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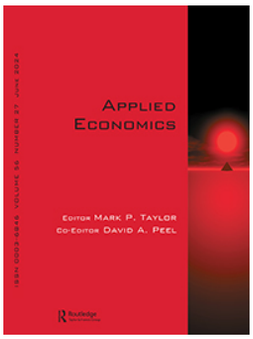
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Discretionary household consumption expenditure in the UK: measurement and evaluation

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ABSTRACT

The current cost-of-living crisis which is afflicting several countries has hastened the need to be able to distinguish between essential and inessential items of spending. Hence, the principal purpose of this paper is to develop a series on UK discretionary household consumption expenditure through making maximum use of publicly available data that are provided by the Office for National Statistics. The Family Spending workbooks offer information on the weekly consumption patterns of the ten income deciles, while the publication, Consumer Trends, contains quarterly time-series data on the expenditure by the entire household sector on different goods and services. From an analysis of both types of data, we identify 28 three-digit COICOP categories of consumption as being discretionary, constituting, on average, approximately 20% of total domestic household expenditure over the interval, 1985Q1 – 2019Q4. Our approach towards constructing a series on discretionary consumption receives vindication from subsequent empirical results, which show that this variable enjoys a more significant and stable relationship with a reputable measure of consumer confidence than each of the traditional aggregates to be found within Consumer Trends, i.e. spending on durable goods, semi-durable goods, non-durable goods, and services.

KEYWORDS

Consumer confidence; discretionary spending; equal forecast accuracy; expenditure shares; income elasticity

JEL CLASSIFICATION

E21; E27

I. Introduction

The UK economy is currently experiencing levels of price inflation that have not been witnessed for four decades. More specifically, in the twelve months to October 2022, the Consumer Price Index rose by 11.1%, a rate which was last exceeded in October 1981. The recent surge in prices has been described in the media as a 'Cost of Living Crisis'. It should be recognized that if increases in households' disposable income do not come near to matching price rises then the purchasing potential of the personal sector will be considerably reduced. Hence, recently, out of concern over falls in their standard of living, hundreds of thousands of workers have been participating in industrial action, including nurses, junior doctors, hospital consultants, ambulance drivers, university lecturers, school teachers, border force staff, firefighters, postal workers, and members of railway unions. When presented with the prospect of significant decreases in their real income, households are confronted with the challenge of deciding which items of expenditure are essential and which are discretionary. Of course, not all individuals will necessarily share the same view of how a type of spending should be classified. For example, a person who suffers from a mobility problem or who lives in a rural area with limited public transport may regard expenditure relating to a car as critical, compared to a person who is enjoying good health or lives in an urban district near to his/her place of work. Also, it needs to be respected that the categorization of an element of expenditure may alter over time on account of, for example, changes in tastes or advances in technology. As an illustration, when laptop computers were first made available for sale, they were seen as the preserve of an elite group of consumers. However, as time has progressed, such goods have become more affordable and are regarded as fundamental to

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undertaking most work activities and receiving an adequate education.[1]

In the light of the above discussion, a primary aim of this paper is to propose an objective, empirical approach towards distinguishing between necessary and discretionary items of household spending. Isikara (2021) has observed that no consensus has been reached within the economics literature concerning the goods and services which enter the basket of essentials. A recent allocation can be found in the Office for National Statistics (ONS) report by Keane (2021), who sought to calculate inflation rates for discretionary and non-discretionary spending in the UK. Isikara (2021), himself, attempted to determine the weight of necessary goods and services in both the spheres of production and consumption. With regard to the latter, Isikara (2021) formed both narrow and broad groups of essential items of spending. Employing OECD data on 32 countries[2] over a period from 2000 to 2016, he estimated that between 63 and 85% of household final expenditure should be classed as essential, with significant variation across countries.[3]

For the purpose of distinguishing between necessary and luxury aspects of personal spending, Kaus (2013) performed an empirical analysis of variations in consumption across both countries and time. More precisely, for more than fifty countries and up to fifty years, data were assembled on twelve categories of expenditure from the United Nations National Accounts Statistics.[4] Adopting a graphical and non-parametric approach, Kaus (2013) obtained a negative relationship between expenditure share and income for each of food and clothing, yet for half of the groups a positive association was apparent.[5] Also, through pooling country-level observations, Kaus (2013) estimated income elasticities of demand. For only four of the classifications – food, alcohol and tobacco, clothing, and education – was the elasticity calculated to be less than 1; for the remaining eight – housing and utilities, furnishings and household equipment, health, transport, communication, recreation and culture, restaurants and hotels, and miscellaneous goods and services – the elasticity was found to be greater than 1. Kaus (2013) observed his findings to be qualitatively similar to those of Theil et al. (1989), who had undertaken an analysis of cross-section data on 51 countries in 1980.

Houthakker (1957) also had the objective of estimating elasticities, making use of all of the household surveys which had been conducted since the end of the Second World War for which results were sufficiently detailed.[6] The international comparison which Houthakker (1957) performed was intended to serve as a commemoration of the centenary of Engel's Law. More specifically, Houthakker (1957) examined how expenditure on each of food, clothing (and footwear), housing (and fuel and light), and miscellaneous items responded to changes in overall spending and family size.[7] With respect to total expenditure, the estimates of the partial elasticities were found to be generally below 1 for spending on food and housing, and above 1 for spending on clothing and miscellaneous goods and services.[8] These findings enabled food and housing to be classed as necessities, while clothing and miscellaneous items could be branded as luxuries.

Nayyar's study (2009) was restricted to a consideration of expenditure on six categories of services (education, health, entertainment, personal, communication, and transport). Tobit and censored quantile regressions were performed in conjunction with pan-India household survey data for the years 1993/94 and 2004/5. For both of these years, services in aggregate and every one of the six different elements were inferred as being luxuries.[9]

[1]Baudisch (2006), in performing an analysis of US time-series data, identified spending on footwear to be a necessity up to the beginning of the 1970s. However, the respective manufacturers responded to the saturated demand through innovation and adding new characteristics to their products.
[2]The initial aim of Isikara (2021) was to consider as many as 52 countries. However, the lack of disaggregated data for some countries resulted in restricting the analysis to merely 32 of these.
[3]The quoted percentages were calculated, having included imputed rentals on owner-occupied housing as an item of expenditure. When this element was excluded, the range became 58–83%.
[4]To be more specific, the data were categorized according to the United Nation's Statistics Division's classification of individual consumption according to purpose (COICOP).
[5]The relevant categories consisted of: housing and utilities; furnishings and household equipment; transport; recreation and culture; restaurants and hotels; miscellaneous goods and services.
[6]Houthakker (1957) consulted 48 surveys relating to 33 different countries.
[7]Miscellaneous expenditure included spending on entertainment and domestic help, domestic appliances, furniture, and transportation.
[8]The result for housing showed conformity with Schwabe's Law.
[9]Analysis was undertaken for the whole of India, as well as distinguishing between urban and rural parts of the country.

