ECONOMIC INTEGRATION AND
CONVERGENCE: U.S. REGIONS,
1840-1987

Sukkoo Kim

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ABSTRACT

Despite the recent inroads made by models of interregional trade based on external economies, the analysis of the long-run trends in U.S. regional specialization in agriculture, manufacturing, wholesale trade, retail trade, services, and all economic activities indicate that these trends are more consistent with explanations based on the neoclassical Heckscher-Ohlin model. Furthermore, while the long-run trends in U.S. regional industrial structures do not explain all the variations in regional income per capita, they played an important role in causing U.S. regional incomes to diverge and then converge between the nineteenth and the twentieth centuries.

Sukkoo Kim
Department of Economics
Washington University
St. Louis, MO 63130
and NBER
soks@wuecona.wustl.edu

I. Introduction.

One of the most salient trends in history is the integration of regional and national economies into a global economy.[1] The processes of integration involve reductions in the barriers to trade imposed by the physical costs of transportation and communications and in the political barriers erected by various polities.[2] Throughout history, technological innovations in transportation and communication have continuously increased the geographic mobility of goods, factors, and information. Over the long-run, political barriers have also fallen, even if not always monotonically. How will global integration affect the fortunes of regional and national economies? Will regions and nations turn into cores and peripheries? Will the early developers benefit at the expense of late comers? Or will regions and nations converge in incomes?

Economic integration provides two sources of income convergence: one specified by models of growth and another by models of trade. The neoclassical Solow growth model argues that regional incomes differ because of their differing levels of capital-labor ratios. In this model, regions with higher initial capital-labor ratios are richer since workers in that region are more productive. Economic integration in factors significantly increases the pace of income convergence in the growth model since labor and capital mobility speeds up the rate at which capital-labor ratios converge.[3] The neoclassical Heckscher-Ohlin trade model argues that incomes

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[1] See Krueger (1996) and Williamson (1996) for a discussion on long-run trends in globalization.

[2] The fall in transportation costs is not solely caused innovations in transportation technology. North (1968) estimated that the elimination of piracy which led to the re-organization of ships contributed significantly to the increase in productivity of ocean shipping from 1600 to 1850. In many instances, political barriers have been the binding constraints to integration. For example, Heckscher (1955) wrote that the greatest obstacles to trade in the Middle Ages were the tolls.

[3] In the Solow growth model, there is no role for trade since regions produce identical products. Consequently, economic integration characterized by goods mobility has little impact on income convergence. However, it is important to note that in the Solow growth model, regional incomes converge in the steady state even if the regional economies are closed. Given the assumption of diminishing returns to

of regions vary because of their differing factor endowments and factor prices.[4] Economic

integration and trade in goods leads to income convergence through factor price equalization.

However, the convergence in factor returns does not lead to full convergence in aggregate

incomes. Since regions differ in their factor endowments, regions will specialize in different

industries. Indeed, from the trade perspective, differences in aggregate incomes can only result

from differences in regional industrial structures. Thus, if regional factor endowments become

more dissimilar over time, then incomes may diverge as regional industrial structures diverge.

Conversely, if factor endowments become more similar over time, then aggregate incomes must

converge since both factor prices and industrial structures converge.

Economic integration also provides two sources of income divergence. The models of

growth based on increasing returns in physical capital or human capital externalities, advanced by

Romer (1986) and Lucas (1988) respectively, predict the possibility of income divergence. In

these models, regions with higher levels of physical or human capital can become even more

wealthy as increasing returns reinforce their initial advantages. The models of trade based on

increasing returns advanced by Krugman (1991a,b) also predict the possibility of income

divergence through the divergence in industrial structures. If high-tech, high-wage industries are

subject to external economies, then the opening up of trade will cause the concentration of all the

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capital, poorer regions accumulate capital at a faster rate through domestic savings.

4 Income per capita (PI) for any two regions in terms of factor earnings are: $PI_i = (w_i L_i + r_i K_i) / L_i = w_i + r_i (K_i/L_i)$, for regions i=1,2. Thus, prior to economic integration, incomes of two regions may differ since both factor prices and factor endowment ratios can differ. When the two regions open up trade, the factor price equalization theorem predicts the convergence of w and r between the two regions so that the $PI_i = w + r (K_i/L_i)$ between the two regions differ only by factor endowment ratios. However, if factors become mobile, then K/L also converges and PI of both regions must be identical. See Dollar and Wolff (1993) and Slaughter (1997).

high-tech, high-wage industries in a few regions. The concentration of high-tech, high-wage industries in a few regions causes regional incomes to diverge as the remaining regions are left with only the low-tech, low-wage industries.

The regions of the United States provide a unique opportunity to study the long-run effects of integration on regional income convergence or divergence.[5] Although there are significant differences between the integration of national economies and the integration of U.S. regional economies, the differences are more often ones of degree rather than of substance. Thus, understanding the long-run trends in U.S. regional industrial structures and incomes is likely to shed important insights concerning the effects of globalization on the income convergence of nations.

The United States progressed from a set of regional economies to an integrated national economy between the nineteenth and twentieth centuries. The growing economic integration brought about significant changes in the patterns of U.S. regional industrial development. In agriculture, economic integration led to greater regional specialization in crops between the nineteenth and the twentieth centuries. In manufacturing, economic integration first led to greater regional specialization at the two-digit industry level between the mid-nineteenth and the early twentieth centuries, but over the second half of the twentieth century the trend reversed dramatically. In services, economic integration led to regional de-specialization. Regional specialization in wholesale trade, retail trade, and other services at the two-digit industry level was quite low for most of the twentieth century. At the broad sectoral one-digit industry level,

[5] See Williamson (1996) and Taylor (1996a, 1996b) for analysis on the role of international factor mobility on globalization.

regional specialization increased between the nineteenth and the early twentieth centuries as the U.S. industrial structure shifted from agriculture to manufacturing, but then converged as services became increasingly more important.

This paper finds that the long-run trends in U.S. regional specialization or regional industrial structures are explained by the neoclassical Heckscher-Ohlin model of trade. However, the secular rise in incomes also contribute to explaining the long-run trends. Regional industrial structures, in the short-run, are predominantly determined by the level of economic integration and interregional and international trade. In the long-run, however, industrial structures may also change for secular reasons. Since the potential for regional specialization differ significantly for different sectors of the economy, the secular shift in industrial structures from agriculture to manufacturing and then to services has had an enormous influence on the overall level of U.S. regional specialization. Thus, any long-run study which examines the correlation between incomes and industrial structures must contend with secular changes in industrial structures as well as changes brought on by economic integration and trade.

The paper also finds that while the regional industrial structures do not completely explain all the variations in regional income per capita, they played an important role in causing the divergence and convergence of U.S. regional income per capita. The divergence and convergence of regional industrial structures at the broad one-digit industry category seems to have played a significant role in explaining the divergence and convergence of U.S. regional income per capita between the mid-nineteenth and the mid-twentieth centuries. However, the rapid convergence of regional income per capita over the second half of the twentieth century may have been caused by the convergence of regional industrial structures at both the broad one-digit industry level and at

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the two-digit industry levels in manufacturing and in services. Throughout, differences in wages at the various industry levels also contributed to explaining the divergence and convergence of U.S. regional income per capita.

The paper is organized as follows. Section II provides a discussion of the historical trends in U.S. regional economic integration. Section III investigates the historical origins of the U.S. census regions and determines whether or not these regions are likely to serve as economic regions. Section IV documents the long-run trends in U.S. regional industrial structures using an index of regional specialization. Section V examines the causes of the long-run trends in U.S. regional specialization. Section VI investigates the correlation between regional industrial structures and regional incomes. Section VII concludes with a summary.

II. The Integration of U.S. Regional Economies.

The early American republic faced enormous physical and political challenges to integrating its economy. The nation's roads were primitive and travel was largely limited to navigable waters. The political challenges to integration were even greater. There was no historical precedent for peacefully integrating sovereign-states into one federation, and indeed, the first attempt was a failure. The Articles of Confederation did little to reduce sectional frictions. Yet despite these problems, the United States was able to overcome the barriers to interregional trade and successfully integrate its regional economies. By the early twentieth century, the integrated U.S. economy possessed the largest domestic market in the world.

The Constitution of the United States laid a firm political foundation for economic integration by prohibiting taxes and duties on interstate commerce and by ensuring interstate

mobility of people and capital.[6] In fiscal terms, however, the federal government played a

relatively minor role until the second half of the nineteenth century. In an era when cities

performed wholesale market functions for extractive industries, states and cities competed to

become commercial centers for the region and the nation. Yet, the constitution constrained the

scope of the political economy of disunion. Rather than erecting trade barriers, the states

competed by building intrastate transportation networks to promote markets and by rejecting the

spending of federal funds on projects in competing states. Numerous federal projects were voted

down or vetoed due to sectional rivalries and questions concerning constitutionality. The net

effect of these rivalries probably resulted in an inefficient national transportation system with too

many canals and railroads in some states and too few in others. Nonetheless, the signs of the

emergence of a national transportation system were unmistakable.

The political problems of integration were not limited to the construction of a national

transportation system. The acquisition of vast new territories and the rise of North-South

sectional frictions over tariffs and slavery ultimately led to the complete disunion of the republic.

Although the Northwest Ordinance specified an orderly procedure for converting the vast new

territories into states, sectional politics made such transitions a delicate operation. As sectional

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[6] Although the Constitution prohibited states from issuing their own currencies, the United States did not have a single common currency until the early twentieth century. Prior to the founding of the Federal Reserve in 1914, a variety of paper monies circulated at any given time. Among the different monies were private bank notes, national bank notes, and non-interest bearing U.S. Treasury notes called greenbacks issued in 1862. While the proliferation of different currencies is likely to have increased the costs of doing business over long distances, the gold and the bi-metallic standards of the times essentially fixed exchange rates between the states so that the varieties of currencies probably did not adversely affect interregional trade to a significant degree. However, some financial economic historians argue that the fragmented banking system resulting from the prohibition of branch banking in many states resulted in capital immobilities see (Calomiris and Ramirez (1996)).

differences finally came to a head, eleven states seceded from the Union and formed the new Confederate States of America between December 1860 and May 1861. Since the Constitution had made no provision for the orderly secession of states, peaceful disintegration of the Union was a distinct possibility. However, the movement toward political disintegration was halted militarily by the northern states.

Had the political dissolution of the United States endured, the political barriers would have significantly hindered the pace of economic integration of the continental North America. Instead, the results of the Civil War quickened the pace of integration. In its aftermath, political and economic forces worked together to bind the states more closely and to remove the physical barriers to trade. The federal government's commitment to integration strengthened as it subsidized the building of a transcontinental railroad by granting enormous tracts of land. Between 1860 and 1890, national transportation and communication systems were established to coordinate the emerging interregional traffic flows. During those years, the national railroad and telegraph mileage increased exponentially from 30,626 to 166,703 and 50,000 to 19,382,000 respectively.

III. The Regions of the Continental United States.

In the first half of the nineteenth century, the continental United States expanded by more than three million acres as new lands were acquired by purchase, claims, military invasion and annexation, filibuster, and secession.[7] However, geographic knowledge of the acquired territories was limited and based on anecdotal observations of fur trappers, prospectors, and explorers who had little geologic training. The scientific understanding of the physical topography of the

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[7] See Meinig (1993).

continental United States increased significantly with the founding of the American school of

geology towards the turn of the twentieth century. American geologists, some self-made men like

John Powell, as well as many who studied under W.M. Davis of Harvard, surveyed, categorized,

and explained the U.S. topography based on the principles of geomorphology.

The first attempt to systematically define the regions of the continental U.S. was made by

Powell in 1895. Powell used three processes, vulcanism, diastrophism and gradation, to explain

the geomorphic or physiographic origins of the features of the continents, seas, lakes, plains,

plateaus, mountains, valleys and hills. Powell also used the geomorphic principle to distinguish

sixteen physiographic regions of the U.S. - five plains, five plateaus, four mountains and two

ranges.[8] Although the geomorphic principles and U.S. geomorphic regions have been refined and

redefined by numerous writers since Powell, there is considerable overlap between Powell's and

the currently recognized geomorphic regions.[9]

By the late nineteenth century, the need to define more useful regions of the U.S. to

convey census and other social statistics was also recognized. Since the inception of the census in

1790, census officials reported information by counties, states and the nation. However, they

believed that these geographic units failed to "meet the requirements of statistics" since the

continental United States was too large to be treated as a single unit and states and counties were

too numerous and too diverse in characteristics to be informative. Therefore, Henry Gannett, the

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[8] The physiographic regions are: Atlantic plains, Piedmont plateaus, Appalachian ranges, Allegheny plateaus, New England plateaus, Lake plains, Prairie plains, Gulf plains, Ozark mountains, Great plains, Stony Mountains, Park mountains, Columbia plateaus, Colorado plateaus, Basin ranges, and Pacific Mountains.

