AGGREGATE INCOME

That what people buy of all goods or of any major good is significantly influenced by the amount of money they have to spend is an indubitable fact, evidence of which appears in all sorts of statistical data.

The powerful influence of income may be seen in the shoe buying of families having different incomes: the higher the family income, the more the money spent on shoes. The famous Consumer Purchases Study of 1935-1936 provided information, obtained during personal interviews, as to the items of clothing bought by about 150,000 individuals.[1] If we plot average family income by income class on one axis and shoe expenditure on the other, both on logarithmic scales, we find that a rise on the income scale of 1 per cent was, at the point of average income, associated with a rise of shoe expenditure of .75 per cent. We may call this the average interfamily income elasticity of shoe expenditure, though it is at best only a rough approximation of even the concept, let alone the true figure.[2] Further, it applies only to families having incomes in the lower and central ranges; for higher income families, elasticity seemed substantially less — nearer .50.

Though the question is not directly relevant to our problem, one is curious to know how interfamily income elasticity of shoe buying compares with that of other sorts of consumer goods. Table 1 answers the question in a rough and tentative fashion. The figures there given are derived in the same way and from the same source material — the 1935-1936 survey of income and expenditure — as the statistics for shoe expenditure. Because the table constitutes a digression, I present it without comment. There is much in it to ponder.

Income and Shoe Buying in Current Dollars

The influence of aggregate consumer income on shoe expenditure is visible also in monthly time series. In Chart 1 shoe sales and disposable consumer income are shown, and their movements may be compared from 1929 through 1941. We start in 1929 because it is only then that monthly income payments became available; we end in 1941 to avoid the disruptions of the war period.

The chart pictures, in the first place, a slight downward trend in shoe sales

[1] The study was a Work Projects Administration project conducted by the Bureau of Home Economics, Department of Agriculture, and the Bureau of Labor Statistics, Department of Labor, under the joint supervision of these agencies and the National Resources Committee. The data cited in the text are based on tables in National Resources Planning Board, *Family Expenditures in the United States — Statistical Tables and Appendixes*, 1935-36 (1941). Hereafter called *Family Expenditures in the United States.*

[2] Actually, many factors are correlated with family income — family size, wealth, living standards, and even recent direction of change in income; all these influences are inextricably amalgamated in the data. The figure of .75 per cent is thus not a pure interfamily *income* elasticity.

TABLE 1

INTERFAMILY INCOME ELASTICITY OF SELECTED CATEGORIES OF DISBURSEMENTS, 1935-1936[a]

(per cent)

DISBURSEMENTS		CLOTHING EXPENDITURES	
Major Subdivision	*Income Elasticity*	*Subdivision*	*Income Elasticity*
Saving	2.60[b]	Coats	1.28
Education	1.55	Dresses	1.23
Auto and expense	1.30	Underwear	1.04
Household operation	1.30	Suits and trousers	1.04
Recreation	1.27	Hats	1.00
Clothing	1.00	Shirts	.92
Furnishings and equipment	.97[b]	Hose	.82
Reading	.88	Footwear	.75
Personal care	.85		
Medical care	.85		
Housing	.78		
Tobacco	.70		
Food	.52		
Fuel and light	.48		

[a] Income elasticity is the percentage shift in expenditure associated with a 1 per cent shift in family income. The measures are based on Tables 1, 7, 9, 11, and 107 in National Resources Planning Board, *Family Expenditures in the United States* (1941). The elasticity coefficients are the slopes of straight lines fitted by inspection to the regression of family expenditure of specified sorts on family income, both plotted on a logarithmic scale.

