The impact of foreign demand on Cyprus house prices

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Abstract

We examine the drivers of house prices in Cyprus, paying particular attention to the impact of foreign demand and its contribution to the recent boom and bust cycle observed in Cyprus’ house prices. To this end, we use two different series to proxy foreign demand for real estate: FDI flows in the real estate sector, and the share of foreign buyers in total property transactions. We employ a Bayesian vector autoregressive mechanism to examine interlinkages between house prices, foreign demand, income growth, credit, interest rates, cost of construction and inflation. The results suggest that the share of foreigners in total real estate demand has a strong effect on house prices, while the effect of overall FDI flows to real estate is small. The timing of increases in both FDI flows and the share appear to be the cause of the recent housing bubble in Cyprus, while flow reversals are key to understanding the downturn and, eventually, the collapse in prices. The impact of foreign demand is qualitatively similar to that in other countries such as Japan and Australia. Simple policy measures to avoid a reoccurrence of this situation are overviewed.

Keywords: House prices, foreign demand, real estate, Bayesian.

1. Introduction

The importance of real estate statistics for any economy across the globe is undisputable and widely accepted. The drivers of demand and supply of real estate prices vary across nations. These drivers depend on various factors that may change with time, such as the economic model of each country, the efficiency and healthiness of its banking system, the size of the real estate sector in relation to whole economy and the ease with which capital moves in and out of the country (Bernanke and Gertler, 2001, NHPAU, 2008, Balke and Keil, 2017 and Geng, 2018).

Indeed, the real estate market is complex and identifying a complete list of its drivers can be a challenge. Still, while researchers may not be able to provide an exhaustive list of determinants, the endeavor to look at the main causes of fluctuations in real

\textsuperscript{2} All views expressed in this paper are strictly personal and do not necessarily reflect the views of the Central Bank of Cyprus or the Eurosystem. We are indebted to George Kyriacou and Petros Sivitanides for their suggestions and especially to George Georgiou for providing comments, suggestions and going through earlier versions of this article. All remaining errors and omissions are ours.

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estate prices is always of use to policy makers. This study, will seek to examine possible factors that affect house prices in Cyprus, paying particular attention to the impact and repercussions of capital inflows in the Cypriot real estate market.  

While Cyprus is a country that has, since its accession to the European Union, been attracting substantial foreign investment compared to its total gross domestic product, to the best of our knowledge the relationship between foreign demand and real estate prices has yet to be extensively examined. To date, only imprecise estimates have been employed to measure foreign demand by the existing local literature (e.g. exchange rates), which captures only part of the story (see next section). There is also a paucity of such studies in the international academic literature.

The absence of this topic from previous studies forms a notable gap in the policy literature, especially when considering that during the Global Financial Crisis, real estate prices played a predominant role (Reinhart and Rogoff, 2008). This is not just related to the US experience. Real estate bubbles had a significant impact on the financial sector in other countries such as Japan, Scandinavia and, of course, Cyprus. While the loop between real estate prices and bank lending has been thoroughly explored in Michail and Thucydides (2018) and Cleanthous et al. (2019) for the case of Cyprus, there is still lack of complete understanding regarding all the drivers that caused the bubble in the first place.

Thus, in this paper, we pay particular attention to foreign demand, captures by both FDI flows to real estate, as well as the share of foreigners in total property sale contracts. As will be shown in the remainder of this paper, the timing of surges in foreign demand coincides with the period just before the real estate boom. Concomitantly, the reversal in foreign demand during the Global Financial Crisis also marks the period just before the burst of the bubble in Cyprus. The likely reason the bubble did not burst immediately was due to the high growth in bank lending, which, however, could only sustain real estate prices for so long.

After employing a Bayesian Vector Autoregression (BVAR) model, which is better suited to our relatively short time-series data, the results suggest that a one standard deviation increase in FDI (approximately €20 million) is estimated to raise real house prices by 0.15%, even though this response is only evident after six quarters, suggesting that the economy does not fully incorporate these changes at the time they occur. As a result, we can conclude that the recent climax observed in capital inflows from 2016 onwards (which in some quarters exceeded the amount of €200 million) facilitated the currently ongoing recovery of the real estate market in Cyprus. However, given the relatively small effect of this relationship (compared with respective relationships internationally), it could also be argued that one-off large foreign investments may not have such an important effect in the overall level of real estate prices, if these are usually channelled to specific large projects. However, it is far more likely that large-project FDI flows can create additional permanent employment in the long-run, as the GDP response suggests.

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1 The terms house prices and residential property prices will be used interchangeably throughout this study, and they refer to both apartments and houses, as per the Central Bank of Cyprus Index.

