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REGIONAL TRENDS IN STEEL PRODUCTION

Since the end of World War II, the Fourth Federal Reserve District's share of the nation's steel production has declined markedly. For example, in 1968, the four steel-producing centers in the Fourth District accounted for about 38 percent of the nation's output of steel, compared with 47 percent in the early post-World War II years. The Fourth District's declining share of steel production reflects a long-term trend toward decentralization in steelmaking evident during the Twentieth Century.

The situation in the District is associated with a move away from older steel-producing centers, such as Pittsburgh and Youngstown, that attributed their early development to their access to raw materials used in steel ingot production. As steel technology improved and access to raw materials became less important, steel capacity and production was directed to regions where steel was historically in deficit supply and where the market for steel was growing most rapidly. On balance,

technological changes in steelmaking and an increased emphasis by steel producers on building new plants closer to steel-consuming markets have not favored the Fourth District. This article discusses some reasons for the recent shifts in the distribution of steel production among the various regional steel centers, with particular emphasis on changes in the Fourth District.

Geographical Distribution of Production. During the post-World War II period, steel output in the United States grew at an average annual rate of only 1.8 percent, which was considerably slower than the growth of overall industrial production. In part, slow growth in steel output reflected increased substitution of other materials for steel and a massive swing from surplus to deficit in the United States trade balance for steel mill products.

Steel output in the post-World War II period has also been characterized by a continuing trend toward decentralization. Despite that trend, steel production is still concentrated in four major

geographical steel centers—Chicago, Pittsburgh, the Northeast Coast, and Youngstown.¹ However, in 1968, these four centers accounted for a smaller share of the nation's steel output than in 1947 (see Table I).

Although the Fourth District still ranks as the dominant steel-producing area in the United States, growth of steel production in this region has been nominal during the post-World War II period. For example, production in recent peak years of 1965 and 1966 barely exceeded the previous high for the District (1955), while steel output in the United States exceeded the 1955 high as early as 1964. Nevertheless, the District's share (38 percent) of total output of steel has been relatively constant during the 1960's, following a long-term decline. The District's relatively unchanged share of output since 1960 reflects expansion in both Cleveland and Cincinnati that has largely been offset by continued deterioration in Pittsburgh's share and a relatively unchanged position for Youngstown.

Table I also shows that Chicago has become the nation's largest individual steel-producing center (having displaced Pittsburgh, the traditional leader), while Youngstown fell from the third to fourth largest steel producer between 1947 and 1968. The relative position among all steel centers improved for the Northeast Coast and Detroit, but declined for Buffalo.

These changes in geographical patterns of steel production largely reflect the changes in steel technology, steel pricing, and steel consumption, factors that are reviewed in this article.

¹For a description of the producing districts and a more complete discussion of production trends, see "Regional Trends in Steel Production," *Economic Review*, Federal Reserve Bank of Cleveland, November 1966, pp. 9-19.

TECHNOLOGICAL CHANGES AND PATTERNS OF STEEL OUTPUT

Steel production requires large inputs of raw materials that account for an important part of the total cost of production. Therefore, proximity to raw materials largely influenced the location of steel centers in the earlier years of the industry's development. However, consumption of raw materials per ton of steel produced has been declining over time. For example, in 1947, nearly 1.8 tons of iron ore, 1.0 tons of coke, and 0.4 tons of limestone were required for each ton of pig iron produced in the United States. In 1968, about 1.6 tons of iron ore, 0.6 tons of coke, and 0.2 tons of limestone were required for each ton of pig iron produced.²

Because coking coal had constituted a key element in pig iron production, the steel industry was historically heavily dependent upon and closely tied to sources of coking coal. Proximity to rich coking coal deposits in southwestern Pennsylvania gave the Pittsburgh steel center its early advantage and dominance in the steel industry; therefore, the area had a superior cost advantage over other steel-producing centers of the country. The advantage was sufficient to overcome the advantage that rival steel centers had because of their proximity to iron ore deposits.³ Development of the by-product coking process in the late Nineteenth Century freed other steel centers from dependence on coking coal from southwestern Pennsylvania and significantly reduced consump-

²American Iron and Steel Institute, *Annual Statistical Reports*, 1948, 1957, 1960, and 1968.

³The Pittsburgh Regional Planning Association, *Region in Transition* (Pittsburgh, Pennsylvania: University of Pittsburgh Press, 1963), pp. 262-263.

TABLE I

Steel Ingot Production
United States and Major Steel-Producing Centers
Selected Years
1947–1968

Mil. of Net Tons	1947	1950	1955	1960	1965	1966	1967	1968	Average Annual Rate of Change in Production 1947-1968
United States	84.9	96.8	117.0	99.3	131.2	134.1	126.9	131.1	
Fourth District	40.2	44.0	49.4	37.9	50.3	51.0	46.7	49.8	
Others	44.6	52.9	67.6	61.2	80.9	83.1	80.2	81.3	
Percent Distribution									
United States	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	+1.8%
Fourth District	47.4	45.4	42.2	38.2	38.3	38.0	36.8	38.0	+0.6
Others	52.6	54.6	57.8	61.8	61.7	62.0	63.2	62.0	+2.7
Chicago	20.2	19.7	20.2	20.9	20.1	20.3	20.8	20.4	+2.1
Pittsburgh	26.3	25.0	22.5	20.2	19.8	19.7	19.2	19.3	+0.2
Northeast Coast	12.1	12.5	13.8	14.5	13.9	13.6	13.9	13.8	+2.5
Youngstown	13.2	12.5	10.8	8.4	8.6	8.3	7.8	8.2	-0.9
Detroit	3.7	4.8	5.1	6.6	7.4	7.5	7.2	7.0	+5.4
West	5.1	5.6	5.5	6.2	6.4	6.4	6.5	6.5	+2.8
South	4.7	5.1	5.3	5.7	5.9	5.9	6.5	6.4	+3.1
Buffalo	5.0	5.0	5.6	5.2	5.4	5.8	5.7	5.5	+2.0
Cleveland	4.7	4.7	5.2	5.6	5.1	5.5	5.3	5.9	+2.7
Cincinnati	3.2	3.2	3.7	4.0	4.8	4.5	4.5	4.6	+4.0
St. Louis	1.7	1.9	2.2	2.7	2.6	2.5	2.6	2.4	+4.2

NOTE: Details may not add to totals because of rounding.

Sources: American Iron and Steel Institute and Federal Reserve Bank of Cleveland

tion of coke. Additionally, technical improvements in blast furnaces and use of beneficiated (refined) ores have continued to reduce coke usage in more recent years.

Technological developments and discoveries of new deposits of iron ore have also played an important role in releasing the steel industry from dependence on raw materials. Consumption of iron ore per ton of pig iron produced had been declining because of increasing usage of scrap as

early as the turn of the Twentieth Century.⁴ That trend encouraged the expansion of steel centers in major steel-consuming markets, such as Chicago and Detroit, where historically scrap has been in abundant supply. Similarly, the conversion of low grade iron ore into high grade ores has also reduced ore usage per ton of pig iron produced.

⁴Walter Isard, "Some Locational Factors in the Iron and Steel Industry Since the Early Nineteenth Century," *Journal of Political Economy*, LVI (June 1948), p. 214.

Moreover, in the post-World War II period, the increase in imports of iron ore from Labrador and Venezuela has encouraged expansion of steel centers along the Eastern seaboard of the United States.

These developments have resulted in smaller quantities of raw materials consumed and shipped to steel-producing plants, which in turn has tended to reduce the importance of locating steel plants near coal and ore sites. Accordingly, the relative position of traditional steel-producing centers, such as Pittsburgh and Youngstown, which owed their prominence to proximity to coal, deteriorated, while other steel centers located favorably with respect to markets grew.⁵

Moreover, changes in the steelmaking process, i.e., the conversion of pig iron into steel, adversely affected the industry position of traditional steel centers. The adoption late in the Nineteenth Century of the open hearth process of converting pig iron first encouraged growth of steel centers in major steel-consuming and steel-fabricating centers. Other more recent developments have contributed further to changing the geographical distribution of steel production in the United States. The open hearth process, the dominant method of steelmaking since the early Twentieth Century, is being rapidly replaced by the basic oxygen process (BOP), which was developed on a commercial basis in Austria in 1952. After a

relatively slow start in the United States, steel-making by the BOP grew remarkably, from only 0.3 percent of total steel output in 1958 to 37 percent in 1968.⁶ Because an oxygen converter can produce 150 tons of steel in less than 1 hour, compared with 12 hours by the open hearth process, its cost advantage over the open hearth process is considerable, ranging from an estimated \$2 to \$10 per ton.⁷ As of January 1969, the industry had installed 54 million tons of oxygen steelmaking capacity in the United States, with another 20 million tons planned for startup during 1969 and 1970 (see Table II).

