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Real Estate Versus Financial Wealth in Consumption

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Abstract

The consumption function for the U.S. economy is estimated with real estate and financial wealth for quarterly data for 1952:1–2001:4. An additional dollar of real estate wealth increases consumption by 8 cents in the current year, as compared with only 2 cents for financial wealth. The results are consistent with theoretical bounds on the marginal propensity to consume from aggregate wealth. The decline in the stock market during 2000–2001 had a limited impact on aggregate demand in part because of an offsetting real estate wealth effect.

Key Words: consumption, savings, marginal propensity to consume, financial assets, real estate assets

1. Introduction

The paper reports on the marginal propensities to consume from housing financial wealth for aggregate U.S. data quarterly for 1952:1–2001:4. Case, Quigley and Shiller (2001) have estimated the marginal propensities to consume from housing and financial wealth, using state-level panel data for the United States. Our study relies on aggregate consumption and wealth data taken from the *National Income and Product Accounts* (NIPA) and the Federal Reserve's *Flow of Funds* (FOF) accounts. In contrast, Case et al. use state retail sales data as a proxy for consumption spending and imputed state data for housing and financial wealth.

The estimating equations in this paper are embedded in an optimizing model of intertemporal consumption. Due diligence tests are performed for unit roots and cointegration to determine the appropriate time series specification. The marginal propensity to consume from housing wealth is more than four times the size of that from financial assets, a result robust to the specification.

The focus of the final section of the paper is on what the housing market has contributed to U.S. macroeconomic performance, particularly since the end of the dot-com bubble in 2000. Why did not the overall economy slow down more, given the

precipitous drop in stock prices and aggregate wealth and the ongoing loss of jobs and rising unemployment? Simulations during the 2000–2001 period, including the recession, indicate that households spent from their housing wealth to offset the decline in financial wealth. The results corroborate a speculation by Greenspan (2001) that families offset declines in spending from falling stock prices by increased spending from real estate wealth.

Consumers may react differently to capital gains depending on whether they are generated by rising stock prices or increasing house prices. This differential reaction may explain the robustness of consumption and aggregate demand when securities markets decline. Giliberto and Thibodeau (1989) suggest that homeowners refinance to access equity for consumption or investment in other assets, such as the stock market. Stanton (1995) shows that falling interest rates are not a requirement for refinancing mortgages. Homeowners may refinance during periods of rising or stable interest rates.[1] Muellbauer (1994) suggests that differences between assets based on liquidity and the distribution of ownership could imply different aggregate propensities to consume.

If the marginal propensity to consume from real estate is higher than it is from financial wealth, then housing and other real estate have a primary role in economic stabilization. From the *Survey of Consumer Finances*, in 1998 and 2001 more than two-thirds of households are homeowners, while only half owned stocks, bonds or mutual funds. Moreover, the holding of financial assets is concentrated in pension and retirement accounts. A higher marginal propensity to consume from housing wealth could cause households to smooth their spending. When stock market prices decline, households use their real estate equity to increase consumption, thereby stabilizing the economy. With the availability of home equity loans and low-cost tax-deductible refinancing, homeowners can access their housing to finance consumption.[2] Homeowners may lower total monthly mortgage payments in an environment of falling interest rates.

This paper estimates the marginal propensities to consume at the aggregate U.S. level from disaggregate wealth. Wealth is divided between real estate and financial equity. Real estate equity includes holdings of principal residences, vacation homes and rental property. Financial equity includes liquid deposits as well as stocks, bonds and mutual funds. For the U.S. quarterly for 1952:1–2001:4, the marginal propensity to consume in the current year is 8 cents from an additional dollar of real estate equity. By comparison, the marginal propensity to consume from an additional dollar of financial wealth is about 2 cents. Both estimates are within bounds under a constant elasticity of marginal utility structure (Poterba, 2000) which restrict the marginal propensity to consume to between 2 and 10 cents. In Case et al. (2001) for 1982:1–1999:4, the elasticity of consumption with respect to housing wealth is 0.06 as compared with 0.03 from stock wealth.

More than half the decline in the savings rate from 9.1 percent in 1995 to 4.3 percent by 2001 is attributable to increases in real estate wealth during that period. The decline in the stock market during 2000 and 2001 is almost entirely offset in consumption by rising real estate wealth and the higher marginal propensity to consume from that asset. Households use their housing and real estate to smooth and stabilize consumption when other assets are performing poorly.

