# Foreign Investment in Real Estate and Housing Affordability

*(Pelaburan Asing dalam Hartanah dan Kemampuan Memiliki Rumah)*

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*ABSTRACT*

*Foreign Investment in Real Estate (FIRE) is gradually becoming an important source of capital to many emerging markets in the world. In one hand, FIRE helps to improve the performance of real estate sector and subsequently upgrade the level of income of host countries. However, on the other hand, the inflows of FIRE may have the effect of increasing the house price. Hence, this study attempts to fill up the under-researched area of pressing issue surrounding the implications of FIRE inflows on host country's affordability level by focusing on the experience of emerging real estate markets. The approach is specifically designed to be as informative as possible in offering the benefits and costs of luring FIRE into the host countries with respect to house affordability. Generally, this study found that FIRE is beneficial in increasing national income but might be offset by increasing house price.*

*Keywords: Affordability; foreign investment; housing price; real estate markets*

*ABSTRAK*

*Pelaburan asing dalam hartanah (FIRE) semakin menjadi sumber modal penting kepada banyak pasaran sedang membangun di seluruh dunia. Daripada satu sudut, FIRE membantu meningkatkan prestasi sektor hartanah dan seterusnya menaiktaraf tahap pendapatan negara tuan rumah. Bagaimanapun, daripada sudut yang lain, kemasukan FIRE mungkin memberi kesan peningkatan harga rumah. Oleh itu, kajian ini cuba untuk mengisi lompong kajian terhadap isu yang mendesak dalam bidang yang masih kekurangan kajian iaitu implikasi kemasukan FIRE kepada tahap mampu milik di negara tuan rumah dengan memfokuskan kepada pengalaman pasaran hartanah yang sedang membangun. Pendekatan telah direka secara khusus agar sangat berinformasi dalam menerangkan keuntungan dan kos menarik FIRE ke negara tuan rumah dengan merujuk kepada kemampuan memiliki rumah. Umumnya, kajian ini mendapati bahawa FIRE memberikan manfaat dalam meningkatkan pendapatan negara tetapi berkecenderungan untuk diimbangi dengan kenaikan harga rumah.*

*Kata kunci: Harga rumah; mampu milik; pelaburan asing; pasaran hartanah*

## INTRODUCTION

Real estate plays an integral role in any economy in the world. Residential real estate provides housing for families, and is often the greatest source of wealth and savings for many of them. Commercial real estate, which includes apartment buildings, creates job opportunity in retail, office rental and manufacturing. Real estate revenue provides a source of income for millions, particularly because real estate construction is labor intensive. Therefore, a decline in housing construction is a big contribution to the high unemployment rate and falling affordability level. Arku and Harris (2005) outline historical progression on the treatment of housing in economic development. The importance of housing policy has always been overshadowed by other social and political objectives and only recently the potential role of housing as a tool of economic development has been

recognized. According to Basolo (2002), city decision makers must pursue developmental or economically advantageous policies such as economic development initiatives and avoid redistributive or fiscally harmful policies such as affordable housing programs. In essence, it is argued that housing during post-war decades is viewed as social expenditures without any expected return out of those expenditures. Hence, spending on housing will leak the capital for productive investment and subsequently pulling down the growth rate. Harris and Arku (2006) further summarized that construction and housing can affect economic development through its impact on employment, savings, investment and labor productivity.

The importance of housing is based on the recent literature seems to be receiving a concensus. However, Bahmani-Oskooee, Hegerty and Wilmeth (2012) argued that saving-investment gap is very prevalent in some

countries under this study and hinted a crucial role to be played by foreign capital or external financing to bridge this gap. Bahmani-Oskooee et al. (2012) concluded that external financing can be used to reduce income inequality in host countries, albeit significant for some countries only. Prior to Bahmani-Oskooee et al. (2012), Durham (2004) confirmed the importance of both, foreign direct investment (FDI) and foreign portfolio investment (FPI), on economic growth but conditional upon the 'absorptive capacity' of host countries. While various studies has confirmed the growth-enhancing role of FDI on host countries such as Sinani and Meyer (2004), Greenaway, Sousa and Wakelin (2004) and Liu (2008), to mention few, the effect of foreign portfolio investment on economic growth of host countries are ambiguous. On the positive note, Knill (2005) argued that foreign portfolio is associated with an increased ability to issue publicly traded securities for small firms in all nations, while Ferreira and Laux (2009) concluded that the net effect of portfolio flows is strong, especially in the less-developed countries. However, Richards (2005) and Prasad, Rajan and Subramaniam (2007) found a contradictory findings. Richards (2005) who studied six Asian emerging equity markets found that the price impact associated with foreigners' trading are much larger, suggesting that foreign investors have a larger impact on emerging markets. Mihaljek (2005) also found similar concern among European Union countries such as Cyprus, the Czech Republic, Hungary and Slovakia. These countries have asked for a longer transitional period before they can allow for foreign buyers in their real estate sector due to the expectation that the impact of large-scale real estate purchases by foreign residents on the (hiking) prices and (sharp-dropping) affordability of local housing could be very significant. At the meantime, Prasad et al. (2007) observed that current account balances and growth among non-industrial countries are positively associated, implying that a reduced reliance on foreign capital is associated with higher growth. Among the possible explanations provided by Prasad et al. (2007) is non-industrial countries are sensitive to overvaluation caused by rapid capital inflows.

On another development, while the emphasis in the past on foreign capital is very much centered on the FDI in manufacturing (*FDIM*) sector, combined with the fall of World FDI, the focus has changed to FDI in services (*FDIS*), especially on FDI in real estate. As stated by UNCTAD (2012), with more than half of global FDI will flow to developing and transition economies, a broader development policy agenda is emerging encompasses inclusivity and sustainability goals. Amidst world economic uncertainty, limited and lower amount of current foreign capital inflows could be very important to be fully integrated into host country's development strategy. As clearly stated in Table 1 of UNCTAD (2012), the investment, including foreign capital should be channelled to areas which are key for the build-up of productive capacity and international competitiveness. FDI in services, including real estate may help to spur infrastructure development in host countries. Hence, many emerging markets are targeting FDI inflow in services. As shown in Table 1, developing countries experienced a surge in inflows of foreign investment in real estate (*FIRE*) of about 32 times in 2002 relative to 1990. Although bulk of the percentage goes to developed countries, which is 88.07 percent in 1990 as compared to merely 11.93 percent for developing countries, the composition of world *FIRE* has changed dramatically in 2002. World percentage of *FIRE* that inflow to developed countries has dropped to 61.14 percent in 2002 and slightly higher in 2005 which recorded 66.44 percent.