[9] See Joerg (1914), Bowman (1911), Fenneman (1931, 1938), Loomis (1937), Atwood (1940) and Thornbury (1965, 1969).

geographer of the census, devised the census regions between 1880 and 1910. In 1880, Gannett

first developed the five main census divisions: North Atlantic, South Atlantic, North Central,

South Central and Western. The five main divisions were then further subdivided to obtain eleven

subdivisions in 1900 but, two of the subdivisions were re-aggregated in 1910 to arrive at the

current nine census divisions. Although little detailed evidence survives concerning the

considerations which led Gannet to the current census regions, it is clear that he applied the

principles of geomorphology in his consideration.[10]

The census regions were chosen based on the homogeneity of topography, climate, rainfall

and soil but were subject to using contiguous state political boundaries. Despite its flaws, the

census definition of the U.S. regions is likely to serve well as regional boundaries for agriculture,

forestry and natural resources. Moreover, since the outputs of these industries are inputs to

manufacturing, the regions are also likely to serve well as economic regions, and thus, this paper

adopts the census regions as the basic unit of observation.[11]

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[10] Gannet wrote: "As will be noticed, the country is divided primarily into three great divisions: the Atlantic region, the region of the Great Valley, and the Western or Cordilleran region, corresponding to the three primary topographical divisions of the country. Each of the two eastern division is divided by a line approximately east and west. This line between the two sections of the Atlantic division follows Mason and Dixon's line; that between the two sections of the Great Valley follows the Ohio river and the south boundary of Missouri. This east and west line separates districts that are very sharply distinguished from one another by population, social conditions, and interests, as well as climate. (Twelveth Census of U.S., 1900: Special Reports)" The states within census regions are geomorphically more homogenous when compared against states in other regions. In addition, Gannet may have applied additional criteria such as the historical patterns of settlement, the percentage of native, foreign, and African American population, the distribution of urban and rural population, the distribution of manufacturing and agriculture employment, and civil organization.

[11] Since Gannet's census regions were designed to be used for a variety of purposes, they are likely to involve compromises from any particular point of view. However, despite attempts by numerous writers such as Perloff et. al (1960) and Bogue and Beale (1961) to define alternative U.S. regions, the census regions remain the most widely used. For definitions of agricultural and forest regions of the U.S., see Baker (1926) and Bowman (1911).

IV. Economic Integration and U.S. Regional Specialization.

The U.S. regions were able to establish sizeable population levels prior to their rapid integration. Early in the nineteenth century, the population was concentrated along the eastern seaboard states in the New England, Middle Atlantic and South Atlantic regions. However, incentive to migrate increased as the population grew. Given the importance of land in an agricultural economy and the relative abundance of land in the west, people migrated to that region. The costs of migration were high but the expected benefits were even higher. By the late nineteenth century, the percentage of people residing in the New England and South Atlantic regions fell sharply, the percentage in Middle Atlantic remained relatively constant, and in most other regions, it rose significantly. Although the regional distribution of the U.S. population continued to change during the twentieth century, significant regional economies formed through migration and natural population increase by the late nineteenth century (see Figure 1).

This section presents data on the long-run trends in U.S. regional specialization in agriculture, manufacturing, wholesale trade, retail trade, services and the overall economy. The index of regional specialization used in this paper captures the differences in the industrial structure of regions. The index of regional specialization used in this paper is defined as:

$$SI_{ij} = \sum_{i=1}^{n} |\frac{E_{ij}}{E_j} - \frac{E_{ik}}{E_k}|,$$

where E_{ij} is the level of employment industry i=1, . . . , n for region j and E_j is the total industrial

employment for region j and similarly for region k.[12] If the index is equal to zero, then the two

regions, j and k, are completely de-specialized and the industrial structures of the two regions are

identical. Moreover, if factor prices equalize across the two regions, the two regions should also

have identical income per capita since each region has the same proportion of its labor force in

each of the industries. On the other hand, if the index is equal to 2, then the regions are

completely specialized and possess completely different industrial structures. Since each region

has its workforce in completely different industries, there is no reason for income per capita to

converge even if factor prices equalize. Given the nine census divisions, there are thirty-six bi-

regional indexes. These indexes are averaged to derive an overall measure of U.S. regional

specialization.

Regional Specialization in Agriculture

The continental United States, given its vast geographic variation in topography, soil,

climate and rainfall, possesses great potential for territorial division of labor in agriculture.[13] The

U.S. regions achieved significant levels of specialization by the mid-nineteenth century as the early

American economy was based on exports of agricultural products. As these regions became more

regionally integrated, regional specialization in agriculture increased even more.

The data on the value of output of various agricultural products are used to calculate the

index of regional specialization for agriculture.[14] For reasons of historical comparability, the

following agricultural products are used: wheat, barley, corn, oats, rye, cotton, tobacco and

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[12] The index is from Krugman (1991b). For a more detailed discussion on the index see Kim (1995).

[13] See Baker (1926-1932) and Haystead and Fite (1956).

[14] Data on employment by agricultural crops are unavailable.

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vegetables.[15] The data for earlier years up to 1920 are from the *Census of Agriculture*; data for

1956 to 1987 are from the *Agricultural Statistics*.

Regional specialization in agriculture, already high by the late nineteenth century, rose

throughout the twentieth century. The index of regional specialization rose steadily from 0.98 to

1.25 between 1870 and 1987 (see Figure 2 and Table 1). The examination of the regional

distribution of some of the major agricultural products, such as wheat, corn, cattle and dairy,

indicates that the rise in regional specialization was accompanied by significant regional

reallocation (see Table 2). In 1840, more than 60 percent of wheat was threshed in the two

northern regions, Middle Atlantic and East North Central, while the bulk of the remaining forty

percent was threshed in two southern regions, South Atlantic and East South Central. By 1900,

the center of the wheat growing region shifted to the West North Central region where

approximately 50 percent of wheat was grown.[16] During the first half of the nineteenth century,

corn was grown in the East North Central and in the two southern regions, South Atlantic and

East South Central. However, since the late nineteenth century, corn production became

concentrated in the corn-belt states of the West North Central and the East North Central regions

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[15] Data prior to 1900 are given in gross output form such as bushels and pounds. Prices from the Historical Statistics of the United States are used to convert output into value terms. Due to the difficulty of obtaining regional agricultural prices, it is assumed that prices are equal across regions.

[16] In the first half of the nineteenth century, the falling transportation costs via the introduction of steam vessels on the Ohio and the Mississippi rivers shifted the center of wheat growing regions from the Atlantic seaboard to Ohio. This was followed by the construction of the Erie Canal which shifted the center further West to Illinois, Indiana and Wisconsin. In the second half of the nineteenth century, the geography of wheat growing regions were significantly changed by technical advances in flour milling and the growth of the railroads. The refinement of the automatic all-roller gradual reduction mill, which enabled the processing of hard winter and spring wheat, shifted the wheat growing regions further West.

where the climatic, rainfall, topographic and soil conditions are almost ideal for its production.[17]

As late as 1870, the dairy industry was located near population centers and close to 70 percent of

milk was produced in the Middle Atlantic region. The location of the dairy industry changed

between the late nineteenth to the early twentieth centuries as the East North Central region

became increasingly more important, but during the latter half of the twentieth century, milk

production became more regionally dispersed.[18]

The geographic movements of cotton and tobacco followed different patterns. The

regional distribution of cotton was already concentrated in the Southern regions by the mid-

nineteenth century and showed relatively little change until the latter half of the twentieth century.

Cotton production, for most of the nineteenth and the first half of the twentieth centuries, was

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[17] The corn-belt may have an absolute advantage in the production of many agricultural products. The dark brown to black prairie soils are very fertile, the warm, humid summer seasons are conducive to growth, the winter temperatures are mostly below freezing and therefore retards soil leaching, the rainfall is heavy during the warm growing season, and the land is practically level to rolling.

[18] The climatic and topographic conditions of the East North Central and the Middle Atlantic regions give these regions comparative advantage in the production of hay and pasture which is used to feed dairy cattle in the winter and summer respectively. The climate in this region is too cold for corn or winter wheat but the cool summers keep the milk sweet for a longer period thereby making it easier to handle. Moreover, even though the region is hilly and difficult to plow, the hay and pasture requires no plowing and little labor and keeps the farmers profitably employed throughout the year. Baker (1926), p463: "Wisconsin now has more dairy cows and probably produces more milk than any other state in the Union... The development of the dairy industry in this state has been due largely to temperature conditions. First, the cool summer temperatures favor a low bacterial content in the milk and the production of quality of dairy products, especially cheese, which is not readily obtainable in warmer climates. Second, the low temperature and high summer rainfall promote pasturage of high quality which is best utilized by dairy cows, and which also reduces the agricultural work of the summer, so far as the feeding of cattle is concerned. Third, for the same reason, corn can be grown for silage, but not so satisfactorily for grain, and the silage, together with hay, the production of which is favored by the climate, provides excellent winter feed for dairy cattle. Fourth, dairying affords profitable employment to the rural population during the winter, and this is peculiarly adapted to the climatic conditions existing in the state. Within the state, moreover, there has occurred a geographic division of the territory between the production of butter and of cheese which also has been due largely to the influence of temperature conditions."

concentrated in the South Atlantic, East South Central and West South Central regions, but moved further westward to the Mountain and Pacific regions during the second half of the twentieth century. Tobacco production was highly concentrated in two Southern regions, South Atlantic and East South Central, by the mid-nineteenth century and its concentration in those regions increased even more during the twentieth century.

Regional Specialization in Manufacturing

The data on manufacturing employment by twenty 2-digit industries are used to construct the index of regional specialization for manufacturing. The data for 1860 and 1900 are from Niemi (1974) who categorized the raw data into 2-digit industries using the 1963 standard industrial codes. Since Niemi omitted the Mountain and Pacific regions, the data for these two regions were added. The remaining data are from the *Census of Manufactures* and *Annual Surveys of Manufactures*. The 1972 census definitions and Niemi's product list are used to categorize the raw data for years prior to 1939 into 2-digit industries.

Regional specialization in manufacturing, after a slight decline between 1860 and 1890, rose substantially toward the turn of the twentieth century. The level of regional specialization flattened out during the interwar years but then fell continuously and substantially through 1987 to the point where regions were less specialized than they were in 1860. The aggregate index of regional specialization for manufacturing, calculated using census divisions and the two-digit SIC employment levels, was 0.69 in 1860, fell to 0.61 in 1890 before increasing to 0.75 in 1900. The index plateaued at 0.89, 0.86, and 0.87 in 1914, 1927 and 1939 respectively, and then fell to

historic low levels of 0.45 in 1987 (see Figure 2 and Table 3).[19]

Regional Specialization in Wholesale and Retail Trade

The data on wholesale and retail trade employment are used to calculate their respective

indexes of regional specialization. The data for 1929 and 1939 are from the *Census of*

Distribution; the data from 1954 to 1987 are from the *Census of Business* and the *Census of*

Wholesale Trade and *Census of Retail Trade*. For wholesale trade, the data are categorized at the

twenty 2-digit industry level which coincides with the definitions for manufacturing industries.[20]

For retail trade, the data was categorized at the current 2-digit retail industry definitions.[21]

Regional specialization in wholesale trade was relatively low in 1939 and continued to

decline over the twentieth century. The index of regional specialization was 0.32 in 1939, fell to

0.26 in 1958, and then declined further to 0.20 in 1987 (see Figure 2 and Table 4). The level of

regional specialization in retail trade was lower than wholesale trade and exhibited similar trends

over time. The index of regional specialization in retail trade was 0.18 in 1929 and fell

consistently to 0.11 in 1987 (see Figure 2 and Table 5).

Regional Specialization in Services

The data on service employment at the 2-digit industries from the *County Business*

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[19]   The qualitative pattern of regional specialization found at the two-digit level using census divisions are robust to how regions and products are defined. Similar results are obtained if the products are defined at the three-digit level or if the regions are defined at the state level. For details see Kim (1995).

[20]   The current wholesale trade 2-digit industries consist of two broad categories - durable and nondurable goods. The individual 3-digit and 4-digit industries were used to categorize the wholesale data into 2-digit industries comparable to the census of manufactures.

[21]   The retail trade industries consist of food and general store, general merchandise, apparel, furniture, automotive, filling stations, eating, drug stores and other.

Patterns are used to construct the index of regional specialization for services.[22] Regional

specialization in services was low and remained low between 1947 and 1987. The index of

regional specialization for services was 0.19 in 1947, rose slightly to 0.24 in 1967, and remained

stable at 0.23 and 0.21 in 1977 and 1987 respectively (see Figure 2 and Table 6).

Regional Specialization in All Economic Activities

Data on one-digit sectoral employment is used to calculate the index of regional

specialization for all economic activities. The data for the period between 1870 to 1950 are from

Perloff et. al. (1960) and the one-digit industries include agriculture, mining, forestry, fishing,

manufacturing, and services. The data for the period between 1939 to 1987 are from the *Census*

of Agriculture, *County Business Patterns* and *Census of Governments*. The one-digit industries

for this latter period are slightly more comprehensive and include agriculture, mining,

construction, manufacturing, transportation, wholesale trade, retail trade, finance, services, and

government.

Regional specialization in the overall economy rose through the nineteenth century,

leveled off between the late nineteenth and the early twentieth centuries, and then fell

precipitously through most of the twentieth century. The index of regional specialization in all

activities increased slightly from 0.50 to 0.60 between 1870 and 1880 but then remained at 0.53

between 1880 and 1910.[23] However, between 1939 and 1987, the index of regional specialization

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[22] Services in this study consist of hotel and other lodgings, personal services, business services, auto repair, services, and garages, miscellaneous repair services, motion pictures, amusement and recreational services, health services, legal services, educational services, social services, museums and botanical zoological gardens, membership organizations, and miscellaneous services.

[23] For the period between 1870 and 1950, the one-digit industries consist of agriculture, mining, forestry, fishery, manufacturing, and services. For the period between 1939 and 1987, the industries were

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in all economic activities fell from 0.50 to 0.20 (see Figure 2 and Table 7).