2 The fact that the CBC Residential Property Price Index is based on valuations, which are known in the literature to exhibit a time lag for the capture of price changes, may also explain the delay of the market to capture the impact of FDI on house prices.
The share of foreigners in total sales contracts appears to have a much stronger effect on the level of house prices, as a one standard deviation shock in the share (around 2%) has a 0.8% impact on house prices. The effect is not limited to house prices as an increase in the share of foreign buyers appears to increase loans by more than 0.5%. This is likely due to indirect effects: as foreign demand causes house prices to increase due to a total demand increase, households feel more comfortable to obtain a loan based on the increased value of their property, which can be used as collateral. Furthermore, an increase in house prices would also encourage real estate developers to borrow for further newbuilding purposes. The results suggest that the link between capital flows and real estate prices exists and, furthermore, inflows of capital can indirectly cause an increase in lending via their effect on house prices.

The housing sector is of importance to various stakeholders, such as government authorities, households, investors, financial institutions and others, making the results of this paper significant for both their macroeconomic and socio-political implications. Price increases, if not justified by the economic fundamentals of the domestic economy, can have a two-fold impact on economic inequality: first, by affecting housing affordability and reducing the possibility that people on low-incomes will ever be home-owners, thus creating a permanent class of rentiers (Keynes, 1936), with all the implications this could have for the social fabric. Second, the concentration of too much foreign investment in a single sector of the economy can cause the so called “Dutch disease” (The Economist, 1977), which refers to the phenomenon whereby the growth in revenues in a specific sector results in the exports of other sectors becoming more expensive (via currency appreciation), thus making these sectors less competitive, hence creating further inequality.

As such, it appears that the only way for the domestic real estate sector to protect itself against such surges and retrenchments in capital flows and real estate prices, with its subsequent implications for inequality, is to impose restrictions on real estate investments. Examples of such restrictions include the requirement to live in the country both before or after the purchase, for an extensive period of time, having in place strict due diligence procedures to verify the purpose of the investment and its association with legal activities, providing incentives for foreign investments in sectors other than real estate (e.g. in entrepreneurship and innovation), and limiting incentives related with real estate investments, e.g. placing a cap on the number of foreign transactions. Naturally, many more policy options exist. Still, the above do not absolve the banks’ responsibility to provide loans to individuals and firms which have a proven ability to repay, and not just rely on collateral (PIMCO, 2013).

For interested readers who would like more details to the general introduction presented above, the following section provides a Cyprus-specific and international literature review. Section 3 presents the quantified relationship between foreign investment and the property market internationally (Japan and Australia). Details on the data used in our study are presented in section 4. The methodology is presented in section 5, and the results from the estimation are found in section 6. Section 7 concludes.
2. Putting Real Estate in Context

Capital inflows in a country can be examined from many perspectives. The Lucas (1990) paradox refers to the puzzling observation that instead of capital flowing from rich countries to poor countries, as classical economic theory would expect, the opposite takes place. A plausible explanation for this paradox is that investors look for safe havens for their capital, which is offered by richer and more advanced countries.

While Cyprus is not usually the first choice for foreign real estate investment,\(^3\) it does offer some appealing benefits and advantages to foreign buyers looking to buy property abroad. First, the Mediterranean climate is attractive to pensioners from northern Europe. For example, British buyers were, until the financial crisis, the largest in this category (Loizou, 2007, 2008, 2012).

Second, Cyprus is considered as a safe country when compared with other countries in the region. The island has a stable democratic system and a developed financial services industry, characteristics which are particularly appealing to foreign investors. Finally, the fact that Cyprus is a member of the EU since 2004 has facilitated the inflow of capital in real estate, while the continued interest of foreign investors for house purchases for retirement purposes, as holiday homes or even as buy to let investments, also contributed in the influx of capital in the real estate sector (Loizou, 2007, 2008, 2012).

In the years since its EU accession, Cyprus has experienced a boom-bust cycle in real estate in general and in house prices in particular. While the significant credit expansion during the years 2006 – 2008 played a major role in driving residential property prices up, foreign demand has also contributed to the observed increases: as the share of foreigners in total sales contracts rose, the house price index followed suit (Figure 3, section 3). In the eruption of the financial crisis in 2008, foreign demand for properties declined severely (see Figure 3, section 3), as evidenced by the reduction in sales contracts deposited by foreigners with the Department of Lands and Registry.

Following the significant correction of house prices, residential property prices have since 2015 been recovering at a moderate rate. This can be attributed to increased economic activity, incentives related to government taxation, reduced fees and new lending. However, according to the residential property sub-indices prepared by the Central Bank of Cyprus it seems that certain hotspots are developing, e.g. apartment prices in Limassol. This has been largely attributed to foreign capital inflows and, in particular, the Cyprus Investment Scheme which enables third-country citizens to obtain a Cypriot passport. Other factors include the population density of Limassol city center, the demand created by AirBnB and the large student population (CBC, 2018).