TABLE 1. Inflows of foreign investment in real estate (in billions USD)

|  | 1990 | 2002 | 2005 |
|---|---|---|---|
| Developed Countries | 103.4 (88.07) | 703.1 [ 6.80] (61.14) | 1,068.9[1.52] (66.44) |
| Developing Countries | 14.0 (11.93) | 447.6[31.97] (38.86) | 539.9 [1.21] (33.56) |
| World | 117.4 | 1,150.7[ 9.80] | 1,608.8[1.40] |

*Notes*: Developing countries include Central and Eastern Europe as well. The data is based on total inward FDI in business activities. Figure in [ ] denotes ratio to the figure in previous year in the table. Figure in ( ) stands for percentage of world.
*Source:* UNCTAD (2005, 2007).

Allowing foreign capital to enter, depending on its motivation, might be growth-promoting or growth-reducing. High inflows of *FIRE* into developing countries can be fully utilized to promote economic development in the host countries. However, as caution has been made by several studies such as Richards (2005), Mihaljek (2005) and Prasad et al. (2007), the inflows could trigger an increase in countries' house price and later on translated into a lower affordability level. Considering only the implication of foreign capital on house price and conclude that host country should reduce the volume of inflows may not be a wise policy suggestion. In our view, a more proper policy whether to lure or limit the inflows of *FIRE* should be based on its impact on affordability, which is more representative of welfare generated by the inflows. In the absence of information on country's affordability, this study approaches the issue indirectly which is by way of contrasting the cost and benefit of having inflows of *FIRE*. Although there are at least three ways in measuring affordability such as a perfectly balanced housing market, housing expenditure to income ratio, and housing affordability index, the measurement requires information on housing which is not easily gathered even in the case of small samples like this study.

Therefore, the objective of this study is to examine the possible effect of inflows of *FIRE* on house affordability. The idea is particularly unique because it approaches the

issue by investigating the benefit and cost, or indirectly via channels of *FIRE* from the perspective of host countries. The benefits of approaching the issue from this perspective are two folds: Firstly, it allows us to clearly examine the relative benefit (via income-generating effect) of *FIRE* against its cost (via price-elevating effect). The effect of *FIRE* on both could be equally low or high, translated into low or insignificant impact of *FIRE* on affordability. In aggregate analysis, if this finding is found, someone will, by mistake, simply conclude that *FIRE* is not crucial factor to economic development. While this could be a proper conclusion in the case of equally low, but could be a huge mistake in the case of equally high. Hence, directly looking into net effect may not be able to provide the real insights, leading to probable misspecification of policy prescription pertaining to *FIRE*. Secondly, the model allows us to have competing factors explaining income and house price, which later on can be utilized to explain relative importance of *FIRE* in both models. This offers rich information and enables policy makers to draw a better policy suggestion. The next section discusses a brief economic background of selected emerging markets. The countries in the list are limited to those discussed during the first draft of this paper. Although this study expanded the countries, whatever has been discussed is sufficient for the sake of highlighting the issue and hence, no discussion about the rest is presented here. It is then followed by literature review. Methodology is the fourth section and results in are presented and explained in the fifth section. Sixth section concludes.

## BACKGROUND OF STUDY

According to Mihaljek (2005), the size of real estate sector in developed countries is around 20 - 25 percent of GDP. Comparing this figure with the one for emerging real estate market as shown in Table 2, the size of real estate market in the selected emerging markets is still relatively very small. Low level of construction may indicate considerable potential for future growth of real estate in all countries under study. It may also suggest that

available domestic fund may not be sufficient to cover the huge need of construction, particularly housing and business lots.

Table 3 highlights the level of affordability in the selected cities for some countries under study. 6 cities in Bosnia, Bulgaria, China, Macedonia, Vietnam and the Philippines recorded a falling index. The largest drop of more than 42 percents is observed in the case of Shenzhen City. Other cities such as Guangzhou and Beijing are also suffering the same problem. In contrary, the remaining 6 countries in this study enjoyed higher affordability level. Vilnius City in Lithuania, Tunis in Tunisia and Mexico City in Mexico are the cities in which more than 100 percent of improvement in affordability level is recorded. As they are all the recipients of *FIRE,* the issue of growth-enhancing *FIRE* is very critical and requires a serious attention.

Finally, to see the preliminary link between affordability and construction, they are plotted in Figure 1. As construction represents supply of house, it is expected that more construction will generate higher supply of house and therefore, lower house prices and increase affordability. What we can observe is the missing clear-cut or strong association between construction and

TABLE 2. Construction (as % of GDP) for Selected Countries

|  | 1980 | 1990 | 2000 | 2005 | 2010 |
|---|---|---|---|---|---|
| Bosnia | NA | NA | 6.91 | 5.22 | 6.18 |
| Bulgaria | 8.03 | 7.26 | 4.57 | 5.80 | 8.09 |
| China | 4.30 | 4.38 | 5.57 | 5.61 | 6.07 |
| Kazakhstan | NA | NA | 5.49 | 8.16 | 8.00 |
| Latvia | NA | NA | 6.79 | 6.95 | 5.93 |
| Lithuania | NA | NA | 6.01 | 7.54 | 5.65 |
| Mexico | 7.21 | 4.48 | 6.33 | 6.79 | 6.64 |
| Philippines | 10.06 | 6.53 | 5.70 | 4.74 | 6.12 |
| Romania | 7.16 | 5.52 | 5.35 | 7.39 | 9.98 |
| Thailand | 4.44 | 6.87 | 3.06 | 3.02 | 2.67 |
| Tunisia | 6.68 | 4.37 | 4.81 | 4.90 | 4.80 |
| Turkey | 5.92 | 6.58 | 5.39 | 5.02 | 4.59 |
| Vietnam | 3.33 | 3.84 | 5.35 | 6.35 | 7.03 |

*Note*: NA = not available.
*Source:* UNCTAD (2012).

