House Prices, Homeownership and Household Consumption in Korea

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주택가격 변동이 가계 소비에 미치는 영향을 2010-2019년중 가구패널자료(KLIPS)를 이용하여 분석하였다. 주택가격이 소비에 미치는 영향은 주택보유여부 및 주택가격 변동 방향에 따라 비대칭적으로 나타났다. 주택보유가구와 무주택가구에서 모두 주택가격 하락시에 소비를 조정하는 영향이 크게 나타났는데, 주택보유가구는 가격하락시에 소비를 줄이는 반면 무주택가구는 소비를 늘리는 효과가 크고 유의했다. 주택가격 상승이 가계소비에 미치는 영향은 상대적으로 매우 작게 추정되었다.

주요 용어: 주택가격, 가계소비, 자산효과, 가구 패널자료

Ⅰ. Introduction

This paper investigates the impact of real estate house prices on household consumption, making use of almost 10,000 household panel data from Korea. We examine asymmetric impact of house price cycle on household consumption across ownership status and directions of house price fluctuations. The responses of homeowners and renters could be opposite as any change in house prices means changes in housing asset value that homeowners can extract to use, while it may affect the minimum level of down payment that renters have to save to buy their own home. In this regard, it is also expected that a rise or fall in house prices may force homeowners and renters in the opposite way in determining their saving and consumption decision. By considering those asymmetries in estimation, we expect to draw more precise

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implication on consumption dynamics and macroeconomic consequences of house price fluctuations.

We employ an empirical framework that is standard in the literature on measuring the impact of house prices on household consumption. In the panel regression, we have the growth rate of real household consumption as a dependent variable, and we include the growth rate of house prices and other various household-level demographic features, and aggregate-level macroeconomic conditions, as control variables. A different feature from a standard regression model is in incorporating indicators identifying ownership types and directions of house price fluctuations in regression and thus capturing asymmetric influences of house price changes on consumption. Household-level panel data from the Korean Labor and Income Panel Survey (KLIPS) database of 2010-2019 (13th to 22nd) waves were used to construct an annual unbalanced household-level panel dataset. The KLIPS is a longitudinal survey that follows up on 5,000 households living in non-rural areas across Korea and reports comprehensive household level information, including assets, liabilities, incomes, consumption, economic activity, education, household membership structure, and various demographic features of the household. For a measure of housing asset value, we use the house price index in the residential area of the pertinent households. Specifically the house price index compiled for 17 regional districts by four residence types are matched to the household database. Household-level fixed effects are included to control remaining household features that could possibly affect consumption behavior, and a clustered robust standard error at the household level is adopted in the estimation.

Our main finding is that there exist statistically significant and economically substantial asymmetric responses across the ownership status and the direction of house price fluctuations. The result implies that the average impact of house price changes on consumption is driven to a larger extent by a contractionary impact of falling house prices rather than a boosting impact of rising house prices on consumption. This is consistent with the preference of loss aversion, which expects that capital loss brings about a larger influence than capital gain of the same magnitude. Looking at the ownership status, we find that there exist opposite responses between homeowners and renters, and the differences in responses are statistically significant and substantial. The asymmetric responses become more remarkable when we consider the two sources of asymmetries simultaneously. Adjustments in consumption were more significant and substantial in the periods of falling house prices for both owners and renters. These findings provide a different perspective from what previous studies suggest in understanding macroeconomic consequences of house price fluctuations. According to the findings of the previous studies, changes in housing asset value would bring about changes in the household

consumption of the same direction. Studies which include both owners and renters report positive responses for both groups, though the adjustment of the latter are usually smaller than the former (for example, Campbell and Cocco 2007, Disney et al. 2010, Aladangady 2017). Our findings, however, imply that the impact of housing value on consumption and overall macroeconomy could be small as its impacts on homeowners and renters are offset, and thus omitting the asymmetric consequences across homeownership could generate a bias in inferring macroeconomic consequences of house price cycles.

