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Foreign investment in Australian residential properties

House prices and growth of housing construction sector

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Abstract

Purpose – The purpose of this study is to examine the impact that foreign investment in existing houses and new housing development has on residential house prices and the growth of the housing construction sector.

Design/methodology/approach – The analysis is based on a panel cointegration method, estimated using annual data for all Australian states and territories spanning the period of 1990-2013.

Findings – The results indicate that increases in foreign investment in existing houses do not significantly lead to increases in house prices. On the other hand, a 10 per cent increase in foreign investment for housing development decreases house prices by 1.95 per cent. We also find that foreign real estate investments have a positive impact on housing construction activities in the long run.

Originality/value – Existing studies used aggregate foreign real estate investment in their analyses. As foreign investment in existing houses and foreign investment for housing development have different impacts on the demand and supply sides of housing market, it is crucial that the analysis of the effects of foreign investment in residential properties on real estate market is conducted for each type differently.

Keywords Australia, Construction, Foreign investment, Panel cointegration, House prices, Construction costs

Paper type Research paper

JEL classification – F41, F21, G12

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1. Introduction

We examine the impact that foreign investment in residential properties in Australia (FIRPA) has on house prices and the growth of the housing construction activities. Over the last two decades, Australia has experienced:

- increasing foreign capital flows into the local real estate sector; and
- strong growth in house prices.

This poses questions of whether there is a significant link between FIRPA and house prices, and whether FIRPA contributes to the growth of the housing construction sector.

In recent years, there have been some concerns about the impact of FIRPA on the Australian real estate sector (Bowden, 2013; Hyam and Janda, 2014). The issue has also attracted attention from the public and federal policymakers. For example, on March 19, 2014, the former Treasurer Joe Hockey referred an inquiry into the FIRPA framework. The inquiry was in response to concerns about whether the current regulatory framework for FIRPA is delivering the best social and economic outcomes.

A number of observers note that FIRPA has led to increases in house prices, especially for first homebuyers, possibly causing a decline in housing affordability in Australia. Others also argue that housing purchases and development by foreign investors have increased the exposure of the Australian housing market to international business cycles. In addition, they claimed that foreign-financed residential investment might lead to an increase in the value of the Australian dollar, which in turn might reduce the export competiveness of Australia (for a review, see Gauder *et al.*, 2014; Australian Parliament, 2014).

In contrast, a number of commenters and policymakers argue that FIRPA may not be a significant driver of Australian house prices because the share of FIRPA is only around 5-10 per cent of the value of the national housing turnover (Gauder *et al.*, 2014). Regarding the problem of affordability, they claim that foreign buyers are not causing the housing market distortions for first homebuyers because they mainly operate within a different price bracket from first homebuyers and buy different types of properties (higher-priced and high-density dwellings). It is also argued that foreign investors in residential properties are generally long-term investors and do not have short-term speculative mentality (which can create volatility in the housing market). Its supporters also claim that FIRPA has provided a stimulus to the local real estate-related industries (e.g. construction activities and real estate brokerage services) through increases in supply of new construction and the number of real estate transactions. Another argument is that foreign developers can introduce technology and skills to the Australian real estate market and increase competition (for a review, see Australian Parliament, 2014; Gauder *et al.*, 2014; Rogers *et al.*, 2015).

Although the conversation on the impact of FIRPA on house prices is on-going in the media, the reports provided by the Australian Parliament (2014) and Reserve Bank of Australia (Gauder *et al.*, 2014) concluded that FIRPA has little impact on house prices, but it increases the supply of new housing and brings benefits to the local building industry and its suppliers. Whilst there is a consensus amongst Australian policymakers that FIRPA positively influences the real estate sector, the direction and magnitude of the link between FIRPA and the housing market is empirically inconclusive. Studies that were conducted by the Australian Parliament (2014) and Gauder *et al.* (2014) tend to lack econometrics analyses and instead support their arguments using only descriptive statistics and interviews.

