Analyses of different parameters affecting household consumption in the United Kingdom

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MSc. in Management   2019 – 2020
Submitted to National College of Ireland

Abstract

This research outlines the consumption behavior in United Kingdom. The previous recessions in UK marked a contraction in consumption expenditure which was boosted by high level of debt financing. The validation of conventional consumption theories in accordance with UK economy is questioned and new consumption model is developed. A model developed is based on all the consumption theories and the current economic trend. The trend of households' behavior in specific economic periods is highlighted. The study then assess the impact of central bank's monetary policy impact on the debt levels of the households. It also emphasize on the issues of rising household debt and problem debt and its impact on consumption. The paper then provides an empirical investigation of UK spending in relation to variables including interest rates, debt levels, income and savings of the households. Analysis is drawn based on the empirical evidence, consumption model and the current trends of these variables. The results suggest that the consumption theories are not completely in line with the current economic conditions in UK.

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Declaration

Submission of Master Thesis

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Title of Thesis: Analyses of different parameters affecting household consumption in the United Kingdom

Date: 19th August, 2020

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Acknowledgements

I would like to thank my research supervisor Dr. Paul Hanly for his time, patience and consideration throughout the undertaking of my thesis. His input was of paramount significance to the completion of this research.

I would also like to thank my family for their encouragement, motivation and understanding throughout the undertaking of this research and the Master's course.

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Chapter 1: Introduction

1.1 Background

The expenditure incurred by households to meet their everyday needs like food, clothing, rent, transportation, durable goods, leisure, healthcare, education and other miscellaneous services is the final household consumption. Household consumption covers a large percentage of GDP and hence, analyzing the household demand is significant for an economic growth (OECD Data, 2020). This research focuses on household consumption during the current recession in 2020 by comparing the behavior of households during previous recession. There has been extensive research to understand households' consumption behavior in various countries in relation to different variables. The relationship between interest rate and household consumption in Germany is explained by Hermann-Josef Hansen, connection between housing wealth and consumption is explained by Andrew Farlow in 2005, relation between house price shock and consumption in the UK in 1990 is explained by R. Disney et.al. Since the consumption by households declines during recession or economic crisis, there are many comparative studies focusing on consumer spending during such times. However, every recession is different in terms of its length and impact, different households will be affected and will behave in different manner. The focus will be on the impact of current recession on the household consumption (Crossley et.al 2013).

There are various consumption models which explains the relationship between savings and consumption, income shocks and consumption. In this research, a number of different variables common to the current and previous recession which impacts consumption in UK will be studied. It includes the households' propensity to save as the economy enters recession, declining expenditure pattern of consumers on some goods and services. These economic model ignore the role of interest rates on consumption, whereas a few economists later placed emphasis on importance of the interest rates on spending. This study intends to explore the current household consumption pattern and its relationship with different variables types, namely interest rate, savings, disposable income, different debt levels for the households' in the UK.

The global recession which hit the UK in 2008 was different from previous recession in 1980 and 1990 in a number of ways. The annual growth of consumption in 2008 global recession was 5% below the normal growth which shows that larger contraction in the economy (Crossley et.al 2013). The fall in consumption could be a result of increase in savings and decline in income. The monetary measures by the central bank of reductions in the base rate also influenced the debt levels and interest rate which impacted the household consumption. According to Financial times, savings amongst households are much lower in UK than any other OECD country (Strauss, 2020). Household debt is of great concern which is rising amongst the low income groups households, this can prove to be a financial concern (Ons.gov.uk. 2019). The Literature gap, along with the changing economy since the previous recession to the current times will be addressed in this research study.

The study analyses the impact the variables including different interest rates, disposable income, savings and debt levels which majorly influences consumption during recessionary times in the UK. There are studies which focused on the previous recessions and its impact on consumption. This study will focus on recession in 2020 and its impact on households. The research will be aimed at exploring the impact of monetary policies like declining interest rates, the saving behavior of consumers during crisis and how will it affect the current household consumption in the UK.

1.2 Structure of the study

This research thesis is split into seven different chapters which are listed as follows:

- The first chapter provides a brief introduction and background to the topic.
- The second chapter provides the existing literature review on the topic from various published journals and economic theories.
- Chapter three outlines the research aims and objectives, defines the research question.
- Fourth chapter provides the detailed methodology that will be followed to conduct the research. Data used in the research will be explained and the various sources from where it was obtained will be listed as well. The complete model which will be used to conduct the statistical analysis with different parameters will be emphasized.

- The fifth chapter lists the findings of the research. It also analyses the findings and relation between the variables in accordance with the literature review of the selected country. It provides an in-depth discussion and answers to the research question.
- In chapter six, the results obtained will be discussed briefly. The limitations of the research work will also be listed.
- The final chapter concludes the thesis along with a few recommendations.

This was an introductory chapter of the thesis. It briefly gives a background of the research work that will be conducted. The structure of the thesis is also explained. In the next chapter, the literature concerning the housholds consumption and different variables (interest rates, debts, income and savings) are explained in detail.

Chapter 2 – Literature review

2.1 Introduction

The literature review highlights the role of various parameters which affects the household consumption in the United Kingdom. This chapter will provide an overview on various parameters like interest rates, savings and debt. With the help of reviewed journal articles and previous research, this study mainly aims at understanding the household consumption post the pandemic. This chapter will study various economic theories and frameworks as well as the past researches on the household consumption and economic crisis in United Kingdom. The consumption of households in United Kingdom will be analyzed using various variables like

- Interest rates
- Income
- Savings
- Debt levels and debt variables

The above mentioned variables will explore various economic theories and framework to explain its relation with the consumption of the household.

2.2 Rationale

In September 2008, the bankruptcy of Lehman Brothers bank in US due to sub - prime mortgages was one of the reason for global financial crisis of 2008 (the Economist, 2013). The recession which followed had not only impacted US but also had significant impact across Eurozone and UK. The banking systems and the process of lending to other markets declined due to the credit risk across financial markets with the fear of bankruptcy. The over reliance of banks on funding lead to insolvency of banks across Eurozone like Northern Rock and HBOS bank in UK (Smith and Arnold, 2017). In times of recession where economy was contracting, monetary authorities like Central banks seeks to stimulate the economy through introduction of expansionary monetary policy through increased consumer spending and promote bank lending.

2.2.1 Monetary policy and its Implications

As stated by H.Ward (2017), monetary policy is the process by which the central bank of the country controls the supply of money by adjusting the interest rates. Monetary policy decision is transmitted through various ways which have indirect effect on the price of goods and services. The transmission mechanism works in two stages, in first stage changes are made in the interest rates or the base money which leads to change in the financial market conditions. In the second stage changes in the financial market are made which leads to the nominal spending on goods and services by households and firms (Angeloni and Ehrmann, 2003). Monetary policy can be expansionary or contractionary. An expansionary policy is used to combat the financial and economic crisis by lowering interest rates (as one of the tools of monetary policy), in a hope that lower interest rates would provide easy credit which will lead to growth. Interest rate is an essential component of monetary policy and as a result interest rate dynamic have gained much attention in the economic and financial sector (Nishiyama, Y. 2012). The expansionary policy works through a number of channels such as reducing the interest rates so that loans become much cheaper and savings become less attractive amongst consumers due to low returns which increases spending and reduce the reserve requirements for banks so they hold less cash reserves and tend to lend more.

2.2.2 Economy in UK

In 2008, Bank of England in UK lowered the bank rate from 5% to 0.5% to make it easier for households and business to borrow money and spend to boost the economy. But there is a limit, how low the interest rates can go and so the central bank adopted another method to boost economy which was Quantitative easing. Quantitative easing or asset purchase is a tool that central banks use to inject money into the economy. It involves creating digital money to buy government debt in form of bonds with lower rate of interest on these bonds. The interest rates on government bonds tend to affect other interest rates in the economy so QE makes borrowing money cheaper for households and it encourages spending. By pursuing QE, it was possible to partially counter the demand shock of domestic and global recession (Myant, et. Al. 2016). The Bank of England has been increasing the QE amount by purchasing government bonds since November 2009 till June 2020. It initially infused 200 billion pounds which helped economy

through the financial crisis. In 2012, BOE infused 375 billion pounds mostly government gilts to meet the inflation target, then again in August 2016 435 billion pounds to revive the economy after the EU referendum. In the year 2020, due to the Covid 19 pandemic, money was infused twice through QE. In March 645 billion pounds and 745 billion pounds in June were injected to help economy survive during the pandemic to boost consumption which leads to economic growth.

2.3 Household consumption trends in previous recession

In 1974, an article by Julius Shiskin defined recession as two negative quarters of GDP growth. However, there were arguments behind the concept of two consecutive quarters which ensure that statistical aberrations or onetime events cannot create a recession; for a recession to occur, the real economy which includes the production and consumption of goods and services should decline (O'Donoghue 2009). The national bureau of economic research defines recession broadly as decline in economic activity visible in real GDP growth, personal income, employment, industrial production, and wholesale-retail sales' (NBER, 2003:1). In this definition various factors are considered which provides an insight into economic health of the economy. However, despite considering various factors NBER did not announce recession without negative quarters of GDP growth which signifies that GDP plays a crucial role in defining recession (O'Donoghue 2009).

Consumption being a significant component of GDP but also is connected to the welfare of the individual citizens and the households. Comparing the consumption pattern of households in previous recession provides an indicator of the severity of the impact. Also comparing various aspects of consumption, debt levels and the savings pattern illustrates the overall distribution impact of the recession. Since 1976, there were 3 recessions in UK. The first one from 1980 Q1 to 1981 Q1, the second recessionary period was from 1990 Q3 to 1991 Q3 and the third one was from 2008 Q2 to 2009 Q3. The trend analysis of these variables is explained in the later part of the research.

Household consumption expenditure is the largest component of the final uses of GDP, since it accounts two third of the aggregate spending in the UK economy (BOE quarterly bulletin). The neoclassical economists consider household consumption as the final purpose in an economic

activity and hence level of consumption per person is a measure of economy's productive success (Bonsu and Muzindutsi 2017) The household consumption expenditure covers all purchases made by the households to meet their everyday needs and it includes all the expenses apart from dwellings (OECD 2013). There has been extensive literature on the consumption and demand for money. A stable demand for money function is necessary to use money supply as an instrument of monetary policy. However due to the financial liberalization policies in 1980's in developed countries led to the instability to the money function, and a switch form money supply to interest rates is used as an instrument of monetary policy (Kumar, S. 2014). Monetary policy decisions are transmitted through the economy in number of ways which have an indirect effect on prices of goods and services.

2.4 Economic models of household consumption - Consumption theories

2.4.1 Life cycle theory of consumption

There are few consumption theories which became focus of research in macroeconomics after the World War-2. Keynes' General theory explored the central role of relationship between consumption and income, it implied that real income was an important determinant of consumption which was later challenged by introduction of psychological factors and social interdependencies based on income concerns (Palley, 2008). In 1954, the life cycle hypothesis by economist Modigliani and Brumberg replaced the Keynesian theory in which the relationship between consumption and savings is presented. According to lifecycle hypothesis, the objective of households is to keep the consumption pattern smooth over their life span by borrowing during the low income phase and saving during the high income phase. It suggests that consumption follows a random walk and is not affected by any kind of financial or non-financial variable like debt or interest rates (Kim, Setterfield and Mei, 2012). According to the life cycle hypothesis, the consumption pattern according to the age profile of the households should be higher for the young compared to the old (Deaton, 2005). The consumption pattern of household is assumed to be smoothed by savings and borrowing while anticipating future growth in income when their income falls. However, there are number of other factors which affect savings and consumption which includes uncertainty over future incomes, income inequality and psychological decisions (Kim, Setterfield and Mei, 2012).

2.4.2 Permanent Income hypothesis

Carroll in 1997, stated in one of her papers that households where future earnings are uncertain, households will be reluctant to borrow since it will be difficult to pay off their debt. If these households expect their future income to grow they will keep their consumption within their current income inducing an articulation between income and consumption. Though the income is increasing the lifecycle theory under uncertainty the consumption of households is constrained by their current income. This is contrary to the insights of the Modigliani model which says that consumption is independent from the profile of income. Another theory which dominated the consumption theory in economics is the Friedman's permanent income hypothesis. According to Friedman's permanent income hypothesis, households' responds to income shocks that alter their lifetime resources and therefore a temporary change in disposable income can only trigger a small change in the consumption (BOE 2017 link). It allows households to make large investments in housing and education and a smooth consumption over time by obtaining higher debt anticipating a higher future income (IMF 2017). However, there are evidences of large estimates of marginal propensity to consume with liquidity restraints, income risk being explanations for violating the income hypothesis. Marginal propensity to consume is the change in consumption to a change in Income. When there is a negative income shock, the household is unable to spend more thus resulting in larger MPC. In contrast, when there is a positive income shock the savings might increase in the household and there would be smaller consumption response (Carroll 2001). This effect is more prominent in the households with low total assets and also households with low illiquid assets (Deaton, 1991).

In 1998, Krugman suggested that a reduction in real interest rates would stimulate household consumption during the Japanese economic crisis. Later the developed countries like US, UK and France adopted this approach. The economic theories suggest that the effect of real interest rate on household consumption also depends on the various other parameters like the income effect and substitution effect. The substitution effect is basically the benefits a consumer may obtain from a decrease in the real interest rate by spending on today's consumption or saving for later. So the decision of the households to spend or save is a key influence on the economic outlook.

Household saving is a significant factor which causes asymmetry between consumption and income risk. Whenever the household is skeptical about future income they may hold some buffer savings to help them through the income shocks and if they can predict a negative income shock they might even cut down spending but only raise the expenditure modestly in case of positive income shock and save the rest (Kaplan et al., 2016). Borrowings by Households lead to growth of the private sector, credit lending although higher household debt and growth may not always lead to the economic growth in the long term perspective (Beck, Levine, and Loayza 2000). When a country faces negative income shocks, high household indebtedness causes significant debt overhang problem and financial vulnerability and lead to a prolonged recession (Mian and Sufi 2011). As per the consulting survey by Bank of England, the estimated results were that the British households changed their consumption more significantly when there was a temporary fall in income than the rise of the same level of income.

