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The Rising Cost of Time of Females, the Growth of National Brands and the Supply of Retail Services

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THE RISING COST OF TIME OF FEMALES,
THE GROWTH OF NATIONAL BRANDS
AND THE SUPPLY OF RETAIL SERVICES

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ABSTRACT

The increase in the relative earnings of females since the mid-seventies has increased the cost of time of females. The theme of this paper is that the rise in the relative cost of time of females has increased the demand for nationally advertised brand names and reduced the information traditionally supplied by the retail store. The paper presents a theory of the optimal allocation of shopping responsibilities between two working members in a family. Under certain conditions a rise in the wage of the female will increase the demand for brand names by more than an increase in the male wage. The paper relates the increase in the relative earnings of females to the growth of trademark filings (a proxy for branding), an increase in manufacturer advertising, and a reduction in retail personal services in several industries.

The female work force has expanded greatly since World War II but the earnings of females did not increase relative to males until the mid-seventies. The methods of marketing and promoting products have changed as firms respond to the rise in the cost of time of females. The rise in the relative cost of time of females has increased the consumer's demand for products that save shopping time. Consumers can save shopping and search time by purchasing nationally advertised brand names and by patronizing stores that provide greater service.

This paper presents evidence that brand names in consumer good industries have grown more rapidly than the growth of the economy as the relative earnings of females have increased. While brand names have expanded, service quality in retail stores has declined in several industries with the diffusion of discount type retailing and the growth of part time workers. The decline in the quality of retail services during a period when the cost of time is increasing seems paradoxical and invites an explanation. We explain the decline in retail services by suggesting the information in brand names is a substitute for the product information that traditionally was obtained by searching retail stores. We argue the growth of branded goods has lowered the value of the certification function traditionally performed by retail stores and decreased the demand for information supplied by retail stores. The retail store performs a more limited role now and is more of a provider of inventory.

Steiner [1978] and Bresnahan [1986] have already suggested that information obtained by the consumer directly through manufacturer promotion is a substitute for information obtained at the retail outlet. Steiner suggested the growth of the large toy store was due to the growth of manufacturer promotion of games. Bresnahan argued the cost of providing information through traditional retail outlets has increased relative to the cost of supplying mass communication. He presented some evidence of increasing returns in the use of television and magazines in the beer industry. We stress demand determinants more and give supply determinants a lesser role since the rates for national network TV advertisements have not changed much relative to the rates for newspaper advertisements. We believe the increased cost of time of the female is an important key to understanding why manufacturers are supplying more information to the consumer in recent years and explains why personal service in stores has declined.

Section 1 of the paper presents a theory of how a change in the wage rate of each working member of a family affects the demand for brand names and retail store services. In section 2 the shopping times of females and males are compared in a cross section and across

time to show how shopping times of females and males have changed over time. An examination of several time series shows the rise in the relative earnings of females began in the mid-seventies and coincides with (1) an increase in the growth rate of consumer good trademark filings (a proxy for branding), (2) an increase in the advertising intensity by manufacturers of consumer goods, (3) an increase in the advertising intensity of manufacturers relative to retailers and (4) a decrease in personal services at retail stores. Section 3 presents reduced form estimates of the effect of the relative rise in female earnings on the incidence of branding, the comparative growth of manufacturer and retailer advertising and on retail store services. Section 4 summarizes the major conclusions and draws some implications of the analysis.

I. A THEORY OF THE DEMAND FOR BRANDED GOODS

We expand on the pioneering papers on the economics of time by Becker [1965] and Ehrlich and Fisher [1982] and present a theory of the demand for brand names and store services by a family of two working members. The utility of each member depends on the units of X consumed and hours of leisure, L . The superscript or subscript m denotes a male while f denotes a female.

$$1) \quad a) U_f = U^f(X_f, L_f) \quad b) U_m = U^m(X_m, L_m).$$

X represents a vector of i goods consumed by the consumer. To ease the exposition, it is treated as a single good in the formal analysis but the reader should think of the family purchasing i goods. The consumer uses time to purchase each unit of X . Shopping time includes the time required to acquire information and to purchase a good.

Shopping time per unit of X depends on which types of products are purchased, which types of stores are patronized and which member of the family shops for each good. The consumer economizes on time by purchasing brand name goods and visiting stores that save time of the consumer. Consumers associate a brand name with such characteristics as quality, reliability, fashion, etc. A better known brand name contains information about the characteristics of the product and is a substitute for information about lesser known brands that a consumer acquires by a more time intensive search of different stores, from sales people and word of mouth.¹ Similarly, the consumer can patronize stores that employ trained and informed employees and seldom out of stock, all of which economize on the consumer's time.² Finally, the female and the male shopper can have different propensities to purchase a

brand name or to shop at a service intensive store because of wage rate differences or differences in the past accumulation of information.

B is total brand name capital of a brand (the cumulative total of promotion expenditures on the brand less depreciation) and S is the service intensity of the stores in the market, (the number of quality adjusted sales personnel). For each good, the consumer uses t minutes to purchase a unit of X and pays a price of P . The price paid and the time used to consume a unit of X depends on the brand and store service intensity of the good purchased by the consumer. P and t depend on the B of the brand purchased, S of the store patronized and the sex of the shopper.

$$\begin{array}{ll} 2) & a) \quad t_f = t^f(B, S) \qquad \qquad \qquad b) \quad t_m = t^m(B, S) \\ 3) & a) \quad P_f = P^f(B, S) \qquad \qquad \qquad b) \quad P_m = P^m(B, S) \end{array}$$

with $\partial t / \partial B = t_B(B, S) < 0$ and $\partial^2 t / \partial B^2 = t_{BB}(B, S) > 0$. There are diminishing returns to time savings by purchasing a good with greater brand name capital. The consumer economizes on time by selecting a good with a higher B but pays a higher price for a brand name product because of the added resources required to establish the brand intensity of the brand, $\partial P / \partial B = P_B > 0$ and $\partial^2 P / \partial B^2 = P_{BB} > 0$. The brand name capital may take the form of informational or persuasive advertising. There are diminishing returns to the time saving by purchasing at a store that offers greater service intensity, i.e. $\partial t / \partial S = t_S(B, S) < 0$ and $\partial^2 t / \partial S^2 = t_{SS}(B, S) > 0$. The function $P^f(B, S)$ represents the array of prices for different combinations of brand name intensity and service intensity that are offered at different stores that the female shops. $P^m(B, S)$ can be given a similar interpretation.

Equations 4-6 present the budget constraint of the family and the time constraint of each member when there is only one consumer good.

$$\begin{array}{l} 4) \quad P_m[aX_m + bX_f] + P_f[(1-a)X_m + (1-b)X_f] = w_m h_m + w_f h_f. \\ 5) \quad t_m[aX_m + bX_f] + h_m + L_m = H_m. \\ 6) \quad t_f [(1-a)X_m + (1-b)X_f] + h_f + L_f = H_f. \end{array}$$

The generalization to i goods is obvious. a is the proportion of the male's consumption of X that is purchased by the male and b is the proportion of the female's consumption of X that is purchased by the male. If $a = b = 1$, then the male purchases all the family's requirements for this good. If $a = b = 0$, then the female purchases all the units of this good that the family consumes. The members of the family determine the optimal values for a and b through mutual consent as described below. w_f and w_m are the female and male wage rates. h_m and h_f are the number of hours worked by the male and the female and H_f and H_m denotes total hours available of each

member. Each member spends time either working, shopping or on leisure. When i goods are consumed, each a and b has an i subscript.

After solving equation 5 for h_m and equation 6 for h_f and then substituting these expressions into equation 4, the full price budget constraint of the family becomes

$$7) L_m = \frac{T - \{F_m b + F_f[1 - b]\}X_f}{w_m} - \frac{F_m a + F_f[1 - a]}{w_m} X_m$$

$$\text{where } T = \frac{w_m H_m + w_f H_f - w_f L_f}{w_m}, F_m = P_m + w_m t_m \text{ and } F_f = P_f + w_f t_f.$$

F_m is the full price of the good to the male shopper and equals the sum of the market price plus the opportunity cost of time for the male shopper. F_f is the full price of the good if the female shops for the good. $w_m H_m$ is the full income of the male and $w_f H_f$ is the full income of the female.

Which member shops for the good and the brand and service intensity selected by the shopper are determined independently of how the family solves the bargaining problem of allocating resources to each member. Let's suppose the two members reach some solution to the bargaining problem. The solution allows the female to consume X_f^* and L_f^* reach utility of $U_f^* = U^f(X_f^*, L_f^*)$. Given L_f^* , the female then must determine how her remaining time is divided between shopping and working. To determine how the female makes this decision, we assume that each member satisfies a weak Pareto efficiency condition. Each member is willing to maximize the utility of the partner **given** the utility of that member. For example, the female is willing to substitute between shopping time and work time so that the utility of male is maximized given her utility and vice versa. **Given** his utility, the male will not oppose any substitution between his work time and shopping time that prevents the female from maximizing her utility. This Pareto efficiency condition assures both members reach the contract curve. The solution to the bargaining problem determines which point on the contract curve is reached.

Given X_f^* and L_f^* , equation 7 becomes the full price budget constraint of the male and represents the male's feasible tradeoff between L_m and X_m . The position of this constraint depends on the values of a and b and B and S of the shopper. If the utility of the male is maximized given U_f^* , a and b must be determined so that male can maximize hours of leisure, L_m , for a given X_m . a and b must be selected so that the full price budget constraint is positioned as far right as possible. To satisfy this requirement, the intercept in equation 7 must be as large as possible and the slope in equation 7 as small as possible. This is achieved if a and b are selected so that