2.1 House Prices in Cyprus

The possible factors that affect house prices in Cyprus have been examined by various studies. They usually examine the impact from both demand and supply sides and a

\(^3\) Examples of areas that prominently attract foreign capital in real estate due to the alluring capital returns and rental yields they offer to the investors include, New York, London, Paris, Tokyo and others (Jones Lang Lasalle, 2017).
few variables are commonly used. From the demand side, per capita income, household income, or alternatives like per capita GDP and household final consumption expenditure as a proxy for disposable income, are commonly used (Pashardes and Savva, 2009; Platis and Orfanides, 2005; Sivitanides, 2015; Savva, 2015). Population and related variables, like number of households and demographic/cultural characteristics, have been also used to measure demand (Pashardes and Savva, 2009; Platis and Orfanides, 2005; Sivitanides, 2015). Interest rates are also found to play a role in explaining house prices in all the above studies except in Pashardes and Savva (2009), where they are found to be statistically insignificant.

From the supply side, the cost of construction materials and labour costs are usually used (Pashardes and Savva, 2009; Platis and Orfanides, 2005; Sivitanides, 2015). Interestingly, Pashardes and Savva (2009), who, in their seminal work, were the first to examine the impact of several macroeconomic variables on house prices in Cyprus, find that inflation, unemployment and tourism do not play a significant role.

As regards to foreign demand, in almost all of the above studies the exchange rate, specifically the sterling-euro rate, has been used as a proxy. For example, Pashardes and Savva (2009) use it as a factor that affects demand for properties by UK investors. The positive correlation they find with house prices points to the inflationary effect of foreign demand from UK investors up to at least 2008, which is the last year included in the analysis of the authors. This was also the year when the sterling-euro exchange rate depreciated significantly, which also contributed to the fall in demand by UK buyers, as the rationale would go. Savva (2015) finds similar results, i.e. positive correlation between house prices and the exchange rate in both the boom and bust period.

While the exchange rate seems to be established as one of the drivers of foreign demand, we believe it captures only a small part of what drives foreign demand in Cyprus. Perhaps the most relevant study which examined the impact of foreign investment on Cyprus’ real estate for citizenship scheme is the one conducted by the Ministry of Finance published in early 2019. In this report the MoF (2019) argues that 1.2% out of the 13% of total economic growth in Cyprus in the last three years is due to the Cyprus Investment Scheme. Furthermore, out of the €6.6 billion in foreign investment generated by the citizenship scheme since 2013, €3.6 billion found its way into the real estate and housing sector, which according to the MoF accounts for the significant increase in apartment prices in Limassol. While the MoF study lacks the use of a sophisticated model to quantify the impact of the capital inflows on the real estate market, and focuses only on FDI flows, it does provide useful insights regarding the extent of the inward FDI in the period 2013 – 2018.

2.2 Foreign Demand and House Price Literature

There is a scarcity of international studies specifically on foreign demand and house prices, with FDI flows usually used as a proxy for the former. Favilukis et. al (2013) examine the relationship between capital flows and house prices for various countries over the period 2000 – 2010 and argue that countries which exhibited the largest house price increases over this period often exhibited large and increasing net inflows of
foreign capital. This is also reflected in their large current account deficits, which, as the authors point out, “(…) unlike any prior period, global financial integration allowed for the channelling of one country’s excess savings towards another country’s real estate boom.” (page 247).

Despite this, they, however, conclude that the impact of capital inflows to house prices is rather small (around 5% of the quarterly variation of US house prices). They argue that the largest impact comes from the financial market liberalisation, i.e. more relaxed lending standards and the ability of home owners to borrow against their house equity. Lending standards alone (as captured in bank lending surveys) explain between 53%-66% of house price variability.

McAllister and Nanda (2015) examine the impact of foreign real estate investment on the US office market capitalisation rates for the period 2001 – 2013. The results suggest a statistically significant effect from foreign investment across 38 US metro areas, however, the effect appears minimal, as a 1% increase in foreign share of total investment causes a 0.08% decrease in office market capitalisation rate. Similarly, Devaney and Scofield (2017) show that the nationality and type of foreign investors play a role in the office transaction prices of New York, with foreign investors tending to pay more for a purchase, perhaps due to the fact that they may be less price-sensitive.

In a European-specific study, Badariza and Ramadorai (2018) examine the impact of foreign demand on London’s house prices for a time span of 20 years. They find that in those parts of London with high shares of people originating from a particular country, house prices are approximately 1.62% higher in the months following increased political and economic risk in their home country. They also find that this impact fades out after two years.

In Asia, Nguyen (2011) argues that the inflow of FDI in the real estate and construction sector caused the property market bubble in Vietnam, resulting in macroeconomic instability. He suggests that the government should enhance supervision and encourage FDI into labour-intensive manufacturing sectors.

Finally, Gholipour et al (2014) analyse the interrelationship between FDI in the real estate sector, economic growth and property prices while controlling for interest rates and inflation for a set of OECD countries for the period 1995 - 2008. They, perhaps surprisingly, find that FDI in the real estate sector cause neither property price increases nor economic growth in both the short-run and long-run, something which may be a result of the methodology (panel cointegration) they use.

