Department of Political Economy

THE EFFECT OF FINANCIALISATION ON PORTUGUESE PRIVATE CONSUMPTION

Andreia Antunes Gonçalves

Dissertation submitted as partial requirement for the conferral of

Master in Financial and Monetary Economics

Supervisor:

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Invited Assistant Professor,

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ISCTE IUL
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The Effect of Financialisation On Portuguese Households' Consumption

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Acknowledgments

This dissertation would not be possible without the knowledge, guidance and support of Professor Ricardo Barradas who was always available for my doubts, with a great mood and always with a friendly word.

I want to thank my parents, Leonor and Carlos, for the security they always made me feel, for always encouraging me to learn and develop myself as a professional and as a person.

To my friends of a lifetime, Catarina, Chloe, Daniel, Duarte, Mara e Pedro, a big thank you for always being there for me and also for contributing to my personal development.

Finally, to ISCTE-IUL for giving me amazing teachers and colleagues along this past years.

Continuous effort – not strength or intelligence – is the key to unlocking out potential

Winston Churchill

Resumo

Esta dissertação faz uma análise empírica à relação entre o processo de financeirização e o consumo privado em Portugal entre 1996 e 2016. Foi estimada uma equação para o consumo total que inclui quatro variáveis de controlo (taxa de desemprego, taxa de inflação, taxa de juro real de curto prazo e taxa de juro real de longo prazo) e três variáveis usadas para medir o efeito da financeirização sobre o consumo privado (rendimento, riqueza habitacional e riqueza financeira). A financeirização apresenta dois efeitos contraditórios sobre o consumo privado. O primeiro está relacionado com o decréscimo do rendimento das famílias que provoca um efeito negativo sobre o seu consumo e o segundo está relacionado com o aumento da riqueza das famílias que provoca um efeito positivo sobre o seu consumo. Os resultados demonstram que a financeirização contribuiu de forma positiva para o aumento do consumo privado em Portugal, especialmente no período até à crise.

Palavras-chave: Consumo privado, Financeirização, Rendimento, Riqueza Habitacional, Riqueza Financeira, Portugal, Modelo ARDL

Classificações JEL: C22, D10, E21 e E44

Abstract

This paper makes an empirical analysis of the relationship between the financialisation process and private consumption in Portugal from 1996 and 2016. We estimated an equation for total consumption that includes four control variables (unemployment rate, inflation rate, real short-term interest rate and real long-term interest rate) and three variables linked with labour income, housing wealth and financial wealth. According with the financialisation concept, private consumption may be affected in two contradictory ways. The first is related with the fall of households' income and exerts a negative effect on private consumption and the second is related with the growth of households' wealth and exerts a positive effect on it. Our results show that financialisation exerted a positive effect on private consumption in Portugal, especially until the recent crisis.

Keywords: Private Consumption, Financialisation, Labour Income; Housing-Wealth, Financial-Wealth; Portugal; ARDL Model

JEL Classifications: C22, D10, E21 and E44

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I. Introduction

In several countries, an increasing trend of private consumption in the last years has been emerging. However, the households' labour income has not been simultaneously rising. The financialisation process generates two contradictory effects on consumption (Stockhammer, 2009; Onaran *et al*. 2011; Hein, 2012). In one hand, financialisation leads to a decrease of private consumption due to the decline of households' income. On the other hand, it contributes to an increase of private consumption caused by the growth of households' (housing and financial) wealth.

The relationship between the effects above and private consumption has been tested by several empirical studies (Boone *et al.*, 1998; Ludvison and Steindel, 1999; Davis and Palumbo, 2001; Ludwig and Slok, 2001; Mehra, 2001; Edison and Slok, 2001; Boone and Girouard, 2002; Castro, 2007; Farinha, 2008; Sousa, 2008, 2009; Slacalek, 2009; Onaran *et al.*, 2011; Barrel *et al.*, 2015).

This paper aims to examine the role of financialisation in the evolution of private consumption in Portugal over the period 1996 to 2016. It contributes to the scarcely empirical analysis about financialisation in Portugal by covering a widely period (pre-crisis and during and after the crisis), by carrying out an empirical analysis not only to total consumption and durable consumption but also to non-durable consumption. Besides, it incorporates other important variables beyond labour income and households' wealth mitigating the problem of omitted relevant variables.

Since most of financialisation studies are from market-based, highly developed and financialised economies such as the UK and the US, this paper focused on the Portuguese economy contributes for the scarce literature that exists around bank-based and less financial developed economies. Besides this, the paper evaluates the effects of financialisation on total, non-durable and durable consumption during and after the crisis.

A private consumption equation is estimated using seven variables (unemployment rate, inflation rate, short-term interest rate, long-term interest rate, labour income, housing wealth and financial wealth). Since our variables were integrated of order zero and one the estimations were produced using the ARDL methodology.

The paper concludes that financialisation drove households' consumption in Portugal and that it was mainly due to the households' housing wealth. For the full period, the financialisation effect was positive for all types of consumption. Prior to the crisis the wealth effect was sufficient to counterweight the fall of households' labour income regarding total and non-durable consumption. Finally, during and after the crisis, financialisation contributed strongly for both total consumption and non-durable consumption.

The paper is organized as follows. Chapter II presents a literature review on the effects of financialisation on private consumption. In Chapter III, the private consumption equation is presented, as well as the expected effects of each variable used in that equation. In Chapter IV and V, data and methodology are described. The empirical results and the discussion is presented in Chapter VI. Lastly, Chapter VII concludes.

II. Literature Review

Since the mid-1980s, finance has become larger in the majority of economies, dominating the real economy and society in general. This phenomenon, typically called as financialisation, has also altered the behaviour of economic agents in their relationship into the realm of financial markets (Stockhammer, 2010; Lapavitsas, 2011; Barradas, 2017). Households have become more financial engaged not only as debtors but also as assets holders, which is also valid for the low-income and middle-class ones.

It seems therefore clear that financialisation has had an important effect on private consumption in the last years. Effectively and according to the post Keynesian literature, the phenomenon of financialisation has been exerting two opposing effects on households' consumption (Stockhammer, 2009; Onaran *et al*. 2011; Hein, 2012).

The first effect corresponds to a decline of the households' labour income that exerts a negative effect on private consumption. Technological progress and globalisation are the traditional explanations referred in the literature to justify the fall of the labour income in the last years (European Commision, 2007; Stockhammer, 2009; Guerriero and Sen, 2012; Dünhaupt, 2013b). Nonetheless, financialisation has also been referred as an important driver of the fall of the labour income (Hein, 2012; Hein and Detzer, 2014; Michell, 2014; Hein and Dodig, 2015), namely due to three main factors. The first is the alteration in the sectorial composition of economies, namely through the growing importance of the financial sector and the reduction of the weight of the general government. The second is the proliferation of 'shareholder value orientation' as a dominating model of corporate governance. The third is the erosion of trade unions with effects in the collective bargaining power of workers.

The second effect corresponds to a rise of the households' (financial and housing) wealth that exerts a positive effect on private consumption. Several reasons are identified in the literature to explain the rise of households' wealth in the last years, namely a greater availability of credit supported by financial innovation and engineering (Hein, 2012); an economic situation characterised by low historically interest rates, which has deteriorated creditworthiness standards and have made credit more available even for low-income and low-wealth households (Hein, 2012); the adoption of more aggressive banking policies in the credit segment (Stockhammer, 2009) mainly in an environment of increasing competition among banks (Boone and Girouard, 2002); the existence of some stock market and housing

price booms episodes (Hein, 2012); and the emergence of remuneration schemes that includes incentive payments to employees in the form of stock options (Edison and Sløk, 2001).

Note that the combined effect of these two opposing effects on households' consumption has been positive because the increase of the households' wealth more than have compensated the decrease of the households' labour income (Stockhammer, 2009; Onaran *et al*. 2011; Hein, 2012). This seems to suggest that financialisation has been exerting a general positive influence on households' consumption in the last years.

As demonstrated in Table 1, this hypothesis has been widely empirically tested. The majority of these empirical studies estimate consumption equations by including households' labour income and households' wealth as the main determinants of households' consumption following the permanent income and life-cycle theories (Friedman, 1957; Modgliani and Brumberg, 1954; Ando and Modgliani, 1963). According to these theories, the households' consumption depends essentially on households' permanent income, i.e. the current and expected future labour income plus their stock of wealth. Note that the majority of these empirical studies finds a positive relationship between households' labour income, households' (financial and housing) wealth and households' consumption.

