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CONVENTIONAL FACTORS AFFECTING PRODUCTIVITY

CAPITAL

CAPITAL investment per worker in barbering and hairdressing, as was previously indicated, is low. The *Census of Manufactures* figures for shipments of combined barber and beauty shop equipment give some indication of this. In constant 1948 dollars, shipments per worker were $34 in 1939, $67 in 1947, and $48 in 1958.[21] Capital investment per worker in barbering over time has remained fairly constant, whereas it may have dropped for beauticians.

In earlier years the heat permanent-wave machine cost several hundred dollars.[22] This machine has been replaced by a chemical process that involves only plastic curlers and lotions. Packages containing equipment for six individual permanents were sold at $6 per dozen in 1950.[23] Changes in rent over the long-run period cannot be estimated since no figures are available for earlier years. For 1960 the Internal Revenue Service reported combined barber and beauty shops as having paid rents amounting to 7.6 per cent of total receipts. Another source reported rents for 1962 as 6.3 per cent of sales.[24] If, then, rent is estimated at about 7 per cent, capital input would be somewhat less, since a portion of rent represents items such as management

[21] Current-dollar figures were deflated by the general-purpose machinery and equipment wholesale price index.

[22] *American Hairdresser*, January 1935, shows Nestle's permanent-wave machines ranging in price from $257 to $388 each. This magazine carries in July 1939 a Helene Curtis advertisement for a permanent-wave machine at $295.

[23] *Ibid.*, June 1950.

[24] *Statistics of Income*, 1960–61, p. 71; Accounting Corporation of America, *Mail-Me-Monday Barometer of Small Business, Yearbook, 1962,* p. 92.

expenses and real estate taxes. With amounts involved so small and re-
maining so nearly constant, or dropping, capital input cannot have
had much bearing on changes in productivity in either industry.

<div align="center">HOURS</div>

Table II-6 shows the average hours worked by full-time workers in
1940, 1950, and 1960. While the barber's hours have always been longer
than the beautician's the reduction has been similar over time ·in the
two industries and cannot be a significant factor in explaining differ-

<div align="center">TABLE II-6</div>

<div align="center">*Average Weekly Hours Worked,*[a] *Employed Persons, 1940–60*</div>

	1940[a]	1950	1960
Barbers[b]	53.0	50.1	48.4
Index	105.8	100.0	96.6
Beauticians[b]	47.0	44.6	44.2
Index	105.4	100.0	99.1

Source: *Census of Population,* 1940, 1950, 1960.

[a]*The Census of Population* for 1940 gives hours for wage and
salary workers only. The number of hours worked in 1940 by employed
persons was estimated on the assumption that the change in hours for
employed persons, 1940–50, equals change in hours for wage and
salary workers.

[b]Those working 35 hours or more.

ences in rates of change of output per worker. On the basis of change
in hours alone, one would expect output per worker to rise more
rapidly in barber shops than in beauty shops because the longer the
workweek in the base-year period, the more likely it is that decreases
in hours will be offset by increased output per man-hour.

It is a matter of historical interest that hours appear to have under-
gone a sharp reduction between 1930–40. Data on hours are not avail-
able from the 1930 *Census of Population;* however, statistics of the
hours worked at the time by union barbers can be obtained from the
Bureau of Labor Statistics analysis of the hours worked by unionized

barbers in 63 cities of the United States.[25] The union membership represented in these cities was reported to be 26,960, or about 10 per cent of all barbers. The median number of hours per week out of 85 observations was 57⅔ within range limits of 46 to 69 hours. The interquartile range was from 55 to 62 hours per week.

A not too precise idea of hairdressers' hours in the early 1930's can be obtained from a survey made between December 1933 and April 1934 by the Department of Labor.[26] The survey covered four cities, Philadelphia, New Orleans, St. Louis, and Columbus. In shops with white employees, half the women worked over 48 hours. A report to the Industrial Commission to the Beauty Shop Minimum Wage Board of March 1938 quotes a previous study on beauty parlors in New York City which indicated the range of hours worked as from 45 to over 72 per week.[27] In 1936 the median hours were 49 per week, and by 1939 they had been reduced to 45.