Still, as the next section will demonstrate, foreign demand appears to have played a significant role in at least two developed economies: Japan and Australia. In these two cases, the limitations of the above studies, an outcome of the use of FDI flows to real estate, can be overcome through the use of an alternative; even though this is not readily available in many countries, it is in the two aforementioned countries and Cyprus.
3. The International Experience: A Prelude

The relationship between FDI, the share of foreigners in total property purchases and housing prices is not unique to Cyprus. Thus, it could be beneficial to provide a qualitative examination of such behaviour in other countries. It should be noted from the start that each country naturally has its peculiarities and specificities, and the foreign demand - house price relationship is not a one-size fits all. However, the fact that we live in a world where countries are becoming more inter-dependent and international capital flows are increasing, a qualitative elaboration can shed some light on the matter, and also provide incentives for future research.

Chronologically, Japan serves perhaps as the ideal starting point given that it created an unprecedented transition period from expansion to recession, leading to what has been known as the “lost decade” (Hayashi and Prescott, 2002). Plenty of reasons for the continuation of the crisis and the causes of the lost decade have been offered by the existing academic literature (e.g. Leigh, 2010; Krugman et al., 1998). While the usual rationale with regards to the causes of the crisis (Koo, 2011a, b) focuses on rising asset (housing) prices, a stock market bubble, and a lending boom, Figure 1 suggests that foreign flows also contributed to both the creation and the bursting of the bubble which led to the lost decade. As the timing of FDI flows to real estate suggests, the surge took place just before the housing price boom.

4 An effort to justify the Japanese crisis as a banking sector crisis, with high non-performing loans, bank failures, and the subsequent effects on the economy was made here: https://analysis.hfeu.com/everything-you-wanted-to-know-about-the-japanese-economy.
According to Farrell (1997), foreign direct investment in real estate in Japan rose significantly in the 1980’s, rising from an average of $167 million during the period 1951-1981 to $354 million in 1982. The big boom occurred in the period 1985-1989 when FDI in real estate sky-rocketed to a peak of $14,143 million of FDI in real estate in 1989. This spectacular increase of 3,895% in real estate FDI over the period 1982-1989 led to a collective 39.5% increase in real estate prices during the same period.

As capital flows reversed in the next two years, declining by 37% until 1991, house prices maintained their strength, probably due to excessive lending. This reversal in flows can perhaps be attributed to either changing investor preferences, a reduction in returns on investment, or perhaps due to the selling of properties by foreign investors in an effort to realise their profits. As FDI in real estate nearly halved in 1992, prices started their long decline. The relationship between the two variables is evident, even though qualitatively, in Figure 3. Finally, while not elaborated here, Ball (1994) comments that the housing boom was not only in Japan but in Australia, the US, the UK, and Scandinavia, raising the question of whether similar experiences with FDI flows took place in these countries as well.

A similar image emerges when we study Australia, where we draw on the data included in Philip Lowe’s speech on March 6, 2019, where the Governor of the RBA presented these developments in detail (Lowe, 2019). In particular, graph 7 in the speech illustrates an indicator which bears similarities with the variable of the share of foreigner in total sales contracts we introduce in this study, namely the number of approvals by the Foreign Investment Review Board of Australia.

In the Australian case, approvals jumped by about 15% in 2013 and then to nearly 40,000 in 2016, far from the less than 10,000 in 2011-2012. Lowe (2019) comments that this increase was attributed to buyers from China. Housing prices followed suit. After lingering around the 100-mark in the 2010-2012 period, the index increased by 6.6% in 2013, followed by a larger increase of 9% in 2014 and 2015 as foreign demand increased (Figure 2). What makes the Australian case a perfect example of what this paper suggests is that once foreign investment slowed, the housing price index reflected this change immediately.

As in Japan, the Australian experience suggests that economies tend to try and maintain unsustainable housing growth via increases in bank lending. However, after banks over-extended credit as a rather justifiable response to the increase in housing prices, they realised that this could not continue in the long run chose to tighten lending conditions. As a result, the Australian housing market registered house price declines in every quarter in 2018, after a deceleration in 2017.

5 As Mallaby (2010) notes, speculative attacks by hedge funds and capital flow reversals were also a potential cause of the Asian financial crisis in 1997.
4. The Cyprus Case: An Overview of the Data

Data for the Cyprus economy are relatively easy to find. However, the major drawback for econometric estimation is their short time-dimension and the fact that much of data is only available on an annual basis. These shortcomings present two important challenges to the researcher: the former requires a methodology which can accommodate shorter time-series as well as provide econometrically sound results which are not biased by the lack of available data. The latter requires the breakdown of the series into quarterly or monthly aggregates which, given that they are not compiled by the official statistical authority, can lead to series which do not follow the correct seasonal and series-specific pattern.

To begin with, data for the Residential Property Price Index (RPPI or RPP Index), were obtained from the Central Bank of Cyprus website. The same source was also used to obtain data for loans and interest rates (MFS Statistics),\(^6\) while data for real GDP, CPI inflation, and the Cost of Construction were obtained from the Cyprus Statistical Service. Abiding by the existing literature on the topic, the RPP index was deflated with the Consumer Price Index (CPI), so that the real RPPI is used in the analysis. For robustness verification purposes, we run our tests using first real RPPI and then nominal RPPI. The results remain virtually similar in both cases, with results for nominal RPPI available upon request.

