Wealth Effects and Consumption: A Panel VAR Approach

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Abstract

We provide new evidence on the comparison between stock market wealth effect and housing wealth effect on consumption. Using a panel VAR approach applied to OECD data, we find evidence that stock market wealth effect is larger than ‘net housing wealth effect’ in general. However, with regard to the ‘evolution’ of asset wealth effects over time, it clearly shows that the real estate wealth effect has outweighed the share market wealth effect in recent decade. We further find that asset prices have asymmetric effects on consumption, with stronger and more persistent effects from positive asset price shocks. Our results have important policy implications.

Keywords: Consumption; Wealth effect; Stock price; Housing price; Asymmetry; panel vector autoregression.

JEL Codes: C33, E21, E44, G15, R30.
I. Introduction

The decomposed wealth effect, defined as the change in consumer spending that caused by an exogenous movement in financial or housing wealth, has received a long-history attention since Deaton (1992) and Muellbauer and Lattimore (1995) who state that the changes of stock and property prices become more important in the role of the impact on consumption with the liberalization of financial markets and the deregulation of mortgage markets in the 1980s. The recent subprime mortgage crisis in the US and the European sovereign debt crisis associated with the remarkable fluctuations in both stock and housing markets have brought new concerns on the response of consumer spending to the asset price shocks.

It is unclear that whether there is difference between the effect of stock and housing price on consumption. It is vital to understand the different roles of stock and housing as this detects the extent of policy action to take in case of shocks to each asset price. According to the life-cycle hypothesis (Ando and Modigliani, 1963), the increase from stock or housing wealth should have the same positive effect on consumption because the marginal propensity to consume out of wealth is slightly bigger than the real interest rate in the long-run. However, there are different alternative views challenging the life-cycle hypothesis (Mishkin, 2007). One view argues that housing wealth effect should be larger than the stock wealth effect on consumer spending, because households’ ownership of housing is higher than the ownership of equity. For instance, in the US, more than two-thirds of households are homeowners, while only half own stocks, bonds or mutual funds. Another reason of larger housing wealth effect would be that property price has relatively lower volatility than share price, so changes in housing wealth last longer than changes in stock wealth. On the other hand, the other view states that real estate wealth has a smaller effect than equity wealth on consumption due to the dual natural of housing asset. In
particular, the ‘net housing wealth effect’ is smaller because the positive wealth effect from the increase of property price is partly offset by the negative housing service effect (Poterba, 2000). Moreover, other explanation shows that the increase in share market valuation is more clearly related to future economic growth than change in real estate wealth, which leads to a relatively smaller housing wealth effect.

There are also a few empirical attempts on the comparison between stock and housing wealth effect. However, the results are still ambiguous. Some papers state that stock wealth effect is larger than housing wealth effect (see Ludwig and Slok, 2004; Skudelny, 2009; Slacalek, 2009; De Bonis and Silvestrini, 2012), while some other studies show that housing wealth effect should be stronger (Case et al., 2005; Carrol et al., 2006; Ciarlone, 2011). The data deficiencies on housing price data might be one of the vital reasons for those inconclusive results. In details, different studies tend to construct housing wealth in different ways that based on sales price indices or household sector balance sheet accounts or even survey appraisals for different countries, let alone the problems on housing price data itself that with data breaks or incomplete documentation, and also the conceptual and methodological differences across data sources which make international comparisons difficult. Those encountered problems then promote us to use a unique international house price dataset which can help to address these issues to reassess the wealth effect comparison between stock and real estate. Our study will utilize the housing price dataset from Federal Reserve Bank of Dallas to detect the housing wealth effect. Compared to other housing price database such as Bank for International Settlements (BIS) or OECD, this dataset selects the most similar sources from different countries and documents their differences to clarify the extent to which international sources can be made comparable for empirical research purposes (Mack and Martinez-Garcia, 2011).
The dramatic boom and bust cycles of stock and real estate market in the recent decade and their different impacts on household consumption also provide the opportunity to examine the asymmetric stock and housing wealth effects on consumer spending. Most of previous asymmetric wealth effect studies have concentrated on the US stock market (see Stevans, 2004; Apergis and Miller, 2005a, 2005b, 2006), since stock market always exhibits frequent price fluctuations. Nonetheless, the existing empirical evidence provides very limited guidance on asymmetric responses to housing wealth shocks, because the real estate market had not experienced a dramatic downturn before. The recent sharp drop in housing price due to the global financial turmoil actually enables us to analyse the asymmetric housing wealth effect on consumption.