Table 1 – *The main empirical studies on the (financial and housing) wealth effects on consumption*

Authors	Methodology (Sample)	Dependent Variable	Independent Variables
Boone *et al*. (1998)	Time series G7 countries 1963-1998 (quarterly data) Error-correction model	Real consumption	Real disposable income Unemployment rate Private consumption deflator Real short-term interest rate Stock market index Real house price index
Ludvison and Steindel (1999)	Time series USA 1953-1997 (quarterly data) Ordinary least squares, dynamic ordinary least squares and Stock and Watson (1993) methodology	Consumption expenditure	Disposable income Stock market wealth Non-stock market wealth
Davis and Palumbo (2001)	Time series USA 1960-2000 (quarterly data) Dynamic ordinary least squares and Stock and Watson (1993) methodology	Consumption	Income Financial wealth Human wealth

Ludwig and Sløk (2001)	Panel data 16 OECD countries 1960-2000 (quarterly data) Pooled mean group estimator	Aggregate consumption	Disposable income Stock market indices (market capitalization) Housing prices indices
Mehra (2001)	Time series USA 1959-2000 (quarterly data) Dynamic ordinary least squares and Stock and Watson (1993) methodology	Consumption of nondurables and services	Disposable income Households net worth Corporate equities held by household
Edison and Sløk (2001)	Time series 7 major OECD countries VAR 1990-2000 (monthly data)	Retail sales (proxy for consumption)	Stock-market capitalization (proxy for financial wealth) Industrial production (proxy for income)
Boone and Girouard (2002)	Time series G7 countries 1970-1992 (quarterly data) Error-correction model	Consumption	Disposable income Total wealth Financial wealth Housing wealth Other wealth Interest rate Inflation rate Unemployment rate
Castro (2007)	Time series Portugal 1980-2005 (quarterly data) Dynamic ordinary least squares and Stock and Watson (1993) methodology	Nondurable	Disposable income Net financial wealth Housing wealth
Farinha (2008)	Panel data Micro data at household level Portugal 1994, 2000 and 2006 Ordinary least squares and two-stage least squares	Consumption of nondurables and services	Income Net total wealth Socio-economic and demographic variables as control
Sousa (2008)	Time series USA 1953-2004 (quarterly data) Dynamic ordinary least squares, Stock and Watson (1993) methodology and VAR	Nondurable consumption of goods and services	Labor Income Total wealth Financial wealth Housing wealth Stock market wealth
Sousa (2009)	Time series Euro area 1980-2007 (quarterly data) Dynamic ordinary least squares, Stock and Watson (1993) methodology, instrumental variables and generalized method of moments	Private consumption	Disposable income Financial wealth Housing wealth
Slacalek (2009)	Time series 16 countries	Total private consumption expenditures	Total compensation of employees

	1970-2003 (quarterly data) Carroll *et al*. (2006) methodology		Net financial wealth Housing prices
Onaran *et al*. (2011)	Time series USA 1960-2007 (quarterly data) ARDL model	Consumption share	Lags of consumption share Gross operating surplus Rentiers income share Non-rentiers income share Net financial wealth Housing wealth Gross domestic product
Barrel *et al*. (2015)	Time series United Kingdom and Italy 1972-2012 (quarterly data) Dynamic ordinary least squares, Stock and Watson (1993) methodology and Carroll *et al*. (2006) methodology	Total private consumption expenditures	Disposable income Net financial assets Housing wealth

Source: Authors' own elaboration

In this Dissertation, we aim to make an empirical analysis of the relationship between financialisation and households' consumption by performing a time series econometric analysis for the Portuguese economy over the period between the first quarter of 1996 and the last quarter of 2016, contributing to the existing literature in five ways.

Firstly, the analysis is carried out for Portugal. In fact, the evidence for Portugal is quite rather limited, in a context where the majority of empirical studies around this matter focus the highly developed and financialised countries, like the United States. Portugal is an interesting case study, namely because its growth model in the last years was supported essentially by the growth of private consumption by following a 'debt-led domestic demand' boom (Barradas *et al*., 2015).

Secondly, the analysis covers the period where financialisation become more preponderant in Portugal (Barradas *et al.*, 2015). Note that the majority of empirical studies includes a period where financialisation was not so much expressive, taking into account the general recognition that it emerges in the 1970s or 1980s.

Thirdly, the analysis covers the period before, during and after the crisis, whilst the existing literature typically focused the period until the crisis. Barrel *et al*. (2015) is the only exception, but their analysis is only centred in the United Kingdom and Italy.

Fourthly, the analysis is carried out not only for the consumption of non-durable goods, which is the traditional strategy, but also for the total consumption and the consumption of durable goods.

Fifthly, the analysis also incorporates other important variables in the explanation of households' consumption beyond households' labour income and households' wealth, which mitigates the problem of omitted relevant variables that could originate inconsistent and unbiased estimates (Wooldridge, 2003; Kutner et al., 2005; Brooks, 2009).

We recognize that Castro (2007) and Farinha (2008) also analyse this issue for Portugal, but they follow different strategies. The latter uses microdata at households' level and focus its analyse only in 1994, 2000 and 2006. The former uses macrodata but its sample does not cover the period where financialisation become more preponderant in Portugal as well as it does not cover the recent period of crisis. Moreover, Castro (2007) only estimates the effects of households' labour income and households' wealth on private consumption on non-durable goods and neglects other important determinants of private consumption.

III. Economic Model and Hypothesis

Our econometric model estimates a private consumption equation by including seven variables. The first four variables are the ones that are normally associated with private consumption such as: unemployment rate, inflation rate, long-term interest rate and short-term interest rate. The last ones are usually used in econometric empirical studies about financialisation: labour income, housing wealth and financial wealth.

Our long-term consumption equation takes the following form:

$$C_t = \beta_0 + \beta_1 UR_t + \beta_2 IR_t + \beta_3 LIR_t + \beta_4 SIR_t + \beta_5 LI_t + \beta_6 HW_t + \beta_7 FW_t + \mu_t \quad \textbf{(1)}$$

where *t* is the time period (quarters), C is the private consumption, UR is the unemployment rate, IR is the inflation rate, LIR is the long-term interest rate, SIR is the short-term interest rate, LI is the households' labour income, HW is the households' housing wealth and FW is the households' financial wealth.

Regarding the effect of each variable on private consumption, the unemployment rate and the inflation rate are expected to impact it negatively; - labour income and financial wealth positively; - and the long-term interest rate, short-term interest rate and the housing wealth can impact it positively or negatively. Thus, the coefficients of these variables are expected to have the following signs:

$$\beta_1 < 0,\ \beta_2 < 0,\ \beta_3 \gtrless 0,\ \beta_4 \gtrless 0,\ \beta_5 > 0,\ \beta_6 \gtrless 0,\ \beta_7 > 0 \quad \textbf{(2)}$$

The unemployment rate affects households' consumption in a negative way since it tends to reflect the business cycle consequently functionating as a proxy for future income levels (Boone *et al.,* 1998; Boone and Girouard, 2002).

The inflation rate is also expected to affect consumption in a negative way since it is a proxy of the real depreciation of non-indexed financial assets and of uncertainty (Boone *et al.,* 1998; Boone and Girouard, 2002).

The effect on households' private consumption of the short-term and long-term interest rates is ambiguous. This is mainly due to the substitution and income effects between

consumption and saving decisions. The income effect states that if households are savers an increase in the interest rates generates a rise of incomes received, which may lead to a higher consumption due to the thought that they do not need to save as much to maintain their savings level. However, through the substitution effect the spending decision is less attractive since the interest rates are now higher the returns of the households' savings are also higher becoming less attractive to spend money.

Like the Keynesian argument states, the labour income is expected to have a positive impact on private consumption. Therefore, the households' consumption increases when their labour income increases, however that increase is less than one, giving the idea that it increases but not as much as their income increase (Keynes, 1936).

