An examination of house price bubble in the real estate sector: the case of a small island economy – Fiji

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Abstract

Purpose – This paper aims to assess the equilibrium house price in the city of Suva (Fiji) and to analyse the house price bubble in the Fiji housing market.

Design/methodology/approach – This paper adopts a time series approach to determine the presence of house price bubbles in Fiji over the period from 1988 to 2018.

Findings – The findings suggest that real income, land cost, building material price, inflation rate, volatility, household size and wealth have a positive impact on house prices, whereas user cost of capital and political disturbances have a negative impact. The findings further indicate that the Fijis' housing market does not constitute any house price bubble.

Practical implications – This paper draws policy implications for a small developing state (Fiji) and other similar economies.

Originality/value – The price bubble in the Fiji housing market is analysed for the first time. This paper develops a comprehensive empirical approach to assess the equilibrium-housing price in Fiji.

Keywords Housing price bubble, Housing market analysis, Housing policy, Equilibrium housing price in Fiji, Small island developing states (SIDS)

Paper type Research paper

JEL classification – R31, R51, E44, G01
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1. Introduction

This paper tests the possibility of house price bubble (s) in Fiji in the wake of rising house prices and global uncertainties. Although there is no guarantee that the local economy is in equilibrium (a time when such analysis is more meaningful), the empirical findings are important for monetary policy and sustainable development of household wealth and livelihood. Globally, changes in monetary policy in response to financial market uncertainties have had serious implications on the cost and availability of funds to households (Asia Development Bank, 2020; IMF, 2019). In small and vulnerable states, since the commercial banks are mostly foreign-owned, financial markets fail to respond to domestic conditions adequately (Prasad, 2020). As such, research on how these changes may affect the asset market, household wealth and the broader macroeconomy is important. Other useful agendas for research on housing include affordability, financialization and housing rights. This paper considers an important aspect of financialization in the context of small and vulnerable economies – Fiji.

Our motivation for this research is due to the fear that with declining housing affordability and the looming potential economic recession worldwide from COVID19, household wealth and their welfare are at risk. This can have compounding effects on the financial market and in the macroeconomy. The 2007/2008 subprime mortgage crisis (GFC) in the US has shown that finance, banking and the real estate market risks can hugely spill-over to the economy and beyond. Yet, after about 12 years of the GFC, countries such as the UK, the USA, Hong Kong, Australia and others (including developing economies) continue to face house price booms fearing another crisis, exacerbated by massive debt accumulation and global uncertainties (IMF, 2019). It is also important to analyse the developments in the asset market of small and vulnerable economies because they face additional developmental challenges due to their nature and size of economic activities.

A summary of the causes of the 2007/2008 GFC can provide some backdrop to this paper. Since early 2000, property prices rose globally and reached their highest levels just before the US market collapsed because of the rising defaults on subprime mortgages. The consequent oversupply of housing (due to depressed demand in real estate) ultimately triggered the house price bubble to burst causing bankruptcies and foreclosure of households, corporates, banks and financial institutions across the world. It is important to understand the pre-condition of such a crisis because the burst of the asset market bubble (if any) in Fiji could have a huge negative impact on this small and vulnerable economy [1]. Fiji remains vulnerable to economic shocks due to heavy reliance on international aid, narrow export base, high external debt and weak economic prospects. Besides, it is easily affected by climatic conditions, external shocks in food and fuel prices and now the global pandemic (COVID19). Our paper is organized as follows. Section 2 documents the facts of the Fijian housing market while Section 3 is brief literature on house price bubbles. Section 4 develops an analytical framework and specifies the empirical model. Section 5 discusses the empirical findings and Section 6 concludes this paper.

2. Stylized facts of Fiji's housing market

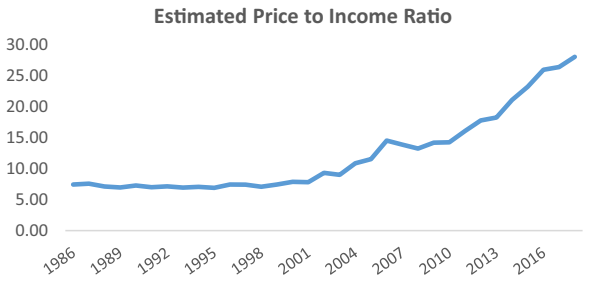
Fiji is a small and vulnerable but most developed economy in the South Pacific region. Fiji's per capita income is close to the UN's classification of upper-middle-income countries. Fiji is endowed with forests, minerals and fishery resources but since the early 1980s, but tourism has expanded rapidly and is now the leading economic activity. Fiji has just over 895,000 people with about 55% (Fiji Bureau of Statistics, 2019a) of them living in urban areas. There is continued rural-to-urban drift but the out-migration (mainly to Australia, New Zealand and the USA) has declined in the past recent decade. Fiji's political climate has been fragile with frequent change of governments, but there has been some degree of stability after the

2006 military takeover. In the past 12 years or so, the economy has recorded a modest (2.7%) average rate of growth of real GDP (World Development Indicators, 2020). The growth forecast is 1.7% for 2020 (RBF, 2020) [2].

