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Οι Επιδράσεις του Χρηματοοικονομικού και Οικιστικού Πλούτου των Νοικοκυριών στην Ιδιωτική Κατανάλωση στην Ελλάδα

Έρση Αθανασίου, Αικατερίνη Τσούμα

Κέντρο Προγραμματισμού και Οικονομικών Ερευνών (ΚΕΠΕ)

Περίληψη

Η παρούσα εργασία διερευνά τις επιπτώσεις του πλούτου των νοικοκυριών στην ιδιωτική καταναλωτική δαπάνη, υπό το φως των σημαντικών αλλαγών στον πλούτο των νοικοκυριών στην Ελλάδα κατά τα τελευταία δεκαπέντε χρόνια, αλλά και δεδομένου τόσο του υψηλού μεριδίου της ιδιωτικής κατανάλωσης στο ΑΕΠ της χώρας, όσο και του καθοριστικού της ρόλου στη διαμόρφωση των εξελίξεων στο ΑΕΠ. Στην εργασία διαχωρίζονται οι επιδράσεις του χρηματοοικονομικού πλούτου (financial wealth) από εκείνες του οικιστικού πλούτου (housing wealth), για να εκτιμηθεί χωριστά η επίπτωση της κάθε μίας από αυτές τις δύο συνιστώσες στην κατανάλωση. Η ανάλυση διεξάγεται για πρώτη φορά για την Ελλάδα, και συνεισφέρει σημαντικά στη σχετική βιβλιογραφία που πραγματεύεται τις επιπτώσεις του πλούτου στην κατανάλωση. Για την ανάλυση γίνεται χρήση τριμηνιαίων στοιχείων για την περίοδο 2000-2014, συμπεριλαμβανομένης μιας χρονολογικής σειράς για τον οικιστικό πλούτο, η οποία κατασκευάστηκε για τους σκοπούς της εργασίας. Τα αποτελέσματα της ανάλυσης συγκλίνουν στην ύπαρξη στατιστικά σημαντικής σχέσης συνολοκλήρωσης μεταξύ της κατανάλωσης και του πλούτου, με θετική επίδραση του οικιστικού πλούτου σε μακροπρόθεσμο ορίζοντα. Βραχυχρόνια, τόσο ο χρηματοοικονομικός όσο και ο οικιστικός πλούτος φαίνεται να παίζουν σημαντικό ρόλο στην εξέλιξη της κατανάλωσης, με τη σημασία του οικιστικού πλούτου να είναι μεγαλύτερη σε σύγκριση με εκείνη του χρηματοοικονομικού πλούτου.

The Effects of Financial and Housing Wealth
on Private Consumption in Greece*

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Abstract

In the light of the considerable changes in household financial and housing wealth in Greece during the past fifteen years, and given the high share of private consumption in Greek GDP, as well as its decisive role in shaping developments in GDP over this period, this paper investigates the effects of household wealth on consumption expenditure. We disentangle financial wealth effects from housing wealth effects, to assess separately the impact of these two wealth components on consumption. This type of analysis is conducted for the first time for the case of Greece, and contributes to the relevant literature on wealth effects on consumption. The analysis employs quarterly data for the time period 2000-2014, including a series on housing wealth in Greece constructed for the purpose of the paper. The results of the analysis point to the existence of a statistically significant cointegrating relationship between consumption and wealth, with a positive housing wealth effect in the long run. In the short-run both financial and housing wealth appear to play a role in determining consumption, with the importance of housing wealth being higher compared to that of financial wealth.

1. Introduction

More recently, there has been revived interest in the relationship between private consumption and household wealth, in the background of major developments in financial and housing markets worldwide. As presented in Figure 1, changing conditions in these markets have been particularly pronounced in the case of Greece, both before and during the recent period of economic crisis. With respect to developments in the housing market from 2000 onwards, housing investment and prices in Greece went through an era of boom until 2008, followed by an era of unprecedented decline thereafter. Concerning developments in the financial market, the Athens Stock Exchange Index went through major fluctuations up to 2008, entering a prolonged period of low performance thereafter.

