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DEMAND UNCERTAINTY AND SALES:

A STUDY OF FASHION AND MARKDOWN PRICING

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INTRODUCTION

Markdowns and sales are ubiquitous in retailing. Though they have been and are omnipresent, they have been ignored for the most part by economists. This misplaced disinterest has been redressed lately and the subject of sales has begun to attract the attention of two groups: theorists, who have attempted to develop a theory of random sales, and marketing specialists, who have studied the growing frequency of price deals in the sale of grocery products.

This paper expands on the theory of clearance sales and applies the theory to explain some interesting time series and cross section regularities in markdowns and markups on merchandise sold by department stores. Dollar markdowns relative to total revenue and percentage markups are traced from 1925 to 1984 and compared across different merchandising groups. The paper applies the theory of clearance sales to explain the dramatic increase in both percentage markups and markdowns during the last fifteen to twenty years. The growing importance of fashion appears to be the primary reason for these recent increases.

Section I expands the theory of clearance sales offered by Lazear [1986] to allow for industry equilibrium. The relationship between the optimal percentage markup and markdown and the degree of uncertainty in reservation prices is derived for a variety of reservation price distributions. Section II examines how the pricing policy of department stores has been affected by the change in distribution of clothing and the promotion policies of apparel manufacturers. Section III examines the time series behavior of markdowns and markups and the effect of the business cycle and the growth of fashion on markdowns and markups. Seasonal patterns in markdowns and estimates of the relative importance of clearance versus other promotional sales are presented in

Section IV. Section V documents the growing importance of fashion by identifying the differential changes over time in percentage markdowns and markups for men's, women's, teen and infant apparel groups. The paper ends with a summary.

I. A TAXONOMY OF SALES AND THE THEORY OF CLEARANCE SALES

Though there are many types of sales, it might be useful to distinguish between three types. The first is the pre-season sale. For example, men's winter suits and coats will be placed on sale for a week or two during late August or early September. A pre-season sale could be offered to reveal which styles will be popular in the coming season. This sales information is used by the retailer to reorder the popular styles. This explanation seems questionable because late August or early September is late for placing new orders for winter merchandise. Another explanation is that some customers have lower storage costs than the store. By offering a pre-season sale the store identifies low-storage cost customers who are prepared to purchase early if the merchandise is offered at a discount while other high-storage cost customers purchase later at regular prices.

The short-term, within-season promotional sale is a second type of sale. Markdowns are offered for short periods of time on selected merchandise. Salop and Stiglitz [1982], Varian [1980], and others have offered theories which attempt to explain why the prices charged by the store for regular merchandise fluctuate at random over time. In most of these models there are both informed and uninformed buyers. Some buyers search and know all prices in the market and will purchase from the lowest price seller. Other buyers have a high cost of search, pick stores at random and purchase from the first seller as long as the

price is less than the buyer's reservation price. In Varian's model each seller adopts a mixed strategy. Each of n stores draws from a distribution of offering prices, g(P), and quotes a price and this produces a distribution of offering prices, not a common market price. At random intervals a particular store will find that its price is the lowest price in the market and will attract all informed customers and a random sample of uniformed customers. When a store's price is the lowest in the market, its sales will be highest. These theories remain in an embryonic stage and have not as yet yielded many testable implications. Still, they do focus on a well-known type of retail pricing, the temporary price cut.

Clearance sales are perhaps the easiest to understand and occur because of the difficulty in predicting the composition of demand, i.e. the popularity of colors, styles and fashions. Lazear offered a model [1986], where a retailer orders a batch of dresses each with a slightly different style. The cumulative distribution of prices these dresses will fetch is F(P). This is the prior cumulative distribution of the prices that will be paid for the dresses. The store does not know whether mauve or purple dresses will fetch high prices in the coming season. Because the retailer cannot predict which will be more popular color (style), i.e. sell for higher prices, the retailer offers all dresses at a common initial retail price, P0. The colors or styles that are valued in excess of P0 will be snapped up. The remaining dresses do not sell at P0 because P0 exceeds the reservation prices of consumers. The seller now knows there is no density at $P > P0$ for the remaining dresses and revises the prior distribution of prices in light of the sample evidence. The optimal markdown price of P1 maximizes

$$(1) \qquad R1 = [P1/F(P0)]\int_{P1}^{P0} F(p)dP = P1\{F(P0) - F(P1)\}/F(P0)$$

Given P0, the optimal markdown price satisfies

$$(2) \qquad F(P0) - F(P1) - f(P1)P1 = 0$$

The optimal first-period price maximizes expected revenue given the optimal pricing behavior in the markdown period. Expected revenue in the first period is

$$(3) \qquad \Pi = P0\{1 - FP0)\} + P1\{1 - F(P1)/F(P0)\}F(P0)$$

Expected revenue equals the sum of expected revenue from selling an item in either the first period or the markdown period. Consider a dress selected at random. It will either sell at P0 with probability 1 - F(P0) or at P1 with probability F(P0) - F(P1). Or it does not sell with probability F(P1). The optimal initial price will satisfy

$$(4) \qquad (P1 - P0)f(P1) + 1 - F(P0) = 0$$

Lazear used equations 2 and 4 to determine the optimal initial and markdown prices.[1] He focused on the optimal price policy of a store that has already ordered a line of clothing. The analysis can be enriched by allowing for industry equilibrium through the entry and exit of firms. New stores will enter or old stores will exit if expected profits differ from zero. Market equilibrium requires

$$(5) \quad P0\{1 - F(P0)\}\} + P1\{F(P0) - F(P1)\} = C$$

where C is the per unit (= marginal) cost of the merchandise. The first term on the left-hand side of the equality represents expected revenue given that a dress picked at random is sold in the initial period and the second term is

expected revenue given that the dress did not sell in the first period but is sold in the markdown period.

If expected profits are positive at the optimal prices, firms will enter and cause the initial and markdown prices to fall. Buyers will lower their reservation prices. The complete distribution of reservation prices will shift down. This adjustment process is not modeled here. Rather, attention will be focused on deriving the price distribution that is consistent with market equilibrium and then deriving the corresponding optimal percentage markup and markdown.

If equations 2, 4 and 5 are satisfied, the industry is in equilibrium. There are three equations but only two unknowns, P0 and P1. The third unknown will be a parameter of the price distribution and is determined in the following manner. First, only consider cumulative price distributions that can be expressed as F(P/X1), X0/X1) where X1 is the minimum reservation price and X0 is the maximum reservation price. Next, assume that the ratio of the lowest reservation price to the cost of the merchandise, X1/C, is exogeneously determined. Then, the three unknowns become P0/C, P1/C and X0/C. For a given X1/C, the firm selects optimal initial and markdown prices so P0/C and P1/C are determined through the maximization behavior.[2] The ratio of X0/C is then determined so that the industry is in equilibrium with zero expected profits. Note that the firm does not optimize X0/C.

The effects of symmetry and asymmetry of the underlying distribution of prices on the optimal percentage markdown and markup can be better understood by studying several specific distributions. Four price distributions will be considered in detail. The two symmetrical distributions are the uniform and the

symmetrical triangular distribution and the two asymmetrical distributions are right triangular distributions with a right or left-handed mode. For the symmetrical triangular distribution, the distribution of reservation prices is given by

$$\text{Symmetrical Triangular} \begin{cases} f(P) = 4(P/X1 - 1)/X1(X0/X1 - 1)^2 \text{ for } X1 < P < (X1 + X0)/2 \\ f(P) = 4(X0/X1 - P/X1)/X1(X0/X1 - 1)^2 \text{ for } (X1 + X0)/2 < P < X0 \end{cases}$$

The asymmetrical price distributions are given by

$$\text{Right-hand Mode} \quad f(P) = k(P/X1 - 1)^{k-1}/X1(X0/X1 - 1)^k \text{ for } X1 < P < X0$$

$$\text{Left-Hand Mode} \quad f(P) = k(X0/X1 - P/X1)^{k-1}/X1(X0/X1 - 1)^k \text{ for } X1 < P < X0$$

When $k = 2$, the two asymmetrical distributions are right triangles with left and right-hand modes, respectively. When $k = 1$, each expression reduces to the uniform distribution. These particular distributions were selected because they are tractable and because they illustrate the effects of symmetry and asymmetry on the optimal percentage markdown and markup.