IV. Explaining the Trends in U.S. Regional Specialization.

Regional specialization may arise as regions exploit their comparative advantage, take advantage of economies of scale in production, or both. The Heckscher-Ohlin model predicts that regional specialization will arise as regions produce and export products that are relatively intensive in their abundant resource. The increasing returns model predicts that regional specialization will arise if external economies are significant or if conventional production economies of scale dictate that only a few large plants can satisfy total demand.[24] However, both of these predictions of the standard trade models assume that economic integration is characterized by perfect mobility in goods and perfect immobility of factors. More generally, the patterns of regional specialization depend on the relative mobility of goods with respect to that of factors.[25] If economic integration is characterized by greater mobility of factors relative to that of final goods, then the Heckscher-Ohlin model predicts regional de-specialization whereas the increasing returns model predict even greater level of regional specialization.

Few scholars question the proposition that the location of agricultural products is explained by the Heckscher-Ohlin model. Since land is immobile and agricultural crops are

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agriculture, mining, construction, manufacturing, transportation, wholesale trade, retail trade, finance, services and government.

[24] See Krugman (1991b).

[25] Regional economists categorize goods by whether the industry is "material-oriented" or "market-oriented." If there are large weight reductions in the manufacturing processes, then these activities are predicted to locate near the materials they consume. If there is little weight reductions, or if the final goods are fragile, highly perishable or dangerous to transport, then these activities are predicted to locate near their markets. Thus, "material-oriented" and "market-oriented" typography usefully summarizes the net transportation costs of final goods relative to their factors.

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intensive in land, the Heckscher-Ohlin model predicts that agricultural products will be produced

in regions with comparative advantages in the various agricultural crops. The location of various

agricultural crops is determined by the qualities of land which are functions of topography,

climate, rainfall, and soil. The topography or physical relief of a region determines the type and

intensity of crop production.[26] The climate, which is primarily a function of latitude, determines

the length of the growing season. The northern-most regions of U.S. average less than 90 days of

growing season while the southern-most average more than 240 days.[27] The average annual

precipitation, in general, rises from west to east, except for the northern pacific coast; in the

eastern half of the U.S., it rises from north to south.[28] However, the more pertinent statistic, the

percentage of rainfall received during the warm months, April to September, differs from the

average annual patterns. The fertile regions of the Midwest tend to receive the most rainfall

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[26] Baker (1926), p.461: "Because of erosion as well as the increased cost of cultivation, land having a slope of over fifteen feet in 100 feet horizontal distance generally should not be put into crops, but kept in pasture or forest, and land in humid regions having over twenty-five feet of slope in 100 should be kept in forest, since if put into crops, or even used for pasture, the soil is likely to wash away."

[27] Other contributing factors are the relative distribution of land and water, the elevation of the land above the sea, and the prevailing winds.

[28] "The chief causes of and abundant rainfall are (1) nearness to the ocean or other large body of water such as the Gulf of Mexico or the Great Lakes in the United States, (2) location within or near the track of cyclonic storms, and (3) mountain ranges athwart the rain-bearing winds. The western slopes of the Coast Ranges of Oregon face the ocean and run at right angles to the westerly winds, and their rainfall exceeds 100 inches a year; the Ohio Valley lies in the track of the more or less regular cyclonic storms that move north westward from the Gulf, and receives a rainfall of 40 to 50 inches a year; nearness to the sea gives the greater part of the Atlantic and Gulf coasts a higher rainfall, 50 to 60 inches, than is enjoyed by any portion of the eastern half of the country except the mountains of Western North Carolina. by contrast the mountain-rimmed parks of Colorado, and the great Basin of Nevada, are regions of diminished rainfall; the coast of southern California owes its dryness chiefly to its position outside the belt of cyclonic storms; the dryness of North Dakota is chargeable chiefly to remoteness from the sea..." Bowman (1911, p117)

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during this period.[29] Finally, regional soil quality depends largely upon the geomorphology of its region.[30]

Technical advances in harvesting, manufacturing and horticulture also contributed to the enhancement of geographic advantages in agriculture.[31] For example, the invention of mechanical reapers and threshers, the introduction of hard winter and spring wheat, and the development of the automatic, all-roller, gradual reduction flour milling system gave significant regional comparative advantage in wheat growing to the Midwestern regions of the United States. The introduction of refrigerated cars and improvements in sanitation and pasteurization, which allowed the long distance shipments of meat and dairy products, increased the comparative advantage of corn- and hay-growing regions.

Scholars remain divided on whether the location of manufacturing is driven by regional comparative advantage or external economies of scale. The concentration of manufacturing activities in the manufacturing belt between the late nineteenth and the early twentieth centuries has been used by numerous writers as evidence for the importance of some kind of increasing

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[29] The Midwestern regions average between 60 to 80 inches of rainfall during the warm months while most other regions receive between 30 to 60 inches. Bowman (1911), p.120.

[30] See Bowman (1911) and Haystead and Fite (1956).

[31] See Baker (1926, p.460-1): "The invention and extensive use in the United States of farm machinery, which is constantly becoming more efficient and essential to profitable crop production, has greatly increased and is still increasing the influence of topography in determining the utilization of the land. Hilly regions, in addition to the former drawbacks of lesser accessibility as compared with level lands, and the disadvantages of shallower and less fertile soil, now suffer from the further disadvantage of being poorly adapted to the use of modern farm machinery... On the other hand, the level surface of much of the land in the semi-arid sections of the Great Plains, which permits the use of the most modern machinery, makes the production of grain profitable under much more arid conditions than is the case where less efficient machinery must be used. "

returns.[32] Moreover, the rise of two regions, the "manufacturing belt" and the "south," during this period has been used as evidence for the emergence of core and periphery regions.[33]

In a recent article, Kim (1995) has argued that the long-run trends in U.S. regional specialization and localization is more consistent with explanations based on the Heckscher-Ohlin model and production scale economies and inconsistent with explanations based on external economies. In particular, the proponents of models based on increasing returns fail to note that, the core and periphery regions, if they ever existed during the late nineteenth and the early twentieth centuries, have all but disappeared during the twentieth century. Contrary to the predictions of the models based on externalities, regional specialization in manufacturing has

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[32] For example, Ullman (1958, 196) writes; "Concentration within countries is the rule. This fact may signal the operation of a general localization principle in man's use of the earth: initial location advantages at a critical stage of change become magnified in the course of development. Geographic differentiation starts out as a matter of homeopathic doses of mild concentration and winds up as a system of massive localization based on a wide range of internal and external economies of scale... This concentration in practice takes the form of an area of concentration in many countries as in the American manufacturing belt." More recently, Krugman (1991b, 5) writes, "Step back and ask, what is the most striking feature of the geography of economic activity? The short answer is surely *concentration*... This geographic concentration of production is clearly evidence of the pervasive influence of some kind of increasing returns."

[33] For example, Krugman (1991b, 22) writes: "We can now tell a stylized story of the rise of the manufacturing belt. In the early United States, with its primarily agricultural population, where manufacturing was marked by few scale economies and where transportation was costly, no strong geographic concentration could occur. As the country began its industrial transition, manufacturing arose in areas that contained most of the agricultural population outside the South - and the South was, for reasons having to do with its uniquely awful institutions, unsuited for manufacturing. During the second half of the nineteenth century, however, manufacturing economies of scale increased, transportation costs fell, and the share of the population in nonagricultural occupations rose. The result was that the initial advantage of the manufacturing belt was locked in. Even though new land and new resources were exploited to the west, even though slavery ended, for three-quarters of a century the pull of the established manufactured areas was strong enough to keep the manufacturing core virtually intact." Also see Meyer (1983).

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decreased rather than increased significantly since the mid-twentieth century.[34]

Kim (1995) argues that the trend in U.S. regional specialization of manufacturing can be explained by changes in the relative mobility of factors within the context of the Heckscher-Ohlin model and changes in scale economies.[35] As transportation costs fell between the late nineteenth and the turn of the twentieth century, firms adopted large scale production methods that were intensive in relatively immobile resources and energy sources. The rise in scale and the use of immobile resources caused regions to become more specialized. However, as factors became increasingly more mobile and as technological innovations favored the development of substitutes, recycling, and less resource intensive methods during the twentieth century, regional resource differences diminished. The growing similarity of regional factor endowments and fall in scale economies caused regions to become de-specialized between World War II and today.

The long-run trends in regional specialization in wholesale and retail trade and other services also seem more consistent with explanations based on the Heckscher-Ohlin model. The

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[34] Kim (1995) also examines the long-run trends in U.S. industrial localization. Kim (1995, p897) writes: "Marshallian externalities - labor market pooling and technological spillovers - are expected to be positively correlated with levels of intensities in research and development, information, skilled workers and rates of technological innovations. Industries with these characteristics are often termed the high-tech industries. If localization is caused by external economies, then high-tech industries should be more localized then low-tech industries (Krugman, 1991b). The dynamic trends and cross-sectional industry localization patterns, however, seem to be negatively correlated with measures associated with high-tech industries. First, despite the rising trends in the intensities in research and development, information, and skilled workers in manufacturing between World War II and 1987, the level of regional specialization in manufacturing fell rather than rose over the period. Second, skill intensity, research and development and rates of technological innovations for tobacco and textile industries fell while those for machinery, electrical machinery and transportation rose. Yet localization levels for the former rose over time but fell for the latter industries. Third, in 1987, localization levels for high-tech industries are comparably lower than low-tech industries such as tobacco and textiles. In sum, contrary to claims made by Krugman (1991b), the historical trends in U.S. regional specialization raise doubts whether geographic concentration provides evidence for the significance of external economies."

[35] See Kim (1993, 1995) for more detail. For additional evidence, see Kim (1996, 1997).

most significant input for services, labor, is mobile whereas the final goods of many services is quite geographically immobile since the receipt of these services require that production and consumption occur in the same location. Since inputs to most services are more mobile relative to final goods, the Heckscher-Ohlin model predicts a low level of regional specialization whereas the increasing returns model predicts a high level of regional specialization. As predicted by the Heckscher-Ohlin model, regional specialization in these service industries was low and remained low over time.

The long-run trend in regional specialization at the broad one-digit sectoral level is explained by the secular rise in incomes and the Heckscher-Ohlin model. Since agriculture, manufacturing, and services exhibit considerably different patterns of regional specialization, the structural shift in industrial structures brought on by the secular rise in incomes has a pronounced impact on regional specialization of the overall economy. As the overall industrial structure shifted from agriculture to manufacturing between the early nineteenth and the early twentieth centuries, regional specialization at the one-digit level rose. The northern region became specialized in manufacturing while the southern region remained specialized in agriculture. However, since the mid-twentieth century, the diminished relative importance of agriculture and manufacturing and the rising importance of services have led to a dramatic convergence in the U.S. regional economic structures.

VI. Explaining the Trends in U.S. Regional Income Per Capita.

The historical trends in U.S. regional income per capita have been well documented by

Easterlin (1960, 1961) and a number of other scholars.[36] In 1840, when the U.S. regions were

relatively isolated, the regional incomes were quite similar, especially if the income per capita of

the South excludes the slave population. As the U.S. regions became integrated between the

nineteenth and the early twentieth centuries, the regional income per capita diverged. The most

significant cause of regional income divergence was caused by the sharp relative decline in

Southern income per capita. During the first half of the twentieth century, regional income per

capita converged, but the Southern income per capita remained well below the national average.

However, since the mid-twentieth century, regional income per capita, including that of the

South's, rapidly converged toward the national average.

The trends in U.S. regional incomes have been recently examined from the growth

perspective by Barro and Sala-i-Martin (1991, 1992).[37] In their papers, Barro and Sala-i-Martin

argue that the convergence of U.S. regional and state income between 1880 and 1990 is

consistent with the neoclassical growth model rather than with models based on increasing

returns.[38] They show that the growth of U.S. regional and state incomes between 1880 and 1990

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[36] Easterlin (1960, 1961) documents U.S. regional incomes between 1840 and 1950. Barro and Sala-i-Martin (1992) and numerous other scholars provide information on incomes between 1950 and 1990. The regional differences in income per capita in 1840 depends on whether the Southern figures include the slave population. If the income per capita for the Southern regions includes the slave population, then the South's average falls well below that of other regions. However, income per capita of the white population in the South exceeded that of the national average. See Easterlin (1960) and Fogel (1989).

[37] Also see Carlino and Mills (1993, 1996) who examine the convergence of U.S. income per capita and earnings from a time series perspectives.

[38] Barro and Sala-i-Martin identify two measures of income convergence: β-convergence and σ-convergence. β-convergence occurs when poor economies grow faster than rich ones and σ-convergence occurs when there is a decline in cross-sectional dispersion of income per capita. The neoclassical growth model implies β-convergence. Barro and Sala-i-Martin also distinguish between absolute convergence and conditional convergence. The hypothesis that poor countries grow faster than rich countries without conditioning on any other characteristics of economies is defined as absolute convergence. The concept that

were inversely related to the initial 1880 income levels as predicted by the growth model.[39] Barro and Sala-i-Martin attribute the regional income divergence between 1840 and 1880 to the Civil War, but provide no explanation as to why the war had such a protracted negative influence on Southern incomes. They also provide little direct evidence that the regional income convergence is driven by the convergence in capital-labor ratios.

This section examines the historical trends in U.S. regional incomes from the trade perspective which explains differences in regional incomes utilizing differences in regional industrial structures. In order to accomplish this result, this section adopts a simple procedure used by Hanna (1951) who constructs two counterfactual regional income estimates to separate out income differences due to industry-mix and wage effects. One hypothetical income is based on the assumption that all regions have identical industrial-mixes and identical wages in each of the industries. In this instance, all regional income per capita would be identical to the overall national average. The second hypothetical income per capita is based on the assumption that regions have different industrial structures but identical income per capita at the industry level. The industry income per capita for all regions is set equal to the national industry income per capita. The two

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an economy grows faster when it is further away from its steady state is defined as conditional convergence. Barro and Sala-i-Martin (1992) show that the incomes of U.S. regions and states exhibit absolute, β-convergence. It is important to note that the U.S. regional incomes also exhibit σ-convergence.