2. Wealth and consumption

Summary statistics on family wealth from both financial and physical sources are presented in Table 1 from the 1998 *Survey of Consumer Finances (SCF)*. The typical household had $43,700 in home equity, and $20,800 in financial assets. However, of that financial holding, $16,000 or nearly 75 percent was in restricted-access pension, retirement and insurance accounts. Household median financial wealth in unrestricted accounts, including cash, certificates of deposit, bonds, stocks and mutual funds was $4,800. From Table 1, the bottom two income groups accounting for 37.4 percent of all households had no or negative unrestricted financial assets. Moreover, financial wealth is concentrated even among the wealthy. Bertaut (1998) notes that among those families in the 1992 *SCF* with over $60,000 in liquid assets, almost half owned no stocks or mutual funds.

In the life-cycle hypothesis of Ando and Modigliani (1963), consumption is based on the stocks of human and other financial and physical assets including housing and real estate or total wealth. Consumption at time t is C_t. The utility function with level U_t exhibits constant relative risk aversion in consumption with parameter γ or

$$U_t = \frac{1}{1-\gamma} C_t^{1-\gamma}. \tag{1}$$

The household derives income from financial assets valued at S_t and an imputed rent from its physical assets, mainly its house, valued at H_t. Personal disposable income is divided between transfer payments G_t and wage and salary, the latter the return to human capital. Wage and salary income is Y_t. The household's transfer payments G_t include Social Security, unemployment compensation, food stamps, housing vouchers, welfare and Temporary Assistance to Needy Families.

Personal disposable income excluding property income is $Z_t = Y_t + G_t$.[3] A factor converts these incomes Y_t from the labor market and G_t from transfers to asset values. If those conversion factors are b_Y and b_G, then unobservable human capital and transfer

Table 1. Median housing and stock market wealth (U.S. Families in $1,000s, 1998).

	% of Families	% Owning Homes	Financial Wealth	Restricted Financial	Unrestricted Financial	Stocks, Mutual Funds	House Equity
All Families	100.0	64.7	20.8	16.0	4.8	7.5	43.7
< $10,000	12.6	36.1	0.8	1.0	− 0.2	0.6	15.9
$10,000–24,999	24.8	54.9	4.3	4.6	− 0.3	4.0	30.1
$25,000–49,999	28.8	67.0	17.1	9.2	7.9	2.9	37.5
$50,000–99,999	25.2	84.5	57.1	29.6	27.5	10.7	63.7
> = $100,000	8.6	91.1	244.3	110.4	133.9	60.2	147.4

Source. 1998 Survey of Consumer Finances from Kennickell et al. (2000).

wealth are $b_Y Y_t$ and $b_G G_t$. Transfer wealth is the entitlement that the household has to receive payments, such as from Social Security.

Both labor income and transfer income are paid in cash and are fully liquid. The underlying assets for human capital and transfer wealth possess corresponding liquidity. The income households receive from financial assets and housing is less liquid. For financial assets, the illiquidity comes from their being held in restricted pension and insurance accounts. The income received from financial assets, in interest, dividends and capital gains, cannot be easily accessed for consumption. For housing, the imputed income and particularly the capital gains cannot always be consumed directly. The parameter λ_S measures the liquidity of financial assets relative to physical assets.

Total wealth is the sum of human capital, transfer wealth and liquidity-adjusted financial and physical holdings, or

$$W_t = b_Y Y_t + b_G G_t + \lambda_S S_t + H_t. \tag{2}$$

Dividing by personal disposable income Z_t

$$w_t = b_Y + (b_G - b_Y) g_t + \lambda_S s_t + h_t. \tag{3}$$

Lower case letters denote ratios of wealth types to personal disposable income. Relative to personal disposable income, consumption is c_t. If β is the marginal propensity to consume from aggregate wealth, then $C_t = \beta W_t$ and

$$c_t = \beta[b_Y + (b_G - b_Y) g_t + \lambda_S s_t + h_t]. \tag{4}$$

Equation (4) links the consumption ratio as a proportion of personal disposable income to relative transfers g_t, financial wealth s_t and housing wealth h_t.

If transfer payments have no impact on consumption, then $b_G = b_Y$. If $b_Y > b_G$, increases in transfer payments cause an increase in savings and a decrease in consumption. In a Ricardian equivalence, households increase their savings in anticipation of the added burden of tax payments in order to fund the added transfer payments. Conversely, if $b_Y \leq b_G$ an increase in transfer payments leads to added or no decrease in consumption.