Figure 1: Athens stock exchange general index, gross fixed capital formation in dwellings and index of house prices
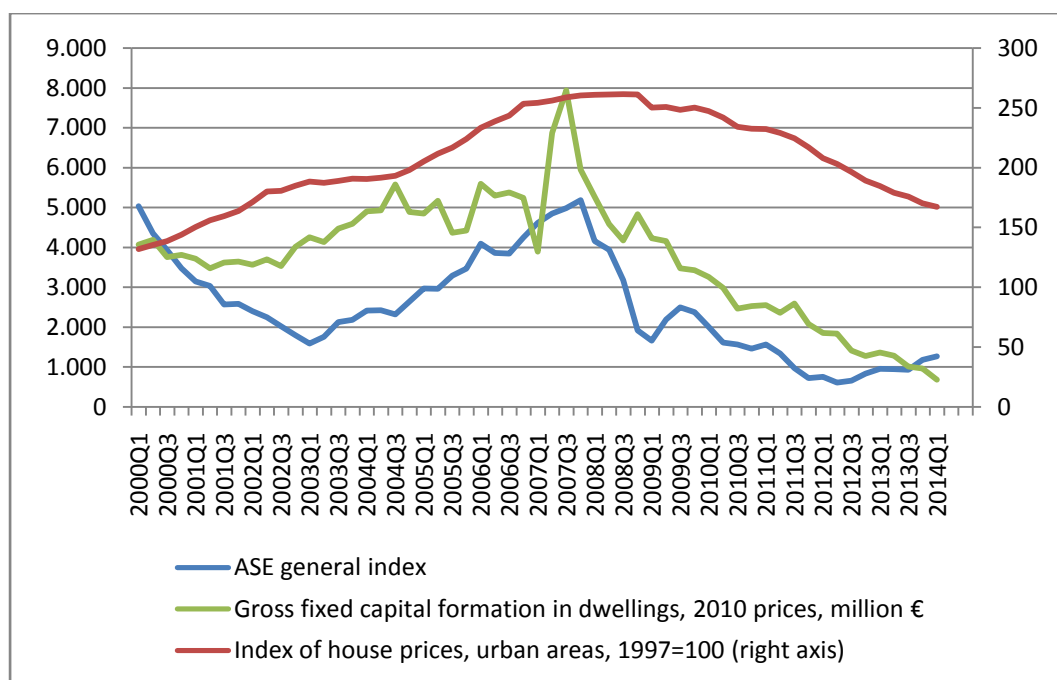

Sources: ELSTAT, Bank of Greece.

The study of the relationship between household wealth developments and private consumption assumes great interest in the Greek case, due to certain structural features of the Greek economy, and the special conditions characterizing recent economic developments. As illustrated in Figure 2, private consumption has persistently accounted for a particularly high share of economic activity in Greece, amounting to 72% of the GDP in 2014, versus 56.9% of the GDP on average in the EU28. Moreover, private consumption has played over time a decisive role in shaping developments in the country's rate of change of the GDP, representing the leading force behind the rise in the GDP over the period 2000-2007, but also a key driver of the downfall in the GDP over the subsequent period of recession. These

structural characteristics provide motivation for the investigation of the potential role that major shifts in housing and financial market conditions may have ultimately exerted on the Greek GDP. Furthermore, in the current conjuncture, in which the country strives to overcome recessionary conditions and progress into an era of sustainable recovery, the study of how consumption and wealth developments interact may provide useful insights with reference to the economy's prospects. In addition, the findings of such an analysis may contribute to the design of economic policies conducive to long-term viable growth.

Figure 2: Share of private consumption in the GDP in Greece and the EU28, and contribution to the rate of change of the GDP in Greece
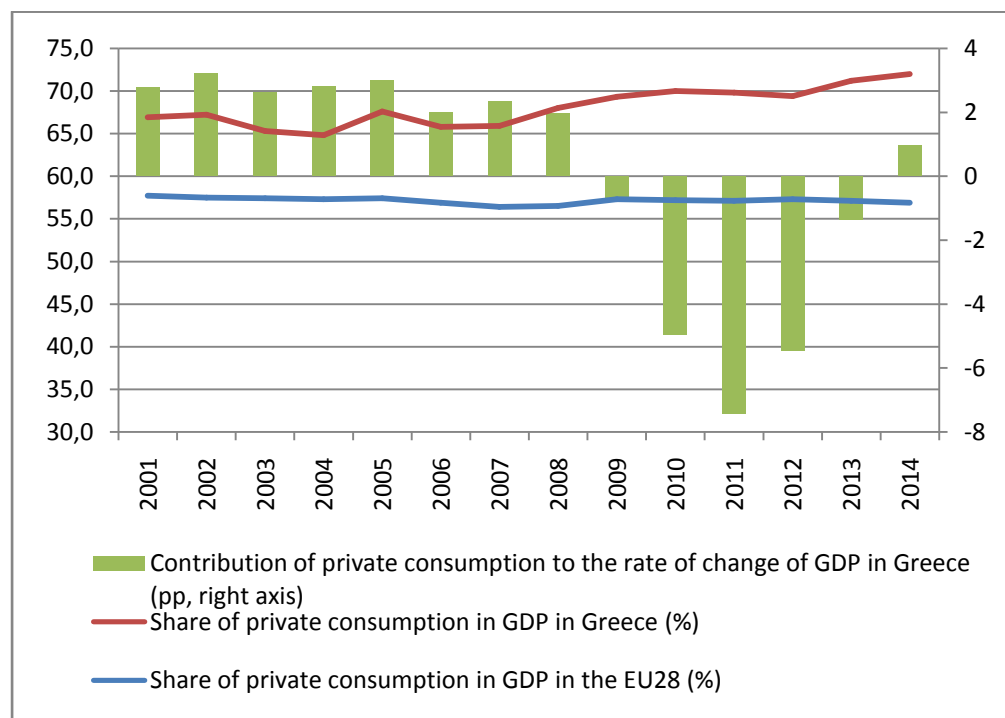
Sources: ELSTAT, Eurostat.