[b] Elasticity seems characteristically to decrease as income shifts upward, so that the figure here given does not apply to most of the income range but only in the neighborhood of its center.

relative to income — the space between the two lines grows smaller as time proceeds — a fact to which we return later. In the second place, the major business cycle fluctuations (the drop after the peak in 1929, the rise from 1933 to 1937, the short but marked drop in the latter half of 1937 and beginning of 1938, and the rise thereafter) appear clearly in both consumer income and in the dollars spent on shoes. The peaks and troughs in these major cycles in both series are marked by crosses (x).[3]

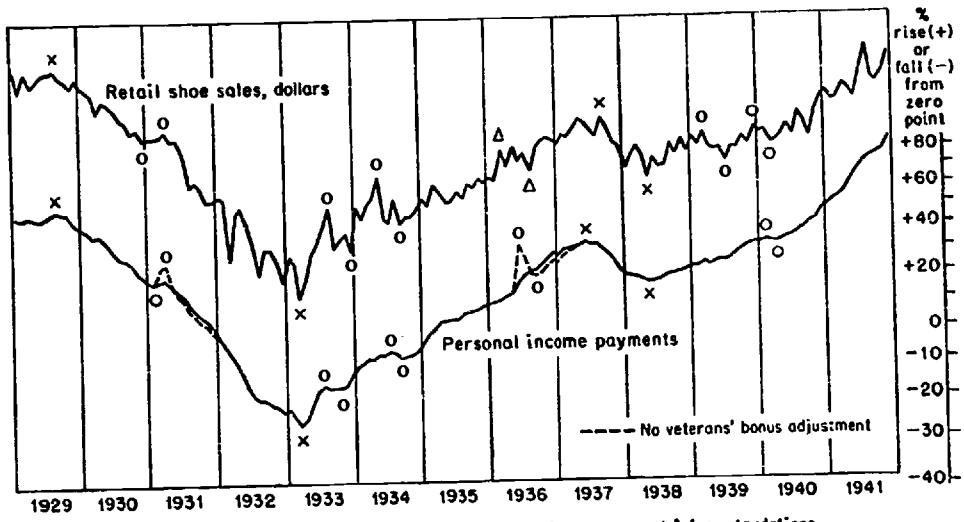
Finally, minor fluctuations are apparent in shoe buying; the peaks and troughs in these minor cycles are marked by zeros (o) or, when the movement consists of a level stretch in a slope, by triangles (△). I call the sequence of fluctuations, whether marked off by major *or* minor turns, "subcycles." The same shorter and often less strong movements that we mark as minor movements in shoe sales are typically found in a considerably emphasized form in most other sorts of data in the shoe, leather, hide industry, where they have an average duration for the industry as a whole of a bit under a year and a half.[4]

[3] For a description of how these specific cycles are selected, see Arthur F. Burns and Wesley C. Mitchell, *Measuring Business Cycles* (National Bureau of Economic Research, 1946), pp. 57-58.

[4] The criteria for the selection of these smaller movements parallel those employed for specific cycles (*ibid.*). But far shorter and slighter movements are recognized as subcycles than would be admitted as cycles; and retardations, as well as outright rises or falls, may be included, too. In general we mark any rise or fall of five months or longer in seasonally adjusted data that does not appear to result merely from a chance sequence of random fluctuations. The presence of

CHART 1

SHOE SALES AND CONSUMER INCOME, 1929-1941



Specific subcycle turns are marked by × for major turns, O for minor turns, and Δ for retardations.

They also seem to be present, the chart suggests, in aggregate income payments. If we include all the income from soldiers' bonus payments the moment when the bonds were redeemed (the dotted lines on the chart), consumer income shows small fluctuations at the same times as does shoe buying, with one exception – the recession in 1939, when income payments merely flatten. Further, shoe sales and income typically reach peaks and troughs at very nearly the same time, with no systematic bias. Seven of the thirteen matched turns occur in the same month. The average deviation from the mean of .4 months by which shoe sales on the average lead income payments is ± 1.0 months. During the 144 months from the beginning of 1929 to the end of 1940 there are only 22, or 15 per cent of the months, when shoe sales and income are not in matching specific subcycle phases, either because of difference in the month when peak and trough occurred or because, in the one case, of a missing phase in one of the series – income.[5] There appears to be no systematic difference in the timing of the two series.