To address the above-mentioned concerns in relation to the possible impact of FIRPA on the Australian real estate sector, we empirically examine the long-term impact and short-term dynamics of FIRPA on house prices (HP) and the growth of the housing construction sector. Applying a panel cointegration analysis consisting of six Australian states (New South Wales,

Queensland, South Australia, Tasmania, Victoria and Western Australia) and two mainland territories (the Australian Capital Territory and the Northern Territory), over the period of 1990-2013, the empirical results suggest that foreign investment in new housing development has a negative and significant impact on residential HP. We also find evidence that FIRPA is positively associated with higher housing construction activities in the long run. Our results provide insights for Australian policymakers to find out which types of FIRPA have been delivering the best economic outcomes for Australia's real estate market.

In addition, our study is motivated by two gaps in the literature on the effect of capital inflows on the host country's real estate sector and economic growth. Firstly, most of the previous studies used the growth of aggregate gross domestic product (GDP) in their analyses (Kim and Yang, 2009; Kim and Yang, 2011; Sá *et al.*, 2011; Tillmann, 2013). Our analysis focuses on the growth of the housing construction sector, which is expected to be more closely linked to FIRPA than to GDP. Secondly, existing studies incorporated aggregate foreign real estate investment in their estimations (Gholipour, 2013; Gholipour *et al.*, 2014). As foreign investment in existing houses and housing development have different impacts on the demand and supply sides of housing market, it is crucial that the analysis of the effects of FIRPA on real estate market is conducted considering different aspects of this market.

The remainder of the paper is structured as follows: Section 2 briefly summarises the related literature. Section 3 describes the variables and data; Section 4 explains the econometric methods and presents the empirical results; and finally, Section 5 concludes the paper.

2. Related literature

A number of studies have investigated the relationship between capital inflows, asset prices (including real estate) and economic growth. In this section, we briefly summarise the relevant studies to our research.

As far as real estate prices and economic growth are concerned, Kim and Yang (2011) found that aggregate capital inflows contribute to land price appreciation but not to economic growth in some of the Asian economies (Indonesia, Malaysia, Philippines, South Korea and Thailand) over the period of 1999-2006. Kim and Yang (2011) argued that the positive impact of capital inflows on real estate prices can be explained at least through two channels. First, capital inflows might result in an increase of money supply and liquidity, unless fully sterilised, which in turn might boost asset prices, including real estate. Second, capital inflows tend to increase economic activities and income in the host country, which can lead to an increase in the real estate prices. In a related study, using data from a panel of OECD (Organisation for Economic Co-operation and Development) countries over the period of 1984-2006, Sá *et al.* (2011) also showed that capital inflows and expansionary monetary policy shocks have a significant and positive impact on real HP and residential investment (a component of GDP) and real credit to the private sector. Tillmann (2013) provided evidence that capital inflow has a significant effect on the appreciation of house prices and economic growth in Asian emerging market economies over the period of 2000-2011. In contrast, Kim and Yang (2009) found no significant link between capital inflows and land prices in South Korea over the period of 1999-2007.

Besides studies on the link between aggregate capital inflows and real estate prices, some studies examined the relationship between private capital inflows, speculative capital inflow and real estate prices. For example, using Chinese data from 1997 to 2008, Guo and Huang (2010) found that speculative capital inflow (or hot money) was one of the major contributors to increases and volatility of China's real estate prices. Jansen (2003) showed that higher asset prices (e.g. stocks and property prices), lower lending interest rates and an increase in

lending by financial institutions to the private sector were the main determinants of foreign private capital flows to Thailand over the period of 1980-1996.

In recent years, there has been a growing interest in examining the linkages between more specific capital inflows, namely, foreign real estate investment and HP in developed and emerging economies. For example, Gholipour *et al.* (2014) found that foreign real estate investment neither causes HP appreciation nor contributes to economic growth in the OECD countries (excluding Australia). Chan (2007) also provided evidence that foreign real estate investments were not the main determinants of escalation of real estate prices in China in 2000s because foreign real estate investments were a small portion of the total real estate investments in the country. On the other hand, using data from 21 emerging economies over the period 2000-2008, Gholipour (2013) showed that higher foreign investment tends to stimulate economic growth and surge HP in emerging countries. Similarly, Liao *et al.* (2015) showed that foreigners' property purchases had large impacts on Singaporean housing price movement over the period of 1996-2011.