The objective of this study is to investigate the stock and housing wealth effect on consumption in a number of OECD countries. Several questions need to be explored. Is stock wealth effect larger than net housing wealth effect, if hold other factors constant? Do these two wealth effects change over time? Does consumption exhibit asymmetric responses to positive and negative stock and house price shocks? Is the asymmetric stock and housing wealth effect consistent over time?

We will use a panel-data vector autoregressive (Panel VAR) approach that advocated by Love and Zicchino (2006) to estimate the wealth effect on consumption in a panel of 14 OECD countries. To the best of our knowledge, there are very few cross-country decomposed wealth effect studies that based on panel VAR techniques. Panel VAR procedure not only increases the efficiency and the power of the analysis due to the panel-modelling framework, but also better addresses the issue of unobserved heterogeneity by correcting for fixed effects. Most of previous multi-country studies employ single-equation method that relying on the cointegrating
relationship between consumption, income and wealth to determine the wealth effect on consumption. According to Lettau and Ludvigson (2001, 2004), unless consumer spending does all the adjusting and none for income and wealth, in order to detect the response of consumption to a shock, it is important to take into account all the variables in the system. Hence, the system estimation is necessary. Moreover, the VAR model has the advantage of explicitly allowing for feedback effects from consumption to wealth or income, something that single-equation approach cannot address. The VAR approach can also illustrate how the response of consumption and wealth vary according to the nature of the shocks on them. In addition, since most of the previous wealth effect estimations are based on the strong assumption of cointegrating relationship between consumption, income and wealth, their results would be biased if they fail to find such cointegrating relation. In fact, some evidences have shown that no cointegrating existing between consumption, income and wealth (Rudd and Whelan, 2002; Slacalek, 2004; and Benjamin et al., 2004). Our panel VAR model, however, will still be able to estimate the wealth effect on consumption regardless of the presence of cointegrating relationship or not, due to the use of stationary series ($I(0)$) for all the variables in the equations.

There also has been little published work to date on asymmetries in consumer wealth effects for the period which cover the most significant boom-bust wealth cycle in most of the developed countries’ history. Actually, to our knowledge, our paper is the first attempt at the investigation of the asymmetric consumption response to both stock and house price shocks for OECD countries based on panel VAR model. It is imperative to examine the potential asymmetric wealth effect on consumption not only because such asymmetric response provides theoretical implications (e.g. ‘sticky’ consumption), but it also offers vital implications for econometric modelling and economic policy analysis as consumption and asset prices behave differently
during different phases of the business cycle. Arden et al. (2000) find that after account the asymmetric specifications in a large scale macroeconomic model, very different model simulations are obtained with significantly different policy implications. Finally, the assessment of asymmetric movement also provides implications on the wealth distribution between homeowners and renters.

Our third contribution is related to the data series that using in this paper. Our data sample will cover the recent global financial crisis which then enables us to detect more significant asset price effects on consumers’ expenditures. The use of the novel housing price data from Federal Reserve Bank of Dallas also assists to produce more complete and consistent estimations on housing wealth effect.

The plan of the remainder of the paper is as follows. The next section briefly introduces the panel VAR procedure that is employed to detect the wealth effect on consumption. Section III describes the dataset and presents the empirical results. Section IV concludes and also provides policy implications.