The parallelism between shoe sales and personal income can be studied further in Chart 2, where monthly first differences in each are depicted,

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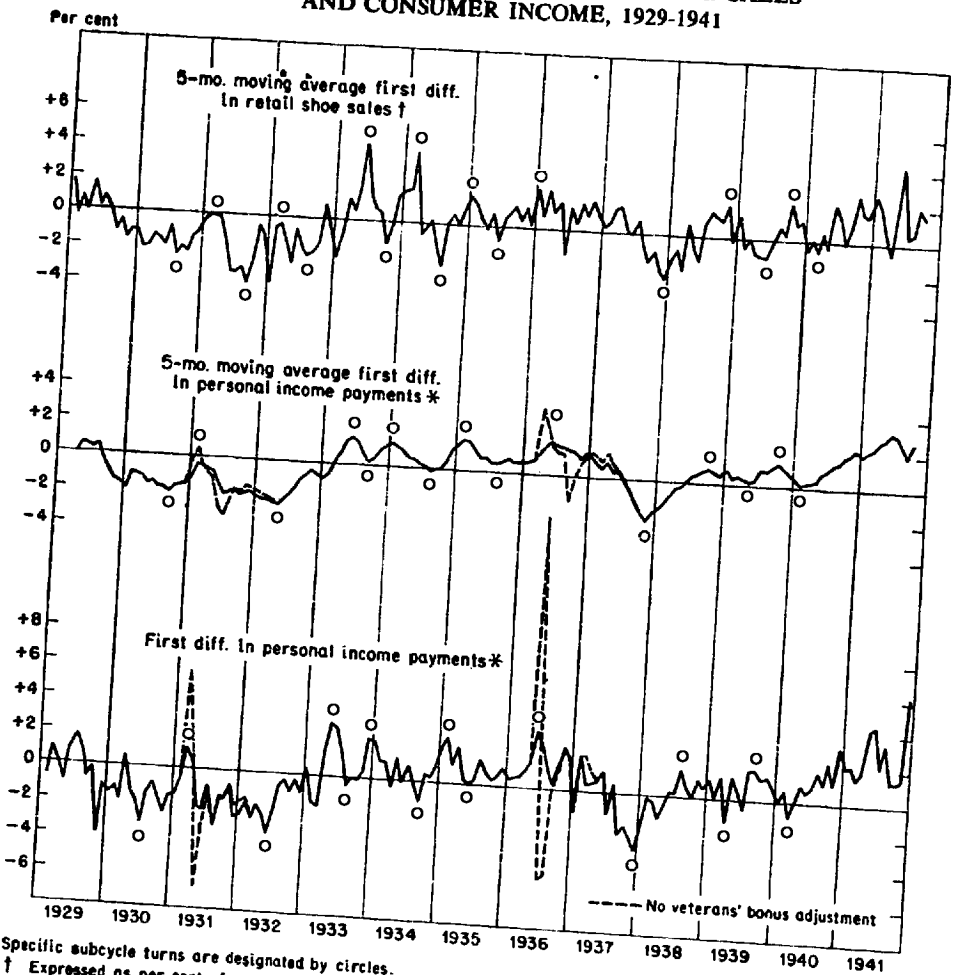
specific subcycles in other data in the shoe, leather, hide industry and the extent to which they tend roughly to synchronize is discussed in Chapter 4 of the forthcoming book, *Consumption and Business Cycles, a Case Study: The Shoe, Leather, Hide Industry.*

