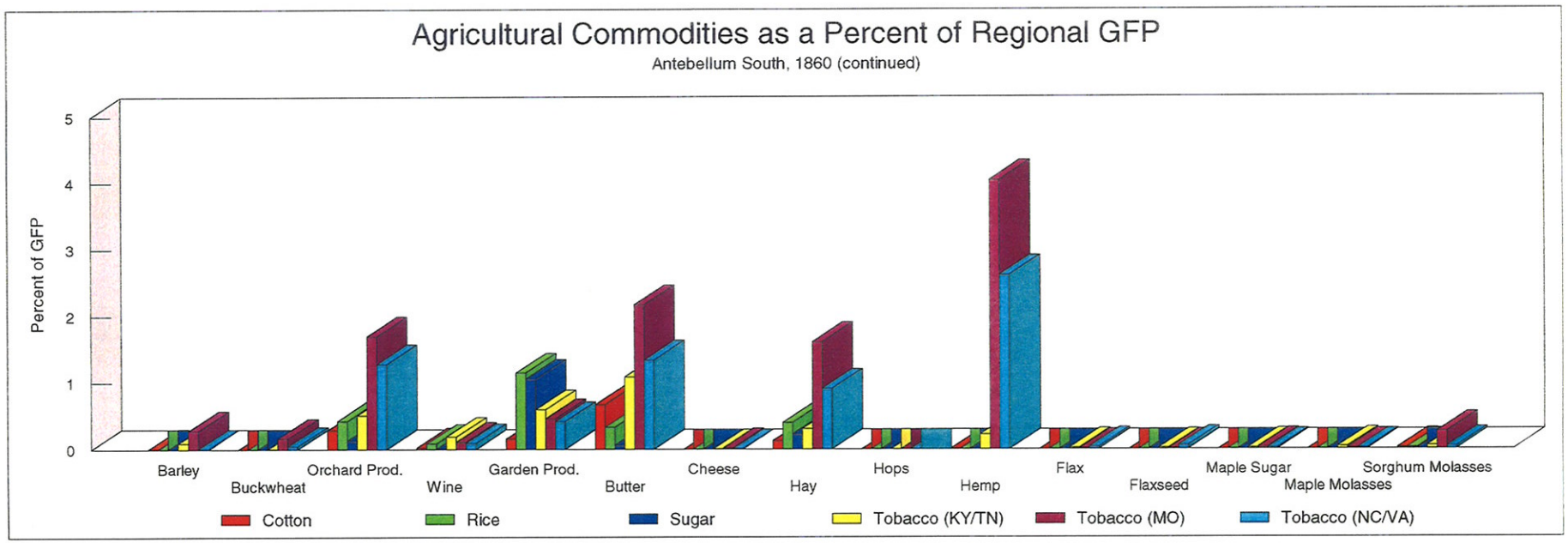
Cotton	Orchard Prod.	Wine	Garden Prod.	Butter	Cheese	Hay	Hops	Hemp	Flax	Flaxseed	Maple Sugar
GFP $ 359,790,230											
Value of Commodity in GFP	1,046,485	93,377	576,044	2,417,301	3,826	455,616	188	19,229	150	464	263
Commodity as % of GFP	0.29	0.03	0.16	0.67	0.00	0.13	0.00	0.01	0.00	0.00	0.00
Rice											
GFP $18,721,835											
Value of Commodity in GFP	80,172	15,651	214,886	62,436	22	75,189	7	0	1	3	11
Commodity as % of GFP	0.43	0.08	1.15	0.33	0.00	0.40	0.00	0.00	0.00	0.00	0.00
Sugar											
GFP $36,941,977											
Value of Commodity in GFP	48,481	2,205	390,600	22,419	202	83,478	0	0	0	0	0
Commodity as % of GFP	0.13	0.01	1.06	0.06	0.00	0.23	0.00	0.00	0.00	0.00	0.00
Tobacco KY/TN											
GFP $90,204,619											
Value of Commodity in GFP	461,321	171,417	538,922	981,145	5,905	280,807	424	198,923	19,185	16,480	18,197
Commodity as % of GFP	0.51	0.19	0.60	1.09	0.01	0.31	0.00	0.22	0.02	0.02	0.02
Tobacco MO											
GFP $ 20,238,325											
Value of Commodity in GFP	343,287	22,830	93,637	439,072	4,195	325,592	97	817,400	2,354	2,178	6,165
Commodity as % of GFP	1.70	0.11	0.46	2.17	0.02	1.61	0.00	4.04	0.01	0.01	0.03
Tobacco NC/VA											
GFP $ 47,756,293											
Value of Commodity in GFP	609,026	43,814	200,079	639,594	3,423	433,616	496	1,247,205	14,957	25,830	7,748
Commodity as % of GFP	1.28	0.09	0.42	1.34	0.01	0.91	0.00	2.61	0.03	0.05	0.02

