An Investigation into the Economic Role of Fashion

Word Count: 5583

0106737

Abstract

This paper develops signalling models by discussing the role of fashion as a signalling device. Its builds on present literature by using Engel Curves as a tool to critically analyse models of fashion demand and their underlying assumptions. The results indicate fashion is used as a signalling device and that the assumptions of the theoretical models are reasonable.

An Investigation into the Economic Role of Fashion

Contents

1. Introduction

‘nothing makes noble persons despise the guilded costume so much as to see it on the lowest man in the world’

The desire of consumers to be ‘in fashion’ and to achieve exclusivity by their mode of dress is a phenomena often observed in Western culture, yet economists have paid little attention to fashion, ‘*the subtlest and most volatile form of luxury*’.

Fashion is generally defined as the ‘opaque process that identifies certain designs, products or social behaviours as “in” for a limited period’[1]. The introduction of a ‘new’ fashion does not require any improvement in product quality; it is simply a change in the design of things for the means of decorative purposes. This is highlighted by the automobile industry, where manufacturers slavishly spend vast amounts on the yearly introduction of new body styles, yet these changes rarely include improved safety or performance features.

To remain ‘in fashion’ is often expensive and impractical, yet in the modern consumer goods market ‘very few indeed are exempt from the same relentless pressure for style change’[2]. Hence, I feel fashion has an important role in the modern society and its economy. Fashion behaviour raises many interesting economic questions. For example, when considering clothing, where the impact of fashion is perhaps the most visible, it is a puzzle as to why people are prepared to pay so much for a non-necessitous good; furthermore, why is it only certain members of society who are prepared to pay these high prices. And why, once an expensive item of clothing has

[1] Pesendorfer, *Design Innovation and Fashion Cycles*, AER
[2] Robinson, *The Economics of fashion demand*, QJE

been purchased, does the consumer spend more money on items that fit the same purpose?

Looking back in history, there used to exist sumptuary laws detailing who had the right (not monetary resources) to wear various garments. This further motivated my study of fashion; I would like to examine if this signalling effect still occurs today, and if so, by what process.

2. Economic theories

Signalling

A possible economic explanation of consumer behaviour linked to fashion is that fashionable items are purchased purely for their signalling qualities.

'Silver Signals' by J. Riley seems a particular important paper in the field of signalling models. Riley's paper is a collection of new economic insights that arose from theories of signalling and screening. It highlights a clear explanation of 'a wide range of economic phenomena', where previously there were only puzzles. However, it does not answer the puzzles raised by expenditure on fashion; hence, I feel I could add value to this paper by developing the theory to apply to fashion signals. For example, the paper discusses the problem of 'private information' and considers situations in which an informed agent must first 'signal' by taking a costly action, without observing the terms of trade under which he will be able to trade. This is applicable to fashion as only individuals themselves know there own quality, and hence have to take a 'costly action' to signal their quality.

Fashion as a signalling device

There are three papers that present similar views on the role of fashion as a signalling device. These were 'The Economics of Fashion Demand' (Robinson, D., QJE), 'Design Innovation and Fashion Cycles' (Pesendorfer, W., AER) and 'Toward an Economic Theory of Fashion' (Coelho & McClure, Economic Enquiry). All three papers discuss how fashion is used to seek and signal status, and the notion that a consumer purchases a fashion item for the purpose of signalling only. They also argue that the purpose of fashion is to facilitate differentiation of 'types' in social interaction. The theoretical models are powered by the idea that the value consumers attach to a fashion good depends on the stock held by other consumers.

Robinson's paper on the 'The Economics of Fashion Demand' is primarily theoretical, discussing the motivation behind fashionable behaviour and the reasons for non-necessitous expenditure occurring. The paper presents psychologists and sociologists views in an economic context, developing psychologists' view that the essential cause of fashion lies in 'competition of a social and sexual kind' (Fluget, 1950). The idea of 'sexual competition' is also accredited to causing fashion in Coelho and McClure's paper, and reinforces the viability of Pesendorfer's 'dating' model.

Robinson's theory is based on assuming two groups: a 'minority' group and a 'majority' group. The fashionable behaviour is then driven by the desire to create an effect relative to the performance of others. It is the aim of the majority to imitate the design choices of those it admires in terms of social status; the minority, who 'inhibit the highest levels of prestige', aim to preserve the distinctiveness of its design choices, given the efforts of the majority to void its distinctiveness.

The continuing non-necessitous expenditure on fashion garments is motivated by a pursuit of rarity; once a garment is deprived of its previous rarity, it will lose preference in the eyes of the fashion leaders (the 'minority'), and then in the regard of the multitude. Once a garment has lost favour the design becomes obsolete.

Myopic behaviour is a key assumption in Robinson's paper; it is assumed that individuals do not store previously fashionable garments, and hence do not take into account future uses of a design. Furthermore, a commodity that is the fashion of the moment reflects current expenditure and current social status (i.e. it cannot have been preserved from the previous time an item was in fashion); past expenditure can not be used to signal quality.

It is also assumed that there is organisation in society, and that fashion can spread vertically. This means that any given class will tend to adopt the fashions of not the highest distinguishable group, but those immediately above it.

Pesendorfer's 'Design Innovation and Fashion Cycles' develops a model of fashion cycles in which designs are used as a signalling device in a 'dating game'. Similar to Robinson's paper, Pesendorfer explains individual's expenditure on fashionable items by their desire to portray their superiority relative to others. There are two types of people; 'high' and 'low' quality who (if they) purchase a design, do so purely to signal their quality. Each consumer in the model wishes to 'date' another consumer. All consumers can observe which design an individual is using, and therefore designs can be used as a signalling device in the matching process. Both low and high types acquire a higher utility from being matched with a high type. Hence, both types would sooner date high quality types (but the loss from a high type meeting a low type is greater than that of a low type meeting a low type). The design is produced by a monopolist, who's only cost is the actual design of the product. The model predicts the adoption of a fashion imposes a negative externality on those who do not adopt the fashion.

The argument presented by Pesendorfer is similar to the basic idea put forward by Michael Spence (1973). Spence asked whether if in a competitive marketplace, sellers of above-average quality products could 'signal' this fact by taking costly action. On the other side of the market, he questioned if uninformed buyers could use the costly action as a way to 'screen' for quality. Similar to Spence's work, Pesendorfer's model is also driven by imperfect information; a consumer has to take a costly action to signal their quality as individuals do not know each other's characteristics.

Pesendorfer's model could be criticized as he assumes individuals care only about their current utility. Hence, Pesendorfer's model contains the assumption that individuals are myopic, as assumed in Robinson's paper. This would perhaps make a group of individuals who discount the future highly appropriate to my analysis.

Coelho and McClure's paper develops a model of fashion cycles powered by status seeking behaviour. They analyse the drive for status among humans as being fundamental to the existence of fashion goods. As in Pesendorfer's dating game, high status is desired as it signals that the 'individual is a relatively good mate for members of the opposite sex'. Similar to Robinson's theory, the value of the fashion good depends on the number of people who hold it; if others hold a large stock of the fashion good, its ability to provide distinction is reduced.

I found Coelho and McClure's discussion of the properties of a status signalling good particularly useful. For example, to be effective, the fashion good must be more costly to obtain for those who do no posses the status than for those who do. Also if fashionable clothing is to be an effective signal of status, it must change.

The work in the three prior discussed papers is related to other literature on consumer behaviour. For example, Leiberstein (1950) distinguishes between bandwagon and snob effect in analysis of static demand curves; Robinson and Pesendorfer's work displays both these effects.

Becker (1991) and Becker and Murphy (1993) derive bandwagon and snob effects by assuming consumers care about whom else consumes a particular good, a key assumption in the papers I have discussed. Bagwell and Bernheim (1993) have similar analysis, but assume consumers can signal with both quantity and the type of good they consume.