2.5 Consumption trends in UK

2.5.1 Savings pattern

Household savings represent the balance between the current income and their current consumption. With the changing economic environment and the tightening of the credit conditions it has altered the view of the households of maintain the appropriate balance between the savings and consumption. During the recessionary years in late 2008 and 2009, the savings ratio had increased to 11.2% and in 2010 it was 11.6%. There are various reasons for the increase in the savings especially during the economic crisis. In an economic downturn when the incomes temporarily fall below the future income the households will spend their past saving to support the current consumption. Attanasio and Weber (1994) provided evidence in their paper that consumption boom and decline in savings in late 1980's after the economic crisis was due to the optimism about the future income prospects and economic boom. The total gross savings (B.8g) and saving ratio of UK households from 1980 until 2019 is shown in Figure 1 and Figure 2, respectively.
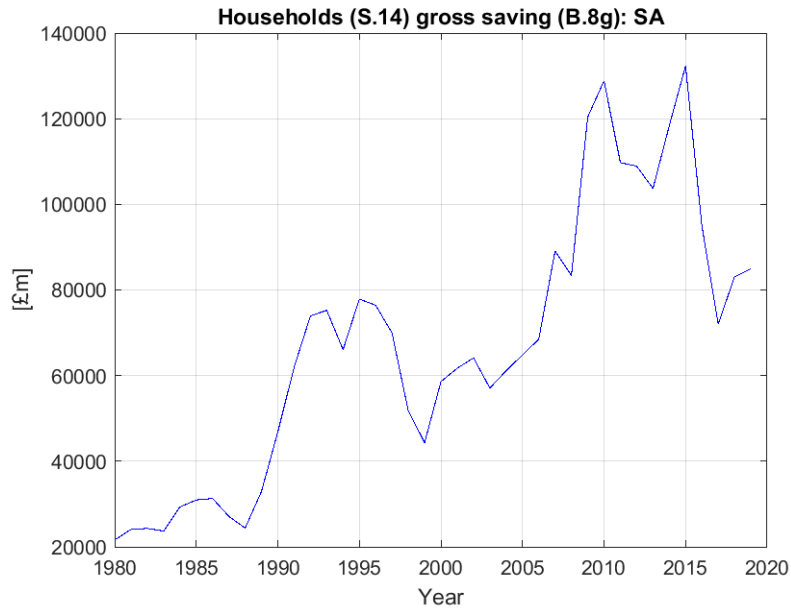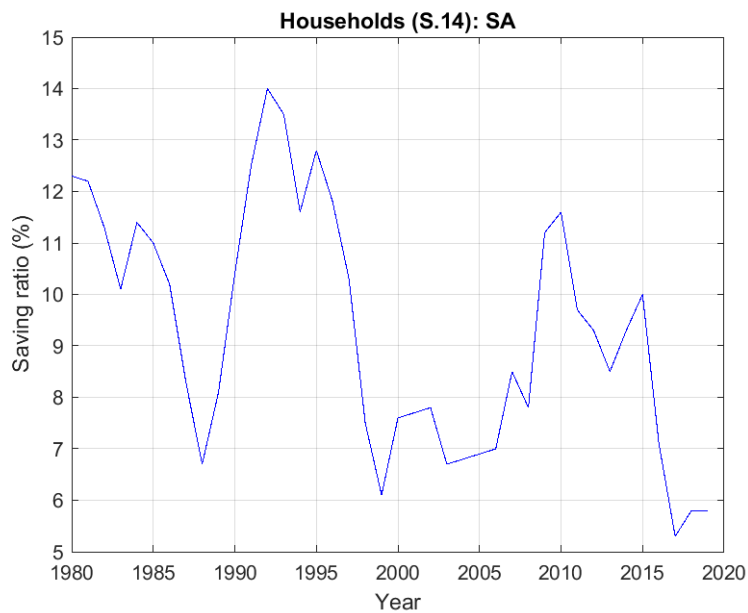
Figure 1: Gross household savings

Figure 2: Households savings ratio

Figure 1 and Figure 2: Source – UKEA - Households (S.14): Saving, gross (B.8g): £million: Current price: Seasonally adjusted (SA), Households (S.14): Households saving ratio (per cent): Current price: £m (million pounds): SA

Analyses: The data in Figure 1 represent the savings of households from 1980 until 2019 whereas Figure 2 represents the saving ratios of households in relation to the overall income from 1980 to 2019. As seen in Figure 1, the gross savings was higher in 2010 in comparison to the savings from 1980 until 2010. For the overall data, the highest savings was in the year 2015. It can be understood that during an economic boom the households save less and spend more and when an economic crisis is anticipated the households start saving more. The income to savings ratio declines after 1981 until 1983 and goes down further between the years 1984 to 1988. In late 1980's, due to the consumption boom, the income to savings ratio was very low (Muellbauer and Murphy 1990) but then the savings to income ratio rose up to 14% due to the economic crisis in the year 1990. There has been a lot of research on the housing price boom in mid-1980's which explains the decline in savings during that period due to the increase in the overall wealth of the households. This states the propensity of households to save and cutback on some goods and services when there is an economic crisis. King (1990) and Pagano (1990) argued that the consumption boom was the result of increased expected future incomes and was consistent with rational, optimizing consumer behavior (Banks and Tanner, 1999). Different recessions have different impact on the households saving and consumption pattern depending on the fiscal and monetary policies of the country. The savings ratio after 1995 slumped to 6% from 12% since the economy was booming in that time frame.

During the great recession in 2008, the savings rate surged up which states that the households tend to save more during the unprecedented times. The savings ratio slumped below 6% after 2015 but it may start to increase in the year 2020 due to the crisis.

2.5.2 Income and Consumption pattern

Based on Keynes theory, Browning and Lusardi in 1996 stated possible influences to save which included precautionary savings which serves as a reserve against contingencies. The lifecycle motivator which provides a relationship between income and consumption needs of the households. The savings of the households encompasses the decision to put money in pension which is a lifecycle motive, to take insurance against unemployment or health conditions – a

precautionary motive or to speculate on stock markets an intertemporal motive. It is also evident from the consumption and income trend analysis of the households in the previous years.
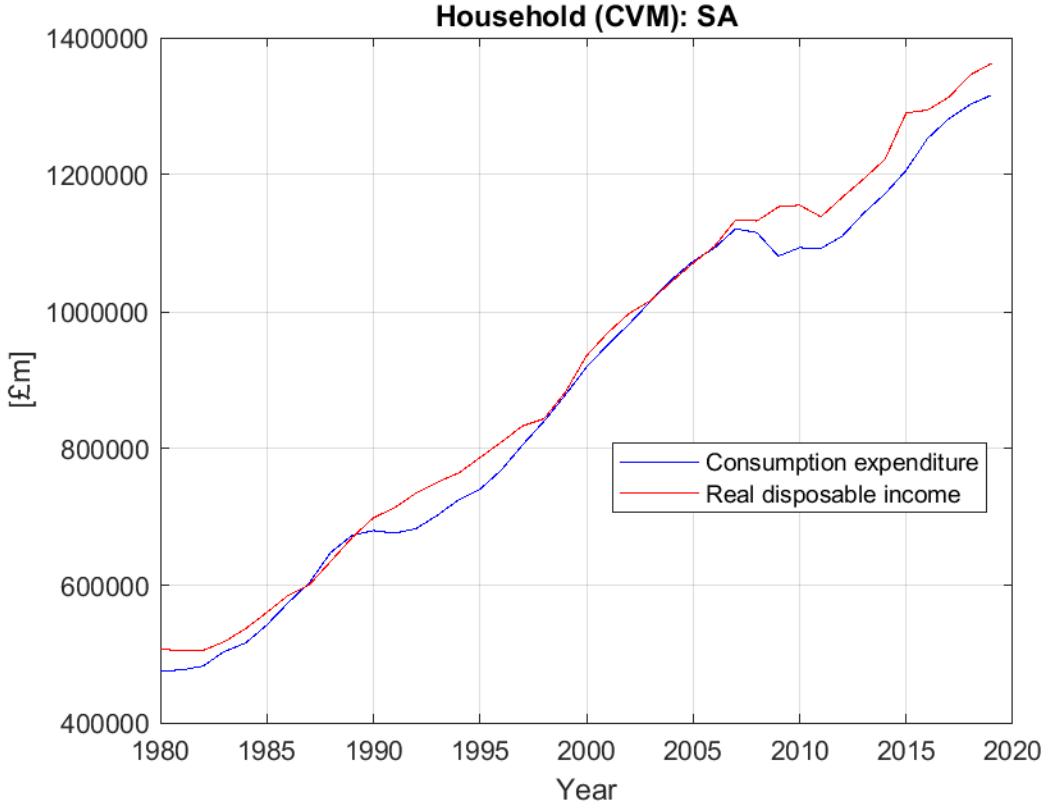
Figure 3: Households consumption (blue) and real disposable income(red) from 1980 until 2019; data set is seasonally adjusted

Figure 3: Source: UKEA - Household final consumption expenditure: National concept chained volume measures (CVM) SA, Households (S.14): Real households disposable income at CVM (reference year 2016): £m: SA

Figure 3 shows the household consumption expenditure and real disposable income from year 1980 to 2019. The consumption pattern and income shows an upward trend over most of the years. The consumption in 1980 was below the real disposable income which was the recession period. It implies that households reduced their consumption expenditure and saved. The gap between the income and consumption reduced after 1985 and consumption was above the income which implies that households spent more when the economy was booming. It can be understood that income is not the only parameter which determines the consumption spending.

The gap between income and consumption rose after the global crisis in 2008 and it was maximum between the years 2008-2010. After the global crisis, it can be seen that the households have been saving a part of their income rather than spending it all as a precautionary motive.
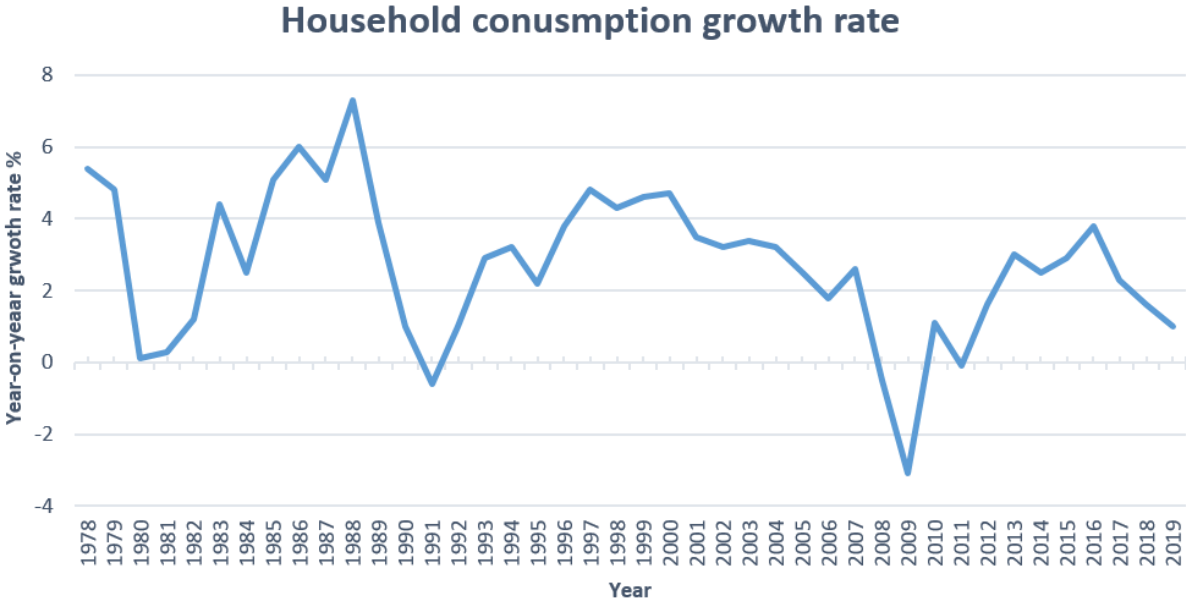
Figure 4: Consumption growth year on year growth rate

Figure 4: Source: UKEA - Total national household consumption annual growth rate year on year – CVM: SA – Office of national statistics

Figure 4 presents the year on year growth rate of the household consumer spending from the year 1978 to 2019. The year on year growth rate indicates the percent change during the past twelve months. It can be clearly observed that during the recession years the household consumption was nearly zero or showed a negative growth rate. In 2019, the consumption growth rate was 1% and it was probably due to the British exit (Brexit) issue.

2.6 Household debt and Interest rates

Every household have a budget constrains which plays a significant role in determining the consumption pattern. The goods and services can be consumed from the income of the household, assets or from obtaining credit. There are different interest rates involved with the

consumption through asset income or through the interest rates (Nakagawa and Oshima in February 2000). According to Financial times, the household spending in UK has been the highest since 2005 in the financial year 2017-2018 (Barrett, 2019). The interest rates in the UK have been low which has encouraged consumers to make purchases on credit. The low interest rates in UK may be one of the reasons for the increased consumption, which implies that more number of households are dependent on credit for buying goods.

There have been previous studies and evidences that suggest the links between general household debt and consumption. Although theoretical model like permanent income and life cycle model predicts that debt does not play a role in household consumption expenditure. In the previous paper by Carroll and Dunn and McCarthy, they have stated that there is positive relationship between the household growth and durable consumption. The growth of credit card debt has also led to a lot of research and there are evidence that consumer durable spending is influenced by credit cards. The debt repayment with interest on household consumption depends on the speculation about the future income growth. Over the past few years in UK, the monetary policy has been encouraging the economic activity by lowering to bank rate which is close to zero and asset purchase by the central bank to push up the asset prices. Low interest rates encourage households to spend rather than save and higher asset prices increases the households wealth (Stockhammer and Wildauer, 2018). Interest rates are important determinant of the current and future consumption and savings. When the real interest rates are high, the households earn a high return on the deposits which encourages them to save more. Likewise, the cost of borrowing is high which pushes down the aggregate spending ratio. The goods and services could be consumed from the income of the household, assets or from obtaining credit. Since the global crisis, a significant amount of attention has been paid to the rising household debt (Bezemer et al. 2016). The debt levels in the developed nations is on a rise due to the expansionary monetary policies by central bank. The rising household debt can pose a financial stability risk due to high household debt and high debt to income ratios compared to the low rate of inflation and wage growth (Stockhammer and Wildauer, 2018). Availability and access to credit boost the consumption and builds personal wealth but high levels of unsecured debt can also cause financial vulnerability.

2.6.1 Reasons for rise in household debt

Rising income inequality has gained prominence as a cause for increase in household debt where poor try to maintain their consumption levels (Kumhof et al. 2012). Before the global financial crisis, very few studies focusing on the role of inequality in income and increase in household debt were conducted. In 2011, Atkinson stressed on how income inequality can cause a great financial crisis. In one of the recent research, the issue of income inequality and financial instability is explored to access the impact of income inequality on debt (Cardaci, 2018).

The mortgage debt and growth in the real estate prices plays a significant role in household debt accumulation (Jordà et al. 2016). The financial institutions consider collateral value from households while borrowing and the rising real estate prices is an important channel which drives up the household debt. The low interest rate of central bank is a major factor for rise in household debt popularly known as low interest rate hypothesis. Sinn and Valentinyi (2013) argued that European monetary policy which led to low interest rates in southern Europe resulted in a debt boom. Credit market deregulation and financial innovation which means eased credit regulation and increased risk taking capability of financial sector also led to rise in household debt.