Finally, reference is made to two investigations that were conducted by Selvanathan and Selvanathan (2003, 2004) which attempted to distinguish between necessary and luxury commodities. In both papers, the classifications were founded upon calculated income elasticities that were derived from having estimated a system of demand equations. The earlier of the two investigations was concerned with the five Asian economic tigers, i.e. Hong Kong, Japan, Korea, Singapore and Taiwan, while the second inquiry was focused purely upon South Africa. In both studies, the relevant annual data were extracted from various editions of the United Nations Yearbook of National Accounts Statistics. In both papers, a review was carried out of spending on eight groups of commodities: food; clothing; housing; furniture or durables; medical care; transport; recreation; and miscellaneous (which included personal care and expenditure on restaurants, cafes and hotels).[10] Largely similar findings seemed to emerge on all six countries. More specifically, food, housing, and medical care could be interpreted as necessary items of spending in all countries (but for medical care in Taiwan). Additionally, clothing, durables/furniture, transport, and miscellaneous services were generally regarded as luxuries (exceptions being durable goods in Singapore and miscellaneous items in Korea). Finally, recreation qualified as a luxury in four out of the six countries (South Africa, Japan, Singapore and Taiwan).

In this paper, using both cross-section and time-series data from the ONS, we seek to adopt a two-step procedure for the purpose of distinguishing between discretionary/luxury and essential items of household spending in the UK. More specifically, the cross-section data are obtained from the Living Costs and Food Survey (LCF) and its predecessors. Within these publications, tables are consulted which report the weekly expenditure patterns of the different income deciles. In contrast, the time-series data are acquired from Consumer Trends, which shows the aggregate spending by members of UK households on different goods and services. In particular, both quarterly and annual data are publicly available on COICOP three-digit categories of consumption from the beginning of 1985.

In common with earlier studies in this area, the classification of types of expenditure as discretionary or essential is effectively governed by the associated income elasticity. More specifically, for a form of spending to be interpreted as discretionary (essential), the income elasticity is required to be greater (less) than 1. Supplying greater detail on the methodology, as a first phase, consideration is given to the cross-section LCF data over sixteen years. Should there be observed to be a tendency, in a majority of years, for the share of total expenditure devoted to an individual good or service to be larger for a high-income group than for a low-income group then the respective aspect of spending is provisionally classed as being discretionary. Upon adopting this approach, 53 out of 137 forms of expenditure meet the criterion.

As a second phase, the ONS publication, Consumer Trends, is consulted to find, within groupings 1KS – 12KS, a match for the 53 aforementioned items of spending.[11] In general, the Consumer Trends data are more aggregated than the Family Spending data, such that only 43 Consumer Trends classifications are considered relevant. Subsequently, for each of the 43 COICOP components, an estimate of the respective income elasticity is achieved through adopting a regression-based approach in conjunction with quarterly time-series data (1985Q1–2019Q4) on the consumption variable and real households' disposable income. It transpires that there are 15 estimates which are less than 1, which encourages discarding the corresponding items of spending from the analysis. Hence, an aggregate discretionary household consumption expenditure series is formed by combining additively the remaining 28 elements. On average, across the interval, 1985Q1 – 2019Q4, discretionary spending amounts to 20% of total household domestic consumption expenditure in the UK.

Having developed a series on discretionary spending by households, we seek to validate our approach by performing both a within- and an out-of-sample empirical analysis. The framework that is adopted recognizes the fundamental contribution of Katona (1968) in seeking to explain

[10]Unfortunately, these headings did not accurately convey all of the expenditure that was undertaken by consumers. For example, household spending on rent, fuel and power was given simply the label of (expenditure on) housing.
[11]K and S signify that the data are contained in the form of chained volume measures and are seasonally adjusted.

gratuitous consumption in terms of both the ability and the willingness to make purchases. Results show that our discretionary consumption variable enjoys a closer and more stable relationship with a reputable measure of consumer confidence than is the case for the established aggregates within Consumer Trends, i.e. household spending on durable goods, semi-durable goods, non-durable goods, and services.

The paper proceeds as follows. In section 2, an examination is performed of the cross-section Family Spending data that are provided by the ONS, which enables a tentative suggestion of items of expenditure which can be classed as discretionary. In section 3, consideration is given to the aggregate time-series data within Consumer Trends for corroboration or otherwise that the nominated elements of spending merit the description of superfluous. Having formed a quarterly time series on aggregate discretionary expenditure by the UK household sector, in section 4, we undertake both a within- and an out-of-sample empirical analysis, focusing upon, in particular, the ability of a well-recognized measure of consumer confidence to predict the growth of this variable, relative to how well it forecasts changes in other types of consumption. Finally, section 5 offers a summary and conclusion.

II. Analysis of family spending data

In this section, an analysis is performed of income and expenditure data that are contained in the two ONS Family Spending workbooks: Workbook 1 – Detailed expenditure and trends; Workbook 2 – Expenditure by income. In total, consideration is given to family spending data from 2003/2004 to 2018/2019. 2003/2004 was selected as the start year for the reason that, before this, there was a different classification scheme applying to goods and services. 2018/2019 was chosen as the end year in order to avoid the influence of COVID-19 and the associated lockdowns on household expenditure and income.

Within the Family Spending workbooks, the LCF weekly household expenditure data are organized into twelve broad groups, as can be seen in Table 1. In terms of relative size, the importance of these groups has not altered to a great extent over time. Spending on transport generally occupies the top position, representing 16 to 17% of total expenditure. Purchases of food and non-alcoholic drinks, recreation and culture, and housing, fuel and power then compete over the next three places. There follows in the rankings, in this order, expenditure on restaurants and hotels, miscellaneous goods and services, household goods and services, clothing and footwear, communication, and alcoholic drinks, tobacco and narcotics. Finally, the bottom positions are filled by spending on health and education, both of which amount to less than 2% of total expenditure.

The data which are contained within tables 3.1 and 3.1E of Family Spending Workbook 1 provide a considerable amount of detail on the consumption patterns of the income deciles. The distinction between the two tables is that Table 3.1E organizes households according to their equivalised disposable income, whereas Table 3 applies no adjustments in respect of a household's size and composition. The aforementioned Table 1 indicates the number of separate items of spending that are represented in these tables, extending to a third level of disaggregation.[12]

Isikara (2021) has acknowledged the arbitrariness which is involved in categorizing goods and services as essentials or luxury items, and accepted that there is always an element of subjectivity in scientific analysis. In short, the approach that is adopted in this paper, with respect to each of the 137 classes of spending, is to interpret the consumption as being discretionary if there is a clear tendency for the expenditure share to increase across the income deciles. To be more specific, a comparison is undertaken of the expenditure share which is associated with households that are located in the lower half of the income distribution with the proportions that apply to the higher income groups. In particular, if the expenditure share that relates to households within the third income decile is exceeded by at least half of the proportions that are linked to the deciles, 4–9, then

[12]Although Table 1 reports 139 different items, one of the entries, Net rent (4.1.3), is calculated by subtracting housing benefit, rebates and allowances received (4.1.2) from Gross rent (4.1.1). Hence, it may be more appropriate to regard the total number of expenditure categories as 137.