TABLE 3. Affordability Index in the Selected Cities

|  | 2011 | 2013 |  | 2011 | 2013 |
|---|---|---|---|---|---|
| Banja Luka [Bosnia] | 0.85 | 0.74 | Almaty [Kazakhstan] | 0.36 | 0.58 |
| Varna [Bulgaria] | 1.12 | 0.67 | Vilnius [Lithuania] | 0.22 | 0.96 |
| Shenzhen [China] | 0.38 | 0.22 | Mexico City [Mexico] | 0.26 | 0.72 |
| Skopje [Macedonia] | 0.75 | 0.45 | Bucharest [Romania] | 0.52 | 0.68 |
| Manila [Philippines] | 0.34 | 0.31 | Tunis [Tunisia] | 0.15 | 0.59 |
| Istanbul [Turkey] | 1.35 | 1.02 | Bangkok [Thailand] | 0.46 | 0.56 |
| Ho Chi Minh City [Vietnam] | 1.03 | 0.62 |  |  |  |

*Source*: Numbeo [http://www.numbeo.com]
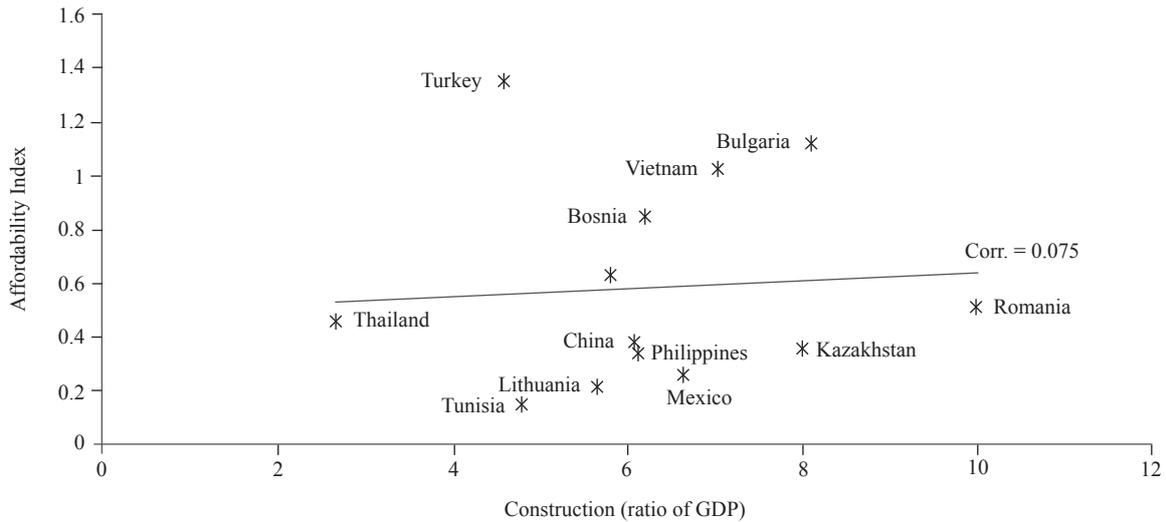
*Note*: Figure for construction is based on 2010. Affordability Index refers to 2011's figures. The straight line denotes the fitted line, representing the correlation between affordability and construction. Corr. denotes correlation coefficient.

*Source:* Table 2 and Table 3.

FIGURE 1. Construction vs Affordability

affordability. The low correlation coefficient of 7.53 percent could be explained partly by increase in cost of living, reflected in price level which is off-setting the potential benefits to be derived from high construction level. Whether or not increasing cost of living is affected by *FIRE*, is another interesting topic to be researched.

## LITERATURE REVIEW

### DETERMINANTS OF HOUSING PRICE

Agnello and Schuknecht (2009) studied the real estate booms and busts in 18 industrialized countries and a more coverage study done by OECD (2011) on the same issue but defined as investigating the causes of house price volatility in OECD countries. Agnello and Schuknecht (2009) has successfully identified short-term interest rates, local and global money and credit developments and mortgage market deregulation as the sources of booms and busts in industrialized countries. For the period from 1970 to 2007, this study observed that only Germany and Australia considered as having stable house price except for the later period, 2000s for Germany in which bust is observed while between 1997 and 2004 for Australia where boom is observed. Canada could be the unique country out of 18 as it only enjoys the booms for 1985-1989 and 2001-2007. The rest of the countries under study have experienced both booms and busts alternately. The only question that we have pertaining to finding of Agnello and Schuknecht (2009) is regarding how come Germany suddenly faced bust period when there is no boom prior to the bust period.

There is no, if we are not mistaken, clear explanation given to this point as suddenly this study shifted its focus on finding the determinants to the booms and busts estimated. OECD (2011), on the other hand, used changes in real house prices across OECD countries and found that 9 countries such as Australia and UK experienced very large increase, refers to 90 percents or more, of house price. The inclusion of Australia in the list seems to be in line with the finding in Agnello and Schuknecht (2009) who found the boom of real estate price in Australia in the recent years. Once again, Agnello and Schuknecht (2009) findings are consistent with OECD (2011) who found that Germany is among the countries in which house price change is not too significant, referring to a change of less than 20 percents). In addition to factors which have been identified by Agnello and Schuknecht (2009), OECD (2011) suggested slow respond of housing supply to sudden increase in housing demand, housing policies (such as social housing) and lower purchase transaction costs could help reducing the volatility in house price in OECD countries.

Borowiecki (2009) examined the determinants of house price in the Swiss economy for the period 1991-2007. One interesting reason given by Borowiecki (2009) regarding the conduct of this research for the Swiss is due to its unique characteristic of low supply of house. This is further explained as because of the outcome of 70 percent mountain and heavy regulations imposed on construction sector in this country. Nonetheless, Borowiecki (2009) findings are considered as short-run relationship given the first-differenced VAR model is employed. Capozza, Herdershott, Mack and Mayer (2002) studies the determinants of house price by utilizing a large panel

data set for 62 US metropolitan areas from 1979 to 1995. Among importance variables observed as influencing the house price is the cost itself and the difficulty to get sufficient supply of house. The latter factor means supply does not respond immediately to a change in demand for house. Interestingly, Capozza et al. (2002) introduced real median income, one of input to calculate affordability index for calculation of Housing Affordabiltiy Index (HAI). Although the impact is significant but the calculated elasticity is low, implying high price of house could be due to other factors such as land supply index, user cost and more importantly the real cost of construction. The implication of user cost in Capozza et al. (2002) is being supported by Iossifov, Čihák and Shanghavi (2008) who revealed that the housing price is highly elastic with respect to changes in real interest rate, as compared to other explanatory variables such as GDP and per capita GDP. Craig and Hua (2011) examine the impact of macroeconomic fundamental on property prices in Hong Kong SAR. As part of the strategies to combat rapid rise in property prices, Craig and Hua (2011) found that land supply and tax policies could be the most effective policy instruments. However, land supply policy is effective after some time lags. Hence, tax policies (e.g. stamp duty on property transaction and a tighter loan-to-value ratio on lending) are the best option to dampen speculative activity which is among the crucial factors driving the property prices up.