Table 1 shows some features of the equilibrium solution for selected values of X1/C. The upper panel shows the results for the uniform price distribution and the lower panel shows the results for a symmetrical triangular distribution. Columns 2, 3 and 4 show the equilibrium values of X0/C, P0/C and P1/C. Column 5 shows the percentage markdown (PMD) which is defined as

$$(6) \quad PMD = (P0 - P1)/P0$$

Column 6 shows markdowns relative to sales (MPS) which equals the dollar value of the markdowns taken on markdown goods divided by the total revenue from the goods sold at original and markdown prices, i.e.

Table 1: Equilibrium Solution for Uniform and Symmetric Triangular Distribution of Reservation Prices

$\frac{X1}{C}$	$\frac{X0}{C}$	$\frac{P0}{C}$	$\frac{P1}{C}$	PMD	MPS	PMU	$1-F(\frac{P0}{X1})$	$\frac{F(\frac{P0}{X1})-F(\frac{P1}{X1})}{1-F(\frac{P1}{X1})}$
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
			Uniform Distribution					
.952	1.14	1.05	.95	.08	.05	.05	.50	.5
.889	1.33	1.11	.89	.20	.11	.10	.50	.5
.800	1.60	1.20	.80	.33	.20	.17	.50	.5
.667	2.00	1.33	.67	.50	.20	.25	.33	.5
.500	2.37	1.58	.76	.50	.20	.37	.33	.5
.250	2.73	1.82	.91	.50	.20	.45	.33	.5
.112	2.87	1.91	.96	.50	.20	.48	.33	.5
.000	3.00	2.00	1.00	.50	.20	.50	.33	.5
			Symmetrical Triangular Distribution					
.900	1.26	1.05	.91	.13	.05	.05	.65	.35
.828	1.44	1.09	.87	.21	.08	.08	.63	.36
.728	1.66	1.14	.83	.28	.12	.12	.60	.38
.514	2.09	1.26	.81	.39	.17	.21	.55	.41
.380	2.32	1.33	.82	.39	.19	.25	.52	.42
.276	2.48	1.38	.83	.40	.21	.28	.50	.43
.141	2.68	1.47	.86	.41	.23	.32	.46	.46
.000	2.88	1.55	.89	.43	.25	.36	.42	.48

(7) $MPS = \{P0 - P1\}\{F(P0) - F(P1)\}/[P0\{1 - F(P0)\} + P1\{F(P0) - F(P1)\}]$

Column 7 shows the percentage markup (PMU) which is defined as

(8) $PMU = (P0 - C)/P0$

Column 8 shows the fraction of all goods purchased (not all goods purchased are necessarily sold) that are sold in the initial period while column 9 shows the fraction of all goods sold that are sold in the markdown period. Table 2 shows similar results for the right triangular distribution with a left-hand mode (upper panel) and a right-hand mode (lower panel).

These tables show that as X1/C decreases, X0/C increases, which can be shown to be a more general result. As the minimum reservation price declines relative to C, then the maximum reservation price is higher relative to C for an industry equilibrium to exist. Fashion goods have greater relative price dispersion because there is greater uncertainty as to which styles will prove to be popular in the coming season. In terms of the model a fashion good will have a smaller value for X1/C and therefore a larger range in the distribution of reservation price than will a non-fashion item.

The tables show that P0/C rises as X1/C decreases. As X0 - X1 increases, P0 rises relative to C so the percentage markup increases (column 7). P1/C is always less than one so items purchased on sale are purchased at less than cost during the markdown period. But P1/C does not decrease monotonically as the range of the distribution of prices increases.

In all four cases, PMD, PMU and MPS increase, or increase and then reach a plateau, as X1/C decreases. Given the price distribution, fashion goods should have higher percentage markdowns and markups and higher MPS than do non-fashion goods.

Table 2: Equilibrium Solution for Right Triangular Distributions of Reservation Prices

$\frac{X1}{C}$	$\frac{X0}{C}$	$\frac{P0}{C}$	$\frac{P1}{C}$	PMD	MPS	PMU	$1-F(\frac{P0}{X1})$	$\frac{F(\frac{P0}{X1})-F(\frac{P1}{X1})}{1-F(\frac{P1}{X1})}$
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
			Right Triangle - Left Mode (k = 2)					
.931	1.40	1.07	.93	.13	.08	.07	.44	.56
.871	1.74	1.16	.87	.25	.16	.14	.44	.56
.771	2.31	1.29	.77	.40	.29	.22	.44	.56
.692	2.76	1.38	.69	.50	.39	.28	.44	.56
.652	3.00	1.44	.65	.55	.44	.30	.44	.56
.567	3.40	1.63	.74	.55	.44	.39	.39	.49
.469	3.75	1.79	.82	.55	.44	.44	.36	.44
			Right Triangle - Right Mode (k = 2)					
.928	1.11	1.04	.93	.10	.04	.04	.65	.35
.833	1.25	1.09	.87	.20	.08	.08	.63	.36
.707	1.41	1.16	.82	.29	.13	.13	.60	.39
.535	1.60	1.25	.81	.35	.17	.20	.55	.41
.427	1.71	1.31	.81	.38	.19	.23	.53	.42
.354	1.77	1.34	.82	.39	.20	.25	.51	.42
.234	1.87	1.40	.83	.40	.21	.29	.49	.43
.130	1.95	1.45	.85	.41	.22	.31	.48	.44

The fraction of items sold in the initial period to total goods ordered decreases with decreases in X1/C. The fraction of goods sold in the markdown period relative to all goods sold remains constant for the uniform, decreases with decreases for X1/C for the right triangle with a left mode and increases with decreases in X1/C for the symmetric triangular distribution and for the right triangle with a right mode. So, the fraction of goods sold on markdown exhibits a diverse pattern which depends critically on the shape of the distribution of reservation prices. What is surprising is that the tables show the minimum share of goods sold in the markdown period is 35%, a relatively large percentage.

The uniform distribution has several limiting implications: 50% of all units sold will always be sold at the markdown price (column 9) which is independent of the range in reservation price and MPS never exceeds 20%. The symmetric triangular distribution yields more general implications. PMD, MPS, PMU and the fraction of goods sold in the markdown period all increase with decreases in X1/C. Since X1/C is lower for fashion goods, then a larger percentage of fashion goods will be sold at markdown prices than will non-fashion goods.

II. OTHER CHANGES AFFECTING MARKDOWNS AND MARKUPS

The theory of clearance sales can be interpreted in such a way as to explain why MPS has increased over time and why MPS differs from one merchandise group to another. The theory predicts that MPS, PMD and PMU will be higher for merchandise groups where fashions are subject to change and would explain the growth in MPU and MPS over time because uncertainty about which items will be more popular has increased over time.

