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Financial Wealth, Housing Wealth, and Consumption

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Abstract

I analyze the wealth effects on consumption generated by different categories of assets. Using U. S. quarterly data, I show that: (i) stock market wealth effects are significantly smaller than non-stock market wealth effects; (ii) indirectly held stock market wealth has a greater impact on consumption than direct property of stocks. Using a cointegrated VAR and a Bayesian framework, I also find that while changes of stock market wealth are mainly transitory, fluctuations of non-stock market wealth (including housing wealth) contain an important persistent component. Governments and central banks should, therefore, pay special attention to the behavior of housing markets.

Keywords: Wealth, Consumption, Cointegration, Bayesian Econometrics

1. Introduction

Consumption is an important component of aggregate demand, because of its influence on economic growth and its impact on business cycles. The study of private consumption decisions is, therefore, relevant.

Conventional macroeconomic models include wealth effects by considering that wealth influences not only private consumption, but also money demand in the general context of assets' choice. In the life cycle and permanent income hypothesis, the consumer's wealth is a fundamental variable. On one hand, private consumption is a function of disposable income and net wealth. On the other hand, a positive wealth shock increases money demand, as agents try to maintain the desired proportion between money and other categories of wealth.

With the growth of relative importance of financial assets, research has been characterized by the introduction of important features that involve the behavior of financial markets, namely stock markets, in theories of consumption decision. In fact, financial markets influence macroeconomic behavior, mainly, through their impact on consumption and investment. Additionally, consumption and investment produce important feedback effects on financial markets.

Theoretical analysis in this area has not gathered a consensus yet and empirical evidence is still inconclusive.

Among the empirical studies that find evidence of significant wealth effects on consumption, we should refer: Mankiw and Zeldes (1991), Barrell and In't Veld (1992), Ogawa et al. (1996) and

Ludvigson and Steindel (1999). Mankiw and Zeldes (1991) show that stockholders' consumption is more volatile and more strongly correlated with stock market returns than non-stockholders' consumption. Barrell and In't Veld (1992) develop a macroeconomic model that includes a long-run government's budget constraint and assumes a weak form of solvability and conclude that wealth effects are important in any model that is intended to analyze the effects of macroeconomic policies.[1] Ogawa et al. (1996) conclude that net financial wealth is an important determinant of consumption and show that changes in net wealth were responsible for about a third of the total change of consumption, during the economic boom of the eighties in Japan. Ludvigson and Steindel (1999) also identify a significant stock market wealth effect in U.S.A., although the behavior of this market is not a good indicator for future consumption.

On the other hand, Poterba and Samwick (1995), Starr-McCluer (2002), Otoo (1999) and Poterba (2000) find modest wealth effects. Poterba and Samwick (1995) show that, although the property of stocks has changed in the last years, it did not have a significant impact on the relation between fluctuations of stock prices and consumption's volatility. Starr-McCluer (2002) suggests that concerns with inversions of the trend of stock prices can lead stockholders to postpone the spending of realized gains. Otoo (1999) shows that the correlation between stock prices and consumer confidence level does not change with the property of stocks, which means that consumers use stocks, mainly, as a leading indicator of the economic activity. Poterba (2000) points out that the concentrated nature of wealth, bequests and precautionary motives are important determinants of the modest wealth effects found in the literature.

This lack of consensus reflects not only the use of different wealth measures, but also alternative methodologies to quantify the magnitude of wealth effects. Moreover, although the literature has emphasized that the impact (on private consumption) of different categories of assets can be different,[2] the question of knowing whether wealth effects originated by direct property of stocks and those generated by indirect property have different magnitudes was not addressed yet. A priori, wealth effects associated with direct property of stocks may be more significant, because direct property requires a permanent search for information by the stockholder in order to follow the evolution of market prices and, consequently, it provides a larger perception of wealth changes. However, if there are significant information asymmetries, agents that actively trade in the market (such as mutual funds, pension funds or hedge funds) may try to exploit others that do it infrequently (such as private investors) and, therefore, indirect held stock market wealth effects may be stronger than directly held stock market wealth effects.

The main goal of this work is to analyze the impact of wealth (and its major components) on private consumption. The methodology adopted consists of two steps: (i) to estimate long-run relationships among consumption, labor income and different measures of (dis)aggregate wealth, aimed at quantifying wealth effects on consumption by category of assets; and (ii) to estimate the short-run dynamics. Using U.S. quarterly data for the period 1953:Q4 - 2004:Q4, I estimate the long-run elasticity of consumption with respect to aggregate wealth to be 0.42 (or a marginal propensity to consume out of wealth of 0.062). Moreover, I show that wealth effects associated with indirect property of stocks are stronger than those associated with indirect property. The short-run dynamics suggests that while changes of stock market wealth are mainly transitory, changes in non-stock market wealth (which includes housing wealth) contain an important persistent component. Governments and central banks should, therefore, pay special attention to the behavior of housing markets when defining macroeconomic policies.

The paper is organized as follows. In Section 1, I briefly describe the evolution of wealth's composition in U.S.A. In Section 2, I review the theoretical literature and empirical evidence of wealth effects on consumption. In Sections 3 and 4, I describe the methodology used, estimate the model and

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[1] Blanchard et al. (1991) distinguish two types of solvability of public accounts: (i) the strong form, which requires that the present value of future deficits and surplus, including interest payments, as a percentage of GDP, sum up to zero; and (ii) the weak form, which requires that the ratio debt/income is constant over time.

[2] See, for example, Zeldes (1989) and Poterba and Samwick (1995).

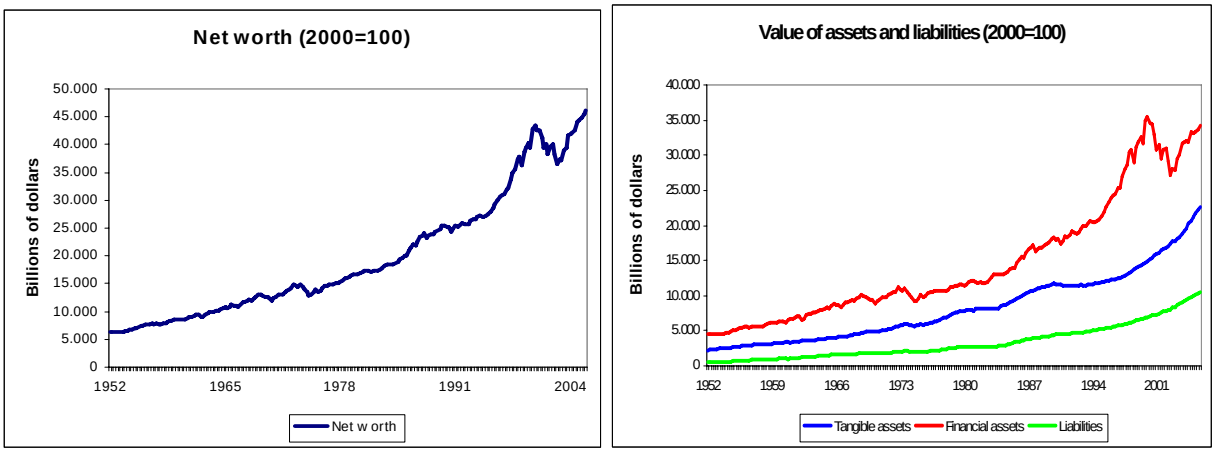
present the major results. Finally, in Section 5, I conclude, discuss the implications of the findings and point out the main lines of future research.

2. Evolution of Wealth in U.S.A.

According to Poterba (2000), the stock market represents approximately one fourth of total net worth in U.S.A. Ludvigson and Steindel (1999) refer that the second half of the nineties was characterized by substantial changes in households' composition of wealth, especially due to fluctuations of the stock market. Bertaut and Starr-McCluer (2000) analyze the U.S. households' composition of assets and liabilities and show that over the past 15 years, despite the big diversification of financial products, the portfolio of the typical household is still very simple and safe, including check, savings and retirement accounts. They also emphasize the concentrated nature of the property of stocks.[3]

Using data from the Flow of Funds Accounts,[4] Figure 1 shows the pronounced growth of wealth during the nineties and the notorious following downturn. Figure 2 suggests that financial assets represent the largest share of assets and this position was substantially reinforced during the nineties. The composition of financial assets has significantly changed, with the decrease of the relative importance of deposits and the growth of equities, mutual and pension funds. Therefore, there is a greater exposure of households and nonprofit organizations to financial markets, both through direct and indirect property of stocks. On the other hand, the wealth-income ratio and savings rate are negatively related since the middle of the nineties, which can be thought as an indicator of a robust wealth effect in this period. The major features of the evolution of financial wealth composition of households and nonprofit organizations in the U.S.A. are presented in the Appendix.

