



How does housing wealth affect household consumption? Evidence from macro-data with special implications for China[☆]

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ABSTRACT

Thanks to four-decade spectacular economic growth, China's households have been accumulating a stockpile of wealth. In such a context, further concerns have been raised about the relationship between wealth accumulation and improvement of economic well-being, mainly through consumption. The issue becomes even more important when considering the challenges facing China in recent years, which can be characterized by a mix of increasingly leveraged households, escalating housing price, sluggish consumption, slowing economic expansion, trade frictions with the United States, and the Covid-19 pandemic and resulting economic difficulties. With that background in mind, this paper first provides international evidence on the relationship between household consumption and wealth, especially in the form of houses. Drawing on a panel of aggregate data for fourteen countries including China, we find that household consumption positively responds to changes in housing wealth, and this link is further affected by different levels of government spending and financial development. We next relate the international evidence to the case of China, with the focus on some recent policy issues over housing regulations and consumption promotion. Importantly, as the evidence and underlying theories suggest, housing wealth-consumption association does not follow a simplistic pattern, and thus, multiple policy measures could and should be undertaken rather than merely curbing speculative activities in real estate exchanges and associated financial business.

1. Introduction

Without loss of generality, housing issues in China can be read as a tale of love-and-hate in view their manifold implications for macroeconomic performance, financial stability, and household welfare. On the one hand, thanks to the real estate reform starting in the late 1990s, dwelling assets have become the most important store of value for Chinese households.¹ As shown by a research team from National Institution for Finance and Development (NIFD for short; see [Li et al., 2018](#), and [Li, 2018](#)), on a per capita basis, the average market value of housing assets is about 17,858 USD in 2016, which accounts for about 46% of total household assets, 54% of net worth (total assets net of liabilities), and about five times of annual personal disposable income. As shown in [Fig. 1](#), dwellings in other countries such as the United States (US), France, Germany, and the United Kingdom (UK), constitute also, but to a lesser extent,

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¹ See [Chamon and Prasad \(2010\)](#) for a brief review of the housing reform in China.

one of the major items in the households' wealth holdings. In the meanwhile, with strong policy supports from local governments, real estate investment has soared since the sector was once defined as one of 'pillar industries' of the national economy in a State Council Notice issued in 2003.² It seems to be the case given the fact that according to the National Bureau of Statistics of China (NBSC), the ratio of 'investment in urban real estate development' to 'total investment in fixed assets' has risen to 11.3% in 2016 from 7.3% in 1998; and the share of 'real estate' sector in national value added measured by GDP was up to 6.5% from 4.0% over the same period (National Bureau of Statistics, 2017). As a consequence, the dwelling conditions in China have also been greatly improved since the inception of housing reform. Again, according to the same data source, the per capita living space has increased from 9.3 to 36.6 sq. m for urban residents and from 23.3 to 45.8 sq. m for their rural counterparts over the past two decades around (National Bureau of Statistics, 2017).

Nevertheless, the housing activities have also their dark side. If we continue narrowing our focus on China, the challenges posed by the prosperity in real estate seem more serious than in other countries, given the slowdown of economic growth and sluggish household consumption over the past six years or so (see Fig. 2). In particular, high returns on housing investment implies that capital and other resources have increasingly been allocated from other economic activities, such as manufacturing and research and development (R&D), toward real estate and the related financial business - sometimes with speculative motives. For instance, as documented in recent research on the Chinese case, the boom in housing market has significant deterring effect on corporate total factor productivity (Lu, Tan, & Zhang, 2019), and brings about misallocations of resources, especially capital, among heterogeneous producers (Wu, Heerink, & Yu, 2020).

Moreover, the escalating housing price may also deteriorate the competitiveness of doing business in some major cities, especially in the so called first-tier cities like Beijing, Shanghai, Guangzhou, and Shenzhen.³ No need to mention that the local residents in those cities are not only benefiting from the housing boom to accumulate their wealth rapidly, but also are bearing the consequences of ever higher living costs. To tackle these problems, the real estate market has formed the object of a series of intensive regulations and macro-control policies issued by the central and local authorities as the market prospers, especially since the concept that 'housing is for living in, not for speculation' was proposed in the Central Economic Working Conference, in December 2016. Although for the time being the real estate development and exchanges show some signs of calming down recently (roughly since mid-2019), housing still remains one of the top policy agenda as China is seeking to build a prosperous and sustainable real economy based on innovations and domestic consumption, rather than asset bubbles and external demand. Notably, this deep structural transformation seems to become unprecedentedly exigent in view of a possible reversal of globalization driven by China-US trade frictions and, more recently, the pandemic of Covid-19. In the new context, the issue of boosting domestic consumption while containing real estate-related risks has taken on new importance. However, to some extent, the current strategy of housing market regulations in the country leads to some misunderstanding about the motivations for buying and holding houses on the one hand, and about the wealth-consumption relationship on the other hand. In particular, the view is not uncommon that housing wealth accumulation necessarily crowds out household consumption. It would cause overly simplistic policy initiatives addressing these complex issues.

Despite some national characteristics, the macroeconomic effects of housing in China could also be understood in a broader context. From a theoretical perspective, as suggested in the framework of permanent income / life cycle hypothesis, in the presence of borrowing constraints or precautionary saving motive, the accumulations of housing assets substantially affect household consuming/saving behavior, mainly through the so called positive 'wealth effect' and the negative 'crowding out effect' (or 'substitution effect'). However, once confronting with real-world data, which effect dominates becomes an empirical question. As will be reviewed in the next section, a large body of empirical literature, based on either national or international data, has addressed this topic without drawing conclusive results. Despite all this, one may still conclude that whatever the quantitative findings, policies do matter in the mechanism through which housing wealth affects consumption and other macroeconomic aggregates. Thus, there is always a large room for policy makers to fully exert the advantages of a prosperous real estate market without discouraging household consumption.

With the above understanding in mind, it is necessary to revisit the open question of how wealth, especially housing wealth, affects consumption by taking a broader empirical perspective. Specifically, our paper, being among the first studies to draw on international macro-level data on wealth instead of asset prices, provides new evidence in taking into account various factors and mechanisms affecting the wealth-consumption relationship. Besides, with the help of panel analysis, we also investigate whether China is a special case in the story. Next, the empirical findings are further related to the relevant policy issues in China, with the emphasis on the recent housing regulations and consumption promotion policies in the new national and global context.

The rest of this paper is organized as follows: Section 2 summarized the related literature and theoretical frameworks on wealth-consumption relationship. Based on a panel of fourteen countries including China, Section 3 econometrically examines how the wealth affects household consumption, with the focus on the roles of housing and financial wealth. From a policy perspective, Section 4 discusses the implications of the empirical findings for China. The last section concludes.

