

The Effect of Housing Assets on Private Sector Consumer Expenditure in Iran

Ali Akbar Gholizadeh¹, Afsaneh Ghasemi², Motahareh Khaksar³

ARTICLE INFO

Article history:

Date of submission: 21-05-2022

Date of acceptance: 10-10-2022

JEL Classification:

E21

R30

M49

Keywords:

Private Sector Consumption

Housing Assets

ARDL Model

ABSTRACT

The purpose of this study is to measure and analyze the effect of housing assets on private sector consumption using time series data in Iran for 1985-2020. This study analyzes the relationship in the form of an autoregressive distributed lag (ARDL) econometric model using Eviews software. The short-term and long-term marginal propensity to consume of permanent income, housing and financial assets is also employed. The short-term and long-term marginal propensity to consume of permanent income are 0.55 and 0.69 and the short-term and long-term marginal propensity to consume of permanent income of housing assets are 0.56 and 0.70. The error correction model shows the adjustment of short-term disequilibrium with a coefficient of 0.48, which is a reasonable relative adjustment rate. Another result of this study is the positive significant effect of financial assets on private consumption in Iran. Various studies in this field around the world show the importance of this issue, such as Dong et al. (2021), Mian et al. (2016), Burrowss (2018), Cho (2016), Lacoviello (2015), Beatrice & Kengne (2015), and other researchers who have studied the impact of housing prices on household expenditure in China, Chicago, South Korea, the United States, the United Kingdom, etc.

1. Introduction

In most economies, private consumption accounts for over 50 percent of aggregate demand. The high share of consumption expenditure in GDP

1. Associate Professor, Faculty of Economics and Social Sciences, Bu-Ali Sina University, Hamedan, Iran (Corresponding author). Email: a.gholizadeh@basu.ac.ir

2. M.A in Economics, Faculty of Economics and Social Sciences, Bu-Ali Sina University, Hamedan, Iranafsaneghasemi91@gmail.com

3 . M.A in Economics, Faculty of Economics and Social Sciences, Bu-Ali Sina University, Hamedan, Iran. Email: m.khaksar86@yahoo.com

prompts economists to better understand aggregate demand. By identifying the factors that influence consumption, economic policymakers can appropriately guide their consumption in a recession or inflation by stimulating the desired variables (Tashkini, 2018: 22). By recognizing the level of consumption and thus the ultimate desire to consume, one can determine future economic trends to change consumption patterns, increase or decrease investment by predicting the potential savings, and estimate future consumption expenditure. Considering the crucial role of consumption as one of the components of aggregate demand, it is necessary to identify and study the effective factors and influencing variables on private sector consumption. Among the many factors that influence this sector, income is one of the most important factors that is frequently mentioned in the theories of private consumption in macroeconomics. Friedman's model of private consumption is a model that implicitly describes wealth as one of the factors affecting private sector consumption, and examines the effects of permanent and temporary income on private sector consumption.

In contrast, Endo and Modigliani's model of private consumption explicitly introduces wealth as a determinant of private consumption patterns. Since then, the wealth variable and its impact on private sector consumption have been increasingly discussed. According to Pyongyang's wealth theory, wealthy people tend to consume more and save less because saving focuses on creating wealth and private sector consumption in future periods. Income is the most important variable in the consumption function. However, other factors such as national wealth, future expectations of consumers, income distribution, etc. are also factors that play a role in private sector consumption (Georgy, 2018: 59). Wealth is also a general concept and has various components, each of which acts as a separate factor in consumption. In economics, there is another term called "property" which includes land, buildings, machinery, durable goods, human resources, bonds, stocks, money or equity securities. In this study, income from property and its relationship and impact on private consumption are particularly

examined. One of the essential components of the capital market and assets is the housing market. Housing, which is one of the essential and basic human needs, is now not only a shelter but also an economic and political asset. Housing is the most important source of household investment and is socially considered as one of the leading indicators of wealth in Iran. Housing is one of the most important sectors in the Iranian economy, and a high percentage of the country's investment goes to this sector. Housing is not only considered as shelter but also as a valuable asset that has a high economic value (Gholizadeh, 2018). Housing is important in two ways: firstly for consumer demand and secondly because as incomes rise, the demand for housing as a commodity will also increase. The housing market is also a place where households can attract some of their total investment in the economy. This study examines the impact of housing wealth on private sector consumption expenditure. The variables include private sector consumption (C), permanent income (A), real estate assets (h), and financial assets (which include stocks, shares, time deposits and notes, and coins in the balance sheet account of the central bank). The data is a time series and covers the period from 1985 to 2020. Moreover, all variables were fixed to 2020.

The remainder of this paper is organized as follows. Section 2 provides the Theoretical literature and background of research. In Section 3 the methodology and data set are presented. Section 4, analysis of the results the model estimation are presented. Finally, Section 5 concludes the paper and makes some recommendations.