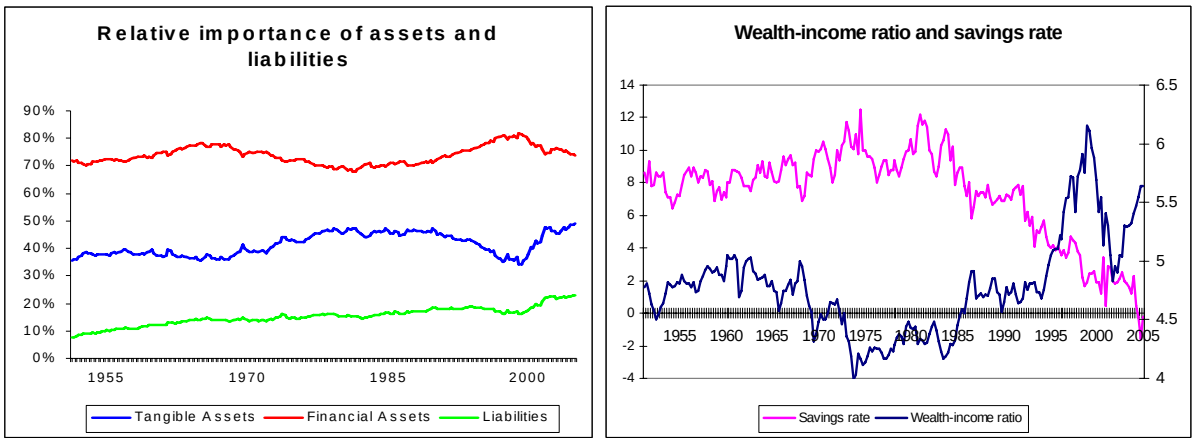
Figure 1: Evolution of wealth of households and nonprofit organizations.



[3] The authors refer that, in 1998, less than an half of the households owned stocks.

[4] The Flow of Funds Accounts is a U.S. quarterly publication (Z.1 release) that comprises macroeconomic information and is released in the second week of March, June, September and December by the Board of Governors of the Federal Reserve System. It provides information about the composition of DP, National Income and wealth, the growth of debt and consumer credit by different groups of economic agents and by financial instrument, in value and in flows. It also presents an estimate of different measures of private saving.

Figure 2: Evolution of wealth-income ratio and savings rate of households and nonprofit organizations.



3. Related Literature

In the last years, the stock markets of the largest economies of OECD have shown substantial fluctuations. Simultaneously, the property of stocks increased significantly. The combination of these features and, in particular, the volatility of financial markets has stimulated the interest about the potential economic effects of these movements.

According to Boone et al. (1998), stock prices influence economic activity through, at least, three channels: (i) increasing the prices of assets, the cost of capital decreases and, therefore, investment demand increases; (ii) the credit channel, which is important because of the increase of the value of collateral (which reduces the problem of adverse selection) and the reduction of risk associated with profitable investments; (iii) and the wealth effect channel.

The theoretical mechanisms associated with the wealth channel are well-known: when the ratio of financial assets to income increases, consumption of stockholders becomes more sensitive to changes in asset prices (Mankiw and Zeldes, 1991); and, as indirect property of stocks increases - through mutual or pension funds -, the correlation between consumption growth and stock market volatility increases (Poterba and Samwick, 1995).

Dynan and Maki (2001) distinguish between two types of wealth effects: the direct and the indirect effect. The logic underlying the wealth effect is quite simple: an increase in the price of stocks boosts wealth and, therefore, allows an increase in consumption. If this answer emerges in a relatively quick way, the relation between stock market and consumption can be referred as the direct channel and it is graphically identified by the negative correlation between savings rate and wealth-income ratio. When consumption adjusts with a significant lag, there is uncertainty about the persistence of the movement of the stock market and it becomes difficult to determine the extension of indirect property of stocks. This lag can be so big that the wealth effect is not revealed in the current consumption of stockholders, but only when assets are transferred to future generations through bequests.[5] In these circumstances, the aggregate relation between stock market wealth and consumption can exist, because, for example, changes in the price of stocks signal future changes of income - this is called the indirect channel.

The first tests to life cycle model (Ando and Modigliani, 1963; Modigliani, 1971; Modigliani and Tarantelli, 1975) showed that consumer's wealth has a significant impact on consumption, with a wealth increase of 1 dollar generating an increase of consumption of approximately 6 cents (or a marginal propensity to consume out of wealth that varies between 4% and 8%). However, as Pearce

[5] The impact (on consumption) of a given change in the stock market wealth depends on its cause: an increase generated by higher expected profits shifts out the budget constraint; an increased associated with a fall in the discount rate changes the slope of the budget constraint. Dynan and Maki (2001) alyze the average answer of consumption over time. Consumers may also decide to reduce labor supply and to consume more leisure: Cheng and French (2000) suggest that the wealth effect is a determinant of the relatively small increase of the rate of participation in labor market.

(1983) refers, these works did not deal directly with the impact of capital gains in consumption, because wealth was not disaggregated by category of assets.

Two related studies for the U.S. economy, using data for the period comprised between the Second World War and the beginning of sixties, have lead to contradictory conclusions: Arena (1965) noted that capital gains do not have a significant effect on consumption,[6] suggesting that this is the result of the strongly biased distribution of stocks; Bhatia (1972) found a significant effect and showed that realized gains have a substantially larger effect than potential gains.[7]

The following works found a positive relationship between capital gains and consumption. Bosworth (1975) showed that non-durable and services consumption expenditure is strongly related with movements of stock prices, but the same does not occur for purchases of durables. It is also suggested that consumers consider average capital gains (instead of current gains) when deciding about consumption. The same relationship was found by Elliott (1980).

While first studies directly included capital gains in the consumption function, recent studies are centered in models based on wealth.[8] Empirical estimates are quite varied. Mayer and Simons (1994) suggests that the long-run impact of the increase of 1 dollar in stock market wealth generates an increase of consumption of approximately 4.2 cents. Brayton and Tinsley (1996) obtain similar results.[9] Caporale and Williams (1997) suggest a marginal propensity to consume out of wealth of around 3% and 5%, pointing out that financial liberalization has strengthened wealth effects. Ludvigson and Steindel (1999) also find a positive (although unstable) relation between wealth and consumption.[10] Poterba (2000) suggests that the marginal propensity to consume out of wealth can be smaller than estimated. Nevertheless, the author concludes that even with relatively small estimates, the effects of the stock market boom on consumption are substantial. Mehra (2001) suggests that wealth effects are independent from the category of wealth - an increase of consumption of about 3 cents for each dollar of increase in wealth -- and that there is a lagged response. On the other hand, Desnoyers (2001) shows that wealth effects are temporary and relatively fast and estimates the marginal propensity to consume out of stock market wealth at around 5.8%.

International evidence is also diversified. In Japan, Mutoh et al. (1993) and Ogawa (1992) suggest that the marginal propensity to consume out of wealth is around 1%. Horioka (1996) and Ogawa et al. (1996) estimate it at around 4%, varying considerably with the measure of wealth and income. In France, several studies (Bonner and Dubois, 1995; Grunspan and Sicsic, 1997) did not find evidence of a significant wealth effect. In Italy, Rossi and Visco (1995) suggest that the marginal propensity to consume out of wealth is between 3% and 3.5% when transfers from Social Security system are included in the measure of disposable income. In Australia, Tan and Voss (2000) estimate that an increase of 1 dollar in wealth generates an increase of non-durable consumption of, approximately, 4 cents. Additionally, the authors did not find evidence supporting that financial liberalization has strengthened wealth effects. Pichette (2000) suggests the existence of a wealth effect of about 3% for Canada. In sum, as Boone et al. (1998) refers, the wealth effect is generally larger for U.S.A. than for G7 countries.

4. Methodology

The methodology used in this paper includes two steps. First, several long-run relations between consumption, labor income and different measures of (dis) aggregate wealth are estimated via DOLS

[6] Evans (1967) reaches the same result although emphasizing that wealth can play an important role on consumption during economic recessions.

[7] Some differences among these studies can explain these results: Arena (1965) included, in the measure of consumption, the purchase of durables, while Bhatia (1972) considered only an estimate of the services provided by durables, used a broader measure of capital gains and a larger lag regarding their ffects on consumption.

[8] See, for example, Laumas and Ram (1982) who suggest that wealth is a variable that should be explicitly included in the consumption function. Moreover, the authors show that wealth effects associated with non-human wealth are greater than those associated with human wealth.

[9] The authors suggest that the marginal propensity to consume out of stock market wealth (3%) is less than the marginal propensity to consume out of other categories of wealth (7.5%).

[10] Using data for the U.S. economy, the authors disaggregate wealth into stock market and non-stock market wealth and show that wealth effects are sensible to the sample period.

(dynamic ordinary least squares) following Stock and Watson (1993). I use ADF (Augmented Dickey-Fuller) tests to analyze the existence of unit roots and follow Engle and Granger (1987) to test the presence of cointegration.[11] Second, I analyze. the short-run dynamics using a cointegrated VAR system.