One main theoretical difficulty that is raised by the papers on fashion is the direct conflict of aims; the minority ('high quality' people) who wish to be distinctive are both flattered and repelled by majority ('low quality' people) imitation. And the majority has both empathy of seeking self-identification and antipathy in trying to nullify its distinctiveness.

A criticism of the literature in general is that economic and sociology viewpoints are opposite. For example, in 'Fashion and its Social Agendas: Class, Gender and Identity in Clothing', Diana Crane discusses how 'low quality' people are likely to spend a high proportion of income on fashion in order to improve social status. This is contradictory to economists, who suggest the 'high' quality people need to take a 'costly' action to signal their quality. However, none of the afore mentioned economic papers demonstrate whether the effect of imitating or being distinct is dominant. Hence, I feel I could add value to the papers by investigating if clothing and footwear budget share is higher for 'high' or 'low' quality people.

My main criticism of all the literature on fashion is that no empirical studies exist. I feel some foundation for estimation and analysis of the models is needed. For example, the models demonstrate that information asymmetry (i.e. an individual does not know the quality of another) provides a logically consistent explanation for an observed behaviour. However, no empirical evidence of this is presented. The assumptions of the models are also yet to be tested. For example, the work by Pesendorfer and Robinson assumes that individuals who use fashion as a signalling device are myopic. Hence, I feel I could add value by seeing if individuals who discount the future highly are more likely to exhibit the predicted behaviour.

To develop the existing work on fashion as a signalling device I am going to use cross-sectional analysis in order to support the role of fashion as a signal device. There are 3 main hypotheses I would like to investigate:

1. Fashion designs are used as a signalling device in a 'dating game'.

This hypothesis refers to Pesendorfer's paper. To test his theory, I will investigate whether single or divorced people spend proportionately more on fashion items than married or cohabiting people. If Pesendorfer's theory is true, we would expect expenditure on clothing and footwear by those who are 'dating' (e.g. those who are single or divorced) to be higher than that of those who are married or a cohabittee.

2. The purchase of fashion garments is to facilitate the differentiation of 'types' in social interaction

I would like to test this assumption and investigate whether 'high' or 'low' quality people have a higher percentage expenditure on fashion items. This should help to highlight whether Crane's view that fashion is used by lower classes to improve their social status is more accurate than Coelho & McClure's theory that fashion is used by upper classes to differentiate themselves from lower.

3. Fashion followers are myopic.

This is a key assumption in the literature on fashion a signalling device. If this assumption were not true, then I would call into question the viability of the models.

3.Data: FES

The data set used is the Family Expenditure Survey, 1994-1998. The FES provides a large sample of data, measuring a diverse range of variables. As the principal data source of household budget expenditure in the UK, I thought it highly suitable for my analysis.

The FES consists of a two-week diary that is completed by all members of the participant families, recording their spending habits over this period. It also measures various characteristics such as income, age and demographics.

The FES provides data at both the household and individual level. I have used data at the individual level as it contains personal expenditure. However, as it does not tell whom the items were purchased for; e.g. a married woman may have a high expenditure on clothing and footwear, but this could be explained by the expenditure being on children's clothes. This would make my analysis less accurate, as it is not measuring expenditure on clothing and footwear for personal consumption. Hence, I have only considered households without children in. This leaves us with 30,000 observations.

4. Variables affecting expenditure clothing and footwear budget share

The independent variables were chosen in the light of a review of theoretical literature, and with the aim to allow the testing of the theories. Hence, I have identified the factors below as the key determinants of demand for clothing.

Dependent variable: Clothing and footwear budget share.

When examining the hypothesis discussed in section 2, I will focus on expenditure on clothing and footwear, as the impact of fashion is most obvious when considering personal adornment[3]. By considering budget share (that is, clothing and footwear as a percentage of total expenditure) I can compare the relative importance of clothing and footwear to individuals with varying expenditures.

Age

Given Pesendorfer's model of a dating game, age is likely to have an impact on clothing and footwear budget share, as dating behaviour is likely to vary according to age.

Marital status

If fashion is used to signal your type to a potential partner, we would expect marital

[3] Robinson, D., *The Economics of Fashion Demand*

status to have on effect on clothing and budget share, with those who are single or divorced or separated having a higher budget share.

Employment status

Occupational class could be interpreted as an indicator of wealth and social status. I will use 'professionals/managers' as a proxy for 'high quality people' as they are likely to have a greater wealth and be middle-upper class. 'Non-skilled manual labourers' are an ideal proxy for 'low quality people', as they can be used to represent the working classes.

Smokers

Smoking can be used as a proxy to an individuals discount rate. Those who smoke are likely to have a high future discount rate, as they care about their utility now rather than in the future. Hence, including a dummy variable for smokers can be used to test the assumption of individuals who follow fashion being myopic.

Aspiration

Those who purchase fashion items often aspire to be like those who are 'superior' to them. This is especially true of the 'low quality' people discussed in both economic and sociological literature, who imitate fashions in order to improve their perceived social class.

5. Data analysis

Expenditure data was estimated from reported amounts, and hence may only provide an indication of trends and basis of comparison between demographic groups.

The average expenditure of clothing and footwear as a percentage of total expenditure generally decreases with age and varies according to occupational class and marital status. The average expenditure on clothing and footwear is higher for females than males in all categories. In this section, I will further analyse the variables marital status, socio-economic background and tobacco expenditure to give an indication to the viability of the hypotheses discussed in section 2.

HYPOTHESIS 1: Fashion designs are used as a signalling device in a 'dating game'.

Looking firstly at patterns of expenditure on clothing and footwear in relation to marital status, we observe that single people have the highest clothing and footwear budget share; both single males and single females spend 2% more on clothing and footwear than married men and married women[4]. This is consistent with the conclusions of Pesendorfer's dating game. However, cohabitees have the highest proportion of expenditure on clothing and footwear for females, which does not seem to be consistent with Pesendorfer's dating model. However, this could be explained by commitment issues; perhaps those who are not married may still be seeking a long-term partner, and hence still feel the need to signal their 'quality'. For males, those who are single have the highest budget share. It is interesting to note that the budget share for separated females is less than that for married females, where as budget share for separated males is higher than that for married men. This could be explained by males re-entering the dating game quicker than females, or it could be that married females purchase clothes for their husband, pushing up their average expenditure.

[4] See Appendix 1, Table 1.

When considering budget share in relation to age, by splitting the data into several age groups, we see that it is highest for those in the age group 16-20 (14.8%)[5] and decreases steadily as age increases, to 5.9% for those age 70 plus. Average budget share for those who are of 'prime dating age' (i.e. those who are 16-30) is substantially higher than all other age groups.