However, during the 1985–2018 period, house prices have steadily increased (Figure 1) relative to average income – the price to income ratio (PIR) has largely trended upwards. Data from the Ministry of Lands (2019) show that house prices increased by 3.9% per annum in the period 1986–2003, but by a massive 18.4% from 2004–2018. In these periods, average household incomes in Suva grew by 0.4% and 0.97%, respectively.

The 2014 Household Income and Expenditure Survey (HIES) [3] shows that household incomes in Fiji grew by 6.1% FBOS (2019b) mainly because of increased government support for micro-enterprise development and improved GDP growth out-turn since 2006. Other market indicators such as the average unemployment ratio, over the period 2000–2018 was 4.2% while the average lending interest rate for the period 1997–2017 was 7.6% (World Development Indicators, 2020). Data also show that while the real long-term interest rate (20-year average lending rate) has slightly declined (−0.12 percentage points) since 2004 and the average land prices grew by 35.4% (or 2.5% per annum) in this period aggravating housing affordability (Ministry of Lands, 2019; RBF, 2018). Meanwhile, the Fiji Housing and Population Census 2017 show that due to lack of affordability, a good majority (40%) continue to rent in hybrid accommodations, notwithstanding those living in family homes, squatters and government-subsidized housing. The real estate market has had a significant growth in the past decade owing to a robust economy and reasonably stable macroeconomic conditions (Reserve Bank of Fiji, 2018). Consequently, the Home Ownership Initiative [4] is the only comprehensive government subsidy scheme that favours housing development in Fiji. However, the homeownership ratio is about 78.6% (FBOS, 2019b). We conjecture that a decline in the mortgage interest rate and a rise in private sector lending is crucial to housing development in Fiji.

The government's housing policy continues to support housing development through the Housing Authority of Fiji and Public Rental Board (Hassan, 2014) mainly targeting 11% of the total population who live in squatter settlements (Fuata, 2015). However, due to the increased demand for land in urban centres against constrained supply, the market price for freehold (also other types of land) and their rental rates are rising, (Hassan, 2014). The government has responded by opening up more land for urban development and housing (National Housing Policy, 2011). This has been complemented by a grant from the World Bank and the International Bank for Reconstruction and Development in 2020. Moreover, through the Public-Private Partnership programme, the government aims at accelerating



Source: Authors' calculation based on data from Ministry of Lands (2019)

Figure 1. Price to income ratio from 1986–2018

the development of affordable housing [5] for low-income earners. Housing loans make up about 70% of the total household loan portfolio and 20% of the banking loans in Fiji (Reserve Bank of Fiji, 2017). In terms of housing supply, the Completion Certificates increased by 55.4% in the 2018–2017 period (Fiji Bureau of Statistics, 2019a), but house prices have increased exorbitantly in the major cities. Reflecting on Figure 1, we find that firstly, the PIR has grown from an acceptable range of about 5 in 1986 to 25 in 2018 (a fivefold increase). Secondly, the PIR doubled every 10 years since 1998 and thirdly, since 2004 it has increased exponentially. These trends are alarming for such a small economy.

Moreover, the weakening of the Fijian economy and increased fragility of the housing market raise concerns of national house price appreciation (Reserve Bank of Fiji, 2018). To manage this, the government has legislated restrictions on ownership of urban properties by foreign nationals in 2016. Furthermore, commercial banks have tightened their lending procedures and the interest rates have been increased because of higher global and domestic financial market risks. Monetary policy was also tightened to dampen the over-heating of the housing market in April 2019. These changes have stressed the financial conditions in Fiji, and with possible negative impacts of COVID19 on the economy, employment and incomes, household welfare is at risk.

Fiji's National Housing Policy (NHP, 2011) intends to address the housing needs of poor households by improving accessibility to finance. The government through its agencies [the Housing Authority of Fiji (HAF) and the Public Rental Board (PRB)] is directly involved in providing affordable lots and rental accommodations to the urban poor. In the past, the progress of housing development was aggravated by economic downturns, scarcity of serviced land in urban centres and the unlawful overthrow of the government in 1987, 2000 and 2006, creating a huge gap between the demand and supply of housing in Fiji. Meanwhile, rapid urbanization has led to the rise of squatter settlements in the urban and semi-urban areas of all major towns and cities. Now Fiji needs a better housing policy framework, supportive financing mechanisms and affordable homeownership schemes. However, the major challenge is to solve the acute shortage of housing supply in towns and cities. The unmet demand for adequate housing has been long neglected and should receive a special focus on the housing policy. To overcome most of these challenges, the government and private investors should work in partnership.