Table 1. Number of items of household expenditure within Family Spending categories 1–12.

	Commodity or Service	Number of Items
1	Food and non-alcoholic drinks	
1.1	Food	33
1.2	Non-alcoholic drinks	6
2	Alcoholic drink, tobacco and narcotics	
2.1	Alcoholic drinks	4
2.2	Tobacco and narcotics	2
3	Clothing and footwear	
3.1	Clothing	11
3.2	Footwear	1
4	Housing, fuel and power	
4.1	Actual rentals for housing	4
4.2	Maintenance and repair of dwellings	1
4.3	Water supply and miscellaneous services relating to the dwelling	1
4.4	Electricity, gas and other fuels	3
5	Household goods and services	
5.1	Furniture and furnishings, carpets and other floor coverings	2
5.2	Household textiles	1
5.3	Household appliances	1
5.4	Glassware, tableware and household utensils	1
5.5.	Tools and equipment for house and garden	1
5.6	Goods and services for routine household maintenance	3
6	Health	
6.1	Medical products, appliances and equipment	2
6.2	Hospital services	1
7	Transport	
7.1	Purchase of vehicles	3
7.2	Operation of personal transport	4
7.3	Transport services	4
8	Communication	
8.1	Postal services	1
8.2	Telephone and telefax equipment	1
8.3	Telephone and telefax services	1
8.4	Internet subscription fees (ex. combined packages)	1
8.5	Combined telecom services	1
9	Recreation and culture	
9.1	Audio-visual, photographic and information processing equipment	3
9.2	Other major durables for recreation and culture	1
9.3	Other recreational items and equipment, gardens and pets	5
9.4	Recreational and cultural services	6
9.5	Newspapers, books and stationery	4
9.6	Package holidays	2
10	Education	
10.1	Education fees	1
10.2	Payments for school trips, other ad hoc expenditure	1
11	Restaurants and hotels	
11.1	Catering services	5
11.2	Accommodation services	3
12	Miscellaneous goods and services	
12.1	Personal care	5
12.2	Personal effects	1
12.3	Social protection	1
12.4	Insurance	4
12.5	Other services	3
1–12	Total number of items of expenditure	139

Information source: Family Expenditure Workbook 1, Table 3.1E.

consumption of the respective good or service is viewed as being discretionary.[13, 14]

This identification strategy is applied to each of sixteen years between 2003/2004 and 2018/2019. The first three and final four years are financial years, while the intervening nine years, from 2006 to 2014, are calendar years. For the years from 2012 to 2018/2019, reference is made to the data that are presented in Table 3.1E of the Family Spending Workbook 1. Within this table, households are

[13]The focus is upon the third income decile as this is exactly in the middle of the bottom half of the income distribution. Also, it seemed to be appropriate to contrast the expenditure share for this group with the respective proportions for all of the higher-income classes (excepting the tenth decile) to avoid an excessive amount of information being disregarded.

[14]The highest income decile is ignored in order to exclude from the analysis those households which are in receipt of exceptionally large incomes.

organized into deciles according to their equivalised disposable income. Unfortunately, though, the same form of table did not exist prior to 2012. Hence, for the years from 2003/2004 to 2011, reliance is placed on tables that arrange households into groups which are based on their (non-equivalised) gross income.[15] More specifically, the sources of the data are Table A6 (2010 and 2011) and Table A8 (from 2003/2004 to 2009) within Family Spending Workbook 2.

The decision is taken to recognize a particular type of expenditure as overall being discretionary if the criterion that was mentioned earlier is satisfied in a majority of the sixteen years from 2003/2004 to 2018/2019. Table 2 shows that there are 53 items of spending that merit this description, which are distributed in the following manner across the twelve broad classifications: food and non-alcoholic drinks (1); alcoholic drink, tobacco and narcotics (2); clothing and footwear (7); housing, fuel and power (1); household goods and services (5); health (1); transport (8); communication (0); recreation and culture (13); education (1); restaurants and hotels (6); miscellaneous goods and services (8).[16] The associated average amounts spent per week by all households in the financial year 2018/2019 are: food and non-alcoholic drinks (£1.00); alcoholic drink, tobacco and narcotics (£7.10); clothing and footwear (£21.40); housing, fuel and power (£7.50); household goods and services (£31.50); health (£3.80); transport (£81.90); communication (£0); recreation and culture (£59.60); education (£5.00); restaurants and hotels (£48.80); miscellaneous goods and services (£31.10). Across all of the 53 goods and services, the sum of the average weekly expenditure is £298.70. Granted that the total average weekly expenditure across all 137 categories of spending is £514.10, it can be calculated that just over 58% is devoted to discretionary purchases.[17] This provisional figure appears to be large in comparison to other studies. While not even 2% of the expenditure on food and non-alcoholic drinks has been found to be inessential, almost the entirety of the spending on clothing and footwear, transport, and restaurants and hotels has been identified as being discretionary.

III. Analysis of consumer trends data

A specific aim of this paper is to produce quarterly data on discretionary household consumption expenditure in the UK dating back to 1985Q1. With this objective in mind, we feel encouraged to consult the ONS publication, Consumer Trends, which presents aggregate time series on several different categories of personal spending. Initially, we seek to match the 53 items of discretionary expenditure that were established in the preceding section with the COICOP classifications within Consumer Trends. Unfortunately, though, there is not always a one-to-one correspondence for the reason that, on occasions, the categories within Consumer Trends are broader than those within the Family Spending workbooks.

In addition to distinguishing between the consumption of durable goods, semi-durable goods, non-durable goods, and services, Consumer Trends distributes household expenditure data amongst twelve broad groups. These classifications have the following labels (with the number of separate components of consumption being shown in brackets): food and non-alcoholic beverages (11); alcoholic beverages, tobacco and narcotics (5); clothing and footwear (6); housing, water, electricity, gas and other fuels (15); furnishing, household equipment and routine household maintenance (12); health (7); transport (12); communication (3); recreation and culture (21); education (1); restaurants and hotels (3); miscellaneous goods and services (15).[18] In total, then, there are 111 separate categories of spending within this publication, which compares with 137 that have been seen within the Family Spending workbooks.[19] With

[15]Gross income does not allow for the payment of income tax or national insurance contributions.
[16]Information on the specific items of expenditure and the associated years is provided in a supplementary table which can be accessed via the journal's website.
[17]All of the figures which are referred to in this paragraph are based upon the data which are contained in Table 3.1E of Family Spending Workbook 1 for the financial year 2018/2019.
[18]With reference to the COICOP, the presented data extend to the three-digit level of disaggregation.
[19]However, data are unavailable on both COICOP 4.4.4 (other services) and 4.5.5 (heat energy). Also, the data on 9.6 (package holidays) are dispersed among other forms of expenditure (e.g. transport).