² See 'the State Council Notice about promoting sustained and healthy real estate market': http://www.gov.cn/zwgg/2005-08/13/content_22259.htm.

³ For illustration, according to NBSC, as of December 2019, the price index of new dwellings in Beijing, Shanghai, Guangzhou, and Shenzhen increased by 44.6%, 49.7%, 56.3%, and 51.2% compared to 2015, respectively. Also see Li and Wu (2014) for the effect of housing price on entrepreneurship activities in China.

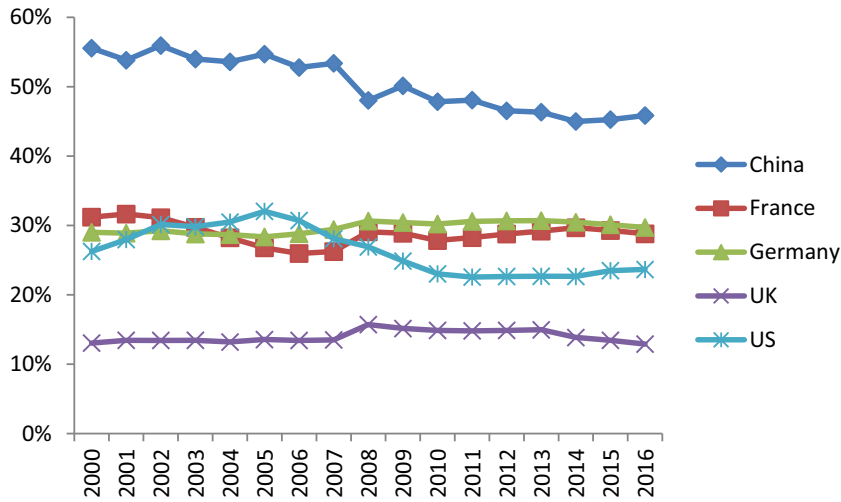


Fig. 1. Dwelling Assets as Percentage of Household Total Assets (2000–2016).
 Note: See Appendix 1 for data sources.

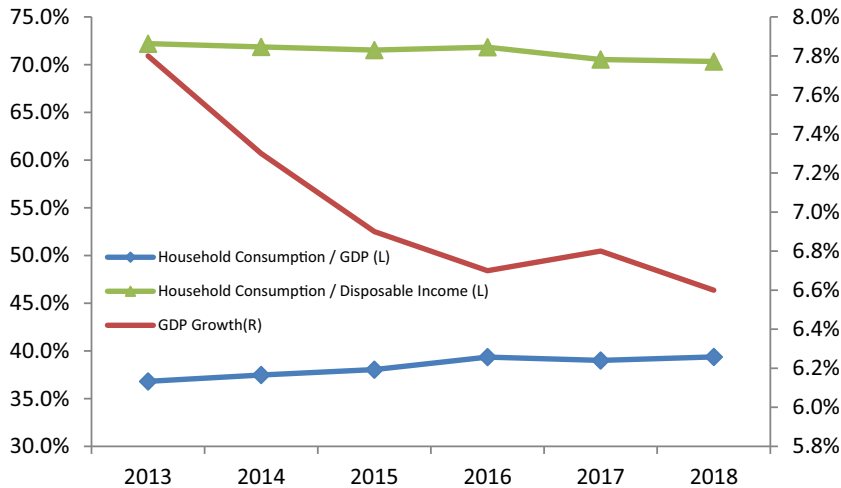


Fig. 2. Household Consumption and GDP Growth in China (2013–2018).
 Notes: 1. Data source: NBSC.
 2. Ratio of consumption to disposable income is calculated based on household survey conducted by NBSC

2. Literature review

Early work by Franco Modigliani (1970) found that a one-dollar increase in wealth (with fixed labor income) leads to an increase of five cents in consumer spending, which is named as ‘wealth effect’. In this spirit, a large body of literature examines how wealth affects household consumption, with a focus on housing wealth - a major component of household asset holdings. From a theoretical perspective, wealth and consumption may be connected in a complex way, such as through four key channels including ‘pure wealth effect’, precautionary saving motive, borrowing constraint, and spending on home-related items. However, not all these are found significant or distinguishable in country-specific cases and over different periods of time. Moreover, the depth of financial development, demographic factors, economic growth perspectives, and other socioeconomic factors also have impact on wealth-consumption relationship. In particular, given the undergoing market transition and other deep structural changes such as rapid urbanization, one may expect a more complex nexus between wealth and consumption in China than in mature markets.

2.1. Four channels of wealth effect

First, the pure (or direct) wealth effect of housing assets on consumption has received a lot of attention among academia. The standard theories of consumption based on either ‘permanent income hypothesis’ or ‘life-cycle hypothesis’ imply that households

adjust their consumption according to their permanent income or lifetime wealth. When unexpected price hike raises housing wealth, households tend to raise their expectations of permanent income / lifetime wealth, thus spend more each period, but not so much, to smooth consumption over their entire life cycle. [Campbell and Cocco \(2007\)](#) provide supporting evidence for this argument in the case of UK, where housing prices have significant positive effects on consumption for elderly homeowners whereas have no effects on younger renters. Other supporting evidence can be found in [Muelbauer and Murphy \(1990\)](#), [Case, Quigley, and Shiller \(2005\)](#), [Gan \(2010\)](#), and [Carroll, Otsuka, and Slacalek \(2011\)](#).

Second, the wealth can also affect consumption through the channel of precautionary saving motive. In particular, serving as a buffer, the increase in wealth will reduce the households' need for precautionary saving and thus stimulate their current consumption (see [Carroll & Kimball, 2006](#), for review of literature). For instance, [Gale and Sabelhaus \(1999\)](#) point out that capital gains from housing, even unrealized, may alleviate the fears about the lack of savings for retirement or other purposes, and thus, can also be measured as savings. This argument partially explains the puzzling decline of US personal saving rates during the late 1990s. [Gan \(2010\)](#) also attributes the precautionary saving channel to be the main driver of notably consumption sensitivity to housing prices in Hong Kong, China. Since refinancing is costly and uncommon there, stronger consumption responses to housing return in less constrained households are empirically observed. Relatedly, using survey-based US household data, [Sheiner \(1995\)](#) finds that the renters facing higher down payment requirements to buy houses in the future tend to augment their saving.