4.1. Long-run Relations

I estimate the long-run relationship among consumption, wealth and labor income following Davidson and Hendry (1981), Blinder and Deaton (1985), Macklem (1994), Ludvigson and Steindel (1999), Davis and Palumbo (2001) and Mehra (2001) among others. This relation is based on the permanent income hypothesis developed by Friedman (1957) and retaken by Hall (1978, 1988), Flavin (1981) and Campbell (1987) according to which consumption is a function of human wealth and non-human wealth. Moreover, since the impact of different assets' categories on consumption can be different (Zeldes, 1989; Poterba and Samwick, 1995; Case et al., 2001), I disaggregate wealth into its main components: financial wealth versus housing wealth; and stock market wealth (directly and indirectly held) versus non-stock market wealth. Following Saikkonen (1991) and Stock and Watson (1993), I use a dynamic ordinary least squares (DOLS) technique, specifying the following equations:

$$c_t = \beta w_t + \delta y_t + \sum_{i=-k}^{k} \beta_i \Delta w_{t+i} + \sum_{i=-k}^{k} \delta_i \Delta y_{t+i} + u_{1,t}, \tag{1}$$

$$c_t = \nu fw_t + \mu hw_t + \delta y_t + \sum_{i=-k}^{k} \nu_i \Delta fw_{t+i} + \sum_{i=-k}^{k} \mu_i \Delta hw_{t+i} + \sum_{i=-k}^{k} \delta_i \Delta y_{t+i} + u_{2,t}, \tag{2}$$

$$c_t = \alpha stw_t + \theta nstw_t + \delta y_t + \sum_{i=-k}^{k} \alpha_i \Delta stw_{,t+i} + \sum_{i=-k}^{k} \theta_i \Delta nstw_{,t+i} + \sum_{i=-k}^{k} \delta_i \Delta y_{,t+i} + u_{3,t}, \tag{3}$$

$$c_t = \gamma stwd_t + \varphi stwi_t + \theta nstw_t + \delta y_t + \sum_{i=-k}^{k} \gamma_i \Delta stwd_{t+i} + \sum_{i=-k}^{k} \varphi_i \Delta stwi_{t+i} + \sum_{i=-k}^{k} \theta_i \Delta nstw_t + \\ + \sum_{i=-k}^{k} \delta_i \Delta y_{t+i} + u_{4,t}, \tag{4}$$

where c denotes private consumption, w, net wealth, fw, financial wealth, hw, housing wealth, stw, stock market wealth, $stwd$, directly held stock market wealth, $stwi$, indirectly held stock market wealth, $nstw$, non-stock market wealth, y, after-tax labor income, $u_{1,t}$, $u_{2,t}$, $u_{3,t}$, $u_{4,t}$, respectively, the disturbance terms of equations (1), (2), (3) and (4) and the operator Δ represents first-order differences. The parameters β, ν, μ, α, γ, φ, θ, δ represent, respectively, the long-run elasticity of consumption with respect to aggregate wealth, financial wealth, housing wealth, stock market wealth, directly held stock market wealth, indirectly held stock market wealth, non-stock market wealth and after-tax labor income. If the explanatory variables are integrated of order 1 and the estimated residuals of the above regressions are integrated of order 0 (this is, stationary), then the time series will be cointegrated and the cointegration vectors will be (1, $-\beta$, $-\delta$), (1, $-\nu$, $-\mu$, $-\delta$), (1, $-\alpha$, $-\theta$, $-\delta$) and (1, $-\gamma$, $-\varphi$, $-\theta$, $-\delta$), respectively.

Equation (1) assumes that there is a long-run relation between consumption, net wealth and income; equation (2) disaggregates wealth into financial and housing wealth; equation (3) disaggregates wealth into stock market wealth and non-stock market wealth; finally, equation (4) disaggregates stock market wealth into directly held stock market wealth and indirectly held stock market wealth.

The models are estimated using DOLS in order to eliminate endogeneity of regressors in the distribution of least squares estimators. When there is heterokedasticity, I use Newey and West (1987)

[11] These tests have limitations and Harris (1995) and Maddala and Kim (1998) present a detailed description of the panoply of alternative tests for cointegration.

standard errors. Finally, when serial autocorrelation is detected, the long-run relations are re-estimated using DGLS (dynamic generalized least squares).

4.2. Short-Run Dynamics

Specifications (1), (2), (3), and (4) allow us to determine the equilibrium level for consumption as a function of income and wealth, as well as to obtain estimates of different marginal propensities to consume. The long-run relations can, then, be included as error-correction terms in cointegrated VAR systems that explain short-run dynamics. These include additionally lagged values of variables specified in the long-run equations.[12]

I estimate for each long-run specification the following cointegrated VAR system by OLS:

$$\Delta X_t = \kappa + \lambda_t \phi_t' X_{t-1} + \Gamma(L)\Delta X_{t-1} + e_t \quad (5)$$

where X_t is the vector of cointegrated variables included in equations (1), (2), (3), and (4), this is, (c_t, w_t, y_t), (c_t, fw_t, hw_t, y_t), (c_t, stw_t, $nstw_t$, y_t), and (c_t, $stwd_t$, $stwi_t$, $nstw_t$, y_t), λ_t is the short-run adjustment vector telling us how the variables react to the last period's cointegrating error while returning to long-term equilibrium after a deviation occurs, ϕ_t is the vector of estimated cointegration coefficients shown, respectively, in equations (1), (2), (3), and (4) and measures the long-run elasticity of one variable respective to another, $\Gamma(L)$ is a finite-order distributed lag operator and the term $\phi_t' X_{t-1}$ measures the cointegrating residual, ect^i_{t-1}, which can be expressed for equations (1), (2), (3), and (4), respectively, as:

$$ect^1_{t-1} = c_{t-1} - \hat{\beta} w_{t-1} - \hat{\delta} y_{t-1},$$

$$ect^2_{t-1} = c_{t-1} - \hat{\nu} fw_{t-1} - \hat{\mu} hw_{t-1} - \hat{\delta} y_{t-1},$$

$$ect^3_{t-1} = c_{t-1} - \hat{\alpha} stw_{t-1} - \hat{\theta} nstw_{t-1} - \hat{\delta} y_{t-1},$$

$$ect^4_{t-1} = c_{t-1} - \hat{\gamma} stwd_{t-1} - \hat{\varphi} stwi_{t-1} - \hat{\theta} nstw_{t-1} - \hat{\delta} y_{t-1}.$$

The parameter associated to the error-correction term in the dynamic equations should have a negative sign, because when consumption moves away from its equilibrium value, the deviation should be corrected in the following periods; the greater the magnitude of the coefficient is, the faster will be the correction.

5. Estimation and Results

5.1. Data

In the estimations, I use U.S. quarterly, seasonally adjusted data, variables are measured at 2000 prices and expressed in the logarithmic form of per capita terms, and the sample period is 1953:Q4 - 2004:Q4.

The definition of consumption includes nondurable consumption goods and services. Data on income includes only labor income. The definition of total wealth corresponds to net worth of households and nonprofit organizations, this is, the sum of housing and financial wealth. Housing wealth (or home equity) is defined as the value of real estate held by households minus home mortgages. Financial wealth is defined as the sum of financial assets (deposits, credit market instruments, corporate equities, mutual fund shares, security credit, life insurance reserves, pension fund reserves, equity in noncorporate business, and miscellaneous assets) minus financial liabilities (credit market instruments excluding home mortgages, security credit, trade payables, and deferred and unpaid life insurance premiums). I also disaggregate total wealth into stock market (directly and

[12] Masson et al. (1996) discusses other variables that may also help to explain the short-run dynamics such as the interest rate, the inflation rate, the unemployment rate, the consumer confidence index, the public deficit, the deficit of the Current Account, and the GDP growth rate. The results do not change significantly with the inclusion of these variables.

indirectly held corporate equities) and non-stock market wealth. Original data on wealth correspond to end-period values. Therefore, I lag once the data, so that the observation of wealth in t corresponds to the value at the beginning of the period *t+1*. A detailed description of the information used is presented in the Appendix.

5.2. Long-run Relations

The estimation of the long-run specifications depends on the characteristics of time-series. Figure 3 shows that the variables included in the long-run equations are non-stationary processes with a strong trend component. I use the Augmented-Dickey Fuller (ADF) ADF tests to determine the existence of unit roots in the series and conclude that all the series are first-order integrated, I(1) as Tables 1 and 2 suggest.

The long-run equations are estimated using DOLS and following Stock and Watson (1993).[13] When heterokedasticity and serial autocorrelation are detected, I use Newey-West (1987) HAC standard errors and covariance with a lag truncation parameter of 4. Next, I analyze the existence of cointegration among series following Engle and Granger (1987), and find evidence that supports this hypothesis. Finally, in case of serial autocorrelation, the long-run relations are re-estimated using DGLS method. All relations are estimated with variables in logarithms and levels, in order to obtain, respectively, estimates of elasticity and marginal propensities to consume.[14]

[13] I include 4 lags and leads, although the results are not sensible to the choice of different values for k.

[14] Some authors estimate the ratio of consumption to income. See, for example, Boone et al. (1998), Maki and Palumbo (2001) and Mehra (2001) among others.

Figure 3: Consumption, aggregate wealth (and its components), and labor income.