Building on previous works, our paper offers two contributions to the literature. Firstly, to the best of our knowledge, past studies mainly examined the effects of aggregate foreign real estate investment on host countries' HP. In this study, however, we disaggregate FIRPA into two categories: foreign investment in existing residential real estate (FDI_ER) and foreign investment in the development of new residential real estate (FDI_NR). This enables us to determine distinctive impact of FDI_ER and FDI_NR on the housing market. That is important as FDI_ER and FDI_NR have different impacts on the demand and supply sides of housing market. Secondly, our panel data regressions focus on the link between FIRPA and growth of residential construction sector rather than the aggregate GDP. In other words, the impact of FIRPA on aggregate GDP may not be well observed when compared to the impact of FIRPA on residential building activities.

3. Variables and data

Annual data for six Australian states (New South Wales, Queensland, South Australia, Tasmania, Victoria and Western Australia) and two mainland territories (the Australian Capital Territory and the Northern Territory), which covered the period of 1990-2013, were obtained for all variables. We use the panel data because of the inadequacy and low frequency of national time-series data for FIRPA. Pooling the observations across states and territories over time allows us to overcome the data restrictions, which we would have otherwise faced when testing for the long-term relationships amongst national time series.

The data for FIRPA were collected manually from the annual reports of the Foreign Investment Review Board (FIRB). FIRB publishes data on the total number and value of approved properties it grants to foreign investors and temporary residents. The FIRB disaggregates total FIRPA into two main categories:

(1) foreign investment in existing (or developed) residential real estate; and

(2) foreign investment in residential real estate for development.

The first category consists mainly of temporary residents in Australia acquiring one existing residential property for use as their residence in Australia. The second category includes three sub-categories:

(1) the development of vacant land category (consists primarily of individual blocks of land purchased for single dwelling construction);

(2) the new dwellings and off-the-plan category (consists of applications by individuals to acquire newly constructed dwellings directly from developers and

applications by developers to sell up to 100 per cent of new residences in a development to foreign interests); and

(3) developed property for redevelopment (involves the acquisition of existing property for the purpose of demolition and construction of new residential dwellings)[1].

The FIRB approvals are the main source of data on the foreign investment levels in real estate in Australia. However, there are three limitations with the FIRB data: firstly, these data correspond to approvals and not actual purchases and foreign acquisitions of real estate that have bypassed the required approval process. In other words, there is no adjustment made to the published approvals data as to whether the proposed purchases were subsequently completed. Secondly, foreign or domestic developers of some proposed new residential projects can receive pre-approval from the FIRB to sell up to 100 per cent of the resultant dwellings to non-residents, after which no further approval from the individual buyers is required. Consequently, the published FIRB data do not fully reflect the share of new residential dwellings in these projects that was actually sold to foreign citizens or temporary residents or the timing as to when the sales took place. Perhaps, more importantly, the FIRB data published reflect only the gross approvals by foreign buyers; the subsequent sale of their properties to Australian citizens or permanent residents is not included in the FIRB data. Thirdly, the FIRB data include a lag in their availability, as well as series breaks (Gauder *et al.*, 2014).

It should also be noted that Australia's FIRPA policy seeks to channel foreign investment into activity that directly increases the supply of new houses and brings benefits to the construction industry and its suppliers (Australian Parliament, 2014). Therefore, non-resident foreign investors are prohibited from purchasing an existing home, and temporary residents (on visas of more than 12 months) can only purchase one existing home to live in whilst they reside in Australia, but they must sell it upon their visa expiry. Foreign investors and temporary residents require approval from the FIRB prior to purchasing a dwelling or site for development (Gauder *et al.*, 2014).

The FIRB shows that the value of foreign investment into Australian real estate has increased over the last two decades. The values of FIRPA has increased by 8 per cent over the period from 1991 to 2013. The USA, the UK and Singapore have been the three largest sources of foreign investment in Australia's real estate sector, with China featuring prominently in recent years. In terms of geographical distribution, much of the FIRPA has been invested in New South Wales and Victoria and, to a lesser extent, to other states and territories.

