The impact of negative equity housing on private consumption: HK Evidence

KF Man, Raymond Y C Tse

Abstract

Housing is the most important single investment for most individual investors. Thus, negative equity of housing capital would have a major psychological impact on the homeowners through a consumption effect.

This study explores the wealth effect of housing and stock markets in Hong Kong. More specifically, studies are made on how the aggregate consumption behaviour is influenced by the presence of an extended and protracted negative equity phenomenon in Hong Kong housing assets.

Using annual data, our results find that there is a long-term equilibrium relationship between consumption and the wealth effect of changes in housing wealth. Furthermore this effect appears to be more significant than that associated with changes in financial wealth.

Key words: Negative equity housing, consumption, wealth effect

The Asian Financial Crisis marked the beginning of the prolonged fall of the Hong Kong housing market: from the all time high index set at 100 in the third quarter of 1997, according to the Centaline Housing Index, it dropped to the lowest point of about 33 in the second quarter of 2003, then surged back to around 55 in the second quarter of 2004. Concurrently with such fall in housing price is the drop in Consumer Price Index. This is the longest ever deflationary period in the post war period of Hong Kong. (This is, however, still less severe than the long deflation experienced by Japan in the nineties.) It has been argued that while the banking deposit was substantial, the collapse in consumer confidence in the direction of economy has led to a sharp decrease in private consumption. In this study, we examine how the housing wealth changes and stock wealth change affects the private consumption behaviour. This is particularly important in view of the fact that over two third of the GDP of Hong Kong comes from services sector. This paper consists for four sections: first section provides a brief literature review, section 2 discusses the data employed in this study, section 3 is about the methodology of the study, study 4 concerns the data analysis and interpretation of results and section 5 is the conclusion.

(1) Literature Review

The theory on life-cycle of saving was first proposed by Modigliani and Brumberg (1954) and then came Friedman's (1957) permanent income hypothesis. They form the basis for life-cycle modelling which is later subject to various strict empirical challenges. The results on such empirical testing are mixed. Some researchers (Flavin (1981), Hansen and Singleton (1983), Mankiw, Rotemberg and Summers (1985)) have suggested that the available data did not fit the model and some further argued that the rejection was due to the fact that some individuals are liquidity constrained. Zeldes (1989) tested the permanent income hypothesis by testing the alternative hypothesis that "consumers optimize subject to a well-specified sequence of borrowing constraints" and the results generally support that "an inability to borrow against future labour income affects the consumption of a significant portion of the population".

The US housing market has been on the uptrend since 1970's and the housing wealth has been expanded significantly. The same happens in Hong Kong. According to the permanent income hypothesis, it predicts that saving rates will decline with the increased housing value subject to the rational expectation and perfect foresight assumptions. The simple reason being that saving is to fund consumption during retirement. In practical terms, the increase in house value greatly increases the ability of homeowner to borrow either by way of second mortgages or simply home equity credit line. Skinner (1989) looked into the impact of housing wealth and consumption and came up with mixed results. By using a "cross-section time-series regression, housing wealth does affect saving but a fixed effects model finds no effect." Engelhardt (1996) looked at the empirical link between house price appreciation and the saving behaviour of homeowners. He found that the saving behaviour of real homeowner with real gains did not change. Also, there is an asymmetry in the saving response to both anticipated and unanticipated real housing capital gains. Surprisingly, the real savings offset comes from household that experiences real housing losses. Only the household who was caught by surprise and suffered from a real loss would save more.

This study is to examine the situation of the Hong Kong housing market and related phenomena after the Asian Financial Crisis in 1997. As mentioned before, a large number of homeowners suffered from real capital losses and holding a 'negative equity' home became popular. Engelhardt (1996) has argued that having a 'negative equity' home would

inhibit one's freedom to move. This might have negative psychological effect and impose practical constraints on the household. Case, Quigley and Shiller (2001) compared the wealth effects of the stock market against the housing market on household consumptions. Their findings confirm that the housing wealth has a large effect over non-housing wealth effect upon household consumption. Combining the empirical results of Engelhardt (1996), one can easily draw the conclusion that any retrench of the housing market would affect the consumption and then the overall economy.

A number of researchers (Fama 1981; Fisher and Merton, 1984; Poterba and Samwick, 1995) have tried to investigate the wealth effect due to increase value of stock market on consumption and generally found that the wealth effect is small. Green (2002) has concentrated his efforts in San Francisco Bay housing market, and found evidence that stock values influence housing consumption. Case, Quigley and Shiller (2001), using state data and cross countries data, however, demonstrated by regression results that the wealth effect due to housing market is more significant than that of stock market. Iacoviello (2003), by performing a structural econometric analysis, came up with results that provide support for housing prices as a driving force of consumption fluctuations.

(2) Methodology

We follow closely the methodology employed in Case et. al. (2001). It is considered that the same variables adopted therein would affect the consumption behaviour of the household and hence were used as the independent variables for the regression analysis. The private household consumption is the dependant variable. In two of our models, we have tried two more comparables, the equity of residential real estate value (EREV) and money supply (M3 (-1)), in the way of one period lag, in our modelling. This is due to the fact that we consider that the money supply variable does not vary contemporaneously with the dependable variable. It is thought that it takes time for the change in money supply to affect the household consumption behaviour. In some of our models, we therefore use distributed lag single equation regression analysis.

All the variables, independent and dependant ones, are deflated by the Consumer Price Index. Such real data allow the application of regression analysis to reveal the fundamental economic relationships between the variables. Moreover, our preliminary tests of stationarity indicate that the variables are stationary after first differencing.