Third, since wealth, especially dwellings, may serve as collateral and thus have an impact on households' consumption by, for instance, increasing their borrowing capacity when the home value increases. It is clear that the extent to which this channel is at work depends greatly on how difficult the homeowners refinance their mortgages. In this regard, one may refer to [Aron and Muellbauer \(2006\)](#), who empirically examine the propensity to consume out of wealth for the households in the UK and South Africa, and find the availability of collateral-backed loans has significant impact on the consumption behavior. In a similar vein, [Campbell and Cocco \(2007\)](#) also use UK micro data and show that the households who are initially subjected to more borrowing constraints tend to consume more following an increase in housing price. Moreover, using US data at county-level, [Mian, Rao, and Sufi \(2013\)](#) provide direct evidence for this channel that the household consumption positively responds to the housing net worth shock, which is further closely correlated with their credit constraints at the onset of the Great Recession of 2008. In a recent study, [Aladangady \(2017\)](#) draws similar conclusions by relating the debt-service ratios of the US households to their marginal propensity to consume out of housing wealth.

The fourth channel, somewhat less discussed in the literature, points to the consumption spurred directly by the home purchase. Recent studies reveal that buying a home could induce considerable spending on home improvements and related durable goods. For example, [Benmelech, Guren, and Melzer \(2017\)](#) find that US households spend additional \$3700 on average over the span of 15-month prior to and after the house purchases, and provide no evidence for a comparable decrease in spending on non-durables. Similarly, [Best and Kleven \(2018\)](#) estimate that a house transaction in UK triggers an extra expenditure as large as 4.8% of the house value on repairs, durables, and services such as estate agent fees and other commissions. More recently, using micro survey data about urban households in China, [He, Ye, and Shi \(2020\)](#) show that the propensity to consume durables is greater than that for nondurables. These results can be read, albeit indirectly, as supportive evidence for the wealth effect on the consumption of home-related items.

In addition to all these channels, some scholars cast doubt on the causal relationship between wealth and consumption. According to them, in many cases, the co-movements of asset price and consumption are simply driven by a common macroeconomic factor that affects them in the same direction. For instance, a productivity growth that makes households optimistic with future income may increase consumption as well as housing prices (thus, value of housing wealth). Besides, the financial liberalization that eases credit conditions for both mortgages and consumer loans may play a similar role. This mechanism due to some third factor has been empirically shown by [Attanasio and Weber \(1994\)](#), [Lettau and Ludvigson \(2004\)](#), [Attanasio, Blow, Hamilton, and Leicester \(2009\)](#), and [Browning, Gortz, and Leth-Petersen \(2013\)](#).

Moreover, there are still some other factors that may affect the correlation between wealth and consumption. For instance, as [Sinai and Souleles \(2005\)](#) point out, homeownership in the US is significantly motivated by the hedging of rent / asset price risks. They also find that households with strong bequest motive, which are often affected by tax law, may prefer to hold appreciated housing assets until death. In these cases, the housing price fluctuations, however large they are, would have no major impact on their consumption choices.

2.2. The case of China

Regarding the case of China, it seems difficult to reconcile the extremely high household saving rates (see [Fig. 2](#)) with the demographic transition and low real interest rates experienced over the past few years. For instance, [Chamon and Prasad \(2010\)](#) show a distinct U-shaped pattern of savings over Chinese urban households' life cycle, wherein the younger and older cohorts have the highest saving rate. In particular, young households not owning a home is associated with 4–7% higher saving rates than the young homeowners in China. To a large extent, their findings, which are sharply opposite to the traditional 'hump-shaped' curve with saving rates peaking at the middle age when earnings potential is the highest, point to the precautionary saving motive related to market economy transition and underdeveloped domestic financial system in China. More specifically, on the one hand, the uncertainty of future income during the economic transition, and rising financial burdens of education, health, elderly care, and housing in household expenditures justify their precautionary behavior. On the other hand, the current financial and land systems provide limited investment options or stores of value other than holding real estate, and also gives insufficient financial support for consumption smoothing. Thus, putting them all together, the positive wealth effect on consumption, which are empirically supported by many studies reviewed above, may not be the case in China.

Indeed, a number of empirical works on China identify a negative or insignificant relationship between housing wealth (almost all proxied by housing prices) and consumption both at the household level and at the city level. For instance, based on Chinese Household Financial Survey 2011 (CHFS 2011), [Li and Huang \(2015\)](#) find that rising housing prices contributes to households' decision of purchasing multiple residential properties, and raises saving rates. However, using a different dataset, namely the Urban Household Survey (UHS) 2008 and 2009 conducted by NBSC, [Li and Chen \(2014\)](#) find no significant wealth effect in China, not only for subsample of homeowners with one or multiple residential properties, but also for subsample of homeowners with full or partial ownerships of residential properties. In addition, based on the monthly credit and debit card transactions at the city-level from 2011 to 2013, [Waxman, Liang, Li, Barwick, and Zhao \(2020\)](#) show that the housing price elasticity of consumption is large and negative in urban China, which is driven by strong investment incentive in housing and financial constraints faced by households.

Nevertheless, there are also some studies that present contrary evidence. Among others, [Zhang and Cao \(2012\)](#) using CHFS 2009 data, and [Li and Liu \(2019\)](#) using China Family Panel Studies (CFPS) 2014 data, both find significant positive effect of housing wealth on homeowners' non-housing consumption, and the wealth effect of housing assets are at least as large as that of financial assets in urban China. Based on city-level data, [Dong, Hui, and Jia \(2017\)](#) document a nonlinear relationship between housing price and household consumption, which results from some threshold effects of heterogeneous financial market conditions.

2.3. Micro versus macro data

With respect to the type of dataset, the existing literature related to the topic can be roughly divided into two streams: micro-level analysis using household survey data such as most studies reviewed above, and macro-level analysis using aggregated data.

Clearly, the advantage of conducting a micro-level analysis lies in the richness of the information about the heterogeneity of household behavior attributed to, among many others, age, income/wealth level, marital status, and access to financial services. However, it is common that the micro-level survey is conducted for only a few periods of time (namely, a small T) and for many families/individuals but within a single country/ region. In particular, as previously noted, the studies on China often focus on one single year or a rather short timespan (often for only two or three years, such as [Li & Chen, 2014](#)). In consequence, the strand of research based on micro data has difficulty identifying both time and country specific characteristics. In addition to this shortcoming, since the surveyed families often change over time, and thus, in this case one has to work with pseudo-panel instead of genuine panel.