Stepanyan, Poghosyan and Bibolov (2010) could be among the first to introduce the role of external financing in investigating the house price determinants in the selected countries of former Soviet Union. Stepanyan et al. (2010) found a significant impact of foreign capital in both dimension, short or long-run. Hence, Stepanyan et al. (2010) concluded that all variable, including foreign capital have been significant drivers in the former Soviet Union countries. Tumbarello and Wang (2010) also examined the implication of private capital inflows on house price changes. Tumbarello and Wang (2010) highlighted that large capital inflows were associated with an increase in house prices in Denmark, New Zealand, Norway and Sweden but not in Canada where the house price was remained constant. Conversely, foreign capital inflows are found to correlate negatively with house price in the case of Australia. Mihaljek (2005) summarized a concern by several European countries pertaining to the restriction to EU citizens to buy property in their countries. Denmark received a special provision to disallow foreigners to own vacation home that are kept unoccupied most of the years in order to prevent speculative activities. Malta, a country which is suffering from rising property prices, is expecting EU membership will not be adding pressure for property prices to increase further. However, Mihaljek (2005) reminding us about a straightforward conclusion that foreign capital will definitely affect house price negatively. In other words, to conclude that housing would become more affordable if foreign ownership of real estate was restricted is too much. While Mihaljek (2005) suggested to look into the effect of other factors, this study suggests that we should look into the possible benefit(s) generated by foreign capital, from which the only we can draw a better conclusion about implication of foreign capital on affordability and whether or not to lure more foreign capital or not into the country. Fernandes and Paunov (2012), on the other hand, argued that if foreign capital inflows are in the form of FDI, it may help reducing price for at least two reasons. Firstly, FDI is likely to increase domestic market competition which later on translated into price reductions as local producers are no longer able to retain the 'monopoly rents'. Secondly, FDI is expected to improve efficiency in the market. While the multinational corporations are by default efficient, leaking of managerial, marketing and organizational know-how and best-practices to domestic firms help gearing domestic firms' efficiency. Later on, domestic market will be able to offer lower price.

DETERMINANTS OF INCOME

The literature on factors affecting income is vast. In principle, the most fundamental principle in economics suggests that for a country to grow, it requires three basic factors, namely land, labor and capital (Firebaugh, 1992) or in the framework of Cob-Douglas production function, it retains labor (L) and capital (K), but replace land with total factor productivity (A). Mathematically, they are summarized as $Y = AL^\beta K^\alpha$, where $\alpha$ and $\beta$ are the output elasticities of capital and labor, respectively. These values are constants and determined by available technology. The most basic factor deemed as necessary for development to take-off is capital. Tang, Selvanathan and Selvanathan (2008) and Adams (2009), among others, confirmed the importance of domestic investment in promoting economic growth. Originally and classically, technology is treated as constant but in the modern growth theory, technology or total factor productivity is no longer set as fixed. In other words, improvement in technology can be achieved should a country embark on technology-enhancing activities such as R&D, luring more technology-embedded FDI and so on. As summarized by Blomstrom (1991), there are several ways through which FDI may enhance technology level of host countries and eventually spur economic growth. The presence of multinational corporations (MNCs) may increase degree of competition in host-country market and force inefficient existing firms, either local or foreign, to make themselves more productive by investing in physical or human capital. MNCs may also train labor and management as well as local suppliers of intermediate products to meet the higher standards of quality control, reliability and speed of delivery required by technology and method of operation of the foreign-owned company. Although many studies such as Borensztein, De Gregorio and Lee (1998) for unconditional effect while Hermes

and Lensink (2003), Durham (2004), Li and Liu (2005), and Alfaro, Chanda and Kalemli-Ozcan (2006) for conditional upon i.e. financial development, institutional quality, have a consensus regarding the positive impact of FDI on economic growth, Firebaugh (1992) is among the first to reinvestigate the implication of foreign investment on poor nations. Although the effect is not directly observable but foreign investment is found to be beneficial, not harmful to host poor countries, which reversed findings of previous studies such as Bornshier and Chase-Dunn (1985), London and Robinson (1989) and Boswell and Dixon (1990). In short, FDI is found to be generally growth-enhancing or development-friendly to host countries regardless of their existing development level.

In addition to input-based factors such as capital and labour, current literature tends to also confirm that openness to trade, apart from openness to foreign capital as discussed above, can spur economic growth. There is almost none study which found exports or trade as inhibits growth. Theoretically, the standard neoclassical trade argument would postulate a substantial positive impact of exports and trade on economic performance due to better allocation of resources. Moreover, the two-gap models of development suggest an attenuation of the foreign resource 'gap' as the primary positive role of exports played in economic development (Ram, 1985).

## METHODOLOGY

### MODEL SPECIFICATION

This study specifies house price (HP) equation based on the literature discussed in the previous section as follows:

$$HP_{i,t} = \alpha_0 + \alpha_1 SG_{i,t} + \alpha_2 IR_{i,t} + \alpha_3 WAGE_{i,t} + \alpha_4 FIRE_{i,t} + \varepsilon_{i,t} \qquad (1)$$

Where *HP* stands for house price, *SG* stands for supply gap of housing, *IR* represents long-term interest rate, *WAGE* is wage per hour and *FIRE* denotes foreign investment in real estate. All variables enter in natural logarithm form. Instead of using construction as a proxy for supply of housing, as summarized by Capozza et al. (2002), the supply gap is more crucial than the supply itself in determining the house price dynamism. In fact, supply gap is the more crucial element in rising house price than the income of population. To capture both elements, this study employs construction as a percentage of GDP as a proxy. This approach helps to minimize the risk of low degree of freedom given the limited observation facing this study. Moreover, unavailable index or information on supply gap or actual demand for house has prompted this study to suggest the following measurement to proxy supply gap (*SG*).

$$SG = \frac{GDP}{GDP} - \frac{CONS}{GDP} = 1 - Cons\ Ratio \qquad (2)$$

To represent cost of buying a house, this study applies long-term interest rate as a proxy. Although various types of interest rates have been put in the list of possible proxies (e.g. lending rates which are only available for 12 countries under study), this study decided to utilize long-term interest rates as this information are available for all countries. The crucial role played by interest rate in influencing house price has been highlighted by Wong, Hui and Seabrook (2003), Gupta and Kabundi (2009), He, Hu and Casey (2009) and few others. Wage per hour is utilized to proxy for cost of doing construction. Finally, with the increasing inflows of FDI in services, the role of *FIRE* is expected to be significant on house price.