Steel-producing centers located in or near the largest steel-consuming markets of the country, such as Chicago and Detroit, show the largest actual and planned installation of oxygen furnace capacity. In these three centers, the relative share of oxygen steelmaking capacity exceeds their share of steel ingot production. For example, about 24 percent of the existing or planned basic oxygen furnace capacity in the United States will be centered in Chicago, compared with 20 percent of the nation's steel produced in that center in 1968. Detroit will have about 15 percent of the oxygen furnace capacity, compared with a 7-percent share of total ingot production.

Steel centers in the Fourth District accounted for 41 percent of existing BOP capacity, compared

⁵See especially, Marvin J. Barloon, "The Interrelationship of the Changing Structure of American Transportation and Changes in Industrial Location," *Land Economics*, Vol. XLI (May 1965), p. 177; Walter Isard and William M. Capron, "The Future Locational Pattern of Iron and Steel Production in the United States," *The Journal of Political Economy*, LVII (April 1949), p. 126; Allan Rodgers, "Industrial Inertia—A Major Factor in the Location of the Steel Industry in the United States," *The Geographical Review*, Vol. 42 (January 1952), p. 58.

⁶American Iron and Steel Institute, *Annual Statistical Reports*, 1968, p. 68. Also, according to the American Iron and Steel Institute, steel produced by basic oxygen furnaces actually exceeded open hearth production in August 1969; for the first eight months of 1969, BOP accounted for nearly 48 percent of total steel output. See *The Iron Age*, September 25, 1969, p. 165.

⁷Joseph K. Stone, "Oxygen in Steelmaking," *Scientific American*, Vol. 218 (April 1968), pp. 24-32.

TABLE II

Location of Oxygen Steelmaking Plants in the United States
January 1969

<u>Steel-Producing Centers</u>	<u>Existing Capacity</u> (mil. of net tons)	<u>Percent Distribution</u>	<u>Planned Capacity 1969-1970</u> (mil. of net tons)	<u>Percent Distribution</u>	<u>Total Existing and Planned Capacity</u> (mil. of net tons)	<u>Percent Distribution</u>
Fourth District						
Cleveland	4.7	8.6%	2.3	11.4%	6.9	9.4%
Cincinnati	1.4	2.6	2.0	10.1	3.4	4.6
Pittsburgh	14.6	26.9	—0—	—0—	14.6	19.7
Youngstown	1.6	3.0	—0—	—0—	1.6	2.2
Total Fourth District	22.2	41.1	4.3	21.5	26.5	35.9
Other						
Chicago	8.6	16.0	9.2	46.6	17.8	24.2
Northeast Coast	4.3	7.9	2.5	12.7	6.8	9.2
Detroit	8.0	14.8	2.8	14.2	10.8	14.6
West	2.5	4.7	—0—	—0—	2.5	3.4
South	1.5	2.8	—0—	—0—	1.5	2.0
Buffalo	4.7	8.7	1.0	5.1	5.7	7.7
St. Louis	2.2	4.1	—0—	—0—	2.2	3.0
Total United States	54.0	100.0%	19.8	100.0%	73.8	100.0%

NOTE: Details may not add to totals because of rounding. Steel-producing centers are grouped according to American Iron and Steel Institute steel districts.

Sources: *Iron and Steel Engineer* and Federal Reserve Bank of Cleveland

with 38 percent of total ingot output in 1968. In Pittsburgh, steel producers sharply expanded their BOP capacity (26.9 percent of the installed total) in an effort to halt or reverse the deterioration in competitive conditions in the area. However, with no further additions planned in 1969-1970, Pittsburgh's share of BOP will drop to about 20 percent of the total. It appears that Youngstown will also undergo some deterioration in its competitive position, because the lower cost BOP capacity in that center amounted to only 3 percent of the United States total through 1968, with no plans for expansion reported for 1969-1970.

Oxygen furnaces consume less scrap than open hearth furnaces, and this has led to a decline in steel scrap prices. As a result, the use of electric furnaces, which are large consumers of scrap, has grown rapidly, accounting for about 12 percent of steel output in 1968, compared with nearly 5 percent in 1947. Electric furnaces, along with continuous casting of steel, have further tended to loosen the dependence of steel on raw materials in favor of proximity to markets.

In the continuous casting method, molten iron moves directly from the blast furnace into the form of a semi-finished product, thereby eliminating intermediate costly operations. Although the continuous casting process presently accounts for an insignificant share of total steel production, use of this process is expected to increase rapidly, especially since several major steel producers have installed continuous facilities in recent years.⁸

Growth of the Nonintegrated Steel Plant. The smaller investment per ton of steel capacity

⁸An estimated 8 million tons of continuous casting capacity has been installed in the past two years, according to *Business Week* magazine. See "A Ribbon of Steel Cuts Industry Costs," *Business Week*, April 19, 1969, pp. 71-72.

required for electric furnaces and continuous casting has led to a proliferation of numerous small, nonintegrated steel plants throughout the United States. In the steel industry, a major capital investment is required in order to establish a fully integrated mill.⁹ Historically, a few large firms accounting for the bulk of production and sales have characterized the steel industry, but estimates show that in 1967 there were about 31 small steel firms with annual capacity ranging from 50,000 to 350,000 tons.¹⁰ These small steel plants are spread throughout the United States, with the majority centered inland, particularly in the South and Southwest. In part, the small steel plant has benefited from declining scrap prices that resulted from increased use of the BOP. All but a few of the small plants use electric furnaces to convert iron into steel, and at least half of the firms have installed continuous casting facilities or have plans to install that process. Despite the success of the small firms, their future expansion into broader product lines, especially in flat rolled products, is limited because of the major capital investment requirements for such facilities. Therefore, these small mills have specialized in less sophisticated bar mill products (such as hot rolled bars and concrete reinforcement bars) that involve a smaller scale of operations.

BASING-POINT PRICING

Although the trend toward decentralization in steel ingot production began early in the Twen-

⁹According to one estimate, the annual cost of an integrated mill with 4 million tons of capacity is about \$1.6 billion. See G. J. McManus, "Steel Plants Seek a New Structure," *The Iron Age*, February 13, 1969, p. 103.

¹⁰See C. L. Kobrin, "The Big Surge of 'Mini' Steel Plants," *The Iron Age*, November 23, 1967, pp. 68-75.

tieth Century, the basing-point system of pricing probably slowed the shift away from traditional steel-producing centers.¹¹ Under the basing-point system of pricing, steel sellers offered identical delivered prices to consumers regardless of the shipping location of the producers. The basing-point price was composed of a base price for steel plus a railroad freight charge from the base point—Pittsburgh—to the buyer's destination. Under that system, for example, producers in Pittsburgh and Chicago could quote the same delivery price to a consumer in Chicago. As a result, the buyer paid a delivered price based on Pittsburgh, whether or not shipments originated from there and regardless of the mode of transpor-

tation used for delivery. In effect, steel producers in Pittsburgh could penetrate distant steel markets without absorbing any freight charges. Steel producers used a single-basing-point system for pricing, with Pittsburgh as the basing point until 1924, when the Federal Trade Commission declared that "Pittsburgh-Plus" was an unfair method of competition.

The basing-point pricing system also retarded more rapid growth in steel *consumption* in areas away from basing-point locations because consumers paid higher prices. Steel consumers ordinarily tended to locate their facilities near a basing-point to minimize costs; many built their facilities near Pittsburgh to take advantage of lower costs in that area. The secondary effects of such decisions by steel consumers, of course, favored steel producers in Pittsburgh, but technological and economic developments had already been undermining that area's historical cost advantages described earlier.

After 1924, the industry adopted a multiple-basing-point system that used several producing centers as basing-points. That system spread some of the advantage that Pittsburgh steel producers had under the single-basing-point system. In 1948, however, the United States Supreme Court, in a case involving the cement industry, declared that a basing-point system was illegal; thereafter, when the steel industry adopted f.o.b. mill prices, natural market forces became much more important influences in the investment decisions of steel-producing and steel-consuming firms.

TRENDS IN STEEL CONSUMPTION

In addition to changes in steel technology and pricing, changes in the pattern of steel consumption influenced the trend toward market orientation in steel. Table III shows the distribution of

¹¹ There is wide disagreement on this point in existing literature. On the one hand, Isard and Capron state "theoretically, the choice of a particular pricing system—whether f.o.b. mill, a single-basing-point, or a multiple-basing-point with or without differentials—has little impact upon the location of basic steel capacity." See Isard and Capron, *op. cit.*, pp. 131-132. In a study of the Pittsburgh economy undertaken in 1959 by the Pittsburgh Regional Planning Association, the basing-point system of pricing was absent from the discussion on reasons for the deterioration in the position of Pittsburgh as a steel-producing center. See Pittsburgh Regional Planning Association, *op. cit.*, especially Chapter 10, pp. 261-290. For a different viewpoint, see Carl Kaysen, "Basing Point Pricing and Public Policy," *The Quarterly Journal of Economics*, LXIII (August 1949), especially pp. 304-305, who concluded that "under Pittsburgh Plus, the rate of expansion of steel production in Chicago and Birmingham relative to Pittsburgh was probably slowed down substantially." See also George W. Stocking, *Basing Point Pricing and Regional Development* (Chapel Hill, North Carolina: University of North Carolina Press, 1954), especially Chapters 4 and 5, pp. 60-111. Stocking states that Pittsburgh Plus "...tended to retard the South's production and consumption of iron and steel and thus directly and indirectly retarded the South's industrialization," p. 62. For a similar viewpoint, see Allan Rodgers, *op. cit.*, pp. 60-64.