QUALITY OF THE LABOR FORCE

Sex. Factors affecting the quality of the labor force differ in the two industries. The most obvious contrast is that of sex: barbers are predominantly male, 97.1 per cent; and cosmetologists predominantly female, 88.8 per cent.[28] The percentage has changed little over time. In 1939, women represented 3.8 per cent of the employees in barber shops, and 91.9 per cent of the employees in beauty salons.[29] Women today are probably more productive workers than they were in earlier periods because they have had more opportunity to gain experience.[30]

Education. No data on formal education are available for 1930; but from 1940 through 1960, barbers have had a markedly lower education than beauticians. From Table II-7 it can be seen that their education is also lower than that of both males and females in the total labor force. Beauticians' education has not only substantially exceeded that

[25] Department of Labor, Bureau of Labor Statistics, *Union Scales of Wages and Hours of Labor*, Bulletin H 515, May 15, 1929, pp. 325–327.

[26] *Employment Conditions in Beauty Shops*, Women's Bureau, Bulletin No. 133.

[27] New York State Department of Labor, Division of Women in Industry and Division of Junior Placement, *Employment Opportunities in Beauty Shops in New York City*, October 1931.

[28] *Census of Population, 1960*, p. 8.

[29] Stigler, *Employment in the Service Industries*, p. 10, n. 13.

[30] For a discussion of this point, see Denison, *Sources of Economic Growth*, p. 80.

TABLE II-7

Median Years of Formal Education Completed, 1940–60

	Barbers	Beauticians	Service Workers[a]		All Occupations	
			Male	Female	Male	Female
1940[b]	8.3	11.8	8.3	9.5	8.7	10.8
1950[b]	8.8	12.0	8.8	9.6	9.7	11.8
1960	9.2	12.1	9.7	10.2	11.1	12.1

Source: *Census of Population*, 1940, pp. 113, 114, 115; 1950, pp. 107, 113; and 1960, pp. 116, 121, 128.

[a]Excludes domestics.

[b]Barbers and beauticians are grouped together in the *Census of Population* for 1940 and 1950. Males have therefore been assumed to be barbers and females beauticians.

of all service workers but in 1940 and 1950 was superior to the educa-
tion of females in all occupations.

It might be thought that the barber's educational differential is re-
lated to the number of foreign-born among barbers. However, as early
as 1930, foreign-born barbers were only 30 per cent of the total and
in 1960 only 18.6 per cent.[31]

The beautician's increase in formal education over time is too small
to have affected productivity changes significantly. The barber now
completes almost one more year of formal education than in 1940,
which may have contributed to his small productivity increase.

The effect of vocational education on labor quality should also be
considered. Over the years both industries have increased the variety
of courses to be studied and the length of time spent in vocational
school before taking the state examination. As these requirements were
increasing, the service for which they were preparing the barber nar-
rowed down to just one—haircutting. Yet the barber must often study
such subjects as "scientific scalp and facial treatment for cosmetic pur-
poses, use of creams, lotions, and other preparations in conjunction
with galvanic, faradic, and high frequency electricity, ultra-violet
radiation, vibratory appliances, barber shop management, ethics, sales-
manship, standardized services, advanced haircutting and shaving
techniques (including scientific finishing and artistic grooming), and
professional courtesy." [32] It is difficult to believe that the average bar-
ber can utilize such elaborate preparation.

The beautician has had an increased number of skills to master, and
the additional hours of vocational schooling and courses required
have more immediate application.[33] Provision has been made for hair-
dressers to take courses that bring them up to date on new techniques
when they return to the industry after an absence. Many more oper-
ators today are all-round operators than in 1936, if New York State
can be used as a guide. In 1936, 63.1 per cent were all-round operators;
whereas in 1956, 88 per cent were so classified according to studies
made by that state's Department of Labor. This broadening of skills
makes for increased flexibility in the use of operators in smaller shops.

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[31] *Census of Population, 1930*, V, 84 and 113.

[32] Rottenberg, in *Aspects of Labor Economics*, p. 18.

[33] A visit to a large school of cosmetology (Queens Beauty School) revealed that
instruction time was principally spent on those subjects which are essential for prac-
ticing cosmetology, e.g., hairsetting, cutting, tinting, manicuring.

Increased vocational education, then, as a factor explaining increases in productivity has more relevance for beauty than barber shops.