As a measure of HP, we use the median house prices ($'000s) provided by the Real Estate Institute of Australia (REIA). The data are available for eight capital cities of Australian states and territories[2]. The median HP data are widely accepted as a reliable source of house prices as they are used by several Australian researchers and international institutions to analyse the Australian housing market (e.g. Bank for International Settlements (BIS)[3]; Adams and Füss, 2010; Abelson and Chung, 2005). In addition, there is a high correlation ($r = 0.97$) between the Australian Bureau of Statistics (ABS) residential property price index and the REIA median HP ($'000s) over the common period from 2003 to 2013. It is noteworthy that we do not use the ABS residential property price indexes due to the lack of consistency in the data set. The ABS has significantly altered their method of collection in 2003/2004.

To measure the performance of the housing construction sector, we use values of residential building work done (VRB) in states and territories[4]. The ABS uses chain volume measures method to calculate this variable[5]. In addition to FDI_ER, FDI_NR, HP

and VRB, we collected information on variables that affect HP and activities in the housing construction sector. These include:

- housing finance for construction and purchase of new houses provided by financial institutions (FIN_NR);
- housing finance for established houses provided by financial institutions (FIN_ER);
- gross state product per capita (GSP/POP);
- lending interest rate (INT); and
- building costs (COST).

Table I provides detailed description of the data and data sources. We used logarithm values for all variables in the analyses.

To answer our research questions, we developed two models. These models test the relationship between HP and VRB/POP and their determinants:

$$\mathrm{HP} = f(\mathrm{FDI\_NR}, \mathrm{FDI\_ER}, \mathrm{FIN\_NR}, \mathrm{FIN\_ER}, \mathrm{GSP/POP}, \mathrm{INT}, \mathrm{COST}) \quad (1)$$

$$\mathrm{VRB/POP} = f(\mathrm{FDI\_NR}, \mathrm{FDI\_ER}, \mathrm{FIN\_NR}, \mathrm{FIN\_ER}, (\mathrm{GSP} - \mathrm{VRB})/\mathrm{POP}, \mathrm{INT}, \mathrm{COST}, \mathrm{HP}) \quad (2)$$

Theoretical models and empirical studies have shown that greater access to housing finance, higher levels of economic activities (often measured by GDP), higher construction costs can lead to increases in HP (Adams and Füss, 2010; Kohler and van der Merwe, 2015). On the

Variables	Definitions	Sources
HP	Annual median house prices ($'000s)	REIA
FDI_NR	Foreign investment in residential real estate for development ($ millions)	FIRB
FDI_ER	Foreign investment in developed residential real estate ($ millions)	FIRB
VRB/POP	Value of residential building work done ($'000) per capita	ABS
FIN_NR	Housing finance for construction and purchase of new houses provided by financial institutions ($ millions)	ABS
FIN_ER	Housing finance for established houses provided by financial institutions ($ millions)	ABS
GSP/POP	GSP ($ millions) per capita	ABS
POP	Estimated state resident population	ABS
INT	Lending interest rate (%)	World Development Indicators of the World Bank
COST	Building price index (proxy for construction costs). The index is based on historical data (on the rates of labour and materials) prepared over the years by the individual firms of the Rawlinsons Group in the capital cities of Australia	Rawlinsons Group
GSP-VRB	GSP excludes VRB	Authors' calculation

Table I. Description of the data and data sources

other hand, an increase in the long-term interest rate reduces the demand for housing, which in turn lowers GP (Adams and Füss, 2010; Lean and Smyth, 2014). Regarding Model 2, we also expect that greater access to housing finance, higher levels of economic activities, lower construction costs and increases in HP have positive impacts on residential construction activities (Borowiecki, 2009; Gholipour, 2011).

4. Methodology and empirical results

We apply a panel cointegration analysis to examine the long-term impact and short-term dynamics of FIRPA on HP and the growth of the housing construction sector. The main reason to use the panel cointegration analysis is that it deals with the possible simultaneity between the variables of interest, which is the main feature of our study. Moreover, this approach restricts the long-run behaviour of the endogenous variables to converge to their cointegrating relationships whilst allowing for short-run adjustment dynamics. Panel cointegration analysis is conducted in three steps: first, we test the stationarity properties of the variables using panel unit root tests. Then, we apply panel cointegration tests to detect the long-term equilibrium relationships, and finally, we estimate the short-term dynamics using Granger-causality test.