[39] Barro and Sala-i-Martin (1991) control for industrial structures using the following weighted index:

$$S_{it} = \sum_{j=1}^{9} w_{ij, t-T} * \log(\frac{y_{jt}}{y_{j, t-T}}),$$

where $w_{ij,t-T}$ is the weight of industry j in state i's personal income at time t-T, and y_{jt} is the national average of personal income in sector j at time t, expressed as a ratio to national population at time t. The industries consist of the nine one-digit industries.

hypothetical income per capita and the actual income per capita are then used to estimate

industry-mix and wage effects. The difference between the two hypothetical incomes, industry-

mix income and the overall national average, provides a measure of the income differences due to

the divergence in regional industrial structures. The difference between the actual income per

capita and the hypothetical industry-mix income provides a measure of the income differences due

to divergence in wages.

For the period between 1840 and 1900, data from Easterlin (1961) are used to estimate

the causes of regional income divergence. Since Easterlin only provides information on

agricultural and non-agricultural labor incomes, the regional differences in industrial structures are

measured by using these two categories. For the period between 1900 and 1987, data on one-digit

industrial employment from section V and earnings data from Schwartz and Graham (1955) and

Survey of Current Business (1989) are used to estimate the causes of income convergence.[40]

The use of the broad industrial categories, agriculture and non-agriculture, or even the

one-digit industries, may attribute greater importance to wages in explaining regional differences

in income per capita than is deserved. Regional wages in agriculture and manufacturing activities

may be different because of differences in regional industrial structures at a more finer industry

level. Data from Niemi (1972) and Census of Manufactures are used to examine the extent to

which wage effects attributed at the broader industry categories are due to differences in industrial

structures at a more finer two-digit level.

The calculations in Table 8 indicate that differences in industrial structures and differences

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[40] Personal income is composed of three major components: wages and salaries, personal dividend, interest, and rental incomes, and transfer payments. Due to data availability, this section examines only the wage and salary component of personal income.

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in wages at the broad industry level played significant roles in causing incomes to first diverge and then converge between 1840 and 1954. The relative importance of industry-mix and wage effects on incomes differed by regions. For some regions, such as the New England and Middle Atlantic regions, favorable regional industrial structures were responsible for their relatively high aggregate income per capita. For other regions, such as the Mountain and Pacific regions, their relatively high aggregate incomes were attributed to favorable wages. For the remaining regions, both industrial structures and wages played important roles in affecting their incomes.

The most significant cause of income divergence between 1840 and 1900 was the sharp relative decline in Southern income per capita caused by the region's growing unfavorable industry-mix and lower wages relative to other regions. In 1840, about 90 percent of the labor force in the Southern regions were employed in agriculture as compared to 71 percent for the rest of the nation. However, by the turn of the twentieth century, the differences widened. In 1900, 82 percent of the labor force in the Southern regions remained engaged in agricultural activities as compared to only 43 percent for the rest of the nation.[41] Since agricultural workers earned less than half of the income of non-agricultural workers throughout this period, the Southern industry-mix toward agriculture lowered its aggregate income per capita relative to other regions.[42] The calculations in Table 8 show that the Southern income per capita in 1880 and 1900 would have

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[41] Goldin and Sokoloff (1982, 1984) argue that one of the sources of northern region's comparative advantage in manufacturing was its abundance in female and child labor force.

[42] Kuznets (1957a, 1957b) finds that there is a negative and pronounced correlation between income per capita and shares in agriculture, and a sightly weaker negative correlation with shares in mining. Kuznets finds a positive correlation between income per capita and shares in manufacturing, and weakly positive with shares in construction and other service sectors. Also see Perloff (1957) and Perloff et. al. (1960).

increased by as much as 20 percent if its industrial structure converged toward that of the national

industrial structure. The data on Table 8 also show that Southern incomes fell relative to the

national average because its workers received less income than workers in other regions in both

agricultural and non-agricultural industries. In fact, lower relative wages were more important

than unfavorable industry-mix in explaining the relative decline in the income per capita of the

South Atlantic and East South Central regions. The lower wages were responsible for a decrease

in Southern income per capita by 20 to 50 percent in 1800 and 1900.[43]

The convergence of regional incomes between 1900 and 1954 was caused by the growing

similarities in regional industrial structures and the convergence of regional wages at the industry

level. For all regions in 1954, the income differences which can be attributed to the industry-mix

effect were considerably lower than they were in 1900. In 1954, the unfavorable industry-mix

toward agriculture accounted for only a 2 to 17 percent reduction in Southern income per capita.

Moreover, the favorable industry-mix income effect for New England and Middle Atlantic regions

fell from 25 percent to less than 10 percent between 1900 and 1954. The reduction in the

importance of differences in regional wages was even more dramatic. Both the disadvantages of

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[43] Economic historians have advanced a variety of explanations for the decline in Southern income per capita. While Goldin and Lewis (1975) attribute the decline to the physical damage caused by the Civil War, most economic historians blame the decline in the productivity in southern agriculture. There is however, considerable controversy concerning the exact cause of the decline in southern agricultural productivity. Wright (1978) believes that the collapse of the world cotton boom contributed to the decline. More recently, Wright (1986) has also argued that the general stagnation of the southern economy was caused by the development of an isolated southern labor market. Ransom and Sutch (1977) attribute the decline to monopolistic credit markets and the withdrawal of black labor. Fogel and Engerman and their co-contributors argue that the most important factor in the decline in southern productivity was due to the break-up of the gang labor system (see Fogel and Engerman (1988), Fogel (1989), Yang (1988), Moen (1992), among many others)). While the decline in southern manufacturing wages played a relatively minor role in the decline of southern income per capita, there is evidence that its lower wages during this period was caused by its lower capital-labor ratios (see Niemi (1972)).

lower wages in the Southern regions and the advantages of high wages in the Mountain and Pacific regions diminished considerably.[44]

The U.S. regional income per capita continued to converge over the second half of the twentieth century. The convergence in regional income per capita during this period was accounted for by significant convergence in regional industrial structures. Between 1954 and 1987, the percentage of earnings that is attributed to differences in industrial structures fell in every region. By 1987, differences in regional industrial structures accounted for only a small fraction of the differences in earnings.[45] The convergence in regional wages also contributed to the convergence in earnings, but its influence was less significant.[46] While the percentage of earnings that is attributed to differences in wages fell for the majority of regions between 1954 and 1987, differences in wages continued to play a significant role in causing regional incomes to differ in 1987.

However, differences in income per capita attributed to wages at the broad one-digit industry categories may be due to regional differences in industrial structures at the finer level of

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[44] The regional capital-labor ratios in manufacturing converged by 1954 (see Moroney (1972) and Kim (1993)).

[45] Agricultural earnings per worker in 1987 calculated in Table 8 seem quite low relative to that of other sectors. The most probable cause is due to the prevalence of migrant or part time workers in agriculture. The low relative agricultural wage is likely to bias the result toward attributing income differences to differences in industrial structures than wages. However, given the size of the agricultural sector in 1987, the bias is likely to be small.

[46] A study by Garnick and Friedenberg (1982) estimate that over half of the narrowing of the regional personal income per capita between 1940 and 1979 were accounted by the convergence of regional industrial structures. On the other hand, reduction in regional wage differentials contributed to only about one-tenth of the convergence. Garnick and Friedenberg also find that other factors such as a more uniform regional distribution of personal dividend, interest and rental incomes, of transfer payments, and of the working age population all played a role in accounting for the convergence in U.S. regional incomes.

aggregation.[47] In agriculture, there is considerable evidence that the lower agricultural wages in the Southern regions between 1880 and 1900 were due to their specialization in cotton and tobacco rather than in grain and other agricultural crops. In manufacturing, the evidence is more mixed. The main cause of the decline in Southern manufacturing incomes in 1860 and 1900 still seem to be differences in wages rather than differences in industrial structures (see Table 9). However, as regional industrial structures in manufacturing at the two-digit level diverged between 1900 and 1947, the differences in industrial structures became a more significant cause of differences in manufacturing incomes. Both the industry-mix and wage effects declined slightly between 1947 and 1987.

VII. Conclusion.

One of the most important trends in history is the growing integration of regional and national economies over time. Yet, scholars remain divided on the effects of economic integration on regional and national industrial development and growth. On one hand, the proponents of new trade and growth models take the position that economic integration will lead to a divergence in industrial structures and incomes.[48] On the other, the proponents of the neoclassical growth models argue that economic integration will inexorably lead to a convergence in incomes.[49] This paper offers still another point of view based on the neoclassical models of trade which argues

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[47] Kuznets (1957b) finds a negative correlation between income per capita and regional concentration in raw material intensive industries such as food, tobacco, textiles, lumber, furniture, paper, chemicals, petroleum, and stone, clay and glass. On the other hand, Kuznets finds a positive correlation with regional concentration in fabricated branches of manufacturing industries such as machinery and equipment of various types. Also see Perloff (1957), Perloff et. al (1960), and Hanna (1951, 1957, 1959).

[48] See Romer (1986) and Lucas (1988) for growth models based on increasing returns. See Krugman (1991a, 1991b) for models of trade and geography based on increasing returns.

[49] See Solow (1956), Barro (1991), Barro and Sala-i-Martin (1991, 1992, 1995).

that the divergence and convergence in regional incomes are explained by the divergence and convergence of regional industrial structures.[50]

The regional economies of the United States between the nineteenth and the twentieth centuries provide a unique opportunity to study the effects of economic integration on regional industrial structures and regional incomes. During this period, the United States progressed form a set of regional economies to an integrated national economy. The process of economic integration affected U.S. regional incomes differently over time. Between the early nineteenth and the turn of the twentieth centuries U.S. regional income per capita diverged. However, since the beginning of the twentieth century, U.S. regional income per capita has converged significantly.

Although the divergence in regional income per capita in the U.S. between the nineteenth and the turn of the twentieth centuries appears to be consistent with predictions of the new trade and growth models based on increasing returns, the divergence can be accounted for by the growing dissimilarities in regional factor endowments. In the early nineteenth century, U.S. regional factor endowments were relative similar. The U.S. economy was predominantly agricultural and most regions were endowed with excellent agricultural land. However, as manufacturing became more important between the nineteenth and the early twentieth centuries, regional factor endowments became increasingly dissimilar. Regional differences in resources such energy and minerals and well as in capital and skilled labor became significantly more important as the U.S. economy became a manufacturing-based economy. And, as predicted by the neoclassical trade model, the divergence of regional factor endowments contributed to the divergence in

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[50] The examination of regional and national income per capita differences from the industrial perspectives was pioneered by Kuznets (1957a, 1957b), Hanna (1951, 1957, 1959), and Perloff et. al. (1960). For more recent works, see Dollar and Wolff (1993), and Slaughter (1997).

regional industrial structures and regional income per capita.

The divergence in U.S. regional incomes was also caused by divergence in regional wages. In particular, the divergence in U.S. regional wages was caused by the significant relative decline in wages in the southern region in the agriculture and non-agricultural industries. Although economic historians continue to disagree on the exact causes, the relative decline in Southern agricultural wages was quite severe. In manufacturing, the lower southern wages relative to other regions is likely to have been caused by their lower capital-labor ratios. While the divergence in capital-labor ratios and wages between the late nineteenth and the early twentieth centuries appears to favor explanations based on increasing returns, the divergence may also be consistent with explanations based on factor endowments. When manufacturing scale economies were relatively low during the first half of the nineteenth century, differences in regional capital supplies may have played a relatively minor role in determining productivity. However, as scale economies in manufacturing rose between the mid-nineteenth and the turn of the twentieth centuries, the importance of the availability of capital may have become increasingly more important in determining productivity in manufacturing.

U.S. regional convergence in economic structures and income per capita over the twentieth century was caused by growing similarities in regional factor endowments and regional wages as predicted by the neoclassical trade and growth models. While the differences in land qualities continued to play an important role in agriculture, the shift in the U.S. industrial structure away from agriculture and manufacturing into services significantly reduced the importance of regional differences in land and resources. Furthermore, differences in regional resource endowments in manufacturing diminished during the second half of the twentieth century as

factors became more mobile and as firms increased their use of substitutes and recycled inputs. As regional factor endowments converged, U.S. regional industrial structures and income per capita converged. In addition, as factors became more mobile, regional capital-labor ratios also converged. The convergence in capital-labor ratios caused regional wages to converge and contributed to the convergence in regional income per capita, especially during the first half of the twentieth century.

Although there are important and significant differences between the study of global economic integration on international incomes and the study of U.S. regional economic integration on regional incomes, the studies are likely to be complements. While differences in demography, political regimes, terms of trade and macroeconomic policies are likely to be important for international studies only, the effects of economic integration between nations and regions are likely to be similar in most other respects. Thus, the study of the long-run trends in U.S. regional economies are likely to shed important insights concerning the future path of national economies. In particular, the findings of the paper make a strong case for adopting the perspective pioneered by Kuznets and others which emphasizes the importance of industrial structures in explaining the incomes of nations and regions.