Private consumption may increase due to financial wealth through several channels (Ludwig and Slok, 2002). The first channel is the "realised wealth effect", where the value increase of the financial assets tends to encourage private consumption. The second channel refers to the "unrealised wealth effect" and it is about the households' confidence that the value of the financial assets as their income will continue to rise in the future consuming more in the present. The third channel is called the "liquidity constraint effect" and refers to the fact that households can also increase their consumption through the rise of their portfolios values which can be used as a collateral. The forth channel refers to the "stock option value effect", in which the increase in the value of households' stock options spurs their consumption. Finally, even when households do not participate on financial markets they can be affected by changes in the asset prices and this can increase the private consumption of those households.

The housing wealth effect has an ambiguous impact on consumption since that effect varies if the households are house owners or if they are house renters (Ludwig and Slok, 2001). There are three channels in which an increase in house prices may lead to a lower consumption and two that may lead to a higher consumption. A negative effect on consumption is expected if the households are house renters since an increase on house prices constraints their budget given the increase trend of the rents they have to pay. Also, when there is an increase in house prices households who are trying to buy a home may have to consume less or buy a smaller home. This is called the "substitution effect". Finally, there is the "liquidity constraint effect" that says a lot about how the financial system is functionating. If the households facing an increase on house prices are unable to take loans against their house using the credit market they may not consume accordingly to it. However, a house

price increase may lead to higher consumption given the “realized wealth effect” and the “unrealized wealth effect”. According to the first effect, when consumers are house owners, consumption can raise if consumers choose to refinance or sell their house in order to consume more. The second effect, occurs when given an increase in the house price, the house owner chooses not to sell or refinance the house. However, they feel wealthier than before leading to a higher consumption.

IV. Data

In this section, we provide a description of the data used in the empirical analysis. To estimate the private consumption described in the previous chapter we used quarterly data from the first quarter of 1996 until the last quarter of 2016, extracted from several data sources such as *Banco de Portugal, Instituto Nacional de Estatística, OCDE* and *FRED*.

Our dependent variable is total consumption, it was extracted from the *Instituto Nacional de Estatística* database. For a deeper analysis, non-durable and durable consumption were also extracted from there.

The unemployment rate is the ratio between the unemployed people and the labour force which is the population of working age (18-64) that are working or actively seeking it. This indicator was extracted from *Federal Reserve Economic Data (FRED) St. Louis Fed* and is presented as the ratio explained above.

The indicator long-term interest rate and short-term interest rate refer to the real interest rates and were extracted from *OCDE* database.

The variable labour income refers to the indicator of net disposable income and was extracted from the *Instituto Nacional de Estatística* and can be found at the Portuguese National Accounts.

The housing wealth corresponds to the house price index and it was extracted from *OCDE* database at 2010 constant prices and is described as a measure of the prices of residential properties over time.

The variable financial wealth is proxied by the net financial assets, i.e. the difference between financial assets and financial liabilities of households. Both variables were extracted from the National Financial Accounts of the *Banco de Portugal* database.

The variables total consumption, durable consumption, non-durable consumption, labour income and financial wealth are expressed in growth rates year-on-year and were all transformed into constant prices using the Consumer Price Index extracted from *Banco de Portugal* database to avoid multicollinearity problems that could arise if our variables were in ratios of gross domestic product or in a logarithmic form.

Table A1 in the appendix contains the descriptive statistics of each variable and Table 2 contains the correlation matrix between them. Since the majority of the correlation

coefficients are lower than the ordinary ceiling of 0.8 in absolute terms we can therefore conclude that there is no multicollinearity between our variables (Studenmund, 2005). The only exception is the correlation between labour income and private consumption. However, if we perform the Variance Inflation Factor's (VIF's), the hypothesis of multicollinearity is completely excluded because all of them are less than 10 (Table A2 in the appendix).

The correlation between labour income and private consumption and the correlations between (financial and housing) wealth and private consumption are both positive. This could suggest that these variables have exerted a positive impact in private consumption which we will assess in the next Chapter.

Table 2 *- The correlation matrix*

	TC	***UR***	***IR***	***SIR***	***LIR***	***LI***	***HW***	***FW***
TC	1							
UR	-0.602***	1						
IR	-0.015	-0.500***	1					
SIR	0.472***	-0.428***	-0.151	1				
LIR	-0.563***	0.634***	-0.314***	0.037	1			
LI	0.807***	-0.439***	-0.206	0.452***	-0.360***	1		
HW	0.611***	-0.380***	-0.336***	0.197	-0.321***	0.696***	1	
FW	0.406***	-0.004	-0.377***	0.318***	0.110	0.573***	0.380***	1

Note: *** indicates statistical significance at 1% level, ** indicates statistical significance at 5% level and * indicates statistical significance at 10% level

To choose the more accurate econometric model we studied the presence of unit roots. Analysing the results from the ADF test and the PP test (Table 3 and Table 4). According to the results of both tests, the variables that do not contain a unit root at a 5% significance level are durable consumption, labour income, short-term interest rates and financial wealth. This means that these variables reject the null hypothesis which is the variable contains a unit root so with this said we can conclude that they are integrated of order zero. Regarding the other seven variables (total consumption, non-durable consumption, unemployment rate, inflation rate, long-term interest rate and housing wealth) we moved to the unit root tests for the first differences tests because we could not reject the null hypothesis of non-stationary at a 5% significance level. The results of the tests conducted for the unit roots of the first differences were clear the null hypothesis is rejected and so the remaining variables are integrated of order one. According to the unit root tests we have a mix of variables, a group of variables of order zero and another group of order one, therefore we had to use the ARDL models in order to proceed our analysis.

Table 3 - *P-values of the ADF unit root test*

Variable	Level			First differences		
	Intercept	***Trend and intercept***	***None***	***Intercept***	***Trend and intercept***	***None***
TC	0,2831	0,6307	0,0670*	0,0000	0,0000	0,0000*
DC	0,0626	0,2329	0,0054*	0,0000	0,0001	0,0000*
NDC	0,3995	0,7490	0,1242*	0,0000	0,0000	0,0000*
UR	0,6341	0,6688	0,5966*	0,0012	0,0071	0,0001*
IR	0,2915	0,1356*	0,2100	0,0000	0,0000	0,0000*
LIR	0,4116	0,5447	0,1954*	0,0000	0,0000	0,0000*
SIR	0,0649	0,1195	0,0039*	0,0004	0,0025	0,0000*
LI	0,0729	0,2472	0,0096*	0,0000	0,0000	0,0000*
HW	0,5104	0,8676	0,1008*	0,0072	0,0291	0,0004*
FW	0,1008	0,3161	0,0191*	0,0000	0,0000	0,0000*

Note: The lag lengths were selected automatically based on the AIC criteria and * indicates the exogenous variables included in the test according to the AIC criteria

Table 4 - *P-values of the PP test unit root test*

Variable	Level			First differences		
	Intercept	***Trend and intercept***	***None***	***Intercept***	***Trend and intercept***	***None***
TC	0,1197	0,2821	0,0232*	0,0000	0,0000	0,0000*
DC	0,0425	0,1650	0,0034*	0,0000	0,0000	0,0000*
NDC	0,1785	0,3108	0,0522*	0,0000	0,0000	0,0000*
UR	0,7161	0,7662	0,6315*	0,0018	0,0100	0,0001*
IR	0,1077	0,0783*	0,1151	0,0000	0,0000	0,0000*
LIR	0,0924	0,1680*	0,0633	0,0000	0,0000	0,0000*
SIR	0,0259	0,0994	0,0010*	0,0000	0,0000	0,0000*
LI	0,0575	0,1652	0,0084*	0,0000	0,0000	0,0000*
HW	0,2666	0,6163	0,0355*	0,0000	0,0000	0,0000*
FW	0,0047*	0,0216	0,0009	0,0000	0,0000	0,0000*

Note: The lag lengths were selected automatically based on the AIC criteria and * indicates the exogenous variables included in the test according to the AIC criteria

V. Methodology

In this section, we will present and explain the methodology used in our econometric model. Since our variables are integrated of order zero and one, the methodology of Autoregressive Distributed Lags (ARDL) proposed by Pesaran (1997) and developed by Pesaran and Shin (1999) was chosen.

With the methodology selected we advanced to the estimation of the ARDL model. This model explains the behaviour of the dependent variable by lagged values of itself and by the contemporaneous and lagged values of the independent variables. An ARDL model is usually denoted with the notation ARDL (p, q_1, …, q_k) where the number of lags of the dependent variable is denoted p, the number of lags of the first explanatory variable is q_1, and q_k is the number of lags of the k-th explanatory variable.