\(^6\) In particular, for interest rates, the category “Lending for house purchase with maturity of more than 5 years” was employed from Table T10, while total loans were employed from table T6.1.
Data on FDI into Cyprus were obtained from Eurostat, which supplies category FA_D_F519 data titled “Financial account; Direct Investment; Equity; Other equity (e.g. real estate)-Liabilities” (Retrieved: 17 February, 2019). While we acknowledge that this seems to be only an estimate of the actual FDI in the real estate market and at the same time it could include some other minor investments which are not directly aimed at real estate, it still remains the best proxy we can obtain regarding FDI.

Furthermore, it is by far better proxy compared with all other proxies for FDI in real estate used in the past, such as exchange rates (Pashardes and Savva, 2009; Savva, 2015). It is also much better than the alternative of using the total inward FDI to Cyprus, where flows would have been severely overstated. The only setback with the use of this variable, or any variable related to the external sector, is that balance of payments data start only in 2008Q1.

FIGURE 3
RPPI and Foreign Share Graph

Given that not all FDI flows are similar or directed to the same property categories, we further provide a variable which accounts for the number of people who are actively investing in Cyprus vs the amount of investment. To elaborate on the necessity of this distinction, we expect that a one-off large investment (e.g. in the case of Cyprus, a foreign investor choosing to build the Agia Napa marina) would have a much different effect on house prices than if a large number of foreigners chooses to invest in Cyprus, e.g. by purchasing homes/offices/apartments for the sake of obtaining residency or nationality. To this end, we employ the ratio of foreign sales contracts to total sales contracts, as obtained by the Department of Lands and Surveys in Cyprus.

To offer an insight as to how important this is to Cyprus, Figure 3 provides the path of the share of sales contracts deposited by foreigners as a percentage of total sales contracts (dashed line) and the RPP Index (solid line). As the figure suggests, movements in the share appear to pre-date changes in the RPPI, suggesting that there is a relationship between the two variables, one that is worth exploring.
Unfortunately, while annual data begin in 2002, quarterly data only exist as of 2008, similar to the BoP case. Furthermore, in 2018 there were changes in the methodology of calculating sales contracts to foreigners, thus not allowing us to exploit any data after that period. Hence our data range is from 2008Q1 to 2017Q4.

It should be mentioned that the change of the methodology employed by the Department of Lands and Surveys for classifying sales contracts to foreigners shows that before 2018 the number of sales contracts deposited by foreigners was underestimated. This effectively serves to strengthen the conclusions of the following sections, given that if the number of foreigners purchasing real estate in Cyprus had been better captured since the beginning of the time series, the impact of foreign demand on house prices would have likely been more pronounced.

Before proceeding with the estimation, table 1 presents the correlation matrix of the proposed variables. While elementary, the correlation matrix can provide important information regarding the relationships between the variables to be examined. For example, inflation appears to have a very strong relationship with the growth rate of population (0.8) thus making any model employed prone to multicollinearity and erroneous inference (see Michail and Massouras, 2014). To this end, we choose to avoid the use of both variables in the same estimation. As the OLS results in section 6 will demonstrate, this will not have any important effect on the conclusions reached.

The qualitative conclusions reached by looking at table 1 are also quantitatively confirmed as the share of foreigners in total sales contracts has a correlation coefficient of 0.7 with the RPPI, while FDI flows have a much lower coefficient of 0.4. A similarly strong relationship appears to also exist between Cost of Construction (CoC) and the RPPI as well as between CoC and inflation, all of which make intuitive sense.

Interestingly, the interest rate has a negative correlation with FDI flows suggesting that perhaps higher interest rates are viewed as a sign of an overheating economy, or simply perhaps foreigners no longer wish to borrow money in Cyprus once rates have increased. Overall, the results from the correlation matrix shed more light on the relationships at stake, even if at a level which does not allow for more complex interrelations between the variables. As such, given that a correlation matrix cannot provide concrete conclusions, in the next section we provide an overview of the methodology to be employed for obtaining a clearer view about the relationship between house prices and their determinants.

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7 Unavoidably, this time span omits the period 2004-2008, in which we believe there is important information that explains the relationship between foreign investment in real estate and house prices in Cyprus. This was a very important period when bank credit expanded rapidly and much of it was used to purchase property. We duly recognise this limitation stemming from the use of the chosen time series to be used in our analysis.
5. The Bayesian VAR Methodology

The simplest econometric model to be employed when aiming to examine the determinants of real estate prices would be an OLS regression. We use the following equation for the purpose of explaining the factors that affect house prices:

$$RPPI_t = a + \beta_1 FDI_t + \beta_2 Share_t + \beta_3 Loans_t + \beta_4 Rate_t + \beta_5 GDP_t$$
$$+ \beta_6 Inflation_t + \beta_7 Coc_t + \epsilon_t, \epsilon_t \sim N(0, \sigma)$$  \hspace{1cm} (1)