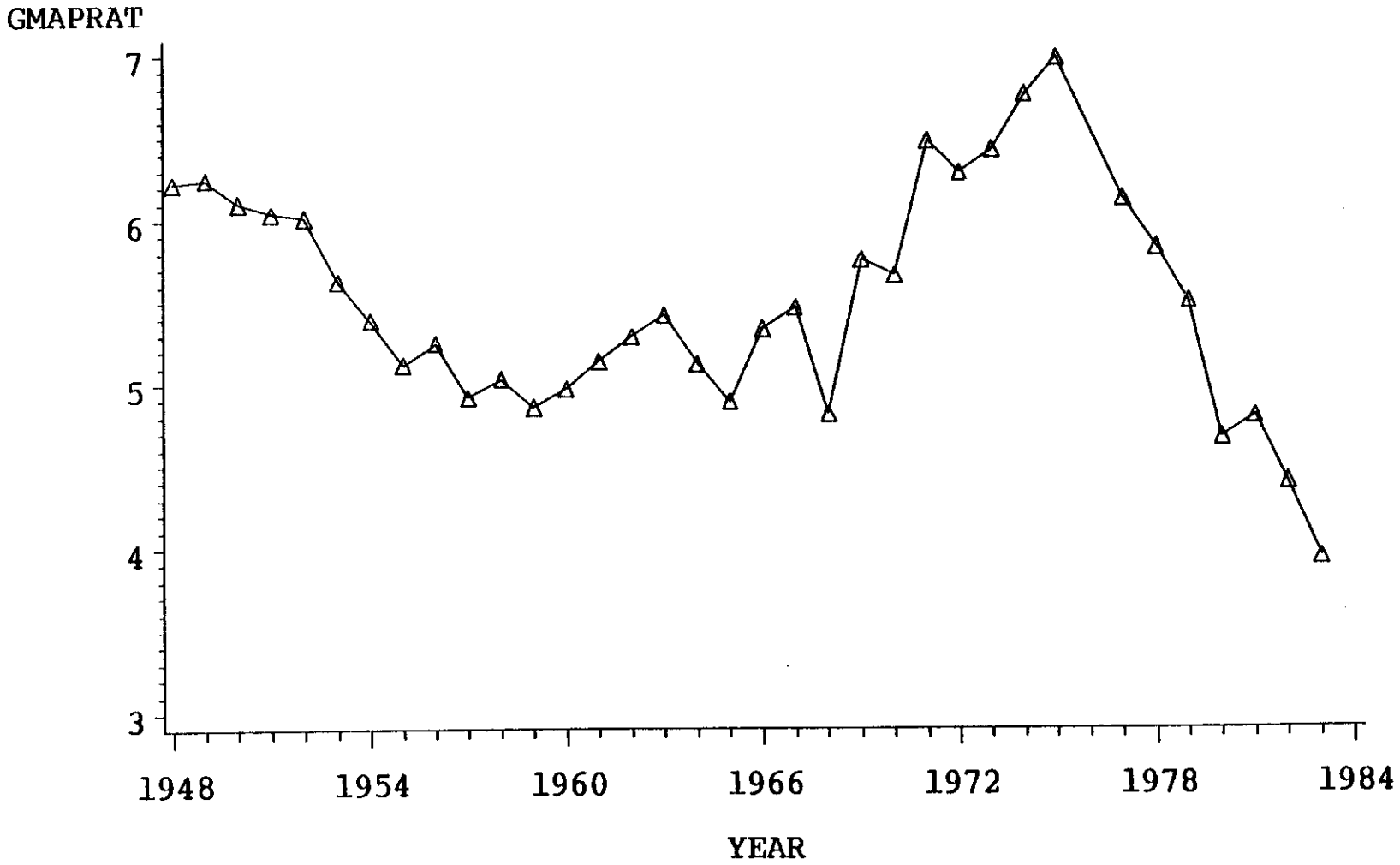
There have been other changes over time which have increased this uncertainty. One important change is the growing market share of imported garments. In the early sixties, apparel clothing imports accounted for about 2% of domestic apparel shipments. By 1984, clothing imports accounted for 25% of all domestic apparel shipments. Lead times are usually longer for imports and this means that forecast errors are more likely when styles and fashions change rapidly. The growing importance of imports will also cause MPS to rise if imported garments are short-run fashion fabrics. Domestic textile producers prefer to produce long-run fabrics while the foreign producers have been willing and able to supply short-run fabric. In the early sixties imported clothing tended to be lower-price, lower-quality clothing. The introduction of import quotas in the early seventies, on a country-by-country basis, has encouraged foreign sources to substitute toward higher-priced and more fashion-type apparel for the United States market. Over time, foreign imports have become more fashion-oriented clothing.

Changes in the channels of merchandising for apparel items have also increased the frequency of department store sales. The increasing frequency with which brand name merchandise has appeared in off-price and specialty stores caused department stores to reduce prices on merchandise sooner than before.

Historically, consumers relied on the department store buyer to certify quality and to economize on the customer's shopping time. The department store catered to the customer who was searching for quality and fashionable merchandise and who would pay for the services of a competent and informed sales staff.

In recent years, apparel manufacturers have developed brand names. The increased use of brand names may be due to the reduced cost of contacting customers through the television and print media and the increased cost of using sales people to inform customers. As manufacturers have developed brand names, they have begun to assume more of the promotion function previously assumed by retailers. Figure 1 shows the ratio of the advertising/sales ratio for retailers (general merchandise and apparel stores) to advertising/sales ratio for apparel manufacturers. The graph shows a modest decline in the ratio of the advertising intensities from 1948 to 1960 followed by a puzzling increase in the early seventies. This rise occurs because the advertising intensity of apparel manufacturers declined over this period while the advertising intensity of general merchandise stores and apparel retailers remained relatively stable. Though there was a general decline in advertising intensity for all manufacturing firms over this period, the decline for apparel manufacturers was smaller and the rise in the advertising ratio of apparel manufacturers during the last ten years has been larger than the rise for all manufacturers. Since the first half of the seventies there has been a large and rapid decline in the ratio of retail advertising intensity to manufacturer advertising intensity. Large retailers have changed policy again and are now selling national brand name merchandise. Over the past eight years the graph indicates that apparel manufacturers have assumed more of the promotion function with the ratio falling to its lowest level in 1983.[3] This recent trend toward greater participation in promotion by apparel manufacturers is a reflection of the growing importance of national brand names in apparel retailing.

Figure 1: Relative Advertising



Advertising/Sales Ratio: General Merchandise + Apparel Retailers Divided by Apparel Manufactures
1976 value by Interpolation

Finally, markdowns have increased because the cost of offering sales has declined. The new cash registers and equipment has reduced the transaction cost of having sales. The new technology has done away with the laborious process of counting and re-marking stock to initiate a sale. With the current technology price reductions are done at the register.

As consumer reliance on brand names has increased, the demand for the services of high-margin, high-service provided by department stores has diminished relative to the services of lower margin retail outlets. A more fragmented market has developed. The size of the traditional customer base for department stores has become smaller while the number of customers who are prepared to purchase brand name merchandise at lower prices at off-price and other lower-margin stores has grown. Department stores have been less effective in servicing this diverse group of customers.

As manufacturers have developed brand names, they have broadened the distribution of their products to include lower-margin outlets and to make their branded merchandise available to lower-margin outlets sooner than in the past. This expansion of the types of outlets carrying brand names is one of the reasons why department stores market share has been declining. Table 3 shows the market share of department stores has declined in an increasing number of merchandise lines in recent years.[4] The market share of department stores declined in six of nine merchandise lines between 1977-1982. Department stores have been forced to adapt to the growing availability of brand merchandise in off-price stores by lowering prices earlier in the season than before. This, in turn, may help explain why MPS has increased over time as competition from lower margin outlets has increased.