TABLE III

Distribution of Production and Consumption of Steel Mill Shapes and Forms
United States and Selected States

Selected Years

1947–1963

	1947		1954		1958		1963	
	Production*	Consumption†	Production	Consumption	Production	Consumption	Production	Consumption
United States	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
East	35.3	26.0	30.8	24.4	29.5	22.4	28.2	19.7
Pennsylvania	29.6	14.2	24.9	11.8	24.4	10.4	23.0	9.2
New York	5.1	5.4	5.5	6.3	5.1‡	5.6	5.2‡	4.9
New Jersey		2.9		3.3		3.4		2.9
Central	45.9	57.8	46.9	56.5	45.9	55.5	49.1	58.5
Ohio	20.4	12.9	18.6	13.4	16.2	13.2	17.2	14.3
Illinois	8.3	12.7	8.1	11.7	8.1	12.3	8.5	11.6
Indiana		5.7	14.0	5.4	14.8	5.5	14.3	6.3
Michigan	15.9	17.2	4.8	17.3	5.4	14.1	7.8	17.0
Wisconsin	n.a.	4.7	n.a.	3.7	n.a.	4.6	n.a.	4.1
South	13.8	10.6	16.2	11.8	17.8	13.7	16.4	14.1
Texas	n.a.	1.9	n.a.	2.5	n.a.	3.0	n.a.	3.1
West	5.1	5.6	6.1	7.3	6.8	8.5	6.2	7.8
California	2.1	4.3	2.6	5.4	3.0	6.3	3.0	5.4

NOTE: Details may not add to totals because of rounding.

n.a. Not available.

* For 1947, data for each region were adjusted upward to reflect a redistribution of production figures that were aggregated to prevent disclosure; for 1954-1963, data for Central and West were adjusted upward to reflect a redistribution of data that were combined to prevent disclosure.

† Data include consumption by metal fabricating establishments and exclude consumption by metal producing plants, construction, mining, utilities, railroad industries, and government purchases.

‡ Includes Rhode Island and Connecticut.

Sources: U. S. Department of Commerce, Bureau of the Census and Federal Reserve Bank of Cleveland

steel consumption and steel production during the post-World War II period by illustrating the broad geographic areas of steel surplus or deficit. The table especially shows the tendency for a growing proportion of output to be centered in deficit supply areas. (Such a comparison only suggests this market influence, because steel produced within a region is not necessarily consumed in the same region. The data on which Table III is based are available only by state; 1963 is the latest year for which data are available.)¹²

As shown in the table, the largest share of the nation's output and consumption of steel products between 1947 and 1963 was accounted for by the Central Region (Ohio, Illinois, Indiana, Michigan, Wisconsin, and Missouri, which is not listed separately but is included in the regional total); the region generally corresponds to the western half of the manufacturing belt in the United States. Even though the Central Region's share of the nation's consumption of steel products remained relatively steady, and the relative share of production rose slightly between these years, consumption exceeded production. The Central Region accounted for about 60 percent of the 24.5 million ton increase in steel output in the United States. Despite the narrowing between output and consumption, the Central Region was still a deficit steel region in 1963, i.e., a region that consumed more steel than it produced. The largest deficit in the Central Region was apparent in Michigan.

The Eastern Region of the United States (New York, New Jersey, Pennsylvania, and the New

England states) accounted for the second largest shares of the nation's steel output and consumption between 1947 and 1963. In contrast to the Central Region, however, the Eastern Region was a steel "surplus" area, i.e., steel production exceeded consumption. The Eastern Region's share of both output and consumption of steel products declined as a proportion of the nation's steel production. In part, that loss in position reflects a decrease in steel consumption and output in Pennsylvania, due partly to declining industries, such as the railroads and mining.

Although the bulk of steel output was historically produced in Pennsylvania, Ohio, Indiana, Illinois, and Michigan, the steel industry has tended to move to the South and West. Both regions accounted for a growing share of national output between 1947 and 1963. The South (South Atlantic and South Central states) ranked as the third largest regional market for steel products in the United States. Between 1947 and 1963, steel markets in the South nearly doubled in size, and in 1963, the area accounted for 14.1 percent of the steel consumed in the United States. The rising share of steel output in the West (the Pacific and Mountain states) reflected both a rapidly rising market for steel and a shortage of steel in that region of the country. The tonnage increase in steel consumption in the West was more than twice as large as in the nation in the period under study, largely because of a surge in steel consumption in California (see Table IV).

As shown in Table IV, between 1947 and 1963, steel consumption in the Central Region rose slightly faster than in the nation (49.0 percent, compared with 47.6 percent, respectively), with considerably larger gains in Ohio and Indiana. Steel consumption in both the West and the South rose about twice as fast as in the nation, while

¹²Consumption data are not available for the separate steel-producing centers shown in Table I; however, production and consumption data are available on a comparable basis in Census reports and are therefore used in this section of the article.

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TABLE IV

Consumption of Steel Mill Shapes and Forms
United States and Selected States
Selected Years
1947-1963
(Mil. of net tons)

	1947	1954	1958	1963	Percent Change 1947-1963
United States	39.4	46.4	44.8	58.1	+ 47.6%
East	10.3	11.3	10.0	11.4	+ 11.6
Pennsylvania	5.6	5.5	4.6	5.3	- 4.9
New York	2.1	2.9	2.5	2.8	+ 33.8
New Jersey	1.1	1.5	1.5	1.7	+ 27.8
Central	22.8	26.2	24.8	34.0	+ 49.0
Ohio	5.1	6.2	5.9	8.3	+ 62.7
Illinois	5.0	5.4	5.5	6.7	+ 35.1
Indiana	2.3	2.5	2.5	3.7	+ 62.2
Michigan	6.8	8.0	6.3	9.9	+ 45.9
Wisconsin	1.9	1.7	2.1	2.4	+ 29.0
South	4.2	5.5	6.1	8.2	+ 95.8
Texas	0.8	1.2	1.4	1.8	+140.3
West	2.2	3.4	3.8	4.5	+105.9
California	1.7	2.5	2.8	3.1	+ 83.9

Sources: U. S. Department of Commerce, Bureau of the Census and Federal Reserve Bank of Cleveland

consumption in the East showed the smallest relative increase, well below the average change for the United States. Those regions of the country that showed the largest percent increases in steel consumption; namely, the West and the South, also increased in relative importance as steel-producing regions of the country (see Table III).

Regional Trends in Product Markets. At least one other aspect of steel consumption that affected the geographic distribution of steel production is trends in product consumption. As indicated in Table V, the share of steel consumption in the South and the West rose between 1947 and 1963 for all major product lines. On the other hand, the share of United States steel consumption in the East declined substantially for all product

lines, except alloy and stainless steel products, while in the Central Region, the share of national markets rose only for steel sheets and strip and for plates. These changes in steel consumption patterns help to explain differences in growth rates of various steel-producing centers in the United States.

For example, the Central Region's share of consumption of bars and bar shapes (used mainly by the automotive, construction, and machinery and equipment industries) declined between 1947 and 1963, although the tonnage volume consumed rose slightly. Nearly one-half of the nation's capacity for bars in 1960 (the latest year for which capacity data are available) was located in the Fourth District, especially in Youngstown and Pittsburgh.¹³ On the other hand, the Central Region's market share for sheets and strip (which is used mainly by the automotive, building contractors' products, and appliance industries and which represents the largest steel market) rose in the Central Region. Steel producers in the Fourth District have been noted for specialization in hot and cold rolled sheets and strip products, which made up more than one-half of the District's hot rolled sheet capacity in 1960. In fact, about 45 percent of the sheet and strip capacity in the United States was located in the Fourth District, particularly in Cincinnati and Cleveland.

As shown in Table I, Cincinnati recorded one of the fastest growth rates in production between 1947 and 1968, in part because of the area's

¹³See "Steel Finishing Capacity in a Heavy Industry Area," *Monthly Business Review*, Federal Reserve Bank of Cleveland, July 1961, p. 9. Data on product capacities for steel-producing centers are taken from American Iron and Steel Institute, *Directory of Iron and Steel Works of the United States and Canada*, 29th Edition, 1960.

