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Does Housing Wealth Affect Consumption? The Case of Cyprus

Nektarios A. Michail* and George Thucydides**

Abstract

In this paper we investigate the relationship between housing wealth and consumption in Cyprus. To this end, we employ a vector error correction mechanism to examine interlinkages among house prices, private consumption, disposable income, financial assets and financial liabilities. We find that house prices affect private consumption, particularly in the short term, albeit to a lesser extent than similar studies for other countries. Financial liabilities are found to be important for consumption behaviour, while financial assets of Cypriot households appear to not affect significantly their consumption. Distinguishing consumption between durable and non-durable goods, we find that an increase in house prices boosts consumption of durables, while non-durables are found to register an insignificant effect.

Keywords: House prices, consumption, VECM analysis.

JEL classification: C1, C32, E21, R30.

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Does housing wealth affect consumption? The case of Cyprus

1. Introduction

The drivers of consumption in an economy are of particular importance to policymakers since consumption can have a significant impact on the economic growth of a country (e.g. Kim, 2017). To explore some of consumption's drivers in Cyprus, this study examines the impact of changes in house prices on consumption. While the housing market in Cyprus has attracted particular attention during recent years, not least due to the rapid increase in prices prior to the financial crisis and the subsequent correction, the link between changes in house prices, housing wealth and consumption, has still not been explored. To this end, this study is the first to explore the relevant link in Cyprus.

Housing is usually the largest component of household wealth. For 52.5% of Europe's households, their main residence accounts for the largest share of their total assets (ECB, 2016). According to Aoki et al. (2001), housing wealth's relationship to consumption is different than other forms of wealth for two reasons. First, people usually live in their houses and value directly the services provided by their home. As a result the benefit of an increase in house prices is directly offset by an increase in the opportunity cost of housing services. Second, it is practically impossible for all local homeowners to realise their capital gains resulting from an increase in house prices at the same time, since the gain to a last-time seller will be a loss to a first-time buyer**.**

The various channels via which consumption and house prices are linked are discussed in Aoki et al. (2001) and Benito et al. (2006). For example, house price changes associated with redistribution of wealth can have a significant impact on aggregate consumption. When house prices move up, those who plan to sell stand to gain, while those who plan to buy stand to lose, thus affecting their consumption

behaviour accordingly. Furthermore, if increasing house prices are associated with increasing property transactions, this may affect consumption as more people will buy home appliances, furniture, etc. for their new homes. Nonetheless, according to Benito and Wood (2005), this type of increase in consumption may be small and short lived.

More importantly, housing wealth may affect consumption via the credit markets. House price changes influence the value of the collateral that homeowners have, which in turn can be used to finance consumption. Lenders, at least prior to the financial crisis, were generally prepared to lend more and at a lower interest rate when more collateral was available (Aoki et al., 2002). Likewise, borrowers are usually prepared to borrow more when their net worth increases as a result of an increase in their property value. Another channel of linkage between housing wealth and consumption are savings. Since housing wealth is a form of precautionary savings (Kennickell and Lusardi, 2004), when house prices rise households do not need to hold as much of other forms of wealth, thus using part of this wealth to support spending.

In many countries, the majority of empirical studies have focused on the relationship between aggregate wealth and consumption. The life-cycle model of household spending behaviour, introduced by Ando and Modigliani (1963), makes the assumption that people adjust their wealth and savings over time to keep their planned spending levels steady. The theory postulates that people do not alter consumption due to predictable changes in wealth or income, but rather due to unexpected changes (e.g. an increase in equity prices).

The life-cycle model provides the theoretical foundation required in order to estimate the impact of changes in wealth on consumption behaviour. The magnitude of this impact is referred to as the marginal propensity to consume. For example,

Ludvigson and Steindel (1999), Davis and Palumbo (2001) and Lettau and Ludvigson (2004) find that the estimated marginal propensity to consume out of wealth ranges from 3% to 5% in the United States. Poterba (2000) considers alternative assumptions for interest rates and life expectancies incorporated in the life-cycle model for the United States, and reports an increase in consumption of between 2.7% and 10.3% following a dollar increase in housing wealth.

The separate examination of wealth effects from financial (e.g. equities) and non-financial assets (mainly housing wealth), is studied in Ludwig and Slok (2004) for 16 OECD countries, Case et al. (2005) for 14 countries and separately for the US, Dvornak and Kohler (2007) for Australia, Bover (2005) for Spain and Ahec et al. (2014) for 30 developed and emerging economies. While all studies report a positive relationship between housing wealth and consumption expenditure, Ludwig and Slok (2004), who employ a panel of 16 OECD countries, find no clear evidence that stock market wealth has a greater impact on consumption behaviour compared to housing wealth. Case et al. (2005), using panel data for the US, find a larger effect from housing wealth than from stock market wealth, while Dvornak and Kohler (2007), who performed similar tests for Australia, find the opposite result, i.e. that stock market wealth effect on consumption is larger than the housing wealth effect. Bover (2005) focuses on the effect of housing wealth and decomposes housing into main residence and other real estate properties. She finds that the former has a greater effect on consumption than the latter, although the difference is small (2% and 1% respectively).

Our study contributes to the literature by examining the housing and financial wealth effects for Cyprus, using the residential property price index as a proxy for housing wealth. Financial assets and financial liabilities are also employed in an effort to better capture the effect of net financial wealth. Our analysis is conducted using a

vector error correction setup, which allows us to examine for the equilibrium effects of the variables under study. Our findings confirm that housing wealth has a positive impact on consumption. Furthermore, we find that it is significant only for the consumption of durable goods while it is trivial for non-durables. In addition, financial assets and financial liabilities appear to have a positive impact on housing wealth, while only financial liabilities have an effect on consumption.

The remainder of this paper is organised as follows: Section 2 describes the data used and their sources, Section 3 outlines the methodology employed, Section 4 presents and discusses the results, and Section 5 provides a breakdown of the findings by examining separately the wealth effect on durable and non-durable goods. Lastly, Section 6 discusses the empirical findings and suggests ways forward for future research.

2. Data

This section provides an overview of the data used in the estimation. Household financial liabilities (FL), financial assets (FL), and the residential property price index (RPPI) were obtained from the Central Bank of Cyprus website, private consumption expenditures (PCR) were obtained from the Cyprus Statistical Service (Cystat) while household disposable income data were obtained from Eurostat.[1,2] All data were seasonally adjusted prior to the estimation. A further breakdown of private consumption into durables and non-durables on a quarterly basis is obtained using the relevant share

[1] Disposable income data are only published annually and are available with a lag. Nonetheless, it is possible to obtain a good estimate (with a correlation of 0.9) by summing the compensation of employees, gross operating surplus and mixed income categories, which are available quarterly. We would like to thank Marios Polemidiotis for pointing this out.