Although using aggregated data cannot, in general, identify the cohort-specific characteristics and may also mute the effects resulting from different channels, it allows for international and time series comparison. To the best of our knowledge, studies of this kind appear less common, but some examples are noteworthy. At an international level, [Case et al. \(2005\)](#) find strong correlation between aggregate house prices and consumption in a panel of developed countries during the period of 1980s and 1990s. Their findings are further supported by [Peltonen, Sousa, and Vansteenkiste \(2012\)](#), who work on a panel of emerging market economies including China over 1975–2008. The latter also show that financial development exerts a remarkable influence on the relationship between asset prices (house and stock) and consumption. Likewise, the asset price effect on consumption is also examined in [Shen, Holmes, and Lim \(2015\)](#), which take a Panel VAR approach to a sample of OECD (Organisation for Economic Co-operation and Development) countries. Interestingly, they not only provide supportive evidence for a positive wealth effect, but also show how the household consumption responds to asset price shocks over time. Moreover, aggregated data are also applied to subnational investigations. For instance, [Lettau and Ludvigson \(2004\)](#) conduct a time-series analysis based on US quarterly data over the period of 1951–2003, and find no effect of the transitory innovations in household net worth on aggregate consumer spending.

To summarize, empirical studies based on either micro or macro data generate mixed results across countries and even within an

Table 1
Summary statistics of key variables (in %).

Countries \ variables	Household consumption / GDP	Housing wealth / GDP	Housing wealth/ total assets	Financial wealth / GDP	Liabilities-to-financial assets ratio
Australia	57.0	104.5	18.6	115.5	43.5
Canada	56.5	84.9	18.7	166.2	30.9
China	39.5	197.7	50.4	154.5	14.5
France	54.4	139.6	30.2	133.9	29.5
Germany	56.1	130.4	29.6	110.2	36.5
Italy	59.9	268.2	48.9	184.9	18.8
Japan	55.9	70.2	13.1	240.1	20.6
Korea	50.4	95.2	17.7	100.2	46.3
Netherland	47.4	102.1	20.7	166.1	40.0
New Zealand	58.0	223.4	43.2	224.6	22.2
South Africa	59.6	57.3	20.8	111.4	25.4
Sweden	46.9	55.8	20.7	98.9	42.3
UK	65.6	70.7	14.0	202.4	29.2
US	63.6	121.0	26.0	246.4	20.4
Sample average	56.1	113.1	25.3	165.7	29.4

Notes: 1. Household consumption and GDP data are sourced from World Development Indicators (WDI), World Bank; sources of wealth data are presented in Appendix 1. 2. Sampled period averages for each variable.

Notes: 3. Housing wealth, financial assets and liabilities are defined in the national balance sheet accounts in corresponding country; financial wealth equals the difference between financial assets and liabilities.

individual country like China. One may, however, draw two common features from the existing literature: (i) The wealth-consumption relationship does not follow a simplistic pattern, and many factors, especially financial conditions, play important roles in the story. (ii) Housing wealth effect on consumption, if any, appears to be more pronounced than financial wealth effect.

3. Empirical framework

As noted above, regarding quantitative analysis, this paper differs from the most current studies by using the macro-level wealth data rather than asset price indexes as proxy variables of housing and financial wealth, while it is common of practice for cross country analyses (see Case et al., 2005, Ciarlone, 2011, Peltonen et al., 2012, Sonje, Casni, & Vizek, 2014, and Shen et al., 2015). To a large extent, it allows us better capture the changes in assets\wealth, which may also be driven by factors other than changes in price, such as enlargement of living spaces and expansion of urban dwellings because of urbanization.

The aggregate wealth data come from the household balance sheet accounts of the sampled countries including Australia, Canada, France, Germany, Italy, Japan, Korea, Netherland, New Zealand, South Africa, Sweden, UK and US. Exceptionally, since China has not released the official statistics of national/sectoral balance sheet accounts, we draw on the aforementioned estimates provided by the research team of NIFD (see Li et al., 2018, and Li, 2018). Moreover, it is important to stress that the selection of the sample is purely due to data availability. In particular, housing wealth data are lacking for most countries. It could be the main reason why much of the research on similar topic relies also on a small sample of countries. However, there seems to be no relationship between the data availability and the wealth-consumption association. Thus, our regressions are unlikely affected by the sample selection bias. In addition, thanks to the inclusion of some major developed and emerging market economies, this small sample, representing about two third of global GDP, is still indicative of the general picture.

Before embarking on econometric investigations, descriptive statistics of some key variables are summarized in Table 1. Clearly, among the sampled countries, China's households consume the least relative to GDP and borrow the least relative to financial assets such as cash, deposits, and securities. In addition, as briefly mentioned above, housing wealth constitutes the most important item in the total assets of households in China (more than half). Importantly, it is noteworthy that the statistical standards about household wealth and financial accounts, especially balance sheets, are far from harmonized among countries (see Li, 2018), thus the cross-country comparison should be taken with caution. However, as will be presented, the regressions based on panel data can partially alleviate this problem.

The benchmark empirical model can be formulated as follows:

$$\ln C_{it} = \beta_0 X_{it} + \beta_1 HW_{it} + \beta_2 FW_{it} + u_{it}$$

where the dependent variable is the logarithm of the household consumption of country i in year t , denoted as $\ln C_{it}$. On the right-hand side, we consider two independent variables of interest (also in logarithm), housing wealth, HW , and financial aggregates, FW , (measured by three indicators: financial assets, liabilities, and their difference, net financial wealth). The vector X refers to a set of control variables, such as GDP (namely a measure of income), which are assumed to have impact on consumption. To deal with the potential serial correlations in the error terms, u_{it} , we apply the Generalized Least Squares procedure to the first differenced data of both sides of the equation. It is believed that the method, denoted by FDGLS, can yield more efficient estimates than the conventional fixed-effects regression in the presence of serial correlation problem (see Roine, Vlachos, & Waldenström, 2009). In addition, although the stationarity of the series seems a minor concern given the first differencing treatment, we still conduct Im-Pesaran-Shin (IPS, for short) unit root test, which allows unbalanced panel. As shown in Appendix 2, almost all the variables used in the regressions appear to contain no unit root, with one single exception, age structure of the population. This point will be further addressed later on.

Table 2 shows the results from regressing Eq. (1) without including control variables other than GDP. As can be seen from column (1), with estimated coefficients ranging from 0.7 to 0.8, the growth of GDP appears to be the most important determinant of household consumption growth. The coefficient of housing wealth is significantly positive, but substantially smaller than that associated with income. It can be interpreted as one percentage up in the growth rate of housing wealth holdings, will cause 0.086 percentage up in the growth of household consumption. As another variable of interest, net financial wealth affects consumption in a similar manner, while its coefficient is only as large as about one quarter of that for housing. In this regard, it is worth mentioning that several studies emphasize the different extents of housing and financial wealth effects on consumption. Just to name a few, drawing on international and US state-level data, Case et al. (2005) also document a positive but quite small financial wealth effect, which even appears to be statistically insignificant in some cases. Similar results are also provided in Ciarlone (2011) for a panel of emerging economies; Gan and Hardin III (2014) for US households; and in particular, Zhang and Cao (2012) for China households. All these are in sharp contrast with an early study of Elliott (1980) about the US, where he documents a large financial wealth effect and an insignificant housing effect. His measures of real estate assets, however, seems not convincing enough to some (see Gan & Hardin III, 2014). Besides, Barrell, Costantini, and Meco (2015) report that despite a positive and significant financial wealth effect, the housing wealth exerts no impact on consumption in Italy.

