Expert Comment

Global forces, local consequences: The role of foreign investment and HNWI money in US real estate markets

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In recent years, the United States has witnessed a surge of prices and foreign investment from ‘high net-worth individuals’ (HNWIs) in many local real estate markets. This analysis asks how related these two trends are. It uses foreign stock markets to represent exogenous forces that may affect local real estate markets as they fluctuate in synchronicity with these distant sources of capital flows. It shows that there has been a high positive correlation between these markets since the Great Recession, and in approximately half of the cases, housing prices in these US cities exhibit significant long-run relationships with foreign stock prices. However, there is very little evidence that foreign economies or HNWIs are causing large fluctuations in US housing prices. This analysis therefore finds little reason to fear that this heightened financial integration is to blame for the housing affordability crisis.

Keywords: foreign investment, real estate, housing affordability, capital flows, financial integration, stock market

1 Author can be reached at aworlando@cpp.edu. I thank Chang M. Liu and Andrew Pan, as well as seminar participants at the Investment Migration Council for helpful comments. All errors are mine alone.
Since the end of the Great Recession, urban real estate markets have been booming, so much so that they have simultaneously prompted a “rental affordability crisis” and an “urban renaissance” of millennials moving back into the city centre after it was decimated by decades of “white flight.” One of the alleged catalysts for this price appreciation – and resulting construction boom – has been foreign investment (Badger, 2014). Major urban markets such as Los Angeles, Miami, and New York City have become safe havens for unprecedented volumes of foreign capital, and the cities have responded to this demand with a wave of new commercial and luxury residential buildings that are transforming neighbourhoods and skylines (Ramírez, 2017; Weiss, 2018). These trends are very controversial, however, being blamed for rising rents, vacant condos, and loss of domestic control over the city (Bertolet, 2017; Levin, 2018). If true, these effects are likely to exacerbate inequality, with wealthy buyers profiting at the expense of displaced middle-income and low-income residents. But are they, in fact, true? What are the real effects of foreign investment on local real estate markets?

The challenge facing the empirical economist is that foreign investment is endogenous to local real estate markets. Like any investors, foreign ‘high net-worth individuals’ (HNWIs) choose markets based on expected returns, and so it is challenging to determine how much of the realised returns were in fact due to the foreign investment and not vice versa. In this paper, I exploit a slightly more exogenous independent variable to proxy for the effects of foreign investment: foreign stock markets.

This effect could operate through two possible channels. On the one hand, when stock markets are performing well in their own country, HNWIs face a higher opportunity cost if they invest in US real estate markets.² When those same stock markets perform poorly, foreigners have a greater incentive to sell stocks and buy US real estate instead.

² This dynamic could also apply to foreign real estate markets, of course, but those data are less reliable for the empirical analysis in this paper.
This ‘opportunity cost’ channel would push US housing prices up when foreign stock prices move down. On the other hand, increases in foreign stock prices could increase HNWI wealth and give them more capital to invest abroad. This ‘wealth effect’ channel would push US housing prices up when foreign stock prices increase as well.

It is unlikely that causation runs in the opposite direction, with housing prices in local US cities affecting large national stock markets abroad. This stipulation allows me to assess the extent to which US real estate markets have become dependent on the whims of foreign stock markets – and therefore, how vulnerable they are to these cross-country capital flows as developing markets once were to foreign investors from the United States. Have the tables turned? Has the United States failed to learn from the mistakes of its trading partners?

I find little evidence for this vulnerability. While it is true that local US housing markets and foreign stock markets have exhibited high positive correlation in recent years, cointegration tests only reveal a linear long-run relationship between about half of the bivariate interactions in my sample, and a full time-series model does not show a significant effect running from foreign markets to local housing prices. When monthly stock prices decrease in Canada, China, and Germany – the largest sources of foreign investments – housing prices tend to increase in the largest destinations: Los Angeles, Miami, and New York. This effect is consistent with the ‘opportunity cost’ channel, but it is not large or precise enough to be economically or statistically significant. The positive correlations we witness, therefore, are likely the result of country-level synchronicity and not a strong ‘wealth effect’ channel on local markets. These findings provide insight into the new role of global forces in local economies in the 21st century.