As already discussed, $RPPI_t$ is the Residential Property Price Index, $FDI_t$ refers to inward FDI into real estate, $Share_t$ is the percentage of foreigners in total sales contracts and the remaining variables are as elaborated in the previous section. All variables are expressed in year on year log-differences, with the exception of FDI, which is expressed in millions of euros, and Share, which is expressed as a percentage.\(^8\)

While the above specification is useful in obtaining a first indication of house price determinants, it is still limited in the sense that no interrelations and feedback loops between the variables are allowed. To avoid this issue, we employ a Vector

\(^8\) Unit root tests and VAR stability tests confirm that the estimation is free of any potential unit root issues. Test results are available upon request.
Autoregression (VAR) methodology (Sims, 1980), which is better suited for such evaluations. However, given that we have a relatively short time series, we also employ Bayesian estimation methods which allow for the estimation to take place even when very little data are available and converge to the normal distribution as the sample range increases (Martinez-Garcia and Wynne, 2014, Van de Schoot et al., 2015 and Mcneish, 2016).

In this case, consider a simple VAR model in which $y_{i,t}$ denotes a matrix with all of the above variables ($FDI_t$, $Share_t$, $RPPI_t$, $Loans_t$, $Rate_t$, $GDP_t$, $Inflation_t$, $CoC_t$) in this specific order, and their transformations. The order is specified such that foreign demand (FDI, Share) changes take place before any change in the RPPI, with loans and loan interest rates being affected by changes in real estate prices. Economic growth and prices are then affected by these changes, while CoC is affected by the overall change in financial and real variables. It should be mentioned that changing the order of the variables does not produce any qualitative difference in the results, with the estimation outcome available upon request.

As nowadays standard in the academic literature (Asteriou and Hall, 2011), the structural VAR representation, is

$$y_t = a + \sum_{j=1}^{k} \beta_j y_{t-j} + \epsilon_t, \epsilon_t \sim N(0, \Sigma) \tag{2}$$

where $y_t$ is a vector of endogenous macroeconomic variables, as specified above, $j$ is the appropriate lag length and $\epsilon_t$ denotes the vector of serially and mutually uncorrelated structural innovations, with variance-covariance matrix $\Sigma$. $\beta_j$ are the appropriate coefficients related with lag $j$ of the vector of dependent variables.

Bayesian methods have commonly been employed to alleviate the issue of time series with small dimensionality notably by using the Litterman (1986) Minnesota prior. However, this prior has the disadvantage of assuming a known variance-covariance matrix and hence it can be too tightly imposed, and it turn dominate information from the data. To avoid this issue, models can be estimated using a non-informative Normal-inverse Wishart prior as in Uhlig (2005) and Weale and Wieladek (2016).

Even though the Normal-Wishart prior is more flexible than the Minnesota prior, it does have limitations. More specifically, assuming an unknown variance-covariance matrix comes at the cost of imposing a Kronecker structure on the prior distribution. This structure creates, for each equation, a dependence between the variance of the residual term and the variance of the VAR coefficients (see Dieppe et al., 2016). To avoid this potential drawback, we employ an Independent Normal-Wishart (INW) prior with unknown $\Sigma$ and arbitrary variance-covariance matrix, $\Omega_0$, which overcomes the Normal-Wishart limitations.

In particular, the INW prior distribution is specified such that, $\beta \sim N(\beta_0, \Omega_0)$, typically defined as the Minnesota $\beta_0$ vector, with 1 in the first lag of each endogenous variable and 0 for further lags and cross-variable lag coefficients (Dieppe et al, 2016). Similarly, $\Omega_0$ also takes the form of the Minnesota covariance matrix. Given these conditional distributions, it is possible to use the Gibbs sampler to obtain random draws from the unconditional posterior distributions of the parameters of interest.
For estimation purposes, standard hyper-parameter values were assumed, i.e. an autoregressive coefficient of 0.8, tightness of 0.1, cross-variable weighting 0.5, lag decay of 1 and 100 for the exogenous variable tightness. Structural identification is achieved through a Choleski decomposition. A total number of 2,000 iterations are employed for convergence of the algorithm, using a standard Gibbs sampler. As is common practice, the first 1,000 iterations reflect the burn-in sample and are discarded (Dieppe et al., 2016). The lag length was specified to 2, according to the information criteria, and VAR stability was confirmed as all roots of the characteristic polynomial lie within the unit circle. Results from the estimation can be found in the section that follows.

6. Is Foreign Demand Important for House Prices in Cyprus?

Table 2 presents the results from the simple OLS estimation. As the table suggests, the share of foreign demand in total demand has a strong impact on the RPPI, at 0.69 with the FDI impact reduced from 0.07 in specification (1) to 0.03 in specification (2). Loans growth is also found to be statistically significant and economically important as its impact stands at 0.33.