[5] Of the 144 months there were 26, or 18 per cent, when the subcycle phases for either shoe sales or income moved in the opposite direction from the major cycle phase. These episodes were short – 4 or 5 months. Though, as we noted, all but one of the six episodes were marked for income as well as shoe sales, they were typically shorter in the former series. The differences in timing of a few months on each of the six occasions – 13 months in all – constituted a large proportion – 50 per cent – of the months covered by them. However, in view of their brevity, it is more noteworthy, perhaps, that 13 of the total of 26 months were in similar phase for the two series.

smoothed by a centered five-month average. For income payments we have likewise drawn the unsmoothed monthly data which, because of the far broader base and the diversity of components for the income series, probably afford the more appropriate comparison for smoothed shoe sales. Except for some confusion in the neighborhood of the two bonus payments, rates of change in shoe buying seem to respond with considerable sensitivity to rates of change in consumer income.

CHART 2
MONTHLY FIRST DIFFERENCES IN SHOE SALES AND CONSUMER INCOME, 1929-1941



Specific subcycle turns are designated by circles.
† Expressed as per cent of average monthly shoe sales, 1929-41.
* Expressed as per cent of average monthly income payments, 1929-41.

Study of these charts raises a further question: Though shoe sales and income have, by and large, the same minor movements at roughly the same time, the minor movements of shoe sales seem to have a somewhat larger amplitude, relative to major swings, than do income payments. To study this matter, we compute first the specific cycle amplitude of all subcycles and, second, that of movements associated with the four major turns (plus the two incomplete

terminal expansion phases) that took place between 1929 and 1941.[6] We find that for shoe sales the minor movements contribute 21 per cent of the total fluctuation of major and minor ones in sequence. For income payments, with the soldiers' bonus of March 1931 and June 1936 distributed over the next nine months, the corresponding figure was 2 per cent. This means that in income payments the minor movements that interrupt the major swings were primarily flattened areas or slanted banks. This is, of course, what the chart suggests.

But the contrast between the two percentage figures, 21 and 2, certainly overstates the importance of minor movements in consumer buying of shoes as compared with those in income receipts. The difficulty rests in technical characteristics of the time series by which we represent the two aggregates. Virtually of necessity our shoe sales series has a large erratic component not possessed to anything like the same degree by a complex aggregate like income payments.[7] Our amplitude measures fasten on absolute highs and lows regardless of what caused them. Further, erratic components at peaks and troughs will influence the amplitude of subcycles more than that of major movements, if only because more of them are included. But insofar as the amplitude measures for shoe sales are influenced by technical factors not present in the income data — the whimsies of small samples, the difficulty of adjusting properly for very heavy seasonal patterns, the influence of weather and special promotions, to mention a few — it would be desirable to reduce the erratic component of shoe sales. To this end we smooth mechanically — a most inadequate expedient — by applying a five-month moving average, and calculate amplitude measures, using single peak and trough months in the five-month average for shoe sales and single peak and trough months for the monthly data on income payments. The minor movements are thus shown to constitute 13 per cent of total subcyclical amplitude in sales and 5 per cent in income payments.

This means that, even after attempting to make the erratic component of the two series more comparable, income payments seem to bear a different relation to major movements in shoe sales than to minor ones. The character of the difference can be stated as an average figure of a rough and approximate sort in which differences in timing are ignored. We obtain it by dividing our per month amplitude figures for shoe sales (already expressed as a percentage of the average standing of the series) by the similar figure for income payments.

[6] For description of how specific cycle amplitudes are computed, see Burns and Mitchell, *op. cit.*, pp. 131-132. Our procedure differed from the standard in that rises and falls were expressed as a percentage of the average value of the series as a whole, rather than for each specific cycle. Basically, the measures add rises from troughs to peaks to falls from peaks to troughs, where the standings at peaks and troughs are taken as a three-month average centered on the month of turn.

[7] Income payments is the sum of an enormous number of diverse series, which lose much of whatever erratic character they may have in the process of summation. Further, something in the order of 15 per cent of total income payments was, at least for the earlier years for which it was computed, obtained by arithmetic interpolation of annual data.

