THE WEALTH EFFECTS OF HOUSING AND STOCK MARKETS ON CONSUMPTION: EVIDENCE FROM A SAMPLE OF DEVELOPED AND DEVELOPING COUNTRIES*

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Abstract

Households usually hold a portfolio of assets, both liquid and illiquid. Housing assets play a special role in the class of illiquid assets because housing assets have spending consequence which differs from financial assets. Since housing services enter households' utility function, an increase in housing price not only increases the wealth of the owners, but also increases the cost of consuming housing services. With reference to a sample of developed and developing countries, the objective of this study is to compare the wealth effects of financial and housing market on consumption. Housing has the dual functions as both a commodity yielding a flow of housing services and an investment asset yielding a flow of capital income. With an empirical framework based on the Permanent Income Hypothesis, the findings from this study suggest that a rise in housing price has both a positive wealth effect and a negative price effect on consumption. While the positive wealth effect is caused by an increase in capital income, the negative price effect is caused by an increase in the cost of housing services. These findings imply that the government policy of land supply aiming to stimulate the economy should strike a balance between the possible wealth and price effects of the housing market. In addition, the level of financial market development has a negative impact on the housing market wealth effect. A plausible explanation is that a more liquid stock market will make real estate a less attractive instrument for capital investment. In addition, the sensitivity of consumption to unanticipated changes in housing price is negatively related to the number of procedures required to register a property. This finding is not surprising because the number of such procedures affects the liquidity of the housing market.

Keywords: housing market; stock market; wealth effect; consumption

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Introduction

Consumption has long been a central element in most macroeconomic models because it accounts for about 50% to 70% of GDP in most economies. Until recently, very little empirical works have been done on the role of assets and asset prices in shaping the pattern of consumption. Households usually hold a balance of assets, both liquid and illiquid. Different assets have different liquidity characteristics. For instance, pension funds, life insurance funds and housing belong to less liquid assets, while stocks and bonds are more liquid. As pointed out by Muellbauer and Lattimore (1995), marginal propensities to spend are less for illiquid assets than for liquid assets because the degree of liquidity of an asset affects its spendability. It is interesting to note that the degree of financial liberalization might increase the spendability of illiquid assets.

In addition, housing plays a special role in the class of illiquid assets. Housing has spending consequence which differs from financial assets because housing services enter households' utility function. An increase in housing price not only increases the wealth of the owners, but also increases the cost of consuming housing service. That is to say, the positive wealth effect is partly offset by a negative price effect. Specifically, Deaton and Muellbauer (1980) formulate this idea analytically and find that the importance of wealth effect declines with the proportion of people who are not owner-occupiers. Moreover, increases in housing price tend to redistribute wealth from young households to older households because the former has typically accumulated less housing wealth. Previous empirical studies, for example, Murata (1994), Lattimore (1993), Muellbauer and Murphy (1994) support this dual nature of housing prices.

Using the Hong Kong data, Cheng and Fung (2004) find that a rise in housing price has both a positive wealth effect and a negative price effect on consumption. While the positive wealth effect is caused by an increase in capital income, the negative price effect is caused by an increase in the cost of housing services. With reference to a sample of developed and developing countries, the objective of this project is to investigate the dynamic relationship between consumption, income, housing prices, capital income and interest rate.

Empirical Framework

Since the classic papers by Friedman (1956) and Muth (1960), the permanent income hypothesis (PIH) has become one of the most important topics in mainstream macroeconomics. A large number of studies have been conducted to test the restrictions implied by Hall's (1978) formulation of rational-expectation permanent income hypothesis (RE-PIH). Hall's derivation gives rise to the following type of stochastic Euler equation:

$$c_{t+1} = c_t + \varepsilon_{t+1} \quad . \tag{1}$$

The above equation states that observed consumption should follow a random walk –lagged information (e.g., lagged income) should give no explanatory power with respect to current consumption changes. In other words, change in consumption is the news on permanent income. This is exactly the orthogonality condition on the disturbance term imposed by rational expectation. A typical way to test the orthogonality condition is to augment Hall's Euler equation (1) with lagged

variables and test for their significance. For instance, a classic paper by Flavin (1981) uses the following two-equation simultaneous system.

$$\Delta c_t = \gamma + \beta_1 \Delta \hat{y}_t + \beta_2 \Delta \hat{y}_{t-1} + \theta \varepsilon_t + u_t \quad (2)$$

$$y_t = \alpha_0 + \alpha_1 y_{t-1} + \varepsilon_t \quad (3)$$

(2) and (3) are the consumption and income equations, respectively, where, the additional error term u_t in (2) represents measurement error in consumption change as well as the effects of information about permanent income that the consumer may have but that is not captured by the autoregressive specification of income. $\theta\varepsilon_t$ in (2) is the warranted change in consumption due to income innovations (unpredictable income shocks). β_1 and β_2 are the excess sensitivity parameters. Clearly, if the permanent income hypothesis is true β_1 and β_2 should be zero.