The analysis proceeds as follows. Section 1 sets the stage with the economic theories and recent findings that reveal what we do and do not know about these forces. Section 2 describes the data used in this analysis. Section 3 presents the first stage of the analysis, correlations, and cointegration tests, and Section 4 presents the second half, a full time-
series model. Section 5 concludes with implications for investors, policymakers, residents, and researchers both in these local markets and around the world.

**Theoretical background**

While economists have only recently begun to explore many of these developments in real estate markets, financial integration between countries has long been of interest to the field. It is well known, for example, that financial integration leads to greater synchronisation of economic fluctuations (Kose, Prasad, and Terrones, 2003; Imbs, 2004). Similarly, research has revealed several important factors that attract HNWIs to cross country borders (Solimano, 2018). With respect to real estate specifically, they tend to invest in states with higher income and population growth, but the attraction is attenuated by the extent to which those forces also drive up the cost of doing business (Lieser and Groh, 2014; Liao, Zhao, Lim, and Wong, 2015). When it comes to equity markets, they tend to invest in riskier firms because they are diversified internationally, offsetting much of the domestic risk (Kalemli-Ozcan, Sorensen, and Volosovych, 2014).

The effects of these capital inflows are less well understood. Economic theory does not afford a clear prediction. On the one hand, foreign investment can act as a fiscal stimulus for the local economy, increasing demand for goods and services and thereby creating jobs for local residents. In return, the HNWIs receive diversification for their portfolios as well as a safe haven to escape political uncertainty and financial opacity in their home countries. On the other hand, the increased demand for real estate can increase housing costs for burdened renters, and the demand for high-growth areas in particular can magnify the growing divergence between rich and poor regions (Diamond, 2016; Ganong and Shoag, 2017). Meanwhile, many of these real estate properties may sit vacant while HNWIs spend most of the year living elsewhere, further aggravating housing shortages in major US cities,
and real estate markets may become dependent on these risky capital flows, exposing their economies to financial fragility.

Empirically, it is difficult to disentangle these effects, particularly given the endogeneity between macroeconomic activity and HNWI behaviour. When we detect a positive correlation, how can we be sure that we are measuring the causal effect of foreign HNWIs on local economies and not the reverse effect of economic growth attracting investors? Hilber and Schöni (2018) come the closest to identifying the direction of the causal arrow with the quasi-natural experiment known as the ‘Swiss Second Home Initiative’. When Switzerland banned second-home construction in certain regions, they created treatment and control groups where foreign HNWIs were and were not restricted from a certain type of investment in local real estate markets. I think a similar programme exists in Australia and New Zealand. That type, second homes, reacted as economic theory would predict from a negative supply shock: Their prices increased. Primary homes, in contrast, experienced a price decrease, as advocates had hoped would happen. Why? Hilber and Schöni point to the simultaneous increase in unemployment growth as a clue, signalling a negative shock to aggregate demand in the local economy. On net, they do not find that this policy is favourable to social welfare.

This evidence suggests that HNWIs are stimulating local economies and driving up housing prices, but it leaves many important questions unanswered. How much of the decline in second-home construction came from curtailing foreign, as opposed to Swiss, investment? Does this finding extend to other types of real estate or other types of investments or other countries? Is it significant enough to make local markets dependent on the whims of foreign economies? The following analysis begins to investigate these potential implications.
Data

Two types of data are necessary for this analysis: foreign stock markets and local real estate markets, both of which are publicly available for major countries and cities. In order to analyse two-way investment patterns, it makes sense to narrow our focus to the most active entities, as the number of permutations increases exponentially with each additional trading partner. This analysis therefore focuses on the three largest sources of foreign investment in local real estate in the United States, as well as the three largest destinations of foreign investment in dollar volume.

The three largest foreign investors in US real estates are Canada, China, and Germany. While China has received the most attention in the news, it is important to remember that most Western investment flows remain within the hemisphere. Fortunately, these three countries provide a diverse sample, coming from three different continents. This analysis employs the monthly close price from Bloomberg for the Toronto, Shanghai, and Frankfurt stock indexes, respectively.