For all subcycles it is 1.19/1.23, or .97; for major cycles it is 1.05/1.17, or .90; whereas if we use the per month amplitude during only the four counter-cycle subcyclical phases (using the same periods for both shoe sales and income), the figure is .71/.38, or 1.87. In other words, on the basis of the figures, shoe sales vary a bit less than proportionately to income during major movements and almost twice as much as income during the minor movements that interrupt the major business swings. Differences of this order are likely to be meaningful. Furthermore, examination of our estimates of shoe sales reported in the Appendix indicates that there is no reason to believe that our series overplays the minor fluctuations in actual shoe sales relative to the major ones, except in the technical sense mentioned a moment ago. In general, then, this preliminary inspection suggests that fluctuations in aggregate shoe buying are not entirely explained by a uniform relation to changes in aggregate consumer income. This conclusion spurs the search for other factors that might explain the differences.

Income and Shoe Buying Adjusted for Price Change

Theoretically, consumer income in current dollars may be converted to "real" income by adjusting for the change in the quantity of consumer goods that the dollar can buy; similarly, shoe sales may be adjusted for the change in price of a group of identical shoes. Actually, there are all sorts of problems involved in both deflations, so that practice and theory may differ substantially. Nevertheless, the operations were performed, and the two series may be compared in the same fashion as has just been done for the data in current dollars.

In general, virtually everything that has been said about the cyclical and subcyclical parallelism between income and shoe buying applies to the "real" series also, and we shall not stop to repeat.

But shoe sales adjusted for change in price of an identical shoe (we call the series "Shoe Sales in Standardized Pairs") is not the same as shoe sales in actual pairs. For when income falls – and this was particularly marked during the severe depression of the early thirties – consumers tend to shift to cheaper grades of shoes. Conversely, when income rises, they tend to "trade up" – to buy better shoes. We see these phenomena in the relation between statistics on prices of a group of identical shoes, on the one hand, and statistics on the average price at which all shoes manufactured in a given year were sold. The same contrast appears in average prices at which all shoes were sold to consumers by two large shoe retailing organizations.[8]

When shoe sales are deflated by a price series that purports to show the average price paid by consumers for all shoes bought each month, we see the same major and minor movements that appear in the data in current dollars or

[8] One was a shoe chain that graciously gave us monthly statistics on dollar and pair sales. The other was a mail order house, and the statistics were compiled on the basis of the frequency with which shoes were advertised in each of several price bands.

in standardized pairs. However, the major downward swing in the early thirties and upward sweep thereafter is greatly muted.

The trading-up and trading-down phenomenon suggests that changing income affects not only the proportion of income that will be spent on shoes but what sorts of shoes will be bought. There is, in other words, a quantity-quality dimension of choice as well as an allocation-of-dollar-income dimension. This phenomenon can be seen in a very interesting way in family budget surveys.

From the 1935-1936 National Resources Committee survey we can obtain information about the number of pairs of shoes bought in a year and the average price paid per pair by husbands, wives, and the two together, in families classified by income level. The data appear in Chart 3. They were obtained by consolidating information published separately for twelve different areas.*