Flavin's framework provides a basis for other empirical studies on REPIH. However, a large proportion of previous literature obtained empirical results that are inconsistent with the orthogonality condition. For instance, Hall (1978), Flavin (1981), Muellbauer (1983), Nelson (1987), Campbell and Deaton (1989), Deaton (1992) Kim (1996), Alessie & Lusardi (1997), Falk & Lee (1998), Seater (1998), DeJuan & Seater (1999), and Baxter & Jermann (1999), find that consumption is excessively sensitive to income in the sense that current income still has explanatory power after accounting for innovation in permanent income. This is referred to as the “excess sensitivity” of consumption. Another line of attack, first considered by Deaton (1987), argued that if labor income is a difference stationary process (appears to be a feature of US quarterly labor income), then observed consumption is far less volatile than the theory predicts. This is referred to as the “excess smoothness” of consumption. Despite challenges and criticisms, PIH has been taken as axiomatic in many macroeconomic investigations due to its theoretical appeal. These results have led some to explore alternative explanations for PIH in order to reconcile the inconsistency between the theory and time series data. For example, the roles of durable goods, liquidity constraints, interest rates have been considered [see Deaton (1992) for a survey of these articles].

Under the PIH, household consumption depends on permanent income, which is the present value of a future stream of disposable income. Disposable income includes labor income and capital income. Our analyses are focused on the housing and stock markets wealth effects on consumption as fluctuations in these two markets accounted for a dominant part of unanticipated change in wealth. In this study, we separate the anticipated and unanticipated components of wealth innovations based on Flavin's (1981) framework and estimate their effects on consumption in a sample of developed and developing countries. Two sources of growth in wealth are considered – labor income growth and capital income growth. The latter is further divided into housing market growth and stock market growth, which are measured by the housing market index (H_t) and stock market index (S_t), respectively. As a source of capital income, the wealth effects created by H_t and S_t on consumption are expected to be similar in magnitude. However, if (either anticipated or unanticipated) changes in real housing price are fully capitalized by H_t, then a rise in H_t will generate a negative price effect in addition to a positive wealth effect on consumption. While the positive wealth effect is caused by an

increase in capital income, the negative price effect is caused by an increase in the cost of housing services. As a result, the wealth effect of H_t will be partly offset by the price effect and, other things being constant, a rise in H_t will has a smaller "net wealth effect" on consumption *vis-à-vis* a rise in S_t. More importantly, this difference provides a basis for estimating the magnitude of the housing market price effect on consumption. Specifically, the following system of equations forms an empirical framework for this study:

$$\Delta C_t = \gamma_0 + \beta_Y \Delta \hat{Y}_t + \beta_H \Delta \hat{H}_t + \beta_S \Delta \hat{S}_t + \beta_R \Delta \hat{R}_t +$$

$$\phi_Y \hat{\varepsilon}_{Yt} + \phi_H \hat{\varepsilon}_{Ht} + \phi_S \hat{\varepsilon}_{St} + \phi_R \hat{\varepsilon}_{Rt} + \mu_t \qquad (4)$$

where, (4) is the growth equation of consumption. While $\Delta \hat{Y}_t$, $\Delta \hat{H}_t$, $\Delta \hat{S}_t$ and $\Delta \hat{R}_t$ are anticipated changes, $\hat{\varepsilon}_{Yt}$, $\hat{\varepsilon}_{Ht}$, $\hat{\varepsilon}_{St}$ and $\hat{\varepsilon}_{Rt}$ are unanticipated shocks in Y_t, H_t, S_t and R_t. Note that Y_t, H_t and S_t are log-transformed.

In equation (4), the β-coefficients measure the response of consumption to anticipated changes in income, housing prices, stock prices, and interest rate, which are also the excess-sensitivity parameters according to Flavin's (1981) framework. The orthogonality condition imposed by rational expectation implies that the values of β's are all zero. The ϕ-coefficients in equation (4) measure the response of consumption to unanticipated innovations in income, housing prices, stock prices, and interest rate, respectively. Clearly, the signs of ($\beta_Y + \phi_Y$), ($\beta_S + \phi_S$) and ($\beta_H + \phi_H$) are supposed to be positive, and that of ($\beta_R + \phi_R$) is negative. Countries with a larger degree of financial deregulation are expected to have larger values of ($\beta_S + \phi_S$) and ($\beta_H + \phi_H$). In addition, ($\beta_H + \phi_H$) < ($\beta_S + \phi_S$) if the wealth effect of housing prices is partly offset by the price effect associated with the cost of housing services. A change in housing prices will has a smaller effect than a change in stock prices on consumption if the price effect is negative.