$$8 \quad M = F_m b + F_f [1 - b] \text{ and}$$

$$9 \quad N = F_m a + F_f [1 - a] \text{ are each minimized.}$$

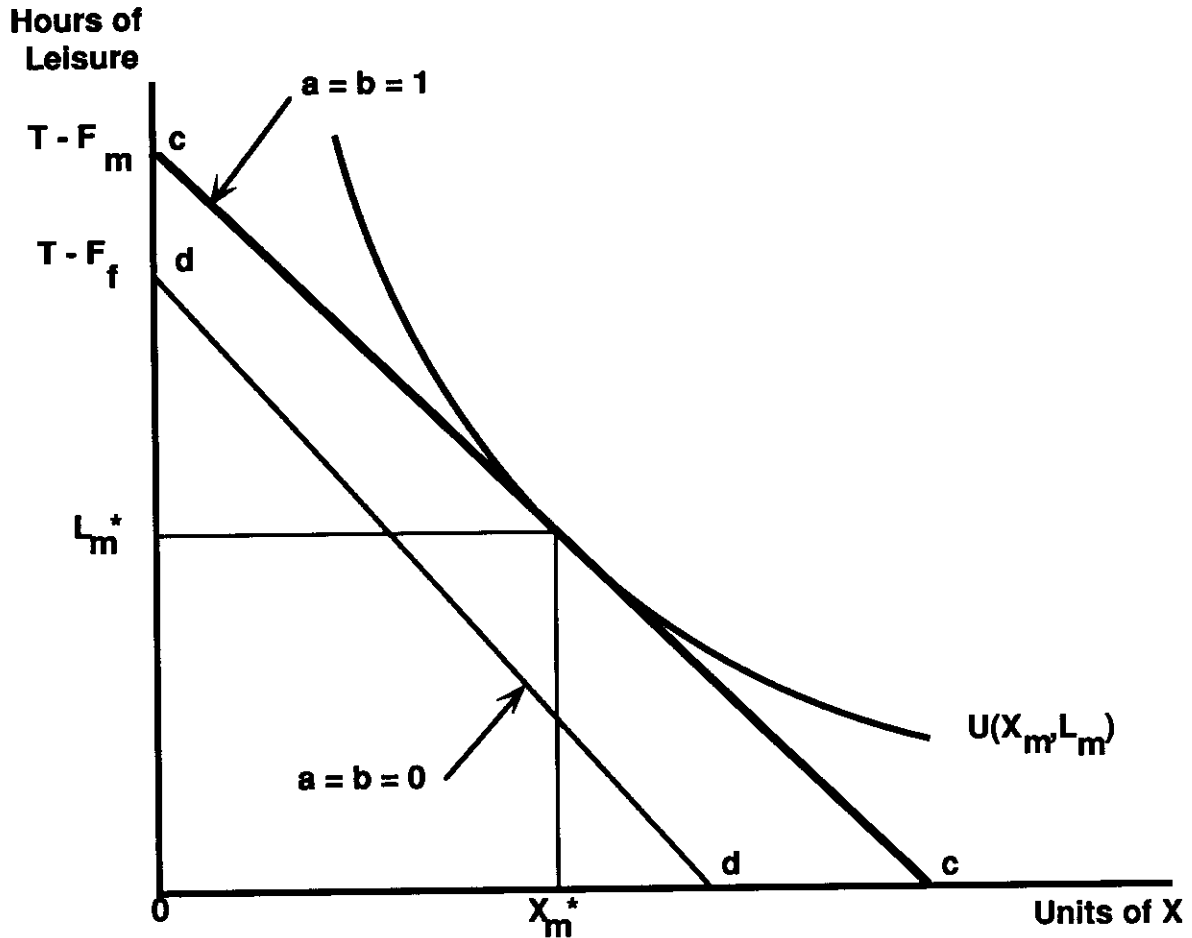
Differentiating equation 8 with respect to b and equation 9 with respect to a yield the common result.

$$10 \quad \frac{dM}{db} = \frac{dN}{da} = F_m - F_f.$$

If the male's full price, $F_m = P_m + w_m t_m$, is less than the female's, $F_f = P_f + w_f t_f$, M and N are minimized when $a = b = 1$. The male shops for all the family's requirements for this good. If the female's full price is lower, then $F_m > F_f$ and M and N are minimized when a and b equal 0. The female does all the shopping for this good. One member shops for all of the family's requirements for a given good. If the family consumes i goods, the individual with the lowest full price for a given good becomes the shopper for that good. Because the price and time functions differ from one good to another, the female will shop for some goods and the male for other goods. The optimal solution might have the female purchasing most of the clothing requirements of the family while the male purchases most durables. If the male and the female have the same price and time functions for each good although the price and time functions differ from good to good, the individual with the lower wage would do all the shopping. Since shopping diaries show males and females shop for different goods, we can infer males and females do not have the same price and time functions for each good.

Graph 1 shows the budget constraint of the male given X_f^* and L_f^* of the female. Suppose $F_m < F_f$ so the optimal values for a and $b = 1$ and the budget constraint of the male is cc . The male shops for this good and maximizes his utility by selecting X_m^* and L_m^* . If the family errs and sets $a = b = 0$ even though $F_m < F_f$, the budget constraint of the male becomes dd and lies inside cc . The utility of the male is not maximized. In this model the assignment of the shopping responsibility depends only on the comparative values of the full prices and is independent of the solution to the bargaining problem of how the resources of the family are divided. Whatever solution to the bargaining problem is arrived at by the two members, the members of the family will be efficient and assign the shopping responsibility to the member with the lowest full price.

Graph 1: Maximizing Male Utility Given the Utility of the Female



If $F_m < F_f$ and the male shops for this good ($a = b = 1$), the budget constraint of the male is

$$11 \quad L_m = \frac{T - F_m X_f^*}{w_m} - \frac{F_m}{w_m} X_m$$

If $F_m > F_f$ and the female shops for this good ($a = b = 0$), the budget constraint of the male becomes

$$12 \quad L_m = \frac{T - F_f X_f^*}{w_m} - \frac{F_f}{w_m} X_m$$

Equation 12 indicates the male uses the full price of the **female** to determine the optimal values for L_m and X_m . An implication of the theory is that the each member determines the quantity of X and hours of leisure by using the full price of the shopper and not the full price of the member. An interpretation of this condition is that the shopper purchases all the requirements of the family and then resells the good to the partner at the minimized full price of the shopper.

Equations 11 and 12 indicate the substitution between leisure and units of X consumed by the male is determined by the ratio of the full price of the shopper to the wage rate of the male. The marginal rate of substitution between X and L of the male will equal the ratio of the shopper's full price of the good to the price of leisure, the male's wage rate. The full price budget constraint of the female will also depend on who shops for the good. For a given utility of the male, the female will have two budget constraints similar to equations 11 and 12. Her feasible tradeoff between leisure and units consumed is also determined by the ratio of the full price of shopper to her wage rate.

If the male is the shopper, equation 11 indicates he will select B_m and S_m to minimize F_m . If F_m is minimized, the male's full price budget constraint in equation 11 is as far to the right as possible so the male can select L_m and X_m to maximize his utility. If the utility of the male is to be maximized, the male shopper will select B and S to minimize F_m .

$$13a) P_B^m(B, S) + w_m t_B^m(B, S) = 0$$

$$13b) P_S^m(B, S) + w_m t_S^m(B, S) = 0$$

Equations 13a and 13b are the first order conditions for minimizing the full price of X with respect to B and S. At the margin B or S increases until the marginal saving in the opportunity cost of shopping equals the marginal increase in the price paid by purchasing a more brand intensive good at a more service intensive store.

If $F_m > F_f$, the female is the shopper. The female selects B and S to minimize F_f because this assures the male's full budget constraint (equation 12) lies as far to the right as possible. If the female selects B and S to minimize F_f , then

$$14a) P_B^f(B, S) + w_f t_B^f(B, S) = 0$$

$$14b) P_S^f(B, S) + w_f t_S^f(B, S) = 0$$

To review, each member selects B and S to minimize the full price if the member shops for that good. The member with the lowest minimized full price is the shopper for that good. This procedure is repeated for each product and all shopping responsibilities are assigned in this manner.

A key implication of the theory is that B and S are determined so that the full price of the shopper is minimized. The optimal brand and service intensities of a good are determined

independently of the solution to the bargaining problem. No matter what the outcome of the bargaining problem is, equations 13 a and b or 14a and b will be satisfied. This is a convenient separation property for it greatly simplifies the analysis. In this model the member with the lowest minimized full price is the shopper for a good given the wage rates of the two members.³

Under certain conditions the theory predicts the family's demand for brand intensity and/or for store service intensity increases by more when the female's wage increases than if the male's wage increases.

If shopping assignments do not change when wage of the male increases, we can differentiate 13a and 13b with respect to w_m to determine how the optimal B and S changes when the male shops for a given good. In Appendix 1 we show that either B or S or both must increase when the wage of the shopper increases. As time becomes dearer, demand will increase for those products and/or for those stores that economize on the higher value of the consumer's time. The optimal response to an increase in w could be an increase in B and S or an increase in B but a decrease in S or vice versa. If either of the latter two cases occur, B and S must be substitutes in either the time or price functions or in both. The growth of branding can reduce the demand for store service intensity if B and S are substitutes.

A change in either the female or male wage rate will not only change the brand and service intensities of the shopper but also the assignment of shopping tasks. The member whose wage increases will shop for fewer goods than before and will increase the brand and/or service intensity of the smaller set of goods still purchased by that member. The partner now purchases more goods than before but selects the same optimal values for B and S for the goods previously purchased by the partner since equations 13a and 13b or 14a and 14b are still satisfied.⁴

When the identity of the shopper changes because of a wage change for one partner, the average brand and/or service intensity of all goods purchased by the family will increase under certain conditions if the male substitutes for the female for some goods and will fall if the female substitutes for the male. A rise in the female's wage reduces the number of goods shopped by the female and increases the optimal B and/or S for those goods still purchased by her. The male shops for more goods than before. He selects the same B and S as before for the goods previously purchased by him because F_m is still less than F_f for those goods. For some goods, the male becomes the substitute shopper for the female because $F_m < F_f$ after the female wage increases and $F_m > F_f$ before the female wage increases. Appendix 1 shows the brand and/or service intensity of the male will be greater than that of the female if certain conditions hold. These conditions essentially require the marginal time savings from an increase in branding or service

is not greater for the female than the male at the equilibrium values of B and S. Under these conditions the male will have higher values for B and/or S than the female for the goods where the male becomes a substitute shopper because his wage is higher. This implies that the average value of B and/or S across all goods purchased by the family will increase. To summarize, not only will B and/or S increase for the smaller set of goods still purchased by the female but the male will have a higher optimal value for B and/or S for the goods that the male now purchases but were formerly purchased by the female. Therefore, a rise in female earnings will increase the average value of B and/or S over all goods purchased by the family. A rise in female earnings should increase the average brand name intensity of the goods purchased by the family as well as the number of brand name products purchased by the family.⁵

Compared to an increase in female wage, an increase in male's wage increases the average brand name intensity of the goods bought by the family by less and could even reduce average brand intensity. When the male's wage increases, the male shops for fewer goods than before and increases the brand and/or service intensity of the goods still purchased by him. The female will shop for some goods previously purchased by the male because $F_m > F_f$ after the male's wage increases. Under certain conditions she has lower optimal values for B and/or S than the male because her wage rate is less than his. When the male wage increases, the reassignment of shopping roles works to reduce average brand intensity. If the optimal value of B and/or S is substantially lower for the female than for the male for those goods now shopped for by the female and the female shops for more goods after the male's wage increases, the average value of B and/or S could even decrease. The argument presented above suggests that a one percent increase in female earnings should cause a larger percentage increase in the average value of B and/or S than a one percent rise in male earnings.

Although the theory focuses on brand name intensity, it can be extended to explain why the number of brand names will increase as well. A rise in the opportunity cost of time means that the total demand for brand names will increase. More brands with higher intensity replace no name goods. Rather than shop at many local stores, each with its own brand name, consumers increase their purchases of goods with nationally advertised brands. A shirt that was formerly sold without a name or under the name of a local retail outlet is replaced by a nationally advertised shirt. The local store name was in essence the brand name of the shirt. Nationally advertised brand names will appear as long as there are some economies of scale in establishing recognized brand names.

The theory presented above is a demand explanation for brand names. While the theory

can explain why the demand for brand names increases, it does not differentiate between a brand name that is established by a national retail chain and a brand name established by a manufacturer. On the supply side we assume that the supply of brand names is perfectly elastic. When the demand for brand intensity increases, the quantity of brand names of different intensities increases.

We can generalize the theory without affecting the major results by including a term for the fixed time cost that must be spent before any units are purchased, for example, travel time. Generalizing the theory by allowing the price and time functions to be a function of the quantity purchased by the shopper, complicates the model and alters the solution method. If there are quantity discounts, the specialization results are reinforced. We do not believe that the trends in trademarks, advertising and retail services are due to the presence of quantity discounts for consumers.

II. TRENDS IN SHOPPING BEHAVIOR, RELATIVE EARNINGS, BRANDING, ADVERTISING AND RETAIL STORE SERVICES

In this section we present some evidence on the amount of time spent shopping by females and males and recent trends in shopping times, the relative earnings of females and real wage rates in retailing, trademark filings - a proxy measure for branding -, manufacturer and retailer advertising and personal services in retail stores.