[2] Financial assets and financial liabilities were obtained from the Quarterly Financial Accounts published by the Central Bank of Cyprus. The data employed in this estimation excludes the equity category as this is inconsistent with annual financial data. Loans and deposits represent the largest portion of liabilities and assets at 85% and 75%, respectively. We would like to thank Lena Cleanthous and Christiana Aristodemou for providing guidance on this.

from total annual spending. Data for annual spending were also obtained from Cystat. The sample size ranges from 2004Q1 to 2017Q2 as data for financial liabilities and financial assets are not available prior to this date.[3] Table 1 presents an overview of the evolution of the series using annual growth rates.

The results appear to mask the change in the business cycle phases which took place in the Cyprus economy. The RPPI, while it was one of the most volatile variables in the study, remained flat, on average, during each quarter of the sample, as the increase in RPPI prices during the boom period was offset by the decrease observed in the correction period. This can be seen more clearly in the standard deviation of the time series which is by far the largest among the variables at hand, as well as by the large minimum (9.7%) and maximum (20.3%) values. The large standard deviation indicates the boom and correction phase, as also reported by Savva and Michail (2017).

Table 1- Descriptive Statistics: Full Sample 2004Q1-2017Q2

	Fin. Assets	Fin. Liabilities	Consumption	Disp. Income	RPPI
Mean	4.4%	4.2%	-1.4%	-0.5%	0.5%
Median	2.9%	2.9%	-0.7%	1.0%	-2.1%
Max	19.4%	12.0%	5.2%	4.4%	20.3%
Min	-6.5%	-2.7%	-10.7%	-7.7%	-9.7%
Std. Dev.	6.70	4.66	3.95	3.63	9.14
Observations	54	54	54	54	54

Data represent year-on-year (annual) growth rates from the corresponding quarter of the previous year.

Financial assets are found to have increased by an average of 4.4% on an annual basis during this 13-year period with a maximum growth of 19.4% and a minimum of -6.5%. Indicative of the debt-fuelled housing boom, financial liabilities increased by 12% at their maximum and decreased by 2.7% at their minimum. In general, the

[3] The total of 54 quarterly observations refers to a smaller sample compared with the papers which study similar topics, however, this is due to the limited time span of the data available for the Cypriot market. While we do acknowledge the possible implications on the econometric analysis, our tests suggest that the main statistical assumptions are met in the estimation.

financial variables appear to have withstood the financial crisis (but the liabilities didn't) and registered positive growth throughout the period under study.

Private consumption and disposable income declined by 1.4% and 0.5%, respectively. The former registered the lowest minimum value (10.7%). In contrast to studies which focus on the level of loans in the economy (e.g. Cleanthous et al., 2017), breaking the sample into two periods for estimation purposes is not as straightforward in this case since each of the variables follows a different path: the RPPI has been on a downward trend since end-2008, consumption declined in 2009, rebounded in 2010 and then further declined until mid-2014, while the financial variables began to exhibit larger fluctuations in early 2012. Hence, we refrain from imposing ad-hoc dummy variables on the sample, an action which is also justified from the fact that all residuals are normal, suggesting the good fit of the cointegrating relationship (see also next Section). Furthermore, estimating two different models for the boom and correction phases of the housing market would not be feasible due to the small number of observations.

3. Methodology

In order to examine the underlying economic relationships among the variables, we employ a vector error correction model (VECM) as introduced by Johansen and Juselius (1990). In its most general way, the model is defined such that:

$$\Delta y_t = C + A y_{t-1} + \sum_{i=1}^{n} B_i \Delta y_{t-i} + D x_t + \varepsilon_t$$

where y_t is a vector of the (log) endogenous variables, C is the vector of estimated constants, matrix A contains the long-run coefficient estimates, matrix B contains the short-run coefficient estimates, and x_t can include deterministic exogenous variables,

with D being the matrix of coefficient estimates for these exogenous variables. Δ is the first-difference operator. For the case of Cyprus, y_t contains financial liabilities, financial assets, the RPP index, private consumption and disposable income. A similar empirical setup was also followed by Ludwig and Slok (2004) and Case et al. (2005).

No deterministic variables have been employed in the estimations which follow. In Section 5, a further distinction between consumption on durable and non-durable goods is made. This is made in order to examine whether, as the literature suggests, the consumption of durable goods is more sensitive to shocks than the consumption of non-durable goods (European Central Bank, 2014).

Table 2: Unit Roots and Stationarity Tests

	Phillips-Perron		**Augmented Dickey-Fuller**	
Variables	Levels	Difference	Levels	Difference
Fin. Assets	-3.01	6.45*	-3.28*	-4.20*
Fin. Liabilities	-2.43	-7.69*	-3.10*	-3.37*
Pr. Consumption	-0.97	-11.70*	-1.14	-11.60*
Disp. Income	-1.73	-8.69*	-1.87	-4.03*
RPPI	-1.45	-5.75*	-1.51	-3.57*

Note: Phillips-Perron test and Augmented Dickey-Fuller, * rejects the null hypothesis 5% level respectively (critical value: -3.02)

To examine whether the variables are suitable for inclusion in a VEC model, we first examine them for stationarity. The results, which are shown in Table 2, are supportive of the view that all variables exhibit I(1) behaviour. Hence, we proceed to estimate the VECM using quarterly data from 2004Q1 to 2017Q2 with one lag based on the Hannan-Quinn and Schwarz information criteria and one cointegrating equation based on the Johansen (1991) Trace and Maximum Eigenvalue tests.[4]

[4] In particular, the Johansen trace test indicates the presence of two cointegrating relationships while the maximum eigenvalue test suggests the presence of one cointegrating relationship. However, as elaborated in Hendry and Juselius (2000, 2001) after examining the cointegrating equations we found the second cointegrating relationship to be economically insignificant, as it was very close to the first and was thus removed from the estimation. Robustness checks with two cointegrating equations were also conducted, with no qualitative changes in the results. The results are available upon request.

The order specifies financial liabilities (FL) first, followed by financial assets (FA), the residential property price index (RPPI) and consumption (PCR), while disposable income (PYN) is ordered last. All data are in natural logarithms. The model is robust to changes in variable order, and this is further confirmed by the generalised impulse responses (GIRF) of Pesaran and Shin (1998). The GIRF results are available upon request. All estimation residuals abide the normality hypothesis, further suggesting the suitability of the cointegrating relationship.

4. Do house prices affect consumption?

Prior to the estimation of the VEC model, we first proceed with the assessment of the direction of causality between the variables at hand. Table 4 presents an overview of the results using Granger causality tests. It should be remembered here that Granger causality tests are not estimates of true causality but only assist in testing whether a variable is good in forecasting another, without taking any indirect effects into consideration. Similar to the VEC model, one lag was also used in the estimation.