It can be written like:

$$Y_t = \alpha + \sum_{i=1}^{p} \gamma_i y_{t-i} + \sum_{j=1}^{h} \sum_{i=0}^{q_j} X_{j,t-i}' \beta_{j,i} + \epsilon_t \qquad \textbf{(3)}$$

Being y_t the dependent variable and X_j an independent variable called fixed regressor if it has no lagged terms in the model (q_j= 0) or dynamic regressor if it has at least one lagged term.

It is possible to see the long run response of the dependent variable to a change in the independent variables by transforming an ARDL model into a long-run representation. The calculation of the long-run coefficients is given by:

$$\theta_j = \frac{\sum_{i=1}^{q_j} \widehat{\beta_{j,i}}}{1 - \sum_{i=1}^{p} \gamma_i} \qquad \textbf{(4)}$$

Transforming the (1) into differences and substituting the long-run coefficients from (2), the cointegration regression form of an ARDL model can be obtained and represented as:

$$\Delta y_t = - \sum_{i=1}^{p-1} \gamma_i * \Delta y_{t-1} + \sum_{j=1}^{h} \sum_{i=0}^{q_j - 1} \Delta X_{j,t-i}' \beta_{j,i} * - \widehat{\emptyset} EC_{t-1} + \epsilon_t \qquad \textbf{(5)}$$

Where,

$$EC_t = y_t - \alpha - \sum_{j=1} X_{j,t}{}'\widehat{\theta_j}$$

$$\widehat{\emptyset} = 1 - \sum_{i=1}^{p} \widehat{\gamma_t} \qquad \textbf{(6)}$$

$$\gamma_i * = \sum_{m=i+1}^{p} \widehat{\gamma_m}$$

$$\beta_{j,i} * = \sum_{m=i+1}^{q_j} \beta_{j,m}$$

To test whether the ARDL model contains a long run relationship between the independent variable and the regressors the Bounds test procedure is used and it transforms (3) into the following representation:

$$\Delta y_t = -\sum_{i=1}^{p-1} \gamma_i * \Delta y_{t-1} + \sum_{j=1}^{k} \sum_{i=0}^{q_j-1} \Delta X_{j,t-i}{}' \beta_{j,i} * - \rho y_{t-1} - \alpha - \sum_{j=1}^{h} X_{j,t-1}{}' \delta_j + \epsilon_t \qquad \textbf{(7)}$$

The test statistic has a non-standard distribution whether the regressors are all integrated of order zero or all integrated of order one. Pesaran *et al.* (2001) provide critical values for the cases where all regressors are integrated of order zero and the cases where regressors are integrated of order one. Pesaran *et al.* (2001) also suggest using those critical values as bounds to when there is a mixture of regressors integrated of order zero and of order one.

To sum up, an ARDL model will be used and to test if it is adequate four diagnostic tests will be conducted (autocorrelation LM test, normality test, heteroscedasticity test and Ramsey RESET test).

VI. Empirical results

In this section will be presented the analysis of cointegration, the four diagnostic tests (autocorrelation LM test, normality test, heteroscedasticity test and Ramsey RESET test), the long-term estimations and the short-term estimations of all types of consumption durability and finally, its economic effect.

We choose four lags for total consumption and for each type of consumption durability (non-durable and durable) since it was what Pesaran *et al.* (2001) indicated for quarterly data. With the number of optimal lags selected we proceeded to the estimation of our ARDL models on E-views software (9.5 student version) considering four as a maximum order to our ARDL for total consumption and its components.

To analyse the existence of cointegration between our four variables we used the methodology developed by Pesaran *et al.* (2001). According to it, if the F-statistic is above the upper bound the null hypothesis of no cointegration can be rejected; if it is below the lower bound, the null hypothesis cannot be rejected and finally, if it is between the lower and the upper critical values the result is not conclusive. Total consumption does not show any characteristics of the existence of trend and so, no trend was considered (Figure A1 in the appendix). Since the upper bound critical value at 1% is 2.73 and the computed F-statistic is 10.70, the null hypothesis of no cointegration can be rejected. Therefore, the existence of a cointegration relationship between our variables can be checked. Non-durable consumption and durable consumption also checked the cointegration relationship between variables.

In order to assess the adequacy of our model we conducted four diagnostic tests (Table 5). The null hypothesis of normality and homoscedasticity could not be rejected and so we were able to conclude that our residuals were normal and homoscedastic. Through the LM test we were able to conclude that our econometric model does not suffer from autocorrelation problems. Using the Ramsey's RESET test, we reject the null hypothesis and so our econometric model may not be well specified in its functional form. Although, analysing the plots of CUSUM and CUSUMSQ (Figure A12 and Figure A13 in the appendix) over the sample period we can conclude that our coefficients are stable and that there are no significant structural breaks since the recursive residuals are between the straight lines of 5% significance levels. This was also valid for non-durable consumption and durable consumption.

Therefore, we can conclude that our ARDL model does not suffer from any econometric problem.

Table 5 - *Diagnostic tests for the ARDL estimations*

Variables	Test	F-statistic	P-value
Total Consumption	**Autocorrelation**	0.544	0.464
	Ramsey's RESET	2.785	0.101
	Normality	2.577	0.276
	Heterocedasticity	0.402	0.992
Non-durable consumption	**Autocorrelation**	0.098	0.755
	Ramsey's RESET	1.814	0.076
	Normality	1.607	0.448
	Heterocedasticity	0.766	0.780
Durable-consumption	**Autocorrelation**	0.286	0.595
	Ramsey's RESET	0.858	0.395
	Normality	4.470	0.107
	Heterocedasticity	0.624	0.878

Note: Autocorrelation tests were conducted with 1 lag and Ramsey's RESET tests with 1 fitted term

Now, we will start by analysing the long-term estimations of the private consumption disaggregating it by durability (non-durable consumption and durable consumption).

Table 6 - *The long-term estimation of private consumption by durability*

Variable	Total	Non-durable	Durable
UR_t	-0.1294	-0.1914***	0.6383
	(0.0916)	(0.0472)	(0.4262)
	[-1.4130]	[-4.0578]	[1.4975]
IR_t	-0.2655	-0.0963	-2.0365**
	(0.1605)	(0.0856)	(0.7825)
	[-1.6541]	[-1.1245]	[-2.6026]
LIR_t	-0.4344***	-0.3982***	-1.3458***
	(0.0741)	(0.0373)	(0.3546)
	[-5.8660]	[-10.6844]	[-3.7954]
SIR_t	0.3370***	0.4348***	0.1589
	(0.1156)	(0.0586)	(0.6032)
	[2.9168]	[7.4181]	[0.2634]
LI_t	0.3310 ***	0.0941**	1.8267***
	(0.0793)	(0.0449)	(0.4110)
	[4.1731]	[2.0946]	[4.4441]
HW_t	0.0950*	0.1029***	0.3405
	(0.0553)	(0.0306)	(0.2632)
	[1.7180]	[3.3611]	[1.2937]
FW_t	0.1876***	0.0981***	0.8998***
	(0.0459)	(0.0218)	(0.2245)
	[4.0911]	[4.4952]	[4.0072]

Note: Standard errors in (), z-statistics in [], *** indicates statistical significance at 1% level, ** indicates statistical significance at 5% level and * indicates statistical significance at 10% level.

In long-term, regarding total private consumption the unemployment rate and the inflation rate are statistically insignificant. All the other variables are statistically significant at the usual significance levels. Concerning the coefficients of the statistically significant

variables only the variable long-term interest rate affects total private consumption in a negative way. This negative effect of the long-term interest rate on total private consumption can be explained through two channels: first, it suggests that the substitution effect between consumption and saving is superior than the income effect (Ludwing and Slok, 2001). So, a 1 p.p. rise on the real long-term interest rate makes the consumption decision less attractive therefore falling by 0.4344 p.p. Secondly, it can also suggest that the Portuguese consumer does not hold too many savings since the income effect would directly increase the incomes received by the savers and it could influence their consumption decisions. Labour income, housing wealth and financial wealth exert a positive effect on total private consumption as expected and according to the majority of the empirical studies around these issues. The magnitude of the financial wealth effect on total consumption is about two times larger than the housing wealth effect on it.