Figure 1

The Regional Distribution of U.S. Population, 1790-1990

Percent
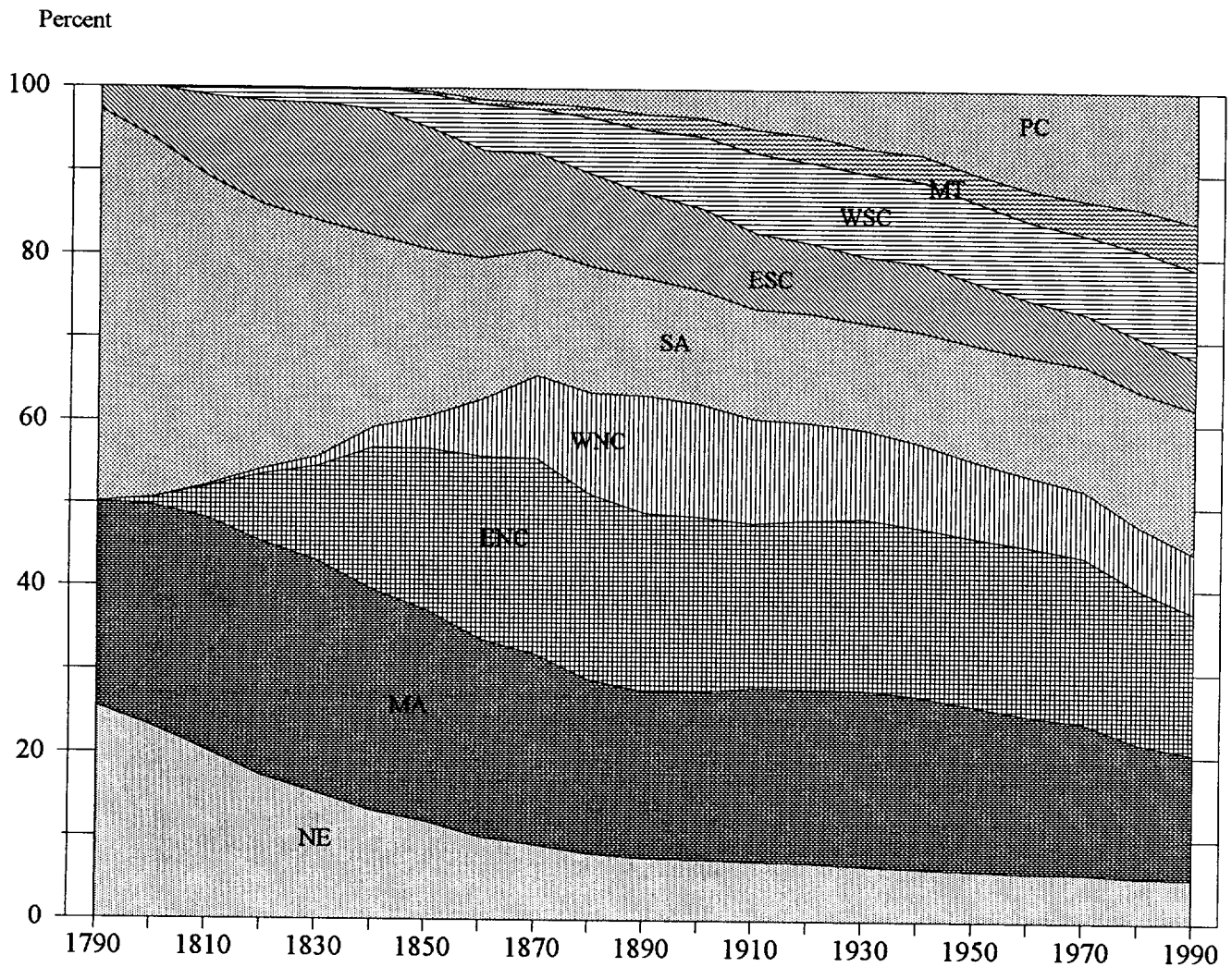
The census regions are defined as: New England: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut. Middle Atlantic: New York, New Jersey, Pennsylvania. East North Central: Ohio, Indiana, Illinois, Michigan, Wisconsin. West North Central: Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas. South Atlantic: Delaware, Maryland, DC, Virginia, West Virginia, N. Carolina, S. Carolina, Georgia, Florida. East South Central: Kentucky, Tennessee, Alabama, Mississippi. West South Central: Arkansas, Louisiana, Oklahoma, Texas. Mountain: Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada. Pacific: Washington, Oregon, California.

Figure 2

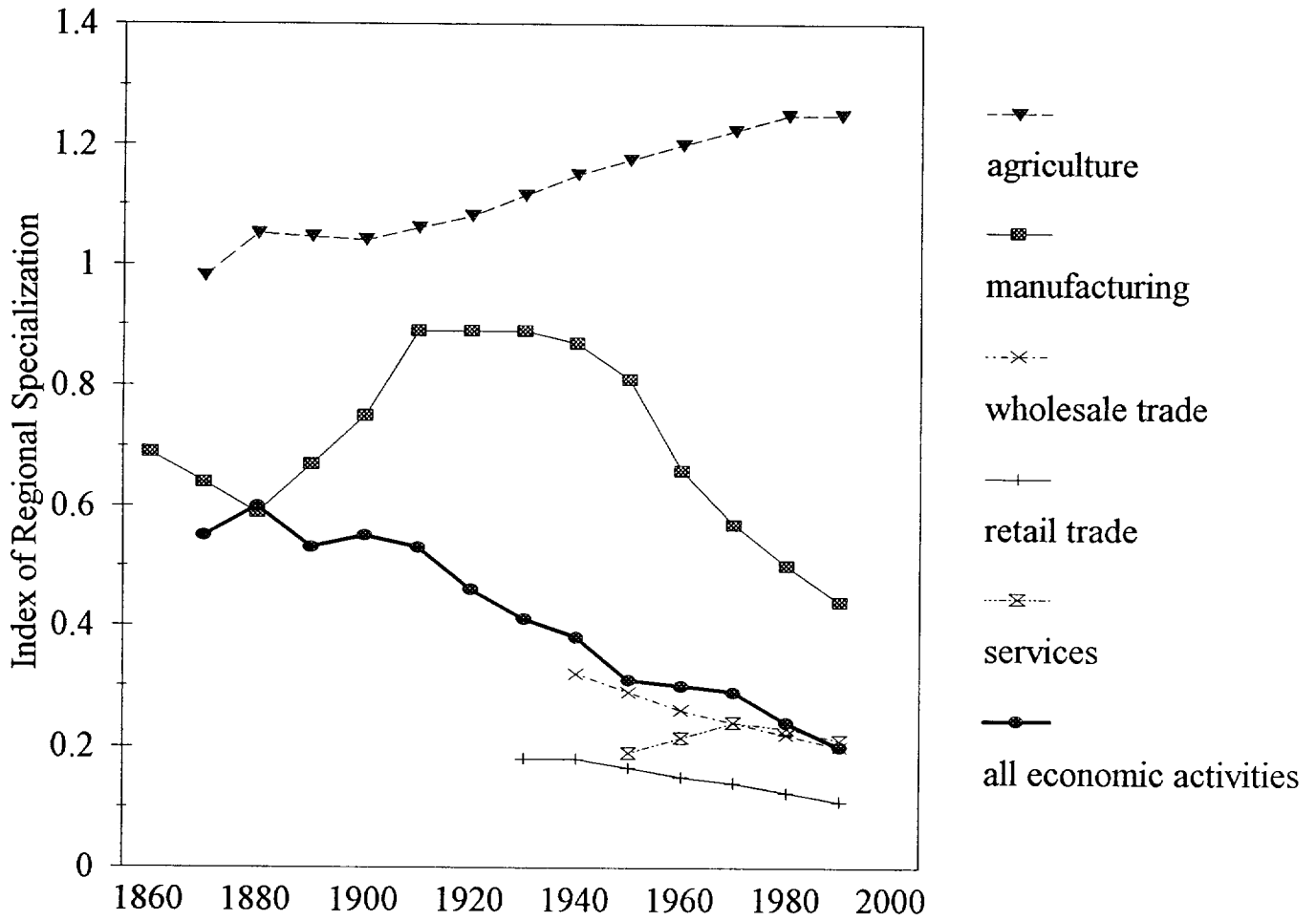U.S. Regional Specialization, 1860-1987

TABLE 1
REGIONAL SPECIALIZATION IN AGRICULTURE, 1870-1987

1870	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	0.46	0.92	0.97	1.02	1.05	1.33	1.00	1.51
MA	-	-	0.53	0.56	0.92	1.13	1.32	0.64	1.14
ENC	-	-	-	0.06	0.81	0.89	1.32	0.69	1.15
WNC	-	-	-	-	0.83	0.90	1.32	0.72	1.17
SA	-	-	-	-	-	0.21	0.60	1.16	1.54
ESC	-	-	-	-	-	-	0.55	1.37	1.74
WSC	-	-	-	-	-	-	-	1.52	1.89
MT	-	-	-	-	-	-	-	-	0.51

Average = 0.98

1900	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	0.79	1.11	1.19	1.19	1.26	1.42	1.22	1.55
MA	-	-	0.47	0.61	0.88	1.02	1.11	0.71	1.19
ENC	-	-	-	0.22	0.97	0.92	1.11	0.99	1.27
WNC	-	-	-	-	1.04	1.00	1.13	0.89	1.09
SA	-	-	-	-	-	0.15	0.36	1.44	1.56
ESC	-	-	-	-	-	-	0.38	1.58	1.68
WSC	-	-	-	-	-	-	-	1.57	1.68
MT	-	-	-	-	-	-	-	-	0.55

Average = 1.04

1920	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	0.92	1.18	1.24	1.19	1.25	1.47	1.44	1.54
MA	-	-	0.28	0.36	1.29	1.04	1.26	1.00	1.13
ENC	-	-	-	0.24	1.33	1.07	1.26	1.01	1.25
WNC	-	-	-	-	1.38	1.10	1.26	0.80	1.04
SA	-	-	-	-	-	0.31	0.45	1.34	1.70
ESC	-	-	-	-	-	-	0.71	1.40	1.76
WSC	-	-	-	-	-	-	-	1.13	1.41
MT	-	-	-	-	-	-	-	-	0.44

Average = 1.08

The specialization index is calculated using production data from the U.S. Census of Agriculture and Agricultural Statistics. The agricultural products consist of wheat, barley, corn, oats, rye, cotton, tobacco and vegetables. (NE - New England, MA - Middle Atlantic, ENC - East North Central, WNC - West North Central, SA - South Atlantic, ESC - East South Central, WSC - West South Central, MT - Mountain, and PC - Pacific.)

TABLE 1 - agriculture
(CONTINUED)

1956	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	0.84	1.39	1.49	0.45	1.03	1.68	1.58	1.26
MA	-	-	0.60	0.66	1.14	1.30	1.41	1.27	0.97
ENC	-	-	-	0.39	1.34	1.34	1.43	1.44	1.52
WNC	-	-	-	-	1.40	1.32	1.44	1.14	1.39
SA	-	-	-	-	-	0.67	1.33	1.22	1.28
ESC	-	-	-	-	-	-	0.92	1.23	1.36
WSC	-	-	-	-	-	-	-	0.86	0.98
MT	-	-	-	-	-	-	-	-	1.00

Average = 1.16

1977	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	1.21	1.82	1.87	0.75	1.16	1.81	1.76	0.93
MA	-	-	0.68	0.69	1.05	1.30	1.48	1.37	1.21
ENC	-	-	-	0.50	1.46	1.37	1.49	1.47	1.68
WNC	-	-	-	-	1.53	1.41	1.26	1.13	1.52
SA	-	-	-	-	-	0.70	1.51	1.41	1.40
ESC	-	-	-	-	-	-	1.05	1.20	1.35
WSC	-	-	-	-	-	-	-	0.72	0.98
MT	-	-	-	-	-	-	-	-	0.88

Average = 1.25

1987	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	1.19	1.74	1.65	1.26	1.77	1.56	1.34	0.56
MA	-	-	0.62	0.72	0.87	1.35	1.58	1.32	1.19
ENC	-	-	-	0.49	1.40	1.42	1.53	1.52	1.70
WNC	-	-	-	-	1.48	1.43	1.32	1.13	1.58
SA	-	-	-	-	-	0.78	1.43	1.19	1.14
ESC	-	-	-	-	-	-	0.78	1.36	1.34
WSC	-	-	-	-	-	-	-	1.00	1.13
MT	-	-	-	-	-	-	-	-	1.04

Average = 1.25

TABLE 2

REGIONAL DISTRIBUTION OF AGRICULTURAL PRODUCTS, 1840-1987

Wheat

Region	1840	1860	1880	1900	1920	1940	1987
NE	2.4	0.7	0.3	0.0	0.1	0.0	0.0
MA	31.0	14.4	7.2	5.0	3.6	3.6	0.6
ENC	31.0	48.9	44.6	20.5	21.4	16.6	7.8
WNC	1.4	9.3	27.1	46.6	44.8	41.2	45.9
SA	21.8	11.5	6.2	4.8	3.5	3.6	3.0
ESC	12.3	9.0	4.4	4.1	1.8	1.1	2.3
WSC	0.1	1.5	0.8	5.3	11.0	12.3	12.8
MT	0.0	0.5	1.0	2.7	5.6	11.8	17.6
PC	0.0	4.2	8.4	11.0	8.3	9.8	10.0