Figure 1: Expenditure on clothing according to marital status (no children)

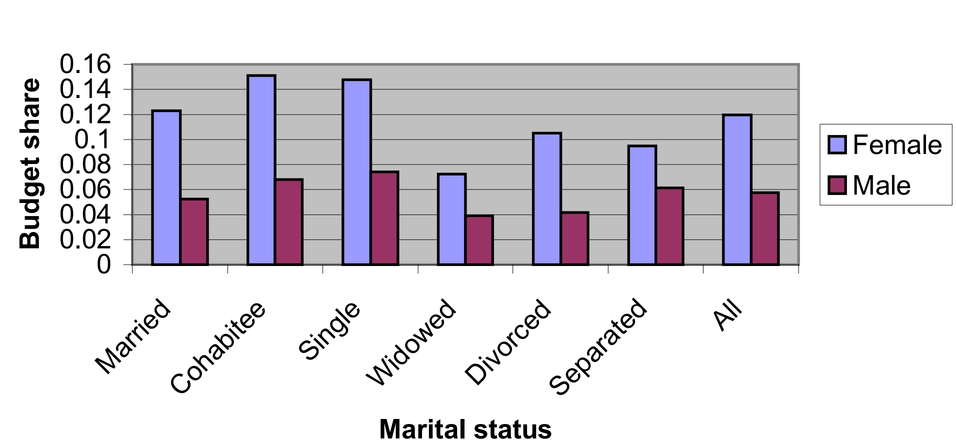
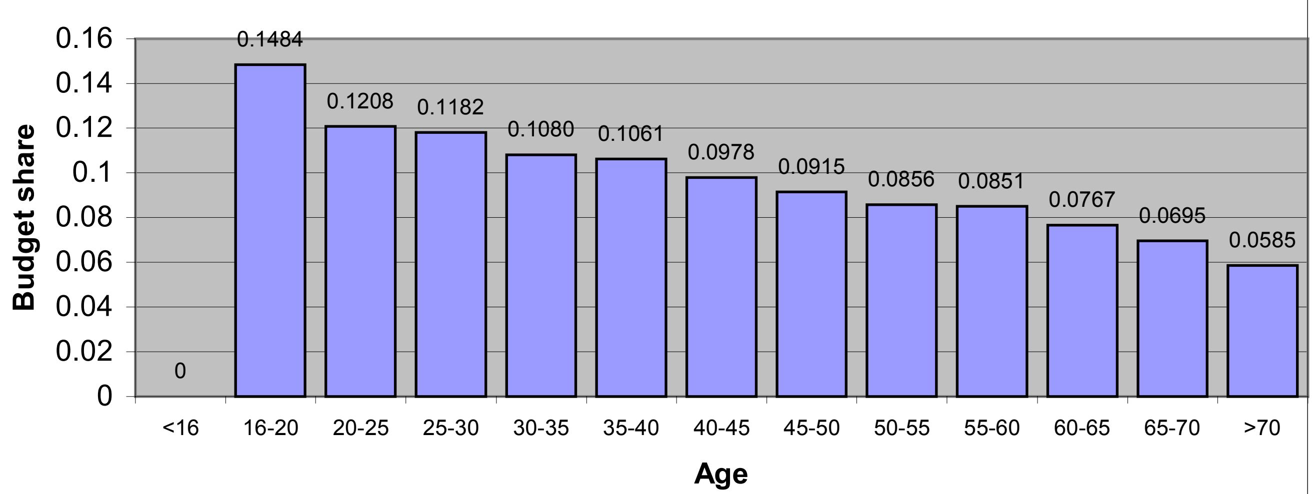


Figure 2: Clothing and footwear expenditure for various age groups



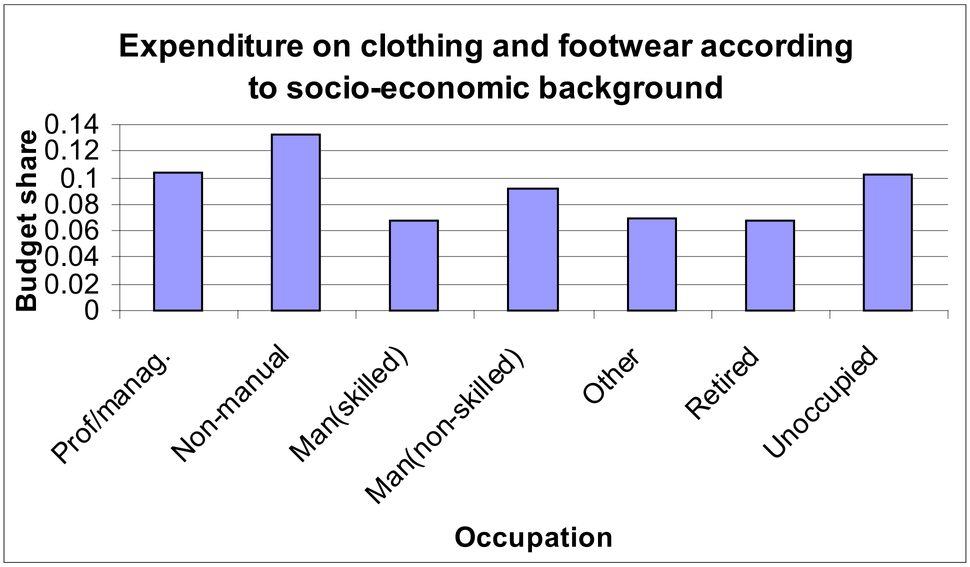
[5] See Appendix 1, Table 2

HYPOTHESIS 2: The purchase of fashion is to facilitate differentiation of 'types' in social interaction

As previously discussed, Crane argues fashion is used by lower classes to improve their social status, where as Coelho & McClure (Economist's) argue fashion is used by upper classes to differentiate themselves from lower. By looking at the effect of socio-economic background on clothing and footwear budget share, we can gain an indication as to which is more accurate. Taking those who are 'unoccupied' or non-skilled manual labourers as a proxy for 'low quality' people, and 'professionals/managers' as a proxy for 'high quality people', we observe budget share is approximately equal for both groups. This could be explained by the theoretical difficulty of a direct conflict of aims; the minority ('high quality') who wish to be distinctive are both flattered and repelled by majority ('low quality') imitation. And the majority wishes to both seek self-identification and also nullify its distinctiveness, by imitating the minority. Hence, both 'high' and 'low' quality people have reason to increase their budget share, and this could explain why it is equal for both groups.

However, if we compare expenditure for those who have manual jobs compared to those who have non-manual jobs (arguably high quality people) budget share is higher for high quality people.

Figure 3[6]:

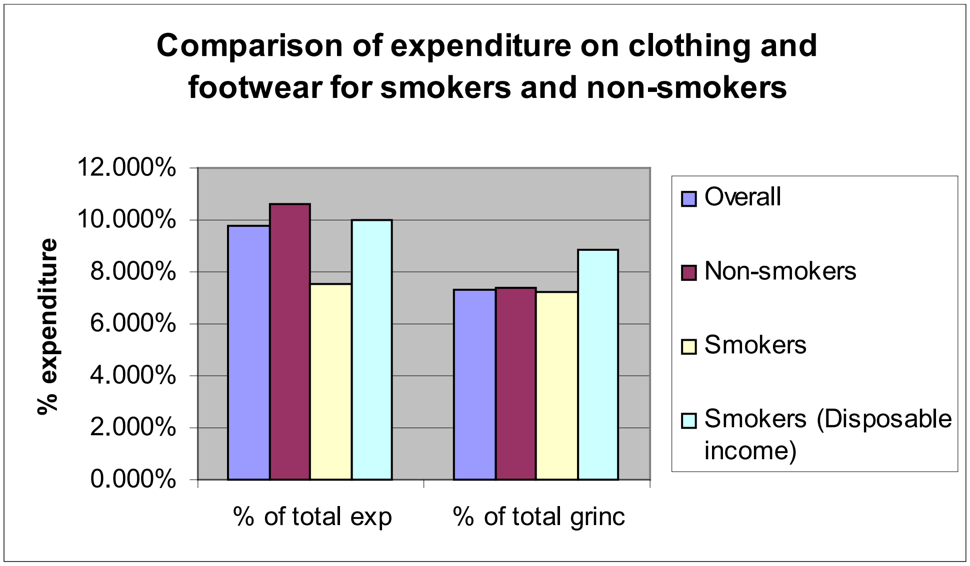


HYPOTHESIS 3: Fashion followers are myopic

If this assumption is true, than those who have a higher future discount rate will be more likely to be prone to following fashions. Figure four[7] takes individuals whose tobacco expenditure is greater than zero as a proxy for individuals who discount the future. At first glance, it would seem that those who do not smoke (i.e. have a lower discount rate) have a higher clothing and footwear budget share than those who smoke. However, if we adjust figures for smokers to only account for their disposable income/ expenditure (i.e. subtract cigarette expenditure from total expenditure and total gross income), we observe that expenditure on clothing and footwear as a percentage of gross income is higher than for non-smokers.