A. Shopping Time by Sex and Age of Buyer

The most comprehensive survey of time spent shopping by members of families was conducted by the University of Michigan Survey Research Center in 1975-76. A follow-up survey in 1981 allows us to examine changes in shopping behavior of the same consumers over time. The results of the study indicated female members of the family allocate more time to shopping and tend to specialize in everyday shopping while males specialize in shopping for major durables. Table 1 shows hours per week spent shopping by females and males.

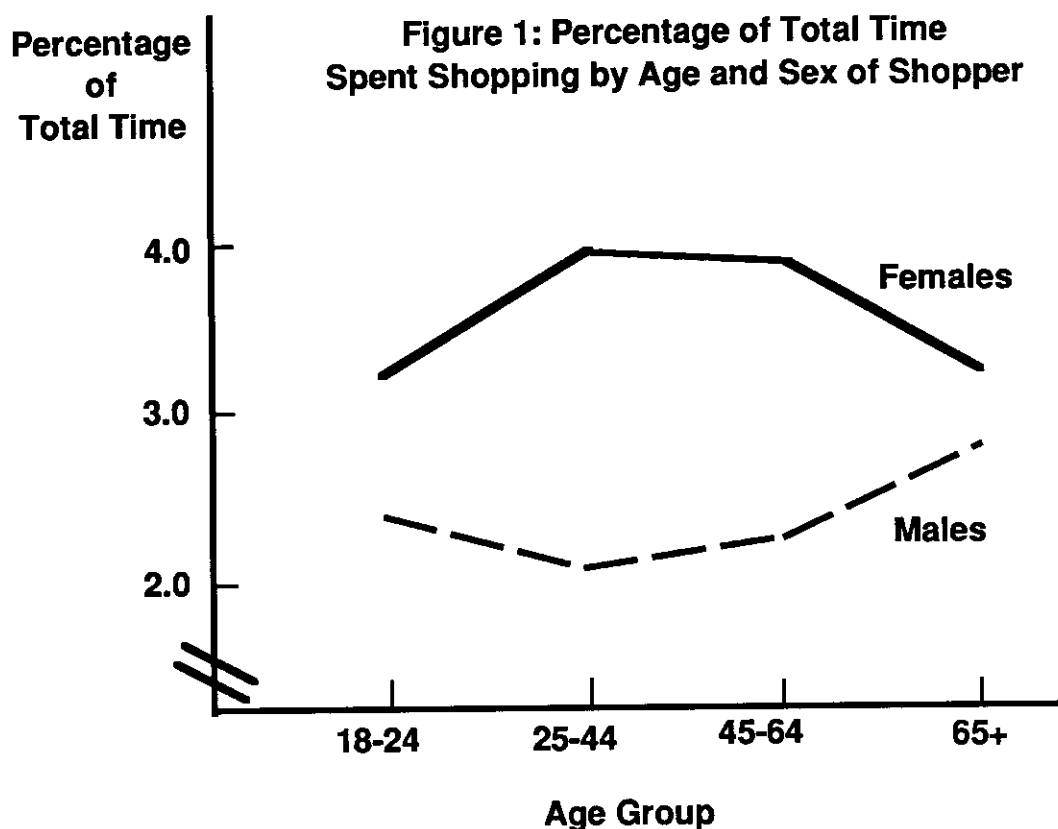
In the mid-seventies' females accounted for 65.4 percent of the total time spent shopping by families. By 1981 the female share of total shopping time was down to 60.5 percent. The relative earnings of females increased between 1975 and 1981 while the follow-up survey indicates the female share of total shopping time is decreasing.⁶

Table 1
Hours per Week Spent Shopping

Product	1975-76		1981	
	Female	Male	Female	Male
Everyday Shopping for Food, Drugs, Clothing and Small Appliances	2.78	1.45	n.a.	n.a.
Furniture, Cars & Housing	.08	.19	n.a.	n.a.
Total Shopping Time (include travel and services)	6.27	3.86	6.68	4.95
Percentage of Total Shopping Time				
a. Unweighted	61.9%	38.1%	57.4	42.6
b. Weighted	65.4	34.6	60.5	39.5

Source: Martha S. Hill, "Patterns of Time Use," Time, Goods and Well-Being, edited by F. Thomas Juster and Frank Stafford, Survey Research Center, University of Michigan, 1985, pp.171 and unpublished tables entitled "Descriptive Tables, 1975-81 Time Use Panel, Synthetic Week Respondents," Table 5, no date.

Figure 1 shows the percentage of total time spent shopping by age and sex of shopper in 1975.



Source: see Table 1

The percentage of time spent shopping is higher for females than for males in each age group. The differences are smaller at both the younger and older ages when wage differences are also likely to be smaller. The decrease in the percentage of total time spent shopping by females and the increase of the percentage of total time spent shopping by males who are over 65 and probably retired indicates shopping behavior responds to relative wages. The second interesting feature of figure 1 is that the percentage of time spent shopping does not change much for either females or males between the age classes of 25-44 and 45 to 64. This is surprising because income and consumption expenditures of families increase with age of household head. In 1975, the average income of families with a head between 14 and 24 years old was \$10,970, between 25 and 44 was \$18,494 and between 45 and 64 was \$21,726. Per family income was higher by 17.5 percent between families with a head between 45 and 64 and a head between 25 and 44. Yet, the time spent shopping by both the female and the male barely changes. Since consumption expenditures increase with income, one would expect total time spent shopping would also increase. The families with higher incomes must be economizing on shopping time to keep total shopping time constant although family income is higher.

Hill and Juster [1985] also find hours per week spent shopping depends on the relative wages of the members in the family in a study of 275 families. The shopping time per week of

the respondent in the survey is inversely related to the respondent's wage and directly related to the spouse's wage rate, holding constant other variables such as preferences for shopping and sex of respondent. These interesting results indicate shopping assignments are not fixed or solely sex-determined but respond to changes in the cost of time.

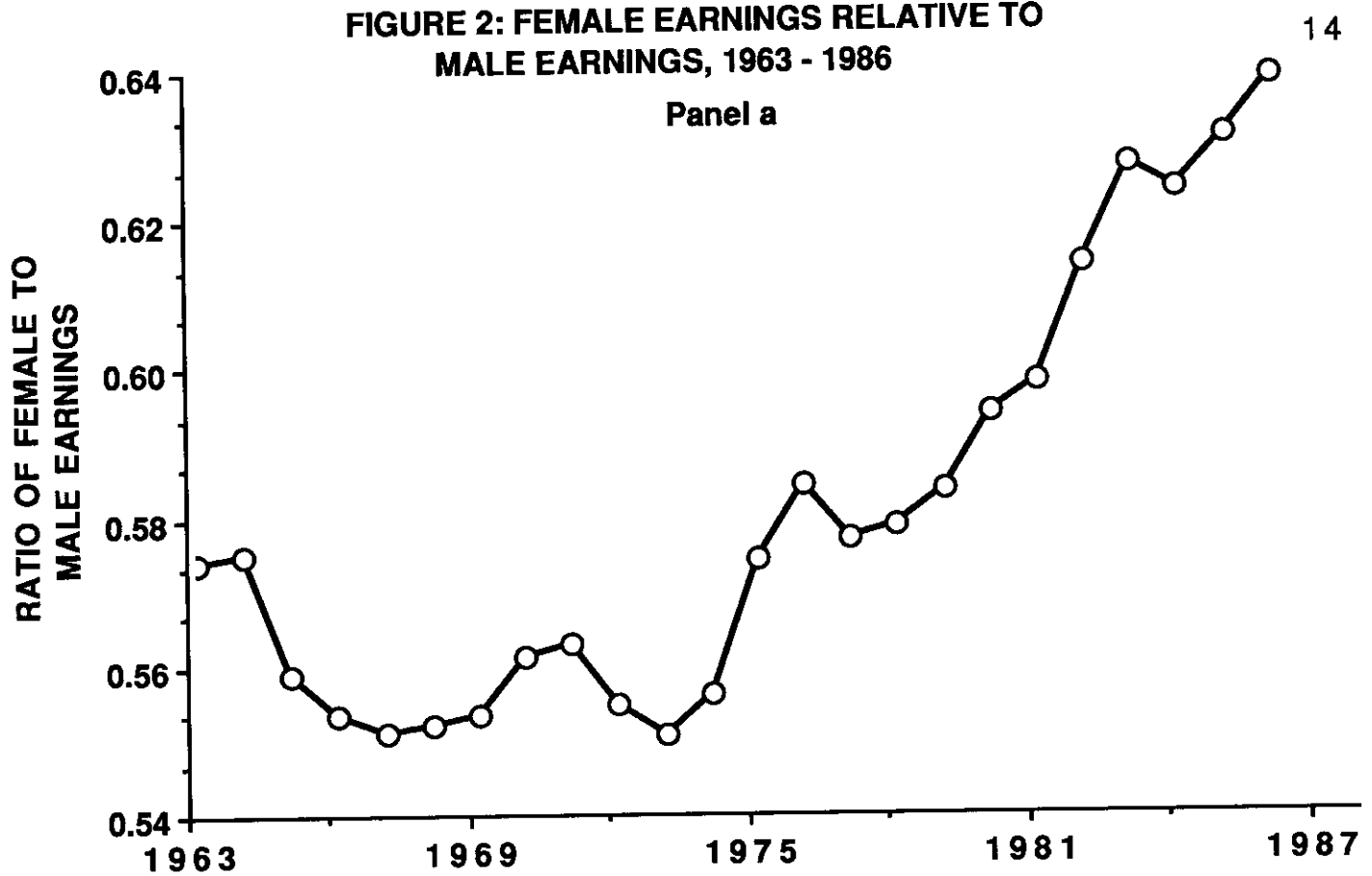
B. The Increase in the Relative Earnings of Females and the Decline in Retail Wage Rates

Panel a of figure 2 shows the time series of the weekly earnings of full-time female workers relative to the weekly earnings of full time male workers from 1963 to 1987. Real weekly earnings of males peak in the early seventies and in 1987, the last year in the sample, for females. The relative earnings of females decline slightly from 1963 to the mid-seventies and then increase about 8 percentage points from 1975 to 1987, a comparatively large change over a short time. The earnings of full time workers suggest that the cost of time of females declined slightly from 1963 to the mid-seventies and increased absolutely and relative to the cost of time of males since the mid-seventies. Panel b shows real hourly wage rate for non-supervisory workers in retailing peaks in 1973 has declined by 19 percentage points between 1978 and 1987. During the period where full time female workers have done quite well, real wages of retail workers have decreased. This decline reflects the growing importance of part-time workers and probably the employment of lower quality retail workers. The decline in the real retail wage rate also means that the decline in service at retail is not due to a rise in the real cost of retail labor that causes a substitution toward capital in retailing. The decrease in the real retail wage rate suggest that retail firms are employing lower quality workers