The effects of household wealth on consumption have been examined extensively in the theoretical and empirical literature, mostly for the USA and advanced economies. However, to the best of our knowledge, there are no studies investigating these effects for the case of Greece, partly due to data availability issues. This lack of evidence, combined with the importance of investigating wealth effects on consumption in the Greek case, provide the main motivations for the present paper. Most notably, in an effort to overcome data availability constraints, we have constructed a novel series of housing wealth in Greece. The derivation of this series, constitutes one of the main contributions of our paper. Furthermore, it is crucial for our analysis, as it represents a precondition for the disentanglement of financial wealth effects from housing wealth effects, to assess separately the importance of developments in each of these two wealth components.

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The dataset used in the present paper is based on quarterly data for Greece over the period 2000Q1 to 2014Q1, and includes apart from the aforementioned housing wealth series, private consumption expenditure, net financial wealth, and net real disposable income. We apply the two-step procedure in order to examine both the long and the short-run relationship between consumption and wealth, through a cointegration and error correction model (ECM) analysis. Our results are in favour of the existence of a positive and statistically significant cointegrating relationship between consumption and wealth, with a positive housing wealth effect in the long run. In the short-run both wealth components play a role in determining consumption, with the importance of financial wealth being, however, smaller compared to that of housing wealth.

This paper is organised as follows. Section 2 provides the theoretical background and reviews the relevant empirical literature. Section 3 describes the data series, and explains the construction of the housing wealth series. Section 4 outlines the empirical methodology applied in the analysis. Section 5 reports the empirical results, and section 6 summarizes the conclusions and policy implications of our study.

2. Theoretical background and empirical evidence

The analysis of the relationship between private consumption and wealth, and more particular, of the effects of wealth on consumption, is directly related to the framework of the permanent income hypothesis (Friedman, 1957) and the life-cycle model (Modigliani and Brumberg, unpublished). As pointed out by Ando and Modigliani (1963), Friedman's permanent income hypothesis, even though well suited for testing against cross-section data, does not generate the type of hypotheses to be easily tested against time series data. As they indicate, almost contemporaneously with Friedman's work, Modigliani and Brumberg 'developed a theory of consumer expenditure based on considerations relating to the life-cycle of income and of consumption needs of households'. In their unpublished paper, Modigliani and Brumberg also attempted to derive time series implications of their hypothesis.

In the life-cycle model, the utility of the individual consumer is assumed to be a function of his own aggregate consumption in current and future periods. The next assumption is that the individual maximizes utility subject to the resources available, these being the sum of current and discounted future earnings over his lifetime and his current net worth. As a result, the individual's current consumption can be expressed as a function of his resources and the rate of return on capital, with parameters depending on age. To obtain the aggregate consumption function over all individuals, the individual functions are aggregated. In deriving the

aggregate consumption function most crucial become the assumptions relating to the characteristics of the individual's utility function and the age structure of the population.

According to the above model, the individual's consumption, c_t^T, is given by:

$$c_t^T = \omega_t^T y_t^T + \omega_t^T (N - T) y_t^{eT} + \omega_t^T \alpha_{t-1}^T \qquad (1)$$

where y_t^T is the current non-property income, y_t^{eT} is the average annual expected income, (T stands for the age of the individual and N denotes the earning span) and α_{t-1}^T is the current sum of the net worth, carried over from the previous period. To obtain aggregate consumption, under specific assumptions, equation (1) is then aggregated within each age group and over the age groups, resulting in:

$$C_t = \alpha_1' Y_t + \alpha_2' Y_t^e + \alpha_3' A_{t-1} \qquad . \qquad (2)$$

In their empirical least-squares approach applied to a single equation, and when they work with first differences, Ando and Modigliani obtain a highly significant coefficient estimate of net worth. Overall, they conclude that the tests seem to support the hypothesis of the importance of net worth as a determinant of consumption.