[6] See Appendix 1, Table 3 for data.
[7] See Appendix 1, Table 4 for data.

Figure 4:



6. Estimating Engel Curves

Differences in behaviour can be modelled by making demand depend not only on prices and total expenditure but also on some list of household characteristics. To do this I am going to use Engel curves. A wide selection of functional forms for Engel curves has been explored in the literature. Deaton and Muellbauer[8] recommend the Working-Leser specification in which budget share are linear in the log of total expenditure.

$$w_i = \alpha_k + \beta_{ik} \log x + \varepsilon_{ik}$$

$$w_i = \frac{p_i q_i}{x} = \text{budget share for good } i$$

$$x = \sum p_k q_k = \text{total expenditure}$$

[8] *Economics and Consumer Behaviour,* Cambridge University Press

Blundell, Duncan and Pendakur (1998) compare semiparametric methods for the analysis of cross-section behaviour of consumers with the Working-Leser and quadratic logarithmic parameter specification. Semiparametric models are valuable as they allow for more variety or curvature than is permitted by Working-Leser. However, when using the specification test developed by Aït-Sahalia, Bickel and Stocker (1994) Blundell *et al* found both the Working-Leser and quadratic logarithmic to provide an ‘acceptable parametric specification’ for clothing budget share. As they found no evidence of non-linearity in the clothing Engel curve, they suggest that the Working-Leser specification is a reasonable approximation for clothing and footwear budget share curves.

However, there is growing evidence from a series of empirical studies that suggest quadratic logarithmic terms are in fact required for certain budget share equations. Banks, Blundell and Lewbell (1997) find evidence of distinct non-linear behaviour and found quadratic terms to be significant when analysing clothing budget share. The sample for the regressions of Banks *et al* was restricted to a group of childless couples, where as Blundell *et al* used a sample containing couples with one or two children[9]. My data sample contains only households with no children; hence, as the demographic composition of my sample is similar to that of Banks *et al,* I feel that the QUAIDS specification Banks *et al* employed to be more appropriate than the Working-Leser specification. Furthermore, the linear model is a subset of the quadratic specification; if the coefficient on the quadratic term is zero, than I can revert to the Working-Leser model.

[9] The importance of demographic composition on the Engel curve shape is highlighted Blundell, Duncan and Pendakur, *Semiparametric Estimation and Consumer Demand*, JAE, 1998

Banks *et al* found the QUAID system to be accurate and found no additional semiparametric terms were required when estimating budget share equations for clothing and footwear. Hence, I will use the following equation below in my analysis.

$$w_i = \alpha_k + \beta_{ik} \log x + \delta(\log x)^2 \varepsilon_{ik}$$

7. Zero expenditures

The FES can give a misleading indicator of a household's underlying consumption pattern. In particular, since most commodities are purchased infrequently, individuals may be observed to spend nothing on a commodity they nevertheless consume. These zero expenditures can cause problems when estimating demand systems, and hence the treatment of zero expenditures if fundamental to my analysis. There are three main explanations for the existence of zero expenditure. The first is that of infrequent purchase. Secondly, expenditure may be misreported. The third explanation is variation in preference across the sample: individuals may simply not consume some commodities.

Given the nature of clothing and footwear, it is unlikely that individuals 'choose' not to consume this commodity! Hence, the Heckman 2-step or Tobit model, sometimes employed to manage consumption preferences, are not suitable for my analysis. Misreporting is a serious concern for only relatively few commodities, and it then raises many issues other than the possibility of feigned zeroes. Hence, I feel infrequent purchasing is likely to be the cause of the zero observations in my data; approximately 16% of the sample households did not purchase any clothing or footwear during the interview period, which seems to indicate more than differing preferences.

8. Method of analysis

In this section I will look to find the components of budget share using regression techniques.

Initially an OLS regression was performed, using the QUAIDS specification (as discussed in section 6). However, ignoring the censoring process discussed above can lead to very different results when using ordinary least squares. Engel curves have traditionally been estimated by applying OLS, with little attention to the source of disturbance ε.

Keen (1986) recommends deriving a constant estimator for Engel curves to deal with the complications that arise due to the censoring process generating zero expenditures. He suggests that the Engel curve parameters can be estimated consistently by using an instrumental variable. Infrequency of purchase is a problem whereby if people only purchase an item, say, once a month and you observe the data in a fortnight, then you will miss about half the data. Hence, we have a measurement error problem, as the observed data measures true spending with error. Using instrumental variables is one way to manage this problem. With relation to the FES, Keen recommends income as the ‘only obvious candidate instrument’.

9. Results[10]

[10] For full results, see Appendices 3-8

Both OLS and instrumental variables regressions were carried out. Separate regressions were carried out for males and females. The null hypothesis that these equations are identical was strongly rejected (see Appendix 2). Hence my analysis concentrates on the separate regressions for males and females.

Contrasting the regressions using OLS or instrument variables, it can be seen that there is little difference between the values generated.

Looking at the coefficient of log total expenditure presents an interesting difference between male and female budget share. The coefficient is negative (and significant) for females and the coefficient on (log total expenditure)^2 is positive (and significant). This tells us that as expenditure increases for females, the budget share decreases at an increasing rate. In terms of fashion signalling theories, this seems to suggest that those with a small total expenditure (and indirectly those who are 'low quality') place a greater emphasis on clothing and footwear budget share than those who have a high total expenditure. This suggests that the lower class females spend a higher proportion on clothing and footwear than the upper classes. Further evidence of this can be seen by looking at the dummy variables for socio-economic class; non-manual, skilled manual, retired and other workers all have a lower clothing budget share in comparison to non-skilled manual workers (taken as a proxy for 'low quality people). The positive coefficient on professionals/managers however, does not fit this pattern. However, this could reflect the desire of the 'high quality people' to distinguish themselves from all other types.

In comparison, the coefficient on log expenditure for males is positive but very small, but insignificant. The coefficient on (log total expenditure)^2 is also positive, but again very small. At the 5% level we fail to reject the null hypothesis of insignificance of these variables. This suggests that clothing budget share is similar for all males, and does not vary as total expenditure increases.

Expenditure elasticities were derived by differentiating the budget share equation with respect to expenditure.[11]

Table 5: Expenditure elasticity

	Elasticity
Male	1.05
Female	0.04

If we compare the elasticities of expenditure, for males the elasticity is 1.05, and for females, the elasticity is 0.04. This implies that for males, clothing and footwear are luxury goods, meaning that clothing takes up a larger share of the budget for better off households. This would suggest that economist's viewpoint that 'high quality people' spend proportionately more on clothing and footwear in order to differentiate themselves holds true. For females however, the elasticity (as it is less than one) implies clothing is a necessity, and hence will take up a larger share of the budget for less well off households. This is consistent with the view of sociologists (e.g. Crane), who argue that low quality people have a proportionately higher expenditure on clothing in order to improve their social class.

Looking at marital status, for both males and females the coefficient on the dummy variable 'single' is positive and significant. This implies that clothing budget share is 6% higher for single females and 4% higher for single males than those who are married (see Table 6, below). This would seem to support Pesendorfer's dating game as those who are likely to participate in the dating game spend proportionately more

[11] See Appendix 10 for calculations.

on clothing. For males, the coefficient for those who are divorced or separated is also positive and significant, further supporting the model. If we consider the effect of age on clothing budget share, we see that the coefficient is negative and significant. This tells us that as age increases, clothing and footwear expenditure decreases as a proportion of total expenditure. This is true for all of the marital statuses.