Table 5

		Maple Molasses	Sorghum Molasses
Cotton			
GFP	$ 359,790,230		
Value of Commodity in GFP		568	75,808
Commodity as % of GFP		0.00	0.02
Rice			
GFP	$18,721,835		
Value of Commodity in GFP		0	3,418
Commodity as % of GFP		0.00	0.02
Sugar			
GFP	$36,941,977		
Value of Commodity in GFP		0	0
Commodity as % of GFP		0.00	0.00
Tobacco KY/TN			
GFP	$90,204,619		
Value of Commodity in GFP		31,722	45,928
Commodity as % of GFP		0.04	0.05
Tobacco MO			
GFP	$ 20,238,325		
Value of Commodity in GFP		3,174	53,632
Commodity as % of GFP		0.02	0.27
Tobacco NC/VA			
GFP	$ 47,756,293		
Value of Commodity in GFP		6,831	17,834
Commodity as % of GFP		0.01	0.04

Figure 3


Agricultural Commodities as a Percent of Regional GFP
Antebellum South, 1860
Percent of GFP
60
40
20
0
Milk Cows & Oxen
Other Cattle
Sheep
Swine
Wheat
Rye
Indian Corn
Oats
Rice
Tobacco
Cotton
Cane Sugar
Cane Molasses
Wool
Peas & Beans
Irish Potatoes
Sweet Potatoes
Cotton
Rice
Sugar
Tobacco (KY/TN)
Tobacco (MO)
Tobacco (NC/VA)


Agricultural Commodities as a Percent of Regional GFP
Antebellum South, 1860 (continued)
Percent of GFP
5
4
3
2
1
0
Barley
Buckwheat
Orchard Prod.
Wine
Garden Prod.
Butter
Cheese
Hay
Hops
Hemp
Flax
Flaxseed
Maple Sugar
Maple Molasses
Sorghum Molasses
Cotton
Rice
Sugar
Tobacco (KY/TN)
Tobacco (MO)
Tobacco (NC/VA)

highest percentage of corn grown in 1860, 23.8%. The North Carolina/Virginia tobacco region accounted for 9.8% of its GFP by corn output.

There were two other commodities for which one region had significant output while the remaining five did not. The tobacco region of Kentucky and Tennessee had one of these cases: oats. A third of its total GFP was obtained by the production of oats (33.4%). The other less dramatic case was the output of sweet potatoes in the rice region, where the crop constituted 7.7% of its GFP.

Regional Averages/Standard Deviations

Besides examining a crop region by its aggregated Gross Farm Product and shares of total production (by summing county output before calculating Gross Farm Product), an area can also be examined by the average percent attributed to a commodity in county level GFP. In other words, each county's individual Gross Farm Product is calculated; then, the share or percent of the county GFP are converted for each commodity; the percentage of individual county output for each commodity is then averaged for the different regions. This process results in the average percentage of cotton, beef, etc. produced within each crop region. The population's standard deviation from the average percentage of total output can also be calculated for each commodity. The county averages and standard deviations are listed for each of the six crop regions in Table 6. This technique allows us not only to find the mean output of each product, but also gives us an idea of the diversity of the counties within a region. (The variation or mix of crops and livestock, as well as different degrees of specialization, is meant by the term "diversity.") The higher the

standard deviation, the more diverse were the counties.

One might expect a good deal of uniformity within a crop region since they were formed precisely because of a similarity in production. Perhaps the smaller regions, where soil quality and market demand are less likely to vary from incredible distances, would have had more uniformity than those encompassing several states. While there were a few apparent cases of moderate uniformity among counties, most of the commodities comprising an average greater than 1% had standard deviations in excess of one-half that amount. The average percentage of GFP earned from cotton was about what the regional shares were, the cotton region averaging 51% of county-level Gross Farm Product with a standard deviation of 20%. The indication that rice and cane sugar were produced almost exclusively in their respective regions is displayed again by the average county percentages. Within the rice region, though, there is much variation in the average percentage of county GFP for the production of rice. Its average was 24%, but its standard deviation was 26%, indicating that there was a wide spread of output amongst the major producers of this crop. There were also a few notable averages that had relatively small standard deviations: the combined livestock and dairy averages, specifically in the output of pork, for the Kentucky/Tennessee tobacco and Missouri tobacco areas. These small standard deviations are indications that there was more uniformity in the raising of livestock within these regions (compared to the previous examples cited). Overall the county production averages reinforce the regional GFP proportions of output, while the standard deviations testify to the agricultural diversity within the regions.