2. Theoretical literature and background of research

2.1. Theoretical literature

The primary economic goal of every individual and household is to maximize utility through increased consumption. Households seek to maximize the utility of consumption throughout their lives. Therefore, they seek to facilitate their consumption over time, which can be achieved

through saving. Meanwhile, the way households save is also important, so the combination of assets held by households in their asset portfolio can also affect investment in the economy. Individuals usually hold their assets in the form of financial assets and, in the case of inflation, in the form of tangible assets when financial markets are active and efficient. In a dynamic economy, the transfer of household money through financial markets (banks, the stock market and other financial institutions such as deferred funds and loans, insurance companies, and pension funds) leads to economic growth and employment growth. In countries where financial markets, especially the stock market, are not developed, active, or institutionalized, and the value of money declines due to persistent inflation, people hold their wealth as unproductive assets to avoid inflation-related losses. Households can increase their wealth in two ways, either by saving directly or indirectly by valuing the price changes of their current assets. Accordingly, the increase in asset prices together with the increasing wealth effect influences private sector consumption and investment, which include an increase in expected wages (as a result of real income growth) and collateral value, which in turn leads to an increase in the borrowing capacity of private firms (Bayoumi & Edison, 2018: 74). Since housing is a basic need as shelter, apart from its role as an asset, John Vickers points out that higher prices lead people who do not own or need housing to try to reduce their non-housing costs. So the impact of the cost of property on consumption costs can be twofold. The analysis of the role of wealth in household consumption also relates to the permanent income theory or life-cycle model. According to this, the level of household consumption is a function of permanent income or the current value of labor income as well as capital income. Capital income includes household and financial assets. Given expected permanent income, households spend their money in three ways:

They borrow in the first year, then they save, and finally they avoid saving in the last years. An unexpected increase in wealth thus induces consumers to spread income over the remaining period, spending a little

more and saving less. Wealth affects consumption in two ways: first, households can sell assets to finance themselves, and second, they can borrow to increase their spending. The ability of households to borrow depends on the performance of financial markets; deep markets allow them to own more assets. The impact of asset changes and fluctuations on consumption varies by type of asset. The impact of property price fluctuations on private sector consumption can be explained as follows: The effect of rising property prices on consumption is twofold: for homeowners and for households with no assets or renters. To interpret the effect of rising housing prices on asset owners, they increase their wealth and they are more likely to spend by selling property, or the price differentials increase wealth, freeing up more resources for consumption by more households. To illustrate the impact of rising housing prices on asset-less households, substitution effects can be found, i.e. when housing prices increase, they will reduce their housing demand and free up their financial resources for purposes other than housing. They will also be more desirable by consuming non-housing assets. It is also possible that renters will argue that as prices rise, they will reduce their consumption of other goods in order to save more money for home purchases and reduce rental costs. This is, of course, due to the dual nature of real estate, which is both a basic shelter and an asset (Bayoumi & Edison, 2018: 66). The channel through which changes in housing prices can affect the real activity of the economy is the balance sheet channel through which homeowners can borrow against their higher collateral values. The ability of homeowners to take advantage of this effect depends on competitive conditions in the mortgage market, ease of repayment, and the overall greater availability of mortgage products. Through this channel, monetary policy has a positive effect on domestic demand and real economic activity.

The other channel is the change in the price of real estate due to the effect of real estate wealth. The fact that the increase in demand should match the supply from the seller's economic factors suggests that the effects of a change in the capital or wealth of the beneficial owners and those who suffer

from higher housing prices may be broadly balanced. There is some evidence that the positive impact of wealth for landlords may overcome the negative impact of consumption on new buyers in the future. Moreover, it is argued that if homeowners do not have credit constraints and believe that the rise in real housing prices is permanent and consistent, the rise in their housing wealth may lead to higher consumption. From this perspective, liquidity and the ability to spend to observe housing assets play an important role (Letaau et al., 2018: 52). Moreover, the impact of changes in real estate prices on real economic activity, and in particular on non-residential consumption expenditure, may be amplified by the effects of confidence and expectations. More specifically, a thriving housing market may be the result of optimism about future income. Since current consumption is mainly related to consumers' feelings, they may also be encouraged to increase their consumption expenditures. Using the utility function of two periods of the person in the first period, which is the period of activity, with earnings and accumulation, they buy a cheap housing unit, and the second period, which is the period of retirement, lives in a flat.

Importantly, the utility function behaves well and the prices of each period are predicted based on the prices of the previous period. The purchased housing unit is sold at the beginning of the second period, and the individual chooses to rent. Studies have shown that the price elasticity of housing demand is larger than the price elasticity of housing supply. At the same time, in the short-run, the price elasticity of housing supply is zero, and as the life span increases, the distance offered gradually increases. At any given time, there is a certain amount of housing that cannot be quickly adjusted in response to a price change. The housing stock represents the total stock of housing in the market at a given time and is measured by the heterogeneity of the housing market based on unit value. In the existing housing market, the intersection of the supply and demand curves determines the price of housing. Since housing is a standard commodity, any increase in price leads to a decrease in demand. Rising housing prices protect property

owners from the risk of depreciation due to inflation. Housing prices rise faster than inflation, increasing the wealth of households that own housing and ultimately their propensity to consume. In the housing industry, rising prices reduce the demand for housing and increase the demand for housing in the stock market, and their net effect depends on their double-digit level. Therefore, the Slavic economy in housing is not comparable to other goods. In addition to the income and substitution effects, there is a third component that determines the sum of the three components as the descending or ascending slope of the demand curve.