Data

Data on housing price indices of a sample of developed and developing countries were taken from official statistics published by their governments. Share price indices were taken from the IMF Financial Statistics. Data on interest rates, consumptions and income were taken from the database of World Development Indicators. The sample runs from 1984-2004. The set panel data is unbalanced. The list of countries in the sample and the sample means (2000-2004) of major variables are given in Table 1.

** insert Table 1 here **

Results

Equation (4) was estimated by ordinary least square. Country-dummies were included to take care of the fixed effect. The equation was estimated in three specifications: Model 1 is the basic model; Models 2 and 3 allow changes in housing and stock prices to interact with country-specific characteristics. The results are reported in Table 2.

** insert Table 2 here **

The results with regard to PIH are mixed. The insignificant coefficient for $\Delta\hat{Y}_t$ and the significantly positive coefficient for $\hat{\varepsilon}_{Yt}$ across all model support the PIH: consumption responds to news on permanent incomes only, current and lagged incomes give no explanatory power with respect to current consumption changes. The response of consumption to changes in housing price is also consistent with PIH: consumption responds positively to an unanticipated increase in housing price (significantly positive coefficient on $\hat{\varepsilon}_{Ht}$), but it does not respond to an anticipated increase housing price (insignificant coefficient on $\Delta\hat{H}_t$). However, the significantly positive coefficients for both $\Delta\hat{S}_t$ and $\hat{\varepsilon}_{St}$ suggest that consumption responds to both anticipated and unanticipated changes in stock price, which is inconsistent with PIH.

The empirical findings do provide some evidence for the dual-impact of housing price. As aforementioned, a change in real housing price (either anticipated or unanticipated) generates both a positive wealth effect and a negative price effect. Hence, the "net wealth effect" of H_t will be smaller than that of S_t. i.e., ($\beta_H + \phi_H$) < ($\beta_S + \phi_S$), if the price effect is sufficiently large. The estimated coefficients from Models 2 and 3 suggest that $\beta_H < \beta_S$ and $\phi_H < \phi_S$, which imply that the price effect partly offset the wealth effect for both anticipated and unanticipated changes in housing price.

By including interaction terms in the regression equation, Models 2 and 3 examine the effects of education (EDU_t), financial development (CRT_t, CAP_t and $STRD_t$) and institutional development ($ENFOR_t$ and $REGIS_t$) on the sensitivity of consumption to unanticipated changes housing and stock prices. EDU_t is the education expenditure as a percentage of gross national income (GNI), CRT_t is the domestic credit to private sector as a percentage of GNI, CAP_t is the stock market capitalization as a percentage of GDP, $STRD_t$ is the total value of stocks traded as a

percentage of GDP, $ENFOR_t$ is the number of procedures to enforce a contract, and $REGIS_t$ is the number of procedures to register a property. The results as reported in Table 2 show that most of the estimated coefficients of the interaction terms are not significantly different from zero, except for the ones of $\hat{\varepsilon}_{Ht} \times STRD_t$ and $\hat{\varepsilon}_{Ht} \times REGIS_t$. The negative coefficient for $\hat{\varepsilon}_{Ht} \times STRD_t$ implies that the level of financial market development has a negative impact on the housing market wealth effect. A plausible explanation is that a more liquid stock market will make the real estate market less attractive for capital investment. In addition, the sensitivity of consumption to unanticipated changes in housing price is negatively related to the number of procedures required to register a property. The finding is not surprising because the number of such procedures affect the liquidity of the housing market.

Conclusions

The property and stock markets play an important role in many economies as fluctuations in housing prices and stock prices account for a dominant part of unanticipated change in wealth of the people. The findings from this study suggest that a rise in housing price has both a positive wealth effect and a negative price effect on consumption. While the positive wealth effect is caused by an increase in capital income, the negative price effect is caused by an increase in the cost of housing services. Moreover, the sensitivity of consumption to unanticipated changes in housing price is related to the level of financial and institutional development.

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List of Tables

Table 1: Countries in the sample

Country	**Consumption growth (%)**	**Housing price growth (%)**	**Stock price growth (%)**	**Income growth (%)**
Argentina	-5.03	1.82	-6.81	-4.87
Australia	3.63	4.51	5.15	3.28
Canada	2.36	2.59	-1.50	2.53
China	7.09	0.23	-3.63	9.38
China, Hong Kong	4.35	-0.43	17.96	4.81
Egypt	2.43	5.25	49.17	4.20
Finland	2.81	1.03	-9.79	2.75
Germany	1.44	3.12	5.70	1.46
Ireland	5.89	1.50	11.82	7.67
Japan	1.43	0.71	-1.54	1.22
Korea, Republic of	5.81	4.46	15.18	6.77
Mauritius	5.41	0.96	12.48	5.34
Netherlands	2.39	1.49	6.92	2.28
New Zealand	5.07	6.13	19.25	4.00
Norway	2.88	4.25	16.75	2.96
Philippines	3.97	0.06	-3.89	3.95
Singapore	3.69	-0.36	-0.25	2.94
South Africa	5.21	-0.99	4.75	3.26
Spain	3.41	0.92	16.48	3.20
Sweden	1.61	4.50	12.57	2.16
Thailand	5.00	0.62	11.98	5.09
Trinidad and Tobago	-5.73	-3.23	38.43	9.69
United Kingdom	2.50	2.60	7.05	2.29
United States	3.18	3.07	11.29	3.17