The coefficient λ_S determines whether there is a difference in the marginal propensity to consume between financial and physical assets. If the marginal propensity to consume from financial assets and housing is identical, then $\lambda_S = 1$. In this case, wealth is a simple sum of net equity holdings in financial and physical assets, or $s_t + h_t$. There is no distinction between a dollar of wealth obtained from the housing market or the stock market. If $\lambda_S > 1$, households have a higher propensity to consume from financial than physical wealth. The opposite is the case when $\lambda_S < 1$. When $\lambda_S < 1$, households have a higher marginal propensity to consume from housing wealth than from financial wealth.

The marginal propensity to consume links to underlying parameters in the economic environment. These are the real rate of interest ω, δ the rate of time preference, the coefficient of relative risk aversion γ in the utility function (1) and the planning horizon

$\tau - t$. From iterated expectations on the utility function, the marginal propensity to consume from wealth is

$$\beta = \frac{1-\theta}{1-\theta^{\tau-t}}, \tag{5}$$

where $\tau - t$ is the planning horizon and the discount fraction is

$$\theta \equiv \frac{1}{1+\omega}\left[\frac{1+\omega}{1+\delta}\right]^{1/\gamma}. \tag{6}$$

The marginal propensity to consume from wealth $\beta(\omega, \delta, \gamma, \tau - t)$ depends on a set of parameters. From (5) and (6), for a given real rate of interest ω, risk aversion coefficient γ and planning horizon $\tau - t$, the marginal propensity to consume $\beta(\bar{\omega}, \delta, \bar{\gamma}, \bar{\tau} - \bar{t})$ corresponds uniquely to rate of time preference δ. Poterba (2000) imposes plausible values for the long-term real rate, the rate of time preference, the relative risk aversion parameter and the planning horizon. In an intertemporal consumption structure, Zhang (1997) derives borrowing constraints as dependent on the rate of time preference, risk aversion and income streams. These bound the marginal propensity to consume from aggregate wealth at between 2 and 10 cents per dollar. By estimating (4), which is a nonlinear equation, a differential marginal propensity to consume from real estate wealth is testable.

3. Empirical data

The data for the present study are quarterly observations from 1952:4 to 2001:4 on aggregate consumption, income and wealth. Data on the various components of disposable personal income and consumption are taken from the quarterly NIPA of the Bureau of Economic Analysis, U.S. Department of Commerce. Wealth data are taken from the Federal Reserve System's FOF accounts. Net real estate equity is real estate wealth less mortgage debt. Financial wealth is total net worth minus net real estate wealth.

In estimating the wealth effect on consumption, two different definitions of income are employed. The first is the standard definition disposable personal income utilized in the NIPA. The second follows that suggested by Davis and Palumbo (2001), where property income from corporate dividends, net interest, rental income and proprietors' income is subtracted from total disposable income. The reason for adjusting disposable income in this way stems from the life-cycle model. Labor income plus transfer income represents the return to human wealth. Thus, property income should not be included with labor income as a proxy for human wealth. Including labor income and property income together can possibly confuse the propensities to consume out of human and property wealth.



Figure 1. Consumption spending and real estate wealth (normalized scale).

Figure 1 plots the relationship between the consumption-income ratio (using the standard definition NIPA definition of income) and the real estate wealth-income ratio.

Case, Quigley and Shiller's (2001) paper on the effect of real estate wealth has received wide attention and been extensively cited in the economic press. The present study re-examines the effect of real estate wealth, using a dataset that is substantially different from that used by Case et al. Table 2 summarizes the differences. Case et al. employ panel data for the 50 U.S. states which is quarterly for 1982:1 to 1999:4. They model consumption at the state level using state retail sales as a proxy variable. Since all states do not report retail sales numbers (because all states do not collect sales tax), state-level retail sales estimates produced by Regional Financial Associates are employed.

In 2001, NIPA consumption spending was $7.06 trillion, while retail sales were $3.51 trillion. Retail sales are therefore about half of consumption spending. In addition, retail sales differ systematically from consumption spending by state residents because of (1) in-state tourist expenditures by out-of-state residents and (2) differences in sales tax rates that

Table 2. Comparisons of measures of key variables.