Age. Another quality of the labor force which bears on productivity is age. The distribution of barbers has so altered over the years as to increase the percentage at the least productive ages and decrease the percentage at the most productive ages. Table II-8 indicates that in 1938 earnings were highest between 25–34 and 35–44 years of age; between 1929 and 1958 the percentage of barbers in these groups dropped from 55.6 per cent to 34.8 per cent. Barbers 65 years and over had the poorest earnings, yet their percentage increased from 2.9 in 1930 to 13.3 in 1960. Moreover, earnings of barbers 55–64 years of age are also lower than at younger ages. In 1930 only 12.2 per cent were 55 years or older; today this figure has risen to 35 per cent.[34] The explanation for this shift seems to be that employment in the industry has declined absolutely.

In contrast, the percentage of beauticians has increased in those age groups where earnings are highest—45 to 64 years. In 1930 only 9.8 per cent were in this age group, but in 1960 28.6 per cent were represented there. At earlier ages, when earnings are lower, the percentage has been substantially reduced.

It is to be anticipated that the rapidly aging labor force contributes to lower productivity among barbers. The physical strain of standing with arms elevated above shoulder level can be very taxing, especially on busy days, when the position is maintained fairly continuously. Although beauticians other than manicurists stand, their arms are held at a more comfortable position. The physical slowing down of the barber as he ages cannot be compensated for in terms of better-quality performance. After cutting hair for a couple of years, the barber attains maximum proficiency, and additional years of practice do not yield improvements in performance. The beautician, on the other hand, has ample opportunity to improve the quality of her work with practice because the nature of the service is more varied and subtle. These improvements are then reflected in increased productivity and earnings.

[34] The question might be raised whether earnings figures for older barbers are too low because no distinction has been made between full- and part-time workers. Only 10 per cent of all barbers are part-time workers, however, so that it is unlikely that serious error would result from the failure to adjust for this factor.

TABLE II-8

Percentage Distribution and Median Earnings of Barbers and Beauticians by Age, 1930–60

Years	16–24	25–34	35–44	45–54	55–64	65+	55 Years and Over	Median Years
Barbers
1930a	11.6b	26.6	29.0	19.4	9.3	2.9	12.2	37.8
1940c	4.9	20.4	28.2	26.4	14.8	5.4	20.2	43.4
1950c	4.8	15.1	21.9	26.6	21.6	10.1	31.7	47.6
1960d	6.9	17.2	17.6	23.5	21.7	13.3	35.0	48.1
Beauticians
1930a	26.6b	37.1	23.9	8.0	1.8	.4	2.2	29.3
1940c	34.5	34.2	20.6	8.3	2.0	.4	2.4	28.5
1950c	16.3	34.2	29.7	13.9	4.7	1.0	5.7	34.3
1960d	15.6	20.3	33.2	20.7	7.9	2.3	10.2	38.7
Median Earnings, 1958e
Barbers	$2,811	$4,157	$4,302	$3,951	$3,717	$2,096		
Beauticians	1,612	1,960	2,059	2,199	2,187	1,258		

Source: *Census of Population*, 1930, 1940, 1950, 1960.

aGainful workers.

b18–24 years. This row will not total 100 per cent since years 10–17 have been omitted.

cEmployed persons. Males are assumed to be barbers and females beauticians.

dEmployed persons. The two occupations are listed separately. Barbers are the sum of male and female barbers; the same is true of beauticians.

eExperienced civilian labor force.

TECHNOLOGY—BARBER SHOPS

A barber in the late 1920's could still devote his whole day exclusively to shaving, despite the introduction of the safety razor; but by 1939, the electric and safety razors combined had curtailed the number of shaves substantially, although shaving was still a significant part of the barber's service.[35] In 1947 a survey made in Los Angeles revealed a maximum of four shaves performed per day by any barber.[36] Today the figure is even less, some shops refusing to shave at all.

The fall in barber-shop shaves tended to reduce the demand for other services. When it was customary for men to visit a barber shop to be shaved three or four times a week, their hair was trimmed more frequently. At the slightest suggestion of shagginess of the hair at the back of the neck, the barber made a practice of calling the customer's attention to it by holding a mirror behind him. Usually the customer responded amenably to this suggestive selling and agreed to a trim.[37] During the 1920's many men did not shampoo their own hair, but turned to the barber for this service as well as for scalp and face massage.