Table 2. Categories of expenditure provisionally identified as discretionary.

Classification	Commodity/Service	Number of Years+	Classification	Commodity/Service	Number of Years+
1.1.4	Pastry (savoury)	9	9.2	Other major durables for recreation and culture	10
2.1.2	Wines, fortified wines (brought home)	16	9.3.1	Games, toys and hobbies	10
2.1.3	Beer, lager, ciders and perry (brought home)	10	9.3.2	Computer software and games	12
3.1.1	Men's outer garments	16	9.3.3	Equipment for sport, camping and open-air recreation	16
3.1.2	Men's under garments	12	9.3.4	Horticultural goods, garden equipment and plants	9
3.1.3	Women's outer garments	12	9.4.1	Sports admissions, subscriptions, leisure class fees and equipment hire	16
3.1.6	Girls' outer garments	9	9.4.2	Cinema, theatre and museums, etc.	15
3.1.7	Infants' outer garments	10	9.4.4	Miscellaneous entertainment	15
3.1.9	Accessories	14	9.5.1	Books	14
3.2	Footwear	11	9.5.2	Diaries, address books, cards etc.	11
4.2	Maintenance and repair of the dwelling	13	9.6.2	Package holidays – abroad	16
5.1.1	Furniture and furnishings	15	10.1	Education fees	9
5.1.2	Floor coverings	9	11.1.1	Restaurant and café meals	16
5.3	Household appliances	10	11.1.2	Alcoholic drinks (away from home)	16
5.4	Glassware, tableware and household utensils	13	11.1.3	Take away meals eaten at home	10
5.5	Tools and equipment for house and garden	14	11.1.4	Other take away and snack food	15
6.2	Hospital services	14	11.2.1	Holiday in the UK	14
7.1.1	Purchase of new cars and vans	14	11.2.2	Holiday abroad	15
7.1.2	Purchase of second-hand cars and vans	16	12.1.5	Hair products, cosmetics and related electrical appliances	14
7.2.1	Spares and accessories	13	12.2	Personal effects	14
7.2.2	Petrol, diesel and other motor oils	15	12.3	Social protection	13
7.2.3	Repairs and servicing	15	12.4.2	Medical insurance premiums	16
7.2.4	Other motoring costs	14	12.4.3	Vehicle insurance including boat insurance	14
7.3.1	Rail and tube fares	16	12.5.1	Moving house	14
7.3.4	Other travel and transport	9	12.5.2	Bank, building society, post office, credit card charges	12
9.1.1	Audio equipment and accessories, CD players	14	12.5.3	Other services and professional fees	12
9.1.2	TV, video and computers	11			

+Number of years refers to the number of years between 2003/4 and 2018/19 for which expenditure on the commodity or service qualifies as being discretionary.

Data Sources: Years 2012–2018/2019, Table 3.1E, Family Spending Workbook 1; Years 2010–2011, Table A6, Family Spending Workbook 2; Years 2003/2004–2009, Table A8, Family Spending Workbook 2.

regard to, in particular, the 53 forms of expenditure that were assessed as being discretionary in section II, there appear to be 43 corresponding types of spending within Consumer Trends. These are displayed in Table 3, below.

Upon studying the contents of Table 3, it is immediately apparent that there is no representation of expenditure on pastries. This is because spending on pastries enters COICOP 1.1.1 (bread and cereals), which additionally incorporates several items which have not been identified as discretionary.[20] For a similar reason, expenditure on holidays has been excluded. While COICOP 11.2 (accommodation services) includes spending on hotels, motels, inns, bed and breakfast establishments, and caravan sites, it also features fees paid for university accommodation, which must be considered to be non-negligible.[21] On the other hand, within Table 3, reference can be found to the overall expenditure by households on garments. While this will encompass an element of spending on clothing (i.e. women's under-garments, boys' outer-garments, and children's under-garments) which, in section II, was not viewed as being discretionary, these essentials constitute only a small proportion of the total.

It should be clarified that, from the analysis of the cross-section data which was performed in section II, we were able to identify items of household expenditure *which have the potential* to be classed as discretionary. In order to be able to decide upon fully whether an aspect of spending

[20]Within Consumer Trends, COICOP 1.1.1 covers expenditure on rice, bread, pasta, pastry-cook products, and other cereal products.

[21]In academic year 2019/2020, as many as 536 thousand students were living in provider-maintained property or private-sector halls of residence. (The source of this statistic is Statista.com (2021)).

Table 3. Consumer Trends classifications corresponding to family spending LCF classifications.

COICOP	Commodity/Service	Income Elasticity	COICOP	Commodity/Service	Income Elasticity
2.1.2			9.1.3		
2.1.3			9.1.4		
3.1.2			9.2	! "# #	$%
3.1.3	# # &	%	9.3.1	""	’
3.2.1	( )		9.3.2	(*	$
4.3	Maintenance and repair of the dwelling	0.84	9.3.3	# +)	,%
5.1.1	-		9.4.1	Recreational and sporting services	0.81
5.1.2	Carpets and other floor coverings	−0.12	9.4.2	. # # /	$
5.3	0 # #	,	9.5.1	Books	0.88
5.4	0 # #	$%	9.5.3	1 ##	’
5.5	2 #	%,	9.5.4	Stationery and drawing materials	0.48
6.3	Hospital services	0.62	10	Education	0.89
7.1.1	Motor cars	0.81	11.1.1	Restaurants, cafes, etc.	0.30
7.2.1	Motor vehicle spares	0.67	12.1.2	3# # # #	4
7.2.2	Vehicle fuels and lubricants	0.05	12.1.3	#	
7.2.3	Vehicle maintenance and repair	0.34	12.3	5 # 6 #) # 7	%
7.2.4	/ # /	’%	12.4	Social protection	0.27
7.3.1	Railways	0.93	12.5.3	0 #	’
7.3.3	8		12.5.4	2	$$
7.3.4	(#))		12.6.2	7 # /	4
7.3.6	/	, ,	12.7	Other services	0.03
9.1.1	8 */ #	, ,			

The elasticities are achieved as a result of performing a simple regression of the logarithm of the respective household expenditure on a constant and the logarithm of real households’ disposable income. The estimation period is 1985Q1 – 2019Q4, with one exception. For stationery and drawing materials, the available data restricted the interval to be 1997Q1 – 2019Q4.

merits this description, we proceed to undertake an examination of aggregate time-series data. More specifically, for each of the 43 categories of expenditure that are presented in Table 3, we estimate a simple regression equation which relates the logarithm of household consumption to a constant term and the logarithm of real households’ disposable income.[22] With one exception, the regression is conducted over the interval, 1985Q1 – 2019Q4, and has the consequence of yielding an income elasticity. The estimates of the income elasticities are shown in Table 3, immediately to the right of the name of the respective good or service.