Key Variables	Case, Quigley and Shiller	Benjamin, Chinloy and Jud
Consumption	Retail sales is used as a proxy for consumption	Consumption is taken NIPA data
Income	Personal income for states from BEA is used	Disposable personal income from NIPA is used
Fin. wealth	Fin. wealth is imputed from mutual fund holdings	Fin. wealth is taken from Fed FOF accounts
R/E wealth	R/E wealth is imputed from Census and R/E price indexes	R/E wealth is taken from Fed FOF accounts

result in differences in per capita retail spending (residents of high-tax states tend to spend less per capita than residents of low-tax states).

Another difference between our study and that of Case et al. arises out of the way in which income is measured. Because estimates of disposable personal income are unavailable at the state level, Case et al. use personal income before taxes. Our study uses NIPA disposable personal income.

The studies also differ in the ways in which wealth is measured. Because official aggregate wealth measures are unavailable at the state level, Case et al. employ a series of statistical imputations to calculate both financial and real estate wealth. They derive their financial wealth measures from state-level estimates of mutual fund holdings, and they estimate real estate wealth using a combination of decadal Census estimates of housing values and state-wide real estate price indexes developed by Case–Shiller. In contrast, our study uses the quarterly FOF account measures of financial and real estate wealth.

4. Model specification

To determine the appropriate time series specification, tests for unit roots and co-integration are carried out. For a time series Δx_t, the estimating equation for a unit root is

$$\Delta x_t = \alpha + \varsigma t + (\rho - 1)x_{t-1} + \sum_{j=1}^{r} \varphi_r \Delta x_{t-r} + \varepsilon_t.$$

Here Δ is the first difference operator, r is the number of augmentation lags, (ζ, ρ, φ) are parameters and ε_t a disturbance. The unit root test is for the null hypothesis of $\rho = 1$ against the alternative of $\rho < 1$. If the time series appear to have a trend, time t is included, and the test statistic is denoted v_1. If there is no apparent trend, time is excluded and the resulting test statistic is v_2. The number of augmentation lags r is large enough to eliminate evidence of serial correlation in the residuals from the estimating equations. In all cases, asymptotic critical values are used, since the residuals from the estimating regressions do not appear to be normally distributed.

Non-stationary series are cointegrated if there is a stationary linear combination of the variables. The Engle–Granger (1987) cointegration test involves recovering the least squares residuals of (4) as e_t. The test statistic is for $\rho_e = 1$ for a unit root against the stationary alternative $\rho_e < 1$ in

$$\Delta e_t = (\rho_e - 1)e_{t-1} + \sum_{j=1}^{k} \phi_k \Delta e_{t-k} + \varepsilon_{et},$$

with parameters (ρ_e, ϕ) and disturbance ε_{et} The augmentation lag order k is large enough to eliminate serial correlation. An additional test takes account of multiple cointegrating

vectors. The Johansen (1995) test determines the number of cointegrating relationships as the rank of Γ in

$$\Delta z_t = \alpha_z + \Gamma z_{t-1} + \sum_{j=1}^{m} \vartheta_m \Delta z_{t-m} + \varepsilon_{zt}.^4$$

Here $z \equiv (c, y-g, h, s)$ is the variable vector for consumption, income other than from transfer payments, real estate wealth and financial wealth, all relative to income.

Unit root test statistics appear in column (4) of the upper panel of Table 3. Statistically significant results at the 1 percent level are in boldface. The tests with consumption, income and wealth measured relative to personal disposable income are reported on the left, and those relative to human capital income on the right. Test statistics including a time trend are v_1 and without a time trend are v_2. The data for all time series in z_t exhibit unit roots in levels. In the first differences all time series are stationary.

Table 3. Unit root and cointegration tests.

(1) Series	(2) Trend	(3) Augmented Lags	(4) Test Statistics	(5) 95% Critical Value
1. Unit Root				
c_t	Yes	4	$v_1 = -1.13, -1.18$	-3.41
y_t	Yes	4	$v_1 = -2.32, -2.33$	-3.41
h_t	No	4	$v_2 = -1.90, -1.91$	-2.86
s_t	Yes	4	$v_1 = -1.50, -1.47$	-3.41
Δc_t	No	3	$v_2 = -\mathbf{7.51}, -7.18$	-2.86
Δy_t	No	3	$v_2 = -\mathbf{5.13}, -5.34$	-2.86
Δh_t	No	3	$v_2 = -\mathbf{5.01}, -4.99$	-2.86
Δs_t	No	3	$v_2 = -\mathbf{6.90}, -6.74$	-2.86
2. Cointegration Rank Test				
(1) Γ Rank, No Cointegration		(3) Γ Rank, Cointegration	(4) Test Statistics	(5) 95% Critical Value
			η_{trace}	
0		1, 2, 3 or 4	26.19, 31.00	47.18
1		2, 3, or 4	7.77, 10.65	29.51
2		3 or 4	2.55, 4.68	15.20
3		4	0.43, 0.71	3.96
			η_{max}	
0		1	18.42, 20.35	27.20
1		2	5.22, 5.97	20.78
2		3	2.13, 3.98	14.04
3		4	0.43, 0.71	3.96
Unit Root Test		1	$-3.21, -3.65$	-4.16