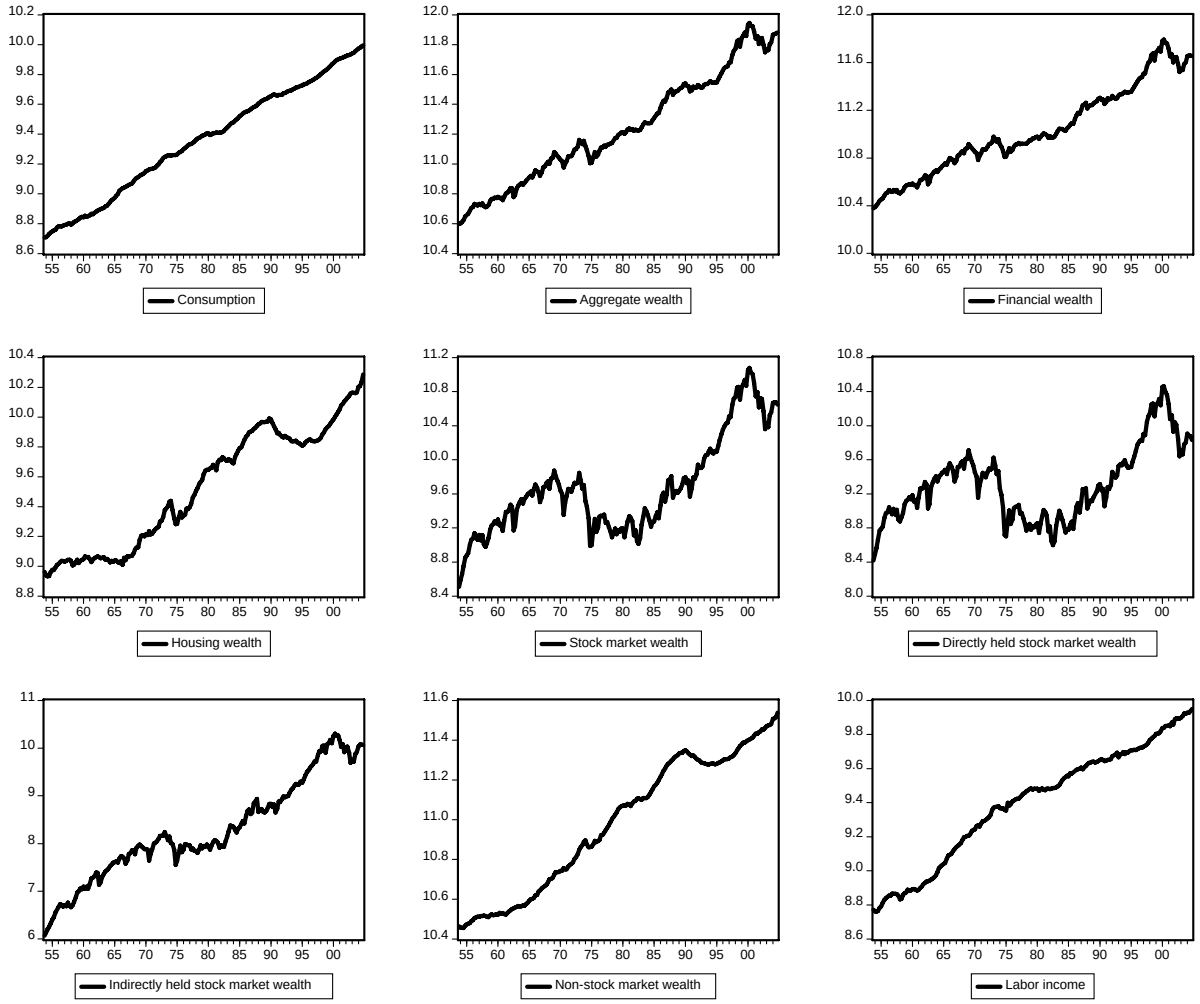


Table 1: ADF tests to the order of cointegration of variables (variables in levels).

	Augmented Dickey-Fuller t-Statistics	**Critical values[d]**	
		1% Level	**5% Level**
c_t	-1.89	-4.00	-3.43
w_t	-2.58	-4.00	-3.43
fw_t	-2.28	-4.00	-3.43
hw_t	-1.58	-4.00	-3.43
stw_t	-1.84	-4.00	-3.43
$stwd_t$	-1.96	-4.00	-3.43
$stwi_t$	-2.45	-4.00	-3.43
$nstw_t$	-2.06	-4.00	-3.43
y_t	-1.15	-4.00	-3.43
Symbols * and ** denote rejection of null hypothesis at a significance level of 1 and 5%. Lag length based on Schwarz info criterion. Critical values suggested by MacKinnon (1996). Model includes trend and constant (drift).			

Table 2: ADF tests to the order of cointegration of variables (variables in first-order differences).

	Augmented Dickey-Fuller t-Statistics	**Critical values[d]**	
		1% Level	**5% Level**
Δc_t	-10.14*	-3.46	-2.88
Δw_t	-13.34*	-3.46	-2.88
Δfw_t	-13.64*	-3.46	-2.88
Δhw_t	-10.49*	-3.46	-2.88
Δstw_t	-13.54*	-3.46	-2.88
$\Delta stwd_t$	-13.49*	-3.46	-2.88
$\Delta stwi_t$	-13.74*	-3.46	-2.88
$\Delta nstw_t$	-4.84*	-3.46	-2.88
Δy_t	-13.83*	-3.46	-2.88
Symbols * and ** denote rejection of null hypothesis at a significance level of 1 and 5%. Lag length based on Schwarz info criterion. Critical values suggested by MacKinnon (1996). Model includes trend and constant (drift).			

Tables 3, 4, 5, and 6 provide a summary of the results of the estimation of the long-run relations via DOLS and DGLS.[15] For each model, the DOLS and DGLS estimates of the coefficients of the cointegration vector (constant is omitted), and the ADF tests to the residuals of the estimated cointegration vector are presented.

The results of the estimation of equation (1) via DOLS are shown in Table 3. The long-run elasticity of consumption with respect to aggregate wealth is 0.42, whereas the elasticity of consumption with respect to income is 0.649. When the relation is estimated with variables in levels, the estimate of the marginal propensity to consume out of aggregate wealth is 0.062 in line with findings of previous studies. Additionally, the ADF tests suggest that the residuals of the estimated cointegration vector are stationary, and, therefore, support the existence of cointegration. Moreover, the implied shares, calculated by scaling the coefficients on aggregate wealth and income (from the regression with variables in logarithms) by the inverse sum of the coefficients are, respectively, 0.39 and 0.61, which are very plausible figures, since they correspond, approximately, to the shares of

[15] In the estimation via DGLS, it is assumed that the error-terms follow an AR(1) process.

capital and labor. Finally, the results suggest that the annual real after-tax rate of return of aggregate wealth is approximately 43.1% (estimation via DOLS) and 9.3% (estimation via DGLS).[16]

Table 3: Long-run relation (1).

Model: $c_t = \beta w_t + \delta Y_t + \eta_{1,t}$				
	β		**δ**	
	Log	**Level**	**Log**	**Level**
DOLS	0.420*	0.062*	0.649*	0.661*
	(14.022)	(11.899)	(20.963)	(17.811)
ADF t-test	-3.415** (Log)		-3.828* (Level)	
DGLS	0.110*	0.017*	0.553*	0.753*
	(4.169)	(4.581)	(6.096)	(7.666)

Symbols *, **, *** represent, respectively, significance level of 1%, 5% and 10%. For the ADF test, the lag length is based on Schwarz info criterion. Critical values suggested by MacKinnon (1996). Model includes constant (drift). Newey-West (1987) corrected t-statistics appear in parenthesis. The sample period is 1953:Q4 to 2004:Q4. $\eta_{1,t} := \sum_{i=-k}^{k} \beta_i \Delta w_{,t+i} + \sum_{i=-k}^{k} \delta_i \Delta y_{,t+i} + u_{1t}$.

Table 4 summarizes the results of the estimation of equation (2). The long-run elasticity of consumption with respect to financial wealth is 0.295 (or a marginal propensity to consume of 0.059), while the long-run elasticity of consumption with respect to housing wealth is 0.173 (or a marginal propensity to consume of 0.145). This suggests that although consumption is more sensitive to changes in financial wealth, the housing wealth effects are greater in magnitude.

The results of the estimation of equation (3) are summarized in Table 5. The long-run elasticity of consumption with respect to stock market wealth is 0.078 (or a marginal propensity to consume of 0.058), while the long-run elasticity of consumption with respect to non-stock market wealth is 0.491 (or a marginal propensity to consume of 0.097). Therefore, consumption is more sensitive to changes in non-stock market wealth and wealth effects associated with this category of assets are greater.

[16] When consumption equals permanent income, the coefficient of wealth - in the equation with variables estimated in levels - can be interpreted as identifying the quarterly real after-tax rate of return on assets. Under permanent income hypothesis, consumption is given by: $c_t = \delta(rw_t + y_t + \sum_{i=1}^{\infty} (1+r)^{-i} E_t \Delta w_{t+i})$. If economic agents and market discount future at the same rate, then δ equals 1, that is, consumption will equal permanent income (expression under brackets). Table 3 shows that the estimate of δ is 0.661 (DOLS) and of 0.753 (DGLS), which implies, respectively, an annual real after-tax rate of return of approximately 43.1% and 9.3% (which we obtain, dividing the coefficient associated with net wealth, β, by the coefficient associated with income, δ).