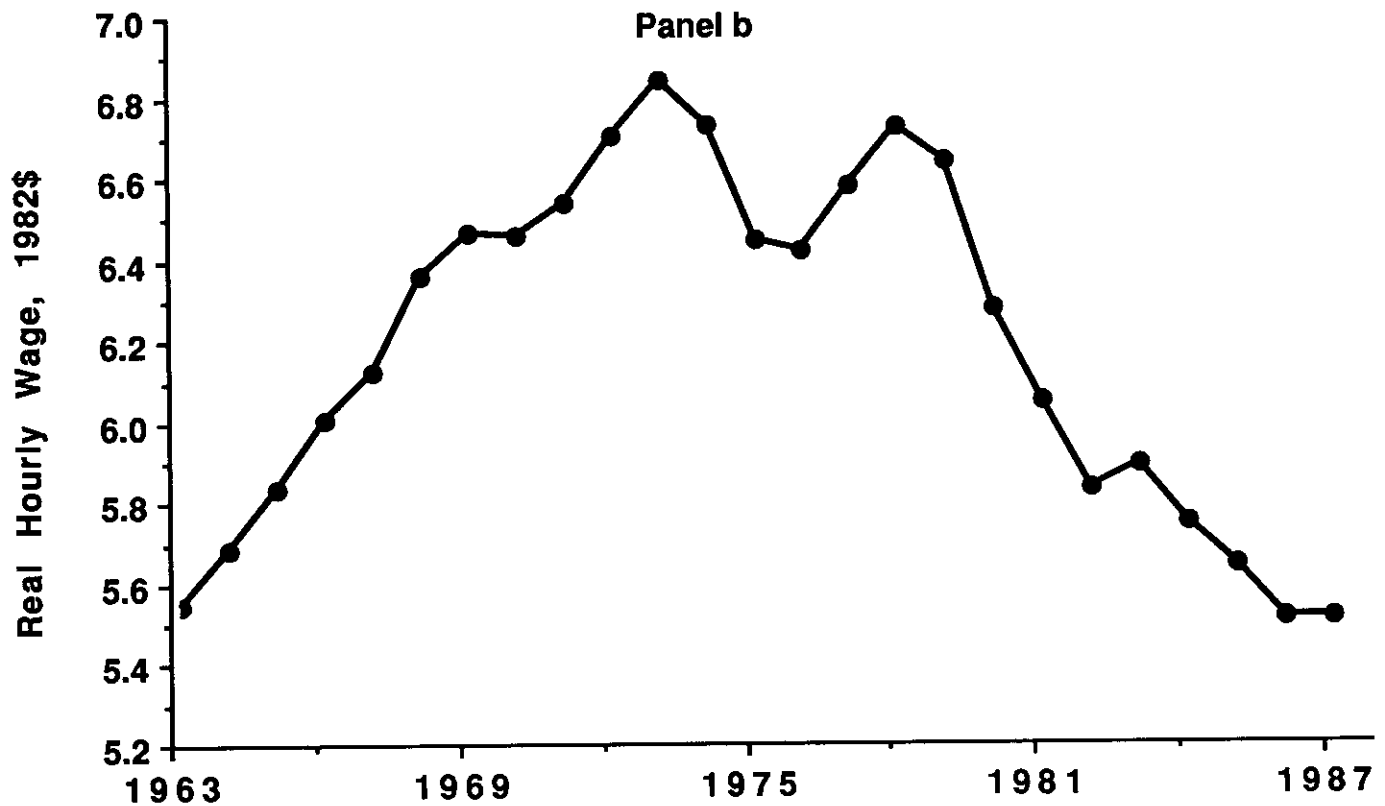
C. The Growth of Branding

Measuring the number of brand names throughout the U.S. economy is difficult. Leaving aside thorny issues of definition and measurement of brand name capital, even simple counts of the number of product names are unavailable except for a small number of industries. Lacking a comprehensive measure of the number or value of brand names, we use a different measure, the number of trademark filings as a proxy for changes in branding. Studies by Griliches and others (Griliches) show patent counts are related to R & D expenditures across industries. Counts of patents are a unique data resource for studying technical change. Trademarks have not been given the same attention as patents have. Yet they are also a valuable data resource for the study of the commercialization of new products. As with patent statistics, they are far superior to other data sources although they too have limitations. They are comprehensive, span decades and include

**FIGURE 2: FEMALE EARNINGS RELATIVE TO
MALE EARNINGS, 1963 - 1986**



**FIGURE 2: REAL HOURLY WAGE RATE,
ALL RETAILING, 1963-1987**



both consumer and industrial products. In this study we assume trends in trademark filings reflect trends in the number of high intensity brands.⁷

Figure 3 shows the growth of trademarks filed and, for comparative purposes, the growth of patent applications and real gross national product of private industries from 1963 to 1986 with 1967 = 1.⁸ The differences between the growth rates of the three series before the mid-seventies are tiny compared to those since the mid seventies when the number of trademark filings increased most rapidly, followed by real GNP and then patent applications.⁹ If the growth in trademark filings is even a crude proxy for the actual growth in high intensity brand names, it suggests that the demand for brand names has experienced a phenomenal growth since the mid-seventies.¹⁰ Trademark intensity, trademark filings per dollar of GNP, is much higher now than in the past. The more rapid growth of trademark filings per dollar of real GNP since the mid-seventies is not a superficial change but reflects an increase in the demand for brand names.

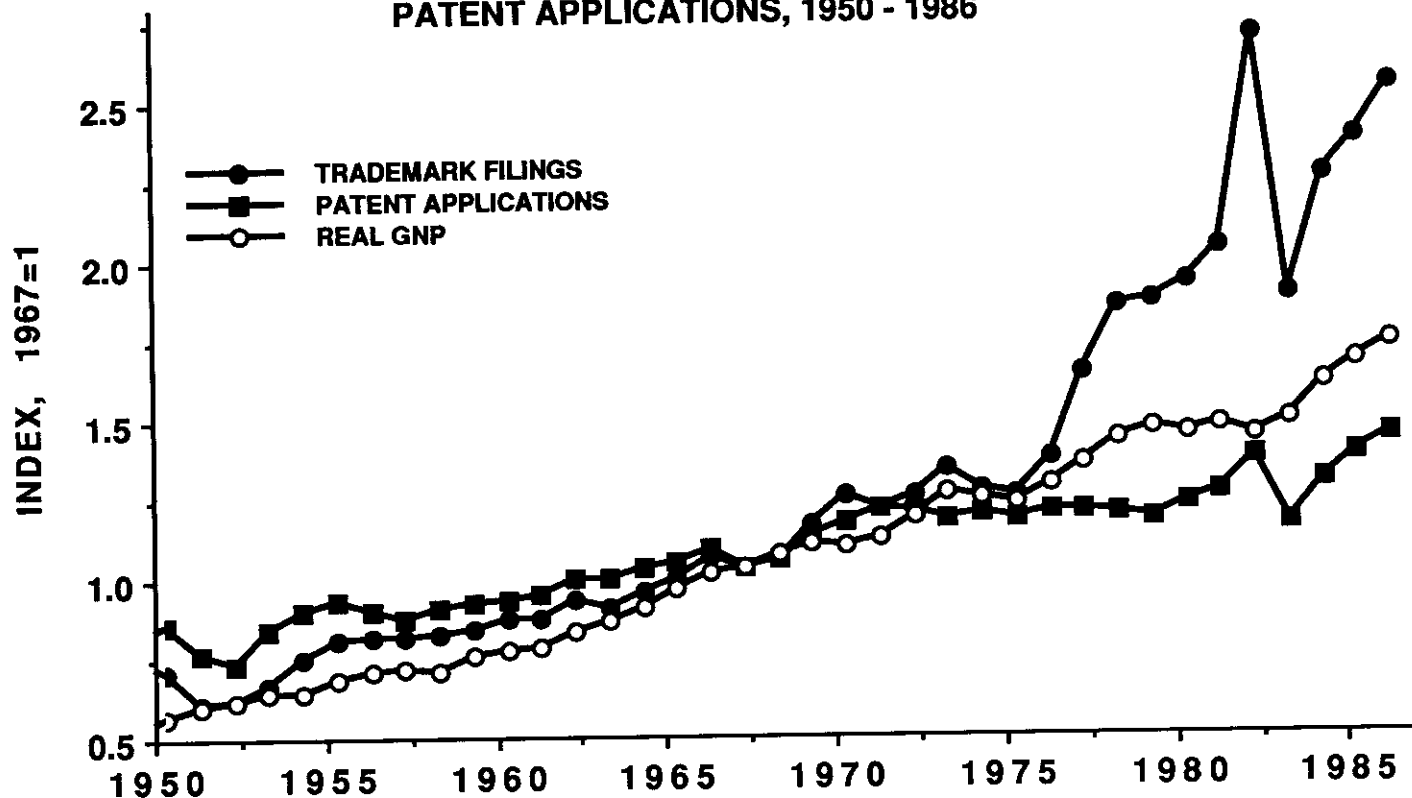
Another less comprehensive source of data on trade names is Brands and Their Companies, a directory maintained by the Gale Corporation. This directory includes trade names of some consumer good industries but no industrial trade names. The depth of coverage varies from one consumer good industry to another. Gale reports the **stock** of trade names increased from 106 thousand in 1974 to 157.6 thousand in 1986 or by 48.7 percent. Real GNP of private industries increased by only 39 percent over the same span. Therefore, the stock of trade names for consumer goods increased more rapidly than the private economy. The direction of change in the Gale data is at least in the same direction as with the trademark data.¹¹

The higher growth rate of trademarks since the mid-seventies does suggest that brand names have grown relatively more important. Even so, the more rapid growth of trademark filings may not be caused by the rise in the cost of time of consumers. A stronger and more persuasive case for the cost of time argument exists if the growth rate of trademark filings for consumer goods exceeds that for industrial goods. It is difficult to explain the faster growth of consumer good trademarks without some reference to the increased cost of time of shoppers.

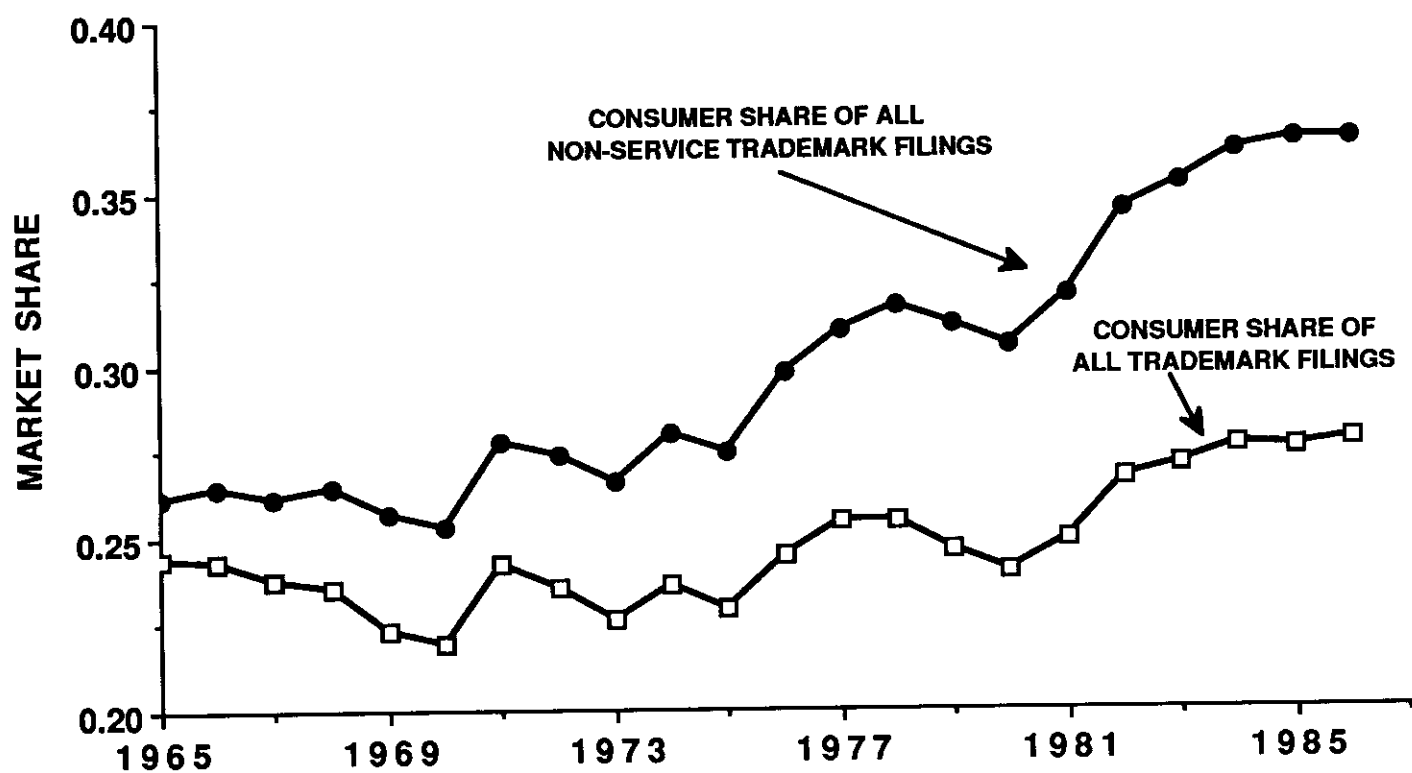
Before examining differential trends in filings of consumer goods versus industrial goods, a brief description of the industry trademark data is necessary.¹² Industry trademark data are available since 1965 because Thomson & Thomson Inc. (T&T hereafter), a private firm providing trademark search services to companies, computerized the complete U. S trademark data base in 1984. T&T has kindly made available industry statistics from 1965 to