4.1 Panel unit root tests

In this study, we apply two panel unit root tests: LLC, developed by Levin *et al.* (2002) and IPS, proposed by Im *et al.* (2003). Both tests typically extend a panel model of the augmented Dickey-Fuller (ADF, Dickey and Fuller, 1979) unit root specification. The LLC test assumes that there is a common unit root process so that the autoregressive coefficients are identical across cross-sections. The IPS test allows for individual unit root processes so that the autoregressive coefficients may vary across cross-sections. Both LLC and IPS tests use a null hypothesis of a unit root.

Table II displays the results of panel unit root tests. The results do not show a conclusion that the null of unit root can be rejected for the levels of the variables. However, the test statistics for the first difference strongly reject the null hypothesis, which imply that the variables are stationary in the first-difference form. We, therefore, conclude that the variables are integrated at order one (I(1)), indicating a possible long-run cointegrating relation amongst the variables in Models (1) and (2). Therefore, what follows is testing for cointegration in the next step of empirical analysis.

4.2 Panel cointegration analysis

To analyse the existence of the long-run equilibrium relationship amongst the variables in equations (1) and (2), we use Kao (1999) cointegration tests. The Kao tests are based on Engle and Granger (1987) two-step (residual-based) cointegration tests. The Engle and Granger (1987) cointegration test is based on an examination of the residuals of a spurious regression performed using non-stationary I(1) variables. If the variables are cointegrated, then the residuals should be stationary I(0). On the other hand, if the variables are not cointegrated, then the residuals will be I(1). Kao (1999) extends the Engle and Granger framework to tests involving panel data. Kao tests the null hypothesis of no cointegration.

The results of applying the Kao framework to test to Models (1-2) are presented in Table III. For two models, the null hypothesis of no cointegration is rejected at 1 per cent, suggesting that there is a long-run equilibrium relationship between the variables in two models.

As the variables are cointegrated, we then estimate the cointegrating relationships between the variables using a panel fully modified OLS (FMOLS) estimator. The FMOLS estimator is designed for non-stationary panels and corrects the standard OLS for serial

Variable	LLC *t*-statistic	IPS W-statistic
Level		
HP	–0.917 (1)	–0.418 (1)
FDI_NR	–0.282 (2)	0.274 (2)
FDI_ER	–0.525 (1)	–0.724 (1)
FIN_NR	4.076 (4)	–1.593 (4)
FIN_ER	1.133 (1)	0.856 (1)
GSP	2.309 (1)	0.628 (1)
COST	1.351 (2)	–0.031 (2)
INT	21.002 (4)	0.844 (4)
POP	–0.403 (1)	1.480 (1)
VRB	–0.347 (1)	–1.178 (1)
First-difference		
Δ HP	–3.716*** (1)	–1.040 (1)
Δ FDI_NR	–8.283*** (1)	–10.055*** (1)
Δ FDI_ER	–2.069** (1)	–5.093*** (1)
Δ FIN_NR	–2.153** (1)	–4.053*** (1)
Δ FIN_ER	0.197 (1)	–2.270** (1)
Δ GSP	–3.191*** (1)	–4.016*** (1)
Δ COST	–2.049** (1)	–0.722 (1)
Δ INT	–5.632*** (1)	–5.958*** (1)
Δ POP	–0.718 (1)	–1.779** (1)
Δ VRB	–3.928*** (1)	–3.696*** (1)

Notes: Δ is the first-difference operator. Newey-West bandwidth selection with Bartlett kernel was used for the LLC and IPS tests. Individual intercept and trend were included in test equation. Values in parentheses represent the number of lags. The optimum lag is determined by general to specific approach. ** and *** indicate significance levels of 5% and 1%, respectively