Table 6: Coefficients on marital status variables (using instrumental variable results)

	Male (IV)*	Female (IV)*
Single	0.036399 (3.35)**	0.056715 (-5.82)**
Divorced/separated	0.059483 (2.74)**	-0.014304 (-2.8)**
Age	-0.000477 (-2.81)**	-0.001194 (-5.82)**
Age*single	-0.000654 (-2.81)**	-0.001189 (-4.41)**

*Figures in parentheses are t-values
**Reject null hypothesis of insignificance at the 1%level.

Using the relationship between married/not-married to test Pesendorfer's dating game is not entirely ideal, as even when controlling for income and occupation, marriage could be picking up other differences apart from the desire to trap a mate. However, this is partly controlled for by only considering households without children (as previously discussed) and by interacting age with marital status (allowing the slope coefficient to vary according to marital status). Controlling for age squared may also have helped, but this variable was found to be extremely small and highly insignificant.

Using a dummy variable for those who smoke as an approximation for those who discount the future highly, the results again vary for males and females (see Table 7, below). For males the coefficient on the smoking dummy variable is negative, suggesting that smokers (i.e. those who are myopic) have a lower proportionate expenditure on clothing that those who do not have as high a discount rate. This contradicts a key assumption of the models discussed in section 2. The interactive variable with log total expenditure is small and insignificant, suggesting that for males whether or not you smoke does not have an affect on the slope.

A different picture is presented when looking at the results for females. In this case, the coefficient on the dummy variable T1 is positive and significant at the 10% level. This implies that those who have a high discount rate are more likely to follow the predicted behaviour of fashion as a signalling device.

Table 7: Coefficients on smoking dummy variables

	Male (IV)*	Female (IV)*
T1	-0.152702 (-1.08)	0.235803 (1.29)**
T1lnexp	-0.00021 (-0.06)	-0.005983 (-1.04)

Figures in parentheses are t-values
*Refers to results given by instrumental variable regression
**Reject null hypothesis of insignificance at 10% level

One idea behind the signalling model is that people aspire to be like others. The variable ‘lnaspage’ captures the idea that people aspire to be like those younger than themselves, and ‘lnaspinc’ allows for those to increase their mean budget share if those who are wealthier than themselves do. The coefficients on these variables are negative, which would suggest individuals do not aspire to be like others. However, when the aspiration variable for income was interacted with the smoking dummy variable, for males the coefficient is positive and significant. This shows that those who smoke (i.e. are myopic) exhibit the predicted behaviour (i.e. aspire to be like those wealthier than themselves) more than those who do not smoke. For females, the same coefficient was negative. However, when the age aspiration variable for females was interacted with the smoking dummy variable, the coefficient was positive. This implies that females aspire to be like those who are younger (n.b. the variable was constructed in such a way that those younger than 20 aspired to be like those older than themselves). This seems consistent with observed behaviour in society, and again suggests the validity of the assumption that those who use fashion as a signalling device are myopic.

Table 8: Coefficients on aspiration variables

	Male (OLS)*	Female (OLS)*
Lnaspage	-0.029294 (-3.89)**	-0.020066 (-2.22)**
Lnaspinc	-0.011593 (-1.57)***	-03.002137 (-.21)**
T1lnaspage	-0.005051 (-0.5)	0.010984 (2)**
T1lnaspinc	0.02034 (1.58)***	-0.002069 (-0.11)

Uses results from OLS regression
* Figures in parentheses are t-values
** Reject null hypothesis of insignificance at 5% level
*** Reject null hypothesis of insignificance at 10% level

10. Critique

By analysing the components of clothing and footwear budget share with the use of instrumental variables, we loose precision as total expenditure is replaced with an estimation for total expenditure. It is also important to remember that the cause of zeroes may not be infrequent purchasing. For example, discrepancies between OLS and instrumental variable methods of estimation may reflect factors apart from measurement errors, such as misspecification of the functional form.

Another problem with the analysis is that although the data at the individual level is used for the estimation of clothing and footwear expenditure, we do not know if the items purchased are for personal consumption rather than the consumption of another individual in the household. This could cause inaccuracies in the data; expenditure by married woman may be high but this could relate to clothes they purchase for their husband. However, the coefficient of single still positive and significant; this point is important as clothing expenditure by a single person is likely to be for themselves, yet this expenditure is higher than a married woman who may be purchasing items for herself and her husband. Further improvements to my analysis could be made by considering expenditure on items for personal consumption. However, this data is not available from the family expenditure survey at the individual level.

The quality of the underlying data affects the accuracy of my results. For example, it is widely known that the FES under records expenditure levels on certain items, such as alcohol and tobacco. Furthermore, the FES does not sample some demographic groups for which consumption of particular goods may be high, such as the student population living in student accommodation. However, I only control for whether an individual smokes or does not smoke; hence, the level of expenditure is not important.

Tanner[12] analysed the reliability of the expenditure data by examining how well estimates of aggregate spending made using FES data compare with aggregate spending totals in National Accounts. When looking at clothing, she found the FES predicts a relatively high proportion of total spending in the national accounts. Hence, the quality of the FES data I have used does not seem to raise any major problems.

By controlling for income and age, I have used social occupational class to pick up an aspirational signalling story between the different classes. However, clothing budget share for different social classes may vary due to other explanations. For example, professionals ('high quality' people) may have a larger budget share as they need to

[12] 'How much do consumers spend? Comparing the FES and National Accounts', IFS

purchase suits, whilst manual workers ('low quality' people) may have a lower expenditure as they get overalls provided by the firm.

There are also criticisms of the theoretical models to be made. For example, in Pesendorfer's dating game, it assumes that everyone's perception of a 'high quality' person is the same; in reality what is found attractive by one individual by not be attractive to another. The inclusion of variables that allow for psychological characteristics, such as past experiences, tastes or self-esteem, would improve the accuracy of my model. However, these factors are difficult to measure.

The study could be extended by considering a time-series analysis. For example, due to imperfect information, there may be a lag between an increase in expenditure by the 'high quality people' and the imitation of this by the 'low quality people'. It could also be extended to approximate the welfare costs of fashion and the costs of imperfect information about an individuals type.

11. Conclusion

In this paper I have developed models of fashion as a signalling device by using empirical evidence to question the models. I have addressed three main issues; that of fashion being used as a signalling device in a 'dating game'; the purchase of fashion being to facilitate differentiation of 'types' in social interaction; and those who use fashion as a signalling device being myopic.

There was contrasting evidence of people who use fashion as a signalling device being myopic: I found no evidence of myopia in those who use fashion as a signal for males; females who had a high discount rate did have a higher clothing budget share. Those who smoked were more likely to aspire to those with a higher income or preferred age to themselves, supporting the assumption of myopic behaviour in the models. There was evidence that those who are single, divorced or separated have proportionately higher clothing and footwear budget share than those who are married, which supports Pesendorfer's dating game for both males and females. Female budget share seemed to support the argument that low quality people have a high budget share in order to improve their social class, where as the male budget share supported the view that high quality people have a higher proportionate expenditure in order to differentiate themselves.

Guided by the theoretical papers, with my results suggesting the models are applicable to observed behaviours, I would suggest that we spend more on fashion garments then we really want to as we are conscious of the differences between types of people. Hence, imperfect information regarding an individual's characteristics, and the desire to signal a superior status relative to others leads to a welfare loss. Consequently, my work has policy implications. For example, it suggests that school uniforms have a positive impact on welfare as it prevents individuals from taking a costly action to signal their quality.

Although there are problems with the data used such as infrequency of purchase, I feel my analysis adds value to existing work as no empirical evidence is presented in the papers. This means it is difficult to judge the accuracy of my results. Hence, there is a need for further estimation and analysis to provide a comparison to my findings.