**FIGURE 3: GROWTH OF TRADEMARK FILINGS,
REAL GNP OF PRIVATE INDUSTRIES AND
PATENT APPLICATIONS, 1950 - 1986**

16



**FIGURE 4: MARKET SHARE OF CONSUMER GOOD
TRADEMARK FILINGS, 1965 - 1986**



1986. Since 1984, total trademark filings in each year are available by industry.¹³ For the years before 1984, only the number of active trademarks in each industry as of 1984, not the original number filed in each year, is available.

The T&T data base is used to estimate time trends in the market share of trademarks of goods purchased by consumers. The market share estimates for the years before 1984 are measured with error because T&T reports the number of active trademarks, not the original number filed in each year. However, there is reason to believe these effects are small. Both the numerator and the denominator of the market share of consumer good trademark filings are underestimated for the years preceding 1984 and the effects of measurement error tend to cancel.¹⁴

The consumer product classes are: 1) clothing (39); 2) foods and ingredients of foods (46); 3) games, toys and sporting goods (22); 4) furniture and upholstery (32) and 5) cosmetics and toilet preparations (51).^{15,16, 17} Figure 4 shows the market share of consumer trademark filings relative to 1) all filings and 2) all non-service filings. Filings for services have grown more rapidly than the filings for consumer or producer goods because of the rapid growth of the business service sector. The smaller increase in the market share of consumer filings relative to total filings reflects the rapid growth of service filings. Since the mid-seventies, the market share of consumer filings has grown rapidly relative to all non-service filings. The market share of filings for consumer goods was 26.2 percent of all non-service filings in 1965, 27.4 percent in 1975 and had increased to 36.5 percent by 1986.

There is considerable variability in the trends in the market share of trademarks in each consumer industry. The clothing and the toy and game industries are the two industries primarily responsible for the growth in the market share of trademark filings of consumer goods. The market share of the furniture trademarks has increased modestly over time but is quite small. The market share of the food trademarks has increased in recent years but did not change appreciably over the 21 year interval while the market share of cosmetics' trademarks has unaccountably declined.¹⁸

This brief history of recent trademark filings has identified two interesting changes: 1) total trademark filings have grown more rapidly than the economy since the mid-seventies after growing at the same rate as the economy for many decades and 2) trademark filings for consumer

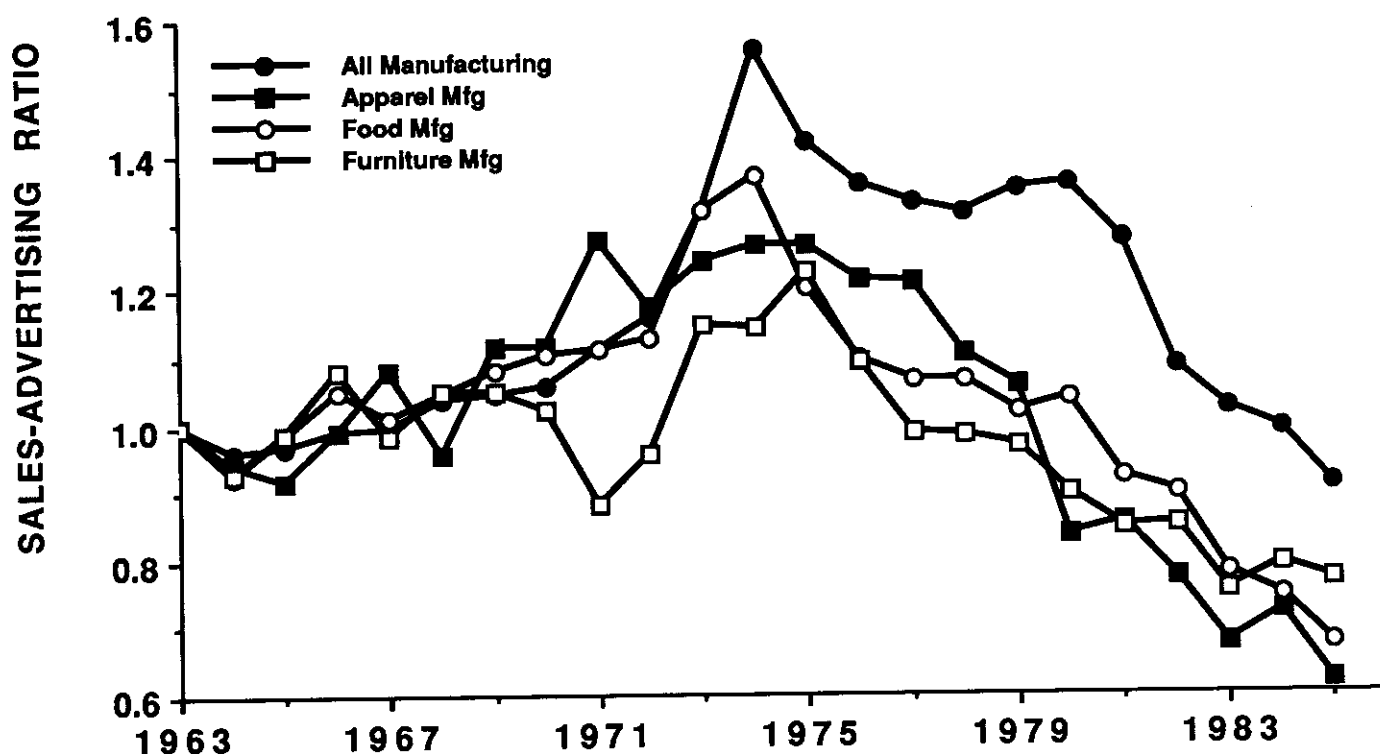
goods have grown more rapidly than trademark filings for producer goods since the mid-seventies with the game and clothing classes experiencing larger increases in market share.

D. Advertising by Manufacturers and Retailers

If manufacturers and not retailers are establishing more brand names, then manufacturer advertising should have increased since the mid-seventies as manufacturers promote new brands. Figure 5 shows the sales-advertising ratios from 1963 to 1985 in the food, apparel, furniture industries and in all manufacturing.¹⁹ The sales-advertising ratio for all manufacturing decreased from 1963 to 1985 by about 9 percentage points. The sales-advertising ratio declined by more in the three consumer goods industries. Between 1963 and 1985, the sales-advertising ratio declined by 38% in the apparel manufacturing industry, by 32 % in the food manufacturing industry and by more than 20% for furniture manufacturers. It is likely some of the larger declines in the sales-advertising ratio in the manufacturing industries producing consumer goods was caused by the introduction of new brands and products. It is less plausible to assume that changes in media rates somehow raised the cost of advertising more for firms producing industrial goods than consumer goods. It is also difficult to understand why it became more profitable for firms to establish barriers to entry by advertising in the apparel, food and furniture industries after the mid-seventies and not before. The sub-industries in these broad industry categories are not known as highly concentrated industries, although there are a few exceptions in the food group.

If manufacturers and not retailers are introducing and promoting more brand name products, the sales-advertising ratio of manufacturers should decrease relative to the sales-advertising ratio of retailers. When all manufacturing corporations are compared to all retailing corporations, the sales-advertising ratio of manufacturers has not changed appreciably relative to the sales-advertising ratio of retailers from 1963 to 1985. In the apparel and food industries the sales-advertising ratio of manufacturers has declined relative to that of the retailers. In these two industries manufacturers play an increased role in the promotion of products. This is particularly significant for the clothing industry where the market share of clothing trademarks has increased. In the food industry the sales-advertising ratio of manufacturers has been decreasing over a longer period relative to the sales-advertising ratio of food retailers. It appears that the promotion function has been slowly shifting to food manufacturers from supermarkets. The long term decline in the ratio of the advertising intensities means that other unspecified factors are at work in the food industry and these trend effects dominate the data. In the furniture industry the relative promotion intensity of manufacturers and retailers has not changed and the increase in the market share of furniture trademarks has been small.

**FIGURE 5: SALES/ADVERTISING RATIO FOR
MANUFACTURING INDUSTRIES, 1963 = 1**



E. Retail Service Intensity

Personal services in retail trade are closely related to the amount and quality of the labor input. Retail service intensity is measured by dollar sales per dollar of payroll. A decrease in service intensity is reflected in a rise in the sales-payroll ratio. An instructive example is the department store industry where the 1987 the Census of Retailing reports sales per dollar of payroll equal \$10.10 in discount department chains, where less service is offered, and \$8.20 in national chain department stores, where more service is offered.