Table 6

County Production Averages and Standard Deviations Within 1860 Southern Crop Regions

Region	Milk Cows & Oxen	Other Cattle	Sheep	Swine	Butter	Cheese	Livestock & Dairy	Wheat	Indian Corn	Tobacco	Cotton	
Cotton	3.37	9.21	0.51	18.85	0.82	0.00	31.63	2.55	7.33	0.11	51.18	Average % of County GFP
	2.44	9.97	0.49	8.26	0.59	0.00	18.16	3.84	3.18	0.53	19.51	Standard deviation
Rice	3.49	8.51	0.53	20.99	0.29	0.00	33.81	0.22	5.18	0.01	24.04	Average % of County GFP
	1.57	4.23	0.39	13.07	0.14	0.00	17.06	0.34	2.17	0.03	20.29	Standard deviation
Sugar	1.20	2.51	0.17	3.53	0.06	0.00	7.47	0.00	4.06	0.01	22.23	Average % of County GFP
	0.87	2.54	0.14	3.48	0.09	0.00	5.99	0.00	2.14	0.02	26.91	Standard deviation
Tobacco: KY/TN	3.46	4.56	1.16	29.96	1.74	0.01	40.90	10.50	18.64	20.17	1.91	Average % of County GFP
	1.01	1.33	0.41	6.12	0.55	0.05	8.25	5.33	3.71	14.80	6.28	Standard deviation
Tobacco: NC/VA	3.25	5.05	0.95	19.85	1.44	0.01	30.55	19.93	10.57	24.43	3.11	Average % of County GFP
	0.99	2.64	0.55	7.78	0.83	0.02	10.82	9.05	3.43	20.10	8.15	Standard deviation
Tobacco: MO	4.75	8.31	1.44	32.68	2.35	0.03	49.55	6.16	24.17	8.80	0.22	Average % of County GFP
	0.92	1.57	0.42	4.25	0.77	0.03	6.20	5.91	5.15	8.12	0.81	Standard deviation

	Oats	Wool	Peas & Beans	Irish Potatoes	Sweet Potatoes	Barley	Buck-wheat	Rye	Orchard Products	Garden Products	Rice	
Cotton	0.13	0.27	1.05	0.20	3.24	0.01	0.00	0.09	0.30	0.19	0.02	Average % of County GFP
	0.18	0.35	1.00	0.19	1.91	0.03	0.00	0.15	0.50	0.96	0.07	Standard deviation
Rice	0.05	0.27	1.85	0.10	8.53	0.00	0.00	0.08	0.39	0.88	23.89	Average % of County GFP
	0.06	0.20	0.90	0.14	4.07	0.00	0.00	0.09	0.65	2.44	26.34	Standard deviation
Sugar	0.00	0.06	0.11	0.15	0.87	0.00	0.00	0.00	0.18	2.55	0.45	Average % of County GFP
	0.00	0.08	0.10	0.20	0.77	0.00	0.00	0.00	0.50	9.22	1.46	Standard deviation
Tobacco: KY/TN	0.52	0.66	0.23	0.94	1.38	0.11	0.01	0.73	0.83	0.86	0.00	Average % of County GFP
	0.45	0.27	0.28	0.75	0.94	0.39	0.01	1.04	0.89	3.15	0.00	Standard deviation
Tobacco: NC/VA	1.51	0.53	0.48	0.83	1.85	0.00	0.07	0.62	1.47	0.44	0.00	Average % of County GFP
	0.68	0.39	0.59	0.43	1.93	0.01	0.20	0.86	1.73	1.91	0.01	Standard deviation
Tobacco: MO	0.70	0.88	0.11	1.18	0.18	0.39	0.23	0.28	1.51	0.52	0.00	Average % of County GFP
	0.53	0.26	0.06	0.42	0.10	1.27	0.24	0.22	0.83	0.75	0.00	Standard deviation