Table 4: Long-run relation (2)

Model: $c_t = \nu fw_t + \mu hw_t + \delta y_t + \eta_{2,t}$

	ν		μ		δ	
	Log	**Level**	**Log**	**Level**	**Log**	**Level**
DOLS	0.295*	0.059*	0.173*	0.145*	0.599*	0.572*
	(15.141)	(15.064)	(7.781)	(6.330)	(21.283)	(16.351)
ADF t-test	-4.374* (Log)				-4.003* (Level)	
DGLS	0.080*	0.017*	0.068**	0.086*	0.532*	0.663*
	(3.291)	(4.993)	(2.048)	(3.097)	(5.060)	(6.794)

Symbols *, **, *** represent, respectively, significance level of 1%, 5% and 10%. For the ADF test, the lag length is based on Schwarz info criterion. Critical values suggested by MacKinnon (1996). Model includes constant (drift). Newey-West (1987) corrected t-statistics appear in parenthesis. The sample period is 1953:Q4 to 2004:Q4. $\eta_{2,t} = \sum_{i=-k}^{k} \nu_i \Delta fw_{t+i} + \sum_{i=-k}^{k} \mu_i \Delta hw_{t+i} + \sum_{i=-k}^{k} \delta_i \Delta y_{t+i} + u_{2,t}$

Table 5: Long-run relation (3)

Model: $c_t = \alpha stw_t + \theta nstw_t + \delta y_t + \eta_{3,t}$

	α		θ		δ	
	Log	**Level**	**Log**	**Level**	**Log**	**Level**
DOLS	0.078*	0.058*	0.491*	0.097*	0.521*	0.496*
	(18.843)	(18.537)	(9.994)	(11.219)	(11.038)	(10.861)
ADF t-test	-3.415** (Log)				-4.405 (Level)	
DGLS	0.020*	0.015*	0.209*	0.045*	0.491*	0.667*
	(2.047)	(4.418)	(3.019)	(3.189)	(4.381)	(5.932)

Symbols *, **, *** represent, respectively, significance level of 1%, 5% and 10%. For the ADF test, the lag length is based on Schwarz info criterion. Critical values suggested by MacKinnon (1996). Model includes constant (drift). Newey-West (1987) corrected t-statistics appear in parenthesis. The sample period is 1953:Q4 to 2004:Q4. $\eta_{3,t} := \sum_{i=-k}^{k} \alpha_i \Delta stw_{t+i} + \sum_{i=-k}^{k} \theta_i \Delta nstw_{t+i} + \sum_{i=-k}^{k} \delta_i \Delta y_{t+i} + u_{3,t}.$

Finally, Table 6 provides a summary of the results of the estimation of equation (4). The long-run elasticity of consumption with respect to directly held stock market wealth is 0.021 (or a marginal propensity to consume of 0.006), while the long-run elasticity of consumption with respect to indirectly held stock market wealth is 0.066 (or a marginal propensity to consume of 0.11). Therefore, consumption is more sensitive to changes in indirectly held stock market wealth and that wealth effects associated with this category of assets are greater. These results are contrary to the findings of Sousa (2003) and provide evidence of the existence of important information asymmetries in financial markets: agents that actively trade in the market (such as mutual, pension or hedge funds) are able to exploit existing profit opportunities at the expense of agents that trade infrequently (such as private investors).

Table 6: Long-run relation (4).

Model: $c_t = \gamma stwd_t + \varphi stwi_t + \theta nstw_t + \delta y_t + \eta_{4,t}$

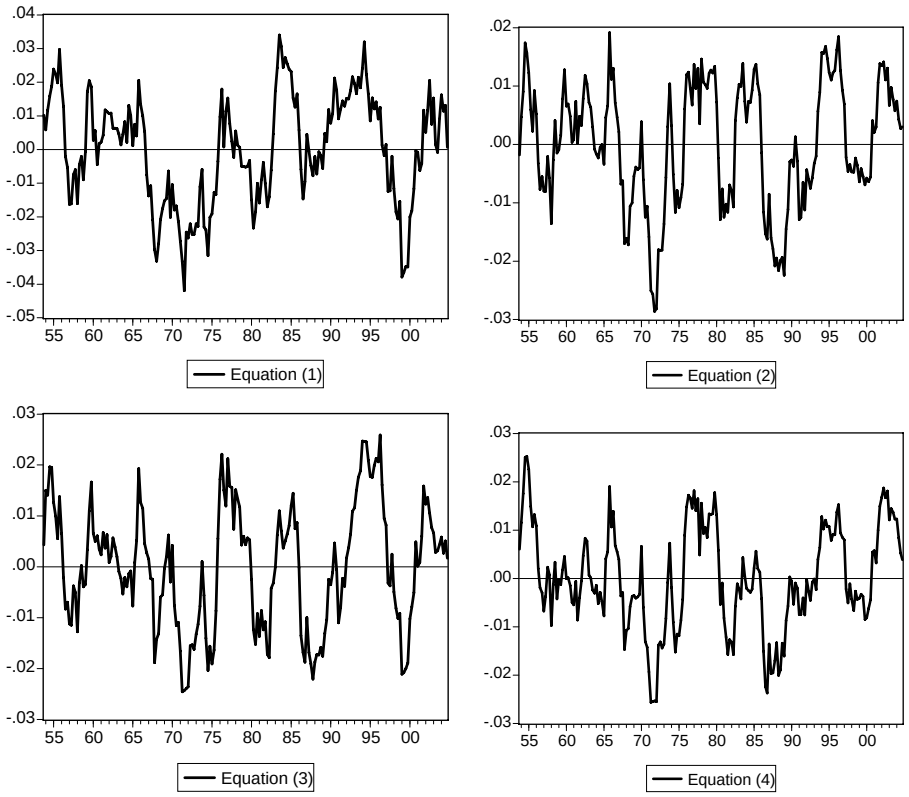
	γ		φ		θ		δ	
	Log	**Level**	**Log**	**Level**	**Log**	**Level**	**Log**	**Level**
DOLS	0.021	0.006	0.066*	0.110*	0.492*	0.083*	0.412*	0.530*
	(0.844)	(0.530)	(2.571)	(8.173)	(8.563)	(10.628)	(7.521)	(13.250)
ADF t-test	-4.607* (Log)				-4.112**(Level)			
DGLS	-0.057*	0.014	0.101*	0.012	0.240*	0.038*	0.657*	0.503*
	(-2.507)	(0.901)	(3.946)	(0.560)	(2.576)	(2.917)	(6.286)	(5.066)

Symbols *, **, *** represent, respectively, significance level of 1%, 5% and 10%. For the ADF test, the lag length is based on Schwarz info criterion. Critical values suggested by MacKinnon (1996). Model includes constant (drift). Newey-West (1987) corrected t-statistics appear in parenthesis. The sample period is 1953:Q4 to 2004:Q4.

$$\eta_{4,t} = \sum_{i=-k}^{k} \gamma_i \Delta stwd_{t+i} + \sum_{i=-k}^{k} \varphi_i \Delta stwi_{t+i} + \sum_{i=-k}^{k} \theta_i \Delta nstw_t + \sum_{i=-k}^{k} \delta_i \Delta y_{t+i} + u_{4,t}.$$

Figure 4 plots the residuals of the long-run relations estimated via DOLS. It can be seen that consumption was below its long-run equilibrium level in the seventies mainly due to the oil shocks and the fall of the international system of payments In addition, consumption was above its long-run equilibrium level in the nineties due to the boom of stock markets, confirming the idea that this period was characterized by abnormally high rates of return.

Figure 4: Residuals of the estimation of the long-run relations via DOLS.



5.3. Short-run Dynamics

I proceed with the analysis of how consumption reacts to shocks on wealth and whether deviations from the long-run equilibrium relationship among consumption, wealth (and its components), and labor income are better described as transitory movements in wealth (and its components) or as transitory movements in consumption and labor income. Table 7 presents a summary of the results of the estimation of the cointegrated VAR system specified in (5), namely, when $X_t = (c_t, stwd_t, stwi_t, ntsw_t, y_t)$.[17]

First, estimation of the consumption growth equation shows that sign of the coefficient associated with ect^4_{t-1} is negative, confirming the idea that deviations from the equilibrium levels are corrected in the following periods. However, its value (approximately, -0.002) suggests that the correction is very slow, which constitutes an indicator that consumers, gradually, adjust their expenditures. This can be interpreted as evidence supporting the presence habit formation and the "indirect" channel of wealth effect, since the response of consumption is not immediate. On the other hand, consumption growth is somewhat predictable by the lag of consumption growth as noted by Flavin (1981), Campbell and Mankiw (1989) and Lettau and Ludvigson (2001), which is a sign of some delay in the adjustment of consumption and represents a statistical rejection of permanent income hypothesis. The lagged values of labor income growth are also statistically significant, which may follow from habit persistence, be evidence in favour of near-rational rules of thumb, or imply that consumers are liquidity constrained.[18]

Second, estimation of the directly and indirectly held stock market wealth growth equations shows that ect^4_{t-1} is statistically significant. The estimated coefficients (respectively, 1.267 and 1.180) suggest that ect^4_{t-1} strongly predicts stock market wealth growth and implies that deviations in stock market wealth from its shared trend with consumption, stock market wealth and labor income uncover an important transitory variation.