The interest rate is also found to be statistically significant, similar to Michail and Thucydides (2018) and Cleanthous et al. (2019), with a strong impact. The cost of construction is found to have an insignificant effect once either inflation or population are included. Interestingly, we do not find any direct relationship between real GDP growth and housing prices, in any specification, most likely due to the fact that house prices are not expected to react contemporaneously to economic growth, supporting the view that developments in house prices were mostly affected by the financial and foreign sectors, and providing additional justification for the use of a VAR specification.

Moving to the main workhorse of this study, Figure 4 presents the results from the impulse response functions, calculated using the Bayesian VAR approach, where the diagonal reflects the own shocks. In particular, both FDI and Share appear to have a positive effect on the real RPPI, albeit to a different extent and timing. A one standard deviation increase in FDI is estimated to raise real house prices by 0.2%, even though this response is only evident after six quarters, suggesting that the economy does not fully incorporate these changes as they occur. However, it appears that this effect is relatively persistent as it is maintained throughout the response horizon, which is when the real GDP response becomes more positive.

To further justify our distinction between the number of foreigners and the amount they invest in Cyprus, an increase in FDI does not appear to have any meaningful effect on the Share. An increase in FDI reduces loan growth perhaps due to a substitution effect between foreign and domestic demand, driving interest rates down for the same reason. The Cost of Construction, as expected, increases after a positive shock in FDI, given that this demand-driven effect is likely to have a bearing on costs (supplier profit margins), even though the reaction is relatively short-lived.
**TABLE 2**

*Simple OLS Results*

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<th>(6)</th>
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<td>−17.0806 ***</td>
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<td>FDI</td>
<td>0.0610 ***</td>
<td>0.0285 *</td>
<td>0.0451 ***</td>
<td>0.0247</td>
<td>0.0303</td>
<td>0.0299</td>
<td>0.0223</td>
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<td>(0.0140)</td>
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<tr>
<td>Share</td>
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<td>0.4137 ***</td>
<td>0.419 ***</td>
<td>0.4290 ***</td>
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<td>Δ/Real GDP</td>
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<td>Δ/Cost of Construction</td>
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<td>Δ/Population</td>
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<td>Inflation Rate</td>
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<td>R-squared (adj.)</td>
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*Notes:* Simple OLS results showing the relationship between the selected variables. *, **, *** denote significance at the 10%, 5%, and 1% level, respectively.
FIGURE 4
Impulse Responses

Notes: Impulse responses from a one standard deviation shock in a Bayesian VAR, using Choleski decomposition. Shaded areas reflect the 67% confidence interval.
The share of foreigners in total transactions appears to have a much stronger effect on the level of house prices, as a standard deviation shock in the share is expected to have a 0.8% impact on house prices. Similarly, an increase in the share appears to register a much stronger response from the overall economy as loans also increase by more than 0.5%. Still, there appears to be little relationship between the amount of FDI flows and the number of foreigners who purchase property in Cyprus, as showcased from the fact that FDI does not register any statistically significant effect.

To provide more comfort to the above results, we include in the Appendix two variations of our model, one including the FDI and omitting the Share and the other vice versa. Both alterations of our model show the same relationship between FDI and house prices and between Share and house prices, which supports the robustness of our empirical findings. As also previously referred to, results using different variable orderings reach the same conclusions with results available upon request.

With regards to other determinants of housing prices, the expected effects can be observed: a shock in loans increases the RPPI, while a shock in the interest rate appears to have a negative impact on house prices, as well as economic activity. Real GDP is also found to have a positive relationship with RPPI, while inflation reacts, as expected, positively, to positive shocks in the domestic economy variables.

Interestingly, FDI flows per se do not appear to have a positive effect on real GDP in the short-run, while Share does. This can be again attributed to the fact that FDI flows to major projects would create additional jobs in the long-run and thus their impact would only be visible in the economy with a lag. In contrast, higher construction activity, as a result of more foreigners purchasing homes in Cyprus would provide only short-term stimulus to the economy.

Real GDP and loans are also positively affected by an increase in real house prices. However, this also implies that a negative shock to the real estate sector could have important consequences both for the domestic economy’s growth as well as for the banking sector’s prospects. Thus, as overall relationships between the variables appear to come out as expected and evidence the suitability of the model used, any potential effects from variables which are not under the control of the domestic monetary authority deserve much more attention.

To this end, the loop between Share and Loans needs to be discussed further. Given that the results support that the number of sales contracts matters, it can be inferred that as a larger number of foreigners purchases properties in Cyprus the greater the effect will be on the banks’ perception about the future of the real estate sector, and the more willing they will be to grant loans to fund further expansion.

This can be argued to be justifiable, once viewed under the proper lens: an increase in the number of foreigners in the pool of purchasers will boost overall demand in the sector. As such, profit margins will grow, while, if this increase persists, investors and real estate developers would raise selling prices as a result of this surge in demand which overshadows supply. The fact that Cyprus experienced an inflow of foreign deposits in the lead-up to the crisis (foreign deposits nearly doubled according to MFS data) was also an additional reason with regards to why lending increased. While it would be possible (and perhaps more sensible) for local banks to purchase foreign
investment-grade bonds with this additional liquidity, extending credit to those wishing to increase investment in the housing sector would generate higher returns as long as prices continued to grow.