TABLE V

Volume and Distribution of Consumption of Steel Mill Shapes by Product

United States and Regions

Selected Years

1947–1963

Volume (mil. of net tons)	Products							
	Total	Bars and Bar Shapes	Sheets and Strip	Plates	Structural Shapes	Wire and Wire Products	Alloy and Stainless Steel	All Other
United States								
1947	39.4	5.7	15.7	4.6	3.4	1.8	2.7	5.5
1954	46.4	6.5	18.8	4.8	3.9	1.8	3.5	7.0
1958	44.8	4.9	18.1	4.8	3.8	2.1	2.9	8.2
1963	58.1	6.0	26.1	6.1	3.9	2.5	3.8	9.6
Percent of United States Consumption								
East								
1947	26.0%	24.1%	20.0%	37.5%	41.2%	29.2%	23.9%	26.2%
1954	24.4	21.6	21.7	29.7	36.3	23.4	25.1	24.1
1958	22.4	19.9	18.9	29.9	32.8	22.4	22.2	22.2
1963	19.7	19.9	15.7	24.5	29.7	19.9	23.4	21.9
Central								
1947	57.8	64.0	69.5	37.0	34.7	60.7	68.4	43.8
1954	56.5	60.0	67.6	40.1	34.1	61.6	63.0	42.8
1958	55.5	63.4	68.9	37.4	36.1	56.7	63.6	37.7
1963	58.5	61.9	72.0	41.6	32.8	60.4	62.1	39.0
South								
1947	10.6	7.7	7.5	17.7	16.9	6.0	4.1	17.2
1954	11.8	12.0	6.6	18.4	20.8	8.9	4.8	19.1
1958	13.7	10.4	8.2	21.2	21.1	13.6	7.9	22.1
1963	14.1	12.3	8.5	22.0	28.5	13.4	9.6	21.1
West								
1947	5.6	4.2	2.9	7.9	7.3	4.1	3.7	12.8
1954	7.3	6.6	4.1	11.8	8.8	6.1	5.1	14.0
1958	8.5	6.3	4.1	11.6	10.0	7.3	6.2	18.1
1963	7.8	5.9	3.8	11.7	8.9	6.4	4.8	18.1

Sources: U. S. Department of Commerce, Bureau of the Census and Federal Reserve Bank of Cleveland

specialization in flat rolled products. In 1960, about 82 percent of the capacity of Cincinnati mills was for sheets and strip. The growth rate of steel output in Cleveland also exceeded the national average during the post-World War II period, also partly because of its high proportion (about 56 percent) of capacity in sheet products. (In Detroit, which had the largest growth rate during the period, about 92 percent of steel capacity in 1960 consisted of sheets and strip).

FOREIGN TRADE AND STEEL PRODUCTION TRENDS

Exports and imports of steel mill products have had different effects on production trends of the various steel-producing centers in the United States. Despite the growing volume of steel imports at all leading United States ports in recent years, capital investment by domestic steel producers has not been inhibited. Leading steel producers in the Chicago area carried out vast capital expansion programs during the 1960's, despite the area's rise to a position as the second largest port of entry for imported steel products in the United States. Moreover, the growth of imports may have been an incentive to accelerate the development of new steelmaking technology. In fact, the United States Steel Corporation has recently placed in operation a major rod facility at its Fairless Works in eastern Pennsylvania that is intended to regain some of the rod business that was lost to foreign suppliers.

Since 1959, when the trade balance in steel shifted from net surplus to net deficit, the United States trade position in steel has steadily deteriorated because of a rapid growth in imports. In 1968, the volume of steel product imports rose to a record 18 million tons, which is the equivalent of about 25 million tons of domestic ingot pro-

duction. Obviously, this "loss" in output was not shared equally among all steel-producing centers in the United States. Centers located in or near major ports of entry were undoubtedly affected the most, along with inland producing centers that have a high proportion of their capacity and output in products that are imported.

The loss of output is even greater if the steady erosion in United States steel exports since the end of World War II is considered. From 1948 to 1957, the volume of United States exports of steel mill products averaged about 3.7 million tons annually, compared with 1.1 million tons of imports; as a result, there was a net surplus trade balance in steel of about 2.6 million tons annually. Nevertheless, that period was already marked by a deficit trade balance in wire rods, bars, and wire and wire products (see Table VI).

During the 1959-1968 period, exports of steel mill products fell to an annual average of about 2.2 million tons, with declining trends apparent for several steel products. Since 1958, all major products for which the United States had a net surplus trade balance have shifted into deficit, with the exception of steel ingots, tin mill products, and railroad products. For most of these exceptions, the trade surplus has steadily diminished (see Table VI). In general, the overall United States trade position has shifted into deficit, and the deficit has increased sharply since the mid-1960's.

The effect of imports on various steel-producing centers of the United States is difficult to determine because not all of the steel imported at various ports is necessarily consumed in the same area, although foreign suppliers probably ship to those United States ports closest to their customers to minimize transportation costs. The volume of steel imports by ports of entry thus

TABLE VI

Net Trade Balance in Steel Mill Products
United States
Selected Years
1947–1968
(Mil. of net tons)

	1947	1950	1955	1960	1965	1966	1967	1968
Ingots, blooms, etc.*	0.6	−0.1	0.5	0.1	0.4	0.1	0.1	0.3
Wire rods			†	−0.4	−1.3	−1.1	−1.1	− 1.6
Structural shapes and piling	1.1	−0.1	0.2	†	−0.7	−0.8	−1.0	− 1.4
Plates			0.2	−0.1	−0.6	−0.9	−1.0	− 1.7
Rails and accessories	0.6	0.1	0.1	0.1	‡	‡	‡	‡
Bars and tool steel	1.1	−0.1	−0.1	−0.8	−1.5	−1.6	−1.6	− 2.3
Pipe and tubing	0.7	0.6	0.3	−0.3	−0.7	−0.8	−0.8	− 1.3
Wire and wire products	0.3	†	−0.2	−0.5	−0.8	−0.8	−0.8	− 1.0
Tin mill products	0.6	0.5	1.0	0.6	0.2	0.2	0.1	0.1
Sheets and strip	0.9	0.7	1.1	0.9	−2.9	−3.3	−3.8	− 6.9
Total steel mill products	5.9	1.6	3.1	−0.4	−7.9	−9.0	−9.8	−15.8

NOTE: Net trade balance represents the difference between exports and imports.

* Includes skelp.

† Less than 100,000 ton deficit.

‡ Less than 100,000 ton surplus.

Sources: American Iron and Steel Institute and Federal Reserve Bank of Cleveland

provides a clue about the impact of imports on various steel centers in the United States.

As shown in Table VII, steel imports were concentrated in coastal steel centers of the United States during the mid-1950's. About 44 percent of the foreign steel that entered the United States in 1955 came into ports in the Southern District, while about 18 percent entered through the Northeast Coast ports, and most of the balance came into the West. (Detroit accounted for an unusually large 17 percent of steel imports in 1955 largely because of a shortage of domestic steel ingots. Imports fell sharply the following year.) In general, although the steel-producing centers that apparently were most heavily affected by imports in the mid-1950's were in or near coastal ports, the

growing volume of imports also had an adverse effect on some inland steel centers that specialized in high-import volume products such as wire and wire products.

During the 1960's, new patterns emerged in the composition of imports as well as in the regional distribution of imports (see Table VII). Imports of all major steel products, except for railroad and tin mill products, grew sharply and absorbed an increasing share of the total consumption of steel. The most remarkable rise in the volume of steel imports occurred in steel sheets and strip. Steel sheets and strip accounted for nearly one-half of the 14.5 million ton increase in the total volume of steel imports between 1960 and 1968, with the balance of the increase distributed throughout all

TABLE VII

Steel Imports By Steel-Producing Centers

Selected Years

1955-1968

(Thous. of net tons)

1955	Chicago*	Northeast Coast	Detroit	West	South	Buffalo	Cleveland	St. Louis	Total §
Ingots, blooms, etc.	20.2	0.3	120.6	0.2	—0—	4.7	0.1	—0—	146.1
Wire rods	0.1	25.1	—0—	3.3	13.7	0.9	—0—	—0—	43.1
Structural shapes and piling	1.7	54.9	8.8	16.1	112.4	0.2	0.4	0.7	195.3
Plates	—0—	0.3	0.1	1.0	0.1	0.1	—0—	—0—	1.6
Rails and accessories	—0—	0.5	0.3	5.8	0.3	—0—	—0—	—0—	6.9
Bars and tool steel	0.2	20.0	2.2	8.4	140.5	0.2	0.2	—0—	171.7
Pipe and tubing	0.2	2.3	—0—	36.7	35.6	—0—	—0—	—0—	73.9
Wire and wire products	0.4	58.0	0.9	80.1	102.3	0.2	0.9	—0—	242.8
Tin mill products	—0—	—0—	—0—	—0—	—0—	—0—	—0—	—0—	—0—
Sheets and strip	5.1	6.7	24.2	0.3	2.0	0.3	—0—	—0—	38.5
Total steel mill products	27.8	168.1	157.2	152.0	405.8	6.7	1.6	0.7	919.8
Percent of total United States	3.0%	18.3%	17.1%	16.5%	44.1%	0.7%	0.2%	0.1%	
<u>1960</u>									
Ingots, blooms, etc.	0.4	8.3	23.2	0.1	7.3	14.3	0.1	†	67.9
Wire rods	29.5	102.0	7.0	66.5	170.2	1.6	29.4	†	408.2
Structural shapes and piling	13.5	100.9	27.6	38.9	289.4	1.4	12.0	1.3	509.6
Plates	6.8	24.0	5.2	38.0	128.8	1.5	1.2	0.1	210.8
Rails and accessories	0.3	2.0	2.1	1.5	2.6	0.3	1.0	0.4	10.4
Bars and tool steel	13.5	124.6	20.4	14.0	306.7	4.3	8.9	0.9	650.9
Pipe and tubing	4.1	47.0	30.3	182.7	183.6	0.4	1.5	†	480.1
Wire and wire products	19.1	150.3	12.2	115.2	248.0	1.8	6.9	1.8	595.5
Tin mill products	0.1	11.7	2.9	14.4	6.8	3.5	—0—	—0—	40.0
Sheets and strip	11.8	96.0	92.3	47.0	78.8	16.5	0.5	0.6	380.2
Total steel mill products	99.1	666.8	223.2	518.3	1,422.2	45.6	61.5	5.1	3,353.6
Percent of total United States	3.0%	19.9%	6.7%	15.5%	42.4%	1.4%	1.8%	0.2%	