Bibliography

Banks, J., Blundell, R. and Lewbel, A., *Quadratic Engel Curves and Consumer Demand,* Review of Economics and Statistics

Blow, L., Leicester, A., Oldfield, Z. *Consumption Trends in the UK, 1975-99,* The Institute For Fiscal Studies

Bikhchandani, S., Hirshleifer, D., Welch, I., *A Theory of Fads, Fashion, Custom and Cultural Change as Informational Cascades',* Journal of Political Economy

Blundell, R., Duncan, A., Pendakur, K., *Semiparametric Estimation and Consumer Demand*, Journal of Applied Econometrics, 1998

Blundell, R. and Duncan, A., *Kernal Regression in Empirical Microeconomics,* The Journal of Human Resources

Coelho, P. and McClure, J. *Toward* an *Economic Theory of Fashion,* Economic Enquiry

Cowan, Cowan and Swann, *Waves in Consumption with Interdependent Consumers,* Canadian Journal of Economics, 2004

Crane, D. *'Fashion and its Social Agendas: Class, Gender and Identity in Clothing',* University of Chicago Press

Deaton, A. and Muellbauer, *Economics and Consumer Behaviour,* Cambridge University Press

Gregory, P., *Fashion and Monopolistic Competition,* Journal of Political Economy

Keen, M., *Zero Expenditures and The Estimation of Engel Curves,* Journal of Applied Econometrics

Lancaster, K., *A New Approach to Consumer Theory,* Journal of Political Economy

Leiberstein, H., *Bandwagon, Snob, and Veblen Effects in the Theory of Consumer Demand,* Quarterly Journal of Economics, 1950

Pashigian, P., *Demand Uncertainty and Sales: A Study of Fashion and Markdown Pricing,* The American Economic Review

Pesendorfer, W. *Design Innovation and Fashion Cycles,* The American Economic review, September 1995

Riley, J., *Silver Signals: Twenty-Five Years of Screening and Signalling,* Journal of Economic Literature, 2001

Robinson, D., *The Economics of Fashion Demand,* Quarterly Journal of Economics

Tanner, S., *How Much Do Consumers Spend? Comparing the FES and National Accounts,* Institute for Fiscal Studies

Getting Started with Stata for Windows

Family Expenditure Survey 1998-99: Section 3, The Derived Data Base

Appendix 1

Table 1: Budget share according to marital status

	Female	Male
Married	0.122976	0.052251
Cohabitee	0.151218	0.068208
Single	0.147503	0.073866
Widowed	0.072204	0.038949
Divorced	0.105259	0.041903
Separated	0.094846	0.061363
All	0.119551	0.05737

Table 2: Budget share according to age

Age group	Mean budget share
<16	0
16-20	0.1484
20-25	0.1208
25-30	0.1182
30-35	0.1080
35-40	0.1061
40-45	0.0978
45-50	0.0915
50-55	0.0856
55-60	0.0851
60-65	0.0767
65-70	0.0695
>70	0.0585

Table 3: Budget share according to socio-economic background

Occupation	Mean budget share	Std. Dev.
Professional/manager	0.103406	0.190529
Non-manual	0.132536	0.190147
Man(skilled)	0.06707	0.143112
Man(non-skilled)	0.092569	0.165872
Other	0.069198	0.157313
Retired	0.067798	0.145075
Unoccupied	0.102194	0.175784

Table 4: Comparison of percentage expenditure on clothing and footwear for smokers vs non-smokers

	Clothing and footwear exp. as a % of total expenditure	Clothing and footwear exp. as a % of total gross income
Overall	9.738%	7.330%
Non-smokers	10.577%	7.373%
Smokers	7.566%	7.206%
Smokers (Disposable income)	10.027%	8.860%

Appendix 2

$$H_0 : \alpha_i^m = \alpha_i^f$$

$$H_1 : any\ \alpha_i^m \neq \alpha_i^f$$

$$F = \frac{(RSS_R - RSS_U)/m}{RSS_U/(N-K)}$$

Degrees of freedom (unres.) = 26 + 26 = 52

Degrees of freedom (res.) = 27

$m = 52 - 27$

$N = 12753 + 12551 = 25304$

$K = 52$

$N - K = 25252$

$RSS_R = 1311.112$

$RSS_U = 380.5446 + 261.4023 = 641.9469$

$$F = \frac{669.1651 / 25}{0.02542163}$$

$F = 21052..90668$

$\therefore$ reject null hypothesis

Appendix 3: OLS Regression

Source	SS	df	MS
Model	148.0244	27	5.482385
Residual	1311.112	48541	0.02701
Total	1459.137	48568	0.030043

Number of obs	=	48569
F(27, 48541)	=	202.97
Prob > F	=	0
R-squared	=	0.1014
Adj R-squared	=	0.1009
Root MSE	=	0.16435

cfper	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
lnexp	-0.075818	0.010698	-7.09	0	-0.096787	-0.054849
lnexpsq	0.005266	0.000496	10.62	0	0.004294	0.006237
T1	-0.167568	0.081948	-2.04	0.041	-0.328187	-0.006949
T1lnexp	-0.005632	0.002207	-2.55	0.011	-0.009958	-0.001306
T1lnaspage	-0.010314	0.006678	-1.54	0.122	-0.023402	0.002774
T1lnaspinc	0.031046	0.007273	4.27	0	0.016791	0.045301
D1	-0.059377	0.001794	-33.1	0	-0.062894	-0.055861
S1	0.003993	0.003382	1.18	0.238	-0.002636	0.010621
S2	0.005551	0.002942	1.89	0.059	-0.000216	0.011318
S3	-0.004062	0.003614	-1.12	0.261	-0.011145	0.003022
S4	-0.005595	0.004177	-1.34	0.18	-0.013782	0.002592
S5	-0.001072	0.003008	-0.36	0.722	-0.006967	0.004823
single	0.054201	0.005613	9.66	0	0.0432	0.065201
divsep	0.00557	0.010721	0.52	0.603	-0.015444	0.026583
cohab	0.008205	0.009736	0.84	0.399	-0.010877	0.027288
widow	-0.005784	0.01834	-0.32	0.752	-0.041729	0.030162
Age	-0.000931	8.71E-05	-10.69	0	-0.001101	-0.00076
agesingle	-0.001231	0.000135	-9.12	0	-0.001496	-0.000967
agecohab	-0.000286	0.000266	-1.08	0.282	-0.000808	0.000236
agedivsep	0.000273	0.000219	1.25	0.212	-0.000702	0.000156
AgeM5	-0.000166	0.000255	-0.65	0.515	-0.000666	0.000334
y94	-0.010001	0.028029	-0.36	0.721	-0.064938	0.044937
y95	-0.010095	0.028026	-0.36	0.719	-0.065026	0.044835
y96	-0.012201	0.028021	-0.44	0.663	-0.067122	0.04272
y97	-0.010637	0.028013	-0.38	0.704	-0.065542	0.044268
lnaspinc	-0.017918	0.004259	-4.21	0	-0.026266	-0.00957
lnaspage	-0.17621	0.004945	-3.2	0.002	-0.029462	-0.00687
_cons	0.647924	0.102187	6.34	0	0.447632	0.848216

Appendix 4: OLS regression (Female)

Source	SS	df	MS
Model	41.9227	26	1.612411
Residual	380.5446	12524	0.030385
Total	422.4673	12550	0.033663