Table 3: Market Share by Type of Store for Broad Merchandise Lines 1963-1982

A. Number of Merchandize Lines Where Department Store Market Share:

	1963-67	1967-72	1972-77	1977-82
1) Increased:	9	6	4	3
2) Decreased:	0	3	5	6

Merchandise Line	1963	1967	1972	1977	1982
I. Cosmetics, Drugs & Health Aids					
A. Department Stores	6.7	9.6	11.6	14.0	15.1
B. Drug Stores	62.5	60.4	63.4	59.7	55.4
C. Grocery Stores	21.4	14.2	15.8	18.4	22.7
II. Men's & Boy's Clothing					
A. Department Stores	33.4	39.1	40.9	46.5	43.5
B. Mens' & Boys' Stores	34.2	32.1	32.8	27.6	23.9
C. Family Stores	14.1	12.1	11.8	13.2	17.8
III. Women's & Girl's Clothing					
A. Department Stores	38.8	44.5	46.5	44.5	40.9
B. Women's Ready Wear	27.4	25.2	28.0	30.3	33.0
C. Family Stores	7.5	7.3	8.0	9.5	11.1
IV. Footwear (excluding Infants and Toddlers)					
A. Department Stores	23.5	26.8	29.4	28.6	15.8
B. Shoe Stores					
1. Men's	4.3	4.6	5.4	6.1	6.3
2. Women's	12.6	12.7	10.9	11.0	15.1
3. Family	33.7	32.0	30.2	30.6	41.7
V. Curtains, Draperies & Dry Goods					
A. Department Stores	43.2	48.2	43.2	47.2	55.7
VI. Major Appliance, Radio, TV, Musical Instruments					
A. Department Stores	22.5	26.0	26.9	26.1	24.2
B. Household Appliance	24.7	22.1	18.9	16.1	15.6
C. Radio, TV Stores	12.4	16.4	16.7	20.4	24.0

VII.	Furniture, Sleep Equipment, Floor Coverings					
	A. Department Stores	17.6	20.1	16.4	17.1	15.0
	B. Furniture Stores	58.4	56.7	58.1	56.2	56.6
	C. Floor Covering Stores	11.9	12.2	15.1	16.9	17.3
VIII.	Kitchenware, Home Furnishings, Small Appliances					
	A. Department Stores	31.6	39.8	40.0	37.1	37.4
IX.	Jewelry & Optical					
	A. Department Stores	15.8	19.8	19.6	20.1	15.7
	B. Jewelry Stores	47.2	51.5	47.5	45.3	52.2
	C. Optical Goods Stores	(na)	8.3	10.4	11.0	11.9

Source: U.S. Census of Business, (various years)

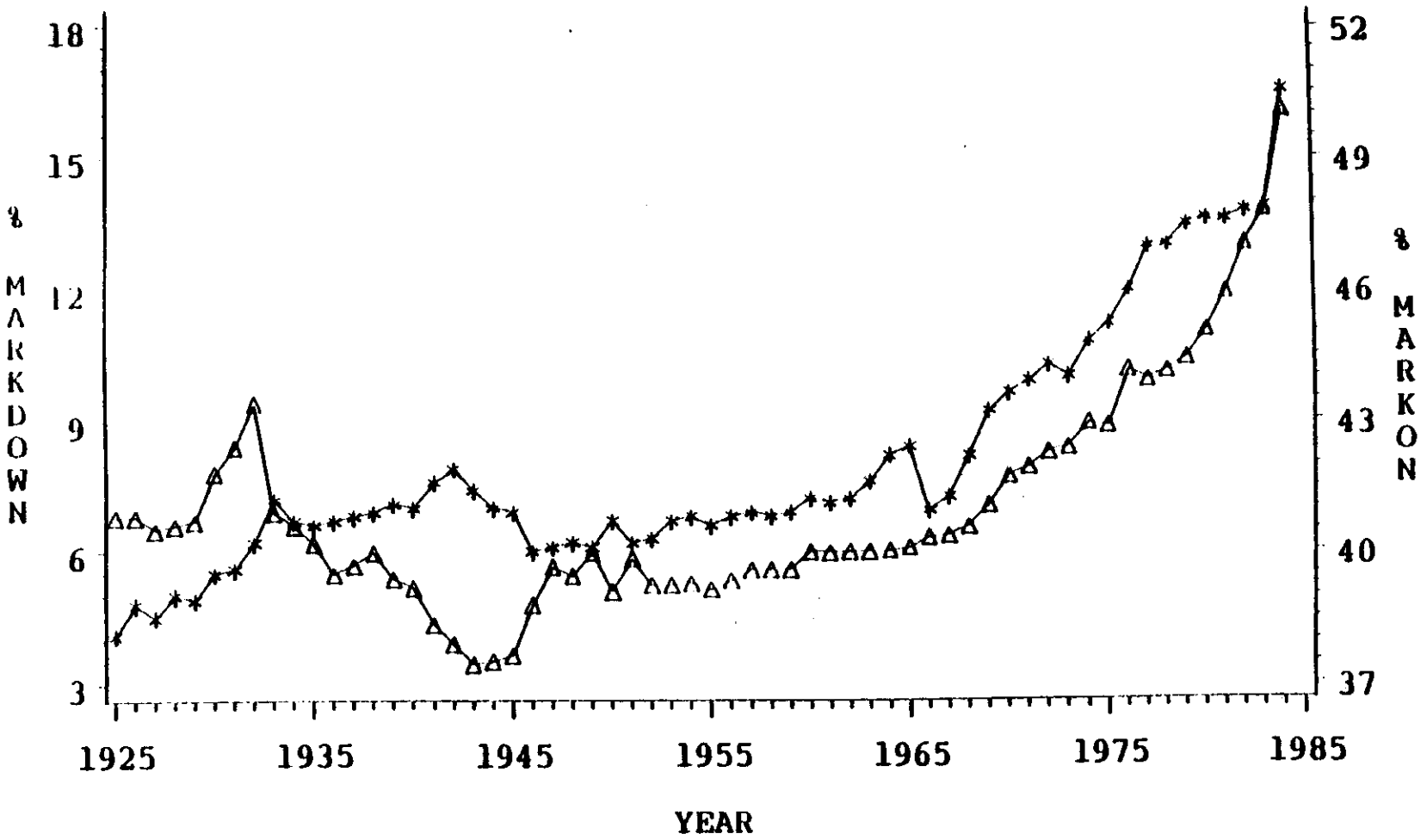
III. TIME-SERIES CHANGES IN MARKDOWNS AND MARKUPS

This section examines the time series behavior of dollar markdowns relative to dollar sales (MPS) and the percentage markup (PMU). Figure 2 shows the dollar markdowns as a percentage of dollar sales for all department stores in the sample and the cumulative markon from 1925 to 1984. The cumulative markon is a term used in the industry and is an approximation to PMU.

There are three periods where dollar markdowns relative to dollar sales and the percentage markon changed noticeably. First, dollar markdowns relative to total revenue rose rapidly with the onset of the Great Depression. Markdowns probably increased because the severity of the Depression was grossly underestimated and excess inventories were reduced. Second, markdowns were unusually low during World War II. The decline in markdowns during the World War II was due to price controls, output restrictions and rationing. Prices were artificially fixed below equilibrium levels. Merchandise was scarce and eagerly purchased by customers so there was little reason to mark down the little merchandise that remained on the shelves.

Third, and most important, has been the large and persistent increase in markdowns since 1970 which follows a period of about forty years of comparative stability. The rise in markdowns has occurred at a time when markups have been rising. Figure 2 shows that department stores have been taking higher percentage markups over time just when they have been selling relatively more merchandise at markdown prices. In some ways, the conjoint increase in the percentage markon and in MPS is paradoxical and surprising. If increases in demand permit higher markups, then markdowns should be applied less frequently. Similarly, if competition among stores has increased and is the cause of higher markdowns, then this competition would have limited or reduced the size of the

FIGURE 2. TIME SERIES OF PERCENT MARKON AND PERCENT MARKDOWN



% MARKDOWN = MARKDOWNS AS A % OF SALES (TRIANGLES)
% MARKON = MARKONS AS A % OF SALES (STARS)

percentage markup. Either the demand or the competition hypothesis would suggest an inverse relationship between the percentage markon and MPS.

The theory of clearance sales suggests a reason for the positive association of the percentage markon and MPS. The theory predicts that markdowns will rise relative to sales when uncertainty increases and uncertainty is greater as fashion becomes more important in the sales of apparel and other merchandise. The same theory also predicts that markups will increase as fashion becomes more important in merchandising. So, the clearance theory predicts PMU and MPS will be directly related.