Alternatively, we further run the regression with total assets (namely the sum of non-financial assets and financial assets) replacing housing and financial wealth. As can be seen from column (2), the magnitude of asset coefficient falls between the housing and financial wealth displayed previously, indicating the existence of a broad wealth effect.

Furthermore, columns (3, 5) report the outcomes of the regressions with two other financial aggregates in place of net financial wealth, namely financial assets and liabilities. Although the signs of coefficients and corresponding level of significance remain unchanged, the magnitude of the housing wealth coefficient becomes somewhat smaller when financial liabilities being included. A

Table 2
Determinants of household consumption without control variables.

Variables\ models	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	FDGLS	FDGLS	FDGLS	FDGLS	FDGLS	FDGLS	FDGLS	FDGLS
<i>Ln_GDP</i>	0.8124 (0.0221)***	0.8424 (0.0205)***	0.7945 (0.0228)***	0.7337 (0.0250)***	0.7222 (0.0252)***	0.8256 (0.0223)***	0.7493 (0.0237)***	0.7124 (0.0294)***
<i>Ln_HW</i>	0.0861 (0.0155)***	–	0.0816 (0.0156)***	0.0460 (0.0169)***	0.0469 (0.0169)***	–	0.0661 (0.0151)***	0.0747 (0.0155)***
<i>Ln_HW_lag</i>	–	–	–	–	–	0.0889 (0.0136)***	–	–
<i>Ln_Fin_NW</i>	0.0202 (0.0081)**	–	–	–	–	–	0.0064 (0.0082)	0.0049 (0.0102)
<i>Ln_Fin_NW_lag</i>	–	–	–	–	–	0.0127 (0.0091)	–	–
<i>Ln_Fin_Assets</i>	–	–	0.0391 (0.0111)***	–	0.0236 (0.0116)**	–	–	–
<i>Ln_Fin_Liabilities</i>	–	–	–	0.1137 (0.0189)***	0.1014 (0.0200)***	–	–	–
<i>Ln_Total Assets</i>	–	0.0784 (0.0148)***	–	–	–	–	–	–
Common time trend	No	No	No	No	No	No	Yes	No
Year-specific dummies	No	No	No	No	No	No	No	Yes
No. observations	361	361	361	361	361	355	361	361
No. countries	14	14	14	14	14	14	14	14

Note: Robust standard errors in parentheses, with ***, **, and * denoting statistical significance at 1%, 5%, and 10% levels, respectively.

possible explanation may consist on the fact that households' liabilities (mainly loans) have substantial impact not only on consumption, but on housing purchase as well. For illustration, over various sample periods, the mortgage loans account for 72% of total loans in the US, 63% in Canada, and 43% in China (see Zhang & Cao, 2012 for the case of China).

In columns (6–8), we also report regression results by considering lagged wealth variables, common time trend, and year-specific fixed effects. Overall, the housing wealth effect remains basically unchanged, whereas the coefficients on financial wealth turn to statistically insignificant. To some degree, this result, being similar to those found in the research mentioned above, suggests that financial wealth plays a trivial role in explaining consumption.

In Table 3, we further include some control variables in addition to income, such as the logarithms of government spending (*Ln_Gov_C*) and of the total value of export and import (*Ln_Trade*), share of urban population (*Urbanization rate*), and share of population aged 15–64 (*Population_15_64*).⁴ All these variables are sourced from WDI, World Bank. As can be seen from columns (1) to (7), the estimates for the two wealth variables seem not to be substantially affected by the inclusion of additional right-hand-side variables. Among them, it turns out that government spending appears to be a more important determinant of household consumption than wealth. Arguably, since larger government spending often corresponds to a higher level of social protection, the fact that both the coefficients on *Ln_HW* and *Ln_Fin_NW* become smaller once *Ln_Gov_C* has been incorporated (comparing the first column of Table 2) implies that precautionary saving motive may play some role in the wealth-consumption connection.

Moreover, compared to other sampled countries which are mostly developed economies, China, as a developing country, may have quite different characteristics regarding wealth-consumption relationship. Thus, it raises a concern about whether the previous results still hold for China. To tackle this potential problem, we next introduce interactions between China dummy (=1, if China; =0, otherwise) and the two wealth variables, denoted by *Dummy&Ln_HW* and *Dummy&Ln_Fin_NW*, respectively. As can be seen from column (8), both interaction terms have insignificant coefficients. In addition, Wald test suggests that the two terms are also jointly insignificant (associated *P*-value equals 0.1665). All these results indicate that China is not special in this matter. Likewise, in the last column of the table we further show that the general findings also hold for the US, which alone represents about one sixth of the total observations.

To further check the robustness of our empirical results, in columns (1) to (4) of Table 4 we first display regressions based on two sub-samples, namely before and after 2007 for the concern that the consumer behavior may structurally change in the aftermath of the 2008 Global Financial Crisis. Some results are noteworthy here: after the crisis, the housing wealth effect on consumption increases substantially, whereas the financial wealth effect turns to insignificant. In the meanwhile, the stimulating effect of government consumption on private one has also become larger since then. Moreover, in both sub-samples, the housing wealth effect appears less important once the government spending is controlled for, thereby further supporting the argument about precautionary saving motive.

To address the concern of the endogeneity due to either omitted variables, or the two-way causality between household

⁴ As shown in Appendix 2, the unit root test results for *Population_15_64* are mixed. Thus, in addition to its first differences, we also use its second differences, which are stationary according to IPS test. However, the regression outcomes remain basically unchanged.

Table 3
Determinants of household consumption with control variables.