Ever since the above contributions, a growing body of empirical literature has dealt with the examination of wealth effects on consumption.[1] A significant part of the related literature applies the cointegration and error correction model methodology to investigate the long and short-run relationship between wealth and consumption. The connection between the theoretical background and the cointegration applications is provided by Lettau and Ludvigson (2001) who note that (the logs of) aggregate consumption, asset holdings and labour income share a common long-term trend, they are cointegrated, but may still deviate substantially from one another in the short run. This argument is derived on the basis of their definition of aggregate wealth (human capital plus asset holdings), and the work of Campbell and Mankiw (1989), showing that if the consumption-aggregate wealth ratio is stationary then the budget constraint may be approximated by taking a first-order Taylor expansion of the wealth accumulation equation.

Addressing net worth and total wealth, does not necessarily involve a distinction between different kinds of assets, and hence different wealth components. A straightforward approach is to differentiate between real and financial wealth, even though as Dvornak and Kohler (2007) indicate, it might be expected from theory that the effects of financial and real, and

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[1] To the relevant empirical applications belong studies using either macroeconomic or microeconomic data. Since, the present application evolves along the lines of similar empirical studies on the basis of macroeconomic data, here we will not review the micro data literature. Carroll et al. (2011) offer a helpful review of that branch of the literature and also point to the heterogeneity characterizing the related work. Of relevance are also certain studies focusing on the role of credit conditions and the credit channel (see e.g. Iacoviello, 2004; Muellbauer, 2007; Musso et al. 2011).

more specifically, housing wealth on consumption should be similar. The authors put forward several reasons in favor of the argument that the responsiveness of consumers to different types of wealth could be different. They discuss the potential role of factors such as differences in liquidity, other utility associated with owning an asset, distribution across income groups, expected permanency of changes, mismeasurement of wealth and psychological factors.

Among the earlier empirical literature investigating wealth effects on consumption, one can distinguish between contributions not disentangling between financial and real/housing wealth and those focusing solely on financial wealth. However, more recent applications put emphasis on the differentiation between financial and real (housing) wealth effects.

Overall, and even though the related literature is vast and the underlying applications diverge in a number of terms (e.g. varying magnitudes of the estimated effects, different estimation procedures applied, different time periods but also different sources for the derivation of financial and real wealth data), a considerable number of papers conclude on the role of total wealth components in shaping consumption, but also detect significant individual effects played by either financial or housing wealth or both.

As can be expected, the majority of the relevant empirical applications refer to the case of the USA (for example, Poterba, 2000; Benjamin et al., 2004; Case et al., 2011; Carroll et al., 2011, who detect significant wealth effects) and other advanced individual economies (as in Barrell et al., 2003, for the UK; Pichette and Tremblay, 2003, for Canada; Tang, 2006, and Dvornak and Kohler, 2007, for Australia; Bassanetti and Zollino, 2008, for Italy; Chauvin and Damette, 2008, for France; Sastre and Fernández, 2008, for Spain; Hamburg et al., 2008, for Germany; Edelstein and Lum, 2004 for Singapore; Jansen, 2010, for Norway, who detect significant effects; O'Donnell, 2007, for Ireland who does not detect clear wealth effects).

There is also a considerable number of studies referring to country groups incorporating panel analysis. Even though according to Labhard et al. (2005), there should be little theoretical rationale for a wide dispersion (they provide evidence on a common long-run marginal propensity to consume (MPC) across 11 OECD countries, and argue that in cases where detected, the observed differences may in fact reflect difficulties in the measurement of wealth across countries and also a failure to take into account shocks causing changes in both consumption and wealth), in most cases, the derived evidence is mixed and significant differences are uncovered between countries (as, for example, according to Girouard and Blondal, 2001, and Boone and Girouard, 2002, who investigate the group of the G7 (except Germany); Bertraut, 2002, investigating 10 countries; Bayoumi and Edison, 2002, estimating panel regressions for 16 advanced economies; Catte et al., 2004, studying 10 OECD

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countries; Case et al., 2005, relying upon a panel of 14 OECD countries and a panel of US states; Dreger and Reimers, 2006, examining a panel of EU countries; Aron et al., 2007, using data for the UK and South Africa; Slacalek, 2009, investigating wealth effects at the country-level, for various country groups and for 16 countries; Skudelny, 2009, using two different euro area data sets for 8 countries, excluding Ireland, Luxemburg, Greece and Portugal due to data availability restrictions; De Bonis and Silvestrini, 2012, using data for 11 OECD countries, to name a few). Note that most often, varying results across the investigated countries are attributed to differing characteristics with respect to financial as well as housing and mortgage markets. For example, in countries such as the UK and the USA, the mechanism of housing equity withdrawal[2] appears to operate more strongly as compared to the cases of European countries. The latter also seem to have more traditional bank-oriented structures and/or less deep financial markets, as compared to Anglo-Saxon economies.