Table 6 continued

County Production Averages and Standard Deviations Within 1860 Southern Crop Regions

Region	Wine	Hay	Hops	Hemp	flax	Flaxseed	Cane Sugar	Cane Mol.	Maple Sugar	Maple Mol.	Sorghum Mol.	
Cotton	0.03	0.13	0.00	0.01	0.00	0.00	0.20	0.05	0.00	0.00	0.02	Average % of County GFP
	0.09	0.26	0.00	0.09	0.00	0.00	1.19	0.18	0.00	0.00	0.08	Standard deviation
Rice	0.11	0.28	0.00	0.00	0.00	0.00	0.15	0.14	0.00	0.00	0.02	Average % of County GFP
	0.34	0.41	0.00	0.00	0.00	0.00	0.25	0.23	0.00	0.00	0.04	Standard deviation
Sugar	0.01	0.24	0.00	0.00	0.00	0.00	47.33	10.10	0.00	0.00	0.00	Average % of County GFP
	0.04	0.29	0.00	0.00	0.00	0.00	27.42	6.90	0.00	0.00	0.00	Standard deviation
Tobacco:	0.36	0.48	0.00	0.35	0.05	0.04	0.11	0.00	0.04	0.08	0.10	Average % of County GFP
KY/TN	1.91	0.41	0.00	1.00	0.08	0.07	0.47	0.01	0.06	0.24	0.16	Standard deviation
Tobacco:	0.10	0.93	0.00	2.33	0.04	0.07	0.01	0.01	0.04	0.02	0.05	Average % of County GFP
NC/VA	0.22	0.89	0.00	7.51	0.06	0.10	0.03	0.05	0.18	0.07	0.13	Standard deviation
Tobacco:	0.17	1.76	0.00	2.63	0.01	0.01	0.11	0.03	0.03	0.01	0.36	Average % of County GFP
MO	0.68	0.85	0.00	5.37	0.01	0.02	0.38	0.09	0.05	0.03	0.40	Standard deviation

Interpretations and Suggested Explanations

Why was there such variety in the county agricultural production? Why did some regions, and perhaps certain counties within a region, specialize more than others? Some of this degree of specialization can be explained by comparative advantage. Because of geographic and climatic requirements, crops such as rice and sugar could not be produced in most areas. Rice production required access to large amounts of water (tidal flows), and the water needed a particular salt content, which generally prevented it from being cultivated "less than 12 or more than 16 miles from the ocean" (*Evidence and Methods*, 194). Cane sugar needed warm, fertile soil and 60 to 70 inches of rain per year, requirements met in very few North American locations. Cotton and tobacco, though not requiring such rare growing conditions in the U.S., are still sensitive to climatic conditions and amounts of rainfall. These growing restrictions would give farmers with appropriate land something of a comparative advantage (for particular crops) over those farmers not in "prime" production conditions.

The comparative advantage certain locations had, combined with the amount of other suitable (or second best) land available, may serve to explain some of the specialization of regions. Extremely rare growing conditions could create a stream of supply lower than the level of demand. Theory indicates that few suppliers and enough demand for a commodity should drive its price up until sufficient supply increases are produced to meet these demands. This supply could come from several outlets: farmers living within the natural advantage regions who had not yet produced the commodity, farmers who found the price high enough to generate profits that allowed for the purchase of capital (such as extra land, tools, slaves, etc.) necessary to meet required growing or labor conditions, imports, or increased output from those already

producing that commodity. The census data shows that many who could produce crops such as rice and cane sugar found it profitable to do so, and to produce these crops in larger shares than other commodities. The larger share of production for these crops, or higher degree of specialization within these crop regions, can then partially be explained by the near absolute advantage these counties had over others.

Yet there was no absolute specialization; even in these more specialized regions there was still production of a wide range of crops (to varying degrees). Did a large share of this non-cash crop production come from farms not specializing in rice, cotton, cane sugar, etc.? In other words, was there a type of division of labor within the region? Did some farms specialize, perhaps entirely, in a cash crop which was exported out of the area for sale while other regional farms compensated for this specialization by producing other crops/livestock for regional sales? These questions are unanswerable with the county census data, requiring more specific data from individual farms. There is some indication, however, from the work of Robert Gallman that this was not the case.[9] What Gallman found were indications that only a small percentage of farms in the Cotton South were not near complete self-sufficiency (that small percentage comprised of a few heavily specialized cotton plantations). Most individual units produced enough grains, foodstuffs, and meat to be self-sufficient.