Moving on to the specification of positive channel from which *FIRE* may benefit the country. *FIRE* is expected to offer a return to the host country in the form of higher income level. Combined with variables suggested by other studies as highlighted in the literature review section, this study specifies the *INCOME* equation as follows:

$$RI_{i,t} = \beta_0 + \beta_1 DI_{i,t} + \beta_2 EXP_{i,t} + \beta_3 FDI_{i,t} + \beta_4 FIRE_{i,t} + \mu_{i,t} \qquad (3)$$

Where *RI* stands for real income, *DI* denotes domestic investment, and *EXP* represents exports. All variables enter in log form. Domestic investment is proxied by gross fixed capital formation (or GFCF, as a percentage of GDP). Although the use of gross fixed capital formation is debatable on the ground that embedded in it is partly the components of foreign capital. This study has tested both, GFCF with and without FDI taken into account, but reported only one of them as there is no significant difference between the two estimated results. For GFCF with FDI, this study deducts FDI from GFCF and use the remaining to proxy domestic investment. The unreported result is available upon request. Other possibility is to use domestic saving. *EXP* has been a crucial factor in promoting economic development. It is well proven that those countries with a more open policy will grow faster than those are closed. The role of *FIRE* is added to represent the focus of this study.

### HOW TO MEASURE 'INDIRECT' IMPACT OF FIRE ON AFFORDABILITY?

As been discussed in the Footnote 1, several measurements of affordability have been proposed such as perfectly balanced housing market, housing expenditure to income ratio and housing affordability index. However, in this study, different or 'indirect' approach, rather than direct impact of *FIRE* on house affordability is employed for three reasons. Firstly, these indicators are not readily available for many countries. Although some variables can easily be calculated such as housing affordability index (HAI), this model requires us to have information on median income which is something rarely we can observe

in any published statistical information. Secondly, the advantage of using this approach is that this model allows us not only to compare the cost and benefit of permitting foreign capital in real estate to enter into a country, but also to compare the relative importance of contribution of other factors. For instance, although *FIRE* could be a strong candidate to trigger house price to go up, but the limited supply of house could be the primary source of house price hike. Thirdly, this study reserves the direct impact of *FIRE* on house affordability in separate paper. Recently, Masron and Ema Izati (2016) has come out with several indicators of affordability and investigate the implication of *FIRE* on these indicators. Masron and Ema Izati (2016) found a similar and consistent result as in this study.

In this study, in the absence of readily available information on affordability, we measure the effect of *FIRE* on affordability by contrasting the impact of *FIRE* on *HP* ($\alpha_4$) with the implication on *RI* ($\beta_4$). Several possibilities could be the outcome of this study, assuming variables are significant, such as:

1. If $\alpha_4$, $\beta_4 > 0$, and $\alpha_4 < \beta_4$, *FIRE* is affordability-improving.
2. If $\alpha_4$, $\beta_4 > 0$, and $\alpha_4 > \beta_4$, *FIRE* is affordability-reducing.
3. If $\alpha_4 < 0$, $\beta_4 > 0$, *FIRE* is highly affordability-improving, strongly recommended to inflow.
4. If $\alpha_4 > 0$, $\beta_4 < 0$, *FIRE* is highly affordability-reducing, strongly discouraged to inflow.
5. If $\alpha_3$ and/or $\beta_4$ are not significant, this study will treat them as: $\alpha_4 = 0$, $\beta_4 = 0$.

Caution, however, is needed. The above condition is only applicable in the case of impact of *FIRE* on house affordability. If *FIRE* can promote income much higher than increase in house price, *FIRE* is considered as affordability-improving. Nevertheless, whether or not house affordability will increase, will also have to depend on other factors. This is why this study approaches this issue from the above perspective. This will allow us to explore more area that can trigger house affordability to drop. For instance, if supply gap in equation (1) has larger effect on house price relative to *FIRE*, the potential of *FIRE* to promote house affordability may not be materialized.

ESTIMATION PROCEDURE & DATA COLLECTION

Given limited information, we proceed initially by employing panel static effect, referring to pooled, fixed- and random-effect models of panel data analysis. Those who are interested to know in detail about the methods can refer to Gujarati and Porter (2009). In fact, equation (3) if expressed at level equation will represent fixed-effect model. If correlation analysis suggest that there is endogeneity issue, equations (1) and (3) will be estimated by using panel dynamic approach of

generalized method of moments (GMM). If endogeneity actual present in the model, the estimation results will be biased and unreliable. For illustration, equation (1) which is following dynamic panel model will become:

$$\Delta HP_{i,t} = \delta_0 + \delta_1 \Delta SG_{i,t} + \delta_2 \Delta IR_{i,t} + \beta_3 \Delta WAGE_{i,t} + \delta_4 \Delta FIRE_{i,t} + \tau_i + \eta_i + \varepsilon_{i,t} \quad (4)$$

where $\tau$ is a period-specific effect and common to all countries; $\eta$ captures unobserved country-specific effects; $\varepsilon$ is a white noise disturbance term and $\Delta$ denotes first difference. By letting X as a set of explanatory variables, equation (4) can be further simplified to:

$$HP_{i,t} - HP_{i,t-1} = -\theta_1 HP_{i,t-1} + \theta X_{i,t} + \tau_i + \eta_i + \varepsilon_{i,t} \quad (5)$$

where $HP_{i,t} - HP_{i,t-1} = \Delta HP_{i,t}$ is the growth of house price and $\theta_1$ is a parameter of convergence speed. As annual data is generally influenced by business-cycle effects spreading over several years, it is common to suspect the presence of autoregressive structure in the residual term. Arellano and Bond (1991) proposed to take first difference with the assumption that $\mu_i = \rho\mu_{i,t-1} + \varepsilon_{i,t}$ and $|\rho| < 1$. Then, equation (5) becomes:

$$HP_{i,t} = (1 - \theta + \rho)HP_{i,t-1} - (1 - \theta)HP_{i,t-2} + X_{i,t}\theta - \rho X_{i,t-1}\theta + \tau_t - \rho\tau_{t-1} + (1 - \rho)\eta_i + \varepsilon_{i,t} \quad (6)$$