Some scattered evidence indicates uncertainty increased around the mid-sixties. Publicly available information about the demand for different colors is only available for bedsheets. Figure 3 shows the percentage of bedsheet sales (produced by domestic manufacturers) that are white or fancies, which include prints, jacquards and other special designs. The market share of white sheets drops precipitously from about 65% in the mid-sixties to about 16% by 1975 while the market share of fancies increases from 15% in the mid-sixties to 75% by the mid-seventies. Over a ten-year span, there was a dramatic increase in the use of prints. Predicting which print patterns and colors would be popular is more difficult than predicting the demand for whites. Similar changes occurred over this period in the men's dress shirt market as white shirts were replaced by other solid color and patterned shirts.

Figure 2 suggests that the factors that affected the markdown and markup policies in the department store industry during the last fifteen to twenty years are quite different from those in previous decades. The subsequent statistical analysis of markdowns and markups accepts this dichotomy by dividing the whole period into two sub-periods, one from the 1925-1955 and the other from

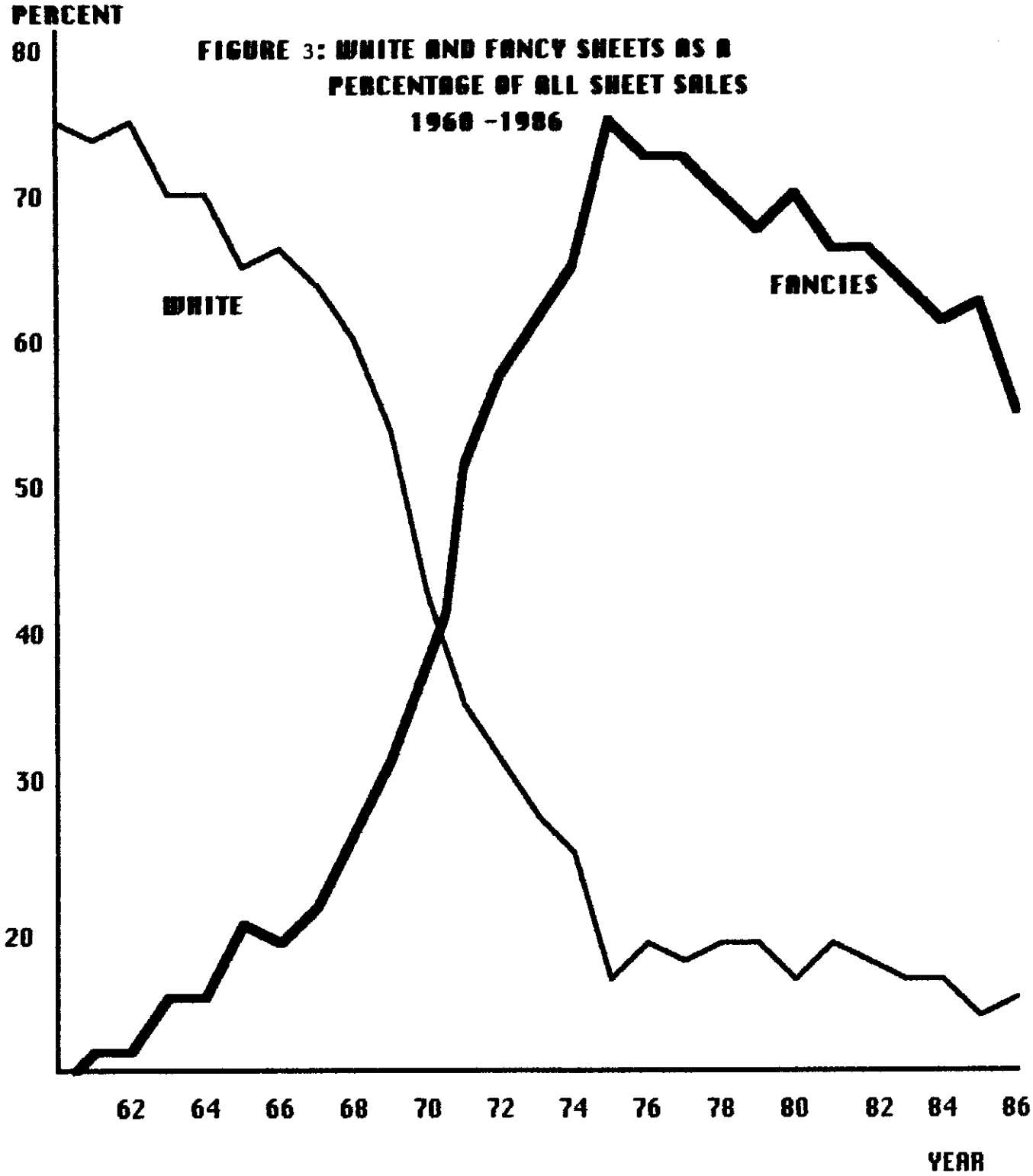


FIGURE 3: WHITE AND FANCY SHEETS AS A PERCENTAGE OF ALL SHEET SALES 1960 -1986

1956-1984. The division is made at the end of 1955 because clothing imports become available in 1956.

During the 1925-1955 period, the Depression and World War II had the most pronounced effects on markdowns and markups. The effect of the business cycle on markdowns relative to sales has been estimated in two ways. The conventional approach simply regresses markdowns as a percent of sales on the ratio of current year to previous year department store sales. If sales are under estimated when sales grow more rapidly and overestimated when sales decline rapidly, the rate of growth in sales will be positively correlated with the forecast error in sales. If so, there will be an inverse relationship between markdowns relative to sales and the annual sales ratio. When transactions decline rapidly, markdowns should increase relative to sales. An inverse relationship between the growth rate of sales and markdonws relative to sales will occur if managers of department stores underestimate sales when sales grow rapidly and overestimate sales when sales decline rapidly. If sale declines in sales were accurately predicted on average, then orders for merchandise would have been lower and no relationship between the growth rate and markdowns relative to sales would be observed.

Uncertainty about sales can also be estimated by using Box-Jenkins techniques to construct a time series of forecast errors of department store sales. Store managers are assumed to have used a Box-Jenkins statistical model to predict sales. Deviations of actual sales from predicted sales are assumed to be the forecast errors of sales made by store managers. When predicted sales exceed actual sales, markdowns relative to sales are assumed to increase as store managers lower prices to dispose of excess merchandise.

Markdowns relative to sales are regressed on the forecast errors of sales, or the growth rate of sales, to determine if markdowns relative to sales are inversely related to forecast errors. In addition, a dummy variable is also included in the regressions to capture the effects of price and output controls, and rationing during World War II on markdowns and markups. The World War II dummy variable equals one from 1942-45.

Column 1 of Table 4 shows dollar markdowns relative to dollar sales (MPS) are inversely related to the forecast error in sales (columns 1 and 2).[5] Another finding which is consistent with this result is that the growth rate of sales is inversely related to markdowns relative to sales (column 3). In years when sales grow more rapidly, MPS declines. The coefficient of the World War II variable is negative and indicates price and output controls reduced the number of markdowns offered by department stores. The negative coefficient of the percentage markon indicates the percentage markon was inversely related to MPS over the 1925-1955 period. This result probably reflects the confounding effects of the controls imposed in World War II when markups remained fairly high even while markdowns decreased.

During the 1956-1984 period, markdowns relative to sales appear to be affected more by shifts in the types of merchandise sold than by forecast errors of aggregate demand. Unlike the 1925-1955 period, the markdowns relative to sales are directly related to the markon (columns 4 and 5). In addition, clothing imports as a percentage of total consumer expenditure on clothing are directly related to markdowns relative to sales.