Assuming Van Neumann-Morgenstein's Expensive Exercise Function, the Slatski relationship can be described as follows.

$$V_1(x_1, h_1^0, p_1) = \int_{p_2} U[\phi(x_1, h_1^0, p_2)] dF(p_2|p_1) \quad (1)$$

$$\frac{\partial h^0}{\partial p^0} = -h^0 \frac{\partial h^0}{\partial Y} + \lambda \frac{D_{n+1, n+1}}{D} - \left[\sum_{j=1}^n V_{x_j p_0}(0) \frac{D_{j, n+1}}{D} + V_{h^0 p_0}(0) \frac{D_{n+1, n+1}}{D} \right] \quad (2)$$

Where x_1 , h_1^0 , p_1 , p^0 , dF , D , $D_{n+1, n+1}$, $D_{j, n+1}$, and λ are , consumer goods, housing services, consumer price index in the first period, average housing price, and probabilistic distribution function, respectively. The only component of housing price is the matrix cofactor for the components of consumer goods, housing prices, and Lagrange coefficients. Moreover, $V_{h^0 p_0}(0)$ is the same as $\frac{\partial^2 V(0)}{\partial h^0 \partial p^0}$. The two terms on the right-hand side stand for the income effect or weight substitution, as it is called in the standard literature of neoclassical microeconomics. These two expressions describe the effect of the change in housing settlement on the optimal value of housing services offered in the first period in terms of income constraints. The expression in the syllabus indicates the effect of expectations, which is the same effect of the change in price on the value of the services offered by changing the expected utility function. The expected utility function is affected because one of the variables entered is the price of real estate in the

same period. Many of the neoclassical microeconomic analyses are based on Slackwick's relationship and the negative relationship between them.

The intraocular expression is the effect of the price change on the expected utility function, which appears through the expected utility of all consumption goods and housing. Therefore, the sign of the Slattersky equation is ambiguous, and the absence of posting is not a sufficient condition to extract the common results of neoclassical economic theory. For this reason, we cannot be sure that the slope of the housing demand curve is always negative. A positive slope of the housing demand curve is probable. An increase in the price in this period may predict an increase in the price in the next period. Moreover, a positive value of money leads to an increase in housing demand, which is contrary to the usual results in neoclassical economics. Demand is inversely related to current price and directly related to expected future price. In this study, expected prices play an important and crucial role (Gholizadeh, 2008: 110). A summary of the theories of consumption in macroeconomic books is discussed below as part of the theoretical basis of the topic. Keynes believed that various factors influence consumption decisions, but in the short-run, the most important factor is income. In Keynes' consumption function, income is considered as real income. In other words, in the consumption function, real income is the same as income at fixed, constant prices (Mankiw Gregory, 1996: 59).

According to a 1949 model by James Dozenbery, consumer behavior is interrelated and not independent, i.e., two people with the same income but belonging to two different income classes have different consumption behavior. In fact, the person compares themselves with others in that class, and what has a significant influence on his consumption is their status in the social class, not their personal income. This morality is called the imitation or demonstration effect (Rahmani, 2004: 69). Consumption behavior is irreversible over time. That is, spending is sticky and invisible when income declines. This spirit is called the spin-off effect. Milton Friedman (2006-2011) proposed a permanent income hypothesis to justify consumerism. This

hypothesis is complementary to Modigliani's life cycle pattern. Both have relied on Irving Fischer's (1867-1947) theory that consumption should not depend solely on current income, but on the contrary on the life cycle hypothesis, in which he emphasized that income is regular throughout life. This pattern emphasizes that people's income fluctuates over the years. Friedman assumes that people want to maintain their consumption even if their income does not remain the same, and therefore the role of wealth in the consumption function is emphasized. In other words, people relate their consumption behavior not only to the current level of income, but also to long-term spending opportunities.

Each person wants to maximize the utility of consumption throughout their life by considering the income constraints during their life. After Modigliani extracts the consumption function of the individual based on the previous assumption with the horizontal sum of consumption functions, he generalizes the results to the whole society (Georgian, 2000: 49). The effect of a price reduction is to increase financial wealth, especially money and real wealth, which leads to an increase in consumption and is known as the wealth effect or Pigou effect. Wealth as a determinant of consumption levels is explicitly studied in life cycle theory, and it is also implicitly studied in permanent income theory. In other words, consumption is a function of real wealth along with income. Pigou wanted to show that price changes can always restore full employment in a free economy. This means that by lowering the general price level and the constant price of nominal money, people's purchasing power increases. On the other hand, since consumption is a direct function of real wealth, it can be concluded that an increase in purchasing power will increase financial assets and thus actual consumption will increase (Rahmani, 2004: 152). Factors such as decreasing saving motives, increasing wealth, fear of inflation and redistribution of income between households can lead to a shift in the consumption curve. Assets such as available cash or bank deposits, securities, and other cash and

tangible assets such as real estate, real property and durable goods that affect private sector consumption as wealth or assets (Branson, 2008: 66).

In general, Endo and Modigliani's function, which is a function of income and wealth, is defined as follows: $c = \alpha_0 y^l + \alpha_1 a$. α_0 and α_1 are the positive coefficients estimated by Endo and Modigliani. An increase in any income from labor or assets increases current consumption. The definition of assets at the beginning of the period is as follows:

$$a_0 = \sum_0^T \frac{y_t^p}{(1+r)^t} = y_0^p + \sum_1^T \frac{y_t^p}{(1+r)^t} \quad (3)$$

The current income assigned to the asset y_0^p is related to the assets a_0 and enters the consumption function with a positive relationship; consequently, the consumption function is expressed as follows:

$$c = c(y - t(y), a); \quad \frac{\partial c}{\partial (y - t(y))} > 0 \quad \frac{\partial c}{\partial a} > 0 \quad (4)$$

Real consumption increases as the confiscation of income or real wealth increases. Above a certain level of disposable income, an increase in real assets, the increase in consumption must necessarily reduce the deferral, for it is always true that $s + c = y - t(y)$. This applies, moreover, to a general consideration of the deferral that people have in the accumulation of assets. There is no contradiction between the current wealth and the wealth they defer. This is because when there is a sudden increase in wealth, such as an inheritance, individuals feel less need to withhold, and the rate of deferral decreases, so the postback function can be written as follows:

$$s = s(y - t(y), a); \quad \frac{\partial s}{\partial (y - t(y))} > 0 \quad \frac{\partial s}{\partial a} < 0 \quad (5)$$

As a result, above a certain level of disposable income, it declines as the real rate of return on assets increases.