1965

Ingots, blooms, etc.	0.3	3.5	158.6	0.8	0.9	74.0	24.5	†	282.6
Wire rods	116.2	288.9	79.5	138.5	532.4	1.2	120.2	1.2	1,283.6
Structural shapes and piling	50.2	197.2	104.4	143.2	402.2	1.1	18.0	†	928.8
Plates	40.7	80.0	100.6	143.4	368.6	1.3	29.1	0.1	773.9
Rails and accessories	1.0	5.7	7.4	2.9	3.2	0.7	1.7	†	24.0
Bars and tool steel	137.8	236.9	166.1	168.4	768.9	12.0	46.3	†	1,641.8
Pipe and tubing	10.8	76.3	30.3	341.0	426.0	1.4	8.7	†	929.9
Wire and wire products	35.5	212.5	42.1	148.2	362.6	3.9	28.2	1.2	866.2
Tin mill products	0.2	23.8	11.0	43.6	13.8	0.1	5.4	†	145.0
Sheets and strip	472.0	583.4	937.8	574.2	537.0	97.2	284.9	†	3,507.2
Total steel mill products	864.8	1,708.3	1,637.9	1,704.1	3,415.7	192.3	567.2	2.5	10,383.0
Percent of total United States	8.3%	16.5%	15.8%	16.4%	32.9%	1.9%	5.5%	‡	

1968

Ingots, blooms, etc.	16.8	18.9	127.6	19.6	11.7	38.5	15.3	†	298.7
Wire rods	164.9	457.9	151.2	160.5	486.1	10.0	160.2	†	1,600.4
Structural shapes and piling	112.0	337.8	169.8	226.4	623.1	5.8	20.2	1.2	1,512.7
Plates	167.7	189.4	302.8	354.9	617.1	20.5	120.7	0.2	1,789.7
Rails and accessories	7.5	3.2	10.1	5.5	16.9	1.8	1.5	†	53.1
Bars and tool steel	183.5	414.7	297.7	265.1	935.0	26.6	84.6	1.5	2,387.6
Pipe and tubing	37.3	138.8	253.4	416.1	705.1	7.5	13.3	0.6	1,617.9
Wire and wire products	78.5	272.9	47.1	152.8	379.1	5.7	28.2	†	1,019.0
Tin mill products	14.1	29.1	1.4	101.6	14.4	0.1	3.3	†	234.3
Sheets and strip	1,449.3	1,537.2	1,580.3	934.6	1,156.8	69.6	694.8	†	7,446.5
Total steel mill products	2,231.6	3,400.0	2,941.4	2,637.1	4,945.4	186.1	1,142.0	3.5	17,960.0
Percent of total United States	12.4%	18.9%	16.4%	14.7%	27.5%	1.0%	6.4%	—0—	

NOTE: Above list of steel-producing centers excludes Pittsburgh, Youngstown, and Cincinnati because customs districts are not located in any of these steel-producing centers.

* Includes Chicago, Milwaukee, and Duluth.

† Less than 100 tons.

‡ Less than 0.05 percent.

§ Total includes all customs districts, whereas components exclude customs districts, such as Puerto Rico, Alaska, Hawaii, and the Mexican border.

Sources: American Iron and Steel Institute and Federal Reserve Bank of Cleveland

ECONOMIC REVIEW

major product lines, except for steel ingots and tin mill products.

The penetration of foreign steel in inland centers of the United States is also related to the dramatic rise in imports of steel sheets. Detroit, Chicago, and Cleveland emerged as major ports of entry for steel products because the opening of the St. Lawrence Seaway in the late 1950's gave foreign steel suppliers direct access to large steel markets in the interior of the United States. In 1968, Detroit ranked as the largest single port of entry for steel imports; Chicago ranked second in importance. The South and the Northeast Coast still accounted for the largest shares of steel imports into the United States in 1968, but the South includes ports in Houston and New Orleans, while the Northeast includes the ports of New York, Philadelphia, and Baltimore.

Finally, one measure of the effects of steel imports on steel-producing centers in the United States is the relationship of imports to domestic steel production. On that basis, imports in recent years still appear to have made the largest inroads in coastal steel-producing centers. For example, although imports through ports in the Southern steel area accounted for a much smaller proportion of total steel imports in 1968 than in earlier years (27.5 percent, compared with 44 percent in 1955), they equaled about 40 percent of domestic steel production in that region. Similarly, imports into the Northeast Coast steel center, the second largest steel importing region in tonnage, volume, and share of total imports, accounted for about one-

fourth of steel production in that center; a somewhat larger percent was true for the West. However, the ratio of imports to production rose sharply for inland steel-producing centers. In 1968, imports into Detroit amounted to more than 40 percent of local steel production (compared with only 3 percent in 1960), while in Chicago and Cleveland, imports accounted for 11 percent and 18 percent, respectively, of production.

CONCLUDING COMMENTS

The gravitation of steel-producing centers to steel-consuming markets, coupled with major technological changes in the steel industry, have worked against improvement in the industry position of the Fourth District, and against restoration of the District's position in the early post-World War II period. The factors that led to the long-term production decline in Pittsburgh and Youngstown are unlikely to be reversed in the short run, although rapid improvement in steel technology makes projections of past trends hazardous. Coastal and inland water-based steel centers located near markets will continue to have a cost advantage over rival centers; as a result, less strategically located centers will have to achieve superiority in steel technology to compete effectively. Because of the marked expansion (possibly over-expansion) of steel facilities in the Midwest in recent years, steel producers in the Fourth District will be under intensified pressure to improve their cost position to avoid relegation to marginal facilities.



SECURITIES OF U. S. GOVERNMENT AGENCIES

Federal agencies have long been important in the money and capital markets in the United States. However, they did not become major participants in these markets until recent years. Between 1959 and 1968, the outstanding volume of Federal agency debt increased four and a half times, from slightly less than \$8 billion to \$36 billion. This increase was much greater than the 25 percent rise in Federal public debt, which increased from \$288 billion in 1959 to \$355 billion in 1968. The present importance of agency debt in the financial system is further illustrated by the willingness of most U. S. Government securities dealers to make a market for Federal agency issues.

THE ISSUING AGENCIES

Federal agency securities are debt obligations that essentially result from lending programs of the United States Government. These programs were initially designed to remedy credit deficiencies in individual sectors of the economy where credit flows from private sources were considered

insufficient. In more recent years, the objectives of Federal credit programs have been expanded considerably to include attempts to influence the flow of resources to projects that are related more to social than economic goals and to promote greater resource utilization in the economy.

Housing and agriculture have traditionally been the principal beneficiaries of Federal credit programs, although increasing amounts of Federal loans have been directed toward stimulating exports, encouraging community development, helping small businesses, and aiding colleges, universities, and their students. To finance these programs, the Federal agencies in turn have issued securities in borrowing from the private sector. In essence, Federal agencies act as financial intermediaries, channeling funds from the public to individual economic sectors. In certain cases, the funds are loaned at lower rates than the borrowing costs to the agencies. This is a form of subsidy, in that the difference in interest paid and received is made up by funds from the U. S. Treasury.

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The agencies involved in providing credit to agriculture and housing account for the bulk of the outstanding agency securities. For more than 50 years, the *Federal Land Banks* (FLB) have provided funds to local *Federal Land Bank Associations* that, in turn, make long-term real estate loans to farmers. Farmers can also obtain credit indirectly through the *Federal Intermediate Credit Banks* (FICB), which were established in 1923. These banks discount and purchase notes originating from loans extended to farmers by agricultural credit corporations, national or state banks, livestock loan companies, etc. The *Banks for Cooperatives* (COOP) were organized in 1933 to make loans to cooperatives engaged in marketing farm products, buying farm supplies, or providing farm business services. The *Commodity Credit Corporation* (CCC) was formed in 1933 to provide further assistance to farming. The specific functions of this agency cover a rather wide range of activities related to price support programs of agricultural commodities as well as to export programs for farm products and other special functions. Price support, however, has been the CCC's major function, accomplished primarily through farm loans on agricultural commodities and storage facilities and through purchases and sales of agricultural commodities.