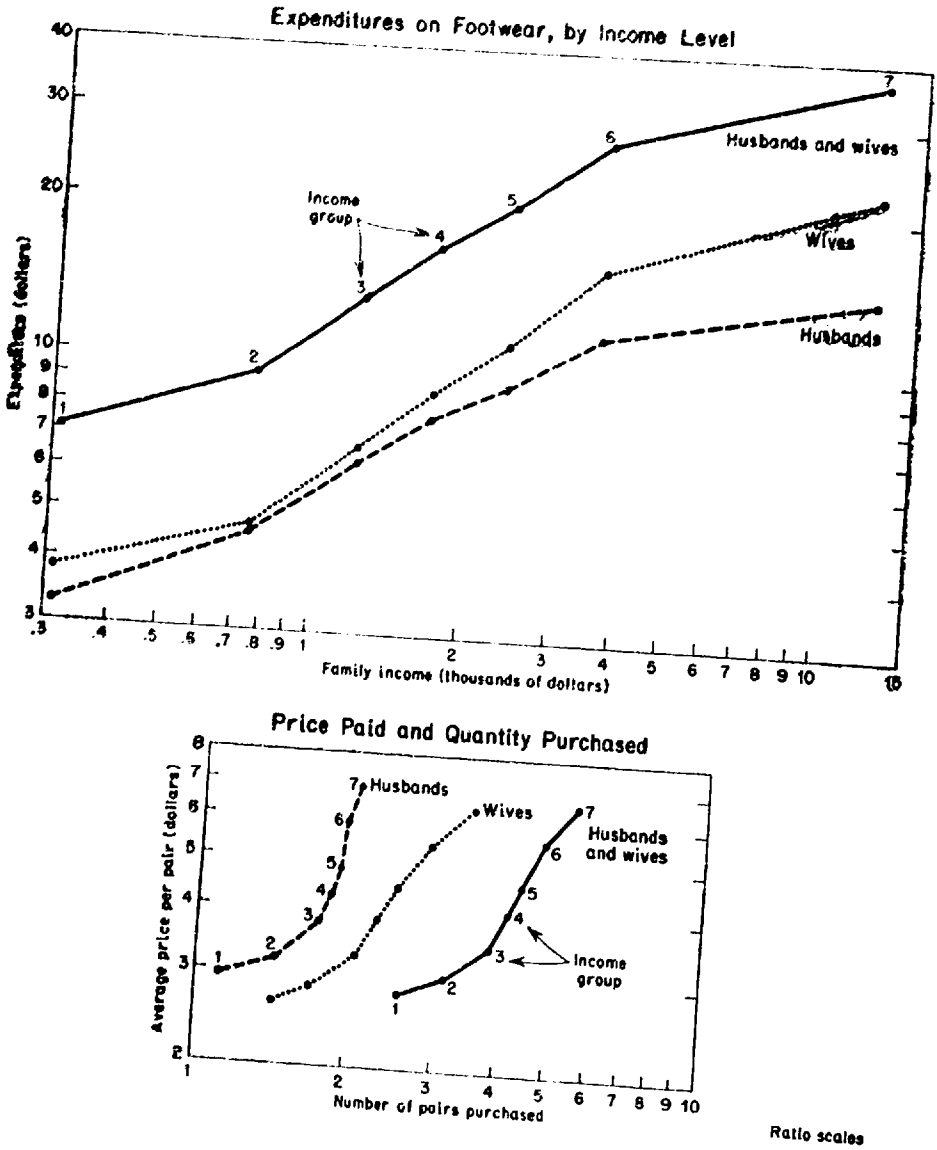
The upper half of the chart shows the total expenditure on shoes (vertical axis) by husbands, wives, and the two together by family income level (horizontal axis). It is drawn on double ratio paper. The numerals simply designate the successive income classes for which data are averaged. For example, class 2, having an average income (reading on the horizontal axis) of $758, includes families with incomes between $500 and $1,000; class 3, having an average income of $1,224, includes families with incomes between $1,000 and $1,500; and so on to the $5,000 and over group, number 7. The numerals are introduced in the top half of the chart simply to clarify the meaning of the lower half of the chart in which a less familiar type of graph is presented. There we see how both shifts in the price paid per shoe (vertical axis) and in the number of shoes bought (horizontal axis) contribute to the changes, income level by income level, in total shoe buying. Each observation that is plotted represents information for one of the seven income groups. As the line moves up and to the right, it indicates that a higher price per pair was paid and more pairs were bought as income shifted upward. Ignoring the two open-end income classes — 1 and 7 — the number of pairs bought by husband and wife together in 1935-1936 increased from three to just under five, and the average price paid from $3 to $5.50 as family income shifted from $500 to $5,000, although virtually all the price shift occurred after the $1,500 level.