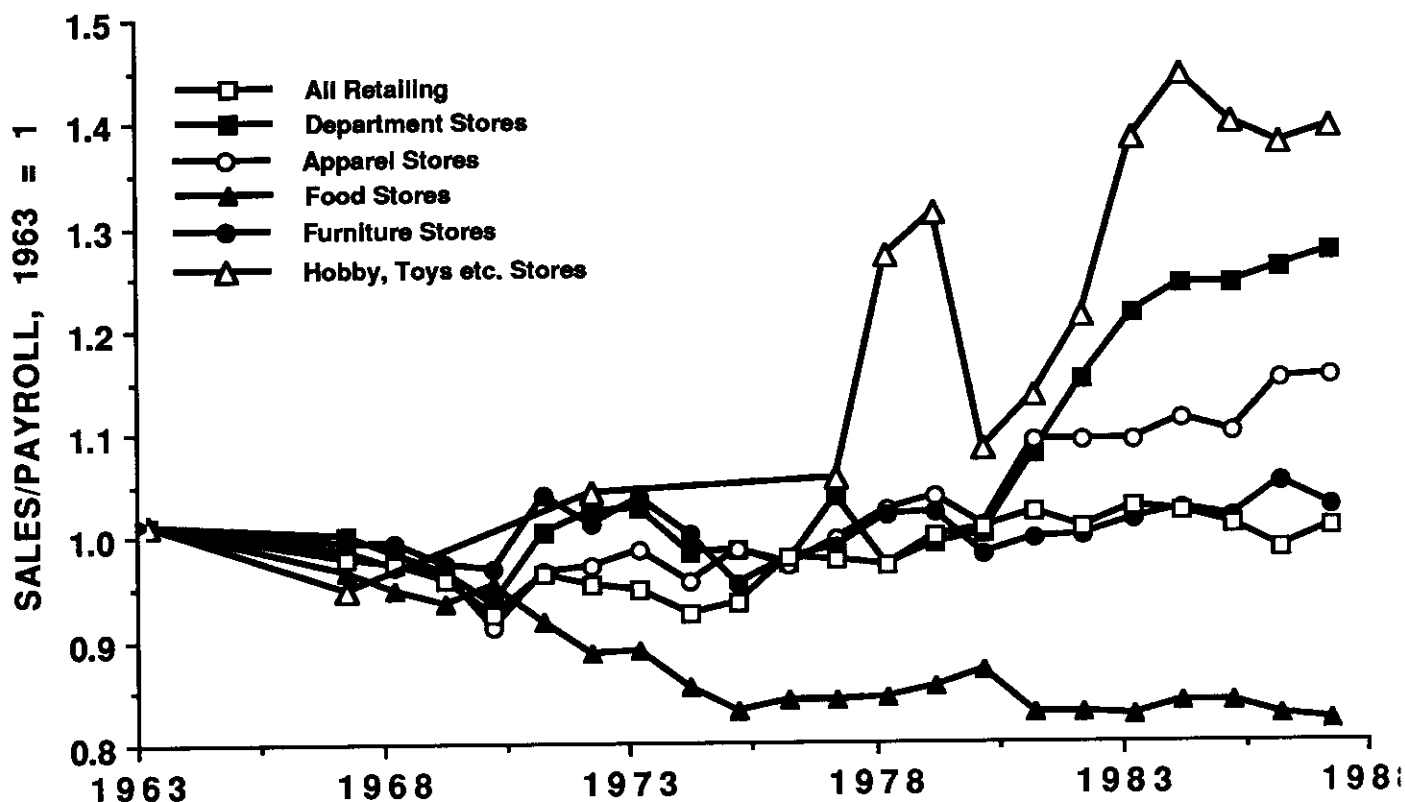
Sales per dollar of payroll will increase if 1) capital is substituted for labor, 2) the product mix changes and fewer labor intensive products are sold and 3) information supplied by the manufacturer is a substitute for the information supplied at the retail outlet. Real wage rates in retailing have declined since the middle to late seventies. Ordinarily, a fall in the price of labor relative to the price of capital would induce retail firms to substitute toward labor.

However, the decline in the real wage rate is a response to the decreased demand by the consumer for information from the retailer. Retailers have responded by providing a lower quality sales staff. As the manufacturer supplies more branded goods or more brand intensive goods, the function of the retailer changes from being a provider of information and inventory to being more of a provider of inventory. This is the type of change that we hope to tease out of the data.

Figure 6 shows sales per dollar of payroll in selected retail industries between 1963 and 1987. For all retailing, the sales-payroll ratio is relatively stable over the entire period. However, this stability in the aggregate masks some dramatic inter-industry differences in rates of change. Sales-payroll ratios have increased substantially in toy stores, department stores, and apparel stores. In the furniture industry the sales-payroll ratio has not changed much. On the other hand supermarkets have experienced a significant and long term decline in the sales-payroll ratio. This decline is probably due to the changing product mix of goods and services sold in supermarkets, i.e., the increased volume of fresh produce and take out food, and, perhaps, to the lengthening of hours and the number of days that supermarkets are open.

What is especially interesting about figure 6 is that the more rapid growth in the sales-payroll ratio in the toy and apparel retail industries coincides with the growth in the market share of trademark filings by manufacturers in these two industries.²⁰ In these two industries branding and retail service intensities appear to be substitutes. In these industries manufacturers supply information through brand name products and retailers are providing less. In the furniture market the sales-payroll ratio has not changed appreciably. The incidence of branding is relatively low and the growth of branding appears to be modest. Although the market share of food trademarks has been stable over the long term, it increased during the late seventies just when the sales-advertising ratio of food manufacturers declined. Although manufacturer promotion of food products has increased, service intensity in the retail food industry has not decreased but increased. The increase in personal service intensity in food retailing preceded the growth of food manufacturer promotion and therefore must be due to other causes.

FIGURE 6: SALES PAYROLL RATIO FOR SELECTED RETAILING INDUSTRIES, 1963 - 1987



III. DETERMINANTS OF THE GROWTH OF TRADEMARKS. ADVERTISING AND STORE SERVICES

This section presents regression estimates of the effect of the relative cost of time of females on branding, promotion, sales force quality and the quantity of personal services in retail stores. The equations may be considered reduced form equations and explore the effect of the relative earnings of females on the growth of trademarks, the wage rates in retailing industries, manufacturer and retailer advertising and store services.

A. The Increase in Trademark Filing Intensity and the Market Share of Consumer Good Filings

Trademark intensity equals total trademark filings divided by total real GNP of private industries.²¹ Column 1 of Table 2 shows second stage regression results for total trademark intensity from 1963 - 1987. After adjusting for first order serial correlation of the residuals, the results in column 1 show trademark intensity is directly related to female earnings and inversely related to the male earnings. Although the theory predicts the

coefficient for male earnings will be smaller than the coefficient for the female earnings variable and could be negative, the negative sign of the coefficient for male earnings is nevertheless surprising. The absolute value of the coefficients for the female and male earnings' variables is virtually the same. The relative earnings of females explain much of the change in total trademark intensity.

Table 2: The Effect of Female and Male Weekly Earnings on Trademark Intensity and Consumer Share of Non-service Filings		
	Total Filings/GNP of Private Industries, 1963 - 87	Market Share of Filings For Consumer Goods, 1965 - 86
Variable	Est t (1)	Est t (2)
Constant	6.11 2.9	.84 6.9
L[Female Weekly Earnings] ¹	8.78 3.0	1.01 8.3
L[Male Weekly Earnings]	-5.45 -1.1	-1.21 -5.2
Real Retail Hourly Wage	-.35 -.7	.06 2.2
Night TV Prime Time Ad Rate/Newspaper Ad Rate	-.18 -.2	
1982 Year Dummy	1.74 8.3	
1983 Year Dummy	-.52 -2.1	
R ²	.915	.897
D-W Statistic	1.02	1.74
N	25	22

Notes to Table 2:

1. L denotes the log of the variable

Source: 1. U.S. Patent and Trademark Office, Commissioner of Patents and Trademarks, Annual Report, various years.

2. Thompson & Thompson, Inc.

A negative coefficient for the male earnings variable can only occur if female shoppers substitute for male shoppers when the male's wage increases. With no substitution, the theory predicts the average brand intensity of the family increases when male earnings increase. The dummy variables for 1982 and 1983 account for the rush to trademark in 1982 before the trademark fee increased in 1983.

Trademark intensity by manufacturers may depend inversely on the ratio of the rate for a network TV advertisement to newspaper advertising rate. This ratio is a proxy for the relative cost of national versus local advertising. Unfortunately, the ratio has not changed much over the this period and probably explains why this variable is insignificant. A rise in the real hourly wage rate would be expected to increase branding but this variable is not significant.

The dependent variable in columns 2 is the market share of filings for consumer goods, i.e., total trademark filings for the five consumer goods divided by total non-service filings. The coefficient estimates in column 2 show the market share of trademark filings for consumer goods is directly related to female earnings and inversely related to male earnings. The real hourly wage rate in retailing is directly related to the market share of consumer filings. An increase in the retail wage rate increases the cost of providing information to consumers in the store and increases the information supplied by manufacturers. While the retail wage rate has a significant effect in this equation, it is seldom significant in subsequent regressions. Therefore, we do not regard the significance of the retail wage rate in this equation as a convincing test of the substitution hypothesis.

To summarize, changes in total trademark intensity and the market share of filings for consumer goods are better explained by changes in the relative earnings of female consumers than by the real retail wage rate or by advertising rates. These results indicate demand variables and not cost variables are more useful in explaining trademark activity.

B. The Growth of Trademark Filings in Individual Consumer Good Industries

Table 3 presents similar regression equations for each of the five consumer good industries. In each regression the dependent variable is trademark filings for the industry group divided by all producer good filings.²² The independent variables included in the regression are; 1) the log of female earnings, 2) the log of male earnings and 3) a measure of relative industry size (personal consumption expenditure on the product divided by the GNP of private industries less GNP of service industries, clothing, food and furniture industries).

Table 3: The Effect of Female and Male Weekly Earnings on Industry Filings Relative to Total Producer Trademarks, 1965-86			
Variable	<u>Clothing</u> Est. t (1)	<u>Food</u> Est. t (2)	<u>Furniture</u> Est. t (3)
Constant	.71 2.5	.43 1.2	-.14 -1.0
L(Female Weekly Earnings)	.74 8.4	.20 2.8	.07 1.7
L(Male Weekly Earnings)	-.77 -7.1	-.23 -2.3	-.04 -.8
Relative PCE ¹	.03 .1	-.005 -.1	.07 .4
R ² (Adj)	.940	.323	.533
D-W Statistic	1.64	.81	1.23
N	22	22	22

Variable	<u>Cosmetics</u> Est. t (4)	<u>Games</u> Est. t (5)
Constant	.27 .9	-.68 -1.6
L(Female Weekly Earnings)	.012 .2	.33 2.6
L(Male Weekly Earnings)	-.04 -.5	-.18 -1.2
Relative PCE ¹	-1.57 -1.1	2.50 1.1
R ²	.102	.765
D-W Statistic	1.22	1.29
N	22	22

Notes to Table 3:

1. Relative PCE equals real personal consumption expenditure on industry product divided by GNP of private industries less GNP of service industries less GNP of the clothing, food and furniture industries.

The results indicate that both female and male earnings are significant determinants of filings for clothing or food products relative to producer filings. In each industry a rise in female earnings increases consumer trademarks relative to total producer trademarks while a rise in male earnings lowers trademark filings in each industry. In the games and furniture industries the coefficient of female earnings is statistically significant but just barely so in the furniture industry. The coefficients for relative earnings of females or relative market size are not statistically significant in the cosmetics industry.

In summary the coefficient of female earnings variable is positive and significant in four of the five industries (the exception is cosmetics) while the coefficient of male earnings is negative and significant in two industries and insignificant in the other three industries. Trademark intensity in these two consumer good industries is more closely related to female than to male earnings.

C. Relative Manufacturer Advertising Intensity and Retailer Service Intensity

As we have already pointed out, the increase in trademark intensity in the apparel and toy industries has coincided with a decrease in service quality. If the brand name conveys information that is a substitute for the information obtained at the store, an increase in the relative earnings of females could increase brand intensity while reducing personal retail services.

To test these hypotheses, we constructed two new dependent variables for each industry. One variable is the sales-advertising ratio in each manufacturing industry **relative** to the sales-advertising ratio for all manufacturing. The second is the sales-payroll ratio in each retailing industry **relative** to the sales-payroll ratio for all retailing. We are interested in explain how the relative sales-advertising ratio and the relative sales-payroll ratio have changed with increases in the relative earnings of females. The relative sales-advertising ratio in each manufacturing industry and the relative sales-payroll ratio in each retailing industry are regressed separately on the relative earnings of females and other control variables that are designed to control for any changes in wage rates in retailing and media advertising rates that might affect each dependent variables. One set of control variables includes the hourly wage rate in the retail industry relative to the wage rate in all retailing and the ratio of the national night time TV rate to the rate for a newspaper advertisement. The second set of control variables includes the sales-advertising ratio in all manufacturing or the sales-payroll ratio in all retailing.