Ⅱ. Data description

2.1 Household-level panel data

The Korean Labor and Income Panel Survey (KLIPS) database is used to construct an annual unbalanced household level panel data. The KLIPS is a longitudinal survey that follows up on 5,000 households living in non-rural areas and reports comprehensive household-level information including assets, liabilities, incomes, consumption, economic activities, education, household membership structure, and various demographic features of the household. Household consumption, which measures the entire amount of nominal consumption of respondent households, is surveyed across 10 sub-items, and we use total consumption expenditure in our analysis. Household income includes earnings from financial assets, housing assets, and transfers other than labor income. Household assets encompass real estate assets, either for personal residence or for a rental income, and financial assets. Liabilities denote any amount of outstanding debt from financial and non-financial institutions and person-to-person loans. There exists a difference in the timing between flow variables and stock variables because items for flow variables, such as income and consumption, are asked for the prior year, while those for stock variables, like assets and liabilities, are compiled as of the date of the survey. This timing gap is adjusted in the regression. Demographic features include comprehensive items, such as education, marriage status, occupation and job status for the head of household and for the other members in the household. The database from 2010 to 2019 (13th to 22nd) waves are used in the regression.

2.2 Aggregate data

A house price index in the residential area of the pertinent household is used as a measure of housing asset value. The Korea Appraisal Board compiles an aggregate Housing Sales Price index for 17 regions by four residence types. The regional classification covers seven metropolitan areas, nine provinces and one special district, the Sejong Special Autonomous City. The type of residences include Apartments, Row Houses, Detached Houses, and Total. The 68 aggregate series in total are matched to each household reported in the KLIPS, according to the region, the type of residence, and the year. For households whose residential types do not belong to the three categories, such as flats with shops or the other exceptions, a total index is matched.

Consumer price index, interest rates, and regional GDP growth rates are used in the regression. Headline Consumer Price Index (CPI) is used in deflating household-level variables and aggregate house price indexes. Real interest rate is defined as a difference between the nominal interest rate and the inflation expectation. The interbank overnight call rate is used as an indicator of the nominal interest rate, and the inflation expectation is from the Consumer Sentiment Index (CSI). Growth rates of regional real GDP for 17 districts are included in the regression in an attempt to capture overall economic activity conditions in the region.

Ⅲ. Estimation strategies and estimation results

3.1 Estimation model

Equation (1) represents the regression model we use in the analysis. The model is close to those used in Campbell and Cocco (2007), Lehnert (2004), and in Gan (2010), among others, but it is extended to reflect asymmetries across ownership status or directions of house price fluctuations.

$$c_{jt} = \mu + \delta I_N + \theta I_R + \xi (I_N * I_R) + \alpha y_{jt} + \beta p_{Rt} \quad (1)$$
$$+ \beta_N (p_{Rt} * I_N) + \beta_R (p_{Rt} * I_R) + \beta_{NR} (p_{Rt} * I_N * I_R) + Z_{jt} + h_j + e_{jt}$$

where, the subscript j denotes each household, R represents the district in which the household resides, and t denotes the year. c_{jt} and y_{jt} denote log difference of the real

consumption and real income of household j in year t, respectively. Z_{jt} presents a set of demographic features of household j, which are included to control for household characteristics that may affect consumption decisions, such as householder's age and its square term, the householder's gender, employment status, economic activity status, marital status, the number of kids, the number of household members and any changes from the previous year. p_{Rt} denotes log difference of the real house purchase price index in district R. h_j indicates household-level fixed effects, that is included to capture any remaining unobserved features that may affect their consumption decision. Consumption, income, and house prices are deflated by the consumer price index and then they are log-differenced, thus they indicate annual growth rates in real terms from the preceding year.

In order to measure asymmetries possibly stemming from ownership status and direction of house price fluctuations, two indicative variables are introduced to capture each of the two sources of asymmetries. The first indicator (I_N), which identifies homeownership status, is assigned 1 for renters, and 0 for homeowners. The second indicator (I_R), which reflects directions of price changes, is assigned 1 if changes in house prices matched to the corresponding observation is positive, and 0 otherwise. The interactive terms between the indicators and house price changes measure the marginal impact of house prices on household's consumption associated with the corresponding sub-samples.

Estimation is implemented by ordinary least squares. It may be the case that the error terms are clustered, not independent and identically distributed, i.e. observations within each household are correlated, but households from different groups are not correlated. With this in mind, we cluster the standard errors at the household-level to have standard errors that are asymptotically robust to both heteroscedasticity and serial correlation. As noted above, we use household-fixed effects to control for household-level heterogeneity not captured in other controls, as there could be remaining unobservable household features which are related to a household's consumption decisions.