Variables\ models	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	FDGLS	FDGLS	FDGLS	FDGLS	FDGLS	FDGLS	FDGLS	FDGLS (Dummy for China)	FDGLS (Dummy for US)
<i>Ln_GDP</i>	0.6702 (0.0262)***	0.8626 (0.0299)***	0.8018 (0.0226)***	0.8112 (0.0222)***	0.6828 (0.0359)***	0.6757 (0.0353)***	0.6369 (0.0381)***	0.7002 (0.0365)***	0.6860 (0.0358)***
<i>Ln_HW</i>	0.0679 (0.0149)***	0.0760 (0.0161)***	0.0850 (0.0156)***	0.0864 (0.0156)***	0.0662 (0.0153)***	0.0563 (0.0150)***	0.0748 (0.0148)***	0.0627 (0.0158)***	0.0542 (0.0162)***
<i>Dummy&Ln_HW</i>	–	–	–	–	–	–	–	0.0006 (0.0445)	0.0225 (0.0252)
<i>Ln_Fin_NW</i>	0.0138 (0.0080)*	0.0172 (0.0082)**	0.0187 (0.0081)**	0.0203 (0.0081)**	0.0127 (0.0082)	0.0052 (0.0083)	0.0046 (0.0103)	0.0127 (0.0082)	0.0094 (0.0087)
<i>Dummy&Ln_Fin_NW</i>	–	–	–	–	–	–	–	–0.0618 (0.0458)	0.0179 (0.0223)
<i>Ln_Gov_C</i>	0.1852 (0.0237)***	–	–	–	0.1775 (0.0254)***	0.1475 (0.0261)***	0.1286 (0.0284)***	0.1740 (0.0253)***	0.1823 (0.0252)***
<i>Ln_Trade</i>	–	–0.0235 (0.0097)**	–	–	–0.0056 (0.0094)	–0.0079 (0.0094)	–0.0299 (0.0121)**	–0.0086 (0.0094)	–0.0059 (0.0094)
<i>Urbanization Rate</i>	–	–	0.0035 (0.0021)*	–	0.0018 (0.0020)	–0.0021 (0.0023)	0.0034 (0.0022)	0.0030 (0.0021)	0.0019 (0.0019)
<i>Population_15_64</i>	–	–	–	0.0003 (0.0031)	–	–	–	–	–
Common time trend	No	No	No	No	No	Yes	No	No	No
Year-specific dummies	No	No	No	No	No	No	Yes	No	No
No. observations	361	361	361	361	361	361	361	361	361
No. countries	14	14	14	14	14	14	14	14	14

Notes: 1. Robust standard errors in parentheses, with ***, **, and * denoting statistical significance at 1%, 5%, and 10% levels, respectively.

2. The P-value associated with Wald test for the joint significance of the two interaction terms is 0.1665 for China, and 0.1427 for US, respectively.

Table 4
Robust tests for determinants of household consumption.

Variables\ models	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	FDGLS	FDGLS	FDGLS	FDGLS	DFD	DFD	DFD	FD2SLS	FDGMM
<i>Ln_Household_C_lag</i>	–	–	–	–	0.3616 (0.0218)***	0.3535 (0.0265)***	0.4111 (0.0321)***	–	–
<i>Ln_GDP</i>	0.8310 (0.0299)***	0.6983 (0.0374)***	0.7678 (0.0301)***	0.6271 (0.0334)***	0.5819 (0.0233)***	0.5787 (0.0243)***	0.4858 (0.0321)***	0.6501 (0.0628)***	0.6424 (0.0620)***
<i>Ln_HW</i>	0.0717 (0.0195)***	0.0593 (0.0189)***	0.1142 (0.0266)***	0.0776 (0.0245)***	0.0289 (0.0113)***	0.0296 (0.0114)***	0.0454 (0.0118)***	0.1593 (0.0725)**	0.1485 (0.0690)**
<i>Ln_Fin_NW</i>	0.0367 (0.0113)***	0.0285 (0.0111)***	–0.0004 (0.0102)	–0.0069 (0.0110)	0.0096 (0.0071)	0.0097 (0.0071)	0.0036 (0.0092)	–0.0651 (0.0698)	–0.0488 (0.0661)
<i>Ln_Gov_C</i>	–	0.1677 (0.0311)***	–	0.2154 (0.0339)***	–	0.0101 (0.0226)	0.0080 (0.0251)	0.2048 (0.0433)***	0.2036 (0.0433)***
Hansen's J chi2 P-value	–	–	–	–	–	–	–	0.7222	0.7222
Year-Specific Dummies	No	No	No	No	No	No	Yes	No	No
No. observations	227 (as of 2007)	227 (as of 2007)	134 (since 2008)	134 (since 2008)	360	360	360	281	281
No. countries	13	13	14	14	14	14	14	14	14

Note: Robust standard errors in parentheses, with ***, **, and * denoting statistical significance at 1%, 5%, and 10% levels, respectively.

consumption and wealth, we first introduce the dynamics of consumption behavior in regressions by including the lagged household consumption (method denoted as DFD). As illustrated in columns (5) to (7) of the table, holding other things being equal, it turns out that the lagged depend variable contain important information to predict the current consumption growth. Or, to put it differently, household consumption exhibits a strong persistence over time. With regard to the housing wealth, its coefficient remains significantly positive, albeit with a lesser magnitude compared to previous regressions.

We then run the regressions using instrument variables (IV), which are believed to be correlated with the endogenous variables, namely housing and financial wealth, but orthogonal to the error terms.⁵ The IVs include 'top 1% pre-tax income share', 'domestic credit to private sector (as % of GDP), and two aforementioned variables, namely total trade value and urbanization rate.⁶ The regressions are undertaken through conventional Two-stage Least Squares estimator (denoted as FD2SLS) and Generalized Method of Moments (denoted as FDGMM). The latter is expected to be more efficient when the heteroscedasticity in errors is pronounced. As shown in the last two columns of Table 4, the hypotheses about the valid IVs are justified by the Hansen J's Chi2 P-value, and the two estimations produce roughly similar outcomes. In particular, the housing wealth effect remains substantial and significant.

Finally, since it is believed that financial conditions facing households also affect the wealth-consumption relationship, we next consider an indicator of financial development, the household liabilities-to-financial assets ratio, which is previously shown in Table 1. Arguably, it serves as a measure of the extent to which the households are credit constrained. In the light of the argument about housing as collateral reviewed in Section 2, it seems reasonable to conjecture that housing wealth's impact on consumption will increase with this ratio. The logic behind is that a high level of the latter can be read as an outcome of a well-developed financial system, in which houses can be used with more ease as collateral (also see Peltonen et al., 2012). Based on this view, we conduct regressions in splitting the sample by the median of the indicator, 27%. As can be seen from Table 5, when the ratio is above that threshold, the magnitude of housing wealth coefficients, always significant, becomes larger as expected. The coefficient of financial wealth remains, however, insignificant throughout.

On the whole, the regression results based on macro-data lead to a consistent picture about the relationship between housing wealth and consumer spending. It is, however, not the case for financial wealth, which seems to have little impact once other determinants of consumption have been controlled for. From a theoretical perspective, the findings illustrated above do not corroborate with the predictions of the 'permanent income hypothesis' or 'life cycle hypothesis', which implies that wealth of different types should have small positive but same effect on consumption (namely pure wealth effect). Nevertheless, as argued in the relevant literature, once the standard consumption theory is augmented by taking into account, among others, the credit constraints and motive for precautionary saving, housing wealth may become a more important consumption determinant, as shown in our econometric analysis (see also Case et al., 2005, Bernanke, 2007, and Gan, 2010).