The three largest US destinations for foreign investors are Los Angeles, Miami, and New York City. Like the countries of origin, these destination cities represent a diversified sample, comprising the Western, Southern, and Northeastern regions of the country, respectively. This analysis employs the monthly median home value, including single-family houses and condominiums, from Zillow for 1996 to 2018 in each of these metropolitan statistical areas.
Figure 1: Median housing prices in US cities, 1996-2018

Notes: Publicly-available monthly home values, including single-family houses and condominiums, obtained from Zillow. Gray shading indicates recessions.

Figure 1 compares these three time series, revealing similar trends with a few important differences. All three cities experience three distinct phases of boom (1996-2005), bust (2006-2011), and recovery (2012-2018). Los Angeles and New York begin at a significantly higher level than Miami, however, and the gap grows over time in both nominal and percentage terms. Similarly, although Los Angeles and New York began at similar levels, this gap has also grown, with Los Angeles far outpacing New York in both the boom and the recovery. By 2018, housing prices in Los Angeles have exceeded their previous peak, while prices in Miami and New York are still below that relative level. From 2012 to 2018, it is noteworthy that Los Angeles is outpacing New York, and Miami is catching up to New York.
Researchers have yet to determine whether these differing trends are due in part to foreign investment and HNWI inflows.

**Correlation and cointegration**

The first half of this analysis proceeds by assessing the synchronicity, or chronological connectedness, of the foreign and local markets. This assessment takes two forms. First, I calculate the correlation coefficient,

\[
\rho_{ij} = \frac{\sum_{t=1}^{m} (s_{jt} - \bar{s}_j)(h_{it} - \bar{h}_i)}{\sqrt{\sum_{t=1}^{m} (s_{jt} - \bar{s}_j)^2} \sqrt{\sum_{t=1}^{m} (h_{it} - \bar{h}_i)^2}},
\]

between each foreign country \(j\) and each local housing market \(i\), using stock price \(s\) and housing price \(h\) in month \(t\) of \(m\). Figure 2 graphs these 27 coefficients in three graphs, one for each sub-period containing the nine country-city pairs. They vary widely. In the boom period, only Canada’s stock market was positively correlated with the US housing markets. The negative correlations with China and Germany are small, indicating no significant connection between their economies and the US housing ‘bubble’. In the bust period, all three foreign stock markets have small positive correlations with the US housing markets. Unsurprisingly, all six markets experienced some decline during the Great Recession, but the stock markets bounced back faster than the housing markets. There is no evidence here that the foreign economies were either magnifying the damage in housing or helping to jumpstart the recovery. The recovery period itself, however, is where we see large positive correlations, nearing one. This graph helps to explain why foreign investment has received so much attention in recent years. Unlike in previous periods, the sharp increase in housing prices corresponds with a similar surge in the economies of HNWIs who are bringing the
most capital into those housing markets. An important caveat, though, is the difference between these economies. China’s stock market has the lowest correlations of the three countries, despite receiving the majority of the attention in the press. The final takeaway is the differences between the cities, which are extremely small. It does not appear that any one city is consistently more synchronised with foreign markets than any other.

**Figure 2: Cyclical correlations between foreign and local markets**

![Graphs showing cyclical correlations between foreign and local markets](image)

(a) Boom  
(b) Bust  
(c) Recovery

*Notes:* Monthly correlation coefficients calculated between each country stock market and city housing market using Bloomberg monthly close data and Zillow home value data, respectively. Boom = 1996-2005; bust = 2006-2011; recovery = 2012-2018.
Second, I run cointegration tests on these nine country-city pairs of time series to determine if they have a long-run linear relationship. The structure of these tests depends on the stationarity of the data. We can assess this stationarity with an augmented Dickey-Fuller test,