The depression years witnessed a radical change. Men had good substitutes in the safety or electric razor for barber shaving services and they began using them in order to save money. Services complementary to shaving showed a similar decline. When the depression was over, the value of the time saved by shaving at home discouraged men from returning to their former pattern. The benefits of the most important technological innovation in barbering thus accrued not to the barber but to the household.

There have been other technological innovations in barbering, such as the electric clipper for haircutting. This has reduced the length of time required to cut a man's hair, especially in those shops that rely entirely on clippers. The quality of the cut is felt to be inferior by some men, however, so that many shops use scissors primarily. The lather for shaving sideburns is now produced by an electric machine

[35] Brown and Cassady, "Guild Pricing," p. 333; U.S. Department of Labor, *Job Descriptions for Domestic and Personal Service,* Washington, 1939. The technological changes that led to the substitution of household for market services may have been partly induced by changes in the costs of time.

[36] Brown and Cassady, "Guild Pricing," p. 333.

[37] Part of the cost of a haircut is the time spent going to and from the barber's. When a man had to go for a shave anyway, the real cost of a haircut was lowered.

rather than by hand, which has probably saved the barber a few minutes. No precise measure can be made of the effect on productivity of such devices, but they apparently have not had major impact. By far the most significant result of changes in barbering technology on productivity has been felt in the household and not in the industry.

TECHNOLOGY—BEAUTY SHOPS

Before 1920, beauty services were considered an expensive luxury by most women; they took care of their own hair. But the craze for bobbed hair in the 1920's caused an abrupt change. Women could not cut their own hair and they discovered that once it was cut, it needed special care to look attractive.[38] A permanent-wave machine had been on the market as early as the first decade of the century, but public acceptance of it did not come until the 1920's, when permanent waves became a complementary service to cutting the hair short.

During the 1930's some improvements were made to this machine. For example, a temperature of 350° F. was originally required for it to achieve its results. In 1935 the Frederics Company marketed a new spiral-type permanent-wave device which functioned properly at only 160°, and some time was saved by its use since it turned off automatically. In the first half of the 1940's the cold-wave permanent was discovered. Its popularity was by no means immediate, however. In 1945 the Helene Curtis cold wave was price-protected at $50. Demand was sharply limited, for not only was it too highly priced for popular consumption but the effectiveness of its results was controversial. The cold wave as it is known today was the result of a series of small technological improvements which were gradually developed since 1948. The full impact of these innovations was felt in the middle of the 1950's, at which time the average price had dropped to a range of from $7.70 in Scranton to $16.00 in Seattle.[39]

The operator saved a substantial amount of time through the use of instant neutralizers and faster processing lotions. In addition, she was freed to service other customers while the chemical reaction of the

[38] U.S. Department of Commerce, *Establishing and Operating a Beauty Shop*, Washington, 1946.

[39] Sources for this paragraph are *American Hairdresser*, January 1935 and January 1945, a summary provided by the Marketing Research Department of Helene Curtis Industries, Inc., January 7, 1964, and Bureau of Labor Statistics preliminary sample of permanent cold waves, 1955.

permanent was taking place. During the application of the older heat permanent, she had to stand continuously at the customer's chair because of the danger of scalp burning.

The impact of the cold wave on productivity is substantial, since it is estimated to have cut the labor time required for a permanent in half. Meanwhile, by the middle 1950's the demand for permanents had grown to the point where they represented 67 per cent of receipts of the beauty salon.[40]

A somewhat similar pattern of development characterized hair coloring. Clairol, the well-known tinting agent, was in existence as early as 1920, but demand was small. At that time the process had many limitations. It offered the consumer few colors, which were neither attractive nor sufficiently subtle to leave doubt that a person's hair was dyed. Between 1939 and 1949, Clairol began advertising a new coloring material noted for producing a "natural look." In the late 1940's and the 1950's many technological improvements were made which reduced the length of time required for the operator to perform the service. During the 1950's demand rose to the point where coloring represented 15 per cent of beauty-salon receipts.