II. Methodology

This study employs panel-data vector autoregressive (panel VAR) method developed by Love and Ziccino (2006) to examine the wealth effect on consumption by modelling the endogenous behaviour between consumption, income and wealth, as well as determining economically interpretable disturbances. The panel VAR approach inherits the advantage from traditional VAR model that treats all the variables in the system as endogenous. In fact, Lettau and Ludvigson (2004) show that both consumption and wealth are endogenous, and conventional way which implicitly treats wealth as exogenous variable may be biased since wealth also
responds to underlying exogenous shocks. Moreover, the panel VAR procedure also has the advantage from panel-data framework that allows for unobserved individual heterogeneity for all the variables by introducing fixed effects which enhances the consistency of the estimation. This panel VAR model can be specified as follows:

\[ X_{t,i} = \alpha_i + \Theta(L)X_{t,i} + f_i + d_{t,c} + \varepsilon_{t,i} \]

where \( \Theta(L) \) is the lag operator and \( X_{t,i} \) represents a vector of four endogenous variables (TC, DIN, SP, HP) or a vector of six variables (TC, DIN, SPP, SPN, HPP, HPN). Subscripts \( t \) and \( i \) refer to time and country. \( f_i \) denotes the fixed effect and \( d_{t,c} \) is the country-specific time dummy. \( \varepsilon_{t,i} \) represents the vector of residuals. In addition, Schwarz information criterion (SIC) is used to select the optimal autoregressive order. In terms of the variables studied in this paper, TC and DIN are the changes of the household total consumption and disposable income. SP and HP indicate the decomposed wealth effects from the growth rate of stock and housing, respectively. In order to distinguish between positive and negative asset price shocks to capture potential asymmetric wealth effect on consumption, positive and negative values of stock and house price changes are calculated to denote the positive and negative wealth shocks, where SPP and SPN represent the positive and negative stock market shocks respectively, and HPP and HPN are the positive and negative housing market shocks. In specific, following Simo-Kengne et al. (2012), two dummy variables \( d_{t,i}^p \) and \( d_{t,i}^n \) are used to calculate the positive and negative asset market shocks. \( d_{t,i}^p \) is set to be equal to one for the positive values of asset price changes and equal to zero for negative values. Conversely, \( d_{t,i}^n \) is equal to one for the negative values of asset price
changes and equal to zero for positive values. Therefore, $SPP$ is computed as $d_{t,i} \times SP$ and $SPN$ as $d_{t,i} \times SP$, so do $HPP$ and $HPN$.

When applying the VAR approach to the panel-data framework, restrictions need to be imposed to ensure that the underlying structure is the same for all the cross-sectional members. In order to relax such restriction on parameters, fixed effects denoted by $f_i$ are utilized to allow for individual heterogeneity in all the variables. However, conventional mean-differencing approach that is commonly employed to remove the fixed effects might lead to biased coefficients because the fixed effect assumption is that the individual specific effect is correlated with the independent variables. One way to overcome this problem is the adoption of forward mean-differencing, or namely ‘Helmert transformation’ (Arellano and Bover, 1995). This ‘Helmert procedure’ helps to remove the forward mean which then preserves the orthogonality between transformed variables and lagged independent variables (Love and Zicchino, 2006). Furthermore, the differencing might also results a simultaneity problem since lagged regressors are correlated with the differenced error term. And heteroschedasticity may exist due to the presence of heterogeneous errors with different cross-sectional members in the panel data. Therefore, after the fixed effects are eliminated by differencing, an instrumental variable method that using lagged regressors as instruments need to be applied to estimate the coefficients more consistently. Panel generalized method of moments (GMM) estimator will be used for the system estimator.