Another matter to explore stemming from the varying degrees of specialization from region to region is the mix of crops a particular area chose to produce. We have already seen that some mix of crops were required for self-sufficiency, indicating that producing one's own foodstuffs was more beneficial than using that time and energy on producing a higher level of

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[9] See Gallman's work "Self-Sufficiency in the Cotton Economy of the Antebellum South."

output of cash crops. To some degree, producing one's own food, along with growing a mixture of crops, was employed to insure farmers of a reasonable harvest. A mix of commodities with varying agricultural requirements may have been partially selected so that even in those years when temperature or precipitation was damaging to one or several crops, some output could still be harvested. This reasoning, however, does not explain what specific mix of crops should have been grown, what livestock raised, or in what proportions.

What should have influenced the farmers' decisions? Like modern firms, we would expect the choice of product(s) to depend on price and the amount of competition, along with the quality, cost, and availability of other factors of production (such as labor, equipment, money, quantity of land, and quality of soil). We would also expect farm output to reflect the optimal production of a commodity (or commodities); that is, farmers continue to increase output (with a given amount of capital) until the point where marginal cost equals marginal benefit. Since this paper utilizes only county-level data and no individual farm data, some of the micro-level actions we would expect to have occurred may not be visible here. Yet some theoretical speculation can be made about the types of commodities and production ratios chosen. The combination of these factors yields an economic model for the output of multiple commodities resembling a complex production possibilities frontier. Farmers would have faced some multidimensional production possibilities frontier formed by the given relative (market) prices and relative costs. A point along the curve (or frontier) should have been chosen, since it is along the curve that full resource utilization is met. Besides self-sufficiency and a form of insurance against complete crop destruction, the production of a given mix of commodities should therefore have allowed for fuller resource utilization.

Economic theory tells us that a farm should produce more of the crops with the highest profit margins---those whose benefit of production outweigh the cost of production by the greatest amount. The price for cotton and tobacco was high in 1860 relative to many crops. The census data seems to indicate that those who could produce cotton did so to whatever degree possible until production costs (time and money for cultivation and harvesting, cost for improving land, etc.) became too high. These results indicate that the price for these crops should have been high enough to produce a relatively large profit margin for these farmers. A single crop, however, does not require constant work throughout the whole year, leading farmers to choose the best combinations and levels of output for crops and livestock, those combinations and levels that would bring in the most money for the least amount of work. Such decisions were probably altered, at least to a minor level, on a yearly basis, but some commodities excluded others, or excluded their mass production. Cotton, for example, required large amounts of intensive work during a long cultivation period (Olson, 219). Many grains did not have such drawn out time requirements. The intensive cultivation of cotton naturally required more labor, which, in turn, might have led to a further increase in the specialization.

Farmers chose crops and seed times based not only on what was possible to grow in a particular area, but on the growing periods and labor requirements of crops and livestock. This reasoning may be why we see a higher share of GFP in livestock in the northern tobacco regions. "The routine activities of daily feeding, milking, and tending of the stock, often grouped together and considered as chores, placed a fairly constant demand for a portion of the farm's labor" (Olson, 219). Grains and tobacco, which did not have such stringent cultivation requirements as cotton (cane sugar and rice not being an option in most of the northern counties), would have left

the farmers with a greater ability to supplement their production with livestock. In other words, raising livestock and producing more grains probably had a smaller marginal cost for the tobacco regions than it would have had for the cotton region.

"Other" region

There are approximately four hundred and seventy counties which remain outside the defined cash crop regions, roughly 40% of the South in 1860. There are large areas such as southern Missouri, northern Arkansas, eastern Kentucky and Tennessee, and that portion of antebellum Virginia which is now West Virginia which are infrequently discussed in detail or are bypassed entirely because they were not part of the high intensity or high growth regions. The case of these areas is not one of idleness; each county produced multiple commodities. They simply did not produce enough of any one commodity (cotton, sugar, rice, or tobacco) to be considered a major producer of the agricultural products.