3. Literature review

Rising house prices and financial market innovations have caused a huge impact on the asset market worldwide. Properties provide equity for investment and a safeguard against loans. As their values fall, so happens to the security in financial assets and the net assets position of economic agents. These can increase the economic vulnerability of corporate and household sectors compromising the national balance sheets of an economy (Jain *et al.*, 2020). However, predicting the market value of non-financial assets can be tricky. Fama (1970) argues that publicly available information is fully reflected in (property) prices aligning them to the market fundamentals. The rapid change in house prices over short periods has been detected for many countries leading to the contention of the Efficient Market Hypothesis. Some cases of asset price bubbles include the Dutch Tulip bubble (Garber, 1990), Japan's real estate and stock market bubbles (Kindleberger and Alibe, 2000) and the US subprime mortgage crisis (Dimitriou and Simos, 2013). These have led to increased research on the presence of house price bubbles in both developed and developing economies; see, for example (Cajueiroa and Tabak, 2006; Evans, 1991).

The housing bubble occurs when the house price surpasses its fundamental value because homeowners envisage that they can sell their properties at a higher price in the future (Roche, 2001). Thus, if house prices are perfectly stable in the long-term, bubbles are unlikely. However, there is no guarantee that it may not systematically depart from its trend value. Abnormal interactions between house prices and market fundamentals are one way to interpret the existence of price bubbles. When experimenting with this idea, Shen *et al.* (2005) found that Shanghai had a house price bubble but none existed for Beijing in 2003. Negro and Otrok (2005) examined movements in house prices from state and regions in the USA and found that historical movements in house price in some states was greatly influenced by internal shocks in early 2000. Case and Shiller (2003) also suggest that speculative bubbles existed in cities of the US around that time. Arestis *et al.* (2017) reveal that Hong Kong house prices were overvalued by 31% relative to disposable income in 2013Q2 qualifying for the possibility of a bubble. Similarly, Besarria *et al.* (2018) concluded evidence of a bubble in Brazil.

However, Siegel and Thaler (1997) argue that returns on equity on property investment will revert to its mean in the long-run due to correction effects as equity returns have been excessive relative to the risk in the past 2–3 decades. The authors conclude that it is difficult to explain the equity premium without incorporating some kind of irrationality. Hui and Yue (2006) and Flood and Hodrick (1990) raised concerns that there are difficulties in empirically measuring the fundamental value of properties. Stevenson (2008) developed an inverted demand model to estimate property value [6]. Therefore, it is essential to explore new perspectives to test for price bubbles.

Hui and Yue (2006) introduced the concept of using exogenous macroeconomic variables in detecting the bubbles as well as to overcome the obstacles in calculating the intrinsic value of assets. In this approach, the presence of price bubbles can be inferred by the relationship between macroeconomic variables and property prices. They found that if changes in prices can be explained by macroeconomic fundamentals, then, the housing market is unlikely to inherit price bubbles. Based on this approach, Abelson *et al.* (2005) found that real house price is significantly influenced by real disposable income, unemployment rates, consumer price index, equity prices, real mortgage rates and housing stock in Australia. Similarly, Tu *et al.* (2018) revealed that interest rates and income are the two critical forces behind house prices in The Netherlands but the impact of inflation is limited. Similarly, Hekwolter *et al.* (2017) find that despite an overheating house price inflation, there is no evidence of a credit-driven bubble in The Netherlands. Biggs *et al.* (2010) established the concept of credit impulse (difference in the growth of credit flow and that of income) and found that rising GDP positively correlates with increased lending activity. Hence, they concluded that easy access to mortgage financing leads to house price volatility in the past 20 years in the USA. Zhou and Sornette (2003) designed a model that used price oscillation and price growth to test for bubbles in the UK housing market, and both these studies provide evidence of speculative bubbles in the UK.

Others used alternative empirical methods. Teng *et al.* (2013) applied the concept of present value with rational expectations in determining house price equilibrium. Shi (2016) used the recursive bubble detection method to minimize the possibility of false identification. Phillips *et al.* (2015) developed a new recursive flexible window method that successfully identifies the well-known historical episodes of exuberance and collapse of the S&P 500 stock market data from 1871 to 2010. Arestis *et al.* (2017) decomposed house prices into fundamentals, frictions and bubble episodes using Glindro and Delloro's (2010) method and found that house prices in Hong Kong exceeded (by 31%) driving the housing market into a bubble. Capozza *et al.* (2004) found variations in the US house price in 62 metropolitan

regions by using supply costs, information costs and expectations for the period 1979–1995. They argue that variations in house prices were not caused by but rather responded to economic shocks.

In summary, these studies show that there are ways to estimate house price bubbles, and such information could be useful in designing pro-active financial market policy. Further, this survey provides theoretical insights through which we pioneer the examination of a potential price bubble (s) in Fiji. Furthermore, a rigorous empirical analysis based on data sets covering long periods is not available for this small economy. Besides, the risk of financial crisis eventuating from the housing price bubble is a possibility in small and vulnerable economies like Fiji. As such, our analysis is important for financial market policy.