The panel VAR model also allows for country-specific time dummies that denoted by $d_{t,c}$ to capture aggregate macroeconomic shocks such as global financial crisis that may influence each country’s stock and housing market in the same way. These country time dummy variables can be removed by subtracting the means of each variable calculated for each country year.
\( \varepsilon_{it} \) is the vector of error terms which is assumed to be independent and identically distributed. Nevertheless, this assumption is normally failed in practice since the actual variance-covariance matrix of the residuals is unlikely to be diagonal. In other words, the innovations in the impulse-response functions may be contemporaneously correlated. In order to estimate the shocks to one of the variables in the system independently, it is important to decompose the errors to make sure that they are orthogonal. Sims (1980) proposes a contemporaneous recursive causal ordering of variables in the VAR based on their degree of exogeneity to address this issue. This approach is based on Choleski decomposition of variance-covariance matrix of residuals to ensure the orthogonalisation of shocks. In specific, the variables that appear earlier in the ordering are more exogenous which will affect the following variables contemporaneously or even with a lag, while the variables come later in the systems are more endogenous that only affect the previous variables with a lag. In our paper, the wealth shocks are ordered after the consumption and income for two reasons. First, according to Lettau and Ludvigson (2004), consumption, income and wealth are all endogenously determined. However, based on system-equation estimation, they find that subsequent to an equilibrium-distorting shock, it is wealth, but not consumption or income that adjusts to restore the long-run equilibrium. Therefore, wealth is relatively more endogenous than consumption and income. Second, previous evidences have shown that asset market can react contemporaneously to all other shocks, but that the variables identified before the asset market react with a lag to asset market news, so they usually order the asset market wealth such as stock and housing at last (see Patelis, 1997; Thorbecke, 1997; and Neri, 2004). In addition, Cochrane (1994) and Fisher et al. (2001) also show that consumption is weakly exogenous so it should be ordered first.
Finally, in order to analyse the impulse-response functions (IRF), the estimation of the confidence intervals for the IRF is required. Since the impulse-response functions are constructed from the estimated VAR coefficients and their standard errors, Monte Carlo simulations are employed to generate the confidence intervals based on the estimated coefficients and the standard errors. 5th and 95th percentiles of the distribution of the generated coefficients from 1000 bootstraps are used as the confidence interval for the impulse responses. Moreover, variance decompositions are also presented to show how essential a shock is in specifying the variations of variables in the panel VAR model by providing the proportion of the movement in one variable that is explained by the shock to another variable over time. In short, compared with impulse response functions that illustrate the future direction of the variables following a shock, variance decompositions express the magnitude of the overall effect.

III. Data and results

3.1: Data

Our study is based on data for a balanced panel of 14 OECD countries. These countries are Australia, Canada, Netherlands, Sweden, Switzerland, the UK, the US, Belgium, Denmark, France, Finland, Germany, Italy and Spain.

We use total consumption and disposable income as the proxy for consumption and income. Stock and house price indices are used as the proxy for financial and housing wealth, since the wealth measurement is not consistently available across the sample of OECD countries.

All our data are in log of real per capita terms that cover the period from 1975Q1 to 2011Q2 with quarterly frequency. Data on consumption, income and stock price indices have been collected from Datastream. The house price indices data follow Mack and Martinez-Garcia (2011) who
constructed them based on a variety of national and international data sources. This house price data is available from Federal Reserve Bank of Dallas.

3.2: Results

3.2.1 Stock market wealth effect versus housing wealth effect

The hypothesis of ‘net housing wealth effect’ is first tested based on the panel VAR model\(^1\). In details, since the rise of house price will generate both the positive capital value effect and the opposite negative housing service effect on consumer spending, it is possible that the ‘net housing wealth effect’ will be smaller than stock market wealth effect if the negative housing service effect is sufficiently large and holding other things unchanged. Impulse response functions which provide the analysis of spillover effects are conducted to estimate the impact of unanticipated asset price shocks on consumers’ expenditure. Figure 1 illustrates the response of total consumption to a unit shock in stock price growth and housing price growth respectively during the overall study period. It visually shows that a unit shock in equity price change has a larger impact than a unit shock in property price change on consumption, which confirms the hypothesis of dual impact of housing price and implies that the positive housing capital income effect is significantly offset by the negative housing service effect. In particular, there is a delayed positive response to consumption following the stock and housing price shock which peaks after one quarter and then gradually reverse to the baseline over three quarters.