2.6.2 Debt problem

While considering the level of debt and debt distribution, it is significant to consider the extent of debt which can be a burden or problem for households. The financial debt was considered as heavy burden by 14% of the individuals with financial debt. Few households may even consider debt as problematic which may have some adverse effects on household finances, their living standard financial stability and inclusion. The debt is termed as problematic if there are any liquidity issues or solvency issues within the household. 4% of the households were in a problem debt situation in 2016 – 2018 compared to 6% in 2014 – 2016. Majority households in the lower income households were in a problem debt compared to the high income households (Household debt in Great Britain - Office for National Statistics, 2020). The neoliberal policies in UK led to rise in personal debt amongst households mostly due to the downward pressure on wages which resulted in income inequalities, persistent low interest rates and changes in credit and housing market (Walker, 2011). Before the crisis, as a result of income inequality, income growth apart

for the top income group was stagnant. However, the demand was strong which contributed to growth of the economy during that time but later led to huge household debt and over indebtedness (Cynamon and Fazzari, 2013). The micro aspect of this economic theory is related to the behavior of the households to match the societal standard of their peers. Comparing living standards with the richer households and growing income disparities led to decline in savings. A process by which increased expenditure by few households leads the other households just below them on income scale to spend more is termed as expenditure cascades (Frank et al., 2014). These below income households then look for resources to finance their desired consumption through borrowing. The low interest rates led to house appreciation and availability of mortgage credit to new buyers become riskier (Mian and Sufi, 2009). The banks and other financial institutions tried to seek profitable opportunities in housing market and supplied mortgage to the households who were riskier also known as subprime borrowers. This resulted in increased demand of houses and therefore housing prices increased. The housing prices appreciation implies that households can borrow a greater value against the home equity for their consumption. This causes emergence of a bubble giving an impression about the sustainability of high levels of debt (Cardaci, 2018).

2.6.3 Current interest rate in UK

In UK, bank rate is an important interest rate which is decided by the Central bank of England which is also known as 'Bank of England Base rate' (Aikman, 2020). The bank rate has an impact on other interest rates like lending and borrowing rate in the economy. So if the bank rate is lowered, the interest rate on mortgage is also lowered and also the interest rate offered on savings account is lowered. The number of interest rates available for different types of debt and savings depends on various factors which includes the risk of the loan, the economic conditions and the London Inter-bank offered rate (LIBOR) (Aikman, 2020). LIBOR serves as the benchmark of interest rates in which the selected number of banks (Panel Banks) lend to one another unsecured loans on the London money markets. LIBOR interest rates are used by banks and financial institutions when setting the interest rate for lenders and borrowers (Media, 2020). Hence when there is rate cut or rise in the base rate, banks and financial institutions pass on the consumers.

Most European economies have a lower level of debt and a higher number fixed rate contracts. The monetary policy transmission has influenced the dominance of floating rate or the variable mortgage which has been a structural feature of UK economy (Britton and Whitley, 1997). The high proportion of debtors and the high number of variable rate debt renders the economy susceptible to various external shocks. The European Union encouraged the adoption of fixed rate mortgage in UK, whereas the consumer's reluctance to settle for fixed rate contracts at higher absolute rates forms a regressive argument (Leece, 2000). Fixed rate of interest is considered when the interest rates are expected to grow up and when the mortgage duration is for longer term.

The debt pattern as per the floating rate of UK households can be better understood with the help of Figure 5.
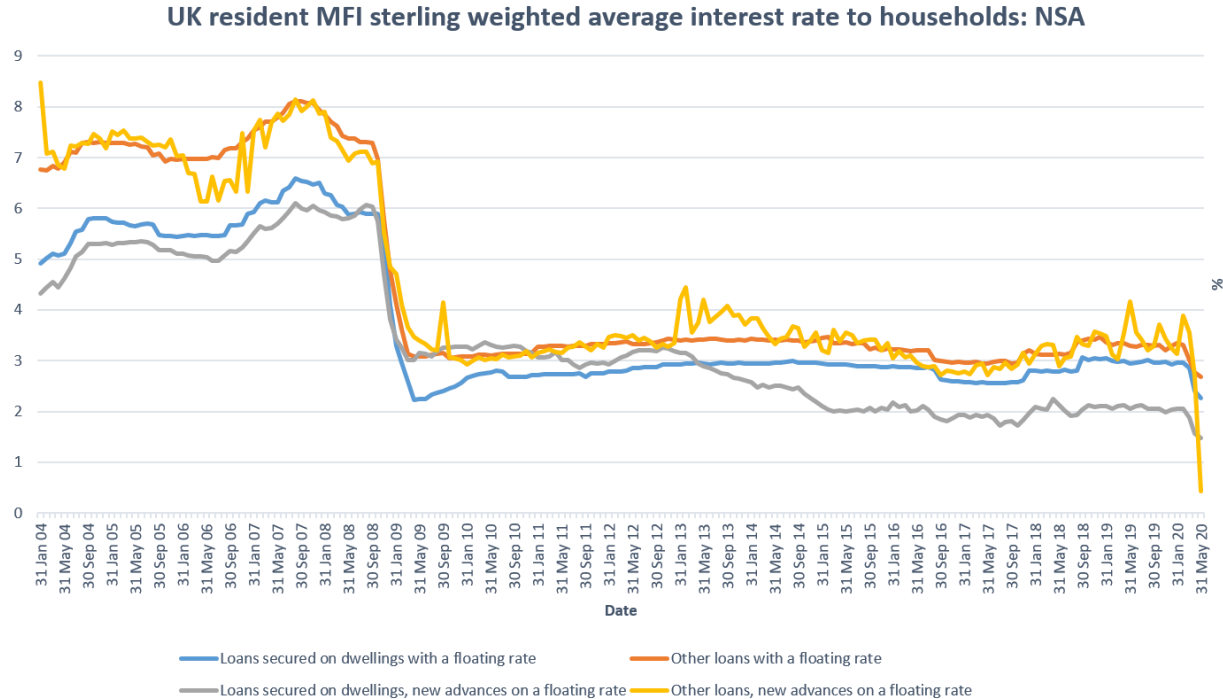

Figure 5: weighted average interest rate to households for different loan types – Floating rate

Figure 5: Source: Bank of England - Monthly average of UK resident monetary financial institutions; (excl. Central Bank) sterling weighted average interest rate - floating rate to households (in percent) not seasonally adjusted (NSA)

Figure 5 represents weighted average floating rate of interest available to households for loans secured on dwellings, other loans and additional new advances on secured loans on dwellings and other loans from Jan 2004 – May 2020. The floating interest rates for different types of loans are plotted in different colors. In general, the loans secured on dwellings were granted at a lower interest rate than other loans. All the interest rates declined considerably after the financial crisis in 2008 The bank rates were lowered during the previous recession from 5.25% in Feb 2008 to 1.5% in Jan 2009. Later in the same year the bank rate was further reduced to 0.50% in March 2009 (BOE, 2020). The variable rate of interest is determined by the benchmark interest rate like the LIBOR or the prime lending rate and additional margins by the lenders. Hence it was lower and it continues to decline in May 2020, the bank rate was further reduced to 0.1% (BOE, 2020).

Figure 6 shows fixed interest rates on dwellings, new advances on dwellings, other loans and new advances on other loans. Each category is denoted by different color in Figure 6. The interest rate data is presented in form of weighted average from the Januray 2004 till May 2020. The fixed interest rates of loans secured on dwellings (blue curve) shows an upward trend from September 2008 to Janunary 2010. During the global recession the credit policies were stringent and banks were reluctant to give loans due to the risk of defualters. In 2010, due to the expansionary monetary policy, there was a rate cut on secured loans and the interest rate continued to decrease and shows a downward trend. The interest rates on new advances for loans secured dwellings (grey curve) indicates that the interest rates declined after Januray 2009. The interest rates on other loans and new advances (yellow curve) curve denoted by yellow color shows greater fluctuations in relation to every year and has a steep fall in May 2020 from about 7% in the previous month to about 2%. The rate for other loans (red curve) is higher compared to new advances. It is evident that the interest rate for new advances was cheaper compared to the interest rate for loans with longer duration of time due to the high risk factor involved for long term loans.

UK resident MFI sterling weighted average interest rate to households: NSA

Legend:
— Loans secured on dwellings with a fixed rate
— Other loans with a fixed rate
— Loans secured on dwellings, new advances on a fixed rate
— Other loans, new advances on a fixed rate
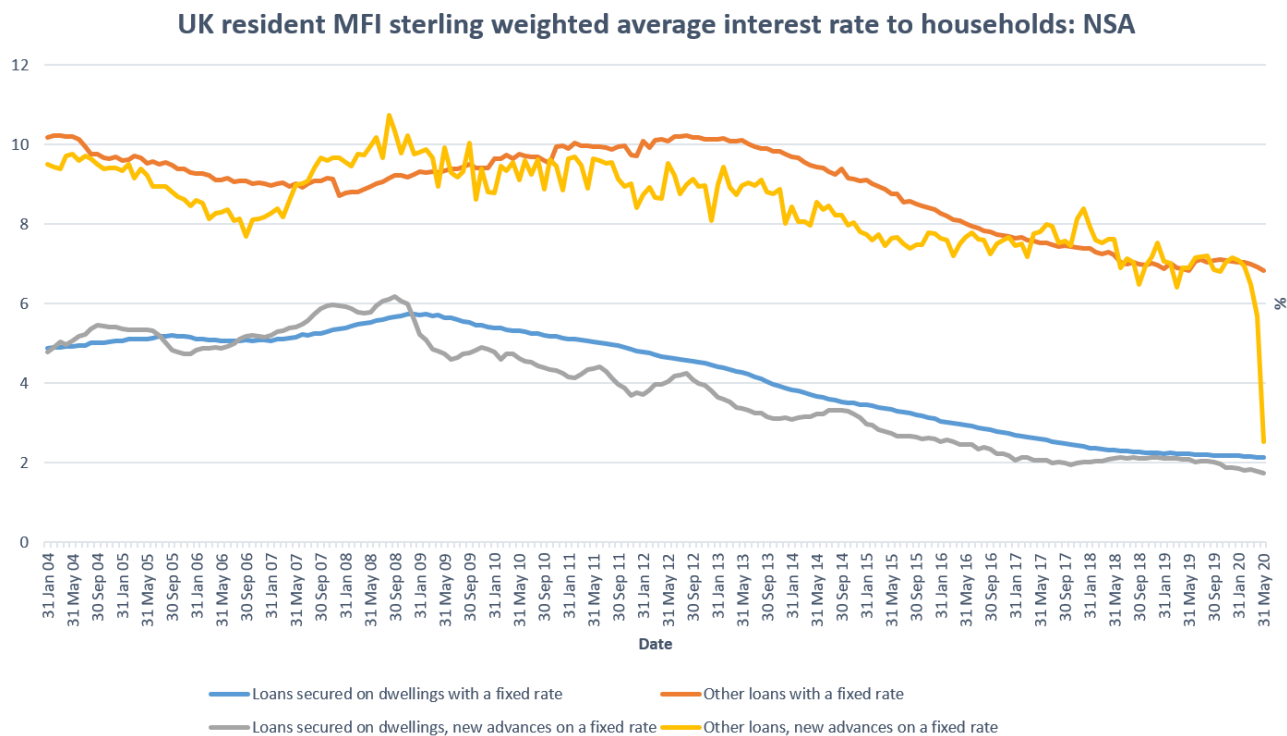
Figure 6: Weighted average interest rate to households for different loan types – Fixed rate

Figure 6: Source: Bank of England – Monthly average of UK resident monetary financial institutions; (excl. Central Bank) sterling Weighted average interest rate with a fixed rate to households (in percent) NSA

Figure 7 shows the different interest rates on personal loans up to 25k pound. The interest rates on personal loan under 10k pounds is presented from the year May 1995 to June 2000, personal loan under 5k pounds is presented from April 2010 to June 2020, personal loan under 25K and 5K are presented from April 2019 to June 2020. The interest rates on personal loans for households under 10k pounds gradually reduces with time and resemble a downward curve with some fluctuations, specifically between the year 2008 to 2011 when the interest rates on personal loans surged. It was below 4% in October 2016 and almost constant till June 2020. During the recessionary period, the interest rates hike on personal loans explains the banks concerns regarding defaulters. The interest rate is fluctuating between 17%-18% on personal loan under 3k pounds.

Interest rate of UK MFI sterling persoanl loan to households: NSA
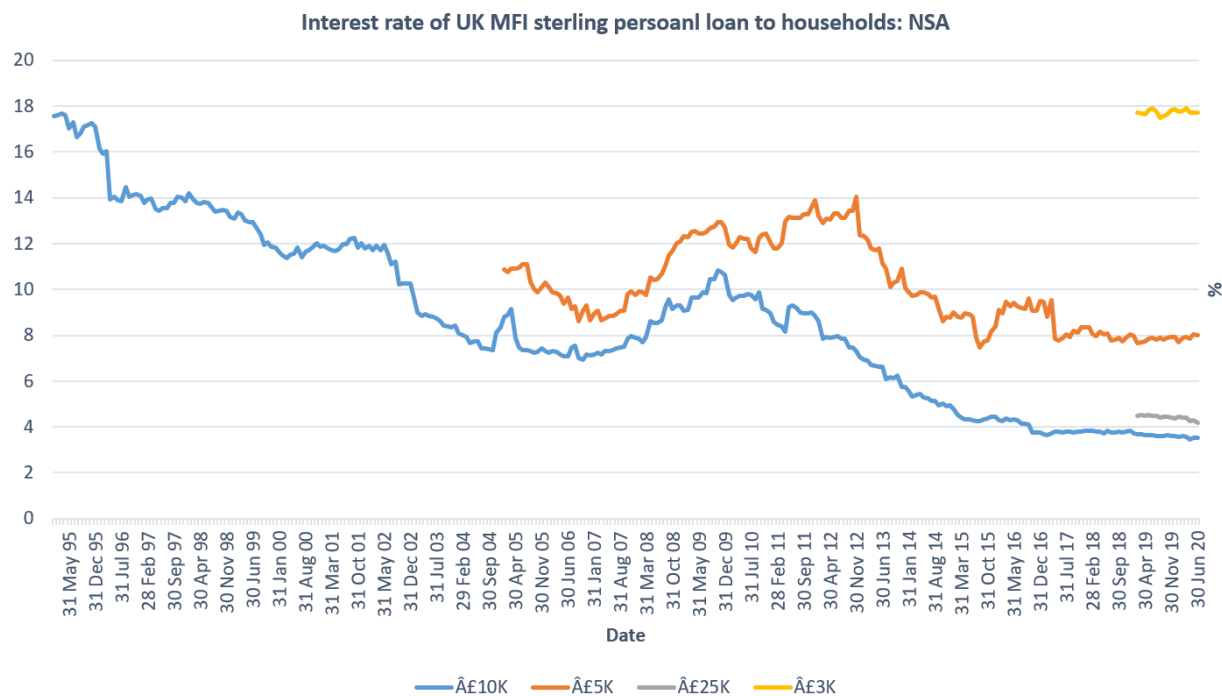
Figure 7: Interest rate on personal loan with different limits to households

Figure 7: Source: Bank of England – Monthly interest rate of UK monetary financial institutions (Excluding central bank) A£10K, A£5K, A£3K, A£25K to households: NSA

2.7 Credit card debt

Household debt in UK can be classified into property debt and financial debt. Property debt includes mortgages and equity release whereas financial debt includes credit card debt, other loans and non - mortgage loan, hire purchase. The financial debt has also risen from April 2014 to March 2018 with an increase of 11%. The level of debt was driven up by increase in the number of households with financial debt from 12.4 to 12.7 million and also the increased levels of financial debt. Financial debt increased from April 2016 to March 2018 for hire purchase, other loans, credit card debt and student loans. The increase in the number of households with student loans rose from 1.6 million in 2014-2016 to 1.8 million in 2016–2018. The number of households with hire purchase rose from 3.9 to 4.6 in the same time frame (Ons.gov.uk. 2020).