Nevertheless, if lagged difference in HP is correlated with the disturbance term, it may produce an endogeneity problem. Blundell and Bond (1998) suggested to overcome this problem by combining the difference estimator and the estimator in levels to form a system estimator by using instrumental variables. The GMM difference estimator uses the lagged levels of the explanatory variables as instruments. This is done under the assumption that the disturbance term is not serially correlated and the levels of the explanatory variables are weakly exogenous. If these conditions do not hold, in particular when the explanatory variables that are assumed weakly exogenous failed to hold, only levels of variables lagged 2 years or more may be used as instruments. This is particularly true for interest rate versus wage in the house price equation and exports versus FDI in the income equation. This leads to additional moment conditions for the regression in levels and explains how the GMM system estimator is obtained.

The data for this study is from 2000 to 2011. The sources of each variable are tabulated in Table 4 below.

In terms of countries, apart from those listed in Table 2, this study also adds Republic Czech, Estonia, Hungary, Slovakia, South Korea, Serbia, Taiwan, Costa Rica, Croatia, Cyprus, Macedonia, Malaysia, Myanmar, Indonesia, Brunei, and Lebanon after receiving feedback from participants in a conference. This inclusion has helped improving the reliability of the finding. Nevertheless, this study could only manage to this number as not many developing countries offer information on segregated foreign capital inflows such

TABLE 4. Source of Data

| | Measurement | Source(s) |
|---|---|---|
| FIRE | Foreign Investment in Real Estate (as % of GDP) | OECD Statistics and various countries' Central Banks and Statistic Departments |
| HP | House Price Index | Global Market Information database. |
| SG | As per equation (2) | UNCTAD Statistics (2013) |
| IR | Long-term Interest Rate | Global Market Information database. |
| WAGE | Wage per hour | Global Market Information database. |
| RI | Real GDP per capita | World Development Indicators (2013) |
| DI | Gross fixed capital formation (as % of GDP) | World Development Indicators (2013) |
| FDI | FDI subtracted by FIRE (as % of GDP) | World Development Indicators (2013) |
| EXP | Exports (as % of GDP) | World Development Indicators (2013) |

as foreign investment in real estate. Other information which is also hard to be gathered is house price index. Only countries under study offer full information. Although the sample size could be considered as small, it can be treated as a preliminary finding and could still be useful to certain extent especially in the absence of huge literature in this area.

## RESULTS AND DISCUSSION

This section starts by analysing the results of correlation analysis as shown in Table 5. On the left hand side, *HP* has correct signs of correlation with the other variables, except for house supply gap (*CONS*) which demonstrates a negative association. Long-term interest rate (*IR*) seems to have the strongest correlation with the *HP*. Low correlation coefficients are found among explanatory variables, implying no serious issue of endogeneity. On the right hand side of Table 5, *RI* demonstrates a positive association with *FIRE* and *FDI* but negative correlation with *DI* and *EXP*. While the positive correlation with *FDI* and *FIRE* is something in line with the literature prediction, the negative correlation with *DI* and *EXP* is a bit strange. This could be explained by the fact that *EXP* will only generate higher income if the level of imports does not increase larger that the increase in *EXP*. This study fully admits that higher imports do not necessarily mean lower growth. Trade liberalization, as reflected in higher exports, may also create higher domestic market competition and possibly it to crowd-out inefficient

domestic private firms. Hence, it is translated into a negative association. Overall, the correlation level among explanatory variables is also low and does not post any serious endogeneity problem.

Moving on to the results of regression analysis of static model in Table 6, although the first model of pool data surely is not the preferred model, cross-fixed effect and cross-random effect, are of conflicting superiority. In addition to country-fixed effect model, this study also tries to control for region in the third model. Nonetheless, F-statistic for redundant test in both fixed-effect models in both equations is highly significant, implying pooled model is less preferred. Out of two fixed-effect models, controlling for country and region, country-fixed effect tends to be superior to region-fixed effect based on higher adjusted-$R^2$ and lower standard error of regression in both *HP* and *RI* equations. Region is added to investigate potentially that region specific effect may play role in explaining the results. Finally, the choice between random and country-fixed effect is a bit complicated. Several model criteria suggest country-fixed effect as superior to cross-random effect but Hausman Test demonstrates that cross-random effect is better. Since Hausman test is a more formal testing procedure, this study relies on the result of Hausman test. In other words, discussion on the impact of each explanatory variable on HP and RI is based on the random-effect model.

The impact of house supply gap (*SG*) is only significant in the region-fixed effect model with a very high coefficient, compared to the other variables. Interestingly, the best two models of country-fixed

TABLE 5. Correlation Analysis

| | lnHP | lnSG | lnIR | lnWAGE | | lnRI | lnDI | lnEXP | lnFDI |
|---|---|---|---|---|---|---|---|---|---|
| lnHP | 1 | | | | lnRI | 1 | | | |
| lnSG | -0.16 | 1 | | | lnDI | -0.29 | 1 | | |
| lnIR | 0.31 | -0.24 | 1 | | lnEXP | -0.13 | 0.26 | 1 | |
| lnWAGE | 0.06 | -0.31 | -0.06 | 1 | lnFDI | 0.15 | 0.42 | -0.17 | 1 |
| lnFIRE | 0.22 | -0.24 | -0.03 | -0.22 | lnFIRE | 0.12 | 0.43 | -0.15 | 0.58 |