With regard to the significant evidence of dual natural of housing price, it is also important to explore the determinants of the extent to which the positive housing capital value effect is offset by the negative housing service effect. According to Deaton and Muellbauer (1980),

\(^1\) Panel cointegration tests show that there is only a weak cointegrating relationship between the estimated variables, so only panel VAR is estimated instead of panel VECM. Results are available upon request.
homeownership rate is one of the most critical determinants because the positive housing capital value effect is stronger for homeowners than for non-homeowners. In other words, the ‘net housing wealth effect’ will be larger if the owner-occupiers account for more proportion of the total households, since in that case the positive housing capital income effect will dominate the opposite housing service effect. Another vital determinant is loan-to-housing value ratio. According to the leverage effect, the positive housing capital value effect will be bigger if the mortgage to property value ratio increases. It is then possible that the ‘net housing wealth effect’ will approach or even exceed the stock market wealth effect if both of the homeownership rate and loan-to-value ratio are large enough. Therefore, it is interesting to see how the ‘evolution’ of homeownership rate and mortgage ratio has impacted the relative strengths of positive housing value effect and negative housing service effect. A split-sample analysis will be employed to check this possibility. In specific, we split our sample into two sub-sample periods, 1975 to 2000 and 2001 to 2011.

Figure 2 plots the sub-period consumption response to the shocks from stock and housing price changes based on the impulse response functions. We can see that for the first sub-period (1975-2000), the stock market wealth effect is larger than the net housing wealth effect, which is consistent with the result from the whole sample period. However, during the second sub-period (2001-2011), the net housing wealth effect is in turn significantly stronger than the stock market wealth effect. Moreover, when comparing with the asset price effects between the two sub-periods, the housing wealth effects have increased over time significantly but not for the stock

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2 Due to the practical difficulty in identifying breaks in panel data (lack of panel-form structural break techniques), our sample split is admittedly ad hoc. We set the break time to be year 2000 for two reasons. First, econometrically, Bai and Perron (2003) structural break test is applied to each country and the results show that the break date is from 1998 to 2002 if only one break date was allowed (test results are available from the author upon request). Therefore, we choose the mid-point of year 2000 as the break date. Second, economically, the relative dramatic boom of housing market starts since the early 2000s and the stock market also collapses at the same time due to the dot-com bubble burst.
market wealth effects. One reasonable explanation for the improvement of housing wealth effects may be the rise in homeownership rate and loan-to-home value ratio in recent decades. Indeed, both of the homeownership rate and mortgage ratio have increased for most of the OECD countries during the study period. For example, the homeownership rate in the US has risen from 64.5% in 1975 to 69% in 2007. The homeownership rate in the UK has also increased to 67.4% in 2010 from 54% in 1975. Most importantly, there is even more growth on loan-to-value ratio. For example, the loan-to-value ratio in the US has jumped from 32% in 1975 to 60% in 2010, and the most significant appreciation takes place during the recent decade, where the mortgage ratio has boosted by 54% since 2001. The loan-to-value ratios have also generally exceeded 80% in most of other OECD countries and even 100% in the Netherlands and the UK. Consequently, the mortgage market innovation along with the climb in homeownership rate have boosted the boom in real estate market which then lead to a stronger housing wealth effect on consumption in recent years. In addition, the ‘evolution’ of the house price effect also implies that the consumption purpose of real estate is relatively strong in the first sub-period, while the investment purpose of housing dominates the housing service consumption purpose since the housing market boom during the second sub-period.

To numerically and detailedly compare the consumption multipliers to stock price shocks with those to housing price shocks, we further tabulate the six-quarter impact effects in Table 1. Firstly, the comparison of the overall stock and housing price shock reveals that a 5% increase in stock price shock after one quarter leads to an increase in consumption of around 0.17%, which is significantly larger than the corresponding number of the house price shock (0.11%). Nonetheless, both of these shocks exhibit similar effects after three quarters. In the context of the sub-period measurement, the stock price shock again is stronger at the beginning (0.15% against
0.09%) but no significant difference to the property price shock after three quarters for the first sub-period (1975 to 2000). During the second sub-period, however, the housing price shock is in turn substantially bigger than the stock price shock at all times.