The cost of time hypothesis predicts the relative sales-advertising ratio in a manufacturing industry where trademark intensity has increased will be inversely related to the relative earnings of females. As the relative cost of the female's time increases, manufacturers respond by increasing branding and promotion. If information supplied at the point of sale is a substitute for information supplied directly to the consumer by the manufacturer through the brand name, then the relative earnings of females will be inversely related to the relative sales-payroll ratio of in the retailing industry. If information from manufacturers and information from retailers are complements, the relative earnings of females will be directly related to the relative sale-payroll ratio in the retail industry.

The regression results in Table 4 show the relative earnings of females are inversely related to the relative sales-advertising ratio of apparel manufacturers and directly related to the sales-payroll ratio of apparel retailers. The results do not depend on which set of control variables are employed. The coefficient of the relative hourly wage rate in apparel stores is seldom significant and has the wrong sign when it is marginally significant. The cost of national TV relative to the cost of a newspaper ads is not a significant determinant in either equation. The relative earnings of females is also directly related to the relative sales-payroll ratio in the toy, game etc. industry. In the two industries with larger increases in trademark intensity retail service intensity has decreased relative to the service intensity in all retailing.

National branding and retail service appear to be substitutes in the apparel and toy industries. Not only has the market share of clothing trademarks increased, but relatively more messages are supplied to consumers by manufacturers through branding than through information supplied at the point of sale. The results for the toy industry are similar but less comprehensive because of the absence of comparable industry advertising data. The increase in the relative earnings of females is directly related to the growth in the market share of trademark filings for toys, games, etc., and to an increase in the sales-payroll ratio of the retail toy industry. The increased branding by toy and game manufacturers has coincided with a decrease in retailer service intensity. This is epitomized by the rise of the national toy chains like Toys-R-Us where personal services at retail have declined.

In the furniture industry the relative earnings of females are not a significant determinant of either the sales-advertising ratio of manufacturers or the sales-payroll ratio of retailers. The promotional functions of the manufacturer and the retailer have not changed appreciably over time although the female cost of time has increased.

Table 4: Relative Manufacturing Industry Sales per Dollar of Advertising and
Relative Retailing Industry Sales Per Dollar of Payroll

Variable	Apparel Relative Mfg. Industry S/A		Apparel Relative Retailing Industry S/P		Food Relative Mfg Industry S/A		Food Relative Retailing Industry S/P	
	Est	Est	Est	Est	Est	Est	Est	Est
	t	t	t	t	t	t	t	t
Intercept	-3.42 -1.9	-1.46 -.6	1.28 3.78	1.07 18.69	1.30 4.3	.22 .4	1.85 4.7	.44 3.0
L(Rel- ative Earnings)	-2.93 -2.3	-4.39 -3.1	.55 2.8	.43 4.2	-.26 -1.1	-.88 -2.7	-.93 -2.3	-2.32 -9.0
Relative Retail Wage Rate	3.89 1.8		-.11 -.3		-.71 -4.9		-.90 -3.6	
Night TV Prime Time Ad Rate/New spaper Ad Rate	-.30 -.6		-.02 -.2		-.09 -1.0		.05 .2	
S/A, Manufact uring				.0002 .5				-.005 -4.9
S/P, All Retailing		.06 .3				-.02 -.5		
R ²	.66	.47	.61	.53	.86	.43	.75	.85
DW ¹	1.65	1.20	1.85	2.02	1.10	.62	1.78	.81
N	23	20	22	20	23	20	22	20

Table 4 continued

Variable	Furniture Relative Mfg. Industry S/A		Furniture Relative Retailing Industry S/P		Toys, etc. Relative Mfg Industry S/A		Toys, etc. Relative Retailing Industry S/P	
	Est	Est	Est	Est	Est	Est	Est	Est
	t	t	t	t	t	t	t	t
Intercept	-1.51 -.7	2.13 .9	.01 .1	.60 6.8			1.72 6.3	2.45 5.0
L(Rel- ative Earnings)	.19 .1	.07 .05	-.03 -.3	-.35 -2.1			3.58 6.6	2.56 2.9
Relative Retail Wage Rate ¹	2.59 1.3		.59 4.7				.66 1.4	
Relative Ad Rates	-.27 -.5		.08 1.4				.69 2.6	
S/A, Manufact uring				.0003 .5				.0008 .2
S/P, All Retailing		-.11 -.5						
R ²	.09	.02	.68	.27			.86	.51
DW ²	1.65	.66	1.91	87			2.90	1.67
N ³	23	20	22	20			14	12

Notes to Table 4:

1. The real wage rate for all retailing is used since wage rate off non-supervisory workers is unavailable for the toys, games etc. industry.

2. The Durbin-Watson statistic is calculated from only the continuous annual observations. For the apparel, food and furniture industries the D-W statistic is calculated for the years from 1967 to 1985. for the toy industry from 1977 to 1985.

3. For the apparel, food and furniture industries, the regression results in the four columns are based on data from 1963 to 1987 for column 1, 1963, 1967-1985 for column 2, 1963, 1967 - 1985 for column 3 and for 1963, 1967 - 85 for column 4. For toy industry, the data are for 1963, 1967, 1972 and 1977 - 1985 for column 3 and 1963, 1967, 1972 and 1977 - 1985. for column 4.

The results for the food industry show relative earnings of females are inversely related to the sales-advertising ratio of manufacturers and the sales-payroll ratio of food retailers. There has been a growth in manufacturer promotion relative to sales and in retail personal services. The long term decline in the sales-payroll ratio in food retailing should not be attributed to the increase in the relative earnings of females but to other unspecified but important causes.

These results are not inconsistent with the results reported by Telser[1964] who found advertising was directly related to brand introductions and product turnover in a comparison of cosmetics, food and soap products.

E. The Difference Between the Sales-Advertising Ratio of Retailers and Manufacturers

We have shown advertising-sales ratios of manufacturing industries producing consumer goods have decreased since the mid-seventies. This evidence would be more impressive if the decrease was larger for manufacturers than for retailers within the individual industries.²³ If manufacturers and not retailers are developing and promoting the new brand names, the difference between the sales-advertising ratio of retailers and the sales-advertising ratio of manufacturers in the same industry should increase over time if consumers demand more brand names.²⁴ Industries with significant increases in trademark filings should show a greater decrease in sales-advertising ratio of manufacturers than of retailers. In those industries where brand names have been established, the sales-advertising ratio of manufacturers would be expected to decrease by more over time than that of retailers. The opposite should be true if the brand names are being established and promoted by retailers.

The dependent variable in the regression in Table 5 is the difference between the sales-advertising ratio of retailers and the same ratio for manufacturers. The independent variables are the log of the relative earnings of females and the two sets of control variables. One set includes the cost of network TV ads relative to the cost of newspaper ads and the other includes the sales-advertising ratio of all manufacturing firms and the sales-payroll ratio of all retailing firms. The second set of control variables explains a larger fraction of the variation of the dependent variable. The difference between the sales-advertising ratio of retailers and that of manufacturers is directly related to the relative earnings of females in the apparel and food industries but are not a significant determinant of the difference in the furniture industry. In the apparel and food industries manufacturers are promoting more intensively relative to retailers as the cost of time of females has increased.

**TABLE 5: The Difference Between Sales-Advertising Ratio
of Retailers and Manufacturers in Same Industry**

Variable	<u>All Retailing Versus All Manufacturing</u>		<u>Apparel</u>		<u>Food</u>		<u>Furniture</u>	
	Est t		Est t		Est t		Est t	
Constant	28.77 .6		75.35 1.2	-63.40 -.4	77.06 2.2	275.19 2.9	-.12 -.003	-277.39 -2.2
L[Female Earnings/Male Earnings]	40.66 .5		295.89 2.8	203.17 2.3	95.51 1.6	199.02 4.0	45.14 .7	-59.48 -.9
Network Ad Rate/ Newspaper Ad Rate	-19.79 -7		17.96 .5		27.92 1.3		-36.22 -1.1	
S/A of All Manufacturers				-.63 -2.9		.30 2.4		-.26 -1.5
S/P of All Retailers				19.19 1.3		-16.52 -2.0		24.75 2.2
R ²	.05		.29	.76	.16	.59	.11	.44
D-W Statistic ¹	.41		.66	1.67 ¹	.54	1.32 ¹	1.22	1.33 ¹
N ²	23		23	20	23	20	23	20

Notes to Table 5:

1. The Durbin-Watson statistic calculated from continuous annual observations. See Table

4.

2. For columns 1,3, 5 and 7 data are for 1963 - 1985. For columns 4, 6 and 8 the data are for 1963 and 1967-1985.

IV. CONCLUSIONS

The earnings of full-time female workers have increased relative to full-time male earnings since the mid-seventies. Because the level of male earnings is higher, the theory of the efficient use of time within the family predicts that males will shop for fewer goods but rely more on brand names and/or stores services to economize on time when they do shop. The

time diary data indicate females accounted for 65.4 percent of total shopping time in 1976 but only 60.5 percent in 1981 as relative earnings rose. The absolute and relative rise in female earnings since the mid-seventies implies that females will not only rely more on brand names and/or store services than they have but males will assume more of the shopping and other duties of the household. The diary data indicates some changes in shopping behavior within the family have occurred.

The theory of the optimum use of shopping and work time within a family implies that a family's demand for brand names will increase by more under certain conditions when the relative earnings of the female increase. The female substitutes toward more brand name products for the goods that she continues to purchase and the male, who has a still greater propensity to purchase brand name products because of a higher wage, shops for more goods. If the relative earnings of the male increase, the theory predicts the family's demand for brand names will increase by less because the female will shop for more goods than before and she relies less on brand names and store services than does the male because of her lower wage rate.

We have presented evidence in this paper that shows the females share of total shopping time has decreased in recent years as the relative earnings of females have increased. Cross sectional evidence shows the males share of shopping time is greater at younger ages and after retirement. Survey data suggests that shopping behavior responds to incentives. As the relative earnings of females have increased, so has the total number of trademarks filed relative to the size of the economy, the market share of trademark filings for consumer goods the market share of trademarks in the clothing and the game industries. The increase in relative earnings of females coincides with a decrease in the sales-advertising ratio in several manufacturing industries that produce consumer goods. The paradox is that the sales-payroll ratio has increased in the retail apparel and toy industries. In these industries the evidence suggests the information supplied by manufacturers through brand names substitutes for information supplied at the point of sale by retailers. The results for these industries are consistent with the earlier findings reported by Steiner.