The Federal Government originally capitalized all of the agricultural banks. At present, however, most of these banks are owned entirely by local farm associations and cooperative organizations. (The FLBs were converted to private ownership in 1947; the FICBs and COOPs changed from mixed ownership to private enterprises in 1968.) Only CCC is a wholly Government-owned agency.

Another major group of Federal agencies is concerned with extending housing credit. Foremost among these is the *Federal National Mort-*

gage Association (FNMA), also known as "Fannie Mae." This institution was originally chartered by the Federal Government in 1938. Until September 1968, FNMA was entrusted with three separate functions. One program provides assistance to the home mortgage market during periods of credit stringency. This function is formally known as "secondary market operations," and essentially involves purchases and sales by FNMA of FHA-insured and VA-guaranteed mortgages. Thus, when the flow of private funds to the mortgage market is curtailed, FNMA purchases of Government guaranteed mortgages exceed sales in the secondary market. The other original programs of FNMA were: (a) special assistance functions, such as extending financial aid to certain types of housing programs of the Federal Government, and (b) management and liquidation functions in connection with existing FNMA mortgage portfolios. The latter two functions of FNMA were transferred to the newly created, Government-owned corporation called the *Government National Mortgage Association* (GNMA) as a result of the Housing and Urban Development Act of 1968. Today, FNMA functions include secondary market operations only. The 1968 Act also provided for the conversion of FNMA from an ownership shared between Government and private interests to complete private ownership.

The *Federal Home Loan Banks* (FHLB) were organized in 1932 to provide financial assistance to the mortgage market. Specifically, the eleven regional FHLBs lend funds to thrift institutions (mostly savings and loan associations) that are members of the FHLB System. The loans are used to accommodate unusual credit demands on the part of these institutions, arising from seasonal factors as well as cyclical developments such as heavy withdrawals of deposits due to "disinterme-

diation." The FHLBs have been wholly owned by their member thrift institutions since 1951 and are supervised by the Federal Government through the Federal Home Loan Bank Board.

Three other Federally owned agencies have outstanding securities: the *Federal Housing Administration* (FHA), the *Export-Import Bank* (Eximbank), and the *Tennessee Valley Authority* (TVA). At present, only the Eximbank has any significance in the money and capital markets. Both TVA and FHA each have only about \$0.5 billion in outstanding issues, and neither agency's securities are traded in the secondary market.

The District of Columbia Armory Board has outstanding bonds of about \$20 million that are also considered Federal agency securities. These bonds were issued in 1960 to construct a stadium in the District.

CHARACTERISTICS OF AGENCY SECURITIES

Federal agency securities differ when they are compared with other types of securities as well as among themselves. Such comparisons depend heavily on the issuing agency. It is possible, however, to distinguish among three categories of Federal agency issues: (a) participation certificates (PCs); (b) CCC certificates of interest; and (c) notes, bonds, and debentures. PCs are securities issued against a "pool" of assets (usually loans) of the participating agencies. Interest received from the pooled loans is used to pay interest on the PCs. Participation certificates are relatively new to the Federal agencies as a debt marketing technique, having emerged as an important instrument in financial markets in 1964, when FNMA issued \$300 million of fully marketable PCs.¹

¹The Eximbank sold certificates of participation against a pool of loans from its portfolios in 1962. However, these offerings were generally small and not marketable.

The dollar volume of all outstanding PCs grew rather rapidly, from \$300 million at yearend 1964 to \$2.0 billion in 1966. Early in 1967, the Eximbank, which had previously sold only registered PCs, began to issue fully marketable certificates; by the end of 1967, FNMA and Eximbank PCs totaled \$7.7 billion. As mentioned earlier, FNMA was converted into private ownership in 1968, and the responsibility for servicing the outstanding FNMA PCs was transferred to the newly-formed GNMA. As of July 31, 1969, total outstanding PCs amounted to \$10.4 billion, of which \$8.6 billion was issued by GNMA² and \$1.8 billion by the Eximbank. Actually, the dollar volume of PCs has declined in 1969. The peak volume was reached in August 1968, when there were \$11.2 billion in FNMA and Eximbank PCs outstanding. FNMA has not sold any new PCs since August 1968; the Eximbank has not sold PCs since June 1968. GNMA has yet to sell a new issue under its own name.

Originally, PCs were issued with fairly long maturities. Currently, GNMA has outstanding issues that do not mature until 1988, while the longest maturity of Eximbank PCs is scheduled for retirement in 1982. Therefore, most PCs currently outstanding are more of a capital market instrument than a money market instrument; but, over time, PCs will increase in importance in the money market as their term to maturity declines.

Certificates of interest are in many respects similar to PCs. These CCC certificates were sold exclusively to eligible financial institutions and

²The \$8.6 billion was shared by the participating agencies or departments as follows: Farmers Home Administration, \$1,166 million; Health, Education, and Welfare, \$212 million; Housing and Urban Development, \$4,314 million; Small Business Administration, \$1,007 million; and Veterans Administration, \$1,866 million.

were backed by a pool of loans originally made to farmers under price-support programs. Interest rates on such certificates were set by the CCC—the last rate having been 7.00 percent. CCC certificates have always been issued with maturities of 14 months or less—unlike PCs, which as noted, carried much longer original maturities.

Sales of certificates of interest were initiated in 1953. Over the years, the dollar volume of such certificates has varied according to the needs of CCC. As of July 31, 1969, there were \$1.3 billion of CCC certificates outstanding, most of which were scheduled to mature before August 1, 1969. As of mid-October 1969, there were \$521 million CCC certificates outstanding, scheduled to mature before August 1, 1970, although CCC maintains the option to call the certificates for redemption before maturity. In August 1969, the CCC announced that no new certificates of interest would be issued after August 29, 1969.³

The remaining Federal agency securities are somewhat more conventional in nature, consisting mainly of notes, bonds, and debentures. To finance its secondary market purchases, FNMA relies on the sale of notes and debentures. The short-term notes are discounted at published rates that are closely gauged to the rates for Treasury bills; i.e., rates on FNMA notes are set at a certain level above the market rate on Treasury bills. These notes are marketed in much the same way as commercial paper or bankers' acceptances. Secondary market rates on FNMA notes are published for different maturities, usually in the 30- to 270-day range. FNMA debentures, on the other hand, are originally issued with intermediate maturities—typically two to five years. As shown in Table I, there were \$8.1 billion of FNMA

securities outstanding at the end of July 1969, with \$2.9 billion in discount notes and \$5.2 billion in debentures.

The FICBs and COOPs also issue debentures, in both cases, the debentures are short-term obligations. All the FICB and COOP debentures outstanding at the end of May were due to mature within one year (see Table I). The FLBs issue bonds secured mainly by first mortgages on farm properties. There were \$6 billion of such bonds outstanding as of July 31, 1969, and all were scheduled to mature before 1980.

Securities of the FHLBs are issued against collateral of guaranteed mortgages, U. S. Government securities, or cash assets. FHLB obligations with original maturities of more than one year are classified as bonds, while those issued with a one-year maturity or less are specified as notes. These notes differ from FNMA notes in that the FHLB issues carry a fixed (coupon) rate of interest, while FNMA notes are sold on a discount basis.

Finally, there are FHA debentures and the District of Columbia bonds. The former are generally long-term obligations, although the Secretary of the Treasury has authority to redeem the debentures before maturity; the latter are scheduled to mature in 1979 with a 1970 call option.

Risk Considerations. Except for outstanding GNMA and Eximbank PCs, the District of Columbia stadium bonds, and the FHA debentures, which are guaranteed by the Federal Government in terms of both principal and interest, most agency securities are not guaranteed by the United States Government. In fact, such securities are often referred to as nonguaranteed agency debt. Some form of Federal backing is, however, implicit for the nonguaranteed issues. In some

³ *Federal Register*, August 13, 1969, p. 13,078.