Another variable that is directly related to the growth of MPS is the percentage of looms that are shuttleless. The shuttleless loom is replacing the

Table 4: Determinants of Dollar Markdowns to Dollar Sales (MPS)

	1925-55			1956-84			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1. Intercept	5.94 (19.0)	28.18 (3.2)	14.15 (6.9)	-33.08 (10.6)	-12.37 (3.9)	5.32 (24.7)	1.31 (.7)
2. Real Sales (t)/ Real Sales (t-1)			-8.03 (4.0)				
3. Sales Forecast Error	-4.94 (3.2)	-4.90 (3.5)		-.46 (.4)			
4. World War II	-1 .25 (2.6)	-.83 (1.8)	-1.32 (2.9)				
5. Markon		-.55 (2.5)		.94 (13.4)	.44 (5.9)		
6. Percent Clothing Imports					33.6 (6.0)	24.5 (3.5)	
7. Percent Shuttleless					.18 (7.6)	.09 (2.3)	.13 (3.2)
8. Percent of Population 10-34 years							11.2 (2.1)
R^2	.381	.500	.491	.878	.971	.969	.979
Standard Error	.622	.568	.598	.576	.335	.319	.303
Rho	.66	.66	.60	.55	.42	.49	.39

shuttle loom and accounts for a growing percentage of all looms in the United States, in other advanced countries and even in some developing countries, e.g. Italy, Taiwan and Japan. Shuttleless looms weave fabric at much faster speeds than do shuttle looms. In the United States the growing use of shuttleless looms has been accompanied by an increasing percentage of shuttleless looms that have a multi-filling insertion capability, which means that multi-color and pattern fabric can be weaved. This latter trend implies that more fashionable clothing can be weaved. Unfortunately, the data on the percentage of shuttleless looms with the multi-filling insertion capability is not available for as long a period. So, the percentage of shuttleless looms in the United States is used as a proxy for the growing capacity to produce fashion merchandise.

Finally, the fraction of the population between 10-34 is directly related to MPS. Younger members of the population appear to be more fashion conscious. This last result must be considered with caution. The fraction of the population between 10 and 34 did not have a significant effect on MPS in the 1925-84 period. In this earlier period, this fraction was declining from 1940 to 1955. During the 1956-84 period, this ratio is rising except for the last few years. So, the results may merely reflect common upward trends in MPS and the fraction of the population between 10 and 34 years.

Table 5 shows some of the determinants of the percentage markon. The percentage markon taken by a store should not be affected by the forecast error of sales because the markup is determined before the actual market demand is observed. The sales forecast error is not a significant determinant of the percentage markon even though it is a significant determinant of MPS during the 1925-1955 period. Other regression results indicate that the percentage markon was higher during World War II under price and output controls. The most

important variable that explains the growth in the percentage markon during the 1956-1984 period is the percentage of clothing imports. The percentage of the population between 18-34 years of age is also directly related to PMU. The percentage of shuttleless looms is not a significant determinant of the percentage markon.

In summary, changes in the markdown during the 1925-1955 period were related to forecast errors in predicting the aggregate demand for clothing and to the World War II price and output controls. In contrast, the persistent growth in the markdown and the markon during the 1956-1984 period is related to growth of imported merchandise and this, in turn, can be related to the growth of uncertainty.

IV. SEASONAL MARKDOWNS

The theory of clearance sales predicts that markdowns will be offered relatively more frequently at the end of seasons and relatively less frequently at the beginning of seasons. Apparel items accounted for a 63 percent of total department store sales in 1984 and the merchandising of apparel has distinct and recognized seasons, spring-summer and fall-winter seasons although the beginning of these seasons has become less easily discernable with the recent trend toward multiple introductions of merchandise within each season.

Dollar markdowns relative to dollar sales are shown by month for 1965, 1977 and 1984 in columns 1-3 of Table 6. The data are for all merchandise sold in department stores, not just apparel items, and include all reporting department stores.[6] In 1977 only companies with sales greater than 20 million dollars in sales are included and in 1984 only companies with sales in excess of 100 million dollars in sales are included. In all years, monthly dollar

Table 5: Determinants of Markon

	1925-55			1956-84		
	(1)	(2)	(3)	(4)	(5)	(6)
1. Intercept	40.09 (127.1)	39.72 (34.4)	40.31 (29.6)	44.29 (20.2)	40.66 (12.1)	33.8 (14.2)
2. Real Sales (t)/ Real Sales (t-1)			-.11 (.1)		.06 (.01)	
3. Sales Forecast Error	-.02 (.02)	-.03 (.03)		.49 (.4)		
4. World War II	.68 (1.9)	.70 (2.1)	.66 (2.1)			
5. Stockturn		.125 (.5)		-1.00 (1.7)		
6. Percent Clothing Imports				42.24 (13.1)	44.86 (15.8)	49.32 (4.9)
7. Percent Shuttleless						-.07 (1.3)
8. Percent of Population 10-34 years						18.94 (2.8)
R^2	.124	.151	.142	.938	.910	.978
Standard Error	.457	.445	.417	.542	.542	.430
Rho	.76	.72	.78	.35	.48	.06

markdowns relative to monthly dollar sales peak in January for the September-February period and in July for the March-August period. The markdowns offered in January-February and July-August are most likely to be end-of-season sales. The other interesting fact is that markdowns relative to sales are lower in March-April and in September-October, the beginning of the traditional spring-summer and fall-winter seasons.

Higher markdowns relative to sales in January and July might be due to a reduced demand for department store services during January and July, i.e. off-peak demands. January and February are the two months with the lowest shares of yearly sales and July ranked third lowest in both 1977 and 1984. However, the peak load explanation would imply that the smallest values for MPS should occur in November and December since the share of yearly sales is highest in these two months, and this is clearly not the case. Still another reason to question the peak load explanation is the recent spread of markdowns into June and December, two months when the demand increases. Still, the peak load explanation does appear to play a role in the pricing of all items in the store. Markdowns relative to sales appear to peak in January and July even for other products where there is a less readily identified season, i.e. televisions, bedding, small appliances. Markdowns during January and July are partly a response to a general storewide decline in demand.

Columns 4-6 show dollar markdowns by month as a percent of dollar markdowns for the year. If all of the sales during January, February, July and August are treated as clearance sales, then clearance sales accounted for approximately 39% of all department store markdowns in 1965, 33% in 1977 and 32% in 1984. At first glance this downward trend suggests that clearance markdowns are declining in relative importance over time. But, a more careful examination

Table 6: Seasonal Variation in Markdowns

Month	Markdowns as Percentage of Sales			Percentage of Yearly Markdowns in Month		
	1965-66	1977-78	1984-85	1965-66	1977-78	1984-85
February	8.4	9.3	18.3	6.3	5.3	6.2
March	6.0	8.7	16.3	5.5	6.7	6.7
April	6.9	8.9	12.7	7.4	6.9	5.7
May	6.2	8.9	14.1	6.5	6.8	6.3
June	6.9	10.7	19.2	6.9	8.3	9.5
July	11.9	14.6	22.1	10.6	9.3	7.8
August	7.4	8.7	16.2	7.4	6.5	6.7
September	5.4	7.7	13.6	6.2	6.4	7.2
October	5.8	8.5	14.7	7.0	7.4	7.4
November	5.9	8.7	14.9	7.7	9.0	8.5
December	5.7	7.6	15.9	13.7	15.2	17.3
January	18.2	21.5	32.8	14.8	12.1	10.9
Share of Yearly Markdowns						
a. July-August				18.1	15.7	14.5
b. January-February				21.1	17.5	17.1
			Total	39.2	33.2	31.6
c. June-August				25.0	24.1	24.0
d. December-February				34.7	32.6	34.4
			Total	59.7	56.7	58.4
e. March-April				12.9	13.6	12.4
September-October				13.2	13.8	14.5
			Total	26.1	27.4	26.9

of the data shows the decrease is due to the increase in markdowns offered during June and December. In recent years, markdowns have begun earlier within each season. The lower panel shows that the percentage of all dollar markdowns occurring from June to August and from December to February has not changed appreciably from 1965 to 1984. What has happened is that the length of the markdown season has been extended in recent years and markdowns are being offered earlier, in June and December. This quickening pace of markdowns may be due to the growing use of multiple introductions within each season and to the increased capacity of competitors to copy popular designs because of the introduction of the speedier shuttleless looms and knitting machines. In addition, the competition from variety and specialty stores and from discount operations have forced department stores to offer markdowns earlier and more frequently than before.