As per the wealth and assets survey by Office of National statistics, households with low income group are more likely to have financial debt while the middle income and high income households

are more likely to have property debt. Since the high income group of households are wealthy to secure mortgage, so they mostly have property debt which also has higher value than financial debt. The wealthiest 50% group of households held 64% of total household debt in April 2016 – March 2018 whereas the least wealthy 50% of the households held 36% of total household debt. This is because the wealthy households will have higher mortgage value than household with less wealth (Ons.gov.uk. 2020).

Credit card debt has grown faster in the UK compared to the disposable income of the households which can be a serious concern. According to financial times, the households in the UK are heavily indebted and the household debt in 2019 was 2.8% higher in comparison to 2018 (Vincent, 2020). This includes majority of the credit card debt and also includes auto loan, education loans and mortgages. If the interest rates are low in a country, the consumers get habituated to take credit even if it is not necessary (T. Ekici et al. 2010). When the interest rates are extremely low, the consumers obtain liquidity and with time when the debt keeps on accumulating, it becomes a financial burden for them (Durkin et al. 2014). This can pose a problem in UK, since the GDP of the country in the last quarter of 2019 showed no growth (Office for National Statistics 2020). A comparative and trend analysis of consumer credit debt growth and other loans and advances growth rate of households is carried out.

Figure 8 shows the data for credit card debt and other loans and advances growth rate from January 2011 to May 2020. The credit card debt was higher during 2011 but it started to decline for few months and surged up again in 2013. It continued an upward trend and the debt rose up until March 2017. Later there wasn't any surge and it seemed stabled around June 2018. Later, it started decreasing and a further sudden decrease can be seen from February 2020 to May 2020. Specifically, in May 2020, the credit card debt growth rate was -10%, meaning that the consumer credit card spending was reduced drastically. The other loans and advances growth rate was negative in 2011 and 2012. It started increasing in 2013 and continued an upward trend until 2017. The growth was almost 0% in May 2020 for other loans and advances. It must be noted that the growth rate of credit card lending was negative for third month running and it fell to -10.7% in May 2020 compared to 3.5% in February 2020. The growth of other loans and

advances remained positive at 0.7% in May 2020, but relatively weak compared to the recent past, i.e. in February 2020 the growth rate was about 6.8%. The downfall of debt in 2020 can be linked to the ongoing economic crisis due to the pandemic (Money and Credit 2020).
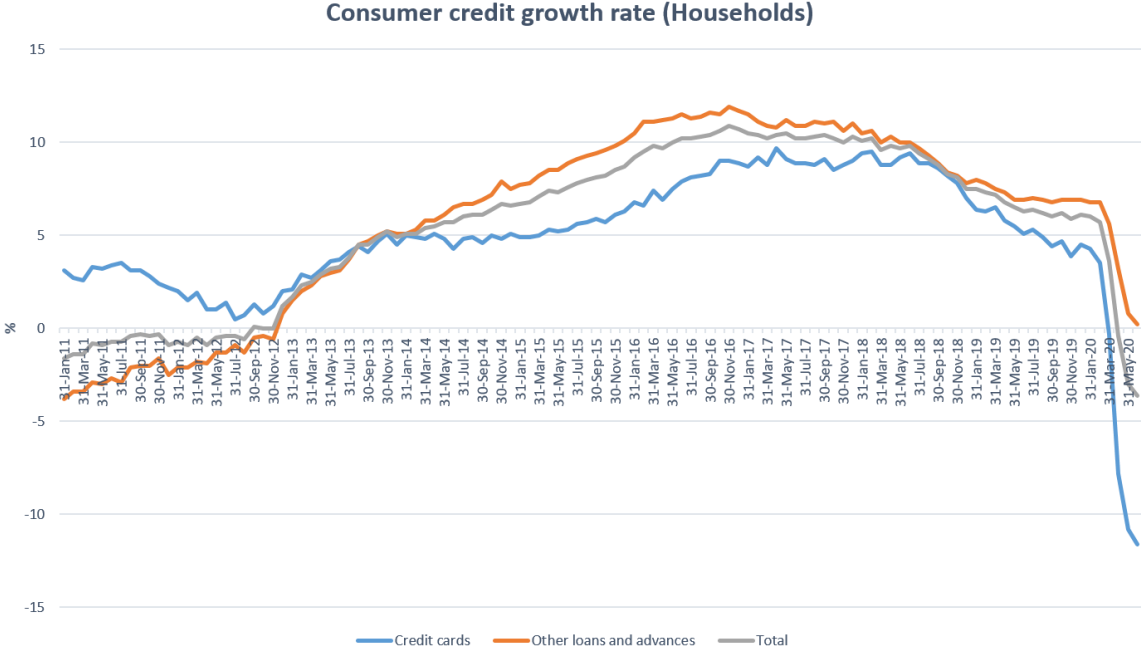
Figure 8: Households credit card debt and other loans and advances growth rate

Source – Bank of England - Consumer credit growth rate

2.8 Literature Conclusion

The presented literature implies how significant the above mentioned factors can be to understand the future consumption behavior of the households. The traditional economic models do hold some significance which influence the consumption but with the changing economic pattern, there are various other factors too which affects consumption. Referring to the literature, there is clear indication that savings and income affect consumption, but the interest rates and easy accessibility to credit also have a huge impact on consumption behavior. Considering the previous year's trend of interest rates, the interest rates have declined considerably in the first quarter of 2020 and there is also a risk for debt problem with increasing household debt. It can pose a threat to the economic stability of the country. The consumption growth rate has also declined in the first quarter of 2020 which can be a sign of economic distress.

Although the literature provides an analysis of the theories affecting consumption and the trends of the variables affecting consumption since past years, the data can also be reviewed statistically to provide further insight on the relationship between the variables. Nevertheless, these theories related to the relationship between consumption and its variables seems to be inept. Further investigation will be carried out statistically and conclusions will be drawn based on the analysis and it links with the literature.

This chapter presented an overview of the theories and current trends pertaining to the thesis research topic. The following chapter will outline the research aims and objectives while defining the research questions.

Chapter 3 Research Question

In this chapter, research questions and its objectives will be outlined.

3.1 Research Question

Primary question

- How will the household consumption be impacted by different variables, namely interest rates, savings, disposable income and debt levels during the current economic recession in the UK.

Secondary questions

- Will the debt levels increase in the UK and affect the financial stability of the economy?
- Will the impact of recession be more severe on households compared to the previous recessions?

3.2 Research aims and objectives

The main objective of the research will be to analyze the effect of the ongoing recession on the consumption behavior of the households.

- The primary objective of the research is to understand the consumption dynamics by analyzing different parameters (interest rates, debt levels of households, income and savings)
- To examine the types of interest rates and its impact on the debt levels which has a direct impact on the economic stability of the country and can lead to prolonged recession.
- It further aims to determine to whether the variables selected (interest rates, debt levels of households, income and savings) have significant relation with the consumption behavior of the households. Also to what extent can it impact the households in United Kingdom during the current recession by analyzing statistically significant variables.
- The secondary objective is to contribute to the academic literature to examine the consumption trends in the UK during the recession in 2020, expanding the current

knowledge by addressing the impact of variables affecting consumption and to contribute to the current economic knowledge regarding the housholds in the UK.

- To study the trend of the previous recession and comparing it with the current economic situation to estimate the length of the recession and provide recommendations to boost the household consumption along with maintaining the financial stability of the country.

The chapter outlined the research questions, research aims and its objective. The following chapter explains the research methodology in detail. The model used to carry out the statistical analysis is briefly described. Different methods used to compute the statistical values are explained in detail.

Chapter 4 Methodology

This chapter explains the research methodology used for this thesis. The methodology selected and the variables chosen for this research are explained and its use is justified. The importance of a clear and effective research methodology is significant to achieve the objectives of the research. Considering research onion as a reference, this chapter also describes the research approach, philosophy and the methods of data collection and data analysis.

4.1 Research philosophy

In the Research Onion, the most external layer of the Onion refers to the way the world is viewed in order to interpret the knowledge on a subject matter (Saunders et al. 2015). It is meant to derive knowledge and drive conclusion by examining the trends and patterns of the related topic. There are 4 different types of research philosophies namely – positivism, realism, pragmatism and interpretivism.

The Wallace's Wheels of Science, mentions about deductive reasoning which is achieved from the cycle of theoretical framework to empirical observations by testing hypothesis (Eikebrokk and Busch, 2016). As per Lin 1998, the quantitative methods test hypothesis and form empirical evidence which is deductive reasoning and positivism is linked to deductive reasoning (Saunders et.al. 2015). The qualitative methods take into account the inductive reasoning, the other half cycle of Wallace's Wheels of Science which is drawing conclusions from observations and then developing a framework or a theory. Inductive reasoning takes into account the personal experiences and situations.

4.2 Justification

By comparing all the four research philosophies, it would be practical to use the research philosophy of positivism which is based on scientific and quantitative methods. The other philosophies which seems to draw inferences from participants, their personal experience seems to be irrelevant in this research study. Additionally, this research, plans to test the hypothesis based on the empirical evidences and theoretical framework of the previous research, which

clearly states that deductive reasoning is relevant. Deductive reasoning approach also eliminates any kind of biased views.

4.3 Research method

There are 3 types of research methods – Qualitative, Quantitative and both. Qualitative research method is derived from subjective experiences of the researcher, whereas the Quantitative method involves a systematic approach through data collection and drawing hypothesis based on the empirical evidence. In this research the choice ideally should be in line with the research philosophy and the reasoning. In this research the numerical measures and statistical tools are used to derive a conclusion which is used in quantitative method. Contrary to this, the qualitative method uses a flexible approach of collection of data and evaluates the real life scenarios (Miles and Huberman, 1994). Considering the above mentioned points, and the hypothesis testing, the researcher opts for quantitative method of research. It is also linked to the research philosophy of positivism and deductive reasoning.

4.4 Research design

Research design is a significant part of the research methodology since it lays out the framework on how to achieve the objectives of the research. It lays the overall standard and consistency of the process (Yin 2014). The three main components of the research design are data collection, measurement and analysis.

The basic structure of this quantitative research design will be as follows:

- Firstly, collecting data and making statistical observation.
- This research will then develop a hypothesis based on the statistical observations and form assumptions regarding the outcome of the hypothesis and plan to test the hypothesis.
- Lastly the findings will be verified and conclusions will be drawn.

4.4.1 Sample selection criteria

United Kingdom is the selected country due to its macroeconomic and business cycle fluctuations, hence it was important to study the pattern of consumption in relation to its impact

on the economy. UK has faced many recessions in previous years and in 2020 the GDP of the country was negative for the second consecutive quarter (Strauss, 2020). So, it can be said that the UK is currently in recession. The expansionary monetary policy adopted by central bank of UK has led to declining benchmark interest rate to encourage consumption growth. Therefore, it is significant to study the households' consumption pattern, debt and interest rate to analyze the impact on households during the current recession.

4.4.2 Data Collection Methods

In this research, secondary source of data will be used to analyze the hypothesis. It refers to the data which is collected other than the researcher and can be obtained from journals, books, articles, magazines, periodicals, websites etc. (Jilcha Sileyew, 2019). The literature data is collected from the academic journals and press releases from Bank of England website, IMF website and OECD website. The description of research variables is presented below:

4.4.3 Research Variables

Independent and dependent variables are used in this research.

Independent variable is the variable which is not affected by any other variable in this research. Dependent variable is the variable on which the research is carried out to study and measure it. In this research the independent variables are different interest rates, different household debt variables, disposable income and savings whereas the dependent variable is consumption.

Note: Data for different variables are available for different time-spans. Hence for different analysis, different range of data set was used. The range of the dataset used will be further specified in the respective analysis part.

4.4.3.1 Independent variable - Interest rates

Interest rate are what the households pay to borrow money and it is shown as a percent of the amount borrowed over a year. Bank Rate is the most significant rate in UK which influences the other interest rates offered by various banks and other financial institutions (BOE, 2020). In UK there, these financial institutions and commercial banks offer two borrowing options – fixed and

floating rate of interest. The floating rate of interest or variable rates fluctuates with the market whereas fixed interest rates are constant for the duration of loan.

In the statistical analysis, four different interest rates are being considered which are as follows:

- Fixed rate for loans secured on dwellings
- Fixed rate on other loans,
- Floating interest rates for loans secured on dwellings
- Floating rate for other loans.

All the data is obtained from Bank of England official website for a period starting from 2004 Q1 to 2020 Q1 **in monthly** format. The data is available in different formats and is easily accessible from the Bank of England official website. The selected timeframe covers the period before the recession in 2008 and after the recession.

4.4.3.2 Independent variable - Household debt

Household debt is the liability of the household which includes consumer debt which is financial debt and mortgages. In the UK, both household mortgage debt and financial debt is increasing which can pose a threat to the financial stability of the country. In this research, the household debt data was collected in three forms which are as follows:

- Short term loans by UK monetary financial institutions (UKMFIs)
- Loans secured on dwellings
- Total housholds financial liabilities.

All the data is collected from Wealth and Asset Survey presented in United Kingdom Economic Accounts (UKEA) data source which is available on Office for national statistics website [Reference to the link]. The data availability ranges from 1987 Q1 to 2020 Q1 and is in quarterly format. The data is measured in two ways, which is current price and chain volume measure, where the inflation effect is removed. In this analysis, households (S.14) short term loans by UKMFIs at current price, households (S.14) total financial liabilities at current price and households (S.14) loans secured on dwellings at current price are considered (Ons.gov.uk. 2019).

4.4.3.3 Independent variable - Disposable Income

Household disposable income is amount of money available for households to spend and save after deductions of direct tax (Ons.gov.uk. 2019). The household income data is from Living Costs and Food survey presented in UKEA available on Office for national statistics website. The data ranges from 1980 Q1 to 2020 Q1 and is available in quarterly format. In this analysis, Households. households (S.14) disposable income (B.6g) at current price is used.

4.4.3.4 Independent variable - Household savings

Savings is the difference between the households' available resources and household consumption. The savings data is from UKEA data set available on Office for National Statistics. The data ranges from 1980 Q1 to 2020 Q1 and is available in quarterly format. In this research, households S.14 Saving, gross (B.8g) at current price is used.