4. Empirical modelling

The analytical framework applied in this study is a multivariate time series model that relates house prices to its underlying determinants. This framework is used in Diba and Grossman (1988) and Flood and Hodrick (1986) where the authors estimate equilibrium house prices using market fundamentals by assuming full-operations of the housing market. Consequently, this paper develops a theoretically consistent empirical model to assess the equilibrium house price in Suva city (a proxy for Fiji). In our empirical model (1), the natural log of house price (*HP*) is a linear function of its theoretical determinants (X_{it}) in their natural logs (except for the user cost of capital), where (X_{it}) is a vector of the major determinants of the house price as suggested by the literature cited above. All data are annual time series and functionally defined, as shown in Table 1.

$$lnHP_t = \alpha + \beta_i \sum_{i=1}^{n} lnX_{it} + e_t \tag{1}$$

The error term (e_t) is expected to be white noise, while each of the $\beta_{i's}$ indicates long-run elasticity of house price with respect to the respective (X_t) variables. The vector of (X_{it}) included in our analysis is based on the influential studies noted above and they are real income, real construction cost, house price volatility, household size, urban concentration ratio, the land area of residential lots, real household wealth, location (distance from the city centre) and the user cost of capital. We added a binary dummy to capture housing market development in Fiji pre and post-2004 periods. Due to a lack of reliable data, variables such as consumer confidence, investment potential, relative property valuation and a broader set of demographic and geographical factors (Nan Geng, 2018) were not considered. However, the included set reveals useful information about house prices in Fiji.

5. Results and analysis

In the analysis below, we provide an empirical basis to explain the equilibrium house price in the real estate market of Fiji. However, as is usual in time-series studies, the unit root tests are first conducted. Table 1 shows that all variables are integrated of order 1, while they are difference stationary.

The long-run estimates obtained with Phillip and Hansen (1990) cointegration method are reported in Table 2. The benefits of this approach are that it controls for serial correlation and heteroscedasticity, both potentially harmful in time series estimates. Secondly, the method is easier to implement when the variable set is large and integrated.

Variable	Definition	ADF unit root tests Order	ADF-Stats (levels, first difference)	Critical value (levels, first difference)	Nature of variable
*lnYR**	Real urban household income in Suva obtained from 2014 HIES-FBoS	1, 1	2.32 (3.61)	2.56 (2.02)	Unit root in levels
*lnRHP**	Real house prices in Suva (F$) using house price data from Ministry of Lands (2019) (various years)	1, 2	1.23 (2.99)	2.56 (2.02)	Unit root in levels
lnRCC	Real construction cost from Rawlinsons Group (2004), 2015 prices	1, 1	2.54 (3.21)	2.56 (2.02)	Unit root in levels
lnVOL	Denotes house price volatility computed from house price data	1, 2	1.87 (2.99)	2.56 (2.02)	Unit root in levels
lnHH	Household size in urban Fiji. Data from 2014 HIES-FBoS	1, 3	2.27 (4.31)	2.56 (2.02)	Unit root in levels
lnURB	Urban concentration ratio is computed as a ratio of the Suva population to the total population. Data from FBoS (various years)	1, 1	2.41 (3.67)	2.56 (2.02)	Unit root in levels
lnNDA	Denotes land area in hectares from Suva house sales data, Ministry of Lands (various years)	1, 1	2.13 (3.22)	2.56 (2.02)	Unit root in levels
lnWLT	Wealth estimated using savings data (FBoS, various years)	1,2	1.82 (3.78)	2.56 (2.02)	Unit root in levels
UCK	User cost computed as nominal lending + inflation + average capital tax rate from FIBoS and RBF data (various years)	2,2	1.92 (2.91)	2.56 (2.02)	Unit root in levels
DUM2004	Denotes dummy variable (0 for pre-2004 and 1 thereafter	–	–	–	–

Notes: Variables are unit root (in levels) and difference stationary. The maximum lags tested were four with intercept and trend for level variables but no trend terms for difference equations. Microfit-4.1 was used to conduct the tests. Variables are I (1)in levels but different stationary

Table 1. Data source, definitions and unit roots

In Table 2, the estimates indicate that real income has a significant and positive impact on house prices with an income elasticity of 0.76 as housing is a necessity good. An increase in real income will also increase the purchasing power of potential homeowners, thus, increase demand for housing. This agrees with Roche (2001), Abelson *et al.* (2005), Biggs *et al.* (2010) and Kok *et al.* (2018). The impact of land cost is significant with a positive coefficient of 0.46 in support of Somerville (1996). Consistent with Somerville, the estimate of the effect of building material price index (BMPI) is significant and similar to that of the inflation rate. The estimates suggest that increased inflation will increase house prices because homeowners desire to mitigate cost and loss in value of money through real investment. This is in the spirit of Stevenson (2008). The house price volatility variable has a positive coefficient as investment risk increases property prices. Also, the household size seems to have a significant positive impact due to the demand pressure. This is consistent with (Nan Geng, 2018). As expected, the user cost of capital shows a negative impact as a tax on capital profits, interest and depreciation rates heighten the cost of capital. This agrees with Abelson *et al.* (2005) and Tu *et al.* (2018). The UCK variable indicates that house prices may decline somewhat if there were a lower tax on capital profits or if financial institutions reduced mortgage interest rates and if the depreciation costs were lower. Similarly, the estimated effect of political instability (uncertainty due to inadequacy of property rights) shows a negative impact on house prices. This agrees with the role of internal factors cited by Negro and Otrok (2005). Finally, the location variable (proximity to the city) shows a statistically significant and positive coefficient. This is in line with Nan Geng (2018).