3.2 Estimation results

The estimation result is provided in Table 1. First, the baseline regression for total observations is presented in Column (I). The coefficient on house price is estimated to 0.099, though it is not statistically significant at the 10 percent level. This implies that households expand the growth rate of their consumption by about 0.099 percentage points in response to a 1 percentage point increase in the house price index for the area they reside. It was documented that the corresponding estimate for house prices in the U.K. is 0.651 from a

comparable previous study in methodology (Campbell and Cocco 2007).

The estimation result with the distinction of households is presented in Column (II). The coefficient on house price is estimated to be about 0.187 and is statistically significant, which denotes the responses of the homeowners. The coefficient on the term which measures the marginal impact on renters is -0.614 and is significant at the 1 percent significance level. The sum of the two coefficients is -0.427, which represents the estimated impact of house prices on renters. The results imply that homeowners increase growth rates of consumption by 0.187 percentage points, while renters reduce their real consumption by 0.427 percentage points when regional house prices change by 1 percentage points.

The estimation result with the distinction of total observation based on the direction of house price fluctuation is presented in Column (III). The reference group is the household year sample of which regional house prices had fallen from the previous year. The coefficient on house prices is 0.244, and the estimate is only marginally insignificant at the 10 percent significance level. The term measuring marginal impact on consumption of rising house prices is estimated as -0.279, and this is not statistically significant at the 10 percent level. The sum of these two coefficients is -0.035, which is statistically insignificant. The estimates imply that households cut growth rates of their consumption by 0.244 percentage points in response to a 1 percentage point decline in house prices, while they cut it only by 0.035 percentage points in response to a 1 percentage point rise in house prices.

Estimation results of Equation (1), which consider asymmetric responses from the two dimension, are presented in Column (IV). The estimates imply that homeowners decrease the growth rate of their consumption by 0.409 percentage points, while renters increase it by 0.679 percentage points in response to a 1 percentage point decline in the regional house prices. In contrast, homeowners decrease consumption growth by 0.024 percentage points, while renters decrease it by 0.093 percentage points when growth rates of house prices rise by 1 percentage points.

IV. Conclusion

We investigate the impact of real estate house prices on household consumption, making use of almost 10,000 household level observations from Korea. We find that there exist statistically significant and economically substantial asymmetric responses across ownership and direction of house price fluctuations. Looking at ownership status, we find that homeowners increase, while renters decrease their consumption in response to changes in house prices. Looking at

directions of house price fluctuation, the impact of falling house prices are larger than that of rising prices. Specifically, the decrease in consumption of homeowners and the increase in that of renters in response to falling house prices were substantial and significant. The results imply that it is important to consider these asymmetries in inferring macroeconomic consequences of house price fluctuations on aggregate consumption.

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<Table 1> Estimation results

	(I)	(II)	(III)	(IV)
Estimates				
Income	0.100***	0.100***	0.100***	0.100***
	(0.000)	(0.000)	(0.000)	(0.000)
House Price	0.099	0.187**	0.244	0.409**
	(0.159)	(0.014)	(0.121)	(0.016)
House Price * I_N		-0.614***		-1.088**
		(0.003)		(0.012)
House Price * I_R			-0.279	-0.432*
			(0.190)	(0.055)
House Price * I_N* I_R				1.018*
				(0.089)
Adjusted R^2	0.033	0.034	0.033	0.034
Number of observations	10,933	10,933	10,933	10,933
Number of households	3,830	3,830	3,830	3,830
Wald tests				
β	0.099	0.187**	0.244	0.409**
	(0.159)	(0.014)	(0.121)	(0.016)
$\beta + \beta_N$		-0.427**		-0.679*
		(0.027)		(0.087)
$\beta + \beta_R$			-0.035	-0.024
			(0.794)	(0.868)
$\beta + \beta_R + \beta_N + \beta_{NR}$				-0.093
				(0.801)

Notes: 1) p-values are in parentheses. ***: significant at 1 percent level, **: significant at 5 percent level, *: significant at 10 percent level, Standard errors are corrected for heteroscedasticity and clustered at household level to control for the effects of residual autocorrelation.