It is in the last couple of years, however, that the response to changed techniques in coloring has been most dramatic. Patrons are normally introduced to coloring by a temporary color rinse which lasts four to six weeks. In the last year or two this type of product has been so perfected that it has wave-set properties and can be administered at the dressing table rather than at the sink, thus eliminating rinsing and saving time and effort. After experiencing these temporary rinses, the customer will frequently accept permanent hair coloring.[41] So successful has the approach been that today receipts from coloring are said to represent one-third of total salon receipts.

Hair dryers have been improved so as to decrease the length of time that a woman must remain under one to dry her hair after it has been set. The work of adjusting the temperature to the comfort of the individual has been transferred from the operator to the customer by simply putting the thermostat within easy grasp of the customer, rather than above her head or behind her.

[40] Interview with L. A. Freiberg of the National Hairdressers' and Cosmetology Association.

[41] Helene Curtis summary.

The innovations so far described have been those that have saved the operator time with no loss, but rather a gain, in the quality of the service performed, thus contributing directly to increased productivity. Another kind of technological innovation, however, does not necessarily save time directly. Colored nail enamel, facial packs, and various rinses are of this type. Beauty-shop suppliers develop such products and hope they will be accepted by the public. If the consumer does accept them, the result is to broaden the variety of services which the beauty shop must offer. This movement away from specialization would normally be considered a factor affecting productivity adversely. There is an offset, however, through the effect on demand.

The relation between the degree of specialization and productivity in both industries contrasts strangely. On the one hand, the barber, who has become more specialized through offering fewer services over the years, until today for the most part he offers only one—haircutting —has had a low rate of increase in productivity. On the other hand, a relatively high rate of increase has been achieved in cosmetology, which originally was highly specialized. The beautician used to perform mainly the "shampoo and set," but today she tints, rinses, sets, and permanent-waves the hair, manicures and pedicures the nails, tweezes the eyebrows, gives facials and massages, along with the selling and servicing of wigs.

SPECIALIZATION AND DEMAND

The probable explanation for this paradox lies in changes in demand. The total demand for the barber's services shrank to the point where specialization was of small benefit; i.e., demand for a variety of services shrank to a demand for only one service. There is little effect on the productivity of a barber who takes half as long as previously to cut a man's hair if the liberated time must be spent idly waiting for another customer. Consumer demand is now focused mainly on one service, the haircut, which takes about twenty minutes to perform today, in contrast to perhaps thirty minutes at earlier periods, when other services were also in demand. It would require a very precise and even flow of customer traffic, say, one man every twenty or twenty-five minutes, to keep the barber productive all day and therefore in a position to take advantage of quicker performance because of specialization. No such even flow of business exists, however, a factor which

will be explored more fully a little later. When each customer demanded several services of the barber, there was less dependence on a precise and even flow of demand. If business was slow, the barber could help spread demand by suggesting additional services, such as a shampoo or massage, to the customers. On the other hand, if he was operating at a peak period, he could withhold any suggestive selling, merely shaving and cutting the hair of each customer.

This should not be interpreted to mean that no benefits from specialization have been felt by the barber. On those days when traffic is heavy and continuous, he obviously can process more customers, thereby adding to his measured productivity. No doubt part of the 1 per cent average annual rate of increase in real output per barber between 1939–48 can be attributed to this specialization, for it was during that decade that time devoted to shaving services dropped from a significant amount to virtually none.

In the beauty shop the adverse effect on measured productivity because of widening the variety of services has been offset by several factors. Attention was previously called to the percentage increase in the number of women who are all-round operators. In the small shop, employment of such personnel makes for greater flexibility in the distribution of work and leads to increased productivity. If the demand at the moment in a small shop is not for tinting services but is instead for a haircut, the tinter need not remain idle; she cuts the customer's hair. In the large shops, however, both increased demand and demand for a wider variety of services has had the effect of increasing specialization, which has helped productivity.

One further consideration relates to the nature of the demand itself. Increased demand for beauty-shop services may take different forms. One woman may come more often for the same service or a woman may demand more kinds of services. It is the latter demand, resulting in a wider variety, whose effect on productivity has been described as possibly adverse. Fortunately, however, an offsetting factor accompanies this form of demand. The woman who requests a variety of services usually does so at one sitting. The result can then be beneficial for the following reasons.