Finally, a few studies are conducted on a regional or state basis, while references to developing economies are scarce (Saad, 2011, for Lebanon, detects significant wealth effects). For the case of Greece, and to the best of our knowledge, there exists no evidence on the potential effects of wealth on consumption, either on an individual country basis or within the context of country-groups or Euro area references.

3. Data

The dataset used in the present paper is based on quarterly data for Greece over the period 2000Q1 to 2014Q1.

For consumption, we employ quarterly seasonally adjusted data from the Hellenic Statistical Authority (ELSTAT) for the category of households and non-profit institutions serving households (NPISH) in nominal terms. For income, we use quarterly net adjusted disposable income data for households and non-profit institutions serving households, available from ELSTAT in nominal terms on a non-seasonally adjusted series. To derive a seasonally adjusted income series, we perform seasonal adjustment using the X12 procedure.

For financial wealth we employ data from Eurostat for the financial assets of households and non-profit institutions serving households in nominal terms. In the case of Greece, these assets consist primarily of deposits and shares and other equity, but also include other items such as currency, other securities and equity in life insurance and pension fund reserves. To obtain net financial wealth, we subtract financial liabilities (excluding mortgage debt, from the Bank of Greece) from nominal financial wealth.

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[2] Housing equity withdrawal is new borrowing secured on dwellings that is not invested in the housing market (i.e. not used for house purchase or home improvements).

For housing wealth, there are no official data available in the case of Greece. The lack of housing wealth data is a common problem in studies of the effects of household wealth on consumption. The way this problem is resolved in the literature is via the construction of the housing wealth series (see e.g. Skudelny 2009, Slacalek 2009, Case et. al. 2005) using other appropriate data, such as, for example, data on residential property prices, the dwelling stock and/or investment in dwellings.

Following a similar approach, in the present paper we construct a housing wealth data series for the Greek economy. The new series is based on (a) data on the housing stock (age and total surface in m^2), obtained from the recently published results of the 2011 census performed by ELSTAT, (b) data on private building activity on the basis of issued building permits, available in m^2 on a monthly basis from ELSTAT, (c) the index of prices of dwellings (historical series), available on a quarterly basis from the Bank of Greece, (d) the average price of new apartments sold in 2009Q1 per m^2 (Mitrakos, 2009) and (e) the assumption of a yearly depreciation rate of 1.3%, which is consistent with the range of housing depreciation rates reported in the literature and employed by statistical agencies in various countries (see e.g. Bokhari and Geltner, 2014; Kostenbauer, 2001).

To construct the housing wealth series we take the total surface and age of housing from the 2011 census and we use the depreciation rate to obtain a measurement of the total housing stock in 2011Q1 expressed in equivalents of new housing m^2. Taking this measurement as a basis, we then use data on private building activity in m^2 and the depreciation rate to compile a quarterly series of the housing stock expressed in equivalents of new housing m^2, assuming a period of two years from permit to construction completion. Having thus obtained a housing stock series, we then use the index of prices of dwellings and the average price per m^2 in 2009Q1 to derive the housing wealth series in nominal terms. Finally, to obtain net housing wealth we subtract mortgage debt (from the Bank of Greece) from housing wealth.

Figure 3 displays the net housing wealth series constructed by use of the above methodology, together with the corresponding series on private consumption and net financial wealth during the period under examination. Notably, on the basis of our household wealth series, the share of housing wealth in total wealth amounted to 60% in 2002 in Greece, versus an average of 57% for the Euro Area as a whole and a range between 40% and 68% in various individual countries, respectively (Skudelny 2009). Furthermore, the ratio of financial and housing wealth to the annual compensation of employees in Greece in the same year equals 8.2 according to our data, and is very close to the corresponding ratios reported by Slacalek (2006) for Italy, Spain, France and the UK. These observations indicate that, even when moving further away from the year 2011 for which we have an official estimate of the

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housing stock on the basis of the census, our calculations produce reasonable results with respect to the size of household wealth in Greece.