Corn

Region	1840	1860	1880	1900	1920	1940	1987
NE	0.8	1.1	0.5	0.3	0.2	0.1	0.0
MA	7.9	6.9	4.7	3.1	3.6	2.4	2.5
ENC	23.3	33.4	35.3	31.0	29.1	35.4	38.8
WNC	5.0	15.0	37.9	41.8	38.2	39.3	47.7
SA	28.2	16.0	7.4	6.4	9.1	7.9	3.3
ESC	31.8	21.3	10.4	8.1	9.5	7.9	2.8
WSC	2.9	6.1	3.6	9.2	9.3	6.5	2.4
MT	0.0	0.1	0.1	0.1	0.7	0.4	1.9
PC	0.0	0.1	0.1	0.1	0.2	0.1	0.7

Cattle

Region	1840	1860	1880	1900	1920	1940	1987
NE	-	6.1	3.8	2.4	2.0	1.8	0.6
MA	-	14.2	10.8	7.0	5.8	5.7	3.6
ENC	-	20.6	19.2	15.6	16.4	17.3	10.7
WNC	-	7.6	20.7	29.7	30.3	28.9	28.6
SA	-	15.4	10.0	6.5	7.1	6.6	7.5
ESC	-	12.1	7.8	5.4	6.8	7.0	7.9
WSC	-	18.0	16.7	21.0	15.2	17.3	21.7
MT	-	0.5	7.0	8.7	11.4	9.5	11.9
PC	-	5.3	4.1	3.8	5.1	5.9	7.3

TABLE 2 - continued

Milk

Region	1840	1860	1880	1900	1920	1940	1987
NE	-	-	11.7	10.0	8.2	6.5	3.0
MA	-	-	53.6	31.3	34.8	22.9	15.2
ENC	-	-	24.9	28.8	37.5	38.6	27.6
WNC	-	-	4.3	20.6	5.1	7.4	15.8
SA	-	-	1.8	2.1	3.2	4.5	6.6
ESC	-	-	0.8	0.9	1.3	3.2	4.0
WSC	-	-	0.4	0.9	1.5	3.8	5.4
MT	-	-	0.2	1.5	1.9	3.1	5.8
PC	-	-	2.4	3.8	6.5	10.0	16.6

Cotton

Region	1840	1860	1880	1900	1920	1940	1987
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MA	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENC	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNC	0.0	0.0	0.4	0.3	0.6	3.8	2.3
SA	37.0	23.7	31.3	28.3	35.7	19.5	4.0
ESC	42.9	46.2	34.7	27.9	17.5	24.0	18.9
WSC	20.1	29.3	33.7	43.5	45.3	46.3	47.1
MT	0.0	0.0	0.0	0.0	0.0	2.6	8.0
PC	0.0	0.0	0.0	0.0	0.0	3.8	19.8

Tobacco

Region	1840	1860	1880	1900	1920	1940	1987
NE	-	2.1	4.2	2.7	4.1	1.6	0.1
MA	-	2.1	9.2	6.4	4.3	2.4	1.6
ENC	-	9.3	12.3	13.8	9.9	4.3	2.6
WNC	-	5.9	2.7	0.4	0.3	0.4	0.3
SA	-	45.4	28.7	34.6	36.0	65.7	62.2
ESC	-	35.0	42.6	41.9	45.2	25.5	33.0
WSC	-	0.3	0.3	0.2	0.0	0.0	0.0
MT	-	0.0	0.0	0.0	0.0	0.0	0.2
PC	-	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 3
REGIONAL SPECIALIZATION IN MANUFACTURING, 1860-1987

(Constructed using 2-digit SIC industries)

1860	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	0.70	1.04	1.05	1.09	0.90	0.95	-	-
MA	-	-	0.70	0.72	0.80	0.54	0.76	-	-
ENC	-	-	-	0.39	0.83	0.55	0.33	-	-
WNC	-	-	-	-	0.67	0.32	0.38	-	-
SA	-	-	-	-	-	0.47	0.87	-	-
ESC	-	-	-	-	-	-	0.51	-	-
WSC	-	-	-	-	-	-	-	-	-
MT	-	-	-	-	-	-	-	-	-

Average = 0.69

1880	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	0.62	0.99	1.00	0.95	0.97	1.14	1.02	0.87
MA	-	-	0.57	0.69	0.59	0.60	0.87	0.84	0.65
ENC	-	-	-	0.26	0.50	0.34	0.51	0.48	0.35
WNC	-	-	-	-	0.51	0.32	0.38	0.35	0.29
SA	-	-	-	-	-	0.39	0.60	0.66	0.41
ESC	-	-	-	-	-	-	0.44	0.46	0.37
WSC	-	-	-	-	-	-	-	0.35	0.45
MT	-	-	-	-	-	-	-	-	0.40

Average = 0.59

1890	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	0.65	0.97	1.06	0.88	0.95	1.02	1.15	1.04
MA	-	-	0.55	0.73	0.53	0.52	0.66	0.82	0.67
ENC	-	-	-	0.35	0.52	0.37	0.49	0.42	0.31
WNC	-	-	-	-	0.54	0.51	0.48	0.30	0.23
SA	-	-	-	-	-	0.39	0.41	0.61	0.52
ESC	-	-	-	-	-	-	0.29	0.50	0.37
WSC	-	-	-	-	-	-	-	0.57	0.31
MT	-	-	-	-	-	-	-	-	0.42

Average = 0.59

The specialization index is calculated using employment data from the U.S. Census of Manufactures. See Appendix I for sources. (NE - New England, MA - Middle Atlantic, ENC - East North Central, WNC - West North Central, SA - South Atlantic, ESC - East South Central, WSC - West South Central, MT - Mountain, and PC - Pacific.)

TABLE 3 - manufacturing

(CONTINUED)

1900	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	0.63	0.83	1.00	0.83	0.97	1.20	1.16	1.04
MA	-	-	0.43	0.65	0.89	0.66	1.00	0.85	0.79
ENC	-	-	-	0.42	0.97	0.60	0.74	0.64	0.52
WNC	-	-	-	-	1.01	0.67	0.50	0.63	0.41
SA	-	-	-	-	-	0.56	0.91	1.03	0.87
ESC	-	-	-	-	-	-	0.47	0.70	0.44
WSC	-	-	-	-	-	-	-	0.80	0.31
MT	-	-	-	-	-	-	-	-	0.76

Average = 0.75

1914	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	0.74	0.97	1.10	0.85	1.17	1.47	1.52	0.76
MA	-	-	0.54	0.80	0.79	0.89	1.24	1.18	0.66
ENC	-	-	-	0.49	0.93	0.86	1.02	0.90	0.82
WNC	-	-	-	-	0.89	0.84	0.83	0.86	1.02
SA	-	-	-	-	-	0.53	0.88	0.98	0.72
ESC	-	-	-	-	-	-	0.48	0.67	0.78
WSC	-	-	-	-	-	-	-	0.72	1.11
MT	-	-	-	-	-	-	-	-	1.06

Average = 0.89

1927	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	0.67	0.86	0.95	0.73	0.97	1.37	1.50	1.21
MA	-	-	0.57	0.75	0.91	0.80	1.18	1.22	1.00
ENC	-	-	-	0.78	1.14	1.03	1.16	1.17	0.92
WNC	-	-	-	-	1.11	1.07	0.89	0.78	0.66
SA	-	-	-	-	-	0.58	1.01	1.20	1.00
ESC	-	-	-	-	-	-	0.61	0.65	0.62
WSC	-	-	-	-	-	-	-	0.43	0.33
MT	-	-	-	-	-	-	-	-	0.39

Average = 0.89

TABLE 3 - manufacturing

(CONTINUED)

1939	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	0.67	0.84	0.84	0.75	0.76	1.17	1.47	1.11
MA	-	-	0.62	0.69	0.86	0.64	1.00	1.17	0.95
ENC	-	-	-	0.78	1.10	0.92	1.01	1.09	0.81
WNC	-	-	-	-	1.04	0.95	0.74	0.82	0.66
SA	-	-	-	-	-	0.45	0.94	1.23	0.97
ESC	-	-	-	-	-	-	0.75	0.92	0.79
WSC	-	-	-	-	-	-	-	0.65	0.47
MT	-	-	-	-	-	-	-	-	0.70

Average = 0.87

1947	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	0.61	0.72	0.74	0.82	0.80	1.08	1.46	1.01
MA	-	-	0.58	0.59	0.85	0.63	0.87	1.22	0.80
ENC	-	-	-	0.66	1.06	0.87	0.96	1.19	0.65
WNC	-	-	-	-	0.95	0.83	0.61	0.93	0.58
SA	-	-	-	-	-	0.43	0.76	1.20	0.85
ESC	-	-	-	-	-	-	0.57	0.88	0.63
WSC	-	-	-	-	-	-	-	0.71	0.39
MT	-	-	-	-	-	-	-	-	0.81

Average = 0.81

1958	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	0.47	0.57	0.60	0.81	0.69	0.78	0.97	0.72
MA	-	-	0.49	0.56	0.76	0.47	0.70	0.79	0.70
ENC	-	-	-	0.50	0.93	0.76	0.66	0.79	0.57
WNC	-	-	-	-	0.86	0.75	0.47	0.57	0.50
SA	-	-	-	-	-	0.40	0.64	0.91	0.80
ESC	-	-	-	-	-	-	0.54	0.75	0.66
WSC	-	-	-	-	-	-	-	0.59	0.49
MT	-	-	-	-	-	-	-	-	0.59

Average = 0.66

TABLE 3 - manufacturing

(CONTINUED)

1967	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	0.44	0.49	0.51	0.81	0.70	0.62	0.70	0.55
MA	-	-	0.48	0.52	0.66	0.42	0.53	0.55	0.57
ENC	-	-	-	0.39	0.90	0.73	0.55	0.55	0.46
WNC	-	-	-	-	0.79	0.71	0.40	0.40	0.39
SA	-	-	-	-	-	0.39	0.58	0.84	0.79
ESC	-	-	-	-	-	-	0.48	0.70	0.65
WSC	-	-	-	-	-	-	-	0.49	0.37
MT	-	-	-	-	-	-	-	-	0.42

Average = 0.57

1977	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	0.43	0.48	0.45	0.76	0.59	0.51	0.52	0.47
MA	-	-	0.50	0.49	0.56	0.36	0.42	0.43	0.50
ENC	-	-	-	0.34	0.82	0.62	0.47	0.57	0.40
WNC	-	-	-	-	0.74	0.59	0.36	0.36	0.37
SA	-	-	-	-	-	0.36	0.53	0.75	0.68
ESC	-	-	-	-	-	-	0.36	0.58	0.52
WSC	-	-	-	-	-	-	-	0.42	0.37
MT	-	-	-	-	-	-	-	-	0.31

Average = 0.50

1987	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	0.39	0.45	0.40	0.66	0.59	0.45	0.39	0.35
MA	-	-	0.51	0.45	0.44	0.39	0.36	0.38	0.41
ENC	-	-	-	0.31	0.67	0.57	0.42	0.52	0.43
WNC	-	-	-	-	0.60	0.57	0.29	0.32	0.35
SA	-	-	-	-	-	0.31	0.44	0.61	0.52
ESC	-	-	-	-	-	-	0.42	0.56	0.48
WSC	-	-	-	-	-	-	-	0.33	0.31
MT	-	-	-	-	-	-	-	-	0.26

Average = 0.44

TABLE 4

REGIONAL SPECIALIZATION IN WHOLESALE TRADE, 1939-1987

(Constructed using 2-digit SIC industries)

1939	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	0.37	0.18	0.16	0.33	0.30	0.30	0.31	0.36
MA	-	-	0.38	0.43	0.60	0.57	0.57	0.61	0.61
ENC	-	-	-	0.19	0.38	0.35	0.28	0.34	0.42
WNC	-	-	-	-	0.31	0.24	0.22	0.23	0.34
SA	-	-	-	-	-	0.24	0.18	0.21	0.12
ESC	-	-	-	-	-	-	0.24	0.24	0.32
WSC	-	-	-	-	-	-	-	0.14	0.22
MT	-	-	-	-	-	-	-	-	0.23

Average = 0.32

1958	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	0.29	0.20	0.22	0.23	0.22	0.25	0.28	0.25
MA	-	-	0.28	0.37	0.45	0.43	0.42	0.52	0.38
ENC	-	-	-	0.16	0.25	0.23	0.18	0.29	0.25
WNC	-	-	-	-	0.20	0.15	0.14	0.21	0.28
SA	-	-	-	-	-	0.17	0.19	0.22	0.24
ESC	-	-	-	-	-	-	0.16	0.23	0.30
WSC	-	-	-	-	-	-	-	0.21	0.23
MT	-	-	-	-	-	-	-	-	0.19

Average = 0.26

The specialization index is calculated using employment data from the Census of Distribution, 1939 and the Censuses of Wholesale Trade, 1958-1987. (NE - New England, MA - Middle Atlantic, ENC - East North Central, WNC - West North Central, SA - South Atlantic, ESC - East South Central, WSC - West South Central, MT - Mountain, and PC - Pacific.)