2.2. Background of research

Kai Dong et al. (2021) studied the dynamic relationship between financial leverage, house prices, and consumer expenditure in China. Using the time-varying parameter vector autoregression model with stochastic volatility (TVP-SV-VAR) and the Bayesian dynamic conditional correlational autoregressive conditional heteroskedasticity (Bayesian DCC-GARCH) model, this study analyzes the interaction mechanism and dynamic correlation between financial leverage, house prices, and consumer expenditure (survey data were collected from China's National Bureau of Statistics from January 2000 to December 2019; the financial leverage and consumer expenditure data were obtained from the Wind Economic Database, and the price of commercial real estate was calculated based on the sales volume and area of commercial real estate on the official website of China's National Bureau of Statistics). The empirical results show that an increase in financial leverage significantly increases house prices and decreases consumer expenditure, that an increase in house prices inhibits financial leverage and weakens consumer expenditure, and that an increase in consumer expenditure increases financial leverage and promotes an increase in house prices. Moreover, house price and consumer expenditure are most important, followed by financial leverage and consumer expenditure, and then by financial leverage and house price. Therefore, a systematic analysis of the dynamic correlation among the three variables is of great practical importance for formulating appropriate fiscal policies to stabilize house prices and promote the growth of consumer expenditure. In particular, financial leverage is an important factor in restraining the rise in house prices and the decline in consumer expenditure. Therefore, monetary policy and macroprudential measures should be taken to control the variables of financial leverage and achieve balanced and sustainable development of the national economy in China.

Coskun et al. (2021) estimated the impact of wealth on household final consumption in China. Their study primarily examines the relationship

between wealth effects arising from the stock market and housing market channels and household final consumption for 11 advanced countries over the period from 1970Q1 to 2015Q4. The modeling strategy used is regression analysis using the common correlated effects mean group (CCEMG) estimator as well as Durbin-Hausman cointegration tests and Dumitrescu & Hurlin (2012) causality tests. The study provides various evidences through whole panel and country level analyses. The results show that consumption is mainly explained by income and that housing wealth is positively and significantly correlated with consumption. Overall, the results suggest that real estate wealth, rather than equity wealth, is the main source of consumption growth in advanced countries.

Burrows (2018) proposed an alternative approach to the question of how house prices affect household consumption by focusing on the impact of changes in housing wealth on household mortgage borrowing and saving in the UK. Household-level data are used to derive a measure of expected and unexpected changes in house prices as a first step, which are then incorporated into a recursive bivariate probit model of the decision to take out and save for housing. Both expected and unexpected changes in house prices have a positive effect on the propensity to withdraw equity, but mainly among younger households. Changes in housing wealth do not directly affect household saving for either younger or older homeowners. However, they have an important indirect effect, as they increase the likelihood that the household will withdraw equity, which in turn has a negative impact on household saving.

Athanassiou & Tsouma (2017) investigated the impact of household wealth on consumption expenditure in Greece. Recognizing the distinct and leading role of residential real estate in Greek households' wealth portfolios, they separate the impact of financial wealth from the impact of residential wealth in order to assess the impact of these two wealth components separately. This type of analysis is conducted for the first time for Greece and uses quarterly data for the period 2000-2015, including a novel series on

residential property wealth created for the purposes of the study. The results of the analysis suggest the existence of a statistically significant cointegrating relationship between consumption and wealth, with positive effects on financial and real estate wealth in the long-run. In the short-run, both wealth components seem to play a role in determining consumption, with a stronger impact of real estate wealth.

In Ozer & Tang's (2017) research titled "Analysis of the effects of financial wealth and housing on the consumption of the private sector in Turkey", the variables have been the same. That is, over time they are moving together and have a long-term equilibrium relationship. Using Granger's causality test, they investigated the mutual effects of housing wealth and financial consumption. They replaced housing stock and housing prices with wealth. The time series data for the study period were 1987-2017. The long-run coefficients of disposable income, financial wealth, and housing wealth on consumption were positive and significant. The value for disposable income was 0.90, and for financial and housing wealth was 0.77 and 0.446, respectively, indicating a stronger effect of financial wealth on consumption in Turkey.

Mian et al. (2016) showed that an increase in household leverage to GDP ratio predicted lower subsequent GDP growth, higher unemployment, and negative growth forecast errors in a panel of 30 countries from 1960 to 2012 in the medium-term. Consistent with the "credit supply hypothesis," mortgage spreads predict an increase in household leverage to GDP ratios and a decrease in subsequent GDP growth when used as an instrument. The negative relationship between the change in household leverage to GDP ratio and subsequent output growth is stronger for countries subject to tighter monetary policy constraints, as measured by a less flexible exchange rate regime, proximity to the zero bound, or higher external borrowing. A rise in household leverage to GDP ratio is simultaneously accompanied by a consumption boom, followed by a reversal in the trade deficit as imports collapse. We also detect a global household leverage cycle that partly

predicts the severity of the global growth slowdown after 2007. Countries with a household leverage cycle that is more highly correlated with the global household leverage cycle experience a sharper decline in growth following an increase in household leverage.