Our study explores the determinants of the house price as other studies elsewhere but is innovative because it tests the presence of a house price bubble in light of the aforesaid market fundamentals within a small economic context. It is also the first empirical study on Fiji. Further, our approach is similar to testing the persistence of long-run relationships between variables; see Engel and Granger (1987), by running tests on the error correction parameter. This is largely applied in time series literature. The idea is to test if the dis-equilibrium (residuals representing the difference between actual and estimated equilibrium house prices) resembles any systematic trends. This is of interest to our analysis because investigating bubbles is synonymous with investigating any systemic departure of house prices from its equilibrium. The idea of exploring the error terms for systematic trends is the basis of the modern cointegration theory, and its applications are numerous. However, the application of this method to explore systematic market movements in finance and real estate literature is

Table 2. Long-run estimates of house price in Suva dependent variable: log of average house price sample: 1987–2018

Regressor	Coefficient (*t*-values)
Intercept	−15.87 (5.81)***
Real income	0.762 (4.86)***
Land cost	0.456 (7.72)***
Building material prices	0.041 (1.82)*
CPI inflation	1.884 (13.86)***
Volatility of house prices	0.006 (12.17)***
Household size	1.935 (15.52)***
Cost of capital	−0.762 (4.86)***
Political crisis	−0.053 (3.62)***
Proximity to city	0.022 (2.89)***

Notes: * and *** represents significance at 10% and 1%, respectively. The respective *t*-values are in brackets. All variables are in logs, except for the cost of capital. The dependent variable is ln HP
Source: Authors' estimates using Microfit 4.2

limited. As such, this would be the first attempt for analyzing house price bubbles in the housing market for Fiji, in line with Hui and Yue (2006) for Hong Kong, Beijing and Shanghai and Abelson *et al.* (2005) for Australia. Other local studies that have discussed financial markets and their impact on Fiji's economy are (Jayaraman *et al.*, 2014; Jain *et al.*, 2020 and Prasad, 2019) but they have not tested for house price bubbles.

Using the aforesaid method, Table 3 presents the empirical results of using Ordinary Least Squares (OLS) to estimate the dynamics of house prices. Included are the first differences of the significant variables of the long-run (Table 2) with at least two-period lags of *X* variables and the one-period lagged residuals (ECT_{t-1}). The OLS is adequate because all variables are I (0).

While short-run results show that all variables strongly contribute to the dynamic changes in Fiji's house prices (except for inflation rate), the one-period error correction term is statistically significant at 1% level and has the correct negative sign. The lagged ECT term is negative and statistically significant showing quick adjustment to long-run equilibrium (within 1 year and 4 months) and consequently indicates no systemic departure from the long-run equilibrium. As such, there is no statistical evidence of house price bubbles in Fiji because the equilibrium relationship is not explosive. The other diagnostics tests are also satisfactory, with all rejecting the presence of auto-correlation, functional form issues, non-normality in error terms and heteroscedasticity.

Regressor	Coefficient
Intercept	−0.0422 (1.16)
Growth of $income_{(t)}$	0.935 (2.51)**
Growth of $income_{(t-1)}$	0.596 (2.21)**
Growth of construction $cost_{(t)}$	0.444 (3.75)***
Growth of $BMPI_{(t)}$	−0.170 (3.41)***
Change in inflation $rate_{(t)}$	0.969 (1.85)*
Growth of household $size_{(t)}$	1.216 (0.00)***
Increase in the user cost of $capital_{(t)}$	0.771 (2.58)**
Raise of volatility of house $prices_{(t)}$	0.074 (3.03)***
$ECT_{(t-1)}$	−0.701 (3.49)***
R-Bar-Squared 0.702 SER	0.038
DW-Statistics 1.7620	
Serial correction $X^2(2) = 0.213$ [0.64]	
Functional Form $X^2(2) = 0.039$[0.84]	
Normality $X^2(2) = 1.475$ [0.48]	
Heteroscedasticity $X^2(2) = 0.998$ [0.32]	

Notes: *, **, *** represent significance at 10%, 5% and 1% levels, respectively. The respective *t*-values are in brackets. All variables are in logs, except for the user cost of capital. The dependent variable is Δln HP. The diagnostics tests are for the null of serial correlation, misspecification of functional form, non-normality and heteroscedastic errors (LM version)

Table 3. Dynamic estimates of house price in Suva city sample 1987–2018

The above analysis implies that once disturbed, house prices will revert to its equilibrium without diverging from the trend. This is reliving for a small economy and is useful for monetary policy especially for regulating the housing market. Given that the market remains stable, over-tightening using liquidity and interest rate police are going to disturb the workings of the market systems. These will create an unwanted dead-weight loss in a well-functioning financial system.