TABLE I

Federal Agency Securities
As of July 31, 1969

<u>Issuing Agencies</u>	<u>Type of Securities</u>	<u>Total</u> (mil. of \$)	<u>Amount Maturing Within One Year</u> (mil. of \$)	<u>U. S. Government Guarantee</u>
<u>U. S. Government Sponsored</u>				
Banks for Cooperatives	Debentures	\$ 1,399	\$ 1,411	No
Federal Home Loan Banks	{ Bonds	6,021	2,721	No
	{ Discount Notes		2,150	
Federal Intermediate Credit Banks	Debentures	4,330	4,330	No
Federal Land Banks	Bonds	6,006	2,416	No
Federal National Mortgage Association	{ Debentures	8,092	4,622	No
	{ Discount Notes			
District of Columbia	Bonds	20	—	Yes
TOTAL		\$25,868	\$17,638	
<u>U. S. Government Owned</u>				
Commodity Credit Corporation	Certificates of Interest	\$ 1,293	\$ 1,293	Yes
Export-Import Bank	{ Debentures	2,411	224	Yes
	{ Participation Certificates			
	{ Discount Notes			
Federal Housing Administration	Debentures	581	—	Yes
Government National Mortgage Association	Participation Certificates	8,565	—	Yes
Tennessee Valley Authority	{ Bonds	735	360	No
	{ Discount Notes			
TOTAL		\$13,585	\$ 1,877	

Source: *U. S. Treasury Bulletin*

cases, the Secretary of the Treasury is authorized to buy Federal agency obligations. For example, the Treasury can purchase up to \$1 billion of the FHLB obligations. In other cases, the individual agencies can borrow funds directly from the Treasury. FNMA, for example, can borrow up to \$2.25 billion for short periods of time.

The high credit standing of agency securities is also indicated by the following: (a) most agency issues can be used as collateral for Treasury tax and loan accounts maintained by commercial banks; (b) member banks can use some agency

issues as security for any advances obtained from their Federal Reserve banks; and (c) since late 1966, some agency securities can be purchased and sold on behalf of the Federal Reserve System's Open Market Account. (However, up to now agency issues have only been involved in Federal Reserve repurchase agreements—never in outright transactions.) It is apparent, therefore, that there is probably little difference in terms of risk between Federal agency securities and U. S. Treasury issues. However, this may not be obvious to a conservative portfolio manager. Thus, the

difference in interest rates on the two types of securities is probably only remotely associated with relative risk.

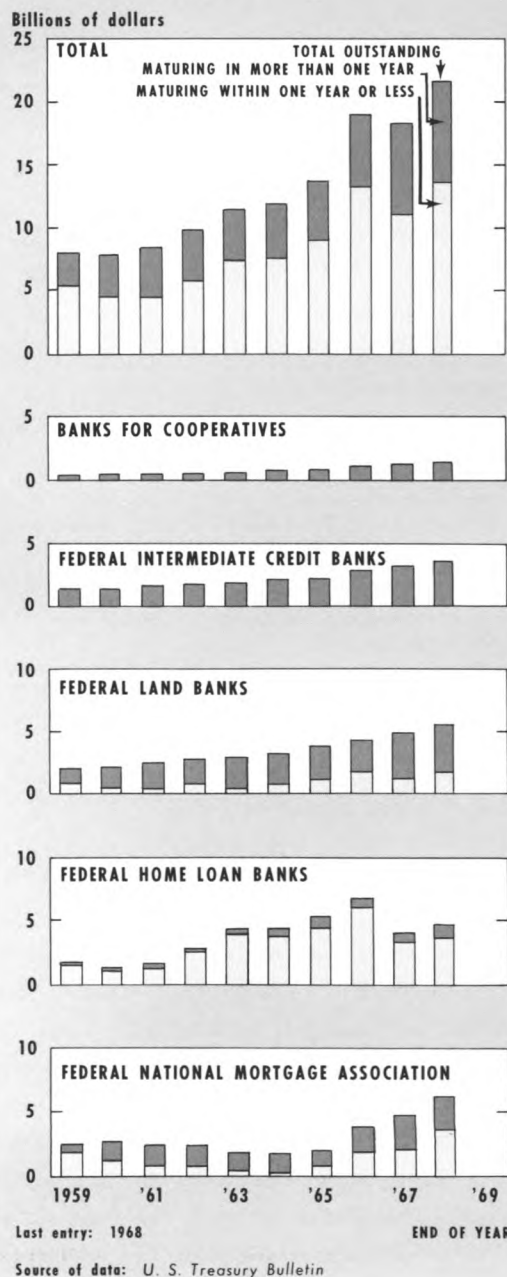
Two other characteristics of agency debt are worth noting—call features and tax-status. With a few exceptions, agency securities presently outstanding cannot be called before maturity. As previously indicated, the District of Columbia bonds and the FHA debentures both have call options. The latter can be called for redemption in whole or in part on three-months' notice.

Interest and any capital gains or losses on agency securities are subject to Federal income taxes, but—again with a few exceptions—not subject to state or local levies. Agency securities are, however, subject to all estate inheritance and gift taxes. GNMA PCs and FNMA debentures do not contain any specific exemptions from state or local taxation.

Trends in Recent Years. It is apparent that all types of agency issues are not equally significant in or even relevant to the money market. Some, such as PCs and FHA debentures, are clearly capital market instruments; others, such as the obligations of FNMA, are of mixed character, depending on the specific maturity. On the other hand, all of the COOP and FICB debentures are short-term money market obligations, with original maturities of less than one year. The agencies that are currently most active in the money market are the farm credit agencies—COOP, FICB, FLB—and the two housing agencies, FHLB and FNMA. Outstanding securities of these five agencies constitute virtually the entire amount of the nonguaranteed agency debt.⁴

⁴The TVA debt is also nonguaranteed, but the individual issues are generally of small amounts and are not traded in the secondary market.

OUTSTANDING FEDERAL AGENCY SECURITIES NOT GUARANTEED by the U. S. GOVERNMENT



The chart indicates trends in the dollar volume of outstanding nonguaranteed securities in the 1959-1968 period. In terms of aggregates, outstanding securities from the five agencies amounted to nearly \$22 billion at the end of 1968 of which \$14 billion were to mature within one year or less. In 1959, the total was about \$8 billion. During the ten-year period, the three farm credit agencies accounted for roughly half of the nonguaranteed debt. The growth in securities issued by each of the three farm credit agencies has been quite steady. However, the growth in outstanding debt of the two housing agencies has been quite irregular, due primarily to changing conditions in the mortgage market. Both FNMA and FHLB obligations increased sharply in 1966 and 1969, largely as a result of the expanded support the institutions provided to the housing market during the year.

Nonguaranteed agency securities are fairly liquid; generally 60 to 70 percent of the outstanding issues in the past ten years fell in the one year or less maturity category. The proportion in this category declined, on balance, from 69.0 percent in 1959 to 64.5 percent in 1968. However, as of July 31, 1969, this proportion had again moved up to 68 percent. Although the public marketable debt is on average longer term than agency debt, the marketable portion of the public debt maturing within one year increased from 42.5 percent in 1959 to 45.9 percent in 1968. The 4½ percent statutory interest rate ceiling on U. S. Government bonds no doubt contributed to this development. Federal agency securities (as well as Treasury bills and notes) are not subject to an interest rate ceiling. The surge in market interest rates since the mid-1960's has made it impossible for the U. S. Treasury to issue bonds.

OWNERSHIP OF AGENCY DEBT

The U. S. Treasury conducts surveys of the ownership of Federal agency issues that are similar to its surveys of the ownership of regular U. S. Government securities. These surveys provide an incomplete picture, however, because in any given year half or more of the total outstanding nonguaranteed Federal agency debt is lumped in a residual "other" category. Nevertheless, the Treasury surveys provide the best information on ownership currently available.

Commercial banks have by far the largest holdings of Federal agency securities for any ownership group. In fact, their holdings increased from \$1,505 million in 1959 to \$3,707 million as of July 1969 (see Table II). Mutual savings banks also increased their ownership, from \$405 million in 1959 to \$1,290 million in July 1969, while holdings at savings and loan associations rose irregularly, from \$330 million in 1960 to \$957 million in 1969. The growth in holdings at insurance companies was especially pronounced between 1959 and 1965, rising from \$252 million to \$565 million; in subsequent years, however, such holdings declined, and in July 1969 amounted to \$359 million. Throughout the period, corporations have been important buyers of agency issues, although their holdings varied widely from year to year. On balance, such holdings changed little between 1960 and 1968, but in relative terms, the reported corporate share, reflecting an incomplete sample, declined drastically, from 11.1 percent of total outstandings in 1961 to 3.8 percent in July 1969.

The increased ownership of Federal agency debt by some public institutions is probably the most conspicuous recent development in this

TABLE II

Ownership of Nonguaranteed Federal Agency Issues
1959–1969
(Mil. of \$)

Owned By	1959*	1960*	1961*	1962*	1963*	1964*	1965*	1966*	1967*	1968*	1969†
U. S. Government accounts and Federal Reserve banks	\$ 22	\$ 37	\$ 35	—0—	\$ 29	\$ 12	\$ 45	\$ 1,356	\$ 1,282	\$ 1,461	\$ 402
Commercial banks	1,505	1,424	1,672	\$ 2,410	2,867	2,645	2,975	2,997	3,502	3,782	3,707
Mutual savings banks	405	466	514	618	695	754	745	929	924	1,011	1,290
Insurance companies	252	266	313	357	400	444	565	531	431	378	359
Savings and loan associations	—	330	307	283	270	307	346	431	422	512	957
Corporations	—	880	968	986	1,208	767	953	715	630	857	1,002
State and local governments	—	—	413	549	540	818	1,337	1,380	1,820	2,849	3,573
Held by all other investors	5,752	4,503	4,353	4,931	5,698	6,382	7,121	10,909	9,813	11,331	15,239
Total amount outstanding	\$7,917	\$7,910	\$8,574	\$10,133	\$11,704	\$12,127	\$14,086	\$19,249	\$18,825	\$22,179	\$26,529

* End of year.