4.4.3.5 Dependent variable – Consumption

Household consumption is the expenditure made by resident households to meet their everyday needs (Ons.gov.uk. 2019). The data for final household consumption is taken from UKEA data set available on Office for National Statistics. The data ranges from 1980 Q1 to 2020 Q1 and is available in quarterly format. In this research, the final household consumption at current price is considered.

4.5 Data Analysis

The model used in this research is $C = \alpha + \beta(Int_n) + \beta(D_n) + \beta(I) + \beta(S)$

where C - represents the household consumption, α is the constant term of the model, β are the estimates for the different interest rates (Int_n), debt parameters (D_n) , households income (I) and households savings (S). The n in Int_n corresponds to the 4 different interest rates explained in section 4.4.3.1. In the case of D_n, the n corresponds to 3 different housholds debt parameters explained in section 4.4.3.2.

This model is based on the consumption economic theories by Keynes General theory of consumption which establishes relationship between Consumption and Income (Palley, 2008), life cycle theory by Modigliani which explains how consumption depends on saving. Additionally,

it explains how households only borrow when the anticipated income is higher than the current income. This hypothesis did not emphasize on the effect of interest rate and debt on consumption. Later Professor Krugman suggested that a reduction in real interest rate affects the consumption and developed countries adopted this approach.

Quantitative data obtained from secondary sources is analyzed using MATLAB software. To observe the long term pattern of the variables, trend of the variables was analyzed. Again to emphasize, independent variables includes income, savings, interest rates and debt; the dependent variable is consumption. Different interest rates considered are explained in section 4.4.3.1 whereas different debt types considered in the study are explained in section 4.4.3.2.

4.5.1 Statistical methodology

The statistical method undertaken in this study to analyze the dependent and independent variables will be outlined.

4.5.1.1 Measure of central tendency and normality test

Data is considered to be normally distributed if it forms a bell shaped curve. When the data is normally distributed, mean and median both can be used as a measure of central tendency. If the data is skewed, the mean will be dragged in the direction of the skew and in such case the median is considered as a measure of central tendency. This implies if the data is skewed, there will be greater difference between the mean and median. The normality distribution is checked for gross disposable income, savings, and final consumption from a period of 1980 Q1 to 2020 Q1.

Measure of central tendency describes the data set by its central position. The measures of central tendency are mean, median and mode. Mean is commonly known as the average and is used with continuous and discrete data. It is calculated as follows:

$$mean = \frac{x1 + x2 + \cdots . xn}{n}$$

where $x1 \ldots . xn$ are the value of the parameter and n is the total count of value.

Median is the middle or the central number of the data set. If the data is skewed, median and mode is preferred.

4.5.1.2 Correlation analysis

Correlation analysis is used to signify the strength of the relationship between the independent and dependent variables. The correlation analysis is performed on all the independent variables in relation to the dependent variable. Specifically, the Pearson's correlation coefficient (R) is computed between consumption and savings, consumption and income, consumption and debt parameters, and consumption and different interest rates. The data of all the variables will be calculated for a period starting from 2004 Q1 to 2020 Q1. The value of R and the corresponding p-value will be presented in tabular format.

A negative correlation means an inverse relation between the variables that is, if one variable increases, the other variable decreases, whereas the positive correlation implies that both the variables move in the same direction. The correlation between interest rates and loans is also analyzed. However, it is important to note that the values of the correlation may not have a direct impact of one variable to another but it measures the strength of the relationship. It does not imply cause and effect relationship.

One of the main limitation of this method variation in the data of debt and interest rates. There are many different types of borrowing and lending rates and debt variables of households in UK, but the four major interest rates which affects the households' consumption are taken into consideration.

4.5.1.3 Regression analysis

Regression analysis is a statistical process to determine if significant relationships exist between the variables, which leads to development of mathematical expressions that describes the behavior of the selected variables. There are 2 sets of variables – Dependent and independent variable. The regression describes how the mean of the dependent variable changes with the changing conditions, whereas the variance of the dependent variable remains unaffected by the changing variable. The independent variable also known as predictor or explanatory variable and

these variables controls the behavior of the model. A simple linear regression model involves one independent variable and states that the mean of the dependent variable changes at a constant rate as the value of the independent variable increases or decreases (Rawlings, Pantula and Dickey, 1998).

A stepwise regression analysis between dependent variable and independent variable will be carried out. A univariate regression between consumption and income, consumption and savings, consumption and debt variables, and consumption and different interest rates ranging from 2004 Q1 to 2020 Q1 will be tested for significance. If the data for any of the independent variables is insignificant, it will be removed from the final multivariate regression analysis. A linear least squares regression analysis will be subsequently calculated based on the significant variables from univariate testing. This will allow for further analysis and to infer the association between the dependent and independent variables.

Further, the assumptions of the regression model will be tested which includes residual normality test, auto-correlation test, homoscedasticity test and residual stationary test.

4.6 Time frame of the research

The time frame selected to study the trend and pattern of income, consumption, savings is from 1980 Q1 to 2020 Q1. This period includes the previous recessionary times in UK which includes 3 recessions, 1980, 1990 and 2008 recession. The behavior of these variables during recession is studied and observations are made to understand the pattern. However, in correlation and regression analysis the time frame considered for all the independent and dependent variable ranges from 2004 Q1 to 2020 Q1 due to the unavailability of data for interest rate. This period covers the time before global recession of 2008. Also, the reason for selecting datasets over longer duration was to encompass event of interest (i.e. recessions) and enhance statistical power of the investigation.

Chapter 5 Result and Analysis

In this chapter, data will be analyzed and results will be presented. An in depth statistical analysis is conducted with different methods on the data collected from different official sources, as explained in the previous chapter. While analyzing the statistical data, various graphs will also be used to demonstrate the trends over a period of time. Graphs offers an alternative outlook while analyzing the quantitative statistics.

At first, we will find out the measures of central tendency like the mean, median and standard deviation of dependent and independent variables. The raw data is tested for normality to see if the data follows a normal distribution patter. Later, a correlation analysis is conducted between the independent and dependent variables. Finally, a regression analysis is carried out on the model proposed in the previous chapter and different associations between independent and dependent variables are drawn. In the last part of this chapter, limitations of the work will be listed.

5.1 Measures of central tendency

Figure 9 shows the households quarterly gross savings data from the first quarter (Q1) of 1980 until the first quarter of 2020. The mean, median and standard deviations of the complete data set is computed and added in the figure itself. The mean quarter value is 16843.47 million pounds whereas the standard deviation is 8044.22 million pounds. It can be observed that the savings pattern trend varies a lot, with households' savings considerably larger in the previous decade (1st Jan 2010 - 31st Dec 2019) compared to the other data presented for other decades. This could be possibly due to higher earnings. The pattern also indicates certain trends, like the savings from 1989 first quarter until 1999 first quarter and from 2008 first quarter until 2017 first quarter are quite similar. It is also seen that the fluctuations in terms of amount were higher in the latter. It must be noted that the sharp decline or rise in the figure is due to the resolution of the figure, as there is data from 8 quarters between two consecutive ticks along the x-axis.
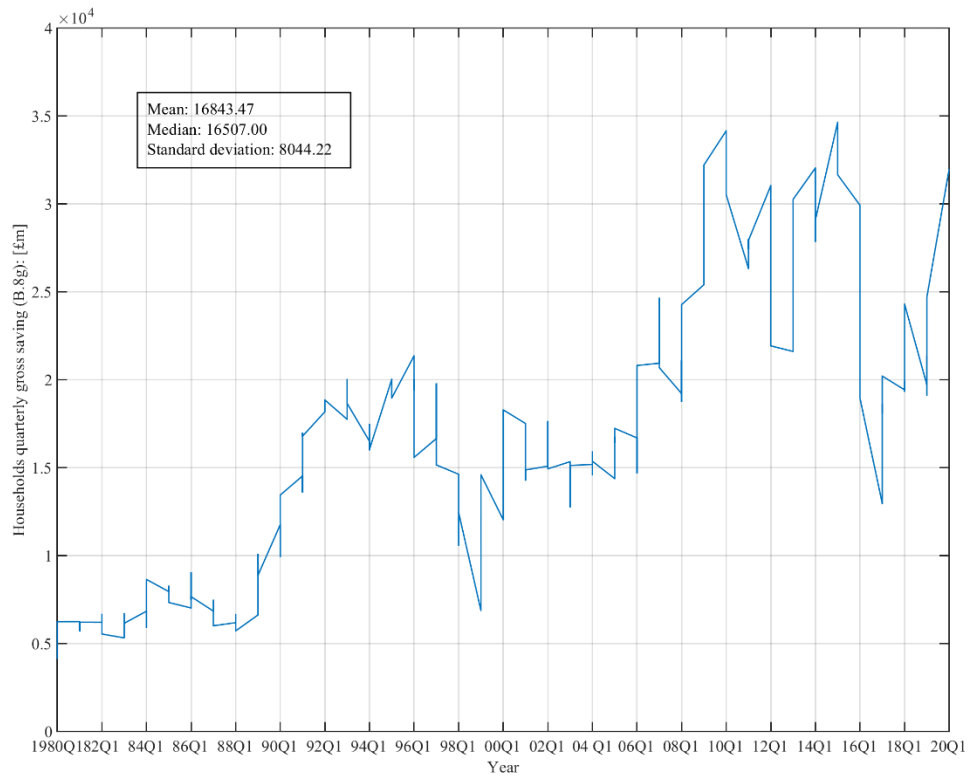
Figure 9: Time series of Households' quarterly gross savings (B.8g)

Figure 10 presents the households' quarterly gross disposable data from the first quarter of 1980 until the first quarter of 2020. The mean, median and standard deviations of the complete data set is computed and added in the figure itself. The mean quarter value is 182701.39 million pounds whereas the standard deviation is 95179.51 million pounds. It can be observed that the disposable income is increasing with time. This increase in the gross disposable income could imply that the earnings in the households have steadily increased with time.
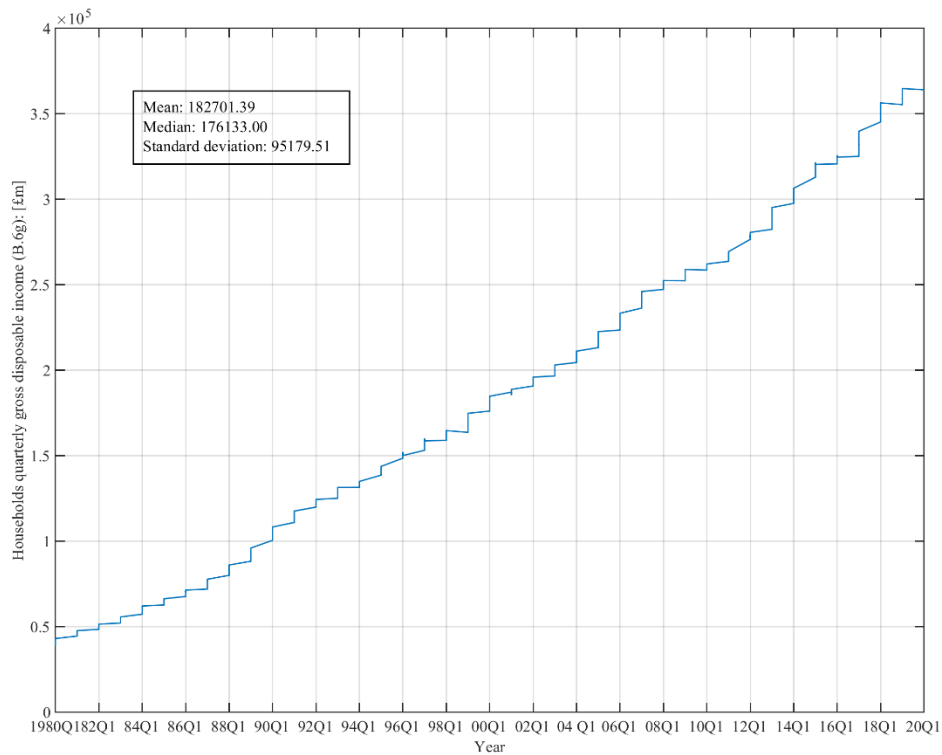
Figure 10: Time series of household's quarterly gross disposable income (B.6g)

Figure 11 represents the households' quarterly final consumption data from the first quarter of 1980 until the first quarter of 2020. The mean, median and standard deviations of the complete data set can also be seen in the figure. The mean quarter value is 176977.87 million pounds whereas the standard deviation is 91592.11 million pounds. It is seen that the households' consumption also increased steadily, similar to the households' gross disposable income, except in certain time span. This increase in consumption is easy to understand as the income has also increased. There are 2 sharp reductions in the households' consumption that could be seen, specifically first being between first quarter of 2008 and the first quarter of 2010 while the second at the first quarter of 2020. The former period corresponds to the recession in the UK while the latter corresponds to the slowdown in economic activity due to the COVID pandemic that hit the world.
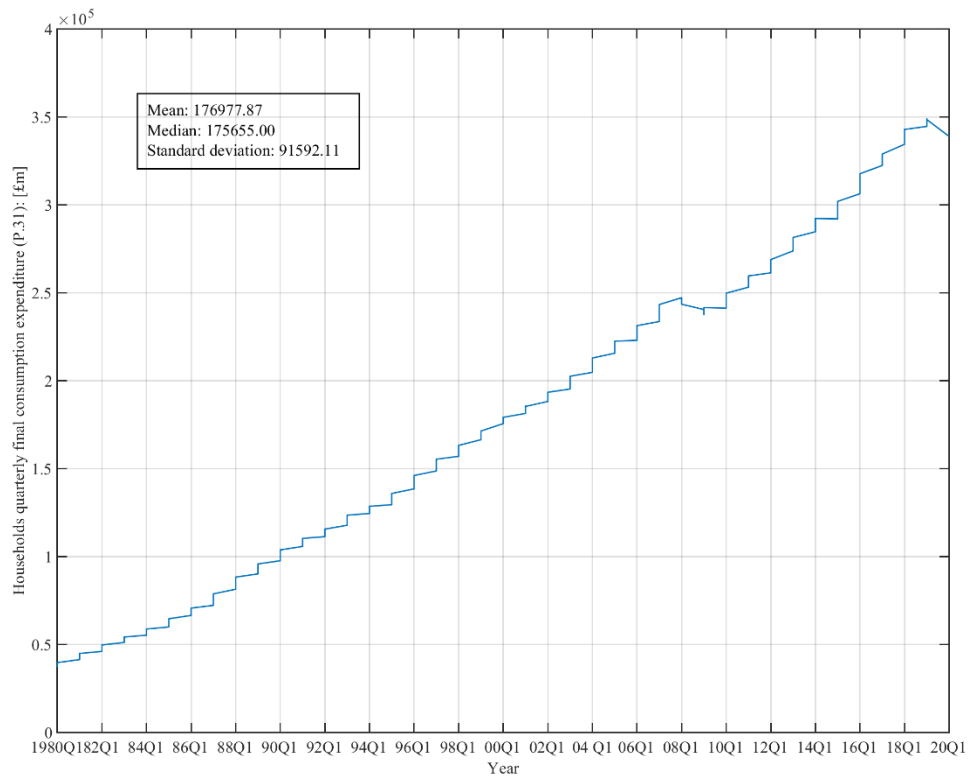
Figure 11: Time series of households quarterly final consumption expenditure (P.31)

Figure 12 shows the amount of households loans secured on dwellings from 2004 Q1 until 2020 Q1 on the left y axis while the corresponding fixed and floating interest rates are depicted on right y axis. The Q1, Q2, Q3 and Q4 for households' loan secured on dwellings corresponds to duration between 1st January to 31st March, 1st April to 30th June, 1st July to 30th September and 1st October to 31st December, respectively. On the other hand, the interest rates plotted for Q1 corresponds to the interest rates on 31st March. For Q2 it would correspond to the interest rate on 30th June, for Q3 it would correspond to the interest rate on 30th September and finally for Q4, the interest rate would correspond to the 31st December. This applies to the dataset of all the years. It must also be noted that both the dataset (loans and interest rates) are not seasonally adjusted. Also, the interest rates are the average of UK resident monetary financial institutions (UKMFI) and are sterling weighted.