Cointegration tests appear in the lower panel of Table 3. To determine the lag length m, both sequential general-to-specific likelihood ratio tests and the Akaike information criterion are applied. Both these approaches involve setting $m = 5$ including the possibility of a drift in the trend component of z_t. There is no cointegration among the variables from the test statistics in column (4). The statistics are for η_{trace} and $\eta_{\max}$ the trace and largest eigenvalue of Γ. The Engle–Granger unit root test reported in the last row also shows no cointegration.

Given the unit roots in levels but stationarity in first differences with no cointegration, the estimating equation is

$$\Delta c_t = \beta[b_Y + (b_G - b_Y)\Delta g_{t-1} + \lambda_S \Delta s_{t-1} + \Delta h_{t-1}]. \tag{7}$$

Coefficients on the independent variables have the same interpretation as those in (6). They reflect the marginal propensity to consume from income above transfer payments, financial wealth and real estate wealth.

Initial estimates of equation (7) reveal the possible presence of autocorrelation. To correct for the autocorrelation of residuals, ARMA terms AR(L) up to lag L are included in the regression models. Serial correlation is tested using the Breusch-Godfrey Lagrange multiplier (LM) test. The null hypothesis of the LM test is that there is no serial correlation up to a lag order k where k is a pre-specified integer. The LM test statistic is asymptotically distributed as χ^2_k, a χ^2 test statistic with k degrees of freedom. There is no evidence of autocorrelation using orders for k as high as 5.

5. Empirical results

Empirical results for the consumption effects of real estate and financial wealth appear in Table 4. The first two columns report results when variables are normalized by personal disposal income. Columns (3) and (4) contain results when variables are normalized by human capital income. Parameter estimates are for the marginal propensities to consume from real estate and financial wealth. Estimates significant at the 1 percent level one-tailed are indicated in boldface.

The estimated constant terms in Table 4 are zero. The coefficient of Δg reflects the difference between the marginal propensity to consume from transfer payment income and that from personal disposable income. These are not lump-sum income payments, which may have different consumption propensities as in Souleles (1999). Both estimates suggest that the marginal propensity to consume from transfer income is not significantly different from that for personal disposable income.

In column (1) are estimates of the marginal propensity to consume from wealth when variables are normalized by personal disposable income. The marginal propensity to consume from financial wealth is 0.023 and is significant at the 1 percent level. The marginal propensity to consume from housing wealth is 0.079, also significant at the 1 percent level. A Wald test on the difference between the two coefficients indicates whether or not financial and real estate wealth can be aggregated. The computed F-statistic

Table 4. Marginal propensities to consume from wealth, 1952:4–2001:4.

	(1)	(2)	(3)	(4)
	Personal Disposable Income		Human Capital Income	
	Estimate	*t*-Statistic	Estimate	*t*-Statistic
Constant	0.00	0.16	0.00	0.43
Δg	0.199	1.17	0.166	0.82
Δs	**0.023**	4.81	**0.025**	4.96
Δh	**0.079**	2.80	**0.157**	5.27
AR(1)	− 0.223		− 0.260	
Adjusted R^2	0.20		0.31	
LM Test	1.46		0.18	
N	197		197	

is 3.76, significant at the 5 percent level. The coefficients on financial and physical wealth are not identical.

The human capital income measure underlying the coefficient estimates in column (3) is more in accord with the life-cycle hypothesis. The marginal propensity to consume from housing wealth is 0.157, while that from financial wealth is 0.025. Both coefficients are statistically significant at the 1 percent level. The Wald test indicates that the difference between the two is statistically significant at the 1 percent level, with a computed *F*-statistic of 18.