With regard to Table 3, any type of expenditure which is associated with an income elasticity of consumption which exceeds 1 is considered to be discretionary for the reason that support for this characterization has now come from not only cross-section data but also time-series data. The qualifying forms of spending are shown in bold. Hence, 28 out of the 43 categories of expenditure are viewed as being inessential. Over the time period, 1985Q1 – 2019Q4, discretionary spending amounts to, on average, approximately 20% of total domestic household consumption expenditure in the UK. On account of the methodology that has been adopted, it follows that this share has been rising (with disposable income) over the course of time, increasing from just under 14% in 1985Q1 to almost 25% in 2019Q4.

From a study of the contents of Table 3, it is apparent that some of the allocations are in contradiction of what has been seen in Keane’s ONS report (2021). In particular, in the current study, neither expenditure on motor cars nor spending on restaurants and cafes, etc. is interpreted as discretionary. In the case of motor cars, one reason may be that purchases are sensitive to relative price movements, which may serve to weaken the relationship between demand and income in a two-variable context. Additionally, it needs to be understood that a significant proportion of households will view ownership of a car as a necessity, for example, for the purpose of travelling to work or transporting children safely to school. With reference to expenditure on restaurants and cafes, etc., within Table 3, the income elasticity of

[22]In his pioneering empirical study which gave rise to Engel’s Law, Engel (1857) adopted a double-logarithmic function. Also, Houthakker (1957) favoured a log-linear specification for the purpose of estimating elasticities.

consumption is found to be very low. This may be on account of much of this type of spending being derived from habit; for example, visiting an eating establishment at lunchtime during a break from work.

An aggregate quarterly time series on discretionary household consumption expenditure in the UK (constant prices, seasonally adjusted) from 1985Q1 to 2019Q4 is created by adding together the data on the 28 highlighted categories of spending which are shown in Table 3. Having applied a logarithmic transformation, this series is presented as a line graph in Figure 1. For comparison, the same figure also shows a time plot of the quarterly data on the logarithm of UK total household consumption expenditure (domestic measure, constant prices, seasonally adjusted). While both series contain an upward trend, it is apparent that, over the full sample period, discretionary spending has grown faster than total expenditure. Additionally, the fluctuations in discretionary consumption appear to be more pronounced than the variations in the overall measure. As examples, during the two economic downturns, 1990Q1 – 1991Q2 and 2008Q1 – 2010Q1, discretionary expenditure decreased by 4.2 and 8.0%, respectively, whereas the corresponding figures for overall household spending are 1.2 and 4.5%.

IV. Empirical analysis

In this penultimate section of the paper, we seek to demonstrate a benefit from having constructed the series on discretionary household expenditure. What we are able to show is that the growth of this variable enjoys a more significant and stable relationship with an indicator of consumer confidence than is the case for the traditional COICOP categories of consumption, i.e. personal spending on each of durable goods, semi-durable goods, non-durable goods, and services.

For the purpose of conducting a within-sample analysis using quarterly data, we adopt the accepted framework of Bram and Ludvigson (1998), which has also been employed by, *inter alia*, Easaw and Heravi (2004) and Gausden and Hasan (2022). Bram and Ludvigson (1998) present as a forecasting model of consumption the regression equation:

$$\Delta \ln(C_t) = \propto_0 + \sum_{i=1}^{4} \beta_i S_{t-i} + \gamma Z_{t-1} + \varepsilon_t \qquad (1)$$

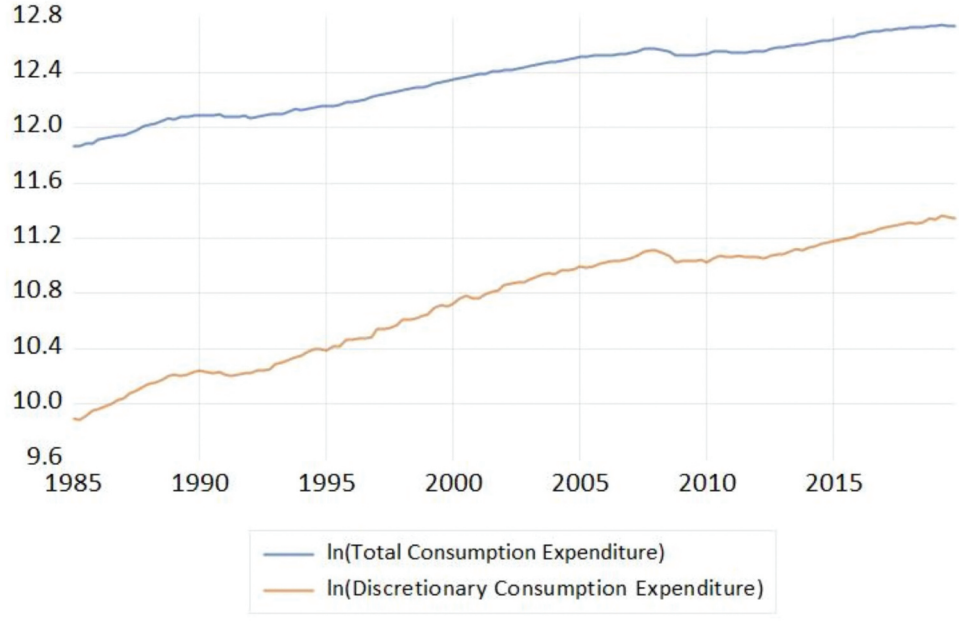


Figure 1. Line graphs of logarithmic forms of total and discretionary household consumption expenditure.

where C denotes constant-price consumption expenditure, S represents an indicator of consumer sentiment, and Z constitutes a vector of control variables, which includes 4 lags on each of the dependent variable, the growth of real income, the change in a short-term rate of interest, and the first-difference of the logarithm of the real stock price. More precise definitions of the variables are shown below, alongside the associated data sources.