(3) Data

Our estimate on the wealth of residential real estate is based on the raw data provided, on an annual basis, by Rating and Valuation Department (RVD) of the Hong Kong SAR Government. Residential flats, according to their respective sizes, are classified as Type A, B, C, D and E. The wealth estimate for each type of housing is made by multiplying the average flat size, the number of available flat units and the average sale price. The total wealth of residential real estate is then the sum of the components.

The other economic variables are also taken from official statistical records assembled and compiled by the HKSAR Government.

(4) Results

Our regression results are tabulated in Table 1, under the headings of the four different models. In model 1 and 3, we use the logarithm of residential real estate value in the regression equations. However, in order to see if the consumption behaviour of the homeowners reflects the residential real estate value or the equity portion thereof, we use the logarithms of EREV in models 3 and 4. Both models 1 and 2 got only three explanatory variables whereas models 3 and 4 got an extra explanatory variable M3, at one period lag time. We speculate that the influences of M3 on consumption would take some time.

We expect the introduction of an extra explanatory variable M3 (-1) can enhance the adjusted R squared value and the DW statistics. The results do confirm our expectation.

From the respective coefficients of the various models, we note that the estimated effect of the housing market wealth or equity of housing market wealth, on private consumption is significant. The elasticity ranges from 0.110874 to 0.121788. This number is in general agreement with statistical results elsewhere. On the other hand, the estimated effect of the stock market wealth on private consumption is less significant and small. The corresponding elasticity ranges from 0.012013 to 0.046699.

This thus leads us to the conclusion that the wealth effect due to housing market wealth is greater and significantly more than that due to stock market wealth.

(5) Conclusions

In this study, we examined the wealth effect due to housing market wealth and stock market wealth in Hong Kong. We note from the estimated coefficients that the former is more important and significant than the latter in Hong Kong. This echoes support to the findings from other researchers in other developed countries.

As a collorary, we also find that the estimated coefficient from income has an even greater significant effect than that of wealth effects. This is understandable as wealth is sort of stored future income and increase in income would have a more direct effect on consumption behaviour.

Acknowledgement

The paper was funded by the Hong Kong Polytechnic University (Project No. G-T520)

References

Modigliani, Franco, and Richard Brumberg. "Utility Analysis and the Consumption Function: An Interpretation of Cross-Section Data." In Post Keynesian Economics, edited by K.K. Kurihara. New Brunswick, NJ: Rutgers University Press, 1954

Friedman, Milton. *A Theory of the Consumption Function*. Princeton, NJ: Princeton University Press, 1957.

Flavin, Marjorie A. "The Adjustment of Consumption to Changing Expectations about Future Income," *Journal of Political Economy* 89 (October 1981): 974-1009

Hansen, Lars Peter, and Singleton, Kenneth J. "Stochastic Consumption, Risk Aversion, and the Temporal Behavior of Asset Returns." *Journal of Political Economy* 91 (April 1983): 249-65

Mankiw, N. Gregory; Rotemberg, Julio J.; and Summers, Lawrence H. "Intertemporal Substitution in Macroeconomics." *Quarterly Journal of Economics* 100 (February 1985): 225-51

Zeldes S.P. "Consumption and Liquidity Constraints: An Empirical Investigation" *Journal of Political Economy* 1989 Vol97(2) 305-346

Skinner Jonathan "Housing wealth and Aggregate Saving" *Regional Science and Urban Economics* 19 (1989) 305-324

Engelhardt G.V. "House prices and home owner saving behaviour" *Regional Science and Urban Economics* 26 (1996) 313-336

Case, K.E., Quigley J.M. and Shiller R.J. "Comparing Wealth Effects: The Stock Market versus the Housing Market", Cowles Foundation Discussion Paper No. 1335 (2001)

Fama, E., (1981) "Stock returns, real activity, inflation, and money" *American Economic Review* 71(4), 545-565

Fisher, S., Merton, R., (1984), Macroeconomics and Finance: The Role of the Stock Market. Carnegie-Rochester Conference Series on Public Policy, Vol. 21, Amsterdam, North Holland.

Poterba, J., samwick, A., 1995. Stock ownership patterns, stock market fluctuations, and consumption, Brookings Papers Economic Activity, 295-357

Green R.K. (2002) “Stock prices and house prices in California: new evidence of a wealth effect?” *Regional Science and Urban Economics* 32 (2002) 775-783

Iacoviello, Matteo (2003) “Consumption, house prices and collateral constraints: a structural econometric analysis”, Boston College working paper No. 542

TABLE 1

Analysis of Equations

	Model 1	Model 2	Model 3	Model 4
c (coefficient)	7.342131 (51.08252)	7.37032 (48.86712)	6.838412 (22.82069)	6.721858 (22.51147)
Log (REV)	0.121787 (5.308433)		0.117749 (5.654662)	
Log (EREV)		0.101156 (4.978430)		0.100134 (5.770353)
Log (SMC)	0.032713 (1.165711)	0.037055 (1.278297)	0.012015 (0.441211)	0.012353 (0.460793)
Log (RS)	0.494019 (5.844816)	0.543621 (6.267481)	0.386731 (3.851404)	0.408535 (4.129253)
Log (M3 (-1))			0.101269 (2.034492)	0.121417 (2.492774)
Adj. R^2	0.982463	0.981003	0.984086	0.987968
DW Statistics	1.534488	1.467216	1.723567	1.798574
F statistics	355.8065	328.057	279.2723	287.4019