Several differences between husbands' and wives' buying are brought out in the chart. These are interesting since they probably bear on the general question of the impact of style on spending decisions; also, the contrasts help to throw light on the trend influences that have been at work in the industry. In the upper half we find that wives' expenditures are both higher and have greater

* The figures are simple averages for eight urban and four rural nonfarm areas for which detailed information on clothing purchases was obtained in the 1935-1936 study. For the eight urban areas, data are in *Study of Consumer Purchases, Family Expenditures in Selected Cities, 1935-36*, Vol. III, *Clothing and Personal Care*, Bureau of Labor Statistics Bulletin No. 648 (1941), pp. 256 ff., Table 5. For the four rural nonfarm areas, data are in M. Y. Pennell *et al.*, *Consumer Purchases Study, Family Expenditures for Clothing, Five Regions*, Department of Agriculture Miscellaneous Publication No. 422 (1941), pp. 274 ff., Table 36.

CHART 3

EXPENDITURE ON FOOTWEAR, PRICE PAID, AND QUANTITY PURCHASED BY HUSBANDS AND WIVES AT SEVEN INCOME LEVELS, 1935-1936



interfamily income elasticity than that of husbands' (the line is steeper). In the lower half we see that the additional options afforded by higher incomes take the form for husbands above the $1,000 family income level (groups 3-7) primarily of buying higher priced shoes, whereas for women the drive to buy more pairs of shoes continues to persist along with the wish for better pairs. It is this desire to buy perhaps blue shoes, red shoes, and brown shoes, evening shoes, day shoes, and sport shoes that accounts for the higher absolute level and income sensitivity of wives' shoe buying (see the top half of the chart) and perhaps also for the lower average price paid by wives at each income level, which is apparent in the lower half of the chart.

These data suggest that were consumer income to be higher in one year than in the preceding year and were reactions to an *alteration* in income broadly to resemble quantity-price differences among families of different income levels in the same year, the average price that individuals would pay for shoes would be higher in the second year than in the first; this higher price would on the average be paid even had there been no change in the price of a shoe of identical quality and no change in tastes or industry offerings. Certainly it seems reasonable to suppose that quantity-quality shifts of this sort would accompany actual change in income, although one would expect that it might do so with a lag. Perhaps the first reaction to an increase in income would be to buy more pairs of the quality of shoe to which one was accustomed rather than to buy a "better" shoe, and actually retailers do report that trading up usually does not become at all common until after improvement in sales has been under way for some time.[10]

Whether the number of dollars spent on shoes or the number of standardized pairs that are purchased month by month is affected by this quantity-quality quirk in consumer choice, together with such measures as industry may take to facilitate it, we cannot say. I might add that quantity-quality choices have very interesting patterns and implications for other commodities, too.

[10] Conflicting with this reported differential reaction to change in income per se, which also seems reasonable on a priori grounds, is the suggestion in our time series for departments of department stores (see Appendix) that sales of men's shoes seem to have a higher cyclical and subcyclical variability than sales of women's shoes. Were such interfamily income elasticity of spending as is due to choices concerning quality less likely to be reproduced in time series than that due to choice involving quantity, one would expect the higher income elasticity of women's relative to men's shoe buying found in area surveys to be, if anything, emphasized in time series. Of course, all the observations for the shoe data are insecure, and about all that we can say at the moment is that the conflict underscores the need to be very cautious in transposing information based on area surveys to the context of change over time.

Eventually, however, it might be possible to learn enough about these shifts along the quality-quantity dimension to understand apparent conflicts of this sort. The same dimension of choice exists for many other commodities, though it creates far more interesting analytic problems in some than in others. For automobiles, for example, where the quality aspect involves purchases of second-hand cars, it has some especially provocative implications.