Variable	Definition	Data Source
Consumption	Household consumption expenditure on each of durable goods, semi-durable goods, non-durable goods, services, and discretionary items (chained volume measures, seasonally adjusted)	ONS
Income	Real households' disposable income (chained volume measure, seasonally adjusted, reference year 2019)	ONS
Interest Rate	The interbank rate for 3-month or 90-day yields	Federal Reserve Bank of St. Louis Database
Real Stock Price Index	Total share prices for all shares (2015 = 100), divided by the implicit price deflator for UK total domestic household consumption expenditure (seasonally adjusted)	Federal Reserve Bank of St. Louis Database and ONS
Consumer Sentiment	The GfK index (seasonally adjusted)	European Commission

It is apparent, then, that the preferred measure of consumer sentiment is the well-reputed GfK index, which has featured in the research of both Easaw and Heravi (2004) and Gausden and Hasan (2022). The value of the GfK index is formed from responses to five questions by a sample of about two thousand households. The participants in the survey are presented with reflective and forward-looking questions concerning both the financial position of the household and the state of the economy. Additionally, they are asked, in view of the general economic situation, is now the right time for people to be undertaking major purchases? From the answers which are supplied by the sample members, it is possible to establish an overall score for each of the questions, which must range from −100 to 100. The value of the GfK index is then achieved by calculating the arithmetic average of the five totals. The higher is the value of the indicator then the greater is the confidence that is being displayed by the respective consumers.

Equation (1), above, is estimated by Ordinary Least Squares. For the reason that the series on the rate of interest only begins in 1986Q1, the full sample period extends from 1987Q2 to 2019Q4. Allowance is made for both autocorrelation and heteroskedasticity in the disturbance terms when calculating the standard errors of the estimators. Table 4 highlights the influence of the consumer confidence index on each of the five types of consumption, showing the sum of the estimates of the parameters which are attached to $S_{t\ i}\ i \quad 1; 2; 3; 4$. Additionally, it presents the results of an F test of the null hypothesis that all of the parameters that are attached to the past values of the sentiment indicator are equal to zero.

The values which are displayed in the first row of Table 4 reveal that the growth of each form of consumption responds positively to a change in consumer confidence. The more sensitive elements are seen to be expenditure on durable goods and discretionary spending, which can be attributed to these being the most volatile types of consumption. The second row of the table indicates the values of the F statistics, all of which are significant at the ten per cent level. Moreover, for expenditure on durable goods, services, and discretionary items, the F values are also significant at the one per cent level. The lowest probability value corresponds to discretionary spending, which suggests that statistically this is the consumption variable which is most closely related to consumer sentiment.

We now proceed to investigate the stability of the relationship between the growth of consumption and the GfK index. Initially, this is achieved by dividing the original sample period into two approximately equal-length intervals, 1987Q2 – 2003Q2 and 2003Q3 – 2019Q4. Equation (1) is estimated over each of the sub-periods with the key findings being presented in the bottom two sections of Table 4. With regard to the earlier interval, from a study of the sums of the estimates, it is apparent that the growth of each category of consumption responds positively to a change in consumer sentiment. Indeed, for all of the forms of spending, with the exception of that on non-durable goods, the sensitivity to movements in the GfK index is stronger in sub-period 1 than sub-period 2. It should be appreciated, though, that the decrease in the sum of the estimates is much smaller for discretionary

Table 4. Results from estimation of Equation (1).

	Category of Household Consumption Expenditure				
	Durable Goods	Semi-Durable Goods	Non-Durable Goods	Services	Discretionary
Sum of Estimated Parameters	0.000785	0.000584	0.000306	0.000134	0.000725
F(4, 110) statistic	5.5780	2.0894	2.1074	4.0190	6.6052
(probability value)	(0.0004)	(0.0870)	(0.0847)	(0.0044)	(0.0001)
BG(4)	7.6805	2.7697	2.9272	6.4356	5.0807
(probability value)	(0.1040)	(0.5971)	(0.5701)	(0.1689)	(0.2791)
Sum of Estimated Parameters	0.001822	0.000879	0.000148	0.000224	0.000996
F(4, 44) statistic	7.0992	2.4642	0.5440	1.1522	3.4506
(probability value)	(0.0002)	(0.0589)	(0.7042)	(0.3448)	(0.0155)
Sum of Estimated Parameters	0.000301	0.000211	0.000348	−0.000019	0.000679
F(4, 45) statistic	2.6208	0.8364	1.0254	2.8668	4.0884
(probability value)	(0.0472)	(0.5093)	(0.4045)	(0.0337)	(0.0065)

Estimation is by Ordinary Least Squares (OLS). The Newey-West procedure is used for the calculation of standard errors.
The sum of the estimated parameters is more specifically $\sum_{1}^{4}$, where $\hat{}$ denotes the OLS estimate of 1; 2; 3; 4 .
The value of the F statistic is computed for the purpose of testing the null hypothesis, : 0 1; 2; 3; 4 .
BG(4) signifies the value of the Breusch-Godfrey statistic, which is computed for the purpose of testing for up to fourth-order autocorrelation in the disturbance terms.

consumption than for expenditure on semi-durable goods and especially durable goods. Upon examining values of the F statistics, in relation to the first sub-period, only two of these are seen to be statistically significant at the five per cent level (corresponding to the consumption of durable goods and discretionary spending). For the same two forms of expenditure, the F probability value is also below 0.05 for the second sub-period. It should be noted, though, that the two marginal levels of significance are much closer together for discretionary consumption than spending on durable goods. Overall, then, an inference that can be drawn from a consideration of Table 4 is that, over the two sub-periods, there is greater consistency in the relationship between consumer confidence and the growth of discretionary expenditure than the other types of consumption, which would suggest that the GfK index is most well equipped to forecast future developments in inessential spending.

In order to emphasize the stability or otherwise in the relationships between the growth of consumption and consumer confidence, we have constructed Figure 2. This graph follows from, for each of the different forms of household spending, recursive estimation of Equation (1), using as an initial sample period, 1987Q2 – 1999Q1. On each occasion on which the equation is estimated, we calculate the sum of the estimates of the parameters which are attached to $S_{t\ i}; i$ 1; 2; 3; 4. The obvious feature of this graph is the wide range of values that applies to the expenditure on durable goods. From (the end date of) 1999Q3 to 2003Q1, the sum of the four estimates falls from 0.00311 to 0.00178, and by 2013Q3 this has reduced further to 0.00074. In contrast, for discretionary spending, the movements are far more limited: from 0.00099 to 0.00096; and subsequently to 0.00070.