Third, estimation of non-stock market wealth growth equation shows that ect^4_{t-1} does not help to predict non-stock market wealth growth: the estimated coefficient is very small (0.024) and it is not statistically significant. However, it is shown that the lagged values of consumption growth, directly and indirectly held stock market wealth growth, non-stock market wealth growth and labor income growth are statistically significant. Moreover, the R^2 statistic shows that this equation explains about 30% of the non-stock market wealth growth.

Fourth, estimation of labor income growth equation also shows that ect^4_{t-1} does not help to predict labor income growth: the estimated coefficient is relatively small (0.018) and it is not statistically significant.

In sum, these results suggest that deviations from the long-run relationship among consumption, stock market wealth (and its components), and labor income are better described as transitory movements in directly and indirectly held stock market wealth. On the other hand, changes in non-stock market wealth (which includes housing wealth) contain an important persistent component. When consumption deviates from its habitual ratio with directly and indirectly held stock market wealth, and labor income, it is stock market wealth (rather then non-stock market wealth, consumption or labor income), that is forecast to adjust until the equilibrating relationship is restored; forward-looking households foresee changes in the return of stock market wealth.

Using the cointegrated VAR estimated in Table 7, I also assess the change in consumption growth caused by a shock to any of the forecasting variables considered. Figure 5 reports the impulse-response functions of consumption growth to a one standard deviation impulse in each of the regressors. It shows that both directly and indirectly held stock market wealth shocks have a positive effect on consumption, although the second are slightly larger in magnitude. Additionally, it can be seen that non-stock market wealth (which includes housing wealth) shocks have a very persistent effect on consumption, while stock market wealth shocks are mainly transitory.

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[17] I use a two-lags cointegrated VAR. The lag length was chosen in accordance with findings from Akaike and Schwarz tests.

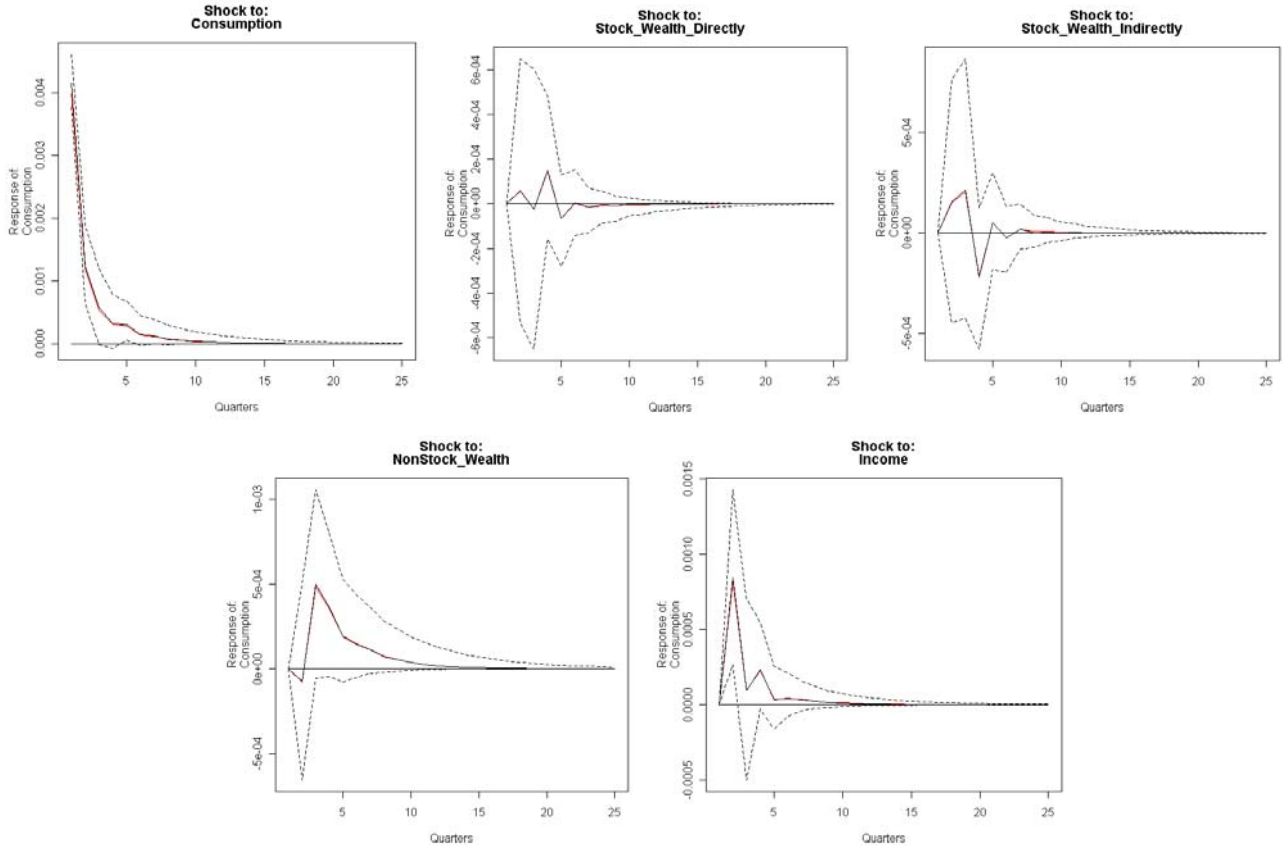
[18] This evidence differs from the results of Lettau and Ludvigson (2001), who find only lagged consumption growth significant.

Table 7: Estimates from cointegrated VAR.

Dependent Variable	Δc_t	$\Delta stwd_t$	$\Delta stwi_t$	$\Delta nstw_t$	Δy_t
Δc_{t-1}	0.221*	4.330*	2.920**	0.139	0.531*
	(2.788)	(2.654)	(1.964)	(1.223)	(3.218)
Δc_{t-2}	0.014	-1.861	-1.335	0.227**	0.016
	(0.174)	(-1.145)	(-0.901)	(2.003)	(0.100)
$\Delta stwd_{t-1}$	-0.001	0.168	0.151	0.019**	-0.038**
	(-0.165)	(0.928)	(0.916)	(1.512)	(-2.044)
$\Delta stwd_{t-2}$	-0.002	0.231	0.173	-0.030	0.051*
	(-0.187)	(1.260)	(1.037)	(-2.361)	(2.773)
$\Delta stwi_{t-1}$	0.001	-0.172	-0.138	-0.017	0.037***
	(0.141)	(-0.862)	(-0.761)	(-1.246)	(1.825)
$\Delta stwi_{t-2}$	0.003**	-0.253	-0.211	0.026***	-0.052*
	(0.327)	(-1.256)	(-1.151)	(1.844)	(-2.549)
$\Delta nstw_{t-1}$	-0.035	0.724	1.253	0.300*	-0.120
	(-0.699)	(0.697)	(1.324)	(4.136)	(-1.139)
$\Delta nstw_{t-2}$	0.118	0.423	0.238	0.140**	0.149
	(2.399)	(0.419)	(0.258)	(1.987)	(1.457)
Δ_{yt-1}	0.112*	0.832	0.809	0.175*	-0.024
	(2.850)	(1.031)	(1.100)	(3.110)	(-0.291)
Δ_{yt-2}	-0.006	-1.040	-0.792	-0.079	0.015
	(-0.150)	(-1.272)	(-1.063)	(-1.389)	(0.178)
Constant	0.004*	0.011	0.024**	0.000	0.003**
	(5.802)	(0.839)	(2.011)	(0.042)	(2.005)
ect^4_{t-1}	-0.002	1.267*	1.180*	-0.003	0.018
	(-0.126)	(4.192)	(4.283)	(-0.158)	(0.603)
R^2	0.14	0.11	0.10	0.30	0.08

Symbols *, **, *** represent, respectively, significance level of 1%, 5% and 10%. Newey-West (1987) corrected t-statistics appear in parenthesis. The sample period is 1953:Q4 – 2004:Q4.

Figure 5: Impulse-Response functions of consumption.



6. Conclusion

The volatility of stock markets in the nineties has renewed the debate about the role of these markets on the determination of economic activity.

This paper analyzes the wealth effects on consumption generated by different components of wealth. Using U.S. quarterly data, I estimate the long-run elasticity of consumption with respect to aggregate wealth to be 0.42 (or a marginal propensity to consume out of wealth of 0.062) in line with findings of previous studies. Moreover, and unlike Sousa (2003), I show that wealth effects associated with indirect property of stocks are stronger than those associated with indirect property, providing evidence of the existence of important information asymmetries in financial markets: agents that actively trade in the market (such as mutual, pension or hedge funds) are able to exploit existing profit opportunities at the expense of agents that trade infrequently (such as private investors).