As the results suggest, there exists bi-directional Granger-causality between many variable pairs. In particular, there appears to be bi-directional Granger-causality in the pairs of financial liabilities and the RPP index, financial liabilities and disposable income, financial assets and disposable income, and the RPPI and disposable income. The private consumption and the RPPI pair appears to be only slightly uni-directional as the hypothesis that the RPPI does not Granger-cause private consumption is rejected at the 6% level and not at the conventional 5% level. A similar case, albeit at the 10% level, holds between financial assets and financial liabilities as the second is found not to Granger-cause the first at the 11% level. In addition, financial assets appear to Granger-cause private consumption at the 6% level.

Table 3: Granger Causality results

Null Hypothesis:	F-Statistic	Prob.
LOG(FA) does not Granger Cause LOG(FL)	6.33	0.02
LOG(FL) does not Granger Cause LOG(FA)	2.62	0.11
LOG(RPPI) does not Granger Cause LOG(FL)	4.59	0.04
LOG(FL) does not Granger Cause LOG(RPPI)	27.6	0.00
LOG(PCR) does not Granger Cause LOG(FL)	2.26	0.14
LOG(FL) does not Granger Cause LOG(PCR)	5.05	0.03
LOG(PYN_SA) does not Granger Cause LOG(FL)	4.91	0.03
LOG(FL) does not Granger Cause LOG(PYN)	14.7	0.00
LOG(RPPI) does not Granger Cause LOG(FA)	2.12	0.15
LOG(FA) does not Granger Cause LOG(RPPI)	18.7	0.00
LOG(PCR) does not Granger Cause LOG(FA)	1.67	0.20
LOG(FA) does not Granger Cause LOG(PCR)	3.68	0.06
LOG(PYN_SA) does not Granger Cause LOG(FA)	4.32	0.04
LOG(FA) does not Granger Cause LOG(PYN)	13.59	0.00
LOG(PCR) does not Granger Cause LOG(RPPI)	10.4	0.00
LOG(RPPI) does not Granger Cause LOG(PCR)	3.61	0.06
LOG(PYN_SA) does not Granger Cause LOG(RPPI)	13.7	0.00
LOG(RPPI) does not Granger Cause LOG(PYN)	6.89	0.01
LOG(PYN_SA) does not Granger Cause LOG(PCR)	1.58	0.21
LOG(PCR) does not Granger Cause LOG(PYN)	16.5	0.00

Table 1 presents the results from pairwise Granger causality tests. FL refers to financial liabilities, FA to financial assets, RPPI is the residential property price index, PCR is real (seasonally adjusted) private consumption and PYN_SA is real disposable income (seasonally adjusted).

In contrast, we find that private consumption is not Granger-caused by financial liabilities while the latter do Granger-cause the former. Similarly, financial assets are not affected by either the RPPI index or private consumption. As already suggested, it should be borne in mind that Granger-causality simply points out whether a variable helps forecast another. It does not, however, indicate whether there could be any effects via indirect channels which could also be important in analysing the effects from a fuller system of equations. To this end, we next present the results from impulse response

functions which aim both at capturing indirect effects as well as quantifying the extent of this relationship.

Given the existing Granger-causality relationships we proceed with the estimation of the VEC model. Table 3 presents the estimation results from the cointegrating equation, while the short-term coefficients can be found in Appendix I. In particular, it appears that, expectedly, higher disposable income and higher financial liabilities have a positive and significant long-run effect on consumption. In contrast, higher financial assets have a negative effect on consumption, an expected result, given that higher savings would essentially mean less spending (ceteris paribus). Interestingly, housing prices do not appear to have a statistically significant effect on the equilibrium level of consumption. To further examine the effects from housing wealth, we estimate impulse responses from the system of equations.

Table 4: Cointegrating Equation Estimation

Variables	**Cointegrating Relationship Estimates**
Consumption	1.00
Financial Liabilities	-0.42***
	(0.13)
Financial Assets	0.57***
	(0.14)
House Prices	-0.07
	(0.09)
Disposable Income	-0.84***
	(0.17)
Constant	-2.29

Table 4 presents the cointegrating equation estimates , which total consumption as the dependent variable. *,**,** denote significance at the 10%, 5%, and 1% level respectively.

Figure 1 presents the impulse responses of a shock of one standard deviation in financial liabilities to all endogenous variables. To begin with, the shock appears to be highly persistent as the response of the variable itself suggests. A shock in financial liabilities appears to cause an equally-weighted response in financial assets, most likely a result of the deposit generation process (see Werner, 2014). As expected, an increase

in financial liabilities, perceived as an increase in overall lending in the economy, permanently increases house prices. The result is in line with Cleanthous et al. (2017), who examine the relationship between house prices, lending and the macroeconomy in Cyprus and reach similar conclusions. The response of private consumption is initially large and positive in the first two quarters, but declines and gradually dissipates in the subsequent quarters. Disposable income also increases through time, although the response is very small and could be considered as insignificant.

Figure 1: Impulse responses to a standard deviation shock in financial liabilities