TABLE 6.  Regression Analysis – Static Model

| | lnHP | | | | | lnRI | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Pool | Fixed Country | Fixed Region | Random | | Pool | Fixed Country | Fixed Region | Random |
| C | -11.08 [-0.33] | 6.34 [1.57] | -43.29* [-1.89] | 6.69 [1.46] | C | 10.89* [8.87] | 6.01* [17.25] | 4.44* [6.41] | 4.19* [9.75] |
| lnSG | 2.45 [0.34] | -1.16 [-1.42] | 10.44* [2.08] | -1.21 [-1.22] | lnDI | -1.04* [-2.17] | 0.38* [4.68] | 0.16 [0.40] | 0.52* [5.95] |
| lnIR | 0.96* [3.84] | -0.002 [-0.01] | 0.75* [2.85] | -0.01 [-1.11] | lnEXP | -0.12 [-0.46] | 0.14* [3.48] | 0.49* [4.01] | 0.34* [4.07] |
| lnWAGE | 0.24* [1.65] | 0.56* [8.34] | 0.25* [13.11] | 0.51* [4.27] | lnFDI | 0.25* [4.40] | 0.002 [0.24] | 0.38* [16.53] | 0.09* [3.77] |
| lnFIRE | 0.29* [3.02] | 0.04* [4.13] | 0.33* [19.78] | 0.12* [2.59] | lnFIRE | 0.22* [2.63] | 0.11* [2.15] | 0.33* [5.13] | 0.15* [3.18] |
| | Model Criteria | | | | | Model Criteria | | | |
| Adj-$R^2$ | 0.14 | 0.92 | 0.57 | 0.41 | | 0.19 | 0.91 | 0.65 | 0.71 |
| S.E | 1.29 | 0.14 | 1.16 | 0.15 | | 0.81 | 0.06 | 0.53 | 0.08 |
| D-W | 0.03 | 1.59 | 1.04 | 0.41 | | 0.08 | 1.48 | 1.38 | 0.68 |
| F-Stat (Overall) | 6.17* (0.00) | 2210.9 (0.00) | 13.05* (0.00) | 23.44* (0.00) | | 8.50* (0.00) | 1142.9* (0.00) | 40.32* (0.00) | 79.35* (0.00) |
| F-stat (Redundant) | - | 2734.6* (0.00) | 2316.0* (0.00) | - | | - | 1638.4* (0.00) | 206.84* (0.00) | - |
| Hausman Test | - | - | - | 3.43 (0.48) | | - | - | - | 6.57 (0.16) |
| | FIRE on AFFORD [$\alpha_4$ vs $\beta_4$] | | | | | | | | |
| | Pool | | Fixed (country) | | Fixed (Region) | | Random | | |
| | 0.22 < 0.29 UP | | 0.04 < 0.11 UP | | 0.331 < 0.333 UP | | 0.12 > 0.15 UP | | |

*Note*: Asterisk * denote significant at least at 10 percent. Figure in [ ] stands for t-statistics. Figure in ( ) stands for p-value. SE stands for standard error of regression and D-W denotes Durbin-Watson Statistics.

effect and cross-random effect suggest that the effect of *SG* on *HP* is negative, albeit insignificant. Difficult to explain but considering that the explanatory variable of *SG* is in a percentage of GDP, it can be explained by the possibility of more or less constant level of house supply gap but complemented by low growth of GDP. Low growth of GDP will then be pulling the *HP* down, either because it reflects low prospects of demand or low ability to buy a house. However, it is difficult to conclude that the insignificant impact means house supply gap is not a major issue in rising house price because based on Craig and Hua (2011), the impact of house supply gap is not immediate. Hence, future study should apply this variable at lagged period. Similar to *SG* long-term interest rate (*IR*) also has a negative sign and insignificant impact on *HP*. *IR* represents cost of getting fund to finance construction of house or building. The third model has the correct expected sign of *IR* impact on *HP* and significant at 1 percent. *IR* will automatically be included in the house price which later on to be imposed on customers. However, with negative sign of effect recorded by random-effect model, the possible explanation to this inconsistent result could be

by treating *IR* as mirroring the cost of getting financing to buy houses. As the cost of fund is becoming more expensive, the demand for house drops and subsequently triggers *HP* to also fall. As the implication is found to be insignificant, *IR* in this study is suggested as not the primary source of rising *HP*. Wage is considered as the most important variable affecting house price, given its largest coefficient consistent with other studies such as Capozza et al. (2002). Interestingly, the role of *FIRE* is significant and positive in all equations although the size of estimated coefficients varies across the models.

On the *RI* model, similar conclusion can be drawn regarding the choice of models. Fixed models tend to perform better than pooled model. Between country-fixed and region-fixed, based on adjusted-$R^2$, standard error of regression and Durbin-Watson statistics, country-fixed model is superior. Finally, the option between cross-random and country fixed effect is determined by using Hausman Test and the result showed that cross-random is the most appropriate option. According to the results of cross-random effect model, all variables enter significantly and positively, which are in line

with the prediction. Domestic investment (*DI*) has the largest impact, followed by exports (*EXP*). This finding is acceptable as many studies have observed growth-enhancing effect of *DI* (e.g. Tang et al., 2008; Adams, 2009) and *EXP* (e.g. Yanikkaya, 2003; Mah, 2005). The importance of FDI is also confirmed in this study. However, the size of impact is very small. The limited impact could mean that in line with the suggestion made by Hermes and Lensink (2003), Durham (2004), and Alfaro et al. (2010) that the positive spillover effect of *FDI* is conditional upon the establishment of several growth factors. Finally, the implication of *FIRE* on *RI* is also proven. Surprisingly, its impact is very low. This could probably imply that the component of the existing *FIRE* is very much dominated by short-term foreign capital or *FPI*. Although it helps to improve the wealth of host country's citizens, the instability generated by these activities may reduce the market confidence and lower demand.

After discussing the impact of each explanatory variable for equation *HP* and *RI*, this study will now combine both estimated results to infer the possible effect of *FIRE* on affordability. As shown at the bottom of Table 6, the calculated implication based on all equations reveals that the *FIRE* has a slightly positive net effect on affordability. Pooled model, country-fixed effect model, region-fixed effect model and cross-random model highlighted the affordability-enhancing effect of *FIRE*. In summary, the inflows of *FIRE* tend to improve the level of affordability of host countries under study and this finding is robust across various static models.

As this study observed a sign of endogeneity issue, particularly in the equation of *RI*, this study continues the analysis by applying a dynamic panel data approach. With limited observations, the use of general method of moment (GMM) could be raising a question on its validity. This study utilizes system GMM in order to minimize the risk of further losing degree of freedom. The validity of GMM results is being supported by the low standard error and insignificant J-statistics. The results are shown in Table 7. The finding of GMM approach also lends another support to the findings of static models in which the '*UP*' is likely the implication of *FIRE* on affordability. The impact of *FIRE* on *RI* is significantly positive. At this stage, this study is gaining more confidence to conclude that *FIRE* has a tendency to upgrade the level of host country affordability.