4. Policy implications for China

Generally speaking, our findings suggest that wealth, especially housing wealth, appears to boost, rather than crowd out household consumption. Furthermore, the extent of this effect also depends on the factors including government expenditure and financial development, indicating that wealth and consumption are linked through a complex way. Although such evidence from international data should be taken with caution when looking at China, it has some important implications for the latter, where real estate plays a vital role in macroeconomic stability and prosperity. In particular, it should be stressed that other than 'living in' and 'speculation', purchasing and holding dwellings in China are also motivated by many factors related to store of value, social protection, credit constraint, bequest motive, and even competitive saving motive in the marriage market as documented in Wei and Zhang (2011). Thus, a dichotomous view of either 'living in' or 'speculation' about housing should be avoided.

To be sure, the above argument should not be directly interpreted as a rationale justifying the recent booming real estate development in major cities across the country. However, this implies, at least, that instead of stigmatizing the developers, real estate agents, banks, and sometimes local governments, there is still large room for more constructive thinking to achieve a healthier wealth-consumption relationship in the country. With this in mind, the following policy implications deserve further attention.

First, housing should not be blamed for its role as precautionary wealth given the inappropriate supply of local public services related to education, health, pension, and so forth. In particular, the public services are not only insufficient but also unequally offered across the country (see Glaeser, Huang, Ma, & Shleifer, 2017). To illustrate the latter point, there are 4.63 licensed doctors per 1000 residents in Beijing in 2018, a number being almost twice as many as in Chongqing (2.46), another province-level municipality in western China (NBSC, various issues). To some degree, this enormous difference in terms of associated public services explains the interregional disparities in house price.⁷ Undoubtedly, improving better and roughly equal public services among the regions constitutes not only a key to stimulating consumption by attenuating the anxiety about the uncertain future, but also to increasing the value of houses, especially those in less developed regions.

Second, there is another salient feature regarding housing behavior in China, which attracts relatively less attention until now. As a matter of fact, compared to renting, owning a house implies a better access to public services and social protection, including

⁵ Although the variables of control, such as GDP and government spending, may also be endogenous with respect to household consumption, here we focus only on the variables of interest, namely the two wealth variables.

⁶ The top 1% income share is sourced from World Inequality Database (WID), and the credit to GDP ratio is from WDI, World Bank.

⁷ For instance, in 2018, the average price for new dwellings in Beijing is 37,420 yuan / square meter, while that in Chongqing is 8190 yuan / square meter (NBSC, various issues).

Table 5
Determinants of household consumption with different financial conditions.

Variables\ models	(1)	(2)	(3)	(4)
	FDGLS	FDGLS	DFD	DFD
<i>Ln_Household_C_lag</i>	–	–	0.3197 (0.0356)***	0.3764 (0.0382)***
<i>Ln_GDP</i>	0.6680 (0.0391)***	0.6509 (0.0326)***	0.5875 (0.0368)***	0.5656 (0.0316)***
<i>Ln_HW</i>	0.0701 (0.0196)***	0.0806 (0.0220)***	0.0293 (0.0158)*	0.0391 (0.0174)**
<i>Ln_Fin_NW</i>	0.0147 (0.0137)	0.0123 (0.0091)	0.0050 (0.0120)	0.0122 (0.0087)
<i>Ln_Gov_C</i>	0.2024 (0.0342)***	0.1516 (0.0294)***	0.0555 (0.0317)*	–0.0446 (0.0328)
Financial liabilities / financial assets	≤27%	>27%	≤27%	>27%
No. observations	180	181	179	181

Note: Robust standard errors in parentheses, with ***, **, and * denoting statistical significance at 1%, 5%, and 10% levels, respectively.

compulsory education and Hukou registration. It is also not uncommon that the tenants suffer from unanticipated rise in rent and eviction. At this juncture, there is a recent noteworthy example that according to media reports, the tenants in some Chinese cities even have difficulty returning back to their home or have to accept rising rents during the Covid-19 lockdown.⁸ Thus, better protecting the tenants' rights would also help weaken the strong preference for homeownership of the Chinese households.

Third, although the banking sector in China has witnessed a booming growth over roughly the decade after 2008–2009 crisis, the practice of using houses as collateral for household loans appears uncommon, and thus the positive link between wealth and consumption has not been fully established. However, financial institutions are not to be blamed alone for this. To illustrate, despite the challenges brought by aging population, it seems that most Chinese households are still reluctant to engage in the house-for-pension scheme (essentially, a reverse mortgage, see Chen & Huang, 2013). Apart from some cultural factors, the uncertainty about the residential land lease constitutes a major barrier. Indeed, under the current legal system all urban land is owned by the state but can be leased for up to 70 years, the banks would encounter difficulty valuing the houses and the land beneath according to their remaining life. To tackle this problem, more policy efforts, such as better defining the terms of the urban land use rights and easing relevant financial regulations, are sorely needed.

Fourth, initiation and promotion of the real estate tax will also help trigger a positive relationship between housing wealth and consumption. In this regard, three mechanisms, among others, are of great importance: (1) it is believed that this property tax is able to weaken the bequest motives, thereby further supporting the aforementioned house-for-pension scheme; (2) the progressiveness of the tax, if well designed, will reduce the economic inequality and thus, benefit the lower income/wealth households, who generally have a stronger propensity to consume; (3) thanks to the tax, the increased local revenue could also help improve the local public services and even fund the residential renovations, thereby increasing the value of houses. This point is further addressed below.

Fifth, although our regression analysis does not directly examine the effect of home purchase on the spending in home-related items, this channel, as reviewed in Section 2, may gain new importance since China has recently made efforts to renovate aging residential areas. In particular, amid the Covid-19 epidemic, an ambitious plan of renovation of 39,000 communities by the end of 2020 has been launched.⁹ To a large extent, this policy measure will lead to the appreciation of the old houses that lack some now-essential facilities such as lift, parking, realty maintenance service, and security system. In the meanwhile, it will also encourage the households benefiting from the plan to spend more, as if they buy new homes, on decorations, furnishings, appliances, and even automobiles, of which the demands have been greatly constrained so far.

Sixth, despite the intense focus on the urban housing issues in the related discussions, there is still large room for improving the system of rural residential properties in China. According to the current institutional framework, the urban-rural land transfers are under strict control, and the rural households, in general, have weaker bargaining power vis-à-vis the local governments in the case of land expropriations. In consequence, the rural houses remain, to a large extent, untradeable and thus, their nature as wealth, is not fully unfolded. Clearly, it is argued that this dual system also widens the urban-rural economic gap, and hurts rural residents' spending (See Tan, Wang, & Heerink, 2020). To tackle this problem, the liberalization of the rural property rights, along with reforms in household registration system (*Hukou* system) should be a key priority for establishing a positive wealth-consumption association in rural China.