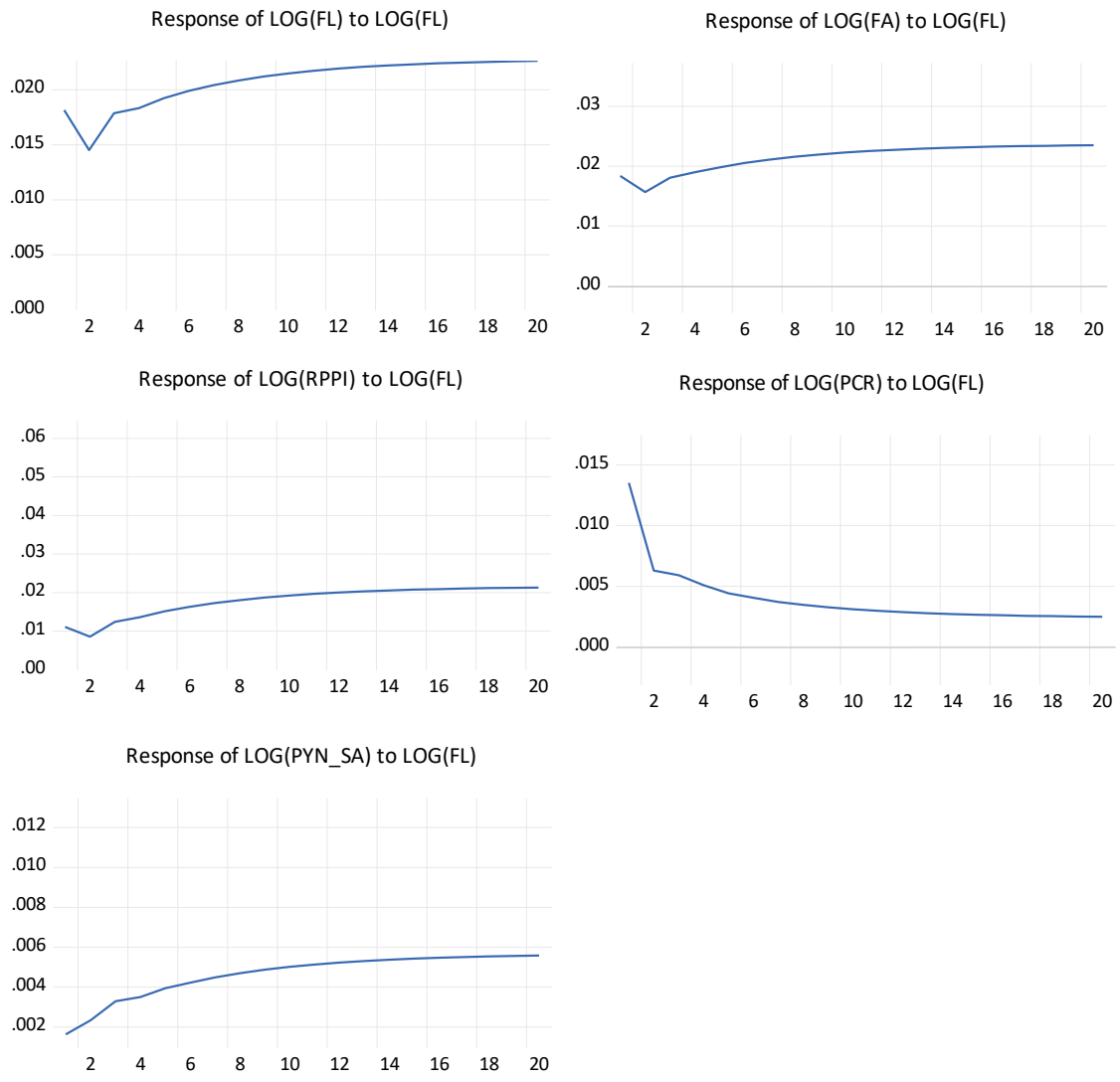

Figure 1 presents the impulse responses to a one standard deviation shock in financial liabilities. FL refers to financial liabilities, FA to financial assets, RPPI is the residential property price index, PCR is real (seasonally adjusted) private consumption and PYN_SA is real disposable income (seasonally adjusted).

The responses of a shock of one standard deviation in financial assets to all endogenous variables can be found in Figure 2. Financial liabilities appear to increase after the shock, a result which can be attributed to the use of the increase in liquidity to fund loans. Interestingly, the RPPI increases by more in this case compared to the financial liabilities shock, which suggests that financial assets may have a greater impact on house prices via their indirect wealth effect on the consumption of durable goods (see also section 5 for more on this topic).

Figure 2: Impulse responses to a standard deviation shock in financial assets

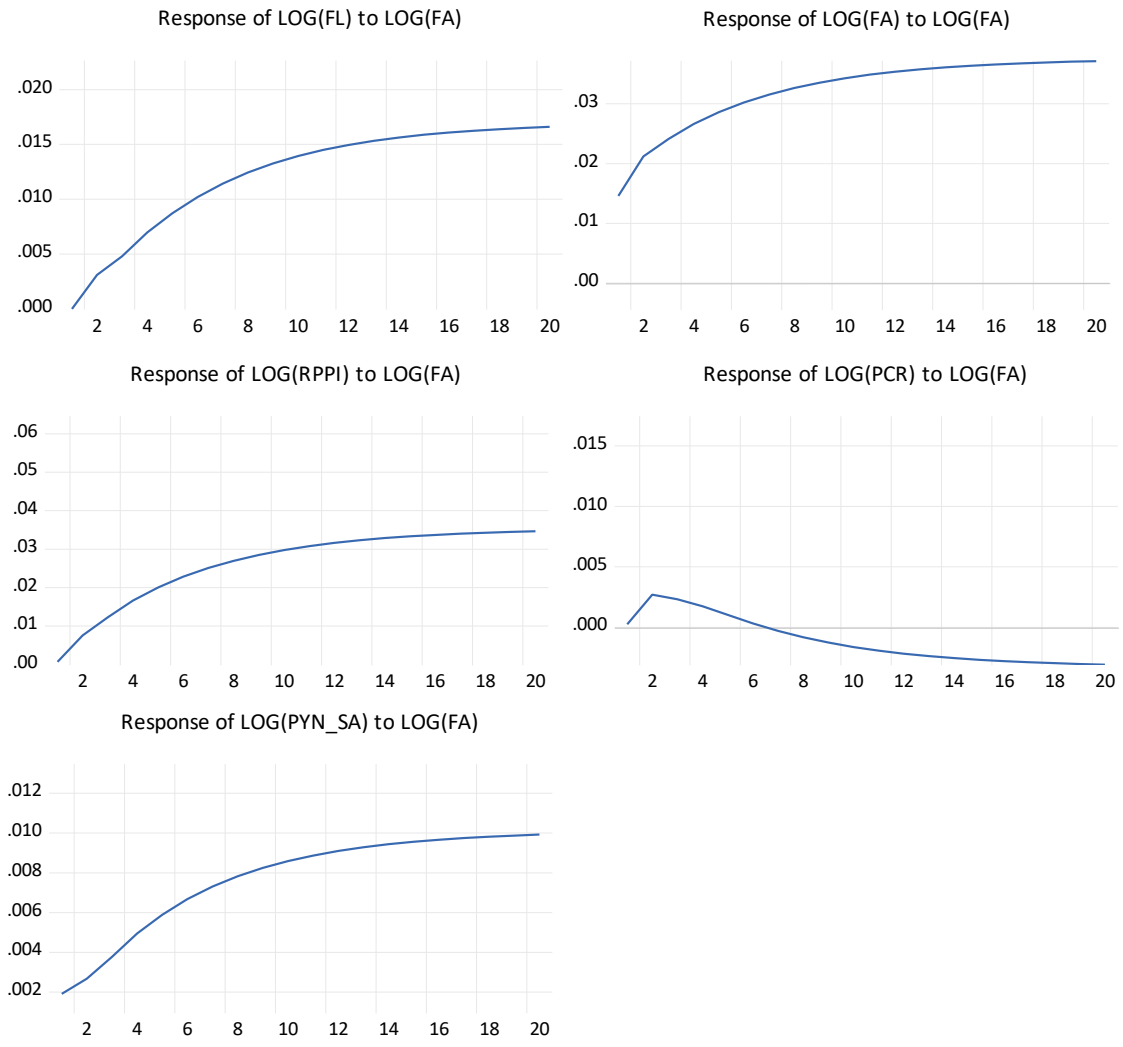

Figure 2 presents the impulse responses to a one standard deviation shock in financial assets. FL refers to financial liabilities, FA to financial assets, RPPI is the residential property price index, PCR is real (seasonally adjusted) private consumption and PYN_SA is real disposable income (seasonally adjusted).

Consumption once again records an insignificant response. As expected, disposable income increases after a positive shock which increases financial assets. This is due to the fact that disposable income is defined as the sum of consumption and savings. The latter includes receipts from interest-bearing deposits which form the largest part of financial assets. Thus, as savings increase through the increase in deposits, disposable income will also rise, as the relevant chart in Figure 2 indicates.