TABLE 7. Regression Analysis – Dynamic Model (System GMM)

| = | lnHP | | lnRI |
|---|---|---|---|
| lnHP(-1) | 0.91* [5.37] | lnRI(-1) | 0.7812* [10.23] |
| lnSG | -0.91 [-0.13] | lnDI | 0.20* [3.98] |
| lnIR | -0.01 [-0.09] | lnEXP | 0.19 [1.39] |
| lnWAGE | 0.20* [1.96] | lnFDI | -0.004 [-0.63] |
| lnFIRE | 0.03* [2.74] | lnFIRE | 0.05* [3.87] |
| Model Criteria | | | |
| Sargan-test | 7.38 (0.59) | | 11.01 (0.27) |
| AR(1) | -4.83* (0.00) | | -4.56* (0.00) |
| AR(2) | -1.49 (0.14) | | -1.14 (0.18) |
| FIRE on AFFORD | | | |
| 0.03 > 0.05 = UP | | | |

*Note:* Asterisk * denote significant at least at 10 percent. Figure in [ ] stands for t-statistics. Figure in ( ) stands for p-value. $H_0$ (for J-stat): Model specification is correct and all overidentifying restrictions (all overidentified instruments) are correct (exogenous).

Finally, this study ends this paper by analyzing year to year impact of *FIRE* on *AFFORD*. For this model, we run them by using OLS, adjusted for White standard errors in order to avoid or minimize heterogeneity issue. The results are depicted in Table 8. Surprisingly, only 8 out of 10 years show a positive and significant impact of *FIRE* on *RI*, relative to only 6 significant impact of *FIRE* on *HP*. Overall, majority of years demonstrate an *UP* in *AFFORD* due to inflows of *FIRE*. In 2006, since both impacts are insignificant, the effect is not known or no effect.

In summary, as far as the role of *FIRE* is concerned, the estimated coefficients suggest that *FIRE* has a tendency to exert a positive consequence on *AFFORD*. Does this imply that host country should promote further the inflows of *FIRE*? The answer is not straightforward and should not be basing solely on the effect of *FIRE*. As part

TABLE 8. Regression Analysis – Cross-Sectional

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| On HP | 0.10 [1.57] | 0.25* [2.49] | 0.09 [3.73] | 0.25* [2.15] | 0.06* [2.28] | 0.25 [1.67] | 0.24 [1.39] | 0.13* [1.80] | 0.09* [9.08] | 0.02* [3.10] |
| On RI | 0.23* [2.69] | 0.28* [1.85] | 0.18* [2.39] | 0.37* [1.97] | 0.22* [2.61] | 0.23* [5.02] | -0.03 [-1.11] | 0.06 [0.21] | 0.17* [2.24] | 0.11* [2.22] |
| On AFFORD | UP | UP | UP | UP | UP | UP | ? | DROP | UP | UP |

*Note*: Asterisk * stands for significant at least at 10 percent. Figure in [ ] denotes t-statistics.

of the motivation of this study discussed in the early section, this study also aims to identify other possible forces driving house prices and income up. Hence, in spite of all indicators demonstrate that *FIRE* is positively associated with *AFFORD*, in the static country random-effect model as well in the GMM model, apart from *FIRE, WAGE* is also found to be significantly influence the *HP*. In fact, in both models, the size of *WAGE* coefficient is overwhelmingly high if compared with the size of *FIRE* coefficient. On the benefit side, *DI* and *FDI* are found to be significant in random-effect model. Demand for *FIRE* is akin to demand for intermediate goods, meaning that *FIRE* is demanded to support the demand for various facilities, including building and subsequently is expected to boost investment, either local or foreign. As highlighted by Masron and Fereidouni (2012), inflows of *FIRE* could act as indicating factor to *FDI* to inflow. *FIRE* can serve two things. Directly, *FIRE* delivers a positive message that host countries' facilities are going to be better now because *FIRE* will take the responsibilities to improve the current domestic condition. Indirectly, the inflows of *FIRE* into host countries indicate that the countries have a set of incentives, ranging from infrastructures to political climates which are conducive to do business. *FDI* could be very much influenced by both points, but *DI* at least might have been boosted due to the first point. Therefore, to refer only to the direct effect of *FIRE* on *RI* and draw a policy for *FIRE* may not be wise enough. In summary, this study may only be able to caution those countries rushing to attract foreign capital in services, especially in real estate about the possible adverse impact of *FIRE* on country's affordability level if proper strategies and rules are not designed to mitigate or even to overturn this impact.

## CONCLUSION

This study investigates another important issue in economic development. In one hand, it is argued that foreign capital is very supportive to economic development via several channels such as providing more capital for domestic use, bringing more talents and management skills and so on. On the other hand, some counter argued that foreign capital may induce negative effect such as pulling the house price up, minimum spillover effect as they want to keep their vital information with them and so on. Hence, the net effect of foreign capital inflows on host country economic development, particularly on affordability level is timely to be investigated. Applying the data for the period from 2000 to 2011 for 30 countries with emerging real estate markets, this study examines the indirect effect of *FIRE* on housing affordability.

This study comes into a relatively robust conclusion that FIRE tends to improve affordability level of host countries. These results are consistent in

all specifications, such as static models, dynamic model and year-to-year models. However, a strong conclusion cannot be drawn although the results tend to confirm the positive consequence of *FIRE* as FIRE is not the only factor that triggers *HP* and *RI*. With limited information, the finding of this study should also be treated with caution and more future research surely needed to confirm this finding.

Another important issue is that although the original intention of this study is to investigate the effect of FDI in real estate on house affordability, the limited number of countries has hampered this unexplored area of research. Information on FIRE is much aggregated, consisting both FDI and portfolio investments. Therefore, the tendency of FIRE to exert a small positive impact on affordability could also due to the significant effect of portfolio (or also called short-term) investments in real estate. Future study may examine them separately so that better picture about the role of both can be drawn and subsequently, appropriate policy on both types of investment can be designed to be growth-enhancing.

## ACKNOWLEDGEMENTS

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