Eventually, taking a boarder perspective, compared to developed economies, housing in China may play an excessively important role as store of value due to lack of other investment opportunities. One important reason for this remarkable difference lies in the fact that households in those countries are allowed to own natural resources such as lands and mines. It is not the case, at least *de jure*, in China. Moreover, holdings of foreign assets by Chinese households are also quite limited due to tight capital control measures. In view of that, the policies regarding real estate regulations need to focus on many factors beyond houses per se, especially on the institutional environments for innovations and entrepreneurship activities from which industrial wealth mainly stems. Before everything, reinforcing protection of property rights (especially including intellectual properties), reducing business tax burden and other related costs, and improving competitive neutrality between different types of businesses are all crucial for establishing a sustainable pattern of household wealth accumulation.

⁸ See <http://www.eeo.com.cn/2020/0211/376048.shtml>; <http://www.nbd.com.cn/articles/2020-02-12/1407515.html>.

⁹ See <https://www.chinadaily.com.cn/a/202004/16/WS5e98480ca3105d50a3d16c3d.html>.

5. Conclusions

Thanks to four-decade spectacular economic growth, China's households have been accumulating a stockpile of wealth from poverty. In such a context, further concerns have been raised about the relationship between wealth accumulation and improvement of economic well-being (mainly through consumption). The issue becomes even more important when considering the challenges facing China in recent years, which can be characterized by a mix of increasingly leveraged households, escalating housing price, sluggish consumption, slowing economic expansion, trade frictions with the US, and the Covid-19 pandemic and resulting economic difficulties.

With that background in mind, this paper first provides international evidence on the relationship between household wealth and consumption. On the contrary to most existing literature, which is generally based on country specific survey or asset price index, the current study draws on macro-level data on household balance sheets (or wealth accounts) for fourteen countries including China, and thus stands out by its more accurate accounting of household wealth, and cross-country and time dimensions. In addition, by digging the sectoral balance sheets, the financial positions and constraints of the households are also better taken into account when examining the impact of wealth accumulation and borrowing on household behavior. Specifically, using various panel regression procedures, a positive correlation between change in housing wealth and change in household consumption is identified, and it seems not to be the case for financial wealth. Moreover, with the help of interaction terms, we find that the general results based on the whole sample still hold for China despite its special characteristics. Besides, further investigations show that the wealth-consumption relationship also depends on government spending and financial development, suggesting that precautionary saving motive and borrowing constraint may play a role in the story.

We then relate the international evidence to the case of China, with a special focus on some policy issues over housing regulations and household consumption promotion. In particular, although it is believed that the unbridled exuberance of real estate posits a major challenge for China's long run economic prospects and financial stability, as suggested from our empirical findings, housing wealth (or wealth in general) does not necessarily crowd out the consumption and their relationship are also affected by many other factors. Therefore, the relevant policymaking requires a broader perspective with respect to the ongoing market reforms and socioeconomic development in the country. As a final note, it is also hoped that the recent pandemic of Covid-19 will shed new light on the household behavior with respect to housing, saving, and spending. This certainly remains a valuable topic for further research.

Declaration of Competing Interest

None.

Appendix 1. Household balance sheets of sampled countries

Countries	Definition/coverage	Accounting standards	Sources	Data versions	Notes	Period
Australia	Households	SNA 2008 ; Australian System of National Accounts (ASNA)	Australian Bureau of Statistics	June 27, 2019	December each year	1988–2018
Canada	Households	SNA 2008 ; Canadian System of National Accounts (CSNA)	Statistics Canada	July 4, 2019	Fourth quarter each year	1990–2018
China	Households	SNA 2008	NBSC, NIFD	November, 2018	–	2000–2016
France	Households	European System of Accounts 2010 (ESA 2010)	National Institute of Statistics and Economic Studies (INSEE)	December 11, 2018	–	1995–2017
Germany	Households and NPISH	ESA 2010	Federal Statistical Office (non-financial assets) ; Deutsche Bundesbank(financial assets and liabilities)	October 26, 2017	–	1999–2016
Italy	Households	ESA 95	Banca D'Italia, <i>Supplements to the Statistical Bulletin</i>	December 16, 2015	–	1995–2013
Japan	Households	SNA 2008 ; National Accounts of Japan	Economic and Social Research Institute (ESRI)	April 5, 2019	–	1994–2017
Korea	Households and NPISH	SNA 2008	Statistics Korea; Bank of Korea	June 19, 2018	–	2008–2017
Netherland	Households and NPISH	ESA 2010	Statistics Netherland	August 11, 2017, for non financial accounts; June 24, 2019, for financial accounts	–	1995–2016
New Zealand	Households	SNA 2008	Reserve Bank of New Zealand; Statistics New Zealand	June 7, 2019	December each year	1998–2018

(continued on next page)

(continued)

Countries	Definition/ coverage	Accounting standards	Sources	Data versions	Notes	Period
South Africa	Households and NPISH	SNA 2008	South African Reserve Bank	–	–	1975–2016
Sweden	Households	ESA 2010	Statistics Sweden	June 19, 2019	–	1980–2018
United Kingdom	Households	ESA 2010	Office for National Statistics	July 31, 2018	–	1995–2017
United States	Households and NPISH	SNA 2008	BEA, Integrated Macroeconomic Accounts (IMA)	June 21, 2019	–	1960–2018

Appendix 2. IPS unit root tests for selected time series

Settings\ variables	$\ln C$	$\ln GDP$	$\ln HW$	$\ln Fin_NW$	$\ln Gov_C$	$\ln Trade$	Urbanization Rate	Population_15_64
<i>Demean</i>	−6.9432***	−11.0767***	−8.9506***	−14.5049***	−10.2740***	−18.6999***	−1.7443**	−3.8436***
<i>No demean</i>	−2.4772***	−5.7320***	−4.2990***	−12.6844***	−4.5565***	−17.3238***	−2.1738**	−0.4326

Notes: 1. All tests are applied to series in first differences without time trend.

2. ‘Demean’ denotes subtracting cross-sectional (namely, country) means.

3. W-t-bar statistic is reported with *** and ** denoting statistical significance at 1% and 5% levels, respectively.

4. Optimal lag length is chosen by BIC.

5. Other variables involved in the regressions, including series of total assets, financial assets, financial liabilities, top income share, and credit-GDP ratio are all shown to be stationary, whereas we do not show the results in the table due to limitation of space.

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