Additionally, and unlike Lettau and Ludvigson (2001, 2004) who argue that asset wealth fluctuations are largely transitory, the results suggest that, while substantial fluctuations in stock market wealth assets need not indeed be associated with large subsequent movements in consumption, fluctuations in non-stock market wealth (which includes housing wealth) are very important due to their persistence in accordance with the findings of Sousa (2005). An important implication is that governments and central banks need to pay special attention to the behavior of housing markets (and to a smaller extent to the behavior of financial markets) when defining macroeconomic stabilizing policies.

This work is, however, only a first approach to the subject and has, therefore, some limitations.

First, this approach does not correspond to a more structural representation of the economy in which the consumer's preferences and the production side are formalized. Lantz and Sartre (2001) address partially this question, showing that consumption does not react directly to wealth changes, but instead both consumption and wealth react to changes in productivity. On the other hand, Tokua (2002)

points out that, from the theoretical point of view, there is little space for the verification of "pure" wealth effects, since both consumption and stock prices are forward-looking variables. Moreover, this work analyzes the impact of stock market on private consumption, but it ignores the impact on private investment.

Second, the formulation ignores that the relation between consumption and wealth may not be stable over time, which would imply that marginal propensity to consume out of wealth is not constant. Ludvigson and Steindel (1999), Mehra (2001) and Shirvani and Wilbratte (2002) try to highlight this aspect, emphasizing that the coefficient associated to stock-market wealth in the consumption function increased substantially during the nineties, a feature that deserves further reflection in future works.

Third, the specification implicitly assumes that agents consume a single good. In contrast, Lustig and Van Nieuwervurgh (2004), Piazzesi et al. (2006) and Yogo (2006) present models in which agents care about the composition of a consumption basket that includes housing services or durable goods.

Finally, this work is just a starting point for future research. A potentiality to analyze in the future is the role of financial deregulation/liberalization. Bayoumi (1993) and Caporale and Williams (1997), among others, point out the importance of these processes for the credit expansion and the elimination of liquidity restrictions that they provide; Bonser-Neal and Dewenter (1999) emphasize the effects of level of development of financial markets on the savings rate; and Bekaert et al. (2001) emphasize their importance for economic growth. Therefore, it would be important to approach the importance of these processes on the magnitude of wealth effects, an aspect that is analyzed in Boone et al. (2001) and what are their implications for forecasting asset returns. Second, it would be also important to analyze the importance of the concentrated nature of the wealth and its impact on the dynamics of wealth distribution. Third, it would be interesting to analyze the existence of asymmetric wealth effects on consumption. For example, Shirvani and Wilbratte (2000) show that the effects of increases in stock prices are greater than those associated with falls. Finally, although literature emphasizes the role played by wealth on non-durable consumption expenditure, it would also be interesting to analyze its role on durables consumption expenditure.

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Appendix

A. Wealth composition

According to the Flow of Funds Accounts, household and nonprofit organizations' net worth[19] consists of assets minus liabilities. The assets include: (i) tangible assets, such as real estate, equipment and software owned by nonprofit organizations and consumer durable goods; and (ii) financial assets, such as deposits (foreign deposits, checkable deposits and currency, time and savings deposits and money market fund shares), credit market instruments (open market paper, Treasury securities (savings bonds, other Treasury), Agency- and GSE-backed securities, municipal securities, corporate and foreign bonds and mortgages), corporate equities, mutual fund shares, security credit, life insurance reserves, pension fund reserves, equity in noncorporate business, and miscellaneous assets. The liabilities include: credit market instruments (home mortgages, consumer credit, municipal securities, bank loans n.e.c., other loans and advances and commercial mortgages), security credit, trade payables, and deferred and unpaid life insurance premiums.

Table A.1 shows the evolution of composition of tangible assets. Real estate is the most important tangible asset, and its relative importance has been increasing over time: in 1952-1954, they represented about 73% of the tangible assets; in 2001-2005, they correspond to around 82%. This fact can be related with the strong appreciation of the residential market observed during the eighties and recently. On its turn, consumer durable goods have been loosing relative importance. Finally, software and equipment owned by nonprofit organizations represent a marginal share of tangible assets.

Table A.1: Composition of tangible assets of households and nonprofit organizations.

Period	Real estate	Equipment and software owned by nonprofit organiztions(1)	Consumer durable goods(1)
1952-1954	72.59%	0.31%	27.68%
1955-1960	74.09%	0.32%	27.02%
1961-1965	75.70%	0.34%	26.64%
1966-1970	75.09%	0.35%	25.76%
1971-1975	75.64%	0.38%	25.74%
1976-1980	76.71%	0.40%	25.79%
1981-1985	78.98%	0.41%	25.22%
1986-1990	79.51%	0.42%	24.54%
1991-1995	78.30%	0.43%	23.83%
1996-2000	78.85%	0.43%	23.65%
2001-2005	82.00%	0.44%	23.98%

(1) At replacement (current) cost.

Table A.2 shows the evolution of composition of financial assets. It is possible to emphasize that: (i) deposits, which represented about approximately 25% of the financial assets in the eighties, lost relative importance to approximately 16%; (ii) credit market instruments lost their relative importance (13% in the beginning of the fifties to 7% in 2001-2005); (iii) corporate equities, which

[19] Sector includes farm households.

represented around one quarter of the financial assets in the second half of the fifties, in the sixties, and in the second half of the nineties; (iv) mutual fund shares increased their relative importance to close to 10%; while life insurance reserves lost importance; (v) pension fund reserves improved substantially their relative importance to more than 27% and represent currently the most important financial asset; and (vi) the equities in noncorporate business, which represented almost 40% of the financial assets in the beginning of the fifties, have significantly lost importance to approximately 16%.

Table A.3 shows the evolution of liabilities. It can be seen that: (i) home mortgages represent currently almost 70% of the liabilities; (ii) consumer credit represents about 21%; and (iii) other liabilities have a marginal relative importance.

In sum, the data reveal that the composition of financial assets has significantly changed, with the increasing importance of pension fund reserves, corporate equities and mutual fund shares. It is important to refer that the sustained growth of the prices of stocks in this period, the increasing number of mutual fund shares, the introduction of the pension fund reserves, the combination of higher prices of stocks and the increasing ownership of stocks through mutual fund shares and pension fund reserves, have contributed to the observed changes in wealth composition.

Table A.2: Composition of financial assets of households and nonprofit organizations.

Period	Deposits	Credit market instruments	Corporate equities[1]	Mutual Fund hares[2]	Security credit	Life insurance reserves	Pension fund reserves	Equity in noncorporate business[3]	Miscellaneous assets
1952-1954	17.32%	12.58%	18.74%	0.50%	0.09%	7.34%	4.30%	37.86%	1.27%
1955-1960	17.25%	11.50%	24.90%	0.96%	0.09%	6.65%	5.87%	31.66%	1.14%
1961-1965	18.42%	9.95%	29.07%	1.51%	0.09%	5.90%	7.71%	26.35%	1.00%
1966-1970	19.96%	9.25%	28.72%	1.85%	0.20%	5.26%	9.07%	24.67%	1.02%
1971-1975	23.24%	8.23%	22.16%	1.47%	0.15%	4.75%	11.15%	27.72%	1.14%
1976-1980	24.71%	8.04%	14.80%	0.88%	0.17%	4.01%	13.68%	32.45%	1.26%
1981-1985	25.27%	8.50%	12.53%	1.14%	0.24%	3.06%	17.74%	30.22%	1.30%
1986-1990	23.80%	10.35%	13.81%	3.50%	0.35%	2.59%	21.77%	22.27%	1.56%
1991-1995	18.49%	11.39%	17.38%	5.35%	0.52%	2.68%	24.91%	17.70%	1.58%
1996-2000	13.25%	8.63%	24.16%	8.34%	0.85%	2.44%	26.86%	14.26%	1.22%
2001-2005	15.68%	7.26%	18.23%	9.46%	1.48%	2.95%	27.28%	16.30%	1.36%

(1) At market value.
(2) Value based on the market values of equities held and the book value of other assets held by mutual funds.
(3) Net worth of noncorporate business (table B.103, line 31) and owner's equity in farm business, and unincorporated security brokers and dealers.

Table A.3: Composition of liabilities of households and nonprofit organizations.

Period	Home mortgages[1]	Consumer credit	Municipal equities[2]	Banks loans n.e.c.	Other loans and advances	Commercial mortgages[2]	Security credit	Trade payables[2]	Deferred and unpaid life Insurance premiums
1952-1954	60.57%	30.27%	0.00%	0.31%	2.96%	1.87%	1.70%	1.14%	1.18%
1955-1960	62.76%	28.10%	0.00%	0.65%	2.61%	1.88%	1.91%	1.01%	1.07%
1961-1965	63.37%	26.59%	0.00%	1.14%	2.90%	2.19%	1.79%	1.02%	1.00%
1966-1970	61.41%	27.56%	0.00%	1.17%	3.60%	2.19%	1.88%	1.19%	1.01%
1971-1975	59.74%	28.44%	0.09%	1.68%	4.17%	1.92%	1.55%	1.40%	1.02%
1976-1980	62.13%	26.46%	0.84%	2.18%	3.62%	1.22%	1.50%	1.10%	0.94%
1981-1985	63.03%	24.79%	2.06%	1.62%	3.74%	1.28%	1.61%	1.00%	0.86%
1986-1990	64.82%	23.94%	2.68%	0.84%	2.51%	1.80%	1.58%	1.32%	0.51%
1991-1995	68.15%	20.72%	2.19%	0.57%	2.25%	2.33%	1.43%	1.98%	0.38%
1996-2000	65.32%	22.98%	2.00%	1.13%	2.00%	1.69%	2.58%	1.99%	0.31%
2001-2005	68.90%	21.32%	1.90%	0.74%	1.31%	1.75%	2.28%	1.58%	0.22%

(1) Includes loans made under home equity lines of credit and home equity loans secured by junior liens, shown on table L.218, line 23.
(2) Liabilities of nonprofit organizations.