Table II.
Results of panel unit root tests

Test	*t*-statistic	Prob.
Panel ADF-statistic (Model 1)	–5.783	0.000
Panel ADF-statistic (Model 2)	–5.579	0.000

Notes: Null hypothesis: no cointegration; automatic lag length selection: Schwarz information criterion; spectral estimation: Bartlett; bandwidth selection: Newey-West automatic

Table III.
Results for Kao residual cointegration test

correlation and endogeneity of regressors. Therefore, the estimator produces asymptotically unbiased, normally distributed coefficient estimates (Pedroni, 2000).[6] Table IV reports the long-run elasticity estimates from the FMOLS estimator when we use HP (Model 1) and VRB/POP (Model 2) as dependent variables. The results indicate that an increase in foreign investment in existing residential real estate (FDI_ER) does not significantly lead to an increase in HP in the long run (Column 1 of Table IV). This finding is consistent with Gauder *et al.* (2014) who argue that foreign participation in the housing market does not have substantial effect on HP. We also find evidence that a 10 per cent increase in foreign investment in new residential real estate (FDI_NR) decreases HP by 1.95 per cent. That can be justified by higher supply in the new residential property market as a result of foreign investment.

Table IV.
Long-run elasticity estimates from panel FMOLS estimator

Model (1) Dependent variable: HP (1)		Model (2) Dependent variable: VRB/POP (2)	
FDI_ER	–0.015 (–0.217)	FDI_ER	0.159** (2.351)
FDI_NR	–0.195** (–2.494)	FDI_NR	0.082 (0.913)
FIN_ ER	0.185*** (3.658)	FIN_ ER	0.029 (0.695)
FIN_NR	0.163*** (3.535)	FIN_NR	0.364*** (5.504)
GSP/POP	0.440*** (16.712)	(GSP-VRB)/POP	–0.732*** (–21.015)
INT	–0.002 (–0.059)	INT	–0.096* (–1.728)
COST	0.857*** (47.277)	COST	–0.610*** (–30.771)
		HP	0.454*** (14.363)

Notes: Panel method: grouped estimation; cointegrating equation deterministic: C; *t*-statistics are in parentheses; *, ** and *** indicate significance levels of 10%, 5% and 1%, respectively

As expected, the availability of housing finance has a positive and statistically significant association with HP. A 10 per cent increase in FIN_ER and FIN_NR surges HP by around 1.85 per cent and 1.63 per cent, respectively. This is in line with a large body of literature that shows credit growth has a significant contemporaneous effect on residential property prices (Goodhart and Hofmann, 2008; Semlali and Collyns, 2002; Zhu, 2006). Gross state product per capita (GSP/POP), which is the indicator of economic activities across states, and construction costs have the expected positive and statistically significant associations with HP.

The results of the FMOLS estimator also show that greater FDI_ER is significantly associated with higher levels of housing construction activities over the period of our study (Column 2 of Table IV). More specifically, a 10 per cent increase in FDI_ER increases VRB/POP by 1.59 per cent. This result lends supports to the arguments that foreign real estate investments have provided a stimulus to the local real estate sector by boosting supply of new housing construction and increases in activities related to alterations and additions to residential building. We also find that construction costs (COST) and housing finance for construction and purchase of new houses (FIN_NR) have negative and positive relationships with VRB/POP, respectively (Column 2 of Table IV).

4.3 Panel causality analysis

Having established that a cointegrating relationship exists between variables in Models (1-2), we then estimate a panel vector error correction model (VECM) to determine the direction of the causality between the variables in each model. The VECM allows the test of short- and long-run Granger causality amongst the endogenous variables. The source of short-run Granger causality can be identified by testing the significance of the (χ^2 statistic). For example, the null hypothesis that FDI_ER does not affect HP requires that all coefficients of lagged FDI_ER are not significantly different from zero in the equation, with HP being the dependent variable. The long-run causality is examined by statistical significance of the *t*-statistics of the lag error correction parameter (ECT). For instance, the statistically significant ECT (in a model that HP is dependent variable, see Table V) implies that the combination of FDI_NR, FDI_ER, FIN_NR, FIN_ ER, GSP/POP, INT and COST variables Granger cause HP in the long run.