From Figure 12, it is observed that the households' loans secured on dwellings has increased with time. The increase was rapid from 2004 Q1 until about 2008 Q2, later the increase was not very significant until about Q4 of 2012 and later it rose steadily again. In terms of interest rates, the fixed interest rate seemed to steadily decreasing from 2008 Q4. For the floating interest rate, there was a sharp reduction from the year 2008 to 2009 (particularly when there was recession in the UK).
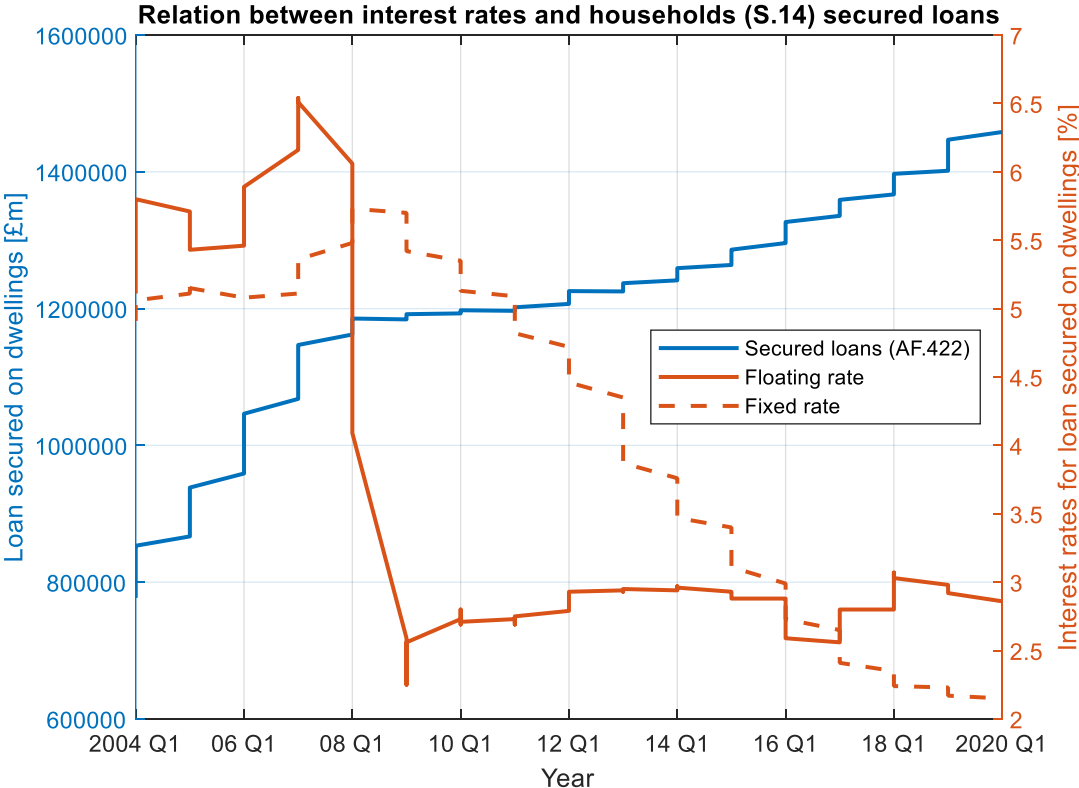
Figure 12: Time series of quarterly households secured loans on dwellings with corresponding fixed and floating interest rate

5.2 Households data normality tests

Figure 13 shows the normal distribution probability plot for households quarterly gross saving from 1980 until 2020 Q1. The blue + markers represents the gross savings data and the red dotted line represent the theoretical normal distribution which serve as a reference for the tests. The red solid line connects the first quantile and third quantiles of data and the dotted red lines on either side of the solid red line extends it till the end of data. Some of the blue markers (gross

saving data) lying between the first and third quantile od data are along all the reference red line and there are markers representing long tails on both ends of the curve, which implies that the variance of the data set is more than one would expect from a dataset representing a normal distribution function.

An additional test referred to as Jarque-Bera test is performed to test the normality of the gross savings data. The Jarque-Bera test (Jarque and Bera, 1987) provides a decision for the null hypothesis which is that the data follows a normal distribution with unknown mean and variance. If the test rejects the null hypothesis, it implies that the data does not follows a normal distribution. The null hypothesis of the quarterly savings data is rejected when tested with the Jarque-Bera test, meaning the data does not follow a normal distribution. The significance level is set to 5% for the purpose of test.
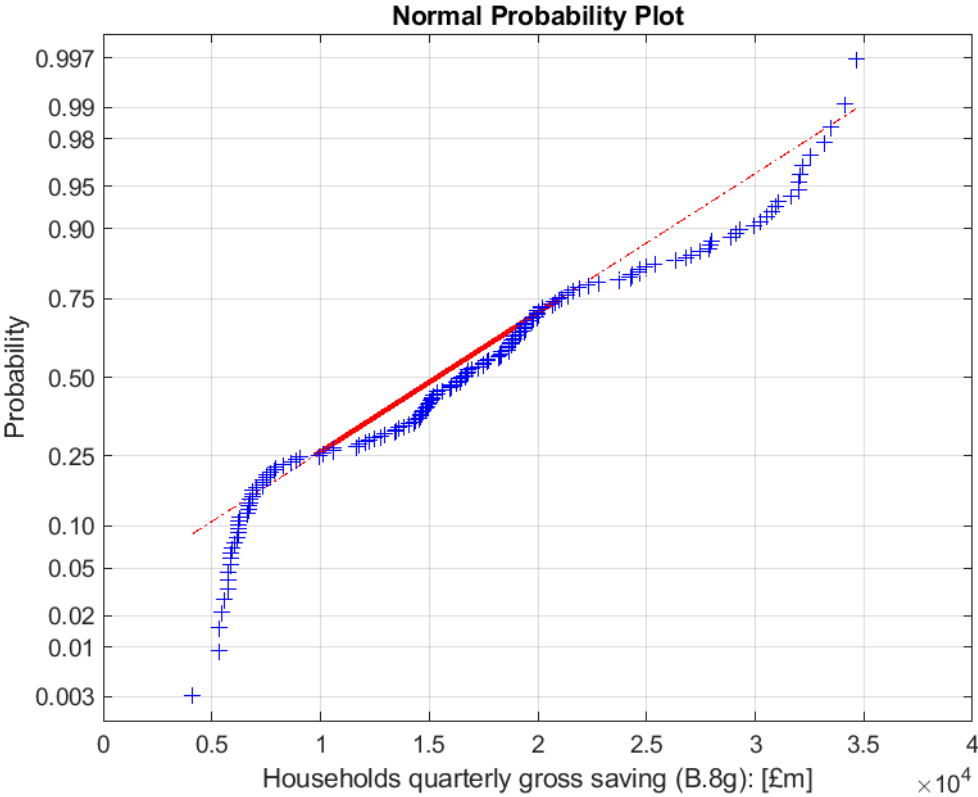
Figure 13: Households Gross savings: normality test

Figure 14 depicts the normal distribution probability plot for households quarterly gross disposable income from 1980 until 2020 Q1. Again, the blue + markers represent the gross disposable income and the red dotted line represent the theoretical normal distribution which serve as a reference. Also, the red solid line connects the first quantile and third quantiles of data and the dotted red lines on either side of the solid red line extends it till the end of data. The blue markers along the center of the dataset fits well to the theoretical normal distribution reference line. But, the tails along both the ends does not fit with the reference line and the deviation is large. Longer tails in the data set implies larger variance than one would obtain with a standard normal distribution plot.

Similar to the previous case, the null hypothesis of the quarterly gross disposable income data is rejected when tested with the Jarque-Bera test, meaning the data does not follow a normal distribution. Again, the test was carried out by setting the significance level to 5%.

Figure 14: Gross disposable income: normality test

The normal distribution probability plot for household's quarterly final consumption expenditure from 1980 until 2020 Q1 is shown in Figure 15. Similar to the previous case, the blue + markers represent the data (consumption expenditure) and the red dotted line represent the theoretical normal distribution line which serve as a reference for the test. The red solid line connects the first and third quantile of the data, whereas the dotted red lines extend till the end of the data on both side. The data points show a linear pattern in the middle and are mostly around the theoretical normal distribution reference line. But, again the tails along both the ends does not fit with the reference line and the deviation is large. Longer tails in the data set implies larger variance and the data is not normally distributed.

The null hypothesis of the final household consumption is rejected when tested with the Jarque-Bera test, meaning the data does not follow a normal distribution. Again, the test was carried out by setting the significance level to 5%.
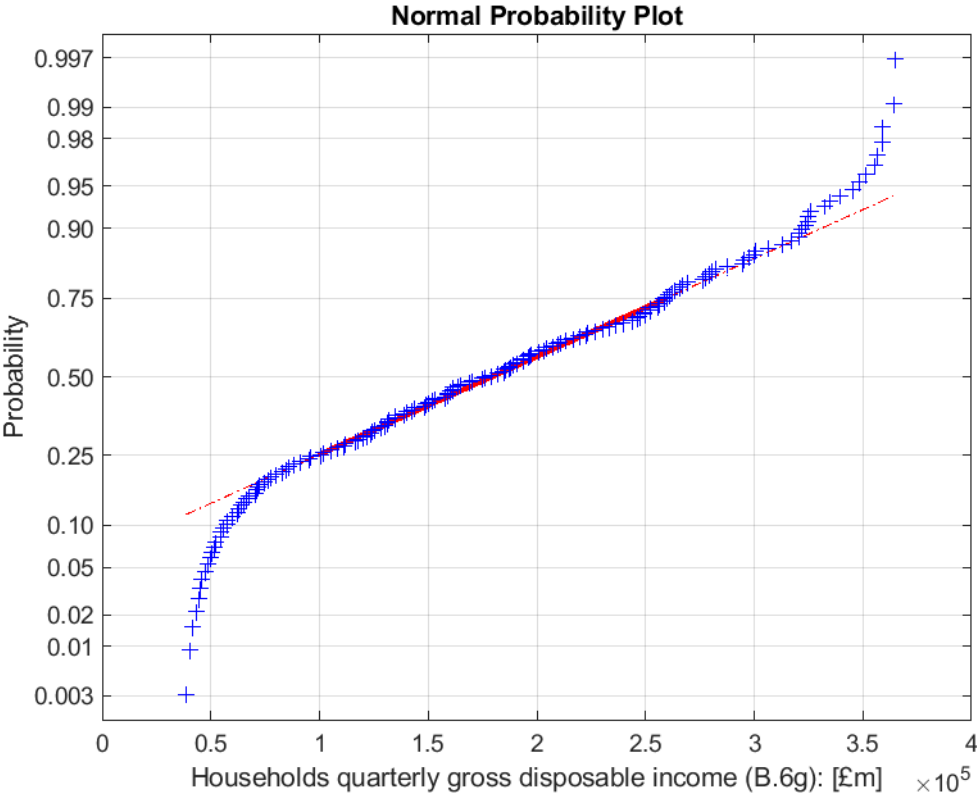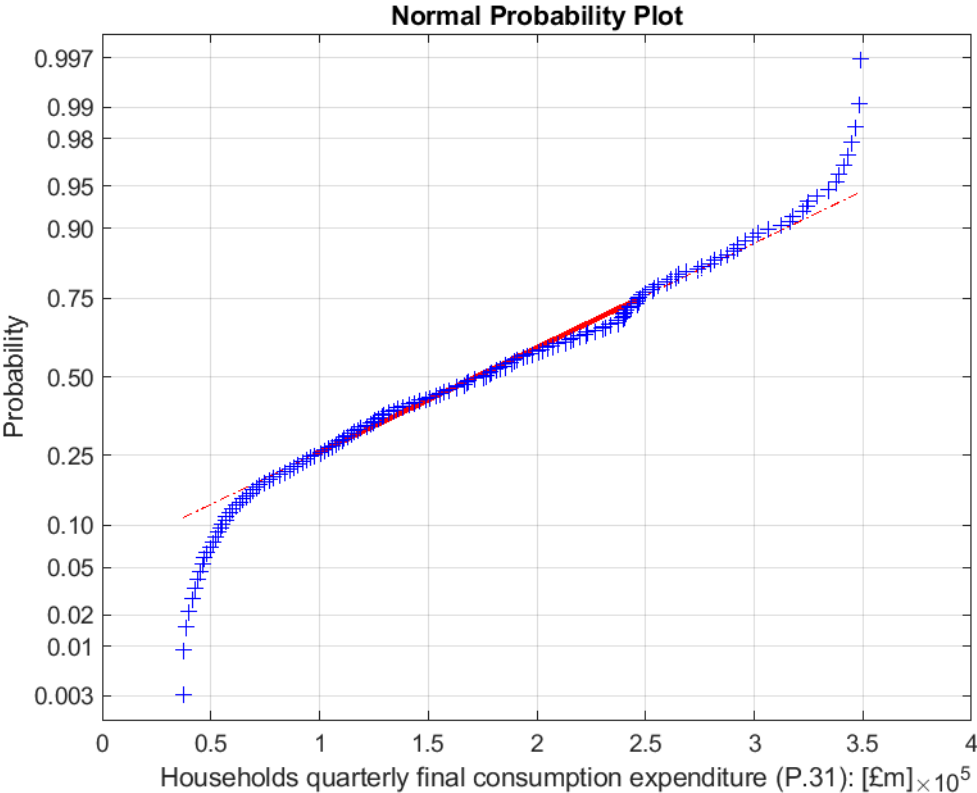

Figure 15: Final consumption: normality test

5.3 Correlation analysis

In order to examine the relationship between dependent variable (consumption) and all the independent variables, Pearson's correlation coefficient denoted by R is computed. It indicates the strength and direction of the relationship. The value of R between independent and dependent variables and their corresponding p-value are listed in Table 1. The data range used for computation of R and p-value of all the variables is from 2004 Q1 to 2020 Q1. p-value is the probability of obtaining the result or occurrence of an event for the given significance test. All tests from hereon are carried out with a significance level of 5%.