Table 2: Results

	Model 1	Model 2	Model 3
$\Delta\hat{Y}_t$	-0.008 (-0.139)	0.064 (1.083)	0.019 (0.311)
$\Delta\hat{R}_t$	-0.001 (-1.337)	-0.000 (-0.786)	-0.001 (-1.504)
$\Delta\hat{H}_t$	0.004 (0.329)	0.013 (1.160)	0.001 (0.066)
$\Delta\hat{S}_t$	0.015** (2.822)	0.015** (2.759)	0.016** (2.911)
$\hat{\varepsilon}_{Yt}$	0.886** (18.058)	0.859** (16.474)	0.850** (15.683)
$\hat{\varepsilon}_{Rt}$	-0.000 (-0.468)	-0.000 (-0.549)	-0.001 (-1.499)
$\hat{\varepsilon}_{Ht}$	0.011* (2.036)	0.020* (2.324)	0.026* (2.074)
$\hat{\varepsilon}_{St}$	-0.008 (-1.460)	0.038* (1.993)	0.045* (2.213)
$\hat{\varepsilon}_{Ht} \times EDU_t$	-	-0.017 (-1.024)	-
$\hat{\varepsilon}_{Ht} \times CRT_t$	-	0.001 (1.222)	-
$\hat{\varepsilon}_{Ht} \times CAP_t$	-	0.000 (0.284)	-
$\hat{\varepsilon}_{Ht} \times STRD_t$	-	-0.001* (-2.160)	-0.001* (-2.064)
$\hat{\varepsilon}_{Ht} \times ENFOR_t$	-	-	0.000 (0.020)
$\hat{\varepsilon}_{Ht} \times REGIS_t$	-	-	-0.004** (-2.955)

(Continued in the next page)

Table 2: Results (continue)

	Model 1	Model 2	Model 3
$\hat{\varepsilon}_{St} \times EDU_t$	-	-0.006 (-1.768)	-
$\hat{\varepsilon}_{St} \times CRT_t$	-	-0.000 (-1.030)	-
$\hat{\varepsilon}_{St} \times CAP_t$	-	-0.000 (-0.597)	-
$\hat{\varepsilon}_{St} \times STRD_t$	-	0.000 (0.794)	-
$\hat{\varepsilon}_{St} \times ENFOR_t$	-	-	0.002 (1.129)
$\hat{\varepsilon}_{Ht} \times REGIS_t$	-	-	-0.004 (-0.917)
Adj. R-square	0.816	0.816	0.835

Notes: The following equation was estimated by OLS:

$$\Delta C_t = \gamma_0 + \beta_Y \Delta \hat{Y}_t + \beta_H \Delta \hat{H}_t + \beta_S \Delta \hat{S}_t + \beta_R \Delta \hat{R}_t +$$

$$\phi_Y \hat{\varepsilon}_{Yt} + \phi_H \hat{\varepsilon}_{Ht} + \phi_S \hat{\varepsilon}_{St} + \phi_R \hat{\varepsilon}_{Rt} + \mu_t$$

where, $\Delta \hat{Y}_t$, $\Delta \hat{H}_t$, $\Delta \hat{S}_t$ and $\Delta \hat{R}_t$ are anticipated changes, and $\hat{\varepsilon}_{Yt}$, $\hat{\varepsilon}_{Ht}$, $\hat{\varepsilon}_{St}$ and $\hat{\varepsilon}_{Rt}$ are unanticipated shocks in Y_t, H_t, S_t and R_t. EDU_t is the education expenditure as a percentage of gross national income (GNI), CRT_t is the domestic credit to private sector as a percentage of GNI, CAP_t is the stock market capitalization as a percentage of GDP, $STRD_t$ is the total value of stocks traded as a percentage of GDP, $ENFOR_t$ is the number of procedures to enforce a contract, and $REGIS_t$ is the number of procedures to register a property.Note that Y_t, H_t and S_t are log-transformed. Country-dummies were included to take care of the fixed effect. * - significant at 5% level. ** - significant at 1% level. Values in parentheses are t-statistics.