Figure 3: Impulse responses to a standard deviation shock in the RPPI

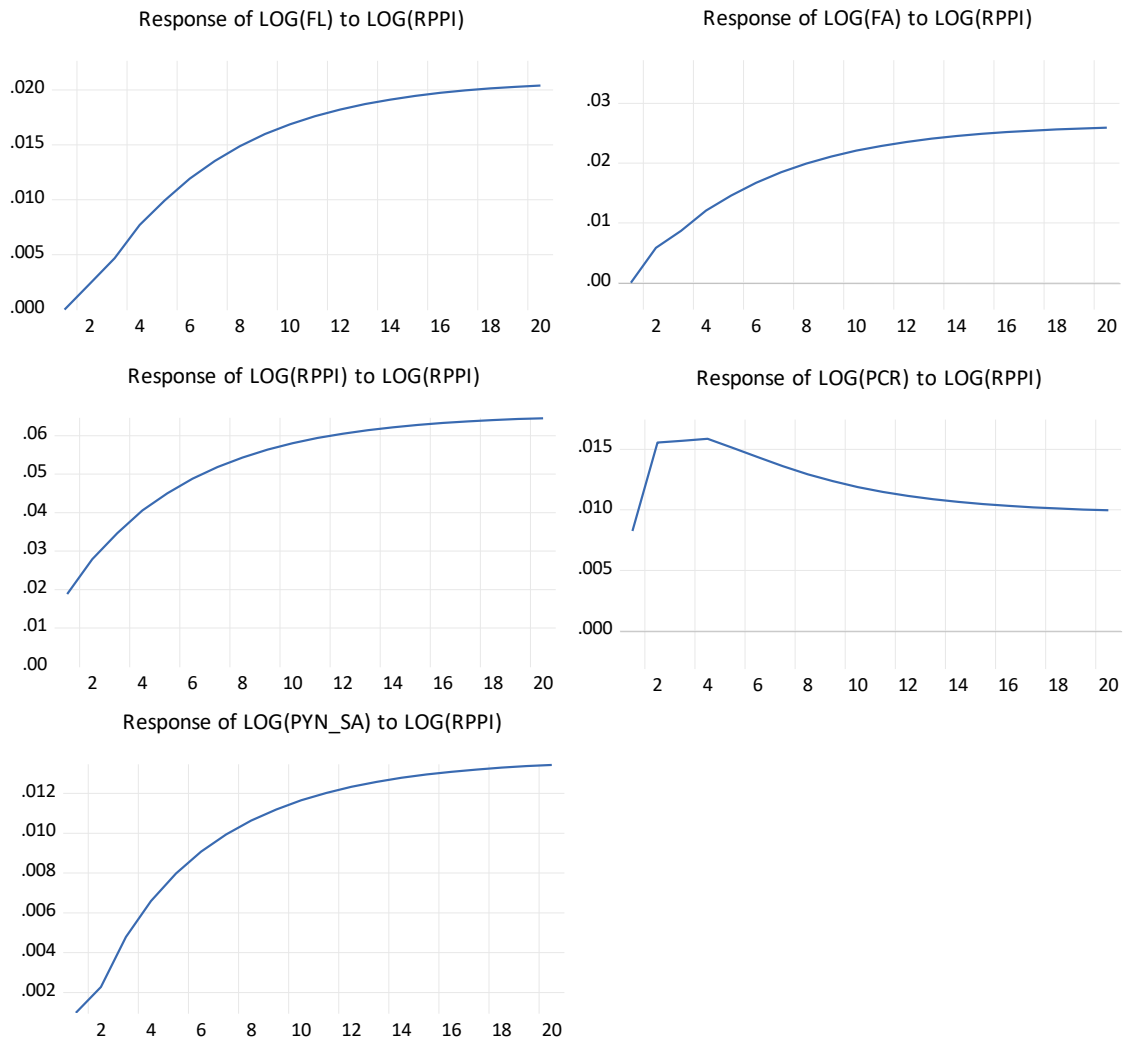

Figure 3 presents the impulse responses to a one standard deviation shock in the RPPI index. FL refers to financial liabilities, FA to financial assets, RPPI is the residential property price index, PCR is real (seasonally adjusted) private consumption and PYN_SA is real disposable income (seasonally adjusted).

The most important response in Figure 3, from the point of view of this paper, is the one which records the responses from a standard deviation shock in the RPPI to the private consumption (PCR). As suggested by the figure, after a shock in house prices, private consumption increases by more than 1.5% while the response declines throughout the horizon. This is in line with the cointegrating relationship results, which point out that there is no equilibrium effect from a change in housing wealth. In other words, the effect is only transitory. The effect from an increase in house prices on the financial/banking sector can also be viewed in the first two graphs in Figure 3, which suggest that both assets and liabilities would increase at a rate close to 2% for the latter and close to 3% for the former. This can be viewed as a result of higher lending due to rising housing prices which, in turn, increases financial assets. As a result of these changes, disposable income rises by more than 1%.

Further proof for the bi-directional relationship between house prices and private consumption can be found in Figure 4. Following a shock in private consumption, the RPP index records a permanent increase of approximately 2%, as part of the consumption will be directed to the housing market (e.g. restorations, furniture, etc), with financial liabilities also recording a 1% increase. In contrast, financial assets do not record any significant change. The positive response of disposable income (PYN) can be attributed to the construction of the variable. In particular, a positive shock in consumption would, *ceteris paribus*, increase PYN as it is the sum of consumption and savings. In more general economic terms, an increase in consumption would result in an increase in overall GDP, which is a proxy for total income in the economy. As long as savings do not change by a larger extent, then disposable income would register an increase.