Number of obs	=	12551
F(26, 12524)	=	53.07
Prob > F	=	0
R-squared	=	0.0992
Adj R-squared	=	0.0974
Root MSE	=	0.17431

cfper	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
lnexp	0.171877	0.026416	6.51	0	-0.223657	-0.120097
lnexpsq	0.250382	0.001215	8.54	0	0.008	0.012763
T1	0.190225	0.191267	0.99	0.32	-0.184687	0.565137
T1lnexp	-0.01002	0.005531	-1.81	0.07	-0.020862	0.000823
T1lnaspage	0.010984	0.013709	2	0.423	-0.037854	0.015888
T1lnaspinc	-0.002069	0.018795	-0.11	0.912	-0.038911	0.034773
S1	0.013207	0.008362	1.58	0.114	-0.003184	0.029597
S2	-0.003608	0.006493	-0.56	0.578	-0.016334	0.009119
S3	-0.02035	0.012473	-1.63	0.103	-0.0448	0.0041
S4	-0.034858	0.013115	-2.66	0.008	-0.060566	-0.009151
S5	-0.00151	0.006704	-0.23	0.822	-0.01465	0.011631
single	0.057611	0.012487	4.61	0	0.033135	0.082086
divsep	-0.013929	0.024742	-0.56	0.573	-0.062428	0.03457
cohab	0.008704	0.020256	0.43	0.667	-0.031001	0.048409
M5	-0.020808	0.030735	-0.68	0.498	-0.081053	0.039437
Age	-0.001204	0.000201	-5.99	0	-0.001598	-0.00081
agesingle	-0.001226	0.000266	-4.61	0	-0.001748	-0.000705
agecohab	-1.52E-05	0.000535	-0.03	0.977	-0.001064	0.001034
agedivsep	0.000182	0.000462	0.39	0.694	-0.000723	0.001087
AgeM5	0.000205	0.00043	0.48	0.633	-0.000637	0.001047
y94	0.078647	0.063793	1.23	0.218	-0.046398	0.203692
y95	0.075701	0.063823	1.19	0.236	-0.049402	0.200805
y96	0.070977	0.063783	1.11	0.266	-0.054047	0.196001
y97	0.078858	0.063727	1.24	0.216	-0.046056	0.203771
lnaspinc	-0.002137	0.009952	-0.21	0.83	-0.021646	0.017371
lnaspage	-0.020066	0.009045	-2.22	0.027	-0.037796	-0.002337
_cons	0.936418	0.168572	5.56	0	0.605992	1.266845

Appendix 5: OLS regression (Male)

Source	SS	df	MS			
				Number of obs	=	12753
				F(26, 12726)	=	18.19
Model	9.716271	26	0.373703	Prob > F	=	0
Residual	261.4023	12726	0.020541	R-squared	=	0.0358
				Adj R-squared	=	0.0339
Total	271.1185	12752	0.021261	Root MSE	=	0.14332

cfper	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
lnexp	0.005195	0.01632	0.32	0.75	-0.026794	0.037184
lnexpsq	0.000821	0.000761	1.08	0.28	-0.000669	0.002312
T1	-0.161453	0.134073	-1.2	0.229	-0.424256	0.101349
T1lnexp	-0.000806	0.003557	-0.23	0.821	-0.007779	0.006167
T1lnaspage	-0.005051	0.010201	-0.5	0.62	-0.025047	0.014945
T1lnaspinc	0.02034	0.012848	1.58	0.113	-0.004845	0.045525
S1	0.004729	0.005471	0.86	0.387	-0.005995	0.015453
S2	0.001054	0.005507	0.19	0.848	-0.009741	0.011849
S3	-0.003638	0.005464	-0.67	0.506	-0.014349	0.007072
S4	-0.00505	0.006304	-0.8	0.423	-0.017407	0.007307
S5	0.001319	0.0053	0.25	0.804	-0.00907	0.011707
single	0.036017	0.010754	3.35	0.001	0.014938	0.057096
divsep	0.058772	0.021617	2.72	0.007	0.016399	0.101146
cohab	0.026631	0.016356	1.63	0.103	-0.005428	0.05869
M5	-0.055224	0.044285	-1.25	0.212	-0.142028	0.03158
Age	-0.000511	0.000168	-3.04	0.002	-0.000841	-0.000182
agesingle	-0.000658	0.000231	-2.85	0.004	-0.00111	-0.000205
agecohab	-0.000573	0.00041	-1.4	0.162	-0.001378	0.000231
agedivsep	-0.001225	0.000414	-2.96	0.003	-0.002036	-0.000413
AgeM5	0.000575	0.000599	0.96	0.337	-0.0006	0.001749
y94	-0.095801	0.043557	-2.2	0.028	-0.18118	-0.010423
y95	-0.087946	0.043535	-2.02	0.043	-0.173282	-0.00261
y96	-0.091341	0.043523	-2.1	0.036	-0.176652	-0.00603
y97	-0.087253	0.043543	-2	0.045	-0.172604	-0.001902
lnaspinc	-0.011593	0.007364	-1.57	0.115	-0.026027	0.002841
lnaspage	-0.029294	0.00754	-3.89	0	-0.044074	-0.014514
_cons	0.403931	0.118659	3.4	0.001	0.171341	0.63652

Appendix 6: Instrumental variables regression

Source	SS	df	MS			
				Number of obs	=	24787
				F(27, 24759)	=	95.91
Model	66.53142	27	2.464127	Prob > F	=	0
Residual	636.1342	24759	0.025693	R-squared	=	0.0947
				Adj R-squared	=	0.0937
Total	702.6657	24786	0.028349	Root MSE	=	0.16029

cfper	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
lnexpsq	0.00539	0.000689	7.82	0	0.004039	0.006741
T1lnexp	-0.007014	0.003127	-2.24	0.025	-0.013143	-0.000885
lnexp	-0.081151	0.014912	-5.44	0	-0.110379	-0.051923
T1	-0.030058	0.114179	-0.26	0.792	-0.253855	0.193739
T1lnaspage	-0.012913	0.008503	-1.52	0.129	-0.02958	0.003753
T1lnaspinc	0.020773	0.011234	1.85	0.064	-0.001248	0.042793
D1	-0.057224	0.002417	-23.68	0	-0.061961	-0.052487
S1	0.005066	0.00478	1.06	0.289	-0.004303	0.014435
S2	0.003018	0.004235	0.71	0.476	-0.005283	0.011319
S3	-0.009156	0.005101	-1.79	0.073	-0.019155	0.000843
S4	-0.011583	0.005949	-1.95	0.052	-0.023243	7.66E-05
S5	0.000434	0.004319	0.1	0.92	-0.00803	0.008899
single	0.047536	0.008381	5.67	0	0.031108	0.063964
divsep	0.025444	0.016557	1.54	0.124	-0.007009	0.057897
cohab	0.02153	0.01319	1.63	0.103	-0.004323	0.047383
M5	-0.010979	0.024255	-0.45	0.651	-0.058519	0.036562
Age	-0.000735	0.000133	-5.53	0	-0.000996	-0.000475
agesingle	-0.00102	0.000178	-5.73	0	-0.001369	-0.000671
agecohab	-0.000401	0.000339	-1.18	0.237	-0.001065	0.000263
agedivsep	0.000641	0.000312	2.05	0.04	-0.001253	-2.89E-05
AgeM5	-0.00013	0.000333	-0.39	0.696	-0.000783	0.000523
y94	0.015923	0.03759	0.42	0.672	-0.057755	0.0896
y95	0.018827	0.03759	0.5	0.616	-0.054853	0.092506
y96	0.014552	0.037576	0.39	0.699	-0.059099	0.088202
y97	0.020319	0.037568	0.54	0.589	-0.053316	0.093954
lnaspinc	-0.010154	0.006289	-1.61	0.106	-0.022481	0.002173
dumlnincas	(dropped)					
lnaspage	-0.018811	0.005944	-3.16	0.002	-0.030462	-0.00716
_cons	0.647924	0.102187	6.34	0	0.447632	0.848216

Appendix 7: Instrumental variables regression (Female)