$$\Delta y_t = \beta_0 + \delta y_{t-1} + \gamma_1 \Delta y_{t-1} + \gamma_2 \Delta y_{t-2} + \gamma_3 \Delta y_{t-3} + \gamma_4 \Delta y_{t-4} + u_t,$$

where the null hypothesis holds that the stochastic trend, $\delta y_{t-1}$, is no different from zero, indicating that the variable contains a unit root and therefore was generated by a nonstationary process (Dickey and Fuller, 1979). Unsurprisingly, we cannot reject this null hypothesis for any of the stock market or housing market variables at the 5% level of statistical significance. These findings are consistent with previous work by Case, Quigley, and Shiller (2005). Their common non-stationarity, moreover, confirms that we can test their cointegration at the same level of first differences using Johansen’s (1995) trace statistic,

$$LR(r_0,k) = -T \sum_{i=r_0+1}^{k} \ln(1 - \hat{\lambda}_i),$$

with the observations $T$ and the estimated eigenvalues $\hat{\lambda}_i$ from a maximum likelihood estimator of a vector error correction model,

$$\Delta Y_t = A + \Pi Y_{t-1} + \sum_{i=1}^{\psi-1} \Gamma_i \Delta Y_{t-i} + E_t.$$

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3 I calculate the critical values for statistical significance using the commonly accepted tables in Fuller (1996). The estimated ADF statistics are available from the author upon request.
where the vector $Y$ contains the $k$ variables, $\Pi = -\sum_{j=1}^{p} B_j - I_k$ is the cointegrating relationship between them for $p$ lags, and $\Gamma_i = -\sum_{j=1}^{p} B_j$ is the sum of their lagged coefficient matrices. The null hypothesis holds that the number of cointegrating equations, or ‘rank’, $r = r_0$. The standard procedure begins with $r_0 = 0$ and then proceeds to higher levels of $r_0$ until a null cannot be rejected or the maximum possible rank ($r = k$) is reached.

For the nine country-city pairs in this analysis, the Johansen test reveals the cointegrating relationships in Table 1. The relationships are split almost equally between cointegrated and not cointegrated. All three local housing markets are cointegrated with China’s stock market, none of the local housing markets are cointegrated with Germany’s stock market, and only Miami’s housing market is integrated with Canada’s. On the whole, it appears that a long-run linear relationship may describe the connection between foreign HNWIs and local housing prices approximately half of the time.

Table 1: Cointegrating relationships between foreign and local markets

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<th>$r = 2$</th>
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<td>China – Los Angeles</td>
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Notes: The number of cointegrating equations, $r$, in the bivariate relationships between foreign stock prices and local U.S. housing prices, as determined by Johansen’s (1995) multiple-trace test technique.

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4 Again, the full test results are available from the author upon request.
Time-series analysis

The second half of this analysis directly tests the effect of changes in foreign stock markets on the US housing markets. It uses the historical relationship between these variables to reveal how local housing markets react to a plausibly unexpected shock to each foreign stock market. A vector autoregressive series of equations creates this ‘unexpected’ shock by controlling for the previous behaviour of the variables, revealing the portion of each change that cannot be anticipated based on what is known about how these variables tend to interact. Importantly, I introduce a new variable in this part of the analysis: national US housing prices, which control for the relationship between national economies in the global marketplace. Then, the changes in local markets can be isolated from national influences, identifying the effect of foreign markets on each city individually.

With this new variable, the cointegrating relationships may change. In order to determine the best structure for the vector autoregressive model, I therefore estimate Johansen’s trace statistic for these three-variable systems. Approximately half of the relationships are cointegrated with rank one, and the other half are not cointegrated. For comparison’s sake, it is best to use the same model across all analyses, and the most conservative approach is to control for the possibility of cointegration by using a vector error correction model (VECM) with rank one, following the equation in Section 4.