† As of July 31, 1969.

Source: *U. S. Treasury Bulletin*

market. U. S. Government accounts and Federal Reserve banks owned \$22 million of Federal agency securities in 1959, but by 1968 such holdings had set a record of \$1,461 million (6.6 percent of the total). However, as of July 31, 1969, holdings by U. S. Government accounts and Federal Reserve banks had declined to \$402 million. The holdings at state and local governments included in the Treasury sample grew from \$413 million in 1961 to \$2,849 million in 1968 (12.8 percent of the total), and in July 1969 amounted to \$3,573 million.

Commercial banks as well as other financial institutions, such as mutual savings banks, insurance companies, and savings and loan associations, that have legal limitations on the type of investments that they can make, find agency issues particularly attractive. Such issues offer many of the advantages of outright Treasury issues as well as providing higher yields. Most agency securities are considered legal investments and are accepted as security against deposits of public funds, such as the Treasury tax and loan accounts at commercial banks. Consequently, when banks are in need of additional liquidity and hold both agency and regular Treasury issues, they would probably choose to sell the latter, lower earning issues. This may be an important reason behind the rise in the volume of agency issues held by financial institutions as a group during the 1959-1968 period. (During the period, holdings of Treasury issues at financial institutions—although much larger in dollar volume than holdings of agency issues—declined substantially.)

The same reason, essentially, also explains the increased holdings of agency securities by state and local governments. State laws often require that investments on behalf of state pension or trust funds be made in U. S. Government or

Government agency securities. In contrast, the increased holdings of U. S. Government and Federal Reserve accounts came about largely as a result of the strain on the housing market in recent years. Since 1966, in an effort to moderate the credit squeeze in the mortgage market, Government trust funds have invested in large amounts of the securities issued by FNMA and the Federal Home Loan Banks. Finally, the decline in the share of ownership by corporations can in part be explained by developments in other money market instruments, such as CDs or commercial paper, that as a rule offer better returns than agency or Treasury issues. Generally, there are only self-imposed legal limitations on the investment of corporations.

Method of Sale. Most agency securities—especially coupon issues—are initially sold through financial specialists known as “fiscal agents.” The agencies maintain their separate fiscal agents under contract. The agent must assemble a group of investment banking firms—banks, brokers, etc.—to distribute the securities to retail buyers. (There are exceptions, however. The short-term discount notes of FNMA are issued exclusively through one dealer firm.) Once sold, Federal agency issues are traded in the secondary market in much the same way U. S. Government securities are. As mentioned earlier, most dealers in U. S. Government securities also make markets in agency issues. However, in terms of volume of trading, Federal agency issues rank far below regular Government issues.

INTEREST RATE RELATIONSHIPS

Interest rates on all types of debt in the free markets have soared during the 1960's, and yields on agency issues are no exception. For example, between 1961 and the third quarter of 1969,

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TABLE III

Selected Money Market Yields
Annual Average
1959–1969

Year	Three-Month Treasury Bills	Three-Month Federal Agencies	Three-Month Finance Paper	Rates on Federal Agencies less:	
				Three-Month Treasury Bills (basis points)	Three-Month Finance Paper (basis points)
1959	3.37%	3.69%	3.82%	+32	–13
1960	2.87	3.20	3.54	+33	–34
1961	2.36	2.47	2.68	+11	–21
1962	2.77	2.84	3.07	+ 7	–23
1963	3.16	3.30	3.40	+14	–10
1964	3.54	3.73	3.83	+19	–10
1965	3.95	4.14	4.27	+19	–13
1966	4.85	5.22	5.42	+37	–20
1967	4.30	4.60	4.89	+30	–29
1968	5.33	5.54	5.69	+21	–15
1969*	6.43	6.93	6.87	+50	+ 6

NOTE: Rates on Treasury bills and Finance paper are annual averages of daily figures; rates on Agencies are annual averages based on single monthly observations.

* First three quarters.

Sources: *Federal Reserve Bulletin* and Salomon Brothers & Hutzler

yields on three-month maturities of agency issues rose from 2.47 percent to 6.93 percent (see Table III). In general, before 1969, increases in agency yields paralleled changes in Treasury yields. During the first three quarters of 1969, however, yields on agency issues rose considerably more than rates on Treasury issues. Maturity for maturity, agency yields are above yields on regular U. S. Treasury issues, but generally below yields on private issues such as commercial or finance paper, bankers' acceptances, or CD rates in the secondary market. For example, in Table III market yields on three-month maturities of agency issues for the 1959-1969 period are compared with yields on finance company paper and three-month Treasury bills. The spread between rates on bills and agency

issues ranged from 7 basis points in 1962 to 33 basis points in 1960 in favor of agency issues. Finance paper rates averaged 10 to 29 basis points higher than rates on agency issues. But, in the first three quarters of 1969, agency yields on average were higher than yields on finance paper.⁵ As indicated earlier, the spread over Treasury bill rates can only partly, at best, be attributed to differences in risk between the two types of

⁵It should be noted, however, that yields on both finance paper and Treasury bills are expressed on a discount basis, whereas rates on agency issues are on a bond-yield equivalent basis; consequently, the comparison tends to overstate the differences with bill yields and understate the differences with yields on finance paper.

securities. For example, PCs, which are backed by a Government guarantee, still carry higher rates (in the primary as well as secondary market) than those on regular U. S. Treasury issues of the same maturity.

The difference in yields, therefore, is probably the result of factors other than risk. One determining factor might be differences in "tradeability." Treasury issues have been in the market for many more years and in larger dollar volume than agency securities. As a result, the investing public is better acquainted with Treasury issues. In addition, Government securities comprise a more homogeneous group than agency issues in terms of tax treatment, call features, or marketing methods. Generally, the secondary market for agency issues is not as well-developed as that for Treasury issues. Furthermore, the dollar volume of individual Treasury issues is usually far greater than the dollar volume of single agency issues. An individual agency offering rarely exceeds \$0.5 billion, whereas in current weeks, three-month Treasury bill offerings were more than three times greater than that amount.

SOME ISSUES OF POLICY

The issuance of Federal agency securities has a considerable impact on financial markets as well as on overall economic activity. Agency borrowing is important in the total demand for credit and, therefore, exerts a direct influence on market rates of interest. In addition, to the extent that agency securities represent funds entering the final expenditure stream—and assuming that such funds would not have entered otherwise—the new issues contribute to the overall level of economic activity.

In certain cases, agency borrowing may have important implications for monetary policy. It is widely recognized, for example, that monetary policy sometimes severely affects mortgage credit and building activity. Housing credit is also affected importantly by FNMA secondary market operations. Consequently, such agency operations must be given serious consideration in the conduct of monetary policy.

An aspect of agency debt that has caused considerable controversy in the past concerns the treatment of agency securities in the Federal Budget. Before 1969, the borrowing and lending activities of agencies either partially or wholly owned by the Federal Government were included in the cash version of the Federal Budget, but only wholly owned agencies were included in the official administrative budget. Moreover, in certain cases such as sales of PCs, agency borrowings were treated as negative expenditures in the Budget accounts—the justification being that the PCs reflected sales of Government assets (e.g., loans) and that proceeds from PC sales constituted "revenue" or "reduced expenditures" for the Federal Government. Many critics, however, argued that, in effect, PC sales represented a means of Federal Government financing not at all different from direct U. S. Treasury borrowing and that the final accounting result of PC sales, which was to reduce the size of Budget deficits (or alternatively, to increase Budget surpluses), was misleading.

The conversion from mixed to completely private ownership in 1968 of FNMA, FICB, and COOP removed the operations of these agencies from the new Federal Budget. At the same time, in accordance with a recommendation of the Com-

mission on Budget Concepts, it was decided that future sales of PCs by agencies still owned by the Government (for example, the Eximbank) should no longer enter the Budget accounts as negative expenditures, but rather as borrowings similar to regular Treasury issues.

Finally, some policy questions also are often

raised concerning what effort, if any, should be made toward achieving greater uniformity among the securities of individual agencies. For one thing, some observers think that it might be desirable to establish a common agency to market all or most agency debt, rather than using many different agents as is done at present.



CORRECTION

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TABLE IV

**Distribution of New Issues of State and Local Government Securities
Purchased by Private Investors
1960—1968**

The share for Commercial banks in 1967 should be 84.9% instead of 34.9%.

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"Bank Holdings of Municipal Obligations (Fourth District)"

September 2, 1969

"Recent Changes in Corporate Balance Sheets"

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