Figure 4: Impulse responses to a standard deviation shock in private consumption

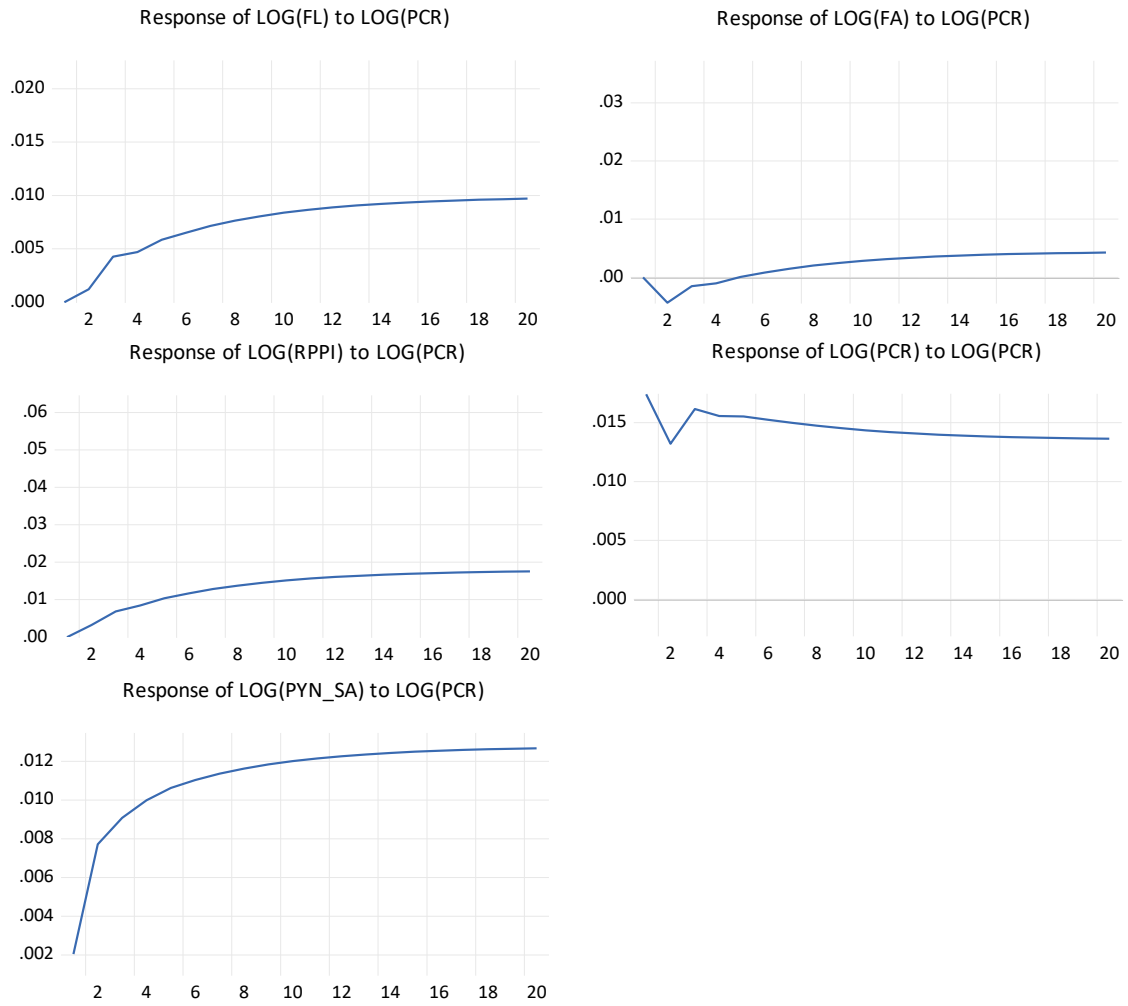

Figure 4 presents the impulse responses to a one standard deviation shock in private consumption. FL refers to financial liabilities, FA to financial assets, RPPI is the residential property price index, PCR is real (seasonally adjusted) private consumption and PYN_SA is real disposable income (seasonally adjusted).

Figure 5: Impulse responses to a standard deviation shock in disposable income

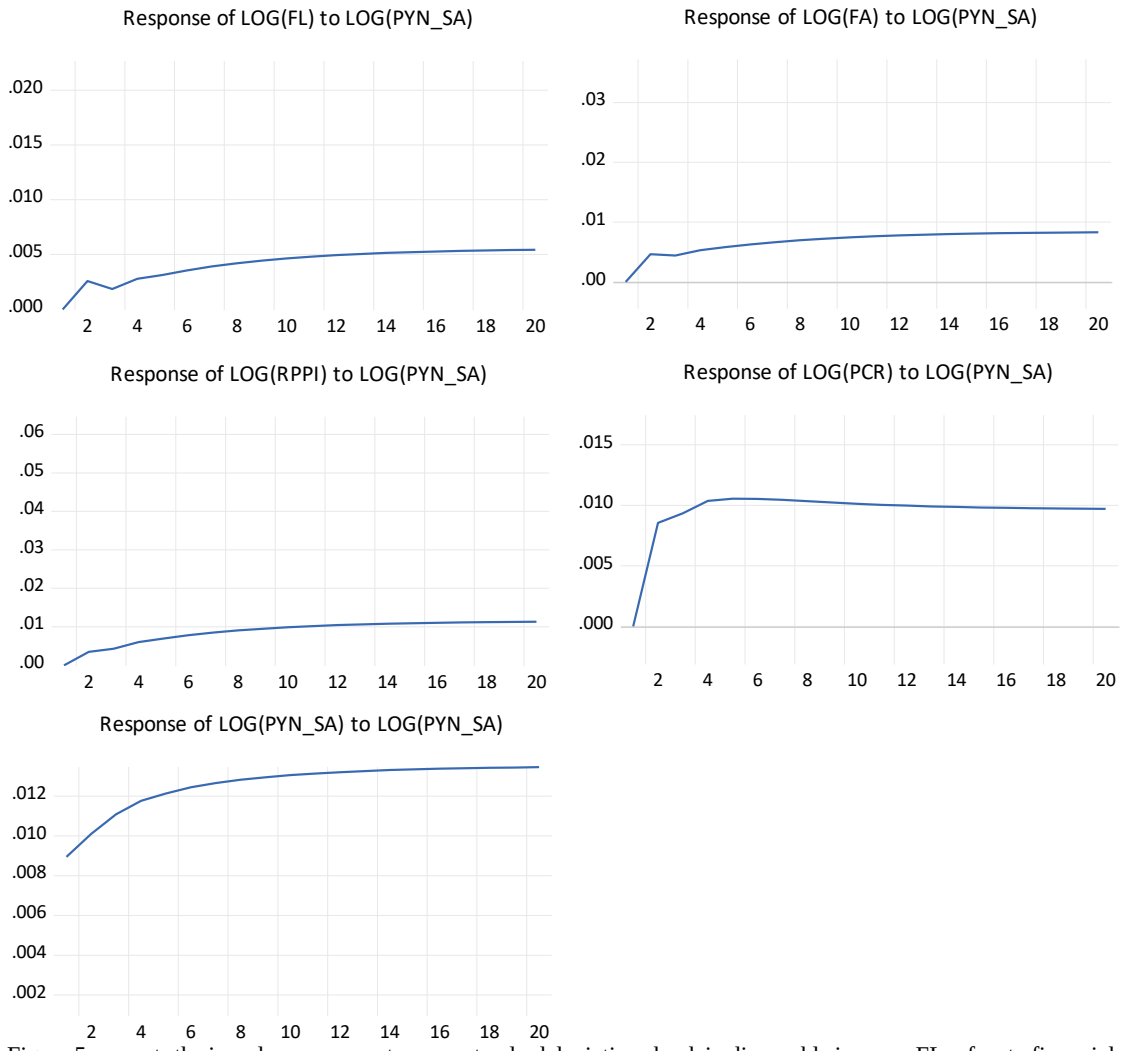

Figure 5 presents the impulse responses to a one standard deviation shock in disposable income. FL refers to financial liabilities, FA to financial assets, RPPI is the residential property price index, PCR is real (seasonally adjusted) private consumption and PYN_SA is real disposable income (seasonally adjusted).