Figure 3: Private consumption, net housing wealth and net financial wealth in Greece (billion €)
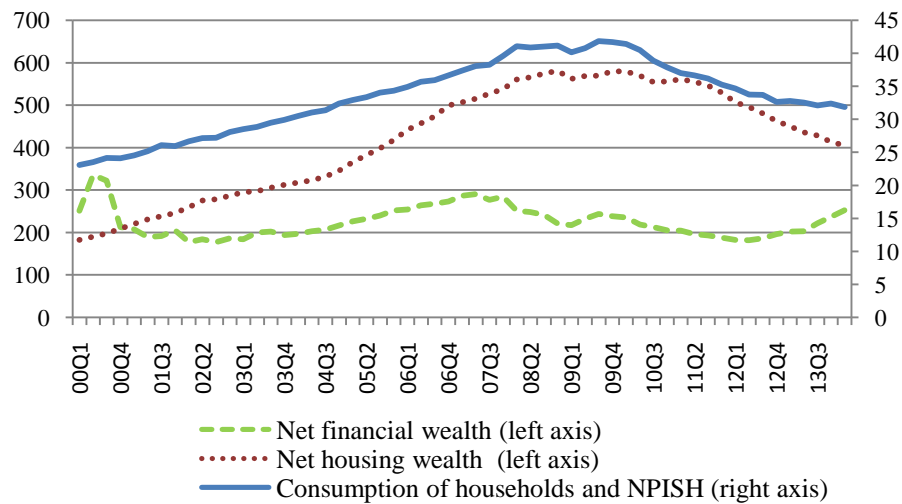
As shown in Figure 3, housing wealth developments have followed a very similar trend with the corresponding developments in private consumption. More particularly, housing wealth increased rapidly up to the beginning of 2008, as a result of high investment in new housing and increasing house prices. During the same period, private consumption moved in a similar pattern, contributing decisively to GDP growth in Greece. From the beginning of 2010 onwards, housing wealth followed a downward trend, as a sharp decline in housing investment coincided with continuous downfall in house prices. In parallel, private consumption contracted sharply, representing one of the main drivers of the recession in the country.

Concerning the evolution of household financial wealth, the series appears to exhibit a higher degree of volatility compared to housing wealth and private consumption. Furthermore, while there have been extended periods where developments in financial wealth have been in the same direction as developments in consumption, there have also been periods with diverging developments. Notably, from the second half of 2012 until the first quarter of 2014, consumption kept declining but financial wealth appeared to recover due to the increase in the value of equity in a period of rising Athens Stock Exchange General Index.

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4. Empirical methodology

In following the theoretical considerations set out in Section 2 and with the aim to enrich existing empirical evidence with an application to the case of Greece, in this paper we apply the standard cointegration and ECM model approach to investigate the potential wealth effects on consumption. This two-step methodology is widely used in the related empirical literature and allows for the investigation of both short-run and long-run effects.

According to the basic long-run relationship, trends in consumption are linked to trends in income and wealth. Since we want to disentangle between the potential effects related to financial and housing wealth, total wealth is further split into the financial and housing wealth components. We do that in order to enable the separate identification of the reaction of consumption to both types of shocks. In the short-run, deviations from the long-run equilibrium might be observed, assuming that this disequilibrium will be gradually corrected towards the long-run relationship. These basic features are captured by the cointegration and the ECM methodologies.

Given, further, that we want to directly obtain MPCs out of the long-run regression, we choose to estimate the equation in levels and not in logarithmic form. In the alternative case of using logarithmic specifications, the coefficients obtained reflect elasticities which can be used, together with the sample averages of the wealth-to-consumption ratios, to obtain MPCs. Still, and as indicated by Chauvin and Damette (2008), the two measures are equivalent only in the case of a stable ratio of wealth to consumption over time. This however does not seem to be always the case. Given that one can expect wide variations in this ratio over time, and based on further theoretical considerations indicating the superiority of direct MPC estimation as pointed out by Altissimo et al. (2005), the level representation is considered as more satisfactory, especially when the aim is to disaggregate wealth into components.

In a first step, we estimate the cointegrating relation using total net wealth. As a robustness test, we also estimate the relation using the disaggregated components of net financial and net housing wealth, but also using only the net housing wealth component. The long-run relationship between consumption, income and wealth is estimated using the Fully Modified Ordinary Least Squares technique (FMOLS) (Phillips and Hansen, 1990). This technique is based on a modification of least squares in order to account for both serial correlation effects and for the endogeneity among the regressors resulting from the existence of a cointegrating relationship. We apply the Engle-Granger (1987) and the Philipps-Ouliaris (1990) test to test the cointegration hypothesis.

The three distinct long-run equations are then formulated as follows:

$$C_{1t} = \alpha_0 + \alpha_Y Y_t + \alpha_T TW_t + \varepsilon_{1t} \tag{3}$$

$$C_{2t} = \beta_0 + \beta_Y Y_t + \beta_F FW_t + \beta_H HW + \varepsilon_{2t} \tag{4}$$

$$C_{3t} = \gamma_0 + \gamma_Y Y_t + \gamma_H HW + \varepsilon_{3t} \tag{5}$$

where equation (3) relates consumption to total wealth, equation (4) differentiates between the two distinct wealth components –financial and housing– and equation (5) includes only housing as a wealth component. In the above equations, C_t denotes consumption expenditure at time t, Y_t stands for disposable income, TW, FW, HW, indicate total, financial and housing wealth, respectively, α, β, γ refer to the corresponding coefficients and ε_t stands for the error term in each equation.