It is also worth noting the results of the other components of private consumption since they differ in some specificities according to the durability (non-durable consumption and durable consumption).

For non-durable consumption, all variables are statistically significant at the usual significant levels except the inflation rate. Labour income, housing wealth and financial wealth also exert a positive effect on non-durable consumption. The unemployment rate and the long-term interest rate exert a negative effect on it since a 1% increase on each of these variables decreases non-durable consumption by 0.1914 p.p. and 0.096 p.p., respectively.

Finally, for durable consumption, the unemployment rate, the short-term interest rate and the housing wealth are statistically insignificant. Inflation rate and long-term interest rate exert a strong negative effect on durable consumption since a 1% increase on those variables causes durable consumption to drop by 0.2037 p.p. and by 0.1346 p.p. Labour income and financial wealth are positive determinants of durable consumption goods since a 1% increase of those variables contributes to a 0.1827 p.p. and 0.8998 p.p. increase of durable consumption goods, respectively.

The results are quite similar when we use the financial assets instead of the net financial assets as a financial wealth measure. The existence of cointegration is still confirmed and the model converges to the long term.

Table 7 - *The short-term estimation of total private consumption*

Variable	Coefficient	*Standard Error*	T-statistic
ΔTC_{t-1}	0.3430***	0.0789	4.3490
ΔTC_{t-2}	0.4760***	0.0802	5.9339
ΔTC_{t-3}	0.1881***	0.0654	2.8766
ΔUR_t	0.2925	0.2402	1.2179
ΔIR_t	0.2247	0.2660	0.8446
ΔSIR_t	1.1565***	0.2721	4.2497
ΔSIR_{t-1}	0.2634*	0.1494	1.7636
ΔLI_t	0.1514***	0.0505	2.9997
ΔLI_{t-1}	-0.3116***	0.0645	-4.8290
ΔLI_{t-2}	-0.1390**	0.0595	-2.3363
ΔHW_t	-0.0507	0.0662	-0.7662
ΔHW_{t-1}	-0.1646**	0.0674	-2.4417
ΔFW_t	0.0156	0.0279	0.5595
ΔFW_{t-1}	-0.1007***	0.0324	-3.1064
ΔFW_{t-2}	-0.0993***	0.0313	-3.1712
ΔFW_{t-3}	-0.1262***	0.0298	-4.2370
ΔEC_{t-1}	-1.0115***	0.0963	-10.5036

Table 8 - *The short-term estimation of non-durable private consumption*

Variable	Coefficient	*Standard Error*	T-statistic
ΔNDC_{t-1}	0.8450***	0.1181	7.1536
ΔNDC_{t-2}	0.6986***	0.0968	7.2137
ΔNDC_{t-3}	0.4501***	0.0881	5.1080
ΔIR_t	0.4973**	0.2256	2.2038
ΔIR_{t-1}	0.1980	0.2546	0.7778
ΔIR_{t-2}	0.4167*	0.2367	1.7605
ΔLIR_t	-0.0827	0.1178	-0.7020
ΔSIR_t	1.1001***	0.2283	4.8196
ΔSIR_{t-1}	0.5007**	0.2394	2.0917
ΔSIR_{t-2}	0.5852***	0.2157	2.7131
ΔLI_t	-0.0166	0.0398	-0.4173
ΔLI_{t-1}	-0.3181***	0.0488	-6.5163
ΔLI_{t-2}	-0.2280***	0.0574	-3.9702
ΔLI_{t-3}	-0.1105**	0.0459	-2.4051
ΔHW_t	0.0611	0.0491	1.2446
ΔHW_{t-1}	-0.1378*	0.0469	-2.9418
ΔHW_{t-2}	-0.1633***	0.0499	-3.2764
ΔHW_{t-3}	-0.1098*	0.0553	-1.9859
ΔFW_t	0.0351*	0.0207	1.6926
ΔFW_{t-1}	-0.0851***	0.0246	-3.4525
ΔFW_{t-2}	-0.0607***	0.0214	-2.8332
ΔFW_{t-3}	-0.0422*	0.0222	-1.8998
ΔEC_t	-1.6763***	0.1733	-9.6743

Table 9 - *The short-term estimation of durable private consumption*

Variable	Coefficient	*Standard Error*	T-statistic
ΔDC_{t-1}	0.2554***	0.080	3.1859
ΔDC_{t-2}	0.3053***	0.0745	4.0991
ΔDC_{t-3}	0.2734***	0.0595	4.5981
ΔLI_t	1.2423***	0.2327	5.3393
ΔLI_{t-1}	-0.9129***	0.3026	-3.0167
ΔLI_{t-2}	-0.7693***	0.2835	-2.7141
ΔHW_t	-0.7124**	0.2948	-2.4167
ΔHW_{t-1}	-0.7883**	0.3222	-2.4462
ΔFW_t	0.0744	0.1363	0.5457
ΔFW_{t-1}	-0.4908***	0.1524	-3.2197
ΔFW_{t-2}	-0.4098***	0.1452	-2.8211
ΔFW_{t-3}	-0.7617***	0.1425	-5.3448
ΔEC_{t-1}	-0.9411***	0.0896	-10.5088

In short-term, the coefficient of the error correction term is negative and significant at 1% significance level for all of our dependent variables (total consumption, durable consumption and non-durable consumption) meaning that all the models are stable and converge to the long-run equilibrium.

Regarding the short run, for total consumption the majority of the lagged variables of each variable are statistically significant however some signs change according with the ones from the long run. For instance, the significant lagged variables of housing wealth and financial wealth and the majority of the lagged variables of labour income impact negatively households' total consumption. In spite of that, the significant lagged variables of short-term interest rate keep affecting it in a positive way. Also, the lagged variables of total consumption affect the present one in a positive way. The lagged variables of the unemployment rate and inflation rate are not statistically significant.

The lagged variables of non-durable consumption and of the short-term interest rate are all statistically significant affecting the present non-durable consumption in a positive way. In a similar way, the majority of the inflation rate lagged variables affect non-durable consumption positively. The statistically significant lagged variables of the labour income, housing wealth and financial wealth exert a negative impact on the present non-durable consumption diverging with their impact in the long run.

At last, for durable consumption the signs of the majority of the statistically significant lagged variables change relative to the long run. For instance, the statistically lagged variables of the housing wealth and financial wealth affect durable consumption in an opposite way when compared with the long run. In a similar way, the majority of the statistically significant

lagged variables of labour income affect durable consumption in a negative way. Finally, the lagged variables of durable consumption affect the present one in a positive way.

The results are quite similar if we use financial assets instead of the net financial assets as a financial wealth measure. The existence of cointegration is still confirmed and the model converges to the long term.

Finally, in Table 10 we present the economic significance of our statistically significant estimates in order to assess the financialisation effect as well as the main drivers of private consumption by durability (Boone *et al.*, 1998; Ludvison and Steindel, 1999; Davis and Palumbo, 2001; Ludwig and Slok, 2001; Mehra, 2001; Edison and Slok, 2001; Boone and Girouard, 2002; Castro, 2007; Farinha, 2008; Sousa, 2008, 2009; Slacalek, 2009; Onaran *et al.*, 2011; Barrel *et al.*, 2015). To have a better understanding in how the financialisation effect contributed to the Portuguese households' consumption we present the economic effects regarding two distinct periods of time "1996q1 until 2008q4" and "2009q1 until 2016q4" named as pre-crisis and during and post-crisis, respectively. Since there were no structural breaks on our model (Figure A12 and Figure A13) we were able to use the same long-run coefficients.