Finally, Figure 5 shows the responses following a shock in disposable income. A positive disturbance in PYN would, in its turn, increase consumption, with the rationale being the same as in the previous paragraph. House prices and, by extension housing wealth, also increase, albeit to a smaller extent compared to the private consumption shock. The response of financial liabilities appears to be insignificant while financial assets appear to increase.

5. Durable and non-durable consumption

To further enhance our analysis, we distinguish between consumption of different types of products and proceed to estimate a VECM with a similar order as before, however, with PCR divided between durable (PCR_D) and non-durable (PCR_ND) consumption. As before, a lag order of one was found to be optimal on the basis of the Schwarz and HQ criteria. For practical reasons, and in order to not over-burden the paper, Figure 6 presents selected responses from this estimation.

Figure 6: Selected impulse responses

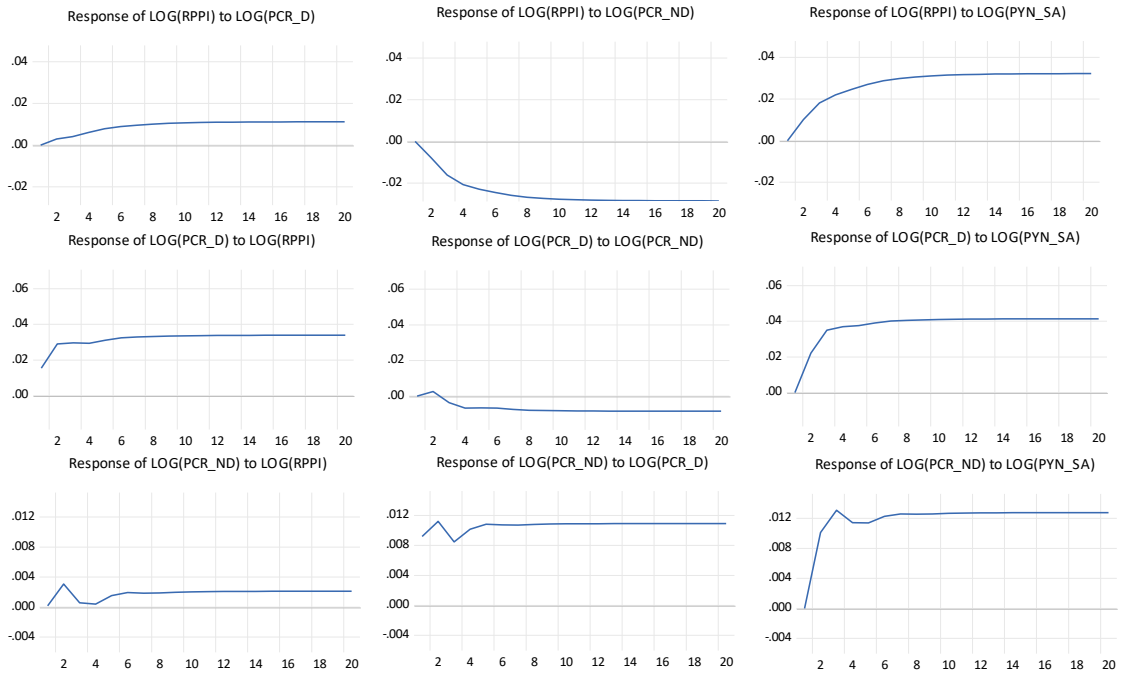

Figure 6 presents selected impulse responses to a one standard deviation shock. FL refers to financial liabilities, FA to financial assets, RPPI is the residential property price index, PCR_ND is real (seasonally adjusted) private consumption of non-durables, PCR_D is real (seasonally adjusted) private consumption of durables and PYN_SA is real disposable income (seasonally adjusted).

In particular, it appears that a shock in house prices would increase the consumption of durables by approximately 4% (column 1, row 2), while non-durable consumption records an insignificant response (column 1, row 3). Interestingly, the response of RPPI to an increase in durable consumption (column 1, row 1) is positive while its response to non-durable consumption (column 2, row 1) is negative. This illustrates that non-

durable consumption is harder to shift as it represents goods such food and beverages which are consumed despite any changes in house prices. The results from the short-run coefficient estimates can be found in Appendix II of this paper.

Table 5: Cointegrating Equation Estimation

Variables	Cointegrating Relationship Estimates
Durable Consumption	1.00
Non-Durable Consumption	-12.68***
	(1.37)
Financial Liabilities	-1.47**
	(0.71)
Financial Assets	0.17
	(0.21)
House Prices	-1.86***
	(0.54)
Disposable Income	-10.3***
	(1.45)
Constant	34.83

Table 4 presents the cointegrating equation estimates , which durable consumption as the dependent variable. *,**,** denote significance at the 10%, 5%, and 1% level respectively.

The absence of a bi-directional relationship between durable and non-durable consumption is also recorded in the results as the latter does not appear to have a significant effect on the former. In contrast, durable consumption has a significant effect on non-durable consumption. Finally, the results suggest that both durable and non-durable consumption respond to changes in disposable income with durables registering a response of approximately 4% while non-durables stabilise at approximately 1.2%.

The results from Figure 6 complement those of Table 5 which also points out that housing price is a statistically significant determinant of the long-run level of durable consumption. Similar to financial liabilities, disposable income, and non-durable consumption, housing wealth has a positive effect on the equilibrium level of durable consumption. In contrast, while not reported in here housing prices are found to have a small negative effect on non-durable consumption. This supports the view that as

housing wealth increases, it is possible to see a shift from non-durable to durable consumption. Another potential channel of this behaviour could potentially relate to precautionary savings (Kennickell and Lusardi, 2004), suggesting that when house prices rise economic agents tend to spend more (i.e. reduce other forms of wealth) and hence purchase more durable goods. Finally, the reason behind the increase in durable consumption could also lie in agents selling any additional houses they possess (e.g. summer houses) and purchasing more of other types of durable goods, even though this behaviour is not expected to be widespread.

Overall, the differences in the consumption categories' responses to a housing wealth shock can be justified by their own nature. In particular, and as suggested earlier, non-durable consumption pertains more to everyday products, such as food and beverages, whose elasticity to changes in any type of wealth, but especially housing which is not-liquid, is very small. It can also be argued that some of these follow Engel's law, i.e. that as income increases their consumption as a proportion of income declines. On the other hand, durable consumption takes up a larger portion of a household's budget and may also be spread out many years, as for example in the case of a house or car loan. As such, it is only rational that durable consumption could increase indirectly, as financial liabilities increase when the value of available collateral increases.