In the second step, we apply the ECM specification to estimate the short-term equation by OLS. We run the model in first differences, in order to investigate the adjustment process to the long-run equilibrium, which is estimated in the first stage, and the short-run dynamics,. We use the long-run residuals obtained from the first stage equation and include them as an error correction term lagged by one period. The short-term equation is formulated as follows:

$$\Delta C_t = \delta_0 + \sum_i^p \delta_i \Delta C_{t-i} + \sum_i^p \theta_i \Delta Y_{t-i} + \sum_{i=0}^p \varphi_{Fi} \Delta FW_{t-i} + \sum_{i=0}^p \varphi_{Hi} \Delta HW_{t-i} + \vartheta ECT_{t-1} + u_t$$

$$\tag{6}$$

where Δ denotes the first difference operator and ECT_{t-1} is the error correction term, lagged by one period. The coefficient on this term, ϑ, measures the speed of adjustment to the long-run relation, from a deviation in the short run caused by shocks to the system. It is expected to have a negative sign, so when consumption moves away from its equilibrium value it then adjusts back to that value in the next period. When using quarterly data, ϑ reflects the adjustment within a period of one quarter, and it follows that the larger the coefficient in absolute terms the quicker will be the corresponding adjustment. Note that we choose the lag lengths of the included variables on the basis of the Akaike information and/or the Schwarz criteria.

5. Results of the analysis

First we test for the stationarity of consumption, income, net financial wealth, net housing wealth and net total wealth (the sum of net financial and net housing wealth), using the Augmented Dickey-Fuller (1984) test. The results are reported in Table 1. For all variables in levels the null hypothesis of a unit root is accepted, therefore suggesting that the variables are non-stationary. For all the variables in first differences, the null hypothesis is rejected at the 5% significance level, and therefore the variables are considered to be integrated of order one.

Table 1: Augmented Dickey-Fuller unit root test results

	Consumption	Disposable income	Net financial wealth	Net housing wealth	Net total wealth
Levels	-2.04	-1.61	-2.83	-1.83	-0.87
	(0.27)	(0.47)	(0.6)	(0.36)	(0.79)
1st differences	-3.88*	-7.71*	-8.00*	-4.01*[a]	-6.7*
	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)

Note: With constant. p-values in parentheses. * indicates that the null hypothesis of a unit root is rejected at 5% significance level. [a] denotes that a trend is also included

Following the stationarity tests, we proceed with the investigation of the long-run relationship between consumption, income and wealth, using the Fully Modified Least Squares technique. First, we estimate the relationship between consumption, income and net total wealth. The results are reported in Table 2 and suggest that both income and total wealth have positive and statistically significant coefficients at the 1% level. As a next step, we proceed to estimate the long-run relationship, this time disaggregating net total wealth to its components, net financial wealth and net housing wealth. The results indicate that income and net housing wealth have positive and statistically significant coefficients at the 1% level, while net financial wealth has a non-significant coefficient. Removing the latter variable, we estimate a long-run relationship between consumption, income and net housing wealth. The results confirm the positive and statistically significant coefficients of both income and net housing wealth.

Table 2: Private consumption and wealth: estimates of the long-run relationship

Variable	Coefficient (p-value)
Total wealth	
Income	0.62* (0.00)
Net total wealth	0.01* (0.00)
Disaggregated wealth	
Income	0.52* (0.00)
Net financial wealth	0.00 (0.81)
Net housing wealth	0.02* (0.00)
Housing wealth	
Income	0.51* (0.00)
Net housing wealth	0.02* (0.00)

Obs. 56, R^2=0.97 for all three equations. The Wald coefficient tests reject joint hypotheses of zero coefficients. In the second equation, the Wald test rejects the hypothesis also when excluding income.

Note: With constant. * indicates significance at the 1%, level.

Table 3 reports the Engle Granger and Phillips-Ouliaris tests for cointegration for the three specifications estimated above. For the specification employing total wealth, the null of no cointegration is rejected at the 5% significance level in two tests and at the 10% level in the other two. For the specification employing housing wealth only, the null of no cointegration is rejected at the 5% significance level in all tests. In the specification with disaggregated wealth, cointegration is implied by rejection of the null at the 10% significance level in three out of the four tests.