6. Conclusions

Globally, the housing markets are becoming progressively significant in shaping the economic and social well-being of corporations and households. Urbanization, industrialization, demographic changes and the growth in the financial market activities have led to an increase in housing demand in developing economies. However, rapid changes in the market conditions may trigger potential risks such as price bubbles. This paper contributes to housing literature in small and vulnerable economies in three ways. Firstly, our analysis of the house price bubble in Fiji is pioneering. Secondly, we apply a comprehensive empirical approach to assess the equilibrium house price in Suva City (a proxy for Fiji) in congruence with the theory and market fundamentals. Thirdly, policy implications derived from the Fijian experience can provide insights for similar small and developing economies in the Pacific and beyond.

The econometric results show that real income, land cost, building material price, inflation rate, house price volatility, household size and household wealth have a positive impact on house prices while user cost of capital and political disturbance dummy have negative impacts. The findings further indicate that Fiji's housing market does not constitute any price bubble over the sample period. This is an important insight for developing housing policy for Fiji where a significant segment of household wealth is tied down to properties. Also, the results provide a sound basis for financial policies to aid households to acquire funds for housing development, which seems to have been undermined since the tightening of monetary policy. Also, the housing market remains important for the Fijian economy as the economic benefits of house price growth are being channelled into other sectors such as construction, finance, retail trade and tourism. This transmission can be disturbed by misinformed changes to a broader set of macroeconomic policies targeting the housing market. Additionally, the study highlights the need for a robust housing programme in Fiji and the urgency of expanding the scope of housing supply. In light of COVID19 and its impact on households, the monetary and financial policies will have to be responsive and pro-active. Our analysis shows the need for innovative financial market policies. Future research might consider a broader range of demand and supply factors to determine how they correspond to house prices and urban development policies. The empirical analysis could also consider the effects of COVID19 on income and affordability of housing in Fiji and beyond.

Notes

1. Jannsen (2010) argues that the burst in house price bubble triggered economic recession in 15 OECD countries.
2. This does not account for the COVID19 impact.

3. The 2014 HIES covered 5% of 184,235 households in Fiji, sampled from the four geographical divisions using stratified random sampling (FBOS, 2019b).
4. More than 2,550 Fijian families have been assisted under the First Home Ownership Initiative since its inception in 2014, an overall investment of $22.7m.
5. (I) Kalabu Housing Project – government provided a grant of $1.5m in the 2014 National Budget and a further grant of $741,344 in the 2015 National Budget to erect 36 one-bedroom units at Kalabu.

(II) Savusavu Housing Project – government provided a grant of $500,000 in the 2014 National Budget and a further $3.34m in the 2015 National Budget for Savusavu project comprising of 32 one bedroom and 16 two-bedroom flats; total of 48 flats. This project was completed in December 2017.

6. However, estimates with time series data in levels violates the classical assumptions (Wooldridge, 2012).

References

Abelson, P., Joyeux, R., Milunovich, G. and Chung, D. (2005), "Explaining house prices in Australia: 1970–2003", *Economic Record*, Vol. 81 No. s1, pp. 96-103.

Arestis, P., Gonzalez-Martinez, A.R. and Jia, LK. (2017), "House price overvaluation in Hong Kong: identifying the market fundamentals and understanding the 'bubble'", *International Journal of Housing Markets and Analysis*, Vol. 10 No. 2, pp. 282-304.

Asia Development Bank (2020), *Asian Development Outlook (ADO) 2020: What Drives Innovation in Asia*?, Asia Development Bank, Manila.

Besarria, C.D., Paes, N.L. and Silva, M.E. (2018), "Testing for bubbles in housing markets: some evidence for Brazil", *International Journal of Housing Markets and Analysis*, Vol. 11 No. 5, pp. 754-770.

Biggs, M., Mayer, T. and Pick, A. (2010), "Credit and economic recovery: demystifying phoenix miracles", available at: https://ssrn.com/abstract=1595980 (accessed 20 May 2019).

Cajueiroa, D.O. and Tabak, B.M. (2006), "Testing for rational bubbles in banking indices", *Physica A: Statistical Mechanics and Its Applications*, Vol. 366 No. 1, pp. 365-376.

Capozza, D.R., Hendershott, P.H. and Mack, C. (2004), "An anatomy of price dynamics in illiquid markets: analysis and evidence from local housing markets", *Real Estate Economics*, Vol. 32 No. 1, pp. 1-32.

Case, K.E. and Shiller, R.J. (2003), "Is there a bubble in the housing market?", *Brookings Papers on Economic Activity*, Vol. 2003 No. 2, pp. 299-362.

Diba, B.T. and Grossman, H.I. (1988), "Explosive rational bubbles in stock prices?", *The American Economic Review*, Vol. 78 No. 3, pp. 520-530.

Dimitriou, D. and Simos, T. (2013), "Contagion channels of the USA subprime financial crisis: evidence from USA, EMU, China and Japan equity markets", *Journal of Financial Economic Policy*, Vol. 5 No. 1, pp. 61-71.

Engel, R. and Granger, C. (1987), "Co-integration and error correction: representation, estimation, and testing", *Econometrica*, Vol. 55 No. 3, pp. 251-276.