At the sample mean, 74 percent of total wealth is held in financial assets and 26 percent in real estate. Using these weights, the overall marginal propensity to consume from wealth is 3.8 cents per dollar, using the national accounts definition of personal disposable income. Using the Davis and Palumbo (2001) definition of income from human capital, or personal disposable income less property income, the marginal propensity is 5.9 cents. These estimates are within the Poterba bounds of 2–10 cents. The financial asset marginal propensity of between 2 and 2.5 cents per dollar is at the lower end of estimates, which have ranged from nearly zero to as high as 17 cents.

The marginal propensities to consume from real estate wealth of between 8 and 15 cents per dollar are within the range of between zero and 30 cents previously obtained. The elasticity of consumption with respect to real estate wealth is 0.068 and 0.135 for two income definitions at the sample mean. Case et al. estimate the consumption elasticity for the United States to be 0.06 with respect to housing wealth. The estimates in Table 4 for the aggregate United States are consistent with the state data in Case et al. and within the theoretical bounds.

Estimates of the marginal propensity to consume from financial assets have a wide range, from zero to more than 15 cents per dollar annually. Macroeconomic forecasting uses estimates of between 3 and 5 cents (Brayton and Tinsley, 1996). The range from microdata is larger. Poterba and Samwick (1995) examine markets for luxury goods when stock prices increase. Only automobile demand is relatively sensitive to stock prices, leading Shleifer (1995) to conclude that the marginal propensity to consume from stock market wealth is close to zero. By comparison, using individual data from the *Panel*

Survey of Income Dynamics (PSID), Juster et al. (1999) find a marginal propensity to consume of 17 cents from a dollar of stock gains.

For housing wealth, Elliott (1980) and Hoynes and McFadden (1997) utilize aggregate data and report that changes in housing wealth have only a limited impact on consumption. Using the *PSID*, Engelhardt (1996) finds that consumption is asymmetric in housing wealth. An increase in housing wealth has almost no effect on consumption. A dollar decrease in housing wealth leads to a decline in consumption of as much as 30 cents. Other researchers find positive marginal propensities to consume from increases in housing wealth. Also using the *PSID*, Hurst and Stafford (2002) compare households with limited liquid assets with those not liquidity-constrained. Constrained households are 19 percent more likely to refinance their mortgages with response to an income shock, and spend 60 percent of cashout refinancing proceeds on current consumption.

The marginal propensity to consume from real estate assets is several times larger than that from financial assets, with implications for the stabilization of the aggregate economy. These implications allow consideration of hypotheses such as Greenspan's that the housing market offsets the stock market to stabilize consumption and aggregate demand.

5.1. The savings ratio

From Figure 1, the dark line indicates a sharp rise in the consumption–income ratio during the 1990s, with a corresponding fall in the savings ratio toward nearly zero. In the first quarter of 1995, the U.S. savings ratio was 9.1 percent of personal disposable income. The ratio of real estate wealth to personal disposable income h_t was 0.8997 and the financial wealth–income ratio s_t was 3.6760 in 1995:1. By the first quarter of 2001, six years later, the savings ratio had declined to 4.35 percent. The physical wealth–income ratio was 1.0064 and the financial wealth–income ratio was 4.5954 in the same quarter. The savings ratio change is $-\Delta c = \hat{\beta}_S \Delta s + \hat{\beta}_H \Delta h$, given the same marginal propensity to consume from transfer and non-transfer income, with hats denoting estimates.

Using the estimates from column (1) of Table 4, for personal disposable income, $-\Delta c_t = 0.0211 + 0.0084 = 0.0295$. The decline in the savings ratio is 5.1 percentage points. During 1995–2001, families' additional wealth gain from the real estate market allowed a 0.84 percentage point savings reduction. The rise in financial wealth over the same period led to a 2.11 percentage point decline in saving. The combined decline in savings resulting from higher real estate and financial wealth is 2.95 percentage points, about 58 percent of the total. If the actual changes in real estate and financial wealth were expected, then these account for more than half the decline in the savings rate. The remainder of the decline comes through unanticipated shocks or from variables not measured by the estimation.

5.2. The financial market decline

A model simulation covering the period of sharp declines in the stock market and financial wealth after April 2000 is shown in Table 5. In columns (1) and (2) are the ratios of

Table 5. Wealth and consumption 2000–2001 after the stock market decline.