Peltonen et al.¹ (2016) used a panel of 14 emerging markets, and using advanced econometric techniques and the GMM method and using seasonal data showed that the wealth effects were statistically significant and relatively large. A 10 percent increase in housing prices leads to an increase in private consumption of between 0.25 percent and 0.49 percent; a 10 percent increase in stock prices is associated with a 0.29 percent to 0.35 percent increase in consumption; and when financial assets increase by 10 percent, consumption increases by 0.41 percent to 0.50 percent. Moreover, the empirical results suggest that: (i) the impact on real estate wealth effects tends to be smaller in emerging Asia, while the impact on stock market wealth tends to be smaller in Latin American countries; (ii) the impact on real estate wealth has increased in emerging Asia in recent years; and (iii) consumption is more responsive to negative than to positive shocks in real estate and financial wealth.

Chu (2016) in a paper titled "the effect of housing on usage" examined the impact of changes in housing prices on household consumption. The results of separate regression estimates using different income groups showed that housing price changes did not have a significant effect on overall household consumption, but households divided into different income groups and the effects of these changes were examined. While the effect of wealth is good for high-income households, there is a negative labor effect for low-income households, and as house prices increase, the positive effect of South Korean wealthy owners will be on the negative income effect of low-income earners.

Matthew Lacqueville (2015) considering the empirical results that movements in housing wealth are associated with movements in

1 . Peltonen, T. A., Sousa, R. M., & Vansteenkiste, I. S.

consumption in the same direction, studied the impact of these movements on consumption. In this study, he distinguished between wealth and housing wealth and used OLS method and first order differential for private sector consumption, housing wealth, and non-housing wealth in the United States for the period 1952Q1-2008Q4. Seasonal time series data and panel data, as well as the regression estimation results, suggest that the shocks and fluctuations in housing and private sector consumption are unidirectional. A \$1 increase in housing wealth increases annual U.S. consumption by about 6 cents, and a \$1 increase in nonhousing wealth increases annual consumption by about 2 cents.

Beatrice et al.¹ (2020) provided an empirical analysis of the role of house prices in determining the dynamic behavior of consumption in South Africa using a panel vector autoregression (PVAR) approach for provincial level panel data covering the period 1996 to 2010. The response of consumption to shocks in house prices was assessed. Rising house prices were found to increase consumption, while falling house prices led to a slight decrease in consumption, indicating an asymmetric effect on consumption. In the self-regression method in this study, they examined dynamic coefficients and cause-effect relationships between groups of variables.

Baiyumi & Edison (2021) estimated the impact of housing wealth and equity using data from wealth components in 16 developed countries over the three decades from 1980 to 2003 and two ways considering market-based financial system and bank-based financial system. They examined the trends and changes in wealth over time. The estimation of the panel model was carried out in two stages. In the first stage, the long-run relationship between consumption and wealth was estimated using the OLS method. In the second stage, the amount of waste or discontinuity from the long-run relationship was accumulated and the results were analyzed using the error correction mechanism. They also argued that the impact of equity and real estate wealth has been increased in a stronger market system and the ultimate desire for

¹ Beatrice, D., & Kengne, K.

consumption of wealth in broader financial systems. The impact of wealth components varies across these countries, but in all countries these impacts are positive and significant.

Within the country, there are very few studies that examine the impact of wealth on the aggregate consumption function. However, there are no studies that have addressed the impact of housing wealth. In the internal research of Imam Gholipour & Agheli (2012), the overall impact of wealth on private sector consumption of Iran using ARDL model and seasonal data from 1996 to 2017Q1 was investigated. All variables of private consumption, fixed income and wealth are fixed at 1997 levels. Physical assets are from the National Central Bank tables. Financial assets also come from the aggregate items of currency and deposits, securities, loans, shares, insurance technical reserves and other claims. The final desire for long-term use of assets is 497.0 and in the short-term, this amount is estimated at 261.0. The results of the error correction model estimation indicate that there is a relatively reasonable adjustment of the short-run disequilibrium towards a long-run equilibrium between private consumption expenditure, tied income and financial assets. The results show that financial assets are less effective than private consumption in terms of disposable income.

Azizi (2009) studied the effect of stock market wealth on private consumption. She used the seasonal statistics from 1771-2007 and tested this impact using co-integration modeling and VECM. The results indicated a significant positive relationship between stock market expansion (current market value of stock market), liquidity and private sector GDP in Iran. The empirical results suggest that consumption is sensitive to monetary policy shocks and stock market shocks, and is sensitive to changes in these areas.

Ahmad et al. (2018) considering the high share of consumption expenditure in aggregate demand, estimating the private sector consumption function and identifying the factors affecting it, the results of these studies suggest that private sector consumption expenditure in the Iranian economy accounted for about 47 percent of aggregate demand on average during the

period under study. Related income is the most important factor affecting consumption in the Iranian economy. Estimates of the private sector consumption function using ARDL model using the annual data from 1969-2010, and concluded that the final desire for long-term and short-term consumption of the private sector of income is able to be 0.49 and 0.37, respectively. On the other hand, real liquidity (as a proxy for the real wealth of society) has a positive significant effect on private sector consumption expenditure, so that a unit increase in real liquidity would lead to an increase in private sector consumption expenditure of about 0.09 units.