B. Data Description

Consumption
Consumption is defined as the expenditure in non-durable consumption goods and services. Data are quarterly, seasonally adjusted at an annual rate, measured in billions of dollars (2000 prices), in per capita terms and expressed in the logarithmic form. Series comprises the period 1947:Q1-2005:Q4. The source is U.S. Department of Commerce, Bureau of Economic Analysis, NIPA Table 2.3.5.

Wealth
Aggregate wealth is defined as the net worth of households and nonprofit organizations. Data are quarterly, seasonally adjusted at an annual rate, measured in billions of dollars (2000 prices), in per capita terms and expressed in the logarithmic form. Series comprises the period 1952:Q2-2006:Q1. The source of information is Board of Governors of Federal Reserve System, Flow of Funds Accounts, Table B.100, line 41 (series FL152090005.Q).

Financial wealth
Financial wealth is defined as the sum of financial assets (deposits, credit market instruments, corporate equities, mutual fund shares, security credit, life insurance reserves, pension fund reserves, equity in noncorporate business, and miscellaneous assets - line 8 of Table B.100 - series FL154090005.Q) minus financial liabilities (credit market instruments excluding home mortgages, security credit, trade payables, and deferred and unpaid life insurance premiums - line 30 of Table B.100 - series FL154190005.Q). Data are quarterly, seasonally adjusted at an annual rate, measured in billions of dollars (2000 prices), in per capita terms and expressed in the logarithmic form. Series comprises the period 1952:Q2-2006:Q1. The source of information is Board of Governors of Federal Reserve System, Flow of Funds Accounts, Table B.100.

Housing wealth
Housing wealth (or home equity) is defined as the value of real estate held by households (line 4 of Table B.100 - series FL155035015.Q) minus home mortgages (line 32 of Table B.100 - series FL153165105.Q). Data are quarterly, seasonally adjusted at an annual rate, measured in billions of dollars (2000 prices), in per capita terms and expressed in the logarithmic form. Series comprises the period 1952:Q2-2006:Q1. The source of information is Board of Governors of Federal Reserve System, Flow of Funds Accounts, Table B.100.

Stock market wealth
Stock market wealth is defined as the sum of value of stocks, directly and indirectly held, namely: (a) stocks held by households -- direct property (line 23 of Table B.100 - series FL153064105.Q); (b) stocks held by private pension funds (line 12 of Table L.118 - series FL573064105.Q); (c) stocks held by state and local government retirement funds (line 13 of Table L.119 - series FL223064105.Q); (d) stocks held by federal government retirement funds (line 6 of Table L. 120 - series FL343064105.Q); (e) stocks held by property-casualty insurance companies (line 10 of Table L.116 - series FL513064003.Q); (f) stocks held by closed-end funds (line 6 of Table L.123 - series FL553064103.Q); (g) stocks held by exchange-traded funds (line 12 of Table L.123 - series FL563064103.Q); (h) stocks held by mutual funds (line 9 of Table L.122 - series FL653064000.Q); and (i) stocks held by life insurance companies (line 12 of Table L.117 - series FL543064105.Q), multiplied by the ratio of reserves of life insurance companies (lines 17 and 18 of Table L.117 - series FL543140003.Q and series FL543150005.Q) to the total final assets of life insurance companies (line 1 of Table L.117 - series FL544090005.Q). This definition follows Davis e Palumbo (2001). Data are quarterly, seasonally adjusted at an annual rate, measured in billions of dollars (2000 prices), in per capita terms and expressed in the logarithmic form. Series comprises the period 1952:Q2-2006:Q1. The source of information is Board of Governors of Federal Reserve System, Flow of Funds Accounts.

Stock market wealth, directly held
Stock market wealth (directly held) is defined as the sum of value of stocks held by households (line 23 of Table B.100 - series FL153064105.Q). Data are quarterly, seasonally adjusted at an annual rate, measured in billions of dollars (2000 prices), in per capita terms and expressed in the logarithmic form. Series comprises the period 1952:Q2-2006:Q1. The source of information is Board of Governors of Federal Reserve System, Flow of Funds Accounts.

Stock market wealth, indirectly held
Stock market wealth (indirectly held) is defined as the sum of value of: (a) stocks held by private pension funds (line 12 of Table L.118 - series FL573064105.Q); (b) stocks held by state and local government retirement funds (line 13 of Table L.119 - series FL223064105.Q); (c) stocks held by federal government retirement funds (line 6 of Table L. 120 - series FL343064105.Q); (d) stocks held by property-casualty insurance companies (line 10 of Table L.116 - series FL513064003.Q); (e) stocks held by closed-end funds (line 6 of Table L.123 - series FL553064103.Q); (f) stocks held by exchange-traded funds (line 12 of Table L.123 - series FL563064103.Q); (g) stocks held by mutual funds (line 9 of Table L.122 - series FL653064000.Q); and (h) stocks held by life insurance companies (line 12 of Table L.117 - series FL543064105.Q), multiplied by the ratio of reserves of life insurance companies (lines 17 and 18 of Table L.117 - series FL543140003.Q and series FL543150005.Q) to the total final assets of life insurance companies (line 1 of Table L.117 - series FL544090005.Q). Data are quarterly, seasonally adjusted at an annual rate, measured in billions of dollars (2000 prices), in per capita terms and expressed in the logarithmic form. Series comprises the period 1952:Q2-2006:Q1. The source of information is Board of Governors of Federal Reserve System, Flow of Funds Accounts.

Non-stock market wealth
Non-Stock market wealth is defined as the difference between aggregate net wealth, held by households and nonprofit organizations (line 41 of Table B.100 - series FL152090005.Q) and stock market wealth (see previous definition). This definition follows Davis e Palumbo (2001). Data are quarterly, seasonally adjusted at an annual rate, measured in billions of dollars (2000 prices), in per capita terms and expressed in the logarithmic form. Series comprises the period 1952:Q2-2006:Q1. The source of information is Board of Governors of Federal Reserve System, Flow of Funds Accounts.

After-tax labor income
After-tax labor income is defined as the sum of wage and salary disbursements (line 3), personal current transfer receipts (line 16) and employer contributions for employee pension and insurance funds (line 7) minus personal contributions for government social insurance (line 24), employer contributions for government social insurance (line 8) and taxes. Taxes are defined as: [(wage and salary disbursements (line 3)) / (wage and salary disbursements (line 3)+ proprietor' income with inventory valuation and capital consumption adjustments (line 9) + rental income of persons with capital consumption adjustment (line 12) + personal dividend income (line 15) + personal interest income (line 14))] * (personal current taxes (line 25)). Data are quarterly, seasonally adjuted at annual rates, measured in billions of dollars (2000 prices), in per capita terms and expressed in the logarithmic form. Series comprises the period 1947:Q1-2005:Q4. The source of information is U.S. Department of Commerce, Bureau of Economic Analysis, NIPA Table 2.1.

Population
Population was defined by dividing aggregate real disposable income (line 35) by per capita disposable income (line 37). Data are quarterly. Series comprises the period 1946:Q1-2001:Q4. The source of information is U.S. Department of Commerce, Bureau of Economic Analysis, NIPA Table 2.1.

Price Deflator

The nominal wealth, after-tax income, consumption, and interest rates were deflated by the personal consumption expenditure chain-type price deflator (2000=100), seasonally adjusted. Data are quarterly. Series comprises the period 1947:Q1-2005:Q4. The source of information is U.S. Department of Commerce, Bureau of Economic Analysis, NIPA Table 2.3.4., line 1.

Inflation rate

Inflation rate was computed from price deflator. Data are quarterly. Series comprises the period 1947:Q2-2005:Q4. The source of information is U.S. Department of Commerce, Bureau of Economic Analysis, NIPA Table 2.3.4, line 1.

Interest rate ("Risk-free rate")

Risk-free rate is defined as the 3-month U.S. Treasury bills real interest rate. Original data are monthly and are converted to a quarterly frequency by computing the simple arithmetic average of three consecutive months. Additionally, real interest rates are computed as the difference between nominal interest rates and the inflation rate. The 3-month U.S. Treasury bills real interest rate' series comprises the period 1947:Q2-2005:Q4, and the source of information is the H.15 publication of the Board of Governors of the Federal Reserve System.