These data can be used to obtain a crude estimate of the fraction of markdowns which are clearance markdowns. If all markdowns during July-August and January-February of 1965 are assumed to be clearance sales and all markdowns during June-August and December-February of 1984 are assumed to be clearance sales, then clearance markdowns represented 39% of all markdowns in 1965 and increased to at most 58% of all markdowns in 1984. This nineteen point increase probably overestimates the relative growth in clearance markdowns but clearance markdowns accounted for a larger share of all markdowns now than twenty years ago. Still, a substantial percentage of yearly markdowns do not appear to be clearance markdowns.

V. MARKUPS AND MARKDOWNS BY MERCHANDISE LINE

The demand for some merchandise groups is more difficult to predict because style and fashion change more frequently. In these groups there will be greater uncertainty about which fashions will sell at the initial price and these groups should have higher values for PMU and MPS.

A very early study of markdowns offered in Ohio department stores by Grinstead [1932] noted that MPS was higher for women's clothing than for men's clothing. Historically, men's fashions have changed less frequently than women's fashions. So, the higher MPS for women's clothing is consistent with the implications of the theory of clearance sales.

More contemporary data suggests that differences between merchandise groups have been disrupted in recent years. Table 7 shows the changes between 1965 and 1984 in markdowns relative to total sales, markons and the dollar value merchandise returns relative to total sales by merchandise group. In each year, the apparel merchandise has been arranged into the following groups: 1) women's fashion clothing and accessories, e.g. mostly outergarments, e.g. shoes, dresses and coats; 2) women's standard or non-fashion items, e.g. undergarments; 3) men's apparel and accessories); 4) teens' and junior clothing and accessories; and 5) infants' clothing. All other merchandise sold by department stores was combined into a catch-all other class. Table 7 shows the simple mean, below which is the standard deviation and below the standard deviation is the sample size for each group.

In 1965 markdowns relative to sales were higher for the women's fashion groups and for the teens' and junior group than for all other groups. The pattern of higher markdowns relative to sales for the women's fashion group than for the women's standard group or for the men's group reflected the greater

importance of fashion for women's outer clothing than women's undergarments and men's clothing. In 1965, the percentage markup and the percentage of merchandise returns was highest for the women's fashion group. Merchandise returns relative to sales serve as a proxy for the importance of fashion in the group. What distinguishes fashion from non-fashion goods is the need to match and coordinate fabric, color and design with other items and accessories. For many customers, this is not easily done at the point of purchase. Customers prefer to purchase several items, take them home, try them on to see if colors or fabrics match properly and sometimes decide to return the merchandise because the colors or patterns do not coordinate. This is less true for non-fashion items. Hence, merchandise returns relative to sales can serve as a proxy for the importance of fashion.

Some remarkable changes in these historical patterns have occurred between 1965 and 1984. Markdowns relative to sales for the teens' and junior group have zoomed upward and this group now leads all other groups by a substantial margin. Because the popularity of styles change rapidly in the teen market, this increase in MPS is not at all surprising. While markdowns relative to sales for the women's fashion group are still greater than for the women's standard group, they are now on about par with the men's apparel group and the infant clothing group. The near parity of MPS for the women's fashion group with the infant clothing group is an unexpected finding since style changes would not be expected to be as frequent for infant clothing. This may simply reflect the increasing competition department stores face from off-price and discount stores retailing infant clothing.

The middle panel of Table 7 shows the percentage markons (markups) have also been increasing over this period. The teens' and junior group has had the

largest percentage point increase. This is confirming evidence that the role played by fashion has increased between 1965 and 1984 in the merchandising of teens' and junior clothing.

The lower panel also shows merchandise returns relative to sales has increased most for the teens' and junior group followed by large increases for the women's standard group and the men's apparel group. The larger increases in merchandise returns in these groups reflects the growing importance of fashion and styles in what had been relatively staid merchandise groups. The larger increases in merchandise returns in these groups suggests that fashion has permeated these groups as well.

One interpretation of these changes is that department and specialty stores are now selling merchandise where style and fashion are more important than they were twenty years ago. This implies that there is even greater price uncertainty today than earlier in determining which styles or colors will sell at initial prices. This greater price uncertainty is reflected in both higher markons and higher markdowns relative to sales.

To examine the effects of time, merchandise line and merchandise returns on MPS, a combined cross section and time series regression model was estimated. Dummy year and dummy merchandise class variables are included. The year effects are interacted with the merchandise class effects. Two regression equations include a variable for merchandise returns relative to sales and variables for the interaction of merchandise returns with year. In column 1 and 2 of Table 8 only women's fashion, women's standard, men's and teens' and junior apparel categories are included with the men's apparel group serving as the reference group. In columns 3 and 4 all apparel and non-apparel merchandise categories are included with the all non-apparel group serving as a reference group.

Table 7: Mean of Markdowns Relative to Sales, Markons and Returns Relative to Sales by Year and Merchandise Group[1]

Year	All Groups Combined	Women's Fashion Apparel & Accessories	Women's Standard Apparel	Men's Apparel & Accessories	Teens' & Junior Apparel	Infants' Apparel	All Other Depts.
			Markdowns Relative to Sales				
1965	7.0 (3.5) 123	10.2 (3.6) 29	4.5 (2.1) 12	6.6 (1.6) 10	10.8 (5.0) 7	7.0 (3.0) 11	5.6 2.1 54
1977	10.2 (5.1) 130	11.8 (6.0) 22	8.2 (4.1) 16	10.8 (4.0) 15	18.2 (2.4) 11	10.3 (4.5) 18	8.01 (3.7) 48
1984	16.8 (7.7) 120	19.8 (8.0) 23	13.8 (6.7) 9	19.3 (6.7) 15	27.0 (3.5) 8	18.4 (7.6) 16	13.0 6.1 49
			Markons (Percentage Markup)				
1965	39.6 (5.3) 123	42.2 (3.8) 29	40.7 (1.9) 12	40.6 (3.3) 10	39.2 (3.8) 7	38.8 (3.7) 11	38.0 (6.6) 54
1977	46.0 (5.8) 130	48.9 (2.8) 22	48.2 (1.8) 16	48.6 (2.1) 15	49.1 (1.4) 11	46.2 (4.4) 18	42.3 (7.4) 48
1984	48.0 (6.8) 121	51.9 (2.1) 23	51.6 (1.5) 9	50.6 (2.2) 15	52.1 (.4) 8	48.3 (4.2) 16	44.0 (8.6) 50
			Merchandise Returns Relative to Sales				
1965	7.3 (4.2) 123	9.0 (4.3) 29	6.1 (4.3) 12	5.7 (1.8) 10	7.8 (3.0) 7	5.8 (2.2) 11	7.2 (4.7) 54
1977	7.6 (3.6) 110	8.1 (3.9) 22	7.7 (3.0) 12	8.8 (2.0) 7	10.2 (2.0) 9	6.0 (2.0) 18	7.2 (4.3) 42
1984	9.7 (4.3) 88	10.7 (4.7) 20	9.8 (3.7) 7	9.2 (3.4) 11	13.3 (2.6) 5	8.0 (2.9) 13	9.5 (4.9) 32

[1]Number in brackets represents the standard deviation. Number below standard deviation is sample size.