Evans, G.W. (1991), "Pitfalls in testing for explosive bubbles in asset prices", *The American Economic Review*, Vol. 18 No. 4, pp. 922-930.

Fama, E.F. (1970), "Efficient capital markets: a review of theory and empirical work", *The Journal of Finance*, Vol. 25 No. 2, pp. 383-417.

Fiji Bureau of Statistics (2019a), *Key Statistics*, Government of Fiji, Suva.

Fiji Bureau of Statistics (2019b), *Construction Survey*, Retrieved from Fiji Bureau of Statistics, available at: www.statsfiji.gov.fj/index.php/latest-releases/establishment-surveys/building-statistics

Flood, R.P. and Hodrick, R.J. (1986), "Asset price volatility, bubbles, and process switching", *The Journal of Finance*, Vol. 41 No. 4, pp. 831-842.

Flood, R.P. and Hodrick, R.J. (1990), "On testing for speculative bubbles", *Journal of Economic Perspectives*, Vol. 4 No. 2, pp. 85-101.

Fuata, P. (2015), "Analysis: housing starts and what it means to the economy?", available at: http://fijisun.com.fj

Garber, P.M. (1990), "Famous first bubbles", *Journal of Economic Perspectives*, Vol. 4 No. 2, pp. 35-54.

Geng, N. (2018), "Fundamental drivers of house prices in advanced economies", Staff Working Papers (WP/18/164), The International Monetary Fund, Washington, DC.

Glindro, E.T. and Delloro, V.K. (2010), "Examining asset price bubbles in the Philippines", BSP Working Paper, No. 2010-02, Bangko Central ng Pilipinas, Manila.

Hassan, A. (2014), "Sustainable development of low cost urban housing in Fiji: a case study of the Fiji housing authority", Unpublished Ph.D., University of the South Pacific, Laucala, Suva.

Hekwolter, M., Nijskens, R. and Heeringa, W. (2017), "The housing market in major Dutch cities", DNB Occasional Studies 1501, Netherlands Central Bank, Research Department.

Hui, E.C. and Yue, S. (2006), "Housing price bubbles in Hong Kong, Beijing and Shanghai: a comparative study", *The Journal of Real Estate Finance and Economics*, Vol. 33 No. 4, pp. 299-327.

International Monetary Fund (IMF) (2019), "Global financial stability report: vulnerabilities in a maturing credit cycle", IMF, Washington, DC, April.

Jain, K., Singh, R. and Patel, A. (2020), "Mapping of sovereign risks in small island economies: an application of contingent claim approach to Fiji", *Cogent Economics and Finance*, Vol. 8 No. 1727158.

Jannsen, N. (2010), "National and international business cycle effects of housing crises", *Applied Economics Quarterly*, Vol. 56 No. 2, pp. 175-206.

Jayaraman, T., Chen, H. and Bhatt, M. (2014), "Contribution of foreign direct investment to the tourism sector in Fiji: an empirical study", *Tourism Economics*, Vol. 20 No. 6, pp. 1357-1362.

Kindleberger, C.P. and Alibe, R.Z. (2000), *Manias, Panics, and Crashes: A History of Financial Crises*, John Wiley & Sons, New York, NY.

Kok, S.H., Ismail, N.W. and Lee, C. (2018), "The sources of house price changes in Malaysia", *International Journal of Housing Markets and Analysis*, Vol. 11 No. 2, pp. 335-355.

Ministry of Lands (2019), "Valuation sales report", Government of Fiji, Suva.

National Housing Policy (2011), *Republic of Fiji – The National Housing Policy*, Government of Fiji, Suva.

Negro, M.D. and Otrok, C. (2005), "Monetary policy and the house price boom across US States", Federal Reserve Bank of Atlanta Working Paper No. 24, available at: https://papers.ssrn.com (accessed 8 May 2019).

Phillip, P. and Hansen, B. (1990), "Statistical inference in instrumental variables regression with I (1) processes", *Review of Economic Studies*, Vol. 57 No. 1, pp. 99-125.

Phillips, P.C., Shi, S. and Yu, J., (2015), "Testing for multiple bubbles: historical episodes of exuberance and collapse in the S&P 500", *International Economic Review*, Vol. 56 No. 4, pp. 1043-1078.

Prasad, A. (2019), "Financial markets, governance and economic growth", Phd Thesis, The University of the South Pacific, Suva, Fiji, Unpublished (forthcoming).

Prasad, A. (2020), "Financial markets governance and economic growth", Phd Thesis, The University of the South Pacific (Suva), Fiji, unpublished.

Rawlinsons Group (2004), *Rawlinson's Australian Construction Handbook 2004 (Ed. 22.)*, Rawlhouse Pub.

RBF (2020), *Quarterly Review June 2020*, Government of Fiji, Suva.

Reserve Bank of Fiji (2017), *Financial Stability Review October 2017*, Government of Fiji, Suva.

Reserve Bank of Fiji (2018), *Financial Stability Review October 2018*, Government of Fiji, Suva.