Table 1: R and p-value between consumption and all independent variables

Independent variables	Dependent variable (Consumption)	
	R	p-value
Savings	**0.149**	**0.235**
Income	0.993	0.000
Loans secured on dwellings	0.906	0.000
Short term loans by UKMFI	-0.565	0.000
Total household financial liabilities	0.919	0.000
Floating interest rates on loans secured on dwellings	-0.627	0.000
Floating interest rates on other loans	-0.674	0.000
Fixed interest rates on loans secured on dwellings	-0.944	0.000
Fixed interest rates on other loans	-0.817	0.000

From Table 1, it can be observed that income and consumption show a strong positive correlation with value of 0.993 which means that consumption in household increases almost linearly with the increase in the disposable income. Along with income, loans secured on dwellings and total financial liabilities also show a strong positive correlation with consumption. Savings shows a very low correlation of 0.149 which implies that consumption is not affected by saving. Fixed and floating interest rates show negative correlation with consumption which implies that when these interest rates decline the consumption increases. Fixed interest rate on loans secured on dwellings and other loans shows a stronger negative correlation compared to floating rate on loan secured on dwellings and other loans. This implies that decline in fixed interest rates will have a strong positive impact on consumption growth, whereas consumption growth will be

slightly less impacted by decline in floating interest rates. The p value of savings in relation to consumption is 0.235 which implies that it is not statistically significant as it is less than the significance level of 0.05. All the other variables are statistically significant.

5.4 Regression analysis

5.4.1 Univariate regression

In order to find all the variables that are significant in the model, all independent variables are tested in relation to the dependent variable (consumption). Note: As data for interest rates are available from Q1 2004, all univariates testing is carried out for data from Q1 2004 until Q1 2020. Overall 9 univariate tests are performed. Tests with independent variables which yield a statistically significant p value, are then modeled together and multivariate linear regression is carried out. Table 2 summarizes the statistics of all the 9 univariate regression tests (consumption versus 9 different independent variables).

Table 2: Univariate testing for consumption versus all independent variables

Independent variable	Coefficient estimates		Model p-value	Model R-squared
	Intercept	xi		
Savings	**246826.392**	**1.053**	**0.235**	**0.022**
Income	15881.459	0.910	0.000	0.985
Loans secured on dwellings	-11035.032	0.237	0.000	0.822
Short term loans by UKMFI	507202.313	-1.484	0.000	0.319
Total household financial liabilities	-42098.757	0.202	0.000	0.845
Floating interest rates on loans secured on dwellings	343478.897	-19309.885	0.000	0.393
Floating interest rates on other loans	340433.504	-15324.958	0.000	0.454
Fixed interest rates on loans secured on dwellings	410822.362	-33255.656	0.000	0.891
Fixed interest rates on other loans	570672.341	-33458.471	0.000	0.668

The R-squared is the coefficient of determination and it is used to evaluate the degree at which the overall model can predict the value of the output variable accurately. Moreover, a higher R-squared value means that the independent variables explains the variations in the dependent variable largely and vice versa. For the univariate regression model involving consumption and

income, the R-squared value is about 0.985 which implies that it can explain most of the variation in the dependent variable (consumption). Moreover, the p-value is equal to 0 as well implying the income variable is statistically significant. Another univariate test between fixed interest rates on loans secured on dwellings in relation to consumption yields a very high R-squared value and a very low p-value, thereby implying that independent variable is statistically significant. Only the p-value for univariate tests involving savings results in a value of 0.235 which is higher than the significance level of 0.05 and thus it is statistically not significant. Also, the the R-squared value is very small implying the variation in the dependent variable couldn't be explained. All other independent variables except for saving are considered as they are statistically significant and a multivariate linear regression is performed.

5.4.2 Multivariate linear regression

The regression model now can be expressed as follows:

$$C = \alpha + \beta(Int_n) + \beta(D_n) + \beta(I)$$

where I: income – x1, D_n: loans secured on dwellings – x2, D_n: short term loans – x3 D_n: total financial liabilities – x4, Int_n : floating interest rates on loans secured on dwellings – x5, Int_n: other loans floating interest rate – x6, Int_n: fixed interest rate on loans secured on dwellings – x7, Int_n: fixed interest rate on other loans – x8

Overall there are 8 terms which act as predictors in the multi-variate regression model. The estimates of the independent variables and their p-values are solved using an ordinary least squares (OLS) approach and their values are listed in Table 3.

Table 3: Multivariate linear regression statistic summary

Estimates coefficient variable	Estimates	p-value
Intercept	116905.056	0.018
x1	**0.322**	**0.016**
x2	0.064	0.116
x3	0.067	0.600
x4	0.019	0.587
x5	-4074.973	0.363
x6	4451.596	0.233
x7	**-15987.778**	**0.000**
x8	1038.542	0.703

From Table 3, it is observed that p-value of income variable and fixed interest on loans secured on dwellings are below the significance level of 0.05. Hence, they are significant in the model and can explain the variation in the consumption. Based on the estimates, it can be stated that 1 unit of consumption corresponds to 0.322 unit of income. Similarly, 1 unit of consumption would correspond to -15987.778 unit of fixed interest rate on loans secured on dwellings. Note that the unit of interest rate is %.

Table 4 provides the overall model statistics. The overall number of samples used to evaluate the model is 65. The error degrees of freedom are evaluated by subtracting the total sample size with the number of variables in the model (i.e. 9 in our case with one being consumption and other being 8 independent variables). The root mean square error (RMSE) of the model is equivalent to the standard deviation of the error distribution in the model. The R squared value is 0.996 of the entire regression model which means that almost all the variation in consumption is explained by the independent variables. The remaining value of 0.004 (1-0.996) in R-squared represents the error term in the regression model. Finally, as the p value is less than 0.05, it can be said that the model is significant and explains the variation in consumption quite well. As explained earlier, income and fixed interest rates on loans secured on dwellings largely explain all the variation.

Table 4: Overall model statistics

Sample size	Error degree of freedom	Model RMSE	R-squared	p-value
65	56	2946.417	0.996	0.000

5.5 Tests for assumptions of the regression model

In order to test if the regression output is meaningful, the different assumptions of the regression model are tested. If the assumptions are not true, then the model can be further improved by adding more variables, transforming the data or modeling it using non-linear regression models.

5.5.1 Residual normality test

The residuals of the multivariate regression model are tested for normality using the Lilliefors test (Lilliefors 1967). The function is readily available in Matlab and returns a test decision for the null hypothesis (h) and the p value. The results for the tests are presented in Table 5.

Table 5: Normality tests for residuals of the multivariate linear regression model

h	p-value	Test statistic (kstat)
0	0.062	0.098

As the test decision 'h' is equal to 0, it indicates that the residuals of the model are normally distributed. The null hypothesis that residuals are normally distributed is accepted as the p-value is greater than 0.05 (5% significance level). Note: This p-value is not to be confused with the p-value being less than 0.05 for statistical significance.

5.5.2 Residuals autocorrelation tests

The residuals are tested to determine if serial correlation exists. The test is performed using the Durbin-Watson test (Durbin and Watson, 1950) and its function is available in Matlab under the name 'dwtest'. The results of the test are shown in Table 6.

Table 6: Serial correlation tests for residuals of the multi-variate linear regression model

p-value	DW (Durbin-Watson statistic)
0.000	0.656

As the p-value is very small, it implies that the residuals are auto-correlated and hence the condition of independence is also not met. Moreover, as the DW value lies between 0 and 2, it indicates a positive correlation among the residuals. As residuals show serial correlation, different ways could be used to deal with them. One could add an additional independent variable or carry out data transformation such that autocorrelation is reduced or use estimated generalized least squares method. The model will improve once the serial correlation is resolved.

5.5.3 Homoscedasticity tests

The residuals are now tested to see whether the deviation from the linear fit lines are same across all the values i.e. the assumption of equal variances is tested. Figure 16 represents the fitted value in relation to the residuals computed from the multi-variate linear regression model. A certain trend is seen in the plot where there is an increase in the estimated residuals followed by a decreasing pattern and then it repeats itself again. There's an outlier that is also visible in the plot. As the residuals are not random around the zero line, it probably suggests heteroscedasticity. In order to meet the assumption of homoscedasticity, data transformation could be done and outlier must also be deleted.

Figure 16: Homoscedasticity tests of the residuals
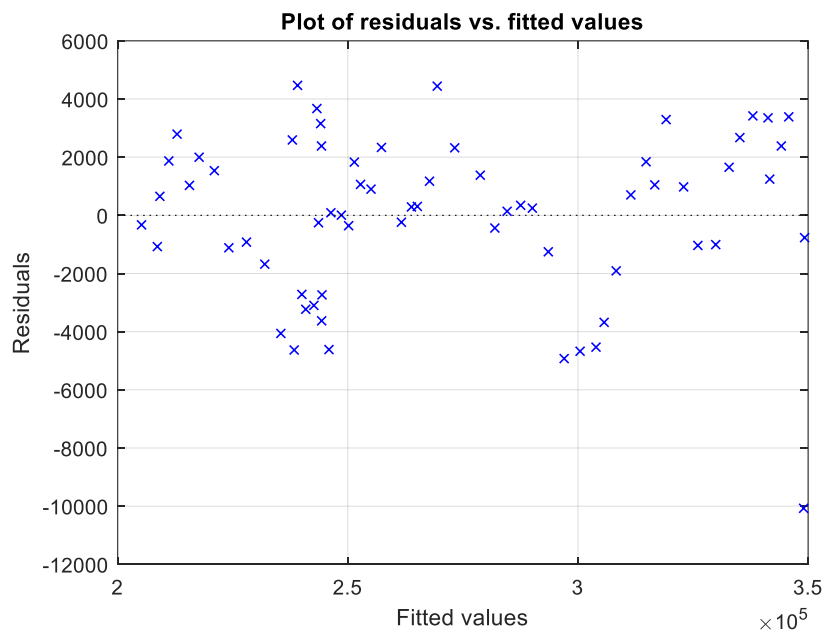
5.5.4 Stationary residuals

The residuals are tested for stationarity using the reverse arrangement test (Bendat and Piersol, 1989). It is tested using the Matlab function 'RA_test (x, method)'. If trend is detected in data, the time series is said to be non-stationary. When the residuals of the model are testing using the RA_test function, it resulted in stationary output.

Even though, the assumption for homoscedasticity fails, the ordinary least square approach is still consistent and unbiased but not the most efficient. Further work is required to adapt the model or the regression should be done using generalized least squares (GLS). As the normal distribution tests for residuals passed, inference still holds valid. The R-squared value of 0.996 implies that most of the variance is explained by the model, particularly from income and fixed interest rate on loans secured on dwellings variables. Lastly, data transformation could help resolve the issue of correlations among residuals.

5.6 Research limitations

- All the analysis in the thesis was carried out without testing for the stationarity of the data until the last week. Later the stationarity of data was tested and it was found that all the data is not stationary. Results of the stationarity tests are presented in the Appendix. Moving forward in the research, the stationarity problem of the time series would be addressed and resolved. The regression analysis would be carried out again and see how the results vary, if at all it varies.

- The quantitative analysis does not take into consideration the behavioral economics which plays a significant role in deciding the consumption and debt levels. This is an open task and needs to be addressed in the future.

- The assumption for homoscedasticity fails and the regression analysis if carried using GLS, the problem could be resolved. Similarly, the correlation problem could be resolved using different ways. Once these problems are resolved, analysis of data can be performed and it would be result in a better model explaining the consumption pattern in the UK.

- The research was carried out using quantitative analysis. This research could be carried out using qualitative analysis where data could be gathered on a large scale around the UK with the help of surveys. This could help in comparing results from both the methods and explain the specific differences obtained.

Chapter 6 Discussions

6.1 Introduction

This chapter intends to answer the research question and arrive at a conclusion by linking the literature and the quantitative data. This chapter brings together the findings and analysis of the statistical data in the previous chapter and discuss it with the current economic situation in UK. Although the results of the data plotted in time series and correlation does show some great evidences, certain aspects in the study needs to be discussed in a brief manner to arrive at a conclusion.

6.2 Results and the Literature

The literature review indicates that there is link between savings, income and consumption through its consumption theories. Life cycle theory states that households, keeping in mind their future income maintain the same level of consumption, by borrowing in times of need and saving during high income years. Whereas the permanent income hypothesis states that the consumption spending is affected by the expected future income, which means that households will only spend if they believe that their future income will be lower than the current income. However, in UK the savings pattern in Figure 1 and the household annual consumption growth rate in figure 4 does not support the life cycle theory. It can be observed in figure 1, there is a decline in the household savings and an increase in the consumption growth rate by 4.8% in 1997. One of the interesting result in the analysis was the lack of statistically significant data between savings and consumption which is contrary to the hypothesis. The correlation between savings and consumption was quite weak. Hence are no statistical evidence of savings having a major impact on consumption. However, the trend analysis in literature review does imply that there is an increase in the savings rate during the recession. A potential limitation in the statistical analysis including the non-availability of data for the previous years of certain variables which may have affected the results.

Income showed a high level of correlation with consumption and in the multivariate regression model the results are statistically significant, which implies that if the income of the households

declines during the recession, it will have a major impact on consumption. Economic theories states that current consumption is affected by the anticipated future income. In this case, the average income of the households which is mean is greater than the median income. Median income is a better measure of income as it is an indicator of standard of living of the individuals from rich to poor (Ons.gov.uk. 2020). Therefore, it can be interpreted that income of the households is not equalized and the increase in the income is only amongst the richer section of the society. During recession, if there are rate cuts or layoffs amongst the lower income group, it may affect the consumption of that group since Income is the most significant factor of consumption.

The total household financial liability also showed a significantly positive correlation with consumption. Financial liabilities include credit card debt, overdrafts, hire purchase, mail order or any other credit commitments. The bank rate was reduced to 0.1% in March 2020 from 0.75% in Aug 2018 (BOE, 2020). Due to the continuous decline in the base rate in UK, households rely heavily on credit to make their purchases and the financial debt is increasing. The eased credit norms were a step to encourage households to borrow and spend more. Hence the positive correlation between the financial liability and consumption. However, increasing debt is not a problem to the economy, but the increase in sub-prime debt can pose a threat to the financial stability of the country. Increase in the debt levels among the households who considers it a burden which leads to adverse effect on household finances. As suggested in the literature review, problem debt in UK is increasing and with its strong correlation with consumption, it can be said that many households rely on financial debt for their consumption needs. This can adversely impact this population of household who rely on debt for their day to day consumption during the current recession with prolonged impact of recession. The distribution of debt amongst the income level and its impact on consumption during the current recession can be a potential topic for research.