Associated with each customer is what might be called a setup time. If the customer is tardy, the operator often wastes time awaiting her arrival. Once the customer is in the shop, she first identifies herself

and her appointment is verified. Then she removes her outerwear and dress and puts on a smock, sometimes assisted, sometimes not. She is next asigned to a particular operator and is directed to her chair. Obviously, if each customer came for only one service, the amount of unproductive setup time would be higher in relation to the more productive time of the operator.[42] When more than one service is requested, sometimes two can be performed at once. Finally, there is greater latitude and flexibility in planning and timing the work load. The advantages associated with the demand for a large quantity of services at one sitting rather than small amounts of services at discontinuous time periods are analogous to those benefits in the production of goods which accrue from one large order of $100,000 in contrast to 100 orders of $1,000 each.

During a recent National Bureau investigation of productivity in retail food stores, a similar situation was found by David Schwartzman.[43] Productivity in food stores was found to be influenced significantly by the size of the average transaction. Both the present study and Schwartzman's offer empirical evidence supporting the theoretical presentation of Armen Alchian, which emphasizes the advantages of planned larger batch or lot quantities of output over a period of time rather than planned rates of output.[44]

It appears, then, that there is justification for concluding that improved technology accompanied by increased demand has contributed to the beautician's improved productivity.

ECONOMIES OF SCALE

It was earlier pointed out that both barber and beauty shops are commonly referred to as "typically small." This characterization is appropriate if the two industries are compared with others in the economy. There are differences, however, between the two industries studied here. In 1958, barbering establishments with receipts of $50,000 or more accounted for only 5 per cent of total barber receipts, but beauty shops in the same category were responsible for 22 per cent of their

[42] It seems likely that the larger and more elaborate the shop, the greater the amount of setup time.

[43] The unpublished material on food stores is part of a larger work on productivity in retail establishments in which Schwartzman is now engaged.

[44] "Costs and Output," in *The Allocation of Economic Resources, Essays in Honor of Bernard Francis Haley,* Stanford, 1959.

total. Only 2 per cent of total barber receipts came from shops with annual sales of $100,000 or more, in contrast to about 11 per cent for beauty salons.[45]

These figures suggest that few benefits from economies of scale accrue to the barber. The effects on the beauty shop are less obvious. Table II-9 indicates that, at any point in time, the larger the establishment, the greater the receipts per worker. Attributing this to economies of scale is a doubtful interpretation, however, because average annual earnings also rise with size of establishment. Higher receipts per worker might be the result of better-quality labor in larger shops. Table II-10, last column, indicates some economies of scale, since there is a small rise in the ratio of receipts to payroll.

Labor quality might increase with size of shop for several reasons. Attention was called in the last section to the fact that the larger the shop, the greater the use of specialists, who receive higher wages than nonspecialists. In order to specialize in a particular field, such as hair styling or tinting, the operator takes postgraduate work at a beauty school, or sometimes an apprenticeship is served under a famous European or American operator. In such cases, improved quality takes the form of the ability to provide a more exciting and attractive hair style or color. Talent and training vary among specialists; the most competent are likely to go into the large prestige salons, where prices and earnings are high.

Large establishments, however, can also be very low-priced and highly competitive, the opposite of the large prestige salon. The physical volume of services performed is heavy and continuous. In these shops, the better quality of the specialist is evidenced by the speed and efficiency with which the customer is serviced.

Over the period 1939–58,[46] the larger the establishment, the smaller the increase in productivity. Presumably, demand has always been strong enough in the big shops to warrant employment of as large a number of full-time workers as are needed, or there would have been fewer. This is supported by the fact that the larger the establishment, the lower the percentage of part-time employees. Little increase in

[45] *Census of Business*, 1958, V, 2–28. The average beauty shop is somewhat larger than the average barber shop. There are more self-employed than wage and salary workers among barbers; the reverse is true of beauticians.

[46] *Census of Business* figures for 1963 cannot be used because they make no distinction between part-time and full-time employees by size of establishment.