Forecast error variance decomposition analysis is also conducted to provide an alternative way of estimating the asset price shocks on consumption as presented in the impulse response functions, where the variance decomposition focuses on the magnitude of the entire effect. Table 2 shows that the variance decomposition results are in line with the conclusions from impulse response functions in Figure 1 and 2. That is, the stock price effect is stronger than the housing price effect for the whole sample. For the sub-period estimation, the share price effect outweighs the property price effect during the first sub-period, while the housing price effect on consumption instead dominates the effect from the equity price effect at the second sub-period. Thus, there is a significant improvement on housing price effect.

In short, both of the impulse response functions and variance decomposition results indicate that the overall stock wealth effect is larger than the net housing wealth effect in the studied OECD countries, but the net real estate wealth effect has increased substantially due to the boom of housing market. In fact, during the recent decade, the housing wealth effect has exceeded the share market wealth effect. Our conclusion is consistent with the evidences from Ludwig and Slok (2004), Skudelny (2009), Slacalek (2009) and De Bonis and Silvestrini (2012) that stock market wealth effect outweighs the housing wealth effect. Furthermore, our finding on the ‘evolution’ of housing wealth effect is also in line with the reports from Peltonen et al. (2009), Slacalek (2009) and Brady and Stimel (2011) that the housing wealth effect has risen remarkably in relative to the stock market wealth effect.
3.2.2 Asymmetric asset price effects

The recent dramatic cyclical movements in both stock and real estate markets also promote us to investigate the potential asymmetric effect of asset price on consumption in OECD countries. Figure 3 presents the impulse responses of consumer spending to a same-sized shock from both positive and negative asset prices for the whole sample period. The results from Figure 3 depict that both of the unexpected positive and negative shocks in stock and housing prices will have significant impacts on consumption. In particular, both of the increase in equity and property prices exhibit larger effects on consumers’ expenditure than the decrease in asset prices. This implies that both stock and housing prices changes affect household consumption asymmetrically. In particular, the positive asset price shock is more persistent than the negative asset price shock.

Our evidence of asymmetric wealth effect on consumption confirms with the notion of ‘habit persistence’ presented by Sundaresan (1989). Specifically, this hypothesis states that consumer spending is more ‘sticky’ during the periods of dropping asset prices, because consumers’ utility depends on the consumption history.

Furthermore, the asymmetric response of consumption also provides some insights on the dual impact of housing price shock. The higher positive housing price effect over the negative housing price effect indicates that homeowners’ consumption responses more to housing value appreciation than the depreciation. Another possibility is that renters respond more to the drop in property price. Since the housing service cost is the largest proportion of non-homeowners’ daily spending, the falling housing price will depress the rental price and even lower the mortgage payment for some renters which then encourage non-homeowners to consume more.
It is also interesting to see how the asymmetric response of consumption to the asset price growth has changed over time. Figure 4 displays the different impulse responses of consumption to positive and negative asset price shocks during the two different sub-periods. First of all, we can see that both of the positive and negative housing price effects on consumer spending have significantly increased, which is consistent with the findings draw from the Figure 2.

Moreover, the asymmetric effects of asset prices on consumption also exist during the sub-periods. For example, the response of consumption to the negative housing price shock is slightly larger than the positive housing price impact during the first sub-period. Nevertheless, for the period of 2001 to 2011, the positive real estate price shock is instead stronger than the negative real estate price shock. The comparison between the positive and negative share price shock is more ambiguous over the sub-periods. With indifference impacts from the positive and negative stock price shocks for the period from 1975 to 2000, the positive equity price shock partly outweighs the negative equity price shock during the second-period (2001-2011).