Table 3: Tests for cointegration

	Total wealth	Disaggregated wealth	Housing wealth
Engle-Granger tau-statistic	-3.9***	-3.92	-3.93**
Engle-Granger z-statistic	-24.1**	-24.99***	-25.53**
Phillips-Ouliaris tau-statistic	-3.90***	-4.03***	-4.06**
Phillips-Ouliaris z-statistic	-23.53**	-26.27***	-27.10**

Note: With constant. *, ** and *** indicate significance at 1%, 5% and 10% level, respectively.

Overall, the above empirical evidence is statisfactory, since it is in favour of a positive and statistically significant cointegrating relationship between consumption and wealth, with a positive housing wealth effect in the long run. The MPC for the housing wealth variable is estimated at 0.02, and is consistent with that found in other studies of the effects of wealth on consumption.

The dynamic specification using disaggregated wealth also yields satisfactory results with respect to the role of wealth in consumption (see Table 4). More specifically, the error correction term (ECT) –the residual from the long-term regression of consumption on income, net financial wealth and net housing wealth– has a significant coefficient with the expected negative sign. On the basis of this coefficient, the speed of adjustment towards equilibrium is 0.17% per quarter. Concerning the short-run effects of wealth components on consumption, the coefficient of the change in net housing wealth is positive and significant at the 1%, while the coefficient of the change in financial wealth is also positive and significant at the 5% level. For the change in housing wealth the coefficient is estimated at 0.03, while for the change in financial wealth the corresponding coefficient is estimated at 0.01. The lagged effects of changes in wealth components are not found to be significant at the 5% level. Overall, the results indicate that in the short-run financial wealth also plays a role in consumption, with its importance being, however, smaller compared to that of housing wealth.

Table 4: Private consumption and disaggregated wealth: estimates of the short-run relationship

Variable	Coefficient	(p-value)
Δ Consumption (-1)	0.84*	(0.00)
Δ Income (-2)	0.13**	(0.03)
Δ Net financial wealth	0.01**	(0.03)
Δ Net financial wealth (-1)	-0.00	(0.47)
Δ Net financial wealth (-2)	-0.00	(0.28)
Δ Net housing wealth	0.03*	(0.00)
Δ Net housing wealth (-1)	-0.03***	(0.06)
Δ Net housing wealth (-2)	-0.00	(0.31)
ECT (-1)	-0.17**	(0.05)

R^2 = 0.99, *p*-values for: residual first order correlation (0.09), Jarque-Bera normality (0.45) and ARCH test (0.68).

Note: With constant. *, ** and *** indicate significance at 1%, 5% and 10% level, respectively.

6. Conclusions and policy implications

The results of our analysis point to the existence of a statistically significant cointegrating relationship between consumption and wealth, with a positive housing wealth effect in the long run. In the short-run both financial and housing wealth appear to play a role in determining consumption, with the importance of housing wealth being higher compared to that of financial wealth.

Notably, despite their relatively small size, the coefficients of the wealth variables in the relationships estimated above are translated into substantial wealth effects in the case of Greece. This holds particularly in the case of housing, where the changes in household wealth in the course of the period examined were very large and wealth effects were present according to our results both in the short run and in the long run.

With reference to the period of crisis, our results suggest that the sharp decline in housing wealth has played a significant role in the rapid downward trend followed by private consumption until recently. Furthermore, with private building activity still contracting, and house prices continuing their decline, the resulting persisting loss of housing wealth may be acting against a more dynamic and lasting recovery in private consumption.

With respect to the impact of household financial wealth in the course of the crisis, our results indicate that negative developments in the value of household equity, via intense shocks in the Athens Stock Exchange Index, have contributed towards the decline in private consumption over this period. In parallel, a negative contribution to the developments in private consumption has emerged due to the concurrent decline in household deposits. However, caution is recommended in assessing the exact impact of this decline, as in the case of Greece movements in deposits in the course of the crisis do not always reflect a depletion of past savings (and hence of wealth) to meet needs in a period of falling incomes and rising tax burdens. Instead, at times, these movements are partly associated with the fleet of deposits from Greece, in response to developments in economic uncertainty.

In view of the above considerations, policies that would contribute towards the stabilisation of housing investment and house prices could reinforce the path towards GDP growth via the elimination of negative housing wealth effects on consumption. In this framework, the re-assessment of the system of taxation of real estate property in the direction of lifting excessive tax burdens features as a key policy recommendation, acting in favour of easing downward pressures on house prices.

In addition to the above, fiscal and structural policies that will safeguard the stability of the economy and contribute to the recovery of investment, may enhance GDP growth also via

positive financial market effects that can have a favourable impact on private consumption. However, attention is recommended with respect to policy choices involving the imposition of additional tax burdens on households. Although to a certain extent binding within the framework of the current economic adjustment programme, such policies could impede private consumption growth, not only via their negative effects upon disposable income, but also through a further depletion of household deposits and a corresponding negative wealth effect.

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