After the regions had been formed on the basis on the four cash crops, data from other commodities were sorted and analyzed in an attempt to uncover some hidden regions of production. Wheat output at the county level was examined because of the crop's importance to both the U.S. and Southern economies, revealing that the prime producers of wheat were those counties within the Virginia/North Carolina tobacco region and the Kentucky/Tennessee tobacco region. Very few of the counties producing more than 100,000 bushels of wheat lay outside the regional borders defined earlier in this paper. Hog raising was then looked at for the South, also because of its importance to the national and Southern economies. The raising of hogs showed the same general scenario. The major "producers" of pork were counties within previously

defined crop regions. A small area in central Tennessee, at the border of the cotton and tobacco regions, proved to have the largest output, most of which was likely exported to other areas of the country. Northern Kentucky, the counties along the Missouri River, and a swath of counties running through Alabama and upwards into northern Mississippi and eastern Tennessee were also areas of high pork output. These extra commodity "sorts" did not produce any significant insight into the "other" region.[10]

Why did the large areas composed of "other" counties produce far less than the cash crop regions? Most likely it is because the farmers in these counties could not produce the sheer volume necessary to compete on the agricultural market, either because of the land quality or other terrain related reasons (for example, those living near or within mountainous territory would have greater difficulty transporting their output to markets for sale, even if they could produce large quantities). Raising livestock probably proved too expensive or time consuming to them because of lack of inputs (such as crops for feed or forests to let hogs graze naturally). Microeconomic theory leads us to believe that individual firms (or farms) will continue to produce until marginal cost exceeds marginal benefit, assuming that the economy functioned on rational economic behavior and decisions. A lesser quality of soil, difficulties with irrigation or transportation, or smaller populations (to draw additional laborers from) would all serve to increase the marginal cost more immediately.

The geographical reasoning has much support. Those areas outside the defined crop regions are noted for their comparative disadvantage for agricultural purposes due to their lesser

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[10] There was an area in central Virginia (along what is today the eastern border of West Virginia) where each county produced more than 10,000 pounds of maple sugar, but since this was a minor commodity to both the U.S. and Southern economies, the area was not discussed in detail.