Table 10 - *Economic significance of our estimates for private consumption by durability*

Period	Private Consumption	Variable	Long-term Coefficient	Actual Cumulative Change	Economic Effect
Full Period	Total	LIR_t	0.4344	-0.621	0.270
		SIR_t	0.3370	-1.210	-0.408
		LI_t	0.3310	0.915	0.303
		HW_t	0.0950	4.321	0.410
		FW_t	0.1876	-0.737	-0.138
	Non-Durable	UR_t	-0.1914	0.2073	0.040
		LIR_t	-0.3982	-0.621	0.247
		SIR_t	0.4348	-1.210	-0.526
		LI_t	0.0941	0.915	0.086
		HW_t	0.1029	4.320	0.445
		FW_t	0.0981	-0.737	-0.072
	Durable	IR_t	-2.0365	-0.644	1.312
		LIR_t	-1.3458	-0.621	0.835
		LI_t	1.8267	0.915	1.671
		FW_t	0.8998	-0.737	-0.663
Pre-Crisis	Total	LIR_t	0.4344	-0.495	0.215
		SIR_t	0.3370	-0.397	-0.134
		LI_t	0.3310	-1.725	-0.571
		HW_t	0.0950	5.010	0.476
		FW_t	0.1876	-1.730	-0.325
	Non-Durable	UR_t	-0.1914	0.183	-0.035

		LIR_t	-0.3982	-0.495	0.197
		SIR_t	0.4348	-0.397	-0.173
		LI_t	0.0941	-1.725	-0.162
		HW_t	0.1029	5.010	0.516
		FW_t	0.0981	-1.730	-0.170
	Durable	**IR_t**	-2.0365	-0.644	1.392
		LIR_t	-1.3458	-0.495	0.666
		LI_t	1.1867	-1.725	-3.151
		FW_t	0.8998	-1.730	-1.557
During and After-crisis	**Total**	**LIR_t**	0.4344	-0.469	0.204
		SIR_t	0.3370	-1.479	-0.498
		LI_t	0.3310	1.051	0.348
		HW_t	0.0950	2.043	0.194
		FW_t	0.1876	0.000	0.000
	Non-Durable	**UR_t**	-0.1914	-0.057	0.011
		LIR_t	-0.3982	-0.469	0.187
		SIR_t	0.4348	-1.479	-0.643
		LI_t	0.0941	1.051	0.099
		HW_t	0.1029	2.043	0.210
		FW_t	0.0981	0.000	0.000
	Durable	**IR_t**	-2.0365	-2.824	5.750
		LIR_t	-1.3458	-0.469	0.613
		LI_t	1.1867	1.051	1.920
		FW_t	0.8998	0.000	-0.001

Note: The actual cumulative change is the growth rate of each variable. The economic effect is the multiplication of the long-term coefficient by the actual cumulative change.

Regarding the full period, the variables that conducted the total consumption were the decrease of the long-term interest rate, the rise of labour income and the increasing trend of housing wealth. The decrease of short-term interest rate and the decline of the financial wealth contributed to a deceleration of this type of consumption by 40,8 p.p. and 13,8 p.p., respectively. The net wealth effect of financialisation relative to total consumption was positive since the increase of households' labour income and households' housing wealth was more than sufficient to compensate the decrease of households' financial wealth. The same applies to both non-durable and durable consumption where financialisation contributed to an acceleration of it.

For the pre-crisis period, the variables that drove total consumption were mainly the long-term interest rates and the housing wealth. The fall of short-term interest rate, labour income and financial wealth had a negative impact on total consumption by 13,4 per cent, 57,1 per cent and 32,5 per cent, respectively. The same applies to non-durable consumption, where a decrease of the short-term interest rate, labour income and financial wealth contributed to a deceleration of it by 17,3 per cent, 16,2 per cent and 17,0 per cent, correspondingly. Finally, for durable consumption, the fall of the inflation rate and long-term interest rates contributed positively to this type of consumption. However, the decrease of

labour income and financial wealth led to a deceleration of durable consumption by 315,1 per cent and 155,7 per cent, respectively. In the pre-crisis period, financialisation contributed for a deceleration of total and durable consumption since the housing wealth effect was not sufficient to counterweight the negative impacts provoked by the labour income and financial wealth. However, it had beneficial effects on the non-durable consumption since the wealth effect supressed the income effect.

Finally, in the during and post-crisis scenario, the main drivers of total consumption were the fall of the long-term interest rate and the increase of the labour income and housing wealth. The decrease of short-term interest rate decelerated total consumption by 49,8 per cent. Regarding non-durable consumption, the decrease of the unemployment rate and long-term interest rate and the increase of the labour income and housing wealth contributed positively for it. Finally, the decrease of the inflation rate and the long-term interest rate favoured durable consumption by 575,0 per cent and 61,3 per cent, respectively. Financialisation contributed positively for total consumption and for non-durable consumption.

Concluding, prior to the crisis the wealth effect was sufficient to counterweight the fall of households' labour income regarding total consumption and also non-durable consumption. However, the same did not happen for durable consumption where the income effect had to counterbalance the deleterious wealth effect caused by the decrease of households' financial wealth. During and after the crisis, financialisation strongly contributed for the acceleration of total consumption and non-durable consumption since both effects were positive. For durable consumption, only the income effect produced a positive impact on it.

Finally, looking for the full period, the financialisation effect was positive for all types of consumption. Therefore, we can conclude that financialisation had a beneficial effect on households' consumption in Portugal.

VII. Conclusion

This dissertation studied the influence of financialisation on the evolution of the Portuguese private consumption between 1996 and 2016 using quarterly data.

Financialisation literature presents two contradictory effects of it on consumption (Boone *et al.* (1998); Ludvison and Steindel (1999); Davis and Palumbo (2001); Ludwig and Slok (2001); Mehra (2001); Edison and Slok (2001); Boone and Girouard (2002); Castro (2007); Farinha (2008); Sousa (2008, 2009); Slacalek (2009); Onaran *et al.* (2011); Barrel *et al.* (2015)). On the one hand, it leads to a decrease of private consumption due to the decline of households' income. On the other hand, financialisation contributes to an increase of private consumption caused by the growth of households' (housing and financial) wealth.

To understand exactly how financialisation affected the private consumption in Portugal was estimated an equation for total consumption as well as for its components using four control variables (unemployment rate, inflation rate, real long-term interest rate and real short-term interest rate) and three variables to measure the different effects in which financialisation can affect households' consumption (labour income, housing wealth and financial wealth).

The variables used in each model were integrated of order zero and of order one therefore the ARDL methodology was used. A long-run equation and a short-run equation regarding total consumption and each of its components were estimated. Also, the economic effects for the full period, for the pre-crisis period and during and after-crisis period of each significant variable for each type of consumption are presented.

Regarding the long-run, the three variables used to measure each channel of financialisation were statistically significant and exerted a positive effect on total consumption. The results were similar when using the non-durable consumption instead of total consumption. For durable consumption, housing wealth was no longer an explanatory variable, however the other financialisation variables kept being statistically significant impacting it in a positive way.

For the short-run, the results from the estimations did not converge with the ones from the long run estimation since the signals of the significant lagged variables related with financialisation were almost always contradictory.

Finally, the dissertation reaches the conclusion that financialisation between 1996 and 2016 had a positive impact on the Portuguese households' consumption. Prior to the economic crisis, the wealth effect was sufficient to counterweight the fall of households' labour income for total consumption and non-durable consumption. During and after the crisis, financialisation had a major paper on the acceleration of total and non-durable consumption. For durable consumption, only the income effect produced a positive impact on it.

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IX. Appendix

Table A 1 - *Descriptive Statistics*

	TC	*NDC*	*DC*	*UR*	*IR*	*RSIR*	*RLIR*	*YD*	*HP*	*NFA*
Observations	84	84	84	84	84	84	84	84	84	84
Mean	0.015	0.016	0.010	0.095	0.022	0.005	0.0312	0.011	-0.006	0.0213
Median	0.025	0.021	0.028	0.089	0.025	0.001	0.025	0.018	-0.009	0.028
Maximum	0.063	0.056	0.203	0.174	0.051	0.057	0.101	0.069	0.072	0.119
Minimum	-0.083	-0.055	-0.320	0.049	-0.017	-0.029	-0.003	-0.106	-0.098	-0.106
Standard Deviation	0.033	0.025	0.122	0.034	0.014	0.017	0.022	0.035	0.042	0.045
Skewness	-1.216	-1.259	-0.715	0.556	-0.635	0.610	0.968	-0.994	-0.246	-0.524
Kurtosis	3.839	3.971	2.911	2.379	2.782	3.055	3.503	4.300	2.640	3.250