	(1) s Financial	(2) h Real Estate	(3) c Consumption	(4) $1-c$ Saving	(5) $\hat{\beta}_S \Delta s$	(6) $\hat{\beta}_H \Delta h$	(7) $\hat{\beta}_S \Delta s + \hat{\beta}_H \Delta h$
2000.1	5.1435	0.9487	0.9596	0.0404			
2000.2	5.1542	0.9577	0.9544	0.0456	0.000246	0.000711	0.000957
2000.3	4.9757	0.9808	0.9582	0.0418	− 0.004105	0.001823	− 0.002281
2000.4	4.8857	0.9940	0.9557	0.0443	− 0.002071	0.001046	− 0.001025
2001.1	4.5954	1.0064	0.9565	0.0435	− 0.006675	0.000982	− 0.005693
2001.2	4.3254	1.0282	0.9567	0.0433	− 0.006212	0.001717	− 0.004494

financial and real estate wealth to personal disposable income, quarterly for 2000:1–2001:2. Financial wealth declined relative to income from 5.1435 in 2000:1 to 4.3254 in 2001:2. Real estate wealth relative to personal disposable income increased from 0.9487 to 1.0282 during the same period.

The wealth effect from the financial market appears in column (5). This effect of declining financial wealth is negative from 2000.3–2001.2. This negative wealth effect, however, is countered by a positive wealth effect from families' holding of real estate in column (6). Column (7) sums the two wealth effects. The overall wealth effect is negative by a small amount. The positive real estate wealth effect offsets the decline in the financial wealth.

6. Summary

This paper estimates the consumption function for the U.S. economy in wealth. Wealth includes real estate and financial assets and the data are quarterly for 1952:1–2001:4. An additional dollar of real estate wealth increases consumption by 8 cents in the current year, as compared with only 2 cents for financial wealth. The results are consistent with theoretical bounds. The decline in the stock market during 2000 and 2001 had a limited impact on aggregate demand because of an offsetting real estate wealth effect. It would appear that another reason for holding real estate is to smooth consumption and reduce its volatility.

There are several possible explanations as to why consumption is so limited from financial wealth. Financial wealth is concentrated in restricted accounts such as pension accounts and insurance. Households cannot easily withdraw funds from these accounts that contain 75 percent of their financial wealth, and they usually cannot borrow against the collateral. Among lower-income families, unrestricted financial wealth is virtually nonexistent to fund consumption. Financial assets are concentrated among high-income families. These holdings may be restricted because they are held as controlling or dominant interests.

Conversely, tax policy favors households concentrating their debt and assets in housing. The ability to deduct mortgage interest from taxable income and the lower rates associated with a national and securitized market lead households to increase debt to fund consumption. In times of rising real estate prices but declining financial asset prices, there are offsetting effects on aggregate demand. Goetzmann and Spiegel (2000) have pointed out the risk of households owning a single house and concentrating their portfolio. This risk is particularly acute for low-income households. The degree of covariance between returns in real estate and financial markets indicate whether there is a risk of both declining together. How these wealth shifts occur has an impact on aggregate demand.

The marginal propensity to consume from real estate wealth is considerably higher than that for financial assets. This gain has allowed families to use real estate wealth to offset declines in financial wealth when they make consumption and expenditure decisions.

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Notes

1. The research on mortgage refinancing focuses on financial incentives, including the exercise of a call option (Kau and Keenan, 1995) based on variables including the volatility of interest rates and term to maturity. Dickinson and Heuson (1994) highlight the pecuniary and nonpecuniary decisions associated with mortgage refinancing.
2. Hurst and Stafford (2002) incorporate mortgages in a conventional permanent income model to examine the extent to which homeowners use house equity to smooth the marginal utility of consumption. Accessing accumulated home equity can be costly with high fixed costs of refinancing causing a liquidity constraint. Although their model predicts an increase in consumption as mortgage rates fall, accessing home equity may not be as illiquid as selling the house, given the ability to refinance and roll in the closing costs, and the restriction of prepayment penalties on residential mortgages.
3. This definition of personal disposable income is consistent with Davis and Palumbo (2001).
4. This maximum likelihood procedure is based on the existence of a Gaussian vector autoregressive representation of the variables as $z_t = \alpha_z + \xi_1 z_{t-1} + \xi_2 z_{t-2} + \cdots + \xi_m z_{t-m} + \upsilon_{zt}$ which is equivalent to the tested specification. The VAR is of lag length m with parameters (α_z, γ) and error $\upsilon_t \sim \text{NID}(0, \Sigma)$ where Σ is the variance-covariance matrix.

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