Figure 3 displays the nine orthogonalized impulse-response graphs that simulate the effect of a one-standard-deviation positive shock to the natural logarithm of stock prices in each of the three foreign countries on the natural logarithm of housing prices in each of the three US cities. The natural logs allow for a standardised comparison across graphs in percentage points. Twelve months after the shock, housing price responses range from -0.75% to +0.15%, and they are almost never statistically significant. The first takeaway, therefore, is the lack of any material impact. Second, note the direction of the effects. Canada and Germany have temporarily positive effects on Los Angeles. China has a
permanently positive effect on New York. The other seven cases are categorically negative. If there is any direct relationship between these markets, therefore, it appears to operate mostly by the ‘opportunity cost’ channel, with rising stock markets attracting capital away from foreign housing markets and vice versa, despite the positive correlations between the two. It is more likely, therefore, that the positive correlations are an artifact of the economic and financial synchronicity of the countries, rather than any causal effect of foreign HNWIs on local housing prices.
Figure 3: VECM impulse responses

Notes: Orthogonalized impulse-response graphs from nine vector error correction models estimated on the natural log of foreign stock prices and the natural log of local U.S. housing prices.
Conclusion

Local housing markets in the United States have fluctuated in great synchronicity with foreign stock markets in recent years, and it is no coincidence that this development has been accompanied by increased cross-border investment by HNWIs. These are the predictable outcomes of global financial integration, but their implications are less obvious. This analysis documents the changing correlation between the largest sources of foreign real estate investment – Canada, China, and Germany – and the largest destinations in the United States – Los Angeles, Miami, and New York – from 1996 to 2018, revealing a striking break with the past in the wake of the Great Recession. It asks whether these high positive correlations are symptoms of a significant dependence on foreign capital – and therefore a significant driver of price appreciation and source of financial risk – or whether foreign HNWIs are merely bit players in a larger drama beyond their control.

The answer is nuanced but leans toward the benign. Cointegration tests reveal a linear long-run relationship in approximately half of the bivariate interactions between foreign stock markets and local housing markets, even after controlling for national housing prices in the United States. In searching for a direct effect of foreign economies on local housing prices, however, a full time-series model reveals very little in both economic and statistical significance. On average, the housing price appreciation in US cities tends to follow negative movements in foreign stock prices, possibly because HNWIs are searching for better performance abroad, but this association is too small to explain any meaningful changes in city-level activity.

It is important to emphasise ‘city-level’, for the scale is a highly likely explanation for these null findings. Private residential investment in the US reached approximately $800 billion in 2018, and foreign HNWIs barely accounted for 1% of that total (U.S. Bureau of Economic Analysis, 2018; Zander, 2018). Even in the large cities where foreign investment is more concentrated, it is difficult to amass enough capital to move markets significantly.
This caveat is important because it does not preclude the possibility that foreign investment is affecting smaller neighbourhoods *within* these metropolitan areas; that question remains open for future research.

It is also important to emphasise that cointegration tests and vector error correction models are not experiments. They do not identify causality with the same internal validity as a randomised controlled trial or even a statistical approximation with constructed treatment and control groups. In time-series analyses, the variable is its own control, and so the conclusions are only as reliable as the stability of the relationship between past and future performance. If we are truly entering a new era where markets react differently to capital inflows, or if other country-city pairs interact under different parameters, then we cannot extrapolate these results directly to those times and places. Still, they are illuminative, for they show that these large local markets have become more synchronised with foreign economies over time but not so much that they are threatened by the ebb and flow of foreign HNWIs and their investment capital.

These findings are comforting, but they should not make us complacent. Risks still abound in cross-border finance. Markets may become more vulnerable if these investments become too highly levered, for example, or if they are concentrated in neighbourhoods where residents do not have sufficient resources to adapt to the resulting changes. Municipal governments still have a responsibility to ensure that investors pay their fair share for the use of public services, and state and federal agencies must continue to police financing arrangements and securities offerings to ensure that investors are not abusing tax incentives or other subsidies. Above all, economic policymakers should remain on guard for the formation of asset bubbles, to which cross-border capital flows have made other countries vulnerable in the past. If these precautions are met, this research shows that foreign HNWIs can play a safe, positive role in US real estate markets – and that the pursuit of affordability
need not come in the guise of anti-immigrant exclusion or isolated nationalism. Indeed, it appears that our greatest challenges lie elsewhere.

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References


