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Residential versus financial wealth effects on consumption from a shock in interest rates

Manuel León Navarro [a,*], Rafael Flores de Frutos [b,c]

[a] Centro Universitario Cardenal Cisneros, C/General Díaz Porlier 58, 28006, Madrid, Spain
[b] Centro Universitario Cardenal Cinseros, C/General Díaz Porlier 58, 28006 Madrid, Spain
[c] CUNEF, C/Serrano Anguita, 8, 28004 Madrid, Spain

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ABSTRACT

This paper analyzes the effects of residential and financial wealth on consumption from another point of view. Instead of specifying an idiosyncratic shock on each type of wealth, in this work it is specified a common monetary shock. The final wealth effect on consumption is the combination of two effects: The effect of the interest rate shock on wealth and the effect of wealth on consumption. The results for the Spanish economy indicate that the relative importance of each component varies with the term considered. Both types of wealth are important but the financial wealth effect dominates that of the housing wealth for all terms. It is only in the long run when both effects become similar.

1. Introduction

The literature of wealth effect (life cycle models) argues that unexpected increases in wealth lead to increases in consumption Ando and Modigliani, (1963). The empirical literature has tested for the existence of such wealth effects by estimating the effects that a specific shock in wealth has on consumption. Davis and Palumbo, (2001), Fernandez-Corugedo et al., (2003), Lettau and Ludvigson, (2004) and Hamburg et al., (2008) are some examples.

Most papers dealt with just one of the two existing types of wealth, the housing wealth and the financial wealth and there are many reasons why housing and financial wealth should have different effects on consumption, see Case et al., (2005) for an exhaustive survey.

In order to investigate which type of wealth has the greatest effects on consumption, authors have used different econometric methodologies but, in general, it is assumed the existence of two specific shocks, one for each type of wealth. At time "t" one of these shocks takes place and the level of the corresponding type of wealth is affected; this leads to a change on the level of consumption. Most papers detect a major long run effect of housing wealth, see Barata and Pacheco, (2003), Pichette and Tremblay, (2003), Catte et al., (2004), Carroll, 2004, Case et al., (2005), Rapach and Strauss, (2006) or Carroll et al., (2011).

Although that comparison is very interesting, it can be considered incomplete in two respects. First, the comparison is made only over long-run effects, ignoring the short and medium term ones. Second, nothing is said about the effects of each type of wealth on consumption when a common shock (a monetary shock) hits to both types of wealth. In this case, the final impact will be the combination of two effects: (1) the effect that the common shock has on each type of wealth and (2) the effect that each type of wealth has on consumption.

From an economic policy point of view, it can be more interesting to evaluate the wealth effects as the result of a shock in a variable which can be modified by the authorities.

This paper estimates the effects on consumption of each type of wealth, when a shock in interest rates affects the two types of wealth.

The theoretical link between financial wealth and interest rates can be the life cycle theory of Ando and Modigliani, (1963), while the theoretical link between interest rates and housing wealth could be either the life cycle model or the financial accelerator model (Iacoviello, (2005)). In the later model, interest rates affect housing wealth as well as housing prices, which in its turn affect consumption through its role as collateral for loans. If the price of housing rises, also does the amount that can be borrowed and therefore the amount that can be dedicated to consumption.

It is important to mention that the housing stock effect (residential wealth effect) may be different from the housing price effect (collateral effect). Empirical works, based on the life cycle model, constrain these two effects to be equal. If this hypothesis is not true, the effects will not be consistently estimated.

In this paper housing stock and housing prices are included as separate variables. The remaining variables considered are: private consumption, financial wealth and the interest rate.

* Corresponding author. Tel.: +34 913096133; fax: +34 913096121.
E-mail addresses: mleon@cu-cisneros.es (M. León Navarro), flores@cunef.edu (R. Flores de Frutos).

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The method proposed in León and Flores, (2012) is used to broke down, into five components, the dynamic response of consumption to a permanent shock in interest rates: (1) A direct effect of interest rate on consumption, named here "the cost of credit effect", (2) the housing wealth effect, (3) the housing price effect, (4) the financial wealth effect and (5) the feedback effect from the Central Bank. Thus, it is possible to estimate which type of wealth has the biggest effects on consumption, for any term. Also, it is possible to evaluate the importance of the Central Bank reactions, very often forgotten.

León and Flores, (2012) method uses a VAR representation, it allows for non-stationary variables, cointegration and any kind of dynamic relationship among the variables. Moreover, it allows for identifying structural shocks without constraining neither the statistical properties of the variables or their dynamic relationships. The identifying assumptions are clearly stated and, with them, the possible weaknesses of the analysis. Finally, an important feature of the method is that the contribution of each component, to the consumption final response, can be algebraically computed.

Our results indicate that both types of wealth have significant effects on consumption and their relative importance changes with the term considered. None type of wealth has significant contemporaneous effects, but both show important lagged effects. The same happens with the variable price of housing, which moves as predicted in the financial accelerator model. Finally, a significant feedback effect, coming from the Central Bank is detected.

Given the results obtained in this research, the policy of low interest rates carried out by the European Central Bank (ECB) during the last two decades, could explain the spectacular and lasting growth of the Spanish Consumption, via both financial and residential wealth effects.

The paper is organized as follows: Section 2 presents the theoretical framework used as well as the mathematical expressions for each component, Section 3 shows the empirical analysis, Section 4 discusses the estimated components and Section 5 summarizes the concluding remarks.