As noted above, the changes in the apparel industry perhaps best illustrate the substitution between national brands and retail services. The growth of clothing trademarks reflects the growth of brand names in the clothing market. With the expansion of national brand names, the quality certification function, which had been adeptly performed by department stores for decades, shifted from the department store to the manufacturer. When the consumer relies more on the brand name of the product and less on the name of the local department

store to determine what brands to purchase, the manufacturer has an incentive to expand brand availability to outlets that offered fewer personal services and lower retail prices. Consumers rely more now on the brand name and less on the name of the department store to certify quality, fashion, etc., and demand fewer services from retail stores. Discount, off-price and specialty stores have grown at the expense of department stores as manufacturers have expanded the distribution of their products and placed brand name merchandise in a greater variety of retail outlets. The department store industry has struggled to adapt to these changes by shedding services and becoming more of a supplier of inventories. The rapid rise in the sales-payroll ratio in department stores reflects a recognition of this more limited function. The increase in the cost of time of consumers has made the traditional method of retailing obsolete. By relying more on the brand names, consumers demand fewer services and are less willing to pay for the services of informed and educated retail sales staff. The growth of brand names has reduced, not increased, the size of market for the traditional department store. The department store industry has been adjusting to this change as middle to low price department stores exit and others survive the competition from discount and other lower service intense outlets by reducing costs and providing a less service intensive product that consumers are now demanding. Although consumers often complain about the lack of service, their actions are a better indicator of their interests than are their words.

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FOOTNOTES

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¹Landes and Posner [1987] present several reasons why branded goods economize on time.

²The time required to purchase goods will be lower at a store that provides a broad inventory, an informed sales staff and elaborate check out services.

³This conclusion would not hold if the price or time function of either or both members also depended on the total quantity purchased by the shopper. If there are quantity discounts from bulk purchases, the optimal values of a , b , B and S and X_m and X_f are determined simultaneously. With quantity discounts there will be an even greater incentive for shopper specialization but the identity of the shopper could change as the total quantity consumed by the family changes depending on how the total quantity purchased enters the time and price functions of the male and the female. We do not believe that quantity discounts are of sufficient importance in consumer markets to justify the added complications of this modified model.

⁴Although the model emphasizes the substitution of shopping time between both members, substitution on other margins will also occur, e.g., between household work and shopping time. A rise in female earnings may increase time spent in the household by the male and leave shopping responsibilities largely unaffected. Juster and Stafford [1990] report some evidence that drudgery work is considered a substitute by males and females.

responsibilities largely unaffected. Juster and Stafford [1990] report some evidence that drudgery work is considered a substitute by males and females.

⁵ The female may begin to purchase brand name products that she did not purchase before her earnings increased.

⁶ The 1981 follow up study only surveyed those members who were in the 1975 survey. This means the respondents were 5 years older and younger families were not included. Since the difference in shopping time between males and females is smaller than for other groups except for those over 65 years old, the exclusion of younger families is not likely to bias the results.

⁷ This measure has some obvious defects because it simply measures counts not the value of the trademark and could be deficient if there were changes over time in the incentive to trademark. If the propensity to use umbrella branding, where the same name is used on many different products, has decreased over time, this would cause the trademark series to grow more rapidly. As with patents, the variance in the value of a trademark is large with many trademarks worth little and a small number worth incredible amounts.

⁸ Trademark filings and patent applications are used in this paper rather than trademark and patent registrations. The registration series are affected by discontinuous changes in staffing which causes larger swings in pending applications and introduces noise in the registration series.

⁹ The abnormal jump in trademark and patent applications in 1982 and the subsequent decline in 1983 is due to an increase in registration fees for new applications that were announced before but not introduced until 1983.

¹⁰ It is possible that some of the growth in recent years are caused by recent legislation that prohibits the introduction of counterfeit goods into the United States. Protection is granted only to goods or services with valid trademarks. While this would raise the incentive to trademark in the last few years, it would not explain why trademark filings began to grow in the mid-seventies.

¹¹ Although much of this increase is probably real, some may be due to better methods of finding list of trade names by the staff at Gale. Unfortunately, it is not possible to separate the two effects.

¹² The U.S. Office of Trademarks began collecting trademark filings by industry (class) in 1981 and uses the international classification system, which is somewhat different from the U.S. classification system. This series is too short to study the changing composition of trademarks by industry and would completely miss the significant growth of filings that began in the mid seventies.

¹³ Active trademarks in any year before 1984 exclude filings that either were never registered or were registered but became inactive before 1984.

¹⁴ There are two reasons why these deficiencies appear to be unimportant. First, market share of consumer good trademarks did not increase between 1965 and 1975. Second, differences in the disappearance rate of filings between consumer and producer industries appear to be small, at least in recent years. The annual disappearance rate of filings between 1984 and 1988 for 1984 filings was slightly lower for producer goods than for consumer goods. By 1988 the estimated annual disappearance rate was 4.3% per year for the 1984 filings of producer goods and 4.8% for consumer goods. This implies that the measured market share of consumer goods would be biased downward in recent years and could not explain why the growth in the observed market share of consumer good filings. If these estimated annual disappearance rates apply in earlier years as well, it is possible to estimate the total number of filings for producer and consumer goods in each year from 1965 to 1983. These reconstituted time series were used to duplicate the regression analyses presented below. The empirical results were similar to those presented below. Therefore, it is unlikely the findings and conclusions presented below are a special result of using the T&T data and not the actual but unavailable series on total filings.

¹⁵ The U.S. trademark classification system defines industries broadly and, unfortunately, has little resemblance to the Standard Industrial Classification.

¹⁶ The number in brackets is the U.S. classification number. This list does not exhaust the list of possible consumer good classes but it includes all consumer product classes with a large number of filings. So, conclusions about the growth patterns of trademark filings for these consumer products should still be applicable if a still broader definition of a consumer industry was adopted.

¹⁷Producer trademarks would include such items as: adhesives, metals and metal castings, chemicals, measuring and scientific appliances, dental and medical appliances, etc.

¹⁸ The absolute number of trademarks has grown in all of these industries.

¹⁹ Advertising data are for corporations and are reported in Statistics of Income, Corporate Returns, and are for the two digit industries and therefore are not available for the more narrowly defined toy industry.

²⁰The sales-payroll estimates for the toy industry have large standard errors in non-Census years. The data are from unpublished Census data from the Annual Survey of Manufactures. An examination of the sales-payroll figures for the toy industry in Census years reveals a steady and sharp increase in the sales-payroll ratio since 1972. It is clear that there has been a sharp rise in the sales-payroll ratio although the statistics from the Annual Survey distort this increase.

²¹The data are from the U.S. Office of Trademarks.

²²We deflated the filings of each consumer good industry by the total filings for producer good industries because our theory only predicts that filings for consumer goods should increase relative to producer goods and not which of the consumer good industries should experience an increase in filings.

²³The trends in the sales-advertising ratio for all manufacturing relative to that of all retailing serve as a useful benchmark to compare the patterns in particular industries.

²⁴ The market share of manufacturers advertising increased from 1963 to 1985 in apparel and food and declined slightly in furniture.

Appendix 1

In this appendix we explore how an increase in the wage rate of a family member changes B and S for a good purchased by a member of the family. We examine two cases where: 1) a change in the wage rate shifts the shopping responsibility for the good from one member to another and 2) a change in the wage rate leaves the identity of shopper unchanged.

In the first case we assume the full price of the female is lower than the full price of the male by arbitrarily small amount. We specify the conditions under which B and/or S increase when the higher wage male worker becomes the substitute shopper because the wage rate of the lower wage female worker increases.

The female must have some other disadvantage to offset her lower wage rate if the full price of the two members are virtually equal. We assume that the time function includes a parameter c so $t(c, B, S)$ represents the time used per unit of X consumed. c is constant for each member but differs between members. With no loss of generality we assume that $\frac{\partial t}{\partial c} > 0$. The higher is the value of c; the larger is the time required to consume a unit of X, given B and S.

What we want to determine are the conditions under which the higher wage worker in the family selects a higher B and/or S when the higher wage member becomes the shopper. Let the full price of the current shopper equal some constant. The shopper satisfies the two first order conditions for minimizing the full price. In summary, these three conditions are.

- 1) $F = P(B, S) + wt(B, S) = k$
- 2) $P_B(B, S) + wt_B(B, S) = 0$
- 3) $P_S(B, S) + w t_S(B, S) = 0$

We differentiate these equations and obtain

- 4) $[0] \frac{dB}{dw} + [0] \frac{dS}{dw} + wt_c \frac{dc}{dw} = -t$
- 5) $[P_{BB} + wt_{BB}] \frac{dB}{dw} + [P_{BS} + wt_{BS}] \frac{dS}{dw} + [w t_{Bc}] \frac{dc}{dw} = -t_B$
- 6) $[P_{BS} + wt_{BS}] \frac{dB}{dw} + [P_{SS} + wt_{SS}] \frac{dS}{dw} + [w t_{Sc}] \frac{dc}{dw} = -t_S$

The coefficients of $\frac{dB}{dw}$ and $\frac{dS}{dw}$ in the first equation are zero because the two first order conditions for minimum full price are satisfied. From the first equation we have $\frac{dc}{dw} = \frac{-t}{w \frac{\partial t}{\partial c}}$ which

is negative. The member with the lower wage must have a higher c if the difference between the

full prices of the two members is initially arbitrarily small. The solution for $\frac{dB}{dw}$ is $(\frac{dS}{dw})$ has a symmetric solution)

$$7) \quad \frac{dB}{dw} = \frac{wt[t_{Sc}(PBS + wtBS) - t_{Bc}(PSS + wtSS)] + wt_c[-t_B((PSS + wtSS) + t_S((PBS + wtBS))]/D$$

where D is greater than zero if the full price is minimized. and t_{Sc} equals $\frac{\partial^2 t}{\partial S \partial c}$ and t_{Bc} equals $\frac{\partial^2 t}{\partial B \partial c}$

The sufficient conditions for the numerator to be positive are

$$8) \quad a) \frac{\partial^2 t}{\partial S \partial c} \geq 0, b) \frac{\partial^2 t}{\partial B \partial c} \geq 0 \text{ and } c) \frac{\partial^2 P}{\partial B \partial S} + w \frac{\partial^2 t}{\partial B \partial S} < 0.$$

Conditions 8a and 8b require the marginal time saving from an increase in branding or service is not greater for the female than the male. Condition 8c requires B and S to be complements in the price and time functions. If conditions 8a-8c hold the male will have a higher B and S if the wage of the male is higher. If conditions 8a and 8b hold but $(PBS + wtBS) > 0$, then $\frac{dB}{dw}$ or $\frac{dS}{dw}$ must increase but not necessarily both. When the male becomes the substitute shopper for the female after the female wage increases, either B or S or both will increase if 8a and 8b hold.

For case 2 the full price of one member is so much lower than that of the other member so an increase in the wage rate of the shopper does not change the identity of the shopper. Only equations 5 and 6 need be satisfied. The comparative statics reduce to equations 5 and 6. Solving for $\frac{dB}{dw}$, we obtain

$$dB/dw = \{-t_B[PSS + w t_{SS}] + t_S[PBS + wtBS]\}/D$$

where D equals $[\partial^2 F/\partial^2 B][\partial^2 F/\partial^2 S] - [\partial^2 F/\partial B \partial S]^2$ which is greater than zero for a minimized full price. A sufficient condition for the numerator to be positive is that $\frac{\partial^2 P}{\partial B \partial S} + w \frac{\partial^2 t}{\partial B \partial S} < 0$, the same condition as 8c. 8c is a sufficient but not necessary condition.

In both cases the substitutability of B and S in the price and time functions plays an important role. Assuming conditions 8a and 8b are satisfied, then both B and S increase when w increases if B and S are complements. When time becomes dearer, the consumer will increase the demand for B and S. If B and S are substitutes, then an increase in w may increase B (S) but decrease S (B) or increase both B and S. If B increase while S decreases, this implies that B and S are substitutes. So, a rise in brand intensity with a decrease in service intensity means branding intensity and service intensity are substitutes. Symmetrical results follow if the price rather than the time function differs between the two members.