The results which have been obtained from the within-sample analysis suggest that information on the GfK measure of consumer sentiment will be of greatest assistance in forecasting the growth of discretionary expenditure. In this sub-section of the paper, we seek to provide some corroborative evidence by, for each of the five types of consumption, comparing the predictive performances of two competing regression models. Granted that, for all of the forms of household expenditure that feature in this study, the series on the first-difference of the logarithm is stationary, it seems to be appropriate to compare the accuracy of the forecasts that are derived from two different methods: one which makes use of the most recent quarter's value of the GfK index; and another which simply relies upon the sample mean. In other words, we seek to contrast the predictive capabilities of the two nested models[23]

[23]Recall that, when a regression equation includes only a constant term on its right-hand side, in addition to a random error term, the Ordinary Least Squares estimate of the intercept parameter equates with the value of the sample mean of the dependent variable.:

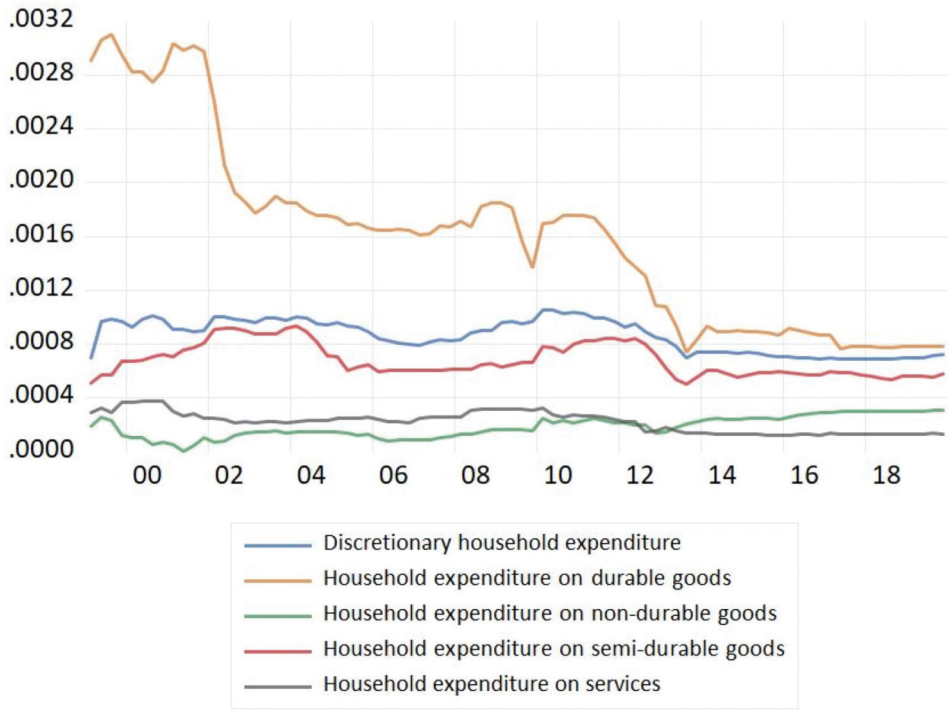


Figure 2. Sums of the estimates of the parameters attached to past values of the GfK index.

$$\Delta \ln(C_t) = B_0 + u_{2,t} \tag{2}$$

$$\Delta \ln(C_t) = B_0 + B_1 S_{t-1} + u_{3,t} \tag{3}$$

We elect to estimate the regression equations recursively, employing as an initial sample period, 1985Q2 – 2007Q4.[24, 25] This choice was made so that one-step-ahead forecasts would be generated over an interval which incorporated the financial crisis that occurred in the UK. In total, 48 predictions are produced, from 2008Q1 to 2019Q4.

Table 5 shows, for each of five consumption variables, the forecast accuracy that is achieved by Equations (2) and (3), as summarized by the value of a root mean square error (RMSE) statistic. In particular, the values in the third row provide an indication of the improvement in predictive performance that arises from the addition of the previous quarter's GfK index to the right-hand side of the baseline regression equation. A value of less (greater) than 1 serves to show that the introduction of the measure of consumer confidence enhances (reduces) the overall quality of the forecasts. Hence, it appears that, in the case of four of the consumption variables, recourse to the data on consumer sentiment succeeds in lowering the value of the RMSE statistic. Also, out of these four variables, it is the forecasts of the growth of discretionary consumption expenditure which benefit the most from the involvement in the analysis of the confidence indicator.

Although the top section of Table 5 shows some interesting results, McCracken (1999) maintained that it is insufficient simply to be reporting values of the RMSE statistic when contrasting the out-of-sample predictive performances of two nested models. Rather, we should seek to apply tests of statistical significance. In his paper, McCracken (1999) was concerned with the properties of three out-of-sample (OOS) tests of equal forecast accuracy: a t test; a regression-based test; and an F test. He established that the limiting distributions of the associated statistics are non-standard. Under the null hypothesis, the distributions depend upon two factors: the number of additional parameters in the unrestricted equation (k_2); and the ratio (π)

[24]Quarterly data on the consumption variables are available from 1985Q1. Hence, the first date on which we have a value of ln is 1985Q2.
[25]A recursive approach is preferred on the basis that, at the time at which the forecast is being prepared, full information is being utilized.

Table 5. Values of root mean square error statistics and McCracken (1999) F statistics.

	Consumption Variable				
	Durable Goods	Semi-Durable Goods	Non-Durable Goods	Services	Discretionary Goods & Services
!" # ! $	% ! % &%				
Equation (3)	0.0290	0.0168	0.0140	0.0086	0.0145
Equation (2)	0.0289	0.0175	0.0147	0.0091	0.0162
Ratio (3)/(2)	1.0045	0.9596	0.9545	0.9405	0.8928
			% ! % &%		
	−0.4298	4.1248	4.6833	6.2685	12.225
Critical values: 0.8025 (10% significance); 1.4612 (5% significance); 3.0300 (1% significance)					

The values relate to one-quarter-ahead predictions of the first-difference of the logarithm of the consumption variable.
Equations are estimated recursively, adopting as an initial sample period, 1985Q2 – 2007Q4. The forecast interval extends from 2008Q1 to 2019Q4.
The F statistic critical values are achieved via linear interpolation, based on the calculated values in Table 4 of the paper by McCracken (1999).

of the number of predictions (P) to the size of the initial sample period used in estimation (R).[26] When McCracken (1999) examined the statistical properties of the tests, he found that, when P is much less than R, and k_2 is small, the F test is more powerful than the t test. Granted that, in our study, $\pi = 48/91$ and $k_2 = 1$, encouragement is received to conduct the F test.