Fakhraei & Mansouri (2018) analyzed the long- and short-run consumption function for income groups for the years 1982-2006. The results of the study using OLS show high significance for the final desire to consume Friedman income for income groups. The final consumption goal for the high income group is a constant income of 0.7 and for the low income group, and 0 and 0.85 for the entire group. The short-run estimation of the final consumption target shows that as the final desire for consumption increases in one group, the final desire is reduced to the consumption of the other group.

Zarranejad (2013) studied the main views and attitudes in the field of consumer behavior in general, and especially addressed the famous consumer theories of Keynes, Duznbery, Modigliani, and Friedman. By adopting the permanence hypothesis, Friedman focused on modeling and estimating the consumption function. The Iranian consumption function was estimated using the F-Rhein duality hypothesis, in urban and rural segments, and for unreliable and durable goods during 1983-1987. In the long-run, the final desire to consume in Iran is constant and equal to the general desire to consume. In this study, the objectives of consumption of permanent income were found to be 0.91.

In this study, We measure and analyze the effect of housing assets on private sector consumption in the form of an autoregressive distributed lag (ARDL) econometric model to analyze the short-term and long-term

marginal propensity to consume of permanent income, housing and financial assets for the first time in Iran.

3. Methodology and data set

3.1. Theoretical Model

The model employed in this study to examine the relationship between housing wealth and consumption expenditure was derived from a model established by Yasemin Barlas Ozer & Kam Ki Tang in a 2017 research titled *empirical analysis of financial and housing wealth effects on consumption in Turkey*.

Many factors affect private sector consumption, which can be related to these factors in terms of functional form: $C = F(Y, A)$. In fact, wealth is actually in the general form, and can be distinguished as follows: $A = K + R + B$.

K corresponds to the value of the capital stock, measured by the total value of the shares plus the value of the inventory of buildings, land, and consumer durables.

R corresponds to the value of people's reserves with the central bank, i.e. the part of the money supply that the government is indebted to the private sector.

B is the monetary value of the government bonds (which the government has sold to the people). The part of the money supply that is held in reserve at the central bank is considered an asset since the rest of the money supply represents the claims of the non-bank sector (people) on commercial banks as deposits (not reserves) (Branson, 2018).

It is also possible to divide wealth into three groups of real, financial, and human assets. With these explanations, we can estimate the model in terms of a long-run model and a short-run model as follows

$$\text{Log}C_t = \beta_0 + \beta_1 \text{Log}Y_t^d + \beta_2 \text{Log}FW_t + \beta_3 \text{Log}HW_t + \varepsilon_t \quad (6)$$

This model concerns high private sector consumption, disposable income, total financial assets, and real estate assets. It relates to the long-run equilibrium coefficients as well as to the disturbance component of the model.

In the model, to evaluate the short-run dynamics of the consumption function, the form *MEC* is expressed as follows:

$$\begin{aligned} \Delta \log C_t = & \delta_0 + \sum_{k=1}^4 \delta_{1k} \Delta \log C_{t-k} + \sum_{k=0}^4 \delta_{2k} \Delta \log Y_{t-k}^d + \\ & \sum_{k=0}^4 \delta_{3k} \Delta \log FW_{t-k} + \sum_{k=0}^4 \delta_{4k} \Delta \log HW_{t-k} + \\ & \sum_{k=0}^4 \delta_{5k} RIR_{t-k} + \delta_6 \Delta ADR_t + \delta_7 D_{94} + \delta_8 D_{01} + \delta_9 D^S + \gamma \varepsilon_{t-1} + \mu_t \end{aligned} \quad (7)$$

In the above model, the short-run coefficients are the deviation from the last long-run equilibrium. In addition, the virtual variables of the model under consideration are the RIR of the real interest rate— the ADR of the age dependency ratio in the time constant trend.

3.2. Data and Variables

The variables include private sector consumption (C), permanent income (A), real estate assets (h), and financial assets (which include stocks, shares, time deposits and notes, and coins in the balance sheet account of the central bank). The data is the period from 1985 to 2020. Moreover, all variables were fixed to 2020. It is noteworthy that the variable of permanent income can be obtained using different methods, such as weighted average method, average of past periods, moving average, etc. However, some of these methods, such as weighted average, can be used if sufficient time series observations are available. In this study, we derive the sum of gross national income of the previous period, the current period and the next period, which is an applied method to convert national income into permanent income. The housing sector is one of the most important sectors of the country's economy. Therefore, it has always been a major concern of the governments to regulate the housing market. In the last four decades, the housing sector has always been characterized by ups and downs. Rising land and housing

prices, speculation in the housing market, lack of use of new technology in construction, etc. have been the major problems in this sector. Another variable is the use of real estate as a housing asset. The data comes from the capital account balance of the Central Bank in billions of rial. All model variables are applied logarithmically. Given the logarithmic model, the coefficients obtained indicate the elasticity of the explanatory variable with respect to the dependent variable. The logarithmic variable is the constant income difference of housing income due to the high linearity between permanent income and housing income. The variable examines consumption.

4. Analysis of the results

In regression, to avoid spurious regression, it is necessary to first test the stationarity of the variables. Table 1 summarizes the results of the augmented Dickey-Fuller test.