If fashion has become more important over time, this can be reflected in two ways. The coefficients of the dummy year variables will increase over time. An alternative method for measuring the growing importance of fashion is to include the proxy variable, merchandise returns relative to sales. If the increase of merchandise returns over time reflects the growing importance of fashion merchandise, then MPS should be directly related to merchandise returns.

Regression results are presented in Table 8. The constant and the coefficients of the year variables in column 1 are positive and signifiant. MPS on men's apparel was about 6.6% in 1965, 12.6% in 1977 and 19.0% in 1984. MPS for women's fashion categories exceeded the MPS for men's apparel by about 3.5 percentage points in 1965 and was about on par with the MPS for women's fashion categories by 1984. The variable for merchandise returns is introduced in column 2. There are two changes worth noting. First, the year effects decrease and the effect of merchandise returns on MPS is both significant and grows over time. Hence, a one percentage point increase in merchandise returns relative to sales increases MPS by more in 1984 than in 1965.

The direct relation between MPS and merchandise returns relative to sales suggests that one reason for the growth of MPS is that fashion has become more important and merchandise returns have increased over time. Of course, the effect of a one point increase in merchandise returns on MPS is larger than this because the coefficient of merchandise returns variable increases over time.[7]

Very similar results are obtained when all apparel and non-apparel merchandise groups are included (columns 3 and 4). The MPS of the women's fashion group is higher than the MPS of the reference group but, unlike the other apparel groups, does not increase over time. For the other apparel groups, the coefficients are larger in 1984 than they were in 1965. This means

Table 8: Markdowns Relative to Sales, 1965, 1977 and 1984, Apparel Items Only and All Merchandise Groups

		Only Women's, Teens' & Men's Apparel Categories		All Apparel & Non-Apparel Merchandise Categories	
		(1)	(2)	(3)	(4)
1.	Constant	6.62 (4.0)	3.51 (2.7)	5.55 (8.8)	3.11 (3.8)
2.	Year, 1977	6.01 (2.4)	-.47 (.2)	1.95 (2.1)	.09 (.07)
3.	Year, 1984	12.41 (5.4)	2.40 (1.1)	7.32 (7.1)	2.46 (1.6)
4.	Women's Fashion	3.56 (1.9)	1.74 (1.3)	4.63 (4.3)	4.00 (4.2)
5.	Women's Fashion 1977	-4.35 (1.5)	-1.68 (.8)	-.29 (.2)	-.15 (.11)
6.	Women's Fashion 1984	-3.00 (1.1)	-3.35 (1.8)	2.08 (1.2)	1.73 (1.2)
7.	Men's			1.07 (.7)	1.57 (1.1)
8.	Men's 1977			4.06 (1.6)	2.60 (1.2)
9.	Men's 1984			5.09 (2.2)	4.78 (2.4)
10.	Women's Standard	-2.16 (1.0)	-2.40 (1.6)	-1.09 (.7)	-.74 (.6)
11.	Women's Standard 1977	-2.46 (.7)	-.99 (.4)	1.60 (.8)	.96 (.5)
12.	Women's Standard 1984	-.97 (.3)	-1.62 (.7)	4.12 (1.7)	3.48 (1.6)
13.	Teens'	4.18 (1.6)	3.03 (1.7)	5.25 (2.8)	5.04 (3.1)
14.	Teens' 1977	1.48 (.4)	1.13 (.5)	5.54 (2.2)	3.97 (1.8)

Table 8 (continued)

		Apparel Items (1)	Apparel Items (2)	All Merchandise Groups (3)	All Merchandise Groups (4)
15.	Teens' 1984	4.79 (1.3)	.12 (.5)	9.88 (2.9)	7.14 (2.8)
16.	Infants			1.40 (.9)	1.88 (1.4)
17.	Infants' 1977			1.41 (.7)	1.66 (.9)
18.	Infants' 1984			3.29 (1.5)	3.96 (2.1)
19.	Returns		.55 (4.4)		.34 (3.8)
20.	Returns 1977		.54 (2.7)		.25 (1.8)
21.	Returns 1984		.88 (4.7)		.43 (3.1)
	R^2 (adj)	.51	.78	.53	.64
	Standard Error of Regression	5.18	3.49	4.63	4.05
	N	151	151	321	321

that MPS has increased by more in each of these apparel groups than for the non-apparel groups. The growing importance of fashion seems to be concentrated in the apparel groups than in the non-apparel groups though a more detailed analysis might show the growing importance of fashion in the home furnishings and the linen groups. Columns 2 and 4 indicate the year intercept effects are not large. On the other hand, the effect of year on the coefficient of the merchandise return variable is large. The increase in the coefficient of the return variable over time is a sign that the growing importance of fashion is not completely reflected in the proxy variable, merchandise returns. For example, the effect on MPS of the increase in imports is not captured in these regressions owing to the lack of detailed import data by merchandise line.

VI. SUMMARY

Uncertainty about aggregate demand or the composition of demand can explain times series movements in dollar markdowns relative to dollar sales over the 1925-84 period. Changes in markdowns and markups during the first four decades of this period appeared to be due to the business cycle and war time controls. The large increases in markdowns relative to sales and the percentage markup on merchandise since the late sixties appears to be due to the increased uncertainty due to the growing importance of fashion.

Clearance sales occur because of the difficulty of predicting the demand for fashion and style. The recent increase in the role of fashion and style has increased the number of markdowns as well as the percentage markups. Though markdowns relative to sales have historically been larger for women's fashion merchandise than for women's undergarments or men's apparel, these patterns have changed since the mid-sixties. Markdowns relative to sales are highest for teens' and junior clothing and markdowns relative to sales on men's clothing now

approach those on women's fashion apparel. These changes suggest the role of fashion has been expanded in recent years to include other apparel groups besides women's fashion merchandise.

Clearance sales appear to be growing in relative importance over time. In 1965, clearance sales accounted for bout 39% of annual markdowns. By 1984, it appears that clearance markdowns may have accounted for as much as 58% of all dollar markdowns. It appears that markdowns due to other causes have declined in importance.

An unanswered question is why fashion has become more important over time. Though a rise in real per capita income could play a part, it cannot explain the abrupt growth in markdowns since 1970. Rather, the growing importance of fashion is likely to be a supply side phenomena. Recent technological changes in the production of fashion fabric has lowered the cost of producing short runs of fabric with different patterns, colors, etc. The deeper cause for the growing role of fashion lies in these technological changes.

FOOTNOTES

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1. The model can be expanded to allow for noise to make the inference problem more difficult.

2. Actually, P0/X1 and P1/X1 are determined and then P0/C and P1/C are derived by multiplying through by X1/C.

3. Advertising intensity, the ratio for advertising to sales, for apparel manufacturers declined less rapidly from 1960 to 1975 than advertising intensity for all manufacturers and since 1975 has increased more rapidly than advertising intensity for all manufacturing. From 1960 to 1983, advertising intensity for apparel manufacturers displayed a different pattern from that for all manufacturing.

4. Unfortunately, the Census definition of department stores includes discount houses. It is likely the decline in market share of the traditional department store has been larger.

5. The regression estimates in column 2 and 3 can be used to estimate how large markdowns as a percentage of sales would be if the sales forecasts had been accurate. Markdowns would still have averaged 5.9% (column 1) of sales during the 1925-55 period when managers make accurate forecasts of aggregate demand. These cycle adjusted markdowns are presumably due to forecast errors of the composition of demand, i.e., styles, fashions, patterns, etc., and to random promotional sales.

6. For 1977 and 1984, the data are reported by company size and with available data cannot be aggregated across all companies.

7. It is possible the higher merchandise returns reflect lower quality of merchandise and consequently higher markdowns. This is not a persuasive argument because the quality of imported clothing has increased over time and this should have caused a drop in merchandise return rates.

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