With regard to the F test, the null hypothesis is Ho: $E\ L_{2;t}$ $E\ L_{3;t}$, where the brackets contain loss functions corresponding to the restricted and unrestricted equations, respectively. Alongside this, a one-sided alternative hypothesis (Ha) asserts that $E\ L_{2;t} > E\ L_{3;t}$. The (modified) out-of-sample F statistic is defined as:

$$OOS - F = \frac{\sum_{t=R}^{T}[\hat{u}_{2,t+1}^2 - \hat{u}_{3,t+1}^2]}{P^{-1}\sum_{t=R}^{T}\hat{u}_{3,t+1}^2}$$

where $\hat{u}_2$ and $\hat{u}_3$ are the forecast errors corresponding to the random disturbance terms in Equations (2) and (3), respectively. For each of the five different forms of household consumption expenditure, the value of *OOS-F* is shown in the final row of Table 5, above the approximate critical values. From an examination of the relevant part of the table, it is apparent that, for only one of the categories of consumption – expenditure on durable goods – is it not possible to reject the null hypothesis at a conventional level of significance. Indeed, for the remaining types of spending, the null hypothesis can be dismissed at the one per cent level. However, the largest value of the *OOS-F* statistic is associated with discretionary household expenditure, which suggests that the GfK index is better suited to predicting this form of consumption than any of the other groupings.

In order to give greater emphasis to the forecasting performance of consumer confidence during the financial crisis, we repeat the analysis using 2008Q1 – 2012Q4 as the prediction period. Table 6 shows that, for all five classes of consumption, Equation (3) produces more accurate forecasts than Equation (2). However, recourse to the data on the GfK index delivers much the greatest improvement for discretionary expenditure. On this occasion, when the *OOS-F* tests are conducted, all of the computed values of the statistic are significant at the five per cent level. Indeed, three of these are significant at the one per cent level, with, by some distance, the largest value being associated with discretionary consumption.

V. Conclusion

The objective of this paper has been to maximize the use of ONS data for the purpose of producing a quarterly time series on discretionary household consumption in the UK. Having undertaken an analysis of both cross-section (LCF) data and time-series (Consumer Trends) data, we identified 28 COICOP categories of household spending that could be classed as inessential, which were duly combined additively to yield an aggregate time series on discretionary household consumption expenditure in the UK.

Over the data period, 1985Q1 – 2019Q4, discretionary consumption was found to constitute 14 to

[26]The addition of R and P yields T + 1, the total number of within- and out-of-sample observations.

Table 6. Values of root mean square error statistics and McCracken (1999) F statistics.

	Consumption Variable				
	Durable Goods	Semi-Durable Goods	Non-Durable Goods	Services	Discretionary Goods & Services
!" # ! $ % ! % &%					
Equation (3)	0.0336	0.0175	0.0175	0.0107	0.0184
Equation (2)	0.0349	0.0193	0.0182	0.0118	0.0220
Ratio (3)/(2)	0.9610	0.9067	0.9585	0.9040	0.8377
% ! % &%					
	1.6569	4.3275	1.7700	4.4727	8.5009
Critical values: 0.6743 (10% significance); 1.0637 (5% significance); 2.1922 (1% significance)					

The values relate to one-quarter-ahead predictions of the first-difference of the logarithm of the consumption variable.
Equations are estimated recursively, adopting as an initial sample period, 1985Q2 – 2007Q4. The forecast interval extends from 2008Q1 to 2012Q4.
The F statistic critical values are achieved via linear interpolation, based on the calculated values in Table 4 of the paper by McCracken (1999).

25% of total household expenditure. This range appears to be roughly in line with the figures that were produced by Isikara (2021).[27] In contrast, though, Keane (2021) calculated the share of discretionary consumption expenditure to be as high as 38.9% in the UK in 2021. One explanation for this larger number was that Keane (2021), did not regard spending on tobacco or motor vehicles as essential. Also, Keane (2021) benefited from access to more disaggregated data, such that she was able to count the consumption of some items of food as discretionary (namely, cakes and biscuits, chocolate, confectionery, ice cream and other dairy products, waters, soft drinks and juices). For the same reason, expenditure on domestic holiday travel and accommodation could be included in the superfluous category.

Having generated a time series on UK discretionary household spending, this was observed to fluctuate to a greater extent than total consumption expenditure, with more extensive falls occurring during economic downturns. On the basis of past research, such a characteristic encouraged the expectation that a measure of consumer confidence would fulfil a more useful role in forecasting the growth of discretionary spending than the well-established aggregates that are found within Consumer Trends.[28] From performing a within-sample analysis, adopting the framework of Bram and Ludvigson (1998), it was discovered that, *ceteris paribus*, there was a statistically significant effect of a change in the GfK index on the behaviour of discretionary consumption. Moreover, compared to expenditure on durable goods, the growth of discretionary spending was seen to enjoy a far more stable relationship with consumer sentiment.

Subsequently, we examined whether the use of the previous quarter's GfK index was able to improve upon the accuracy of the predictions of movements in consumption that were founded upon an evolving sample mean. Selecting the forecast period, 2008Q1 – 2019Q4, with regard to the growth of spending on durable goods, the quality of the predictions was actually seen to decline following the involvement of the confidence variable. In contrast, though, for changes in discretionary consumption, as well as expenditure on semi-durable goods, non-durable goods, and services, the addition of the sentiment measure to the right-hand side of the respective regression equation succeeded in reducing the value of the RMSE statistic. However, the decrease was most marked for discretionary spending. Moreover, when formal tests (McCracken 1999) were performed of equal forecast accuracy, for four out of the five consumption variables, it was possible to reject the null hypothesis at the one per cent level of significance, with the most decisive refutation being for discretionary spending.

In order to place greater emphasis on the period of financial crisis in the UK, the preceding analysis

[27]However, although the percentages might be similar, it must be respected that Isikara (2021) decided upon essential forms of consumption by making value judgements, rather than adopting an empirical approach. Consequently, he elected to interpret expenditure on clothing and transport as necessary, which conflicts with the allocations in the current study.
[28]After having conducted a multi-country analysis, Gausden and Hasan (2020) concluded that greater variability in the data helped to be able to distinguish between the predictive performances of different regression models.

was repeated using the narrower forecast interval, 2008Q1 – 2012Q4. On this occasion, the addition of the previous quarter's GfK index to the regression equation succeeded in reducing the value of the RMSE statistic for all five of the consumption variables, with, again, the improvement in accuracy being most discernible for discretionary spending. Also, when the McCracken (1999) tests were performed, all values of the *OOS-F* statistic were significant at either the five or one per cent level, with the largest value corresponding to the growth of discretionary expenditure.

In conclusion, then, in spite of the need to make some approximations on account of the limitations of the data which are published in Consumer Trends, it would appear that we have produced a series on discretionary consumption expenditure that has a particular benefit. More specifically, we have manufactured a consumption variable which has been found to be more closely related to past movements in consumer confidence than other well-established types of expenditure. It would therefore seem to follow that observation of a rise in household sentiment serves to send a signal that an acceleration of spending is about to occur on, in particular, discretionary forms of expenditure. Thus, upward shifts in consumer confidence might convey an early warning of an economy that is overheating. In this situation, the authorities might seek to respond by a general tightening of monetary policy or by increasing taxes on specific items of expenditure, e.g. alcohol or air travel.

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