However, the continuous growth in real estate prices would likely have unfortunate socio-economic consequences. Increased house prices would lead to more social exclusion and the creation of a rentier class who would not be able to enjoy the benefits of home ownership. This would be especially harmful to the younger generation who may have to postpone several decisions given their limited economic resources. The fact that part of this pool of decisions could also include child-bearing, which imposes an additional financial burden on an already financially distressed young couple, makes the consequences from an unjustifiable increase in house price even more dire. As Cyprus had the unfortunate privilege of having the lowest fertility rate in the world in 2017 (Murray et al., 2018), this is not a topic which could be taken lightly.

The implications of unjustifiably higher house prices also spread to the realm of financial stability. House prices are unlikely to continue their growth indefinitely, given that there will be a reversal of capital flows sooner or later. This would leave investors, real estate developers, and homeowners over-indebted and banks over-extended to the real estate sector. Thus, if not conservatively viewed, the wave of foreign capital flows can increase the economy’s susceptibility to bubbles and crashes, and can harm the banking sector’s viability.

The above-described feedback loops and consequences, fit perfectly to the evolution of events in the recent economic history of Cyprus: house prices increased, creating a feedback loop between them and bank lending, which eventually left the banking sector in the red. What this paper has offered is a concrete explanation on the cause of the housing bubble which caused the over-extension of lending in the local economy. Furthermore, the reversal of capital flows proved to be the prick that popped the bubble given that bank lending could no longer sustain the house price increase once foreign demand collapsed.

Observing the path of the amount of sale contracts deposited by foreigners (and to a lesser extent FDI flows) provides an explanation for both, with the timing perfectly fitting the chain of events. This conclusion is not idiosyncratic to Cyprus. As section 3 has already indicated, a similar situation can be observed in other countries, from Japan in the 1980s to Australia in the 2010s.

7. Discussion and Conclusions

This paper has presented evidence that an inflow of foreign direct investment in real estate can cause severe distortions in the pricing of residential property, which, other than economic can also have significant social costs, especially for young couples. This is especially true in countries where a high house ownership rate exists (HFCS, 2016), as this cultural factor can result in higher debt burdens for households and thus increased sensitivity of the banking sector to cyclical fluctuations.

Most importantly, given that capital flow reversals are known to take place and have been observed to have occurred in the European periphery countries (Michail and Savvvides, 2018), this could also push the housing sector into recession, once domestic
demand cannot accommodate for the loss of foreign capital. If economic agents attempt to maintain price growth using local resources, this would most likely result in a higher percentage of riskier loans, even though they may not appear to be such at the time of granting, given the recent price history. This process would expose the banking sector to severe stress after the eventual collapse of housing prices.

While we live in an era of free capital flows, it appears that the only way for the domestic sector to protect itself against such surges of capital flows and retrenchments of house prices would be nothing more than to impose restrictions on real estate investments, such as the requirement to live in the country both before and after the purchase, strict due diligence check on the source of the investment, and caps on the number of foreign transactions. Of course, there are other possible solutions that can be adopted in order to impose constraints on real estate capital flows.

While any restrictions on capital inflows are likely to be met with reactions by real estate sector participants, especially those who benefit the most from such inflows, making political decision-making even more difficult, one simply has to question whether there really is a trade-off between higher real estate sector returns and financial and economic stability. Until such regulations are imposed, both the banking and real estate sector, with their heavy influence on the well-being of the world’s economies, will be prone to the shift of capital flows for profit-making purposes. Naturally, not all foreign demand flows are the same: any FDI directed to investments which can increase the number of permanent jobs in the country should not be viewed the same as those which only provide a transitory increase in construction employment.

Finally, understanding that capital flows can cause real estate boom and crashes does not absolve banks’ responsibility from providing lending to firms and individuals who have a proven capability of repaying their debt (PIMCO, 2013). In any other case, regardless of whether this takes place in whatever phase of the economic cycle, the repercussions will be just as severe for the financial sector as well as for the rest of the economy. In the case where banks are prudent and apply strict lending criteria during such real estate bubbles, no important spill-overs will occur in the banking sector whereas if banks recklessly distribute their funds, a real estate bubble and its consequent bursting will have negative consequences for the banks themselves.
References


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Platis, S., and Orphanides, S., (2005), ‘Factors that shape house prices in Cyprus (in Greek)’, Monograph, BuySell Cyprus Real Estate.


‘The Dutch Disease’ (November 26, 1977), The Economist, pp. 82–83.


Appendix

TABLE A1

Results excluding Share

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<th>Shock:</th>
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<th>dOPPI</th>
<th>home</th>
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<th>dGDP</th>
<th>Inflation</th>
<th>CoC</th>
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Response of:\n
- Rate
- dOPPI
- home
- FDI
- dGDP
- Inflation
- CoC

70
TABLE A2
Results excluding FDI Flows

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[Graphs showing the responses of various economic indicators to shocks, with shaded areas indicating confidence intervals.]