Figure A1 - *Total Consumption*

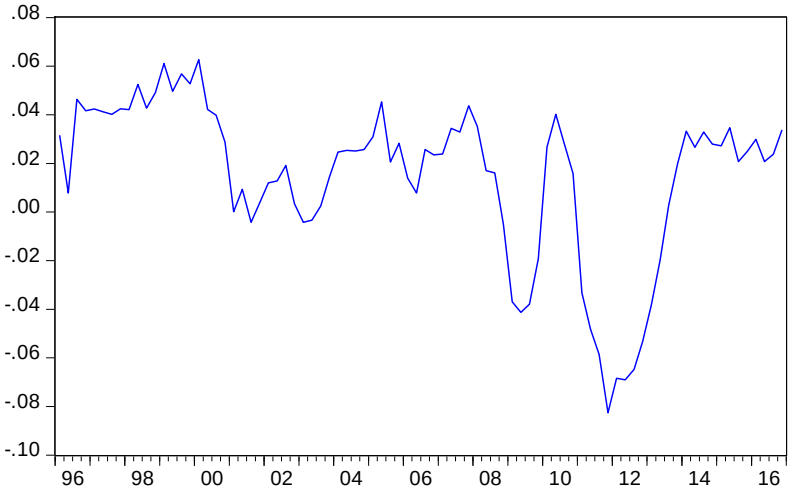


Figure A2 - *Non-Durable Consumption*

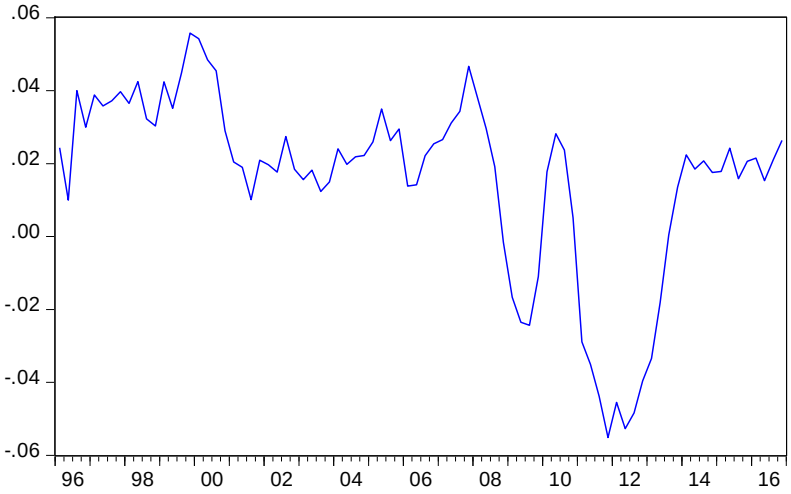


Figure A3 - *Durable Consumption*

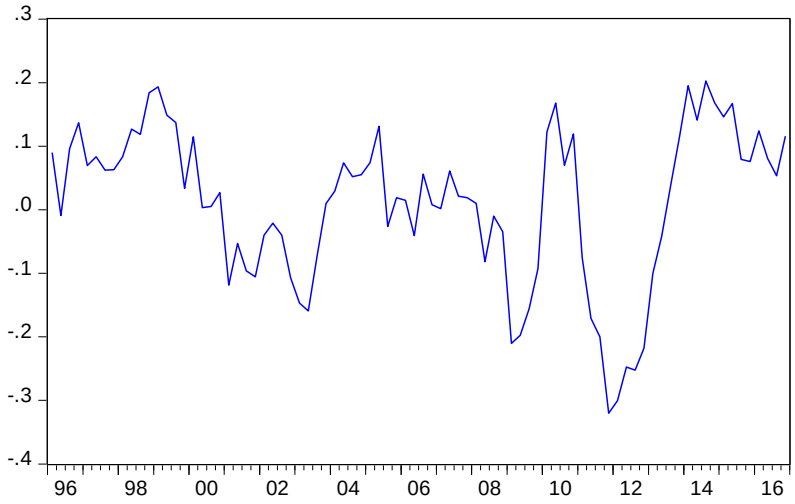


Figure A4 - *Unemployment rate*

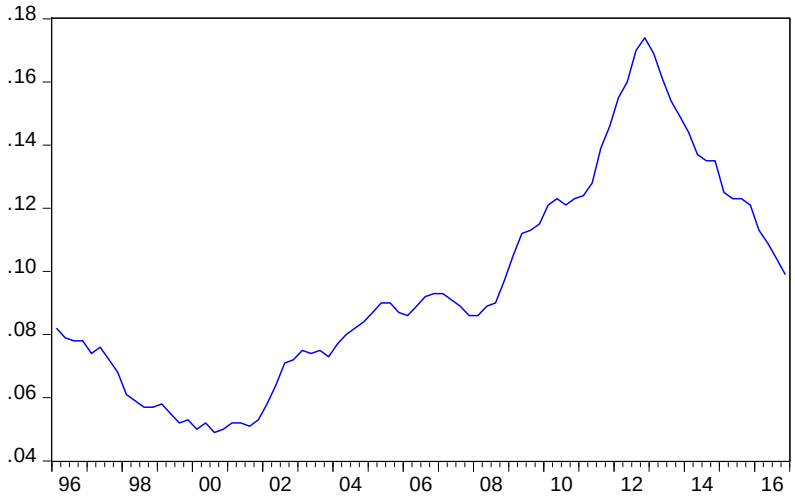


Figure A5 - *Inflation Rate*

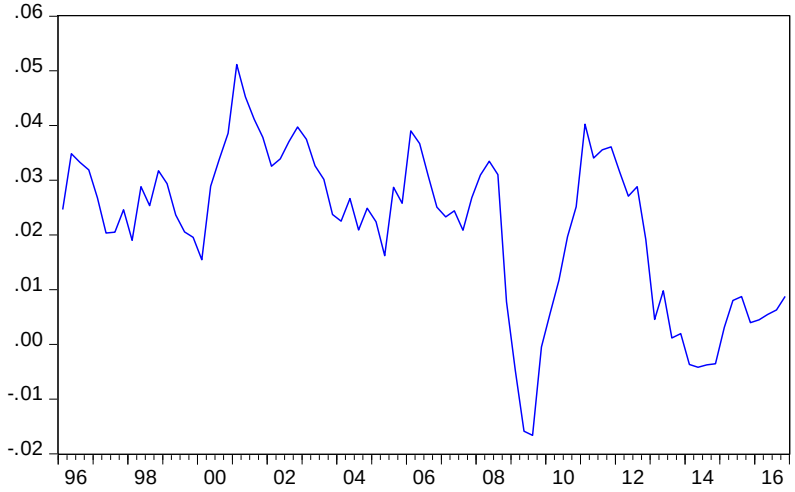


Figure A6 - *Long-Term Interest Rate*

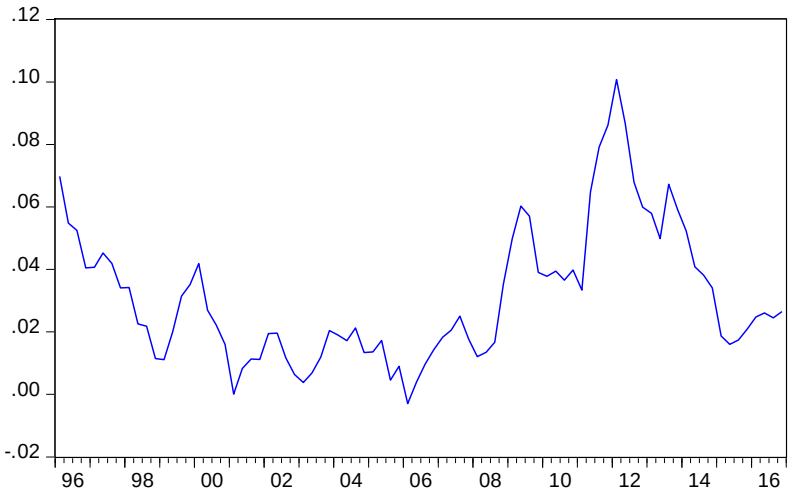


Figure A7 - *Short-Term Interest Rate*

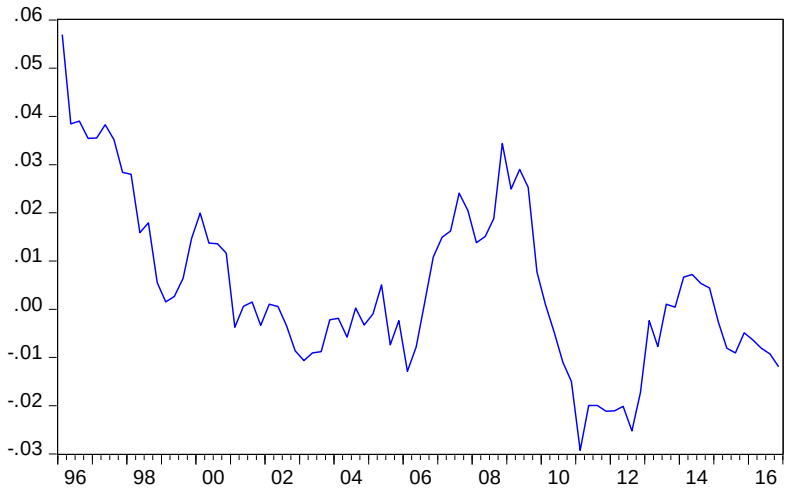


Figure A8 - *Labour Income*

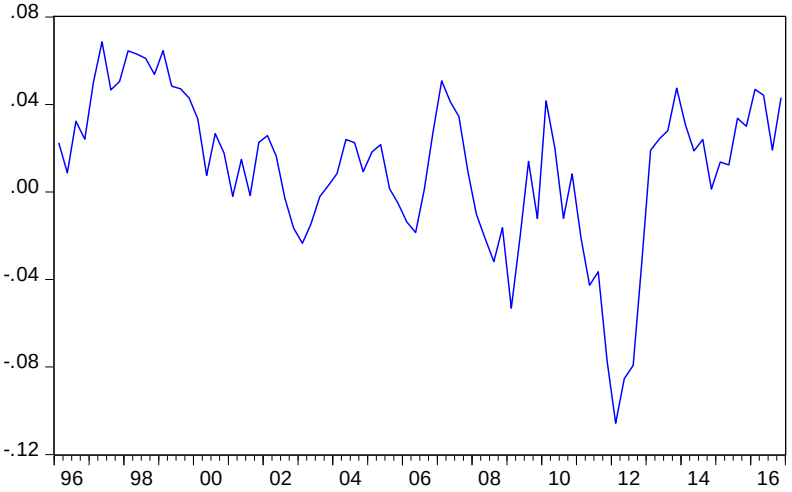


Figure A9 - *Housing Wealth*

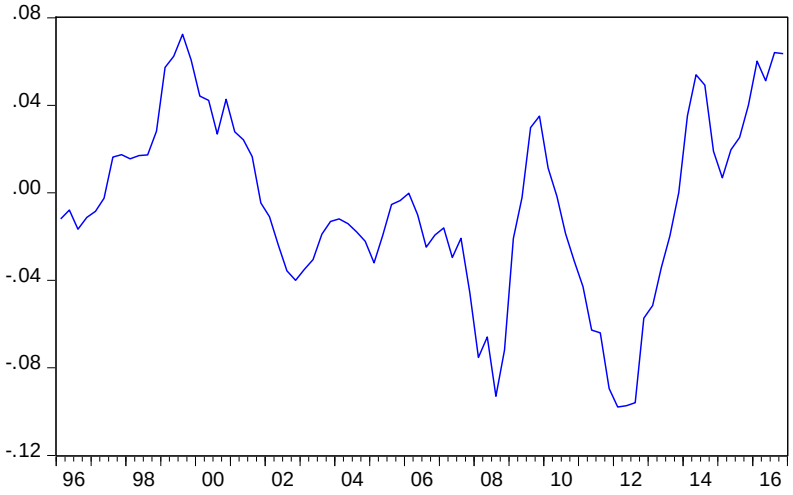