2. The model

Let's assume an economy with two types of agents: (1) the private sector and (2) the Central Bank.

It is assumed that private agents (PA) determine, for each period "t" the levels of vector $z_t = (c_t, \nabla w_t, \nabla pv_t, f_t)$ where lower case letters represent the natural log of the corresponding upper case variables: Consumption (C_t), housing wealth (W_t), housing price (PV_t) and financial wealth (F_t). And ∇ is the difference operator $1 - B$, with B the lag operator. The empirical analysis will show that all variables in z_t are integrated of order one, I(1).

The Central Bank (CB) determines, for each period, the level of interest rates, $r_t = Ln(1 + R_t)$, where R_t is the nominal interest rate.

Both agents, PA and CB, know, at the beginning of period "t", all past values of the mentioned variables. However, while the PA fixed z_t knowing r_t (CB let PA to know r_t at the beginning of the period) the CB fixes r_t without knowing z_t, which are not yet known.

This assumption is the first, out of two crucial assumptions needed for exactly identifying all the structural parameters in the model. Although it is an important assumption it does not seem to be very restrictive, given the information that the CB provides to economic agents. On the other hand, as none of the variables in z_t is a direct target variable for the European CB, it is not likely for the CB to react (contemporaneously at least) to z_t.

2.1. Mathematical representation of PA's behavior

The information set, held by the PA, at "t" (Ω_{zt}) is made of past values of z_t as well as the present and past values of r_t, that is:

$$\Omega_{zt} = \left\{z_{t-j}, r_{t-j}, r_t\right\}, j = 1, 2, 3, \ldots$$

In each period "t", PA determine the level of c_t, ∇w_t, ∇pv_t, and f_t using the information in Ω_{zt}. This can be represented as:

$$\begin{aligned} z_t &= \nu_z(B) r_t + \varepsilon_{zt} \\ \pi_z(B)\varepsilon_{zt} &= \alpha_{zt} \end{aligned} \tag{1}$$

where $\nu_z(B) = (\nu_c(B), \nu_{pv}(B), \nu_w(B), \nu_f(B))'$ is a (4×1) vector of stable transfer functions, each of them having the form:

$$\nu_j(B) = \nu_{j0} + \nu_{j1}B + \nu_{j2}B^2 + \ldots$$

They capture the unidirectional effect of r_t on each variable of z_t. Their coefficients would account for the final response of c_t if no reaction from the CB was to be considered.

The noise $\varepsilon_{zt} = (\varepsilon_{ct}, \varepsilon_{pvt}, \varepsilon_{wt}, \varepsilon_{ft})'$ is a vector of random variables following an invertible VARMA process, with $\pi_z(B) = I - \pi_1 B - \pi_2 B^2 - \ldots$ being an infinite polynomial matrix whose determinant might have roots in the unit circle.

Finally, $\alpha_{zt} = (\alpha_{ct}, \alpha_{pvt}, \alpha_{wt}, \alpha_{ft})'$ is a white noise vector of random variables, with contemporaneous covariance matrix Σ_z.

2.2. Mathematical representation of CB's behavior

The information set, in period "t", for the CB is made of past values of all variables:

$$\Omega_{rt} = \left\{r_{t-j}, z_{t-j}\right\}, j = 1, 2, 3, \ldots$$

For each period "t", the CB determines r_t using Ω_{rt}:

$$\begin{aligned} r_t &= \nu_r(B) z_t + \varepsilon_{rt} \\ \pi_r(B)\varepsilon_{rt} &= \alpha_{rt} \end{aligned} \tag{2}$$

where $\nu_r(B) = (\nu_{rc}(B), \nu_{rpv}(B), \nu_{rw}(B), \nu_{rf}(B))$ is a (1×4) vector of stable transfer functions which represent the reaction function (feedback response) of the CB to previous values of z_t; ε_{rt} is a scalar noise following a general ARIMA model. Finally, α_{rt} is a scalar white noise process, with variance σ_r^2.

Note that, as consequence of the above first identifying assumption, $\nu_{rc}(0) = \nu_{rpv}(0) = \nu_{rw}(0) = \nu_{rf}(0) = 0$.

The second crucial assumption needed for identifying the parameters in representations (1) and (2) is the independence between α_{rt} and α_{zt}. That is, α_{rt} is a structural shock independent of the elements of α_{zt} that would not be structural shocks unless Σ_z be a diagonal matrix, assumption that it is NOT necessary to make.

2.3. The VAR form of the model

Eqs. (1) and (2) can be represented as

$$\begin{bmatrix} \pi_z(B) & -\pi_z(B)\nu_z(B) \\ -\pi_r(B)\nu_r(B) & \pi_r(B) \end{bmatrix} \begin{bmatrix} z_t \\ r_t \end{bmatrix} = \begin{bmatrix} \alpha_{zt} \\ \alpha_{rt} \end{bmatrix} \tag{3}$$

In a more compact notation:

$$\Pi_y(B) y_t = \alpha_{yt}.$$

With contemporaneous error covariance matrix:

$$\Sigma = \begin{bmatrix} \Sigma_z & 0 \\ 0 & \sigma_r^2 \end{bmatrix}. \tag{4}$$

$\Pi_y(B)$ is a (5×5) polynomial matrix where the ratio between the elements in positions (1,5) and (1,1) captures the dynamic, direct effects on consumption from r_t, that is, the coefficients in this ratio capture the direct effects on consumption due to variations in the cost