Our evidences also state that between the two sub-periods, the negative stock price shock has increased more in relative to the increase of the positive share price shock. The rise of negative share price shock may attribute to the two significant downturns in stock market – dot-com bubble burst in the end of year 2000 and global financial crisis in late 2006. On the other hand, the positive housing price shock has strengthened more compared to the negative property price shock. The stronger positive housing price shock may be due to the boom of real estate market during most of the 2000s. Moreover, since we can see that the positive real estate price shock is much larger than the positive stock price shock during the second sub-period, it implies that households benefit more from the boom of housing market than from the share market in recent decade.
Table 3 provides the numerical analysis of the asymmetric responses of consumption to positive and negative asset price shocks. With regard to the whole-sample estimation, both of the positive stock and property price shocks are significantly bigger than the negative asset price shocks. For the sub-period estimation, there is no significant difference between the positive and negative share price shocks. In contrast, during the first sub-period, the positive house price shock is generally smaller than the negative house price shock except at the third quarter. For the second sub-period, nevertheless, the positive property price shock in turn outweighs the negative property price shock except at the first quarter. In addition, both of the positive and negative property price shocks have enhanced significantly over the two sub-periods in relative to the asymmetric share price shocks.

We now turn to discussing the importance of the different asymmetric asset price shocks in accounting for the variance in the consumption. Table 4 tell the same story as the findings from Figure 3 and 4. That is, the positive stock and housing price shocks are larger than the negative stock and property price shocks for the whole sample period. This finding is consistent with the empirical evidences from Stevans (2004) and Apergis and Miller (2005a&2005b) who identify stronger positive stock market wealth effect on consumption as well as Disney et al. (2010), Das et al. (2010), and Simo-Kengne et al. (2012) who find larger positive housing wealth effect. Furthermore, in terms of the sub-period estimation, Table 4 confirms that both of the positive and negative real estate price effects have increased over time. In particular, the gain of the positive housing price shock is more significant than the increase of the negative housing price shock. Our finding of larger negative property price effect over positive housing price effect during early period (1975 to 2000) also explains why earlier asymmetric housing wealth effect
studies such as Skinner (1996) and Engelhardt (1996) report stronger consumption response to decline in housing wealth than the gain in property value.

IV. Conclusion

This paper employs a panel VAR procedure to investigate the decomposed stock and housing wealth effect on consumption for a panel of 14 OECD countries over the period of 1975 to 2011. We find that response to a same-sized shock, the overall stock price effect is larger than the ‘net house price effect,’ since the positive housing capital income effect from the rise of property price will be partly offset by the opposite negative housing service effect. However, due to the significant boom of housing market associated with high level of leverage and homeownership rate in recent years, the net housing wealth effect has increased faster in relative to stock market wealth effect over time. In fact, the real estate wealth effect has clearly exceeded the share market wealth effect in the recent decade.

Moreover, potential ratchet effect of stock market and housing wealth on consumption is also detected. The results show that the gain in stock and housing wealth generates a bigger and more persistent increase in consumer spending than the decline in consumption for a similar reduction in equity and property wealth. Our finding confirms the ‘habit persistence’ hypotheses proposed by Sundaresan (1989). Furthermore, our outcomes also provide insights on the wealth distribution between homeowners and non-homeowners. That is, homeowners benefit more from the house price rise, while renters gain more from the falling house price.

Our results provide important policy implications. First, the ratchet asset price effect on consumption implies that policy intervention is more warranted for the rise of asset price to obviate inflationary pressures than the drop of asset price. Specifically, policy makers need to
identify the asset bubble in early stage to avoid much larger bubble burst in the future. Moreover, it is necessary to prevent the over-consumption in response to the positive asset price shock that may raise the volatility of future GDP growth. Second, the real estate market should receive priority from policy makers since the housing price effect has increased significantly and outweighed the stock price effect in recent years, especially in regards to the enhanced positive housing price shocks. Although the housing markets in some countries such as the US, Japan and Spain have cool down since the subprime mortgage crisis and the Eurozone financial crisis, potential inflationary pressures or bubbles may still exist in some other OECD countries. For instance, the house prices in Australia, Canada, and Norway have lifted by 27.5% from the end of 2006 to 2011 associated with the higher mortgage ratio. Therefore, monetary stabilization policies are more warranted for these nations.
Reference:


Table 1: The percentage change of consumption to a 5% shock to stock and housing prices

<table>
<thead>
<tr>
<th></th>
<th>Stock price shock</th>
<th>House price shock</th>
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<tbody>
<tr>
<td></td>
<td>1-quarter</td>
<td>3-quarter</td>
</tr>
<tr>
<td>TC (1975-2011)</td>
<td>0.17%*</td>
<td>0.08%*</td>
</tr>
<tr>
<td>TC (1975-2000)</td>
<td>0.15%*</td>
<td>0.06%*</td>
</tr>
<tr>
<td>TC (2001-2011)</td>
<td>0.15%*</td>
<td>0.04%*</td>
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</tbody>
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Note: * indicates statistical significance level of 5%.