Figure A10 - *Financial Wealth*

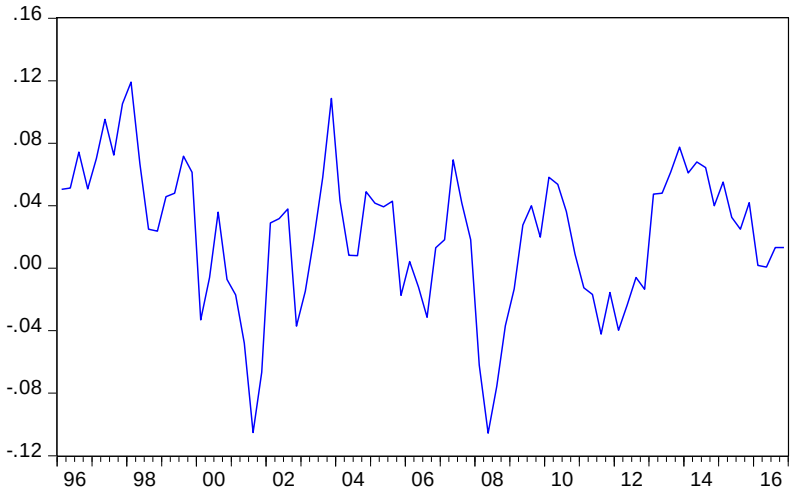
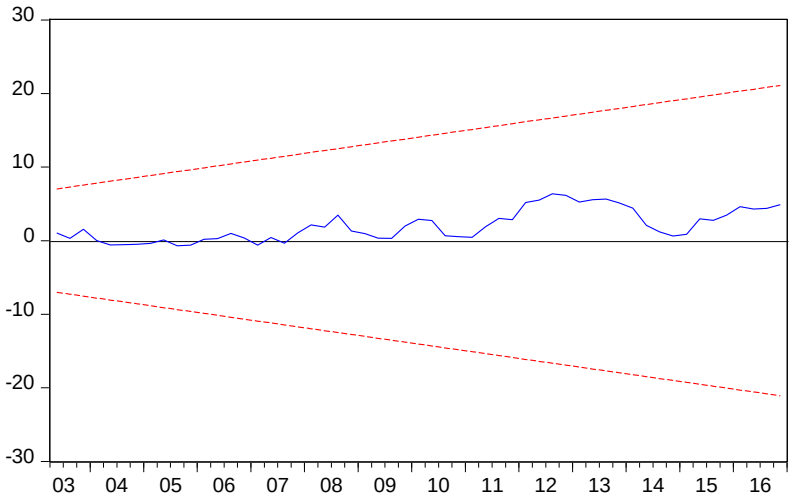


Table A2 - *The diagnostic for multicollinearity*

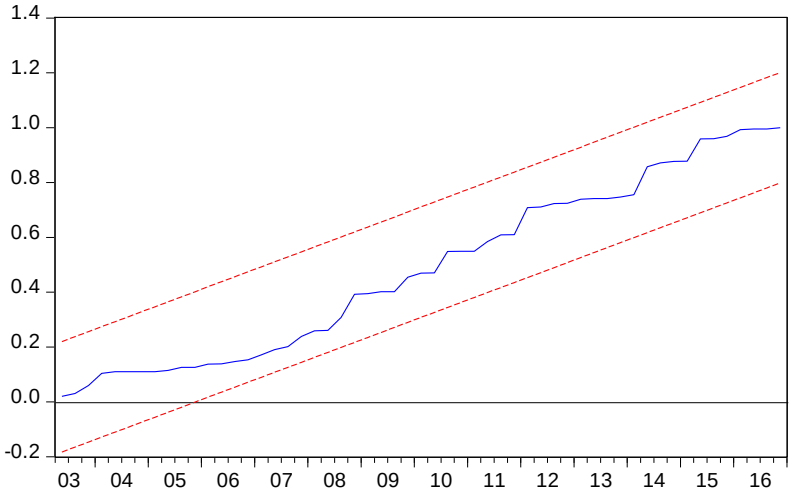
Variables	***R^2***	***Tolerance Value***	***VIF***
TC	0.781	0.219	4.557
UR	0.853	0.147	6.820
IR	0.742	0.258	3.869
RLIR	0.689	0.311	3.213
RSIR	0.690	0.310	3.228
YD	0.778	0.222	4.495
HP	0.724	0.276	3.619
NFA	0.475	0.525	1.906

Figure A11 - *The plot of cumulative sum of recursive residuals*



Note: The straight lines represent critical bounds at 5% significance level

Figure A12 - *The plot of sum of squares of recursive residuals*



Note: The straight lines represent critical bounds at 5% significance level