Figure 4

Wheat Production, 1860

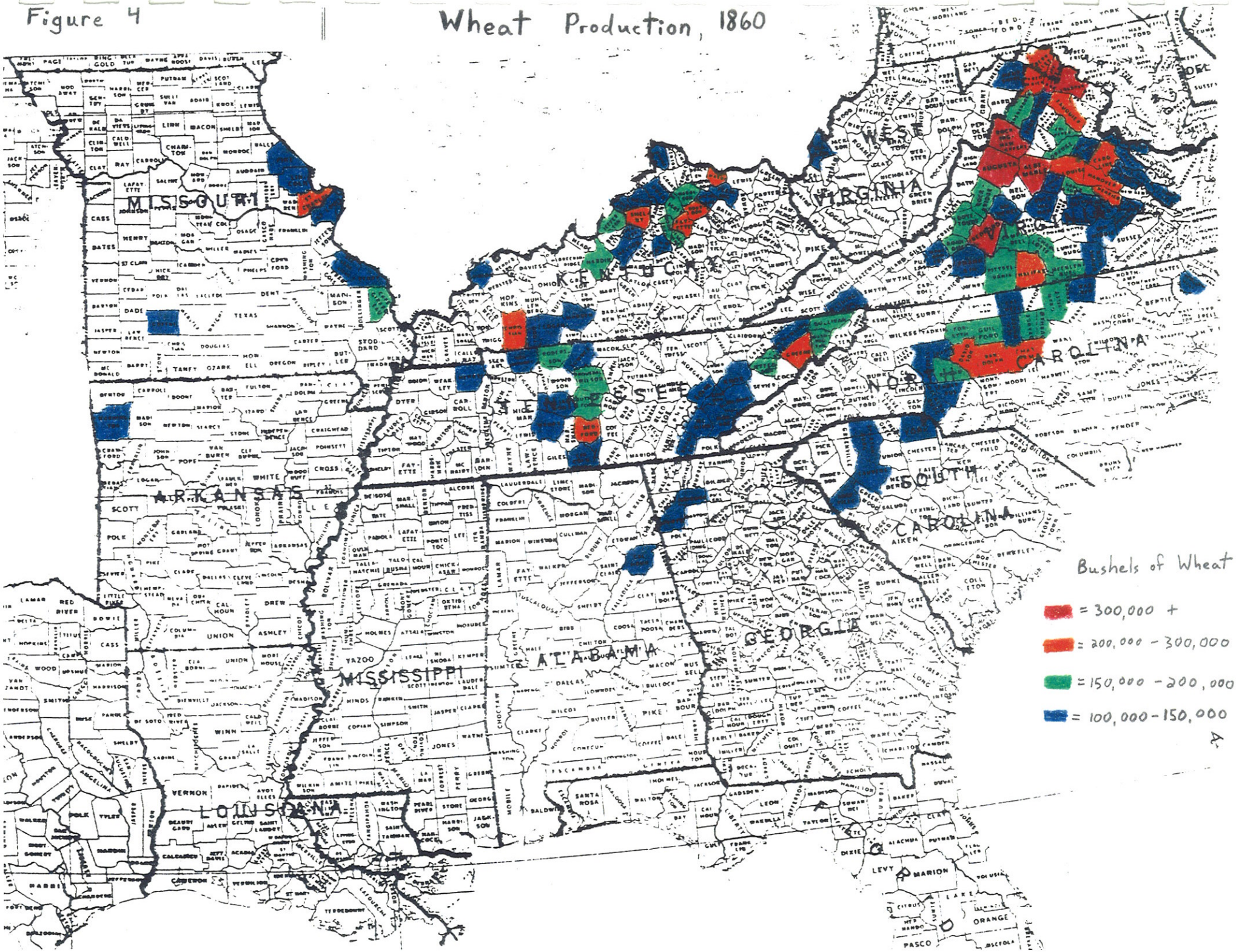
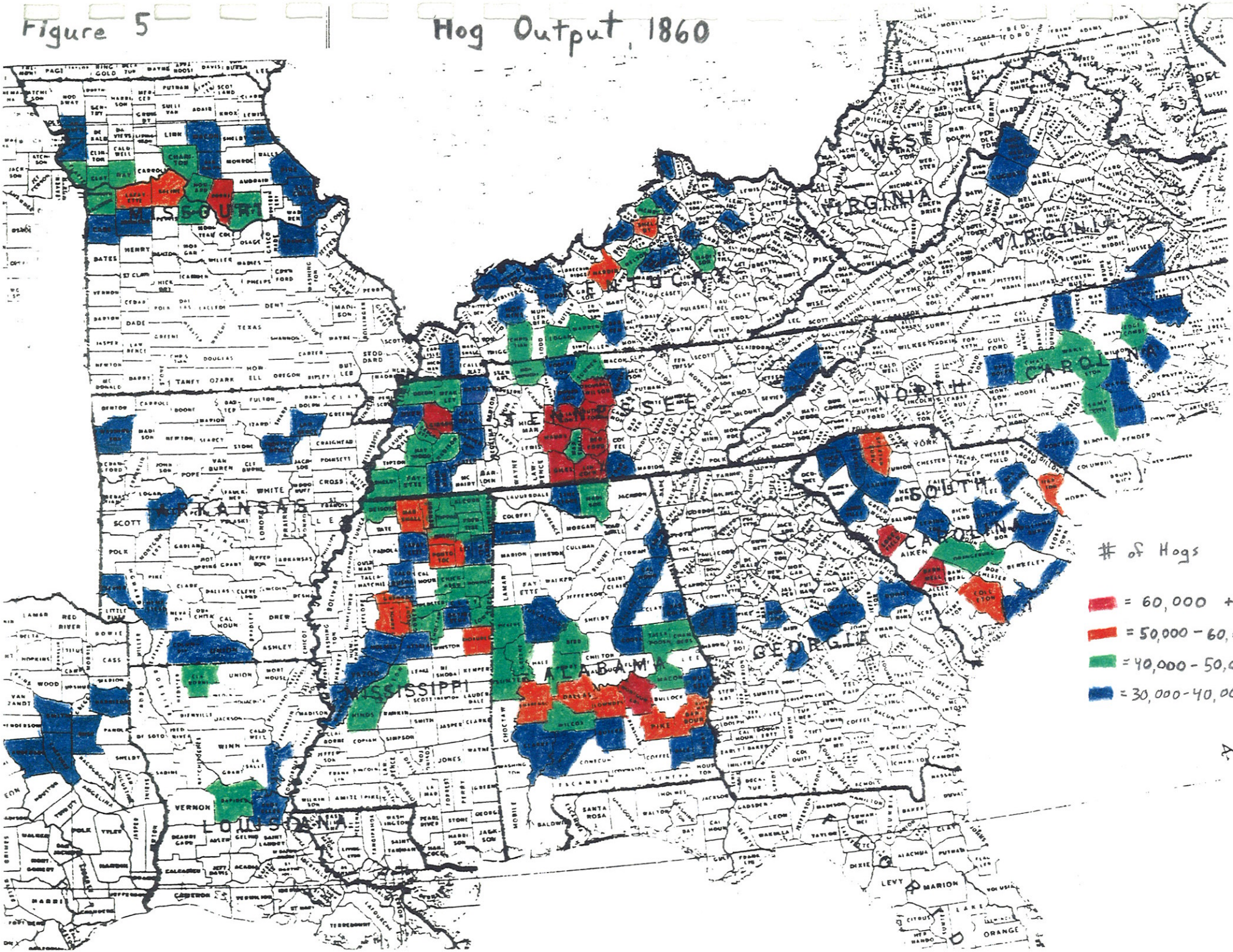