Tables V and VI present the short- and long-run Granger causality results for Models 1 and 2, respectively. The results in Table V indicate that there is a long-run Granger causality running from all independent variables to HP. That is a confirmation to many

Table V. Panel Granger causality test results when HP is dependent variable (Model 1)

	Source of causation (independent variables)								
	Short-run (χ^2-statistic)								Long-run (t-statistic)
Dependent variable	D(HP)	D(FDI_ER)	D(FDI_NR)	D(FIN_ ER)	D(FIN_NR)	D(GSP/POP)	D(INT)	D(COST)	
D(HP)		0.285	2.580	8.211**	0.764	1.894	8.836**	0.353	0.016*** (2.671)
D(FDI_ER)	11.223***		4.763*	1.346	0.914	1.661	0.285	0.633	0.072 (1.253)
D(FDI_NR)	1.421	1.853		0.151	1.228	6.292**	0.212	3.384	0.014 (0.194)
D(FIN_ ER)	1.688	1.277	2.178		0.876	0.362	6.046**	0.141	0.018 (1.153)
D(FIN_NR)	1.338	4.170	0.793	1.070		4.151	2.247	0.174	0.023 (1.006)
D(GSP/POP)	0.489	0.175	1.064	2.106	11.441***		3.176	0.272	0.0002 (0.067)
D(INT)	3.493	8.794**	0.215	2.500	11.197***	0.864		1.813	–0.704*** (–8.186)
D(COST)	15.418***	0.202	2.419	3.069	1.652	0.069	6.392**		–0.0005 (–0.180)

Notes: ECT is the coefficients of the error correction term. *, ** and *** indicate significance levels of 10%, 5% and 1%, respectively. t-statistics are in parentheses. The optimal lag length is determined using the Akaike information criterion (AIC)

Table VI.
Panel Granger causality test results when VRB/POP is dependent variable (Model 2)

	Source of causation (independent variables)									
	Short-run (χ^2-statistic)									Long-run (*t*-statistic)
Dependent variable	D(VRB/POP)	D(FDI_NR)	D(FDI_ER)	D(FIN_NR)	D(FIN_ER)	D(GSP-VRB/POP)	D(INT)	D(COST)	D(HP)	
D(VRB/POP)		3.414	4.614*	2.061	3.785	2.821	1.425	2.762	16.476***	0.004 (0.712)
D(FDI_NR)	2.923		2.454	1.064	0.041	11.410***	0.107	2.968	2.415	–0.0009 (–0.027)
D(FDI_ER)	1.018	3.437		1.422	1.410	3.116	0.254	1.394	10.868***	–0.037 (–1.387)
D(FIN_NR)	0.675	0.049	4.132		2.727	4.869*	0.929	0.480	1.529	–0.027*** (–2.715)
D(FIN_ER)	2.401	0.276	1.284	1.180		1.782	6.005**	0.646	3.306	–0.011* (–1.753)
D(GSP-VRB/POP)	3.571	2.148	1.585	1.679	3.515		3.645	1.766	9.470***	0.0008 (0.161)
D(INT)	2.473	0.328	4.966*	13.555***	2.183	3.074		3.643	3.309	0.369*** (10.178)
D(COST)	5.770*	3.932	0.076	3.009	3.434	6.227**	7.152**		17.610***	0.001 (0.785)
D(HP)	2.753	1.391	0.495	1.466	9.785***	0.182	11.437***	1.141		0.005* (1.814)

Notes: ECT is the coefficients of the error correction term. *, ** and *** indicate significance levels of 10%, 5% and 1%, respectively. *t*-statistics are in parentheses. The optimal lag length is determined using the AIC

studies that found foreign investment, availability of finance services, economic activities, interest rate and costs of constructions are the main determinants of HP. The results also show that there is no short-run Granger causality running from FDI_ER and FDI_NR to HP. This means, in the short run, foreign investment in existing residential real estate and foreign investment in new housing development do not affect HP. The causality analyses suggest that FIRPA can only influence HP in the long run and not in the short run.