TABLE 4 - Wholesale Trade

(CONTINUED)

1967	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	0.27	0.20	0.23	0.17	0.22	0.21	0.24	0.28
MA	-	-	0.30	0.38	0.39	0.44	0.39	0.44	0.41
ENC	-	-	-	0.15	0.20	0.22	0.16	0.20	0.26
WNC	-	-	-	-	0.16	0.18	0.15	0.13	0.33
SA	-	-	-	-	-	0.11	0.14	0.17	0.25
ESC	-	-	-	-	-	-	0.15	0.16	0.29
WSC	-	-	-	-	-	-	-	0.14	0.25
MT	-	-	-	-	-	-	-	-	0.27

Average = 0.24

1987	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	0.21	0.17	0.21	0.11	0.20	0.19	0.19	0.11
MA	-	-	0.28	0.36	0.29	0.35	0.33	0.36	0.20
ENC	-	-	-	0.16	0.16	0.19	0.18	0.18	0.21
WNC	-	-	-	-	0.17	0.16	0.13	0.13	0.23
SA	-	-	-	-	-	0.15	0.14	0.11	0.14
ESC	-	-	-	-	-	-	0.15	0.15	0.23
WSC	-	-	-	-	-	-	-	0.12	0.20
MT	-	-	-	-	-	-	-	-	0.20

Average = 0.20

TABLE 5

REGIONAL SPECIALIZATION IN RETAIL TRADE, 1929-1987

(Constructed using 2-digit SIC industries)

1929	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	0.07	0.11	0.20	0.19	0.23	0.24	0.19	0.19
MA	-	-	0.13	0.22	0.22	0.26	0.24	0.19	0.19
ENC	-	-	-	0.10	0.20	0.24	0.20	0.11	0.13
WNC	-	-	-	-	0.19	0.21	0.16	0.08	0.17
SA	-	-	-	-	-	0.09	0.17	0.18	0.23
ESC	-	-	-	-	-	-	0.16	0.21	0.28
WSC	-	-	-	-	-	-	-	0.13	0.22
MT	-	-	-	-	-	-	-	-	0.14

Average = 0.18

1939	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	0.10	0.16	0.22	0.15	0.21	0.23	0.26	0.20
MA	-	-	0.17	0.26	0.21	0.28	0.28	0.26	0.19
ENC	-	-	-	0.13	0.16	0.22	0.19	0.15	0.12
WNC	-	-	-	-	0.16	0.20	0.11	0.09	0.14
SA	-	-	-	-	-	0.09	0.15	0.21	0.20
ESC	-	-	-	-	-	-	0.17	0.24	0.24
WSC	-	-	-	-	-	-	-	0.12	0.21
MT	-	-	-	-	-	-	-	-	0.13

Average = 0.18

The specialization index is calculated using employment data from the Census of Distributions, 1929-1939 and the Censuses of Retail Trade, 1958-1987. (NE - New England, MA - Middle Atlantic, ENC - East North Central, WNC - West North Central, SA - South Atlantic, ESC - East South Central, WSC - West South Central, MT - Mountain, and PC - Pacific.)

TABLE 5 - Retail Trade

(CONTINUED)

1958	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	0.10	0.13	0.18	0.16	0.18	0.17	0.25	0.17
MA	-	-	0.14	0.24	0.21	0.23	0.23	0.25	0.15
ENC	-	-	-	0.12	0.12	0.13	0.11	0.15	0.11
WNC	-	-	-	-	0.14	0.16	0.10	0.13	0.12
SA	-	-	-	-	-	0.08	0.08	0.20	0.13
ESC	-	-	-	-	-	-	0.08	0.19	0.19
WSC	-	-	-	-	-	-	-	0.12	0.14
MT	-	-	-	-	-	-	-	-	0.12

Average = 0.15

1967	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	0.10	0.14	0.18	0.11	0.18	0.15	0.23	0.18
MA	-	-	0.13	0.22	0.18	0.24	0.21	0.24	0.16
ENC	-	-	-	0.12	0.10	0.17	0.11	0.14	0.11
WNC	-	-	-	-	0.13	0.15	0.10	0.11	0.12
SA	-	-	-	-	-	0.09	0.06	0.15	0.12
ESC	-	-	-	-	-	-	0.07	0.16	0.19
WSC	-	-	-	-	-	-	-	0.11	0.13
MT	-	-	-	-	-	-	-	-	0.10

Average = 0.14

1987	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	0.07	0.12	0.14	0.10	0.10	0.09	0.15	0.13
MA	-	-	0.13	0.15	0.12	0.09	0.09	0.19	0.17
ENC	-	-	-	0.05	0.05	0.12	0.10	0.08	0.08
WNC	-	-	-	-	0.08	0.13	0.12	0.08	0.09
SA	-	-	-	-	-	0.09	0.08	0.10	0.10
ESC	-	-	-	-	-	-	0.06	0.17	0.18
WSC	-	-	-	-	-	-	-	0.15	0.14
MT	-	-	-	-	-	-	-	-	0.05

Average = 0.11

TABLE 6
REGIONAL SPECIALIZATION IN SERVICES, 1947-1987

(Constructed using 2-digit SIC industries)

1947	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	0.09	0.15	0.23	0.12	0.20	0.18	0.16	0.22
MA	-	-	0.19	0.25	0.12	0.22	0.19	0.17	0.24
ENC	-	-	-	0.16	0.18	0.23	0.10	0.17	0.16
WNC	-	-	-	-	0.27	0.29	0.15	0.29	0.27
SA	-	-	-	-	-	0.13	0.24	0.12	0.21
ESC	-	-	-	-	-	-	0.27	0.11	0.22
WSC	-	-	-	-	-	-	-	0.19	0.19
MT	-	-	-	-	-	-	-	-	0.17

Average = 0.19

1967	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	0.24	0.20	0.23	0.33	0.28	0.28	0.39	0.33
MA	-	-	0.17	0.26	0.22	0.26	0.24	0.30	0.17
ENC	-	-	-	0.14	0.19	0.18	0.14	0.28	0.20
WNC	-	-	-	-	0.25	0.17	0.20	0.30	0.29
SA	-	-	-	-	-	0.19	0.13	0.22	0.23
ESC	-	-	-	-	-	-	0.12	0.34	0.29
WSC	-	-	-	-	-	-	-	0.26	0.20
MT	-	-	-	-	-	-	-	-	0.25

Average = 0.24

The specialization index is calculated using employment data from the County Business Patterns. Services in this study consists of hotel and other lodgings (70), personal services (72), business services (73), auto repair, services, and garages (75), miscellaneous repair services (76), motion pictures (78), amusement and recreational services (79), health services (80), legal services (81), educational services (82), social services (83), museums and botanical zoological gardens (84), membership organizations (86), and miscellaneous services (89). (NE - New England, MA - Middle Atlantic, ENC - East North Central, WNC - West North Central, SA - South Atlantic, ESC - East South Central, WSC - West South Central, MT - Mountain, and PC - Pacific.)

TABLE 6 - services

(CONTINUED)

1977	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	0.21	0.19	0.17	0.34	0.23	0.31	0.46	0.32
MA	-	-	0.20	0.24	0.23	0.24	0.16	0.38	0.15
ENC	-	-	-	0.08	0.21	0.13	0.17	0.33	0.20
WNC	-	-	-	-	0.25	0.10	0.23	0.35	0.25
SA	-	-	-	-	-	0.20	0.15	0.22	0.16
ESC	-	-	-	-	-	-	0.18	0.33	0.24
WSC	-	-	-	-	-	-	-	0.30	0.11
MT	-	-	-	-	-	-	-	-	0.30

Average = 0.23

1987	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	0.11	0.18	0.23	0.25	0.23	0.19	0.37	0.25
MA	-	-	0.18	0.23	0.18	0.24	0.16	0.34	0.17
ENC	-	-	-	0.09	0.20	0.09	0.13	0.35	0.24
WNC	-	-	-	-	0.25	0.08	0.18	0.39	0.29
SA	-	-	-	-	-	0.21	0.11	0.25	0.10
ESC	-	-	-	-	-	-	0.13	0.35	0.26
WSC	-	-	-	-	-	-	-	0.29	0.15
MT	-	-	-	-	-	-	-	-	0.27

Average = 0.21

TABLE 7

U.S. REGIONAL SPECIALIZATION: ALL ECONOMIC ACTIVITIES 1870-1987

(Constructed using 1-digit SIC industries)

1870	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	0.23	0.60	0.74	0.82	1.02	0.89	0.66	0.53
MA	-	-	0.54	0.69	0.78	0.97	0.85	0.58	0.33
ENC	-	-	-	0.15	0.24	0.43	0.31	0.51	0.60
WNC	-	-	-	-	0.09	0.28	0.16	0.55	0.72
SA	-	-	-	-	-	0.20	0.07	0.61	0.80
ESC	-	-	-	-	-	-	0.13	0.80	1.00
WSC	-	-	-	-	-	-	-	0.68	0.87
MT	-	-	-	-	-	-	-	-	0.30

Average = 0.55

1880	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	0.25	0.60	0.81	0.90	1.11	1.08	0.65	0.55
MA	-	-	0.55	0.76	0.87	1.07	1.04	0.50	0.34
ENC	-	-	-	0.21	0.32	0.53	0.49	0.58	0.45
WNC	-	-	-	-	0.11	0.32	0.28	0.68	0.63
SA	-	-	-	-	-	0.21	0.18	0.79	0.74
ESC	-	-	-	-	-	-	0.06	1.00	0.95
WSC	-	-	-	-	-	-	-	0.96	0.91
MT	-	-	-	-	-	-	-	-	0.25

Average = 0.60

The specialization index is calculated using employment data from Perloff et. al (1960), 1870-1950, and Perloff et. al (1960) and County Business Patterns, 1939-1987. The one-digit industries for 1870-1954 are agriculture, mining, forestry, fishing, manufacturing and services and, for 1939-1987, they are agriculture, mining, construction, manufacturing, transportation, wholesale, retail, finance, services, and government. (NE - New England, MA - Middle Atlantic, ENC - East North Central, WNC - West North Central, SA - South Atlantic, ESC - East South Central, WSC - West South Central, MT - Mountain, and PC - Pacific.)

TABLE 7 - all economic activities

(CONTINUED)

1890	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	0.23	0.50	0.72	0.82	1.04	1.03	0.61	0.51
MA	-	-	0.44	0.67	0.79	1.00	0.99	0.44	0.28
ENC	-	-	-	0.24	0.35	0.57	0.56	0.34	0.26
WNC	-	-	-	-	0.12	0.33	0.32	0.44	0.45
SA	-	-	-	-	-	0.23	0.22	0.55	0.56
ESC	-	-	-	-	-	-	0.04	0.76	0.78
WSC	-	-	-	-	-	-	-	0.76	0.77
MT	-	-	-	-	-	-	-	-	0.19

Average = 0.53

1900	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	0.21	0.46	0.76	0.86	1.12	1.11	0.68	0.52
MA	-	-	0.40	0.72	0.83	1.07	1.09	0.59	0.34
ENC	-	-	-	0.31	0.43	0.67	0.69	0.25	0.23
WNC	-	-	-	-	0.12	0.36	0.38	0.34	0.45
SA	-	-	-	-	-	0.26	0.27	0.46	0.55
ESC	-	-	-	-	-	-	0.05	0.70	0.80
WSC	-	-	-	-	-	-	-	0.71	0.82
MT	-	-	-	-	-	-	-	-	0.29

Average = 0.55

1910	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	0.18	0.36	0.65	0.84	1.09	1.01	0.63	0.44
MA	-	-	0.31	0.62	0.82	1.06	1.00	0.55	0.31
ENC	-	-	-	0.31	0.51	0.75	0.69	0.27	0.23
WNC	-	-	-	-	0.20	0.44	0.38	0.19	0.41
SA	-	-	-	-	-	0.25	0.19	0.37	0.60
ESC	-	-	-	-	-	-	0.09	0.62	0.85
WSC	-	-	-	-	-	-	-	0.55	0.78
MT	-	-	-	-	-	-	-	-	0.37

Average = 0.53

TABLE 7 - all economic activities

(CONTINUED)

1920	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	0.20	0.28	0.62	0.70	1.00	0.86	0.67	0.43
MA	-	-	0.24	0.59	0.67	0.95	0.83	0.61	0.29
ENC	-	-	-	0.35	0.43	0.72	0.59	0.40	0.20
WNC	-	-	-	-	0.12	0.38	0.25	0.13	0.36
SA	-	-	-	-	-	0.30	0.17	0.23	0.45
ESC	-	-	-	-	-	-	0.14	0.42	0.75
WSC	-	-	-	-	-	-	-	0.30	0.61
MT	-	-	-	-	-	-	-	-	0.41

Average = 0.46

1930	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	0.16	0.19	0.56	0.57	0.89	0.72	0.62	0.34
MA	-	-	0.18	0.57	0.56	0.86	0.71	0.58	0.23
ENC	-	-	-	0.38	0.39	0.70	0.54	0.43	0.19
WNC	-	-	-	-	0.12	0.33	0.17	0.11	0.38
SA	-	-	-	-	-	0.32	0.16	0.16	0.38
ESC	-	-	-	-	-	-	0.17	0.34	0.70
WSC	-	-	-	-	-	-	-	0.20	0.53
MT	-	-	-	-	-	-	-	-	0.42

Average = 0.41

1940	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	0.17	0.18	0.52	0.44	0.74	0.59	0.56	0.40
MA	-	-	0.20	0.51	0.41	0.71	0.56	0.50	0.27
ENC	-	-	-	0.37	0.27	0.57	0.42	0.45	0.31
WNC	-	-	-	-	0.21	0.27	0.08	0.19	0.37
SA	-	-	-	-	-	0.31	0.22	0.25	0.34
ESC	-	-	-	-	-	-	0.24	0.40	0.58
WSC	-	-	-	-	-	-	-	0.17	0.43
MT	-	-	-	-	-	-	-	-	0.36

Average = 0.38

TABLE 7 - all economic activities

(CONTINUED)

1939	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	0.21	0.24	0.69	0.60	0.99	0.87	0.76	0.46
MA	-	-	0.22	0.69	0.58	0.96	0.85	0.69	0.36
ENC	-	-	-	0.49	0.41	0.77	0.66	0.56	0.29
WNC	-	-	-	-	0.20	0.33	0.21	0.24	0.44
SA	-	-	-	-	-	0.39	0.28	0.27	0.39
ESC	-	-	-	-	-	-	0.20	0.50	0.75
WSC	-	-	-	-	-	-	-	0.31	0.63
MT	-	-	-	-	-	-	-	-	0.43