Source	SS	df	MS			
				Number of obs	=	12205
				F(26, 12178)	=	51.58
Model	40.78885	26	1.568802	Prob > F	=	0
Residual	370.3575	12178	0.030412	R-squared	=	0.0992
				Adj R-squared	=	0.0973
Total	411.1463	12204	0.033689	Root MSE	=	0.17439

cfper	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
lnexpsq	0.247811	0.001283	8.43	0	0.008297	0.013326
T1lnexp	-0.005983	0.005736	-1.04	0.297	-0.017226	0.00526
lnexp	0.182047	0.027984	6.51	0	-0.2369	-0.127194
T1	0.235803	0.197566	1.29	0.233	-0.151457	0.623063
T1lnaspage	0.011639	0.013922	0.84	0.403	-0.038928	0.01565
T1lnaspinc	-0.011097	0.020167	-0.55	0.582	-0.050628	0.028434
S1	0.015334	0.008434	1.82	0.069	-0.001198	0.031865
S2	-0.003122	0.006537	-0.48	0.633	-0.015936	0.009692
S3	-0.018656	0.012597	-1.48	0.139	-0.043349	0.006036
S4	-0.034099	0.013262	-2.57	0.01	-0.060095	-0.008103
S5	-0.001287	0.006815	-0.19	0.85	-0.014645	0.012072
single	0.056715	0.012715	4.46	0	0.031792	0.081638
divsep	-0.014304	0.024834	-2.8	0.565	-0.062982	0.034374
cohab	0.012467	0.020666	0.6	0.546	-0.028042	0.052976
M5	-0.021127	0.030815	-0.69	0.493	-0.08153	0.039275
Age	-0.001194	0.000205	-5.82	0	-0.001597	-0.000792
agesingle	-0.001189	0.00027	-4.41	0	-0.001717	-0.00066
agecohab	-5.27E-05	0.000546	-0.1	0.923	-0.001123	0.001018
agedivsep	0.000197	0.000463	0.43	0.671	-0.000711	0.001105
AgeM5	0.000223	0.000431	0.52	0.605	-0.000622	0.001068
y94	0.119804	0.06661	1.8	0.072	-0.010762	0.250369
y95	0.117391	0.06665	1.76	0.078	-0.013255	0.248036
y96	0.111187	0.066598	1.67	0.095	-0.019355	0.241729
y97	0.118575	0.066541	1.78	0.075	-0.011856	0.249006
lnaspinc	-0.009419	0.010526	-0.89	0.371	-0.030051	0.011214
dumlnincase	(dropped)					
lnaspage	-0.017138	0.009226	-1.86	0.063	-0.035222	0.000946
_cons	0.995871	0.176405	5.65	0	0.650089	1.341652

Appendix 8: Instrumental variable regression (Male)

Source	SS	df	MS
Model	9.349956	26	0.359614
Residual	257.4998	12555	0.02051
Total	266.8498	12581	0.021211

Number of obs	=	12582
F(26, 12555)	=	17.53
Prob > F	=	0
R-squared	=	0.035
Adj R-squared	=	0.033
Root MSE	=	0.14321

cfper	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
lnexp	0.003217	0.016538	0.19	0.846	-0.0292	0.035634
lnexpsq	0.000895	0.00077	1.16	0.245	-0.000615	0.002405
T1lnexp	-0.00021	0.003691	-0.06	0.955	-0.007445	0.007024
T1	-0.152702	0.140875	-1.08	0.278	-0.428838	0.123434
T1lnaspage	-0.004661	0.010301	-0.45	0.651	-0.024853	0.015532
T1lnaspinc	0.018355	0.014301	1.28	0.199	-0.009676	0.046387
S1	0.005379	0.005512	0.98	0.329	-0.005424	0.016183
S2	0.001674	0.005525	0.3	0.762	-0.009156	0.012505
S3	-0.003037	0.005478	-0.55	0.579	-0.013776	0.007701
S4	-0.004727	0.00636	-0.74	0.457	-0.017194	0.00774
S5	0.001209	0.005371	0.23	0.822	-0.009319	0.011736
single	0.036399	0.010854	3.35	0.001	0.015125	0.057674
divsep	0.059483	0.021681	2.74	0.006	0.016986	0.101981
cohab	0.027812	0.016462	1.69	0.091	-0.004455	0.06008
M5	-0.053399	0.044275	-1.21	0.228	-0.140184	0.033387
Age	-0.000477	0.00017	-2.81	0.005	-0.000809	-0.000145
agesingle	-0.000654	0.000233	-2.81	0.005	-0.00111	-0.000199
agecohab	-0.000588	0.000413	-1.42	0.155	-0.001398	0.000222
agedivsep	0.001235	0.000415	2.98	0.003	-0.002048	-0.000423
AgeM5	0.000552	0.000599	0.92	0.357	-0.000622	0.001726
y94	-0.091834	0.044056	-2.08	0.037	-0.178191	-0.005477
y95	-0.08404	0.044042	-1.91	0.056	-0.170369	0.002289
y96	-0.087224	0.044034	-1.98	0.048	-0.173538	-0.000911
y97	-0.083141	0.044058	-1.89	0.059	-0.169501	0.003219
lnaspinc	-0.01071	0.008186	-1.31	0.191	-0.026757	0.005336
dumlnincasp	(dropped)					
lnaspage	-0.028822	0.007594	-3.8	0	-0.043708	-0.013936
_cons	0.397536	0.123124	3.23	0.001	0.156193	0.638878

Appendix 9: Key for variables

lnexp = natural log of expenditure

lnexpsq = natural log of expenditure squared

Smoking dummy variable:
T1= 1 if smoker
0 otherwise

Sex dummy variable
D1= 1 if male
0 otherwise

Occupation dummy variable
S1 = 1 if professional/manager
0 otherwise
S2 = 1 if non-manual
0 otherwise
S3 = 1 if manual (skilled)
0 otherwise
S4 = 1 if other
0 otherwise
S5 = 1 if retired/unoccupied
0 otherwise
All compared to manual (non-skilled)

Marital status dummy variable
single = 1 if single
0 otherwise
divsep = 1 if divorced or seperated
0 otherwise
cohab = 1 if cohabitee
0 otherwise
M5 = 1 if widowed
0 otherwise
All compared to married

Age = age of individual

Agesingle, agecohab, agedivsep, ageM5 – Age interacted with respective marital status dummy variable

Dummy variables for year data obtained from
y94 = 1 if year is 1994
0 otherwise
y95 = 1 if year is 1995
0 otherwise

y96= 1 if year is 1996
0 otherwise
y97 = 1 if year is 1997
0 otherwise
All compared to 1998

lnaspinc = natural log of mean expenditure on clothing and footwear for those in the income group above you

lnaspage = natural log of mean expenditure on clothing and footwear for those in the age group above you (if your age is less than 20)
OR natural log of mean expenditure on clothing and footwear for those in the age group below you (if your age is more than 20)

Appendix 10: Calculation for expenditure elasticity

$w_i = \alpha + \beta \log x + \gamma (\log x)^2$

$w_i = \frac{p_i q_i}{x}$ (= clothing and footwear budget share)

p = price ; q = quantity;

$x = \sum_k p_k q_k$ = total expenditure

$\Rightarrow \frac{pq}{x} = \alpha + \beta \log x + \gamma (\log x)^2$

$$\frac{pq\left(\frac{\partial q}{\partial x}\frac{x}{q}\right) - pq}{y^2} = \beta\left(\frac{1}{x}\right) + 2\gamma\left(\frac{\log x}{x}\right)$$

$$\left(\frac{\partial q}{\partial x}\frac{x}{q}\right) - 1 = x\frac{\beta}{pq} + x\frac{2\gamma}{pq}(\log x)$$

but $\eta = \left(\frac{\partial q}{\partial x}\frac{x}{q}\right)$ and $x/_{pq} = 1/_w$

$\Rightarrow \eta = 1 + \frac{\beta}{w} + \frac{2\gamma}{w} x \log x$

where η = expenditure elasticity

x and logx is calculated seperately for males and females, using the average total expenditure for each sex respectively.

	Average log*x*	Average *w*	β	Γ	Elasticity
Male	11.08	0.06	0.0032	0.000895	1.05
Female	11.2	0.13	-.017	0.25	0.04