Figure 5

Hog Output, 1860



quality of natural inputs. Northern Georgia and western North Carolina are part of the "blue ridge," referred to as "the backbone of the Appalachians" by Hilliard in his *Atlas of Antebellum Southern Agriculture*. This area has some of the worst soils for agricultural production. Eastern Tennessee and Kentucky, along with western Virginia, are located in the area referred to geographically as the "Appalachian plateaus" and the "ridge and valley." As its name implies, the ridge and valley area is comprised of numerous steep hills and deep valleys, making travel difficult. The Appalachian plateaus have poor, thin soil. The area composed of southern Missouri and north-western Arkansas is known as the "interior highlands." Similar to the Appalachian plateaus and the ridge and valley, the interior highlands were agriculturally poor. "Barren uplands to the north [make] it one of the least productive regions in the area" (Hilliard, 9).

Since the census data tells us that these areas could (and did) produce crops and raise livestock, there is indication that the general population within those areas found the amount of competition too great, their productivity too low, or the cost of production to be greater than the benefits derived from such actions, leading them out of the market. What the defined crop regions show us, therefore, are those areas that were part of the market, those that chose to compete for agricultural sales.

Conclusion

Stepping back from the data, the picture we are presented with is that of several agricultural markets whose micro-level actions are not seen in detail. What we see is aggregate

levels of production for defined regions, regions which showed a good deal of deviation from within, as well as several structural differences from other areas. One of the implications that the Gross Farm Product data indicates is that the northern regions of the Antebellum South, the three tobacco regions, were less specialized and produced a higher percentage of livestock meats and crops such as wheat, corn, and oats than the cotton, rice, and sugar regions. The degree of specialization and the mix of crops/livestock each region produced can be partially explained by several factors: 1) geographical location (including climate, precipitation levels, accessability to markets, and soil quality); 2) particular crop requirements (labor quantity and intensity necessary for planting, cultivation, and harvest; time requirements for planting, cultivation, and harvest; and length of growing period); and 3) market conditions (market price, demand for commodities, and competition).

Some of the northern areas should not, perhaps, have been designated tobacco regions. The Missouri region's output, for example, was 45% sales from meats (three-fourths of that swine) and 30% Indian corn and wheat, while only 10% of total output was tobacco. The Kentucky and Tennessee region had a slightly higher share of production in tobacco (14%), but over 33% of their 1860 GFP came from the sales of oats (implying that this area also raised a large amount of horses, something this study did not examine) and another 24% from meats.

Whatever they are labeled, however, there is still a large contrast between these northern areas and the cotton and sugar regions. The above data show that the tobacco regions did not have just one or two central commodities; rather there were usually about four commodities within each area that were of larger relative importance. Compare this situation with the sprawling cotton region, where 61% of their total GFP was attributed to cotton sales (another

33% a combination of various meats and Indian corn). Also, combining the cane sugar and cane molasses production of the sugar region yields 60% of their GFP, cotton production accounting for 26%. Even between the three tobacco regions there was varying degrees of emphasis placed upon crops. The cash crop of tobacco, for example, ranged from 10% to 28%; wheat from 6% to 19%; corn from 10% to 24%; oats from 0.7% to 33%.

Clearly these were not homogeneous regions, just producing one central crop. Each region, even those most specialized such as the cotton area, produced quantities of other commodities grossing millions of 1860 dollars. Often these regions were large producers of three or more commodities. Cash crops were not limited to their region; cotton was grown and sold in each of the specific regions formed here, even that of northern Missouri, an area not typically considered "cotton country." Even between regions with a common central cash crop, such as tobacco, it is evident that these were unique areas, not duplications of each other. Obviously there were still numerous economic decisions to be made at the farm level of production, since those with a large output of the same crop differed considerably in their overall composition of agricultural production.

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