Roche, M.J. (2001), "The rise in house prices in Dublin: bubble, fad, or just fundamentals", *Economic Modelling*, Vol. 18 No. 2, pp. 281-295.

Shen, Y., Hui, E.C. and Liu, H. (2005), "Housing price bubbles in Beijing and Shanghai", *Management Decision*, Vol. 43 No. 4, pp. 611-627.

Shi, S., Valadkhani, A., Smyth, R. and Vahid, F. (2016), "Dating the timeline of house price bubbles in Australian capital cities", *Economic Record*, Vol. 92 No. 299, pp. 590-605.

Siegel, J.J. and Thaler, R.H. (1997), "The equity premium puzzle", *Journal of Economic Perspectives*, Vol. 11 No. 1, pp. 191-200.

Somerville, C.T. (1996), "The contribution of land and structure to builder profits and house prices", *Journal of Housing Research*, Vol. 7 No. 1, pp. 127-141.

Stevenson, S. (2008), "Modeling housing market fundamentals: empirical evidence of extreme market conditions", *Real Estate Economics*, Vol. 36 No. 1, pp. 1-29.

Teng, H.J., Chang, C.O. and Chau, K. (2013), "Housing bubbles: a tale of two cities", *Habitat International*, Vol. 39 No. 3, pp. 8-15.

Tu, Q., Haan, J.D. and Boelhouwer, P. (2018), "House prices and long-term equilibrium in the regulated market of The Netherlands", *Housing Studies*, Vol. 33 No. 3, pp. 408-432.

Wooldridge, J.M. (2012), *Introductory Econometrics: A Modern Approach*, Cengage Learning, South-Western, Mason.

World Development Indicators (2020), Data Bank, available at: https://databank.worldbank.org/source/world-development-indicators_accessed (accessed 22 May 2020).

Zhou, W.X. and Sornette, D. (2003), "2000-2003 Real estate bubble in the UK but not in the USA", *Physica A: Statistical Mechanics and Its Applications*, Vol. 329 Nos 1/2, pp. 249-263.

Further reading

Case, K.E., Quigley, J.M. and Shiller, R.J. (2005), "Comparing wealth effects: the stock market versus the housing market", *Advances in Macroeconomics*, Vol. 5 No. 1, pp. 1-35.

Christiano, L.J. and Fitzgerald, T.J. (2003), "The bandpass filter", *International Economic Review*, Vol. 44 No. 2, pp. 435-465.

Fereidouni, H.G., Al-Mulali, U., Lee, J.Y. and Mohammed, A.H. (2016), "Dynamic relationship between house prices in Malaysia's major economic regions and Singapore house prices", *Regional Studies*, Vol. 50 No. 4, pp. 657-670.

FernáNdez-Kranz, D. and Hon, M.T. (2006), "A cross-section analysis of the income elasticity of housing demand in Spain: is there a real estate bubble?", *The Journal of Real Estate Finance and Economics*, Vol. 32 No. 4, pp. 449-470.

Fiji Bureau of Statistics (2002), "Household income and expenditure survey", Government of Fiji, Suva.

Fiji Bureau of Statistics (2008), "Household income and expenditure survey", Government of Fiji, Suva.

Fiji Bureau of Statistics (2014), "Household income and expenditure survey", Government of Fiji, Suva.

Garino, G. and Sarno, L. (2004), "Speculative bubbles in UK House prices: some new evidence", *Southern Economic Journal*, Vol. 70 No. 4, pp. 777-795.

Government of Fiji (2016), *Post-Disaster Needs Assessment: Tropical Cyclone Winston*, Government of Fiji, Suva.

Hassan, A. (2007), "National overview of housing in Fiji", *The 13th Annual Conference of the Pacific Rim Real Estate Society*, Curtin University of Technology, Perth.

Hatzvi, E. and Otto, G. (2008), "Prices, rents and rational speculative bubbles in the Sydney housing market", *Economic Record*, Vol. 84 No. 267, pp. 405-420.

Housing Authority of Fiji (2015), "Annual Report 2015", Government of Fiji, Suva.

Jin, Y. and Zeng, Z. (2004), "Residential investment and house prices in a multi-sector monetary business cycle model", *Journal of Housing Economics*, Vol. 13 No. 4, pp. 268-286.

Oikarinen, E. (2009), "Interaction between housing prices and household borrowing: the Finnish case", *Journal of Banking & Finance*, Vol. 33 No. 4, pp. 747-756.

Public Rental Board (2017), "Annual report 2017", Government of Fiji, Suva.

Reinhart, C.M. and Reinhart, V.R. (2010), "After the fall, no. w16334", National Bureau of Economic Research.

Somerville, C.T. (1999), "Residential construction costs and the supply of new housing: endogeneity and bias in construction cost indexes", *The Journal of Real Estate Finance and Economics*, Vol. 18 No. 1, pp. 43-62.

Tu, Y. and Bao, H.X. (2009), "Property rights and housing value: the impacts of political instability", *Real Estate Economics*, Vol. 37 No. 2, pp. 235-257.

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