The correlation between short term loans by monetary financial institutions shows a moderately negative correlation with consumption. Figure 7 in literature review shows that interest rate for short term loans are higher which might have a negative impact on consumption.

The fixed interest rates have a stronger negative correlation with consumption which implies that if the fixed interest rates are cut down, the households will invest the reduced monthly installments in consumption. Also the multivariate regression table shows the results for fixed interest rates on dwellings as statistically significant. The lower interest rates encourages the households to borrow and make purchases on credit which results in more goods and services being produced in economy. In figure 6, it can be observed that the fixed interest rates on other loans have gone down drastically in May 2020. This was due to the rate cut by central bank to boost the consumption. Hence the statistical evidence are in line with the literature review and fixed interest rate is a major contributor affecting consumption behavior. However, there have been disagreements between the economist and policy makers about the declining interest rates which does have a large impact on consumption but the already high debt of the households limit their ability to take advantage of declining interest rates (Di Maggio, et.al, 2014).

The floating rate of interest on dwellings and other loans have a weak negative correlation with consumption. As per the multivariate regression, the results shows the floating rate as not statistically significant which means it does not impact consumption. However, the difference in result for the two interest rates raises the potential for further research.

The results obtained for two variables are in line with the hypothesis of the model, which states that consumption in UK depends majorly on income and fixed interest rate. The research limitations mentioned in chapter 5 also specifies about the behavioral economics which has a major impact on the consumption trends and also serve as a potential for further research on consumption.

Chapter 7 Conclusions

This paper examines the household consumption in UK in relation with the variables including Income, savings, types of interest rates and different debt levels. It also discusses the consumption trends as per the current economic conditions in UK and tries to analyze the future trend in accordance with the literature and empirical evidence. The basic research objectives of the paper was to understand the consumption dynamics by analyzing the parameters undertaken in this research and secondly to examine the impact of interest rate on debt levels and economic stability.

From the results derived, it can be implied that Income and fixed rate of interest will be the major determinants of consumption in UK (as it is statistically proven in the multi-variate regression test). Decline in Interest rate on loans secured on dwellings can result in consumption growth. The floating rate of interest can also have an impact on the consumption to some extent as shown in the correlation analysis test but it is not statistically significant in the R-squared test. So it can be concluded that floating rate of interest will not impact the consumption pattern. These observations are in line with the current literature and economic trends. However, the increasing levels and dependency of households towards borrowing to support the consumption may pose a threat to the economy. As per the Office for National Statistics survey, the percentage of households with problematic debt decreases when the income levels amongst the low income group rises.

The impact of recession in UK may impact the low income group households' consumption spending, but it will not have a major impact on the high income group of households unless there is a major cutback in the income due to recession. The length of recession can be prolonged if in future there is increasing problem debt amongst the households although according to the trend of savings, the households develop a habit of saving during recession and it may help the households to support the households in case of prolonged recession.

7.1 Recommendations

The impact of recession on the low income group indicates the problem of income inequality. The policy to redistribute income in favor of low income segments of the society and lesser unequal society benefits from a stable GDP. The income inequality lead dramatic booms and bounds of recessions in the economy. The households in credit market should be only allowed to apply loan to one bank in each period depending on the households ability to pay back. The credit market should only provide be collateralized consumption loans so that the problem of bad debts is reduced.

However, further analysis on the income levels and geographical characteristics to consider the housing prices should be done to understand the impact of the recession in UK

References

Angeloni, I. and Ehrmann, M., 2003. Monetary transmission in the euro area: early evidence. *Economic Policy*, 18(37), pp.469-501.

Bankofengland.co.uk. 2020. [online] Available at: <https://www.bankofengland.co.uk/-/media/boe/files/quarterly-bulletin/2009/household-saving.pdf?la=en&hash=BB8CF1055EB6F9EFDB575350AA4D518BFD0BA03E> [Accessed 17 August 2020].

Bankofengland.co.uk. 2020. *What Are Interest Rates?*. [online] Available at: <https://www.bankofengland.co.uk/knowledgebank/what-are-interest-rates> [Accessed 17 August 2020].

Banks, J. and Tanner, S., 1999. HOUSEHOLD SAVING IN THE UK. *The Institute for Fiscal Studies* ISBN 1-873357-93-1.

Barrett, C., 2019. *Inside The UK'S Debt Crisis*. [online] Ft.com. Available at: <https://www.ft.com/content/1ea8527a-5464-11e9-91f9-b6515a54c5b1> [Accessed 18 August 2020].

Beck, Ross Levine and Norman Loayza. 2000. "Finance and Sources of Growth." Journal of Financial Economics 58 (1–2): 261–300.

Bendat, J. S., Piersol, A. G., and Saunders, H. (July 1, 1989). "*Random Data-Analysis and Measurement Procedures*." ASME. *J. Vib., Acoust., Stress, and Reliab*. July 1989; 111(3): 354–355.

Bezemer, Dirk, Maria Grydaki, and Lu Zhang. 2016. „More mortgages, lower growth?" Economic Inquiry 54, no. 1 (January): 652–674. https://doi.org/10.1111/ecin.12254

Britton, E. and Whitley, J. (1997). `Comparing the Monetary Transmission Mechanism in France, Germany and the United Kingdom', Bank of England Quarterly Bulletin, May, pp. 152-63.

Browning, M. and Lusardi, A. (1996), 'Household saving: micro theories and micro facts', Journal of Economic Literature, vol. 34, pp. 1797–855

Bryman, A. and Bell, E. (2015) Business Research Methods, 4th ed. Oxford: Oxford University Press.

Campbell, J and Mankiw, G. 1990. Permanent income, current income and consumption. *Journal of Business and Economic Statistics, 8: 265–79.*

Cardaci, A., 2018. Inequality, household debt and financial instability: An agent-based perspective. *Journal of Economic Behavior & Organization*, 149, pp.434-458.

Carroll, CD (2001) "A Theory of the Consumption Function, With and Without Liquidity Constraints", Journal of Economic Perspectives, vol. 15(3), pages 23-45, Summer 2001

Cynamon, B. Z. and Fazzari, S. M. (2013). The end of the consumer age. In Cynamon, B. Z., Fazzari, S. M., and Setterfield, M., editors, After the Great Recession: The Struggle for Economic Recovery and Growth. New York, NY: Cambridge University Press.

Deaton, A (1991) "Saving and Liquidity Constraints", Econometrica, vol 59(5), pages 1221-48, September

Deaton, A., 2005. Franco Modigliani and the Life Cycle Theory of Consumption. *SSRN Electronic Journal*,.

Di Maggio, M., Kermani, A. and Ramcharan, R., 2014. *Low Interest Rates Can Boost Households' Consumption | VOX, CEPR Policy Portal*. [online] Voxeu.org. Available at: <https://voxeu.org/article/low-interest-rates-can-boost-households-consumption> [Accessed 18 August 2020].

Duesenberry, J. S. (1949), Income, Saving, and the Theory of Consumer Behaviour, Cambridge, MA: Harvard University Press

Durbin, J., and Watson, G. S. 1950. Testing for Serial Correlation in Least Squares Regression I. Biometrika 37, pp. 409–428.

Eikebrokk, T.R. and Busch, P.A (2016) 'Progress and Stewardship in Information Systems Research: Addressing Barriers to Cumulation through Active Process Ownership', pp.1-10. Available at: https://www.researchgate.net/publication/301870765_Progress_and_Stewardship_in_Information_Systems_Research_Addressing_Barriers_to_Cumulation_through_Active_Process_Ownership

Friedman, M. (1957), A Theory of the Consumption Function, Princeton, NJ: Princeton University Press.

Jarque, C. M., and Bera, A. K. (1987). "A Test for Normality of Observations and Regression Residuals." International Statistical Review. Vol. 55, No. 2, pp. 163–172.

Jilcha Sileyew, K., 2019. Research Design and Methodology. Cyberspace, [online] Available at: <https://www.intechopen.com/books/cyberspace/research-design-and-methodology>

Jordà, Òscar, Moritz Schularick and Alan M. Taylor. 2016. "The great mortgaging: housing finance, crises and business cycles." Economic Policy 31, no. 85: 107–152.

Kaplan, G, Moll, B & Violante, G (2016) "Monetary Policy According to HANK", NBER Working Paper No 21897

Kim, Y., Setterfield, M. and Mei, Y., 2012. Aggregate Consumption and Debt Accumulation: An Empirical Examination of US Household Behavior. *SSRN Electronic Journal*, [online] Available at: <https://pdfs.semanticscholar.org/4aa2/15cd802cbb95289cc16fe923163d400c7ee5.pdf

Kumar, S. (2014) Demand for Money in Developing Countries : Alternative Estimates and Policy Implications. New York: Nova Science Publishers, Inc (Economic Issues, Problems and Perspectives). Available at: http://search.ebscohost.com/login.aspx?direct=true&AuthType=ip,cookie,shib&db=e020mww &AN=776154&site=eds-live&scope=site (Accessed: 7 July 2020)

Kumhof, Michael, Claire Lebarz, Romain Rancière, Alexander W. Richter and Nathaniel A. Throckmorton. 2012. "Income inequality and current account imbalances." IMF Working Paper 12/08.

Kumhof, Michael, Romain Rancière and Winant P. 2015. "Inequality, leverage, and crises." American Economic Review 105, no. 3 (March): 1217-1245.

Leece, D., 2000. Household Choice of Fixed Versus Floating Rate Debt: A Binomial Probit Model With Correction For Classification Error. *Oxford Bulletin of Economics and Statistics*, [online] 62(1), pp.61-82.

Lilliefors 1967, H. W. "On the Kolmogorov-Smirnov test for normality with mean and variance unknown." *Journal of the American Statistical Association*. Vol. 62, pp. 399–402.

Lund, T. (2012) 'Combining Qualitative and Quantitative Approaches: Some Arguments for Mixed Methods Research', Scandinavian Journal of Educational Research, 56(2), pp. 155–165. doi: 10.1080/00313831.2011.568674

M., 2020. *Money And Credit - May 2020*. [online] Bankofengland.co.uk. Available at: <https://www.bankofengland.co.uk/statistics/money-and-credit/2020/may-2020> [Accessed 9 August 2020].

Maki, DM. 2000. The growth of consumer credit *and the* household debt *service burden Finance and Economics Discussion Paper No. 2000/12, Board of Governors of the Federal Reserve System*

Mester, LJ. 1994. Why are credit card *rates sticky?. Economic Theory, 4: 505–30.*

Mian, A. R. and Sufi, A. (2009). House prices, home equity-based borrowing, and the u.s. household leverage crisis. National Bureau of Economic Research Working Paper, (15283).

Muellbauer, J. and Murphy, A. (1990), 'Is the UK balance of payments sustainable?', Economic Policy, vol. 11, pp. 345–83.

Murphy, RG. 1998. Household debt *and consumer spending. Business Economics, 33: 38*

Myant, M., Theodoropoulou, S. and Piasna, A., n.d. *Unemployment, Internal Devaluation And Labour Market Deregulation In Europe*. Brussels, Belgium: European Trade Union Institute, pp.197-227.

National Bureau of Economic Research Business Cycle Dating Committee. 2003. 'Recession Dating Procedure'. Retrieved from the National Bureau of Economic Research at: http://www.nber.org/cycles/recessions.pdf

O'Donoghue, E. (2009). 'Economic dip, decline or downturn? An examination

OECD (2013), "Household consumption", in National Accounts at a Glance 2013, OECD Publishing, Paris. DOI: https://doi.org/10.1787/na_glance-2013-12-en

Ons.gov.uk. 2020. *Household Debt In Great Britain - Office For National Statistics*. [online] Available at: <https://www.ons.gov.uk/peoplepopulationandcommunity/personalandhouseholdfinances/incomeandwealth/bulletins/householddebtingreatbritain/april2016tomarch2018#total-household-debt> [Accessed 9 August 2020].

Pagano, M. (1990), 'Discussion', Economic Policy, vol. 11, pp. 387–90.

Palley, T., 2008. The Relative Permanent Income Theory of Consumption: A Synthetic Keynes-Duesenberry-Friedman Model. *SSRN Electronic Journal*, [online] Available at: <https://scholarworks.umass.edu/cgi/viewcontent.cgi?article=1141&context=peri_workingpapers>.

Rawlings, J., Pantula, S. and Dickey, D., 1998. *Applied Regression Analysis A Research Tool*. 2nd ed. Raleigh: (Springer-Verlag New York, Inc.

Robert H. Frank, Adam Seth Levine and Oege Dijk 2014. "Expenditure Cascades", Review of Behavioral Economics 1, no. 1–2: 55-73. http://dx.doi.org/10.1561/105.00000003

Robson, C. (2011), Real world research, 3rd ed., Wiley-Blackwell: Oxford publisher

Saunders, M. Lewis, P. and Thornhill, A. (2015), Research Methods for Business Students, New York: Pearson Education

Sinn, Hans W. and Akos Valentinyi. 2013. European Imbalances. voxeu.org. Available at: www.voxeu.org/article/european-imbalances [Accessed March 9, 2017].

Stockhammer, E. and Wildauer, R., 2018. Expenditure Cascades, Low Interest Rates or Property Booms? Determinants of Household Debt in OECD Countries. *Review of Behavioral Economics*, 5(2), pp.85-121.

Strauss, D., 2020. UK economy suffers worst slump in Europe in second quarter. *Financial times*, [online] Available at: <https://www.ft.com/content/c8b172e2-8f70-4118-9e81-423e9a4b6839> [Accessed 16 August 2020].

Walker, C., 2011. Personal Debt, Cognitive Delinquency and Techniques of Governmentality: Neoliberal Constructions of Financial Inadequacy in the UK. *Journal of Community & Applied Social Psychology*, 22(6), pp.533-538.

Zhang, J, Bessler, DA and Leatham, DJ. 2006. Does consumer debt *cause economic recession?* Evidence *using directed acyclic graphs. Applied Economics Letters, 13: 401–7.*

Appendix

Raw data stationary tests

Stationarity for data was tested towards the end of thesis. In order to evaluate the stationarity for all the time series data, reverse arrangement test was used (Bendat and Piersol, 1989). The Matlab function 'RA_test(x, method)' is available online. If trend is detected in data, the time series is said to be non-stationary.

Table 7 lists the results of stationary for the dependent and independent variables used in the study

Table 7: Results of stationarity tests for all variables

Variable	Time-series stationary results
Consumption	Non-stationary
Income	Non-stationary
Savings	Non-stationary
Loans secured on dwellings	Non-stationary
Short term loans by MFI	Non-stationary
Total financial liabilities	Non-stationary
Floating interest rate on loans secured on dwellings	Non-stationary
Floating interest rate on other loans	Non-stationary
Fixed interest rate on loans secured on dwellings	Non-stationary
Fixed interest rate on other loans	Non-stationary

All the variables used in the study have non-stationary time series. In future, regression models could be developed by differencing the time series and achieving stationarity. The differentiated dataset could then be used for regression and later analyze the relation between different variables.