Table 2: Variance decomposition (4-variable panel VAR model)

<table>
<thead>
<tr>
<th></th>
<th>TC</th>
<th>DIN</th>
<th>SP</th>
<th>HP</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC (1975-2011)</td>
<td>92.2%</td>
<td>2.3%</td>
<td>3.4%</td>
<td>2.1%</td>
</tr>
<tr>
<td>TC (1975-2000)</td>
<td>93.2%</td>
<td>3.2%</td>
<td>2.0%</td>
<td>1.6%</td>
</tr>
<tr>
<td>TC (2001-2011)</td>
<td>86.2%</td>
<td>0.8%</td>
<td>2.6%</td>
<td>10.4%</td>
</tr>
</tbody>
</table>

The table shows the percent of variation in the row variable (10 periods ahead) explained by column variable.

Table 3: The asymmetric percentage change of consumption to a 5% shock to stock and housing prices

<table>
<thead>
<tr>
<th></th>
<th>Positive stock price shock</th>
<th>Negative stock price shock</th>
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<tbody>
<tr>
<td></td>
<td>1-quarter</td>
<td>3-quarter</td>
</tr>
<tr>
<td>TC (1975-2011)</td>
<td>0.13%*</td>
<td>0.11%*</td>
</tr>
<tr>
<td>TC (1975-2000)</td>
<td>0.11%*</td>
<td>0.06%</td>
</tr>
<tr>
<td>TC (2001-2011)</td>
<td>0.06%</td>
<td>0.05%*</td>
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<table>
<thead>
<tr>
<th></th>
<th>Positive house price shock</th>
<th>Negative house price shock</th>
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<tbody>
<tr>
<td></td>
<td>1-quarter</td>
<td>3-quarter</td>
</tr>
<tr>
<td>TC (1975-2011)</td>
<td>0.07%*</td>
<td>0.10%*</td>
</tr>
<tr>
<td>TC (1975-2000)</td>
<td>0.04%</td>
<td>0.09%*</td>
</tr>
<tr>
<td>TC (2001-2011)</td>
<td>0.17%*</td>
<td>0.12%*</td>
</tr>
</tbody>
</table>

Note: * indicates statistical significance level of 5%.

Table 4: Variance decomposition (6-variable panel VAR model)

<table>
<thead>
<tr>
<th></th>
<th>TC</th>
<th>DIN</th>
<th>SPP</th>
<th>SPN</th>
<th>HPP</th>
<th>HPN</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC (1975-2011)</td>
<td>90.9%</td>
<td>2.4%</td>
<td>3.1%</td>
<td>1.5%</td>
<td>1.4%</td>
<td>0.6%</td>
</tr>
<tr>
<td>TC (1975-2000)</td>
<td>92.2%</td>
<td>3.2%</td>
<td>1.2%</td>
<td>1.0%</td>
<td>0.9%</td>
<td>1.5%</td>
</tr>
<tr>
<td>TC (2001-2011)</td>
<td>83.1%</td>
<td>0.9%</td>
<td>1.4%</td>
<td>1.6%</td>
<td>7.7%</td>
<td>5.2%</td>
</tr>
</tbody>
</table>

The table shows the percent of variation in the row variable (10 periods ahead) explained by column variable.
Figure 1: Impulse responses of consumption to asset price shock (total sample)

Figure 2: Impulse responses of consumption to asset price shock (sub-samples)

1975-2000:

2001-2011:
Figure 3: Impulse responses of consumption to positive and negative asset price shock (total sample)

Figure 4: Impulse responses of consumption to positive and negative asset price shock (sub-samples)

1975-2000

2001-2011