TABLE II-9

Receipts and Employment in Beauty Shops by Store Size, 1939–58

Size of Store by Employment	Receipts per Worker			Real Receipts per Worker			Per Cent Distribution of Employment		
	1939	1948	1958	$\frac{1958}{1939}$	$\frac{1948}{1939}$	$\frac{1958}{1948}$	1939	1948	1958
0	100.00	100.00	100.00	163.64	114.67	142.70	22.17	26.23	29.30
1	114.11	114.40	103.11	147.85	114.96	128.61	23.95	20.09	12.42
2	132.79	123.93	109.89	135.41	107.01	126.53	15.96	15.85	12.47
3	147.80	135.07	121.74	134.79	104.79	128.63	10.44	9.76	8.71
4–5	159.45	146.25	129.26	132.63	105.18	126.11	10.59	10.27	10.76
6–7	164.36	155.69	136.29	135.66	108.62	124.90	5.47	4.81	6.37
8–19	181.43	178.55	142.26	128.31	112.85	113.70	8.09	8.09	13.15
20+	215.62	218.63	153.72	116.66	116.27	100.33	3.31	4.89	6.81

Source: *Census of Business*, 1939, Vol. III, Table 4A, p. 88; 1948, Vol. VI, Table 3A, p. 306; 1958, Vol. V, Table 3B, pp. 3–28.

TABLE II-10

Receipts and Payroll in Beauty Shops by Store Size, 1958

Size of Store by Employment	Receipts per Worker[a]	Average Annual Earnings per Worker[b]	Receipts / Payroll
0	3,629	2,483	1.46[c]
1	3,742	2,341	1.60
2	3,988	2,425	1.64
3	4,418	2,589	1.71
4−5	4,691	2,726	1.72
6−7	4,946	2,844	1.74
8−19	5,163	2,987	1.73
20+	5,579	3,091	1.80

[a]Full-time equivalent employees plus proprietors.

[b]*The Census of Business* does not report proprietors' earnings. In order to estimate them, average hourly earnings of those working 35 or more hours per week for 50−52 weeks among the self-employed as distinct from the wage and salary workers, were obtained from the 1/1,000 sample data. The ratio of the former to the latter was multiplied by the *Census of Business* figure for a full-time employee's wage in each store size, thus:

$$52X \ \frac{\text{Full-time weekly payroll}}{\begin{array}{c}\text{Number of full-time} \\ \text{employees}\end{array}} \times \frac{\begin{array}{c}\text{Average hourly earnings of} \\ \text{self-employed}\end{array}}{\begin{array}{c}\text{Average hourly earnings of} \\ \text{wage and salary workers}\end{array}}$$

This estimate for proprietors in each store size was multiplied by the number of proprietors and added to the *Census of Business* payroll to obtain an estimate of total payroll. Total payroll was then divided by the sum of proprietors and full-time equivalent employees to obtain average annual earnings per worker.

[c]Average annual earnings of the proprietor in the 1-employee store is used to estimate proprietors' earnings in 0-employee store.

productivity in the large shops, therefore, has come from transforming idle hours into active ones.

Any increase in productivity in the largest shops of twenty or more employees occurred between 1939 and 1948. These shops are located almost exclusively in the big cities, such as New York and Chicago, where new fashions are accepted most readily. The impact of the time-saving technological innovations developed in that period was consequently felt first in these large cities. With demand already strong and continuous, processing time was decreased and the physical volume rose as customers in the big cities responded to fashion changes prompted by the new techniques, thus increasing demand.

Receipts in current dollars nearly tripled between 1939 and 1948 in the largest establishments, while in the industry as a whole receipts less than doubled over the same period. Yet the number of establishments employing twenty or more people remained almost constant over the decade and employment in them increased. The establishments with eight to nineteen employees had about equal increases in productivity in the two periods 1939–48 and 1948–58. In the earlier period they probably participated more in the benefits from new technology than from increased demand. Their receipts rose during those years about as much as did the industry as a whole, but employment fell. Smaller shops felt almost all of the impact of improved techniques and demand in the 1948–58 decade.

Except for shops with no employees, only the larger shops have increased their share of employment. The most substantial percentage increase occurred in the largest shops, which doubled their share. The eight-to-nineteen-employee establishments had the next largest increase, followed in magnitude by those with six to seven employees. The pattern is similar even among small shops, except for the very smallest. The largest percentage loss of employment occurred in the shops employing only one or two people; there was less of a loss in those employing three.