Table 1. The results of the augmented Dickey-Fuller test for investigating the stationarity of the research variables

Variable	Dickey-Fuller statistics	Critical value at %5 confidence level	Reliability status
Ln(C)	3.77	-2.96	Mana I(1)
Ln(yp-h)	-5.18	-2.96	Mana I(1)
Ln(h)	-5.16	-2.96	Mana I(1)
Ln(wf)	-1.62	-3.57	Mana I(1)

Note: The critical value of Mackinnon statistics at %5 significance level

Source: Research findings

According to the results of the table and the value of the Dickey-Fuller test, all variables were stationary with a one-time difference. In general, methods such as Engel-Granger are not valid in studies dealing with small samples (small number of observations) due to the absence of dynamic short-run responses between variables, as their estimates are not biased and

therefore hypothesis tests with ordinary test statistics such as t are not valid. Therefore, the use of models with short-run dynamics is considered, which lead to a more accurate estimate of the coefficients of the model by the software Microfit is employed .the outputs if the microfit software in short-term and by determining the optimal intervals according to the Schwartz-Bayesian (SBC) criterion:

Table 2. Results of short-run estimation of dynamic ARDL (1,1,1,3) model

Probability	T statistic	Coefficient	Variable
0.00	4.93	0.51	LC(-1)
0.00	8.37	0.58	L(y-ph)
0.00	10.27	0.59	Lh
0.001	3.90	0.022	Lwf(-3)
0.05	2.01	0.68	C
D-W= 2.18	$R^2= 0.997$	h -Durbin=0.593	F= 860.498

Source: Research findings

According to Table 2 and the estimation model above, the logarithm of constant income is 0.58 percent, which is positive and significant, indicating that consumption increases by 0.58 percent for a 1 percent change in permanent income. The logarithm of housing wealth is also positive and significant, indicating that consumption increases by 0.59 percent for a 1 percent increase in housing wealth, and the coefficient of variation of financial wealth with a lag of 3 has a positive effect on consumption. It is 0.02, and the interpretation of this coefficient is that for a 1 percent increase in financial wealth, consumption increases by only 0.02. The F-statistic indicates the significance of the entire regression. Before estimating the long-run coefficients and error correction models, to ensure the validity of the model, the necessary diagnostic tests (t) (including tests for non-autocorrelation, lower-order shape correction, normality of error rates, and non-variance of variance) are presented in Table 3. According to the F and LM statistics of the estimated model at the 5 percent level, it has no

problems with autocorrelation, variance heterogeneity, and explicit form, and its error terms are normally distributed.

Table 3. Results of diagnostic tests for the ARDL (1,1,1,3) model

Test	Statistics	
	LM	F
SC: No autocorrelation	0.50314[0.478]	0.31107[0.584]
FF: Subsidiary form clarification	1.3578[0.244]	0.86640[0.385]
N: The normality of the residual sentences	2.6429[0.267]	Not applicable
H: Inequality of variance	0.41413[0.520]	0.39032[0.538]

Note: The numbers inside the bracket indicate the probability values.

Source: Research findings

The t-statistic for the convergence test can be calculated as follows:

$$T = \frac{\sum_{i=1}^p \alpha_i - 1}{\sum_{i=1}^p s_{\alpha_i}} = 4.63 \quad (8)$$

Where the fraction represents the sum of the coefficients of the dependent variable minus one and the denominator of the fraction represents the sum of the standard deviation of the coefficients of the dependent variable. Performing this test yields a value of $t = 4.63$, which, being larger than the t -value in Banerjee, Dolado, and Master's table, assumes the null hypothesis of no long-run relationship and its existence. The results of the long-run relationship can be found in Table 4.

Table 4. Results of the estimation of the long-term pattern

Probability	T-statistic	Coefficient	Variable
0.000	9.31	0.65	Lyph
0.000	8.56	0.73	Lh
0.135	1.57	0.027	Lwf
0.014	2.71	1.41	C

Source: Research findings

From Table 5, it can be seen that the error correction model (ECM) is negative, which is statistically significant and as expected -0.48, which can be inferred from this statement. The error is corrected by 48 percent of the short-run disequilibrium for each period to reach the long-run equilibrium. In other words, this coefficient indicates that any disequilibrium in the long-run is corrected by a 48 percent change in consumption. The speed of adjustment in the model is relatively high, and we can hope for the effect of these factors on short-term consumption.

Table 5. Error correction model (ECM) estimation results

Probability	T-statistic	Coefficient	Variable
0.00	8.37	0.58	lyphd
0.00	10.27	0.59	DIh
0.02	-2.39	-0.01	DIwf
0.05	2.01	0.67	Dc
0.00	-4.63	-0.47	ECM(-1)
-	D-W= 2.18	$R^2= 0.91$	F(6,21) 32.86 [0.00]

Source: Research findings

5. Conclusion

According to the results, all coefficients are positive and significant and in line with expectations. The short-term marginal propensity to consume of permanent income is 0.55, which means that a one percent change in permanent income increases consumption by 0.55 percent. The long-term marginal propensity to consume of permanent income is 0.62.

The short-term marginal propensity to consume of housing assets is 0.56, indicating that a one percent change in housing assets increases consumption by 0.56. The long-term marginal propensity to consume of housing assets is 0.70. The short-term marginal propensity to consume of financial assets is 0.007, which means that a one percent change in financial assets increases consumption by 0.007. The long-term marginal propensity to consume of financial assets are the same. The model employed is ARDL model,

financial assets become significant at the third lag, indicating that financial assets have no effect on consumption in the first year but drives consumption in the third year. According to the results, the negative coefficient of error (ECM) is statistically significant and should be -0.48, which can be inferred from this error. In each period, 48 percent of the short-run disequilibrium is adjusted to reach a long-run equilibrium. In other words, this coefficient indicates that any disequilibrium in the long-run is mitigated by a 48 percent change in consumption. The speed of adjustment in the model is relatively high, and one can hope for the effect of these factors on short-run consumption.