6. Discussion and Conclusions

In this paper we investigate the relationship between housing wealth and consumption in Cyprus. For this purpose, we employ a VECM to examine interlinkages among house prices, private consumption, disposable income, financial assets and financial liabilities. Through Granger-causality tests we first establish the existence of bi-directional effects among many pairs of variables. We then proceed with estimating the

VEC model and the impulse response functions from one standard deviation shocks, with the aim of capturing and quantifying the full extent of the relationship.

Our results suggest that an increase in financial liabilities, perceived as an increase in overall lending in the economy, increases house prices in all following periods, in line with previous studies on the subject. However, such a shock only increases private consumption in the short run as the response gradually dissipates. Similarly, an increase in financial assets has a positive impact on housing wealth, while it has an insignificant impact on private consumption.

In line with the literature, we find that an increase in housing wealth increases consumption. While the magnitude of the impact is relatively low (1% -1.5%) compared with studies in other countries, it remains stable in all future periods. A rise in disposable income would lead to a permanent increase in private consumption, a result in line with economic theory. Furthermore, we proceeded with distinguishing between durable and non-durable consumption, where we find that the impact of housing wealth on consumption is strong in the durable category. Specifically, an increase of nearly 4% is observed in durable consumption from a shock in housing wealth. On the other hand, housing wealth bears no significant effect on non-durable consumption. The relatively large effect on durable goods is higher to what similar studies find for other countries. For example Benito and Wood (2005) find this effect to be 1,2% for the UK and Jiang et al. find it to be 0,4% for the US. Also, previous studies find mixed results regarding the effect of housing wealth on total consumption. For example, Benito and Wood (2005) find that households are two to three times more likely to purchase certain durable goods when they move home, while Jiang et al (2013) and Campbell and Cocco (2007) find that older households increase their non-durable consumption by more compared with younger households in the US and UK,

respectively. Our study finds that the housing wealth effect is larger on durable consumption rather than on total consumption, something which can perhaps be attributed to certain social behaviours, which are not examined in our study.

The results illustrate that housing booms are likely to be associated with increases in lending, as the value of available collateral increases. The increase in purchasing power lending would further increase housing prices which would in turn further boost lending. Increases in lending and housing wealth would also have a positive impact on overall consumption, with this vicious cycle creating the illusion of a "booming" economy. The "booming" economy would provide a rationale for increases in lending and housing prices as the economy would continue its debt-fuelled and housing-related growth. Hence, the consumption-lending-housing nexus could easily follow a self-fuelled cycle, with rising house prices boosting bank lending and vice versa, until it escalates enough to cause macroeconomic disturbances or until the policymaker intervenes to tighten the lending criteria for housing and prick the bubble.

In all, while our study finds preliminary indications of a significant positive relationship between housing wealth and consumption in Cyprus, further research is needed on the topic before drawing final conclusions, especially when a longer series of data becomes available. Given the policy importance of the topic, more studies are required in order to reach definite conclusions, especially when it comes to solutions which could be aimed at preventing the economy from overheating.

One aspect that could be examined further is whether the impact of housing wealth on consumption via the credit channel continues to exist after the financial crisis in Cyprus. This would be of particular interest since banks have tightened their lending criteria during the crisis and are relying less on the value of collateral to grant loans and

more on the repayment ability of the borrower. As such, ratios such as the debt service-to-income can be used in the model in the future.

Another aspect that could be examined in the future, should relevant data become available, is the response of consumption age groups, since it is expected, for example, that a young worker, possibly renting or looking to purchase a house, will react differently than a pensioner, owning or renting out a house, from a shock. Until then, and keeping in mind that we have only been able to employ a relatively short sample, our results, as well as their implications, can only be viewed as tentative and subject to further study.

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Appendix I – Short-run Coefficients: Total Consumption

	ΔlnPCR	**ΔlnFL**	**ΔlnFA**	**ΔlnRPPI**	**ΔlnPYN**
Coint. Eq.	-0.304**	0.164*	-0.025	0.229**	0.162**
	(0.124)	(0.096)	(0.124)	(0.115)	(0.05)
ΔlnPCR	-0.049	-0.129	-0.286*	-0.092	0.1477**
	(0.151)	(0.116)	(0.15)	(0.14)	(0.061)
ΔlnFL	-0.675**	-0.410*	-0.602**	-0.825***	-0.123
	(0.301)	(0.232)	(0.300)	(0.279)	(0.122)
ΔlnFA	0.196	0.075	0.384*	0.266	-0.05
	(0.223)	(0.172)	(0.222)	(0.207)	(0.09)
ΔlnRPPI	0.473***	0.103	0.417**	0.417***	-0.063
	(0.194)	(0.149)	(0.193)	(0.179)	(0.078)
ΔlnPYN	0.701***	0.426*	0.494	0.584**	0.265**
	(0.316)	(0.244)	(0.315)	(0.293)	(0.128)
Constant	0.001	0.013***	0.011**	0.006**	0.001
	(0.004)	(0.003)	(0.004)	(0.003)	(0.001)

The Table presents the short-run coefficient estimates in the VECM with total consumption. *,**,** denote significance at the 10%, 5%, and 1% level respectively.

Appendix II – Short-run Coefficients: Durable and Non-Durable Consumption

	ΔlnPCR(D)	**ΔlnPCR(ND)**	**ΔlnFL**	**ΔlnFA**	**ΔlnRPPI**	**ΔlnPYN**
Coint. Eq.	-0.029***	0.096***	0.053***	0.078***	0.074***	0.000
	(0.013)	(0.016)	(0.015)	(0.016)	(0.018)	(0.009)
ΔlnPCR(D)	-0.204	-0.008	0.033	0.120***	0.014	0.053**
	(0.171)	(0.048)	(0.042)	(0.046)	(0.051)	(0.027)
ΔlnPCR(ND)	1.808***	0.641***	0.199	0.027	0.461***	0.070
	(0.741)	(0.208)	(0.185)	(0.198)	(0.222)	(0.118)
ΔlnFL	-0.22	-0.21	-0.11	-0.04	-0.48*	-0.07
	(0.907)	(0.255)	(0.226)	(0.243)	(0.271)	(0.145)
ΔlnFA	-1.33**	-0.40**	-0.11	-0.01	-0.002	0.023
	(0.673)	(0.189)	(0.168)	(0.18)	(0.201)	(0.107)
ΔlnRPPI	0.749*	0.126	0.207**	0.292**	0.577***	0.055
	(0.455)	(0.128)	(0.113)	(0.122)	(0.136)	(0.072)
ΔlnPYN	1.011	0.054	0.157	-0.09	0.286	0.285**
	(0.954)	(0.268)	(0.238)	(0.256)	(0.285)	(0.152)
Constant	0.011	0.005*	0.013***	0.012***	0.007***	0.000
	(0.012)	(0.003)	(0.003)	(0.003)	(0.003)	(0.001)

The Table presents the short-run coefficient estimates in the VECM when consumption is divided between durable and non-durable goods. *,**,** denote significance at the 10%, 5%, and 1% level respectively.