Changes in the distribution of employment by store size apparently had little effect on industry-wide changes in productivity. While the shift of business to the large, highly productive shops tended to increase productivity, the parallel growth of the zero-employee shop had the opposite effect. Of the total increase from 1939 to 1958 in output per worker of about 50 per cent, only about 3 or 4 per cent can be

attributed to changes in store size. About 40 per cent is attributable to increased productivity within stores of given size. Interaction accounts for the remainder.[47]

The average annual rate of increase in output per worker among beauticians has been markedly different in the decades 1939–48 and 1948–58, the rate over the second decade being more than double that of the first. Yet changes in certain factors affecting productivity, such as the distribution of age in the labor force and increases in formal education, cannot be said to have contributed more in the 1948–58 period than in 1939–48 since the changes were about equal in the two periods.

Technological change and change in demand are more likely explanations. The major time-saving innovations of the 1940's, the cold

[47] Let E_{i39}, E_{i58} = per cent distribution of employment in 1939 and 1958 respectively by size of store: P_{i39}, P_{i58} = index of receipts per employee by size of store; and i = size of store 0, 1, 2 . . . 20+ employees. Then, holding productivity constant at the 1958 level,

$$\frac{\sum_{i=0}^{20+} E_{i58}P_{i58}}{\sum_{i=0}^{20+} E_{i39}P_{i58}} = 103.40$$

or, holding productivity constant at the 1939 level,

$$\frac{\sum_{i=0}^{20+} E_{i58}P_{i39}}{\sum_{i=0}^{20+} E_{i39}P_{i39}} = 103.93.$$

Whereas, holding the distribution of employment constant at the 1958 level,

$$\frac{\sum_{i=0}^{20+} E_{i58}P_{i58}}{\sum_{i=0}^{20+} E_{i58}P_{i39}} = 139.05$$

or, holding distribution of employment constant at the 1939 level,

$$\frac{\sum_{i=0}^{20+} E_{i39}P_{i58}}{\sum_{i=0}^{20+} E_{i39}P_{i58}} = 139.76.$$

wave and the "natural" hair dyes, had heavier impact on productivity in the 1950's than in the 1940's. This is because customer acceptance was not immediate, except in the largest shops in big cities. Additional technological advances, developed in the 1950's, were not radical and were quickly adopted throughout the industry. Hence technological improvements of both periods were principally felt in the latter decade. Added to this was the large increase in demand of the 1950's, which kept operators more continuously busy, thus putting them in a position to utilize the time-saving devices to the benefit of productivity.

Between 1939 and 1948, barbers had a somewhat higher rate of increase of output per full-time worker than during the period 1948–58, 1.0 per cent contrasted with .3 per cent. As with the beautician, changes in certain factors affecting productivity, such as formal education, cannot be said to have contributed more in the 1939–48 period than in 1948–58, for they were about equal in the two periods. A factor affecting productivity adversely, namely, the aging of the labor force, changed more radically during the earlier period than during the last ten years. The drop in demand for services other than the haircut was probably sharper in 1939–48 than in 1948–58. Actually, none of the factors affecting the barber's productivity adversely changed more in the second decade than during the 1939–48 period.[48] In the absence of such a change, no satisfactory explanation can be offered for the difference in behavior between the two periods.

[48] It has been suggested that the degree of unionization among barbers in the period 1948–58 might have been greater than during 1939–48, and might have caused the rapid rise in the barber prices in the latter decade. If prices rose above equilibrium and reduced demand, this would affect productivity. However, membership in the barber's union has been reported to be as follows: 1939, 47,500; 1948, 58,600; 1958, 65,800; 1962, 51,400. Leo Troy, *Trade Union Membership, 1897–1962*, Occasional Paper 92, New York, NBER, 1965, pp. A-1 and A-10. Just the opposite situation obtained. The degree of unionization in 1939 was about 22 per cent; in 1948, 30 per cent; in 1958, 36 per cent; and in 1962, 29 per cent. The price indexes of barber services for these years were, respectively, 54, 100, 162, and 183. The rate of increase in unionization was a little higher in the 1939–48 period than in 1948–58. During the years 1958–62, unionization actually declined, so that in 1962 it was about the same as in 1948. Yet barber prices rose 89 per cent. Further, attempts were made to estimate the demand curve for haircuts in cities and states. The results were inconclusive, partly because of the inadequacy of the price data. Consequently, the effect of price on demand could not accurately be estimated.