- It is recommended that the government intervene in the pricing of capital and financial assets, especially residential real estate and land, which can affect residential and non-residential wealth and change consumer behavior through the wealth channel.
- Providing policy solutions to reduce asset market volatility and uncertainty in entering these markets, particularly the housing market.
- Development in the housing market due to the increasing importance of housing wealth for macroeconomic stability and stronger supervision to prevent housing bubbles and speculative behavior in the housing market.

References

- Abbasinejad, H., and Tashkini, A. (2013). *Applied Econometrics (Advanced)* (2nd Ed.). Tehran: Noore Elm. (In Persian)
- Ahmad, M., Tashkini, A., & Suri, A. R. (2018). Estimating the Consumption Function of the Private Sector in the Iranian Economy. *Journal of Economics*, 8(1): 15-39. (In Persian)
- Athanassiou, E., & Tsouma, E. (2017). Financial and Housing Wealth Effects on Private Consumption: The Case of Greece. *South-Eastern Europe Journal of Economics*, 1: 63–86.

- Azizi, F. (2009). The Effect of Wealth Change in the Stock Market on Private Sector Consumption Expenditures (Case Study: Iran 2007–2008). *Journal of Economic Sciences*, 9(2): 61–82. (In Persian)
- Branson, W. H. (2008). *Macroeconomic Theory and Policies*. Translated by A. Shakeri. Tehran: Ney Publication. (In Persian)
- Burrows, V. (2018). The Impact of House Prices on Consumption in the UK: A New Perspective. *Economica*, 85: 92–123.
- Central Bank of the Islamic Republic of Iran (2020). *Serial Information of Economic Accounts*. Retrieved from www.cbi.ir. (In Persian)
- Coskun, Y., Atasoy, B. S., Morri, G., & Alp, E. (2018). Wealth Effects on Household Final Consumption: Stock and Housing Market Channels. *International Journal of Financial Studies*, 6(2): 1–32.
- Dong, K., Chang, C.-T., Wang, S., & Liu, X. (2021). The Dynamic Correlation among Financial Leverage, House Price, and Consumer Expenditure in China. *MDPI Sustainability Journal*, 13: 1–18.
- Fakhraei, S. E., & Mansouri, S. A. (2007). Estimation of Long-Term Consumption Function by ARDL Aggregate Method and Calculation of Short-Term Consumption Relationship in Iran. *Quantitative Economics Quarterly*, 5(2): 23–38. (In Persian)
- Georgian, I. (2000). *Macroeconomics and Theories and Macro-Policies* (1st E.). Tehran: Institute for Business Studies and Research.
- Gujarati, D. (1999). *Fundamentals of Econometrics* (2nd Ed.). Translated by H. Abrishami, Vol. 2. Tehran: University of Tehran. (In Persian)
- Imam Gholipour, S., & Agheli, L. A. (2012). The Impact of Wealth on Private Consumption in Iran. *Quarterly Journal of Economic Modeling*, 6(18):, 61–81. (In Persian)
- Jafari Samimi, A., Elmi, Z., & Hadizadeh, A. (2007). Factors Affecting the Behavior of Housing Price Index in Iran. *Iranian Economic Research*, 9(32): 31–53. (In Persian)

- Mankiw, G. (1996). *Macroeconomics 2*. Translated by H. R. Baradaran Shoraka and A. Parsian. Tehran: Allameh Tabatabaei University. (In Persian)
- Mian, A. R., Sufi, A., & Verner, E. (2016). Household Debt and Business Cycles Worldwide. *Quarterly Journal of Economics* 132(4): 1755–1817.
- Ozer, Y. B., & Tang, K. K. (2017). An Empirical Analysis of Financial and Housing Wealth Effects on Consumption in Turkey. *MRG Discussion Paper Series from School of Economics*, University of Queensland, Australia.
- Peltonen, T. A., Sousa, R. M., & Vansteenkiste, I. S. (2016). Wealth Effects on Household Consumption. *International Review of Economics and Finance*, 24: 155–66.
- Gholizadeh, A. A. (2020). Housing Asset Demand, Theoretical Foundations and Policy Applications. *Journal of Program and Budget*, 42: 57–80. (In Persian)
- Gholizadeh, A. A. (2021). *Housing Economics: Theoretical Foundations and Application*. Hamadan: Bu Ali Sina University. (In Persian)
- Gholizadeh, A. A. (2018). *Housing Theory in Iran in Simple Words*. Tehran: Noore Elm. (In Persian)
- Rahmani, T. (2009). *Macroeconomics*. Tehran: Baradaran Publications. (In Persian)
- Souri, A. (2013). *Econometrics with the Application of Eviews 8* (5th Ed.). Tehran: Publishing of Cultural Studies Publications. (In Persian)
- Statistics Center of Iran (2020). *Serial Accounts and Statistical Yearbooks*. Retrieved from www.amar.org.ir.
- Tashkini, A. (2015). *Applied Econometrics with the Help of Microfit*. Tehran: Dibagaran Publications. (In Persian)
- Zarranejad, M. (2013). Estimation of Consumption Function of Consumer Goods for Two Groups of Urban and Rural Households in Iran in the Period 1993–1998. *Iranian Economic Research*, 5(16): 23–46. (In Persian)