Interestingly, higher property prices are not the motivational factors for foreign investors to invest in the Australian property market in the long run. This means that there are potentially other factors such as better education, better living conditions and political stability that attract foreign investors to Australia (Knight Frank, 2014). Since the 1980s, Australia has encouraged business migration which has resulted in large inflows of capital, much of which has been invested in property (Murphy and Watson, 1994). In 2017, Melbourne was selected as the world's most liveable city for the seventh consecutive year by The Economist (The Economist, 2017). Other top-ranked Australian cities included Adelaide in #6 position, Perth in #7, Sydney in #11 and Brisbane in #16 – each successfully presenting a relative picture of stability. The stable political climate of Australia has also made it a desirable destination for wealthy foreign residents looking to move their family and assets to enjoy a relatively low risk environment (Wong, 2016). All these may justify why high HP are not an impeding factor for foreign investors to enter the Australian property market in the long run.

Table VI presents the results of panel Granger causality test when VRB/POP is the dependent variable. The results indicate that there is no long-run Granger causality running from independent variables (including FDI_ER and FDI_NR) to VRB/POP. However, there is a short-run causality running from FDI_ER to VRB/POP.

In summary, our results are consistent with RBA's views on the impact of foreign investment on HP, in that overseas investors in Australia's housing market do not considerably make it more expensive for Australians to purchase homes, as these investors have a minor impact on HP. However, the role of foreign investment should not be underestimated in HP modelling in Australia because the increase in foreign investors' demand for housing and higher prices in some locations may ripple out to other locations. In addition, our findings provide support for RBA's and Australian parliament's views on the slight and positive impact of foreign real estate investment on the performance of the housing construction industry.

5. Conclusion

The last two decades have witnessed strong growth in terms of FIRPA. A number of observers have argued that FIRPA may boost economic activities in the housing construction sector. On the other hand, some believe that FIRPA is one of the causes of high HP and housing unaffordability in Australia. Using data from Australian states and territories over the period 1990-2013 and applying a panel cointegration analysis, we investigate the effect of FIRPA on house prices and the growth of the housing construction sector. The empirical results show that an increase in foreign investment in new houses has a negative impact on HP in the long run, whilst an increase in foreign investment in existing houses does not have a significant impact on HP. Regarding housing construction, we find statistical evidence that foreign real estate investment in existing houses has a significant impact on the growth of housing construction activities.

These findings provide some implications for Australian policymakers. First, foreign investment in new residential real estate should be encouraged by Australian policymakers, as evidence shows that this type of investments can, to some extent,

contribute to housing supply, reduce house prices and result in higher housing affordability in the country. At the federal level, the proposed "National Urban Policy" text of 2011 also argued that "Australian cities are confronted by significant long-term challenges including population growth and demographic change [and] housing affordability" (Australian Government, 2011, p. 2).

These results support Australian government policy to channel foreign investment into new housing to expand the housing supply and generate employment for builders and suppliers. According to the Australian Parliament (2014), local residential construction industry is one of the most labour-intensive industries in Australia and accounts for around 9 per cent of total employment in this economy. Moreover, materials used in the construction industry are mostly sourced domestically therefore, expansion of construction activities boost demand for construction materials.

The other mainstream concern about foreign investment in residential real estate is housing affordability. Our results suggest that FIRPA does not negatively affect housing affordability in Australia. That is also in line with the Australian Parliament (2014) conclusion that foreign investment has greater contribution to housing supply than housing demand and the benefits of foreign investment outweigh the negatives. The justification is that foreign purchasers may only push the prices up in particular segments of the market such as high-quality new apartments in metropolitan areas.

Notes

1. For details, see Annual Report 2013-2014 published by the FIRB, Australian Government.
2. Available at: https://reia.asn.au/product/remf-data-spreadsheets-purchase/
3. See www.bis.org/statistics/pp.htm
4. A definition of this variable can be found at: www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/8752.0Explanatory%20Notes1Sep%202017?OpenDocument
5. Available at: www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8752.0Sep%202017?OpenDocument
6. We use pooled weighted estimation which accounts for heterogeneity by using cross-section-specific estimates of the long-run covariances to reweigh the data prior to computing pooled FMOLS.

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