Average = 0.50

1954	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	0.12	0.16	0.55	0.42	0.72	0.62	0.63	0.32
MA	-	-	0.17	0.51	0.41	0.71	0.59	0.61	0.27
ENC	-	-	-	0.42	0.31	0.59	0.50	0.55	0.26
WNC	-	-	-	-	0.23	0.24	0.09	0.29	0.38
SA	-	-	-	-	-	0.39	0.27	0.27	0.19
ESC	-	-	-	-	-	-	0.29	0.50	0.58
WSC	-	-	-	-	-	-	-	0.21	0.44
MT	-	-	-	-	-	-	-	-	0.35

Average = 0.39

1967	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	0.11	0.12	0.46	0.35	0.43	0.46	0.54	0.35
MA	-	-	0.18	0.44	0.33	0.42	0.42	0.53	0.31
ENC	-	-	-	0.34	0.22	0.32	0.36	0.48	0.28
WNC	-	-	-	-	0.21	0.16	0.20	0.27	0.17
SA	-	-	-	-	-	0.19	0.15	0.27	0.10
ESC	-	-	-	-	-	-	0.28	0.34	0.23
WSC	-	-	-	-	-	-	-	0.20	0.13
MT	-	-	-	-	-	-	-	-	0.23

Average = 0.29

TABLE 7 - all economic activities

(CONTINUED)

1977	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	0.09	0.12	0.37	0.26	0.34	0.34	0.40	0.26
MA	-	-	0.18	0.34	0.25	0.33	0.30	0.40	0.25
ENC	-	-	-	0.27	0.18	0.25	0.26	0.36	0.22
WNC	-	-	-	-	0.20	0.18	0.19	0.27	0.15
SA	-	-	-	-	-	0.23	0.13	0.19	0.10
ESC	-	-	-	-	-	-	0.29	0.37	0.24
WSC	-	-	-	-	-	-	-	0.18	0.15
MT	-	-	-	-	-	-	-	-	0.18

Average = 0.24

1987	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC
NE	-	0.12	0.15	0.31	0.20	0.30	0.28	0.29	0.20
MA	-	-	0.19	0.25	0.18	0.30	0.25	0.27	0.16
ENC	-	-	-	0.18	0.12	0.20	0.20	0.25	0.14
WNC	-	-	-	-	0.17	0.15	0.17	0.23	0.11
SA	-	-	-	-	-	0.23	0.11	0.13	0.11
ESC	-	-	-	-	-	-	0.25	0.30	0.21
WSC	-	-	-	-	-	-	-	0.11	0.14
MT	-	-	-	-	-	-	-	-	0.16

Average = 0.20

Table 8

Differences in Regional Incomes Attributable to Industry-Mix and Wage Rates, 1840

Distribution of Labor by Industry

	NE	MA	ENC	WNC	SA	ESC	WSC	U.S.
Agriculture	62	68	82	85	90	92	86	79
Non-Agri.	38	32	18	15	10	8	14	21
Total	100	100	100	100	100	100	100	100

Income Per Worker by Industry

	NE	MA	ENC	WNC	SA	ESC	WSC	U.S.
Agriculture	182	225	147	140	148	156	238	173
Non-Agri.	465	462	348	372	343	380	904	437
Total	291	302	184	173	168	174	331	228
Hypothetical Industry-Mix	275	258	221	213	200	194	210	228

Percent Difference Attributable to

	NE	MA	ENC	WNC	SA	ESC	WSC	U.S.
Industry Mix	18.6	12.3	-3.3	-6.9	-13.2	-16.1	-8.0	0.0
Wages	5.9	15.8	-18.1	-20.7	-17.3	-10.9	45.3	0.0

Note: Data for 1840, 1880, and 1900 are from Easterlin. The 1954 data on employee are from Perloff et. al. (1960). The 1954 data on earnings are from Schwartz and Graham (1955). The 1987 data on employee are from Census of Agriculture, County Business Patterns, and Census of Governments. The 1987 data on earnings are from Survey of Current Business. The hypothetical industry-mix regional income is calculated by assuming all regions earn identical earnings equal to the national average. The percent difference attributable to industry-mix is calculated by taking the differences in logs between the U.S. aggregate income per worker and the hypothetical industry-mix income per worker. The percent difference attributable to wages is calculated by taking the differences in logs between the actual regional total income per worker and the hypothetical industry-mix income per worker. (NE - New England, MA - Middle Atlantic, ENC - East North Central, WNC - West North Central, SA - South Atlantic, ESC - East South Central, WSC - West South Central, MT - Mountain, and PC - Pacific.)

Table 8 - continued

Differences in Regional Incomes Attributable to Industry-Mix and Wage Rates, 1880

Distribution of Labor by Industry

	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC	U.S.
Agriculture	31	38	67	78	88	91	90	37	46	66
Non-Agri.	69	62	33	22	12	9	10	63	54	34
Total	100	100	100	100	100	100	100	100	100	100

Income Per Worker by Industry

	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC	U.S.
Agriculture	274	388	345	272	142	166	177	206	524	252
Non-Agri.	544	574	567	635	407	510	613	724	716	572
Total	460	504	418	351	173	198	220	532	628	361
Hypothetical Industry-Mix	473	451	357	322	290	282	283	453	426	361

Percent Difference Attributable to

	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC	U.S.
Industry Mix	27.0	22.2	-1.2	-11.6	-22.1	-24.7	-24.2	22.7	16.5	0.0
Wages	-2.7	11.1	15.9	8.8	-51.5	-35.4	-25.3	16.0	38.9	0.0

Table 8 - continued

Differences in Regional Incomes Attributable to Industry-Mix and Wage Rates, 1900

Distribution of Labor by Industry

	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC	U.S.
Agriculture	21	25	50	70	78	83	85	45	45	56
Non-Agri.	79	75	50	30	22	17	15	55	55	44
Total	100	100	100	100	100	100	100	100	100	100

Income Per Worker by Industry

	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC	U.S.
Agriculture	286	330	341	386	139	144	205	360	486	260
Non-Agri.	586	638	622	688	409	500	654	848	772	622
Total	524	562	480	476	199	204	271	626	644	420
Hypothetical Industry-Mix	547	532	439	367	340	321	313	457	460	420

Percent Difference Attributable to

	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC	U.S.
Industry Mix	26.4	23.7	4.5	-13.4	-21.2	-26.8	-29.3	8.5	9.2	0.0
Wages	-4.3	5.4	8.9	25.9	-53.5	-45.4	-14.5	31.4	33.6	0.0

Table 8 - continued

Differences in Regional Incomes Attributable to Industry-Mix and Wage Rates, 1954

Distribution of Labor by Industry

	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC	U.S.
Agriculture	5.7	5.0	11.7	30.6	20.9	39.8	30.7	24.2	11.9	17.0
Mining	0.1	1.0	0.6	0.9	1.5	1.8	4.0	4.4	0.7	1.3
Construction	4.3	4.3	4.6	4.3	5.0	3.8	4.7	5.5	5.6	4.6
Mfg.	39.7	35.4	36.9	17.4	23.4	19.4	13.8	10.1	24.1	27.7
Trans.	5.9	8.1	6.9	7.4	6.3	5.2	7.4	8.8	7.8	7.1
Trade	17.7	18.1	17.2	16.9	16.5	13.1	16.3	17.9	19.2	17.2
Finance	4.4	5.4	3.4	3.2	3.1	2.1	2.9	2.8	4.0	3.7
Services	10.8	11.7	8.9	8.4	8.7	6.7	8.4	10.2	11.2	9.6
Government	11.5	11.1	9.8	10.8	14.6	8.0	11.7	16.0	15.4	11.7
Total	100	100	100	100	100	100	100	100	100	100

Wages and Salaries Per Worker by Industry

	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC	U.S.
Agriculture	1267	1292	2020	2145	1241	867	1136	2010	2596	1571
Mining	5572	4211	4778	4453	4057	3556	4976	4670	4873	4509
Construction	4094	4689	4809	3956	3500	3692	3643	4390	4896	4307
Mfg.	3895	4225	4711	4124	3275	3435	3913	4210	4672	4210
Trans.	2318	2875	2996	3008	2721	2864	2696	2949	3269	2894
Trade	3439	4037	3698	3299	3051	2894	3184	3337	4024	3574
Finance	3886	3946	3818	3497	3719	3793	3667	3688	4125	3842
Services	3020	3443	3272	2785	3275	3009	3053	2925	3742	3269
Government	4419	4388	4145	3757	5502	5670	4821	4904	5791	4778
Total	3547	3866	3895	3119	3139	2482	2907	3406	4251	3530
Industry-Mix	3822	3796	3667	3173	3469	2991	3191	3345	3646	3530

Percent Difference Attributable to

	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC	U.S.
Industry Mix	7.9	7.3	3.8	-10.7	-1.7	-16.6	-10.1	-5.4	3.2	0.0
Wages	-7.5	1.8	6.0	-1.7	-10.0	-18.7	-9.3	1.8	15.4	0.0

Table 8 - continued

Differences in Regional Incomes Attributable to Industry-Mix and Wage Rates, 1987

Distribution of Labor by Industry

	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC	U.S.
Agriculture	1.7	1.9	5.4	13.7	5.4	12.5	7.0	7.5	8.4	6.4
Mining	0.1	0.3	0.4	0.4	0.4	1.0	2.6	1.7	0.3	0.7
Construction	4.6	4.0	3.5	3.5	5.8	4.3	5.1	5.4	4.5	4.5
Mfg.	21.0	17.7	22.4	15.6	16.6	20.6	13.7	10.8	16.2	17.6
Trans.	4.0	5.2	4.2	4.6	4.7	3.9	5.3	4.9	4.7	4.7
Wholesale	5.2	6.1	5.4	5.4	4.9	4.7	5.5	4.7	5.5	5.4
Retail	17.7	15.7	17.2	16.1	17.9	15.7	17.7	17.9	16.5	16.9
Finance	7.3	8.1	5.6	5.6	5.8	4.4	6.0	5.6	6.3	6.2
Services	25.6	25.7	21.4	20.2	21.7	16.9	20.2	23.4	22.7	22.2
Government	12.8	15.2	14.7	15.1	16.7	16.0	17.0	18.1	14.9	15.5
Total	100	100	100	100	100	100	100	100	100	100

Wages and Salaries Per Worker by Industry

	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC	U.S.
Agriculture	6301	6375	5874	9309	6346	3907	8123	7135	6694	6801
Mining	63044	41280	41023	35029	39139	37083	41474	39367	44394	40504
Construction	42785	41234	39312	38507	30319	29456	33598	32522	40855	36342
Mfg.	30473	30516	32784	28794	25138	24827	29053	29282	32822	29778
Trans.	33825	37418	39074	39636	36959	38530	35776	37351	36321	37283
Wholesale	33474	32978	30314	29066	29715	25933	28702	27165	31095	30369
Retail	15174	15189	13310	12971	14080	13403	13968	13715	16305	14347
Finance	29484	37106	27069	24954	26418	23939	27223	26785	32479	29743
Services	26765	28977	25678	23238	26305	25094	27013	25252	31693	27268
Government	25471	25840	22118	22290	28462	22847	23749	25144	29254	25469
Total	26560	28048	24978	22146	24168	21023	24388	23649	27553	25216
Industry-Mix	26089	26336	25336	23648	25317	24081	25241	24858	24801	25216

Percent Difference Attributable to

	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC	U.S.
Industry Mix	3.4	4.3	0.5	-6.4	0.4	-4.6	0.1	-1.4	-1.7	0.0
Wages	1.8	6.3	-1.4	-6.6	-4.6	-13.6	-3.4	-5.0	10.5	0.0

Table 9

Differences in Regional Incomes Attributable to Industry-Mix and Wage Rates:
U.S. Manufacturing Two-Digit Industries, 1860-1987

Percent Difference Attributable to

	NE	MA	ENC	WNC	SA	ESC	WSC	MT	PC	U.S.
1860										
Industry Mix	-2.9	0.2	4.5	4.1	-0.2	4.0	3.6	-	-	0.00
Wages	-2.9	3.3	0.3	12.2	-23.1	-5.2	26.8	-	-	0.00
1900										
Industry Mix	-5.5	0.9	4.7	4.2	-8.1	-1.7	-0.8	-	-	0.00
Wages	7.1	5.4	-0.9	0.5	-44.4	-26.3	-10.6	-	-	0.00
1947*										
Industry Mix	-2.3	1.3	6.8	-1.7	-11.8	-9.2	-3.9	-3.1	-1.3	0.00
Wages	-2.4	2.9	2.8	-7.0	-9.0	-15.5	-13.5	0.1	16.5	0.00
1987										
Industry Mix	2.0	-1.8	5.3	2.2	-6.3	-7.1	2.2	0.6	1.7	0.00
Wages	-0.1	2.6	4.4	-3.4	-8.5	-11.3	-4.3	-0.0	6.8	0.00

Note: The data for 1860 and 1900 are from Niemi (1972) and the data for 1987 is from the Census of Manufactures, 1987. The wage rates were calculated by dividing payroll by the number of employees. The 1987 calculations are for operating establishments and do not include auxiliaries.
* The 1947 figures were calculated by Hanna (1951). Hanna's calculations were based on production worker wages and production worker man-hours from the Census of Manufactures, 1947.

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