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Can Israeli Stocks Indices Predict Real Estate Prices Trends?

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***A*bstract:** This research examines the prediction power of stocks indices traded on Tel-Aviv stock exchange of nominal and inflation adjusted real estate prices in Israel. Real estate prices in Israel have risen dramatically during the last two decades, making it very difficult for young couples to afford a new house. If the stock market can be used to predict house prices, this could help policy makers in adjusting supply and demand of houses. The finding indicates that TARE (Tel Aviv Real Estate index) has a one to three lagged positive predictive power of housing prices. It is also found that TA100 index which includes the highest market capitalization stocks traded has also positive weaker lagged predictive power over nominal real estate prices trends than TARE and a stronger than TARE predictive power over inflation adjusted housing prices trends. This research established that nominal housing prices are easier to predict using stock market data than inflation adjusted prices. Using the forecast abilities established in this research, it is probable that real estate prices will continue to rise in the near future.

Keywords: Real estate; Housing; Forecasting; Home prices; Housing trends

JEL Classifications: G17, G12, G13 , R21

1. Introduction

Housing prices in Israel were emerging higher in the last two decades due to combination of a high demand accompanied with a shortage of adequate supply and a low interest rate. At the same period of time the stock market in Israel has also gained high positive return to investors. The rising houses prices make it almost impossible for young couples to buy a house, a fact that ignited protests around the country. Since the stock market in the financial literature is known for its ability to precede economic trends I examined to what extent two major stock indices are able forecast real estate prices trends.

2. Literature Review

The theory that the stock market is forward looking for the economy is based on the idea that the stock price is the present value of future dividends. As corporate profits are positively correlated with national GDP, it is clear that the future economic activity of a country is related to the future dividends of the country's companies (Fama, 1990; Fischer and Merton, 1984). Increase in the current expectations about the future economic activity leads to higher stock prices. Some researchers have argued that stock prices can cause future economic activity through the "wealth" effect which means that which states that people consume a fraction of the present value of their total future income (Ando and Modigliani, 1963; Kaplan, 2008). In this context, a rise in the stock prices would increase the wealth of the households, who consequently would elevate their consumption levels. Dynan and Maki (2001) used data on individual households in the consumer expenditure survey to conclude that those households who own stocks react to stock price changes

with changes in consumption in the same direction within a couple of years, while those who do not own stocks exhibit no consumption response to variations in the stock market.

Other researchers have questioned the ability of stock prices to foresee future economic trends. Binswanger (2000, 2004) and, Mao and Wu (2007) for example, have argued that the stock prices can deviate from their fundamental values due to the occurrence of speculative bubbles and that globalization can decrease the link between the domestic stock prices and the domestic economy, as it makes the share price of domestic firms more dependent on foreign sales and the foreign economy. Mahdavi and Sohrabian (1991) mention that variations in the real discount rate and deviations in the linkage between corporate profits and the economic activity can create noise in the prediction of the future economic activity.

3. Data and Model

In the following research, I examined whether stock prices can indicate any foreseeable change in Real estate prices in Israel. In order to do so, I used three serious of monthly data from 2000 until 2016: 1) The official Israeli statistics authority index for housing prices and 2) Tel Aviv stock exchange real estate index (from now on TARE) which includes all stocks traded at Tel–Aviv stock exchange related to real estate. 3) A major stock index which include 100 highest market capitalizations in Israel (TA100 index). Figure 1 below demonstrates TARE price behavior versus the official Israeli housing index.

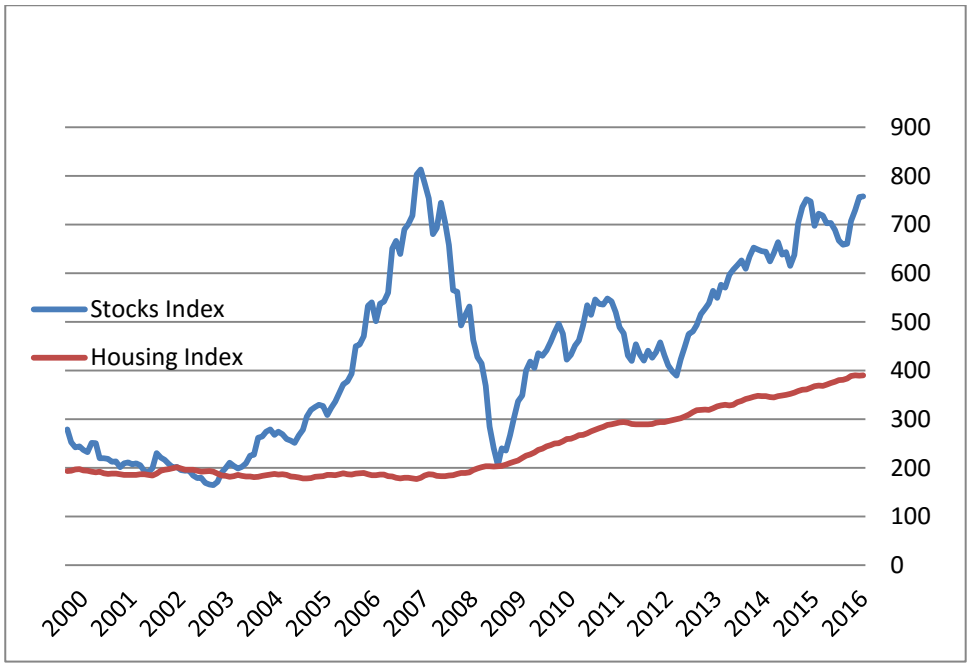

Figure 1. Real estate stock index and housing prices index, Israel

This figure shows that investing in Tel Aviv real estate index was twice as fertile to investors in the examined period then investing in solid real estate. However, that investment as can be seen in Figure 1 included much higher risk. From the beginning of year 2000 until June 2016, the average monthly return of the TARE index was 0.73% with Standard deviation of 6.06 compared to 0.35% with average with standard deviation of 0.92. The volatility difference is also displayed in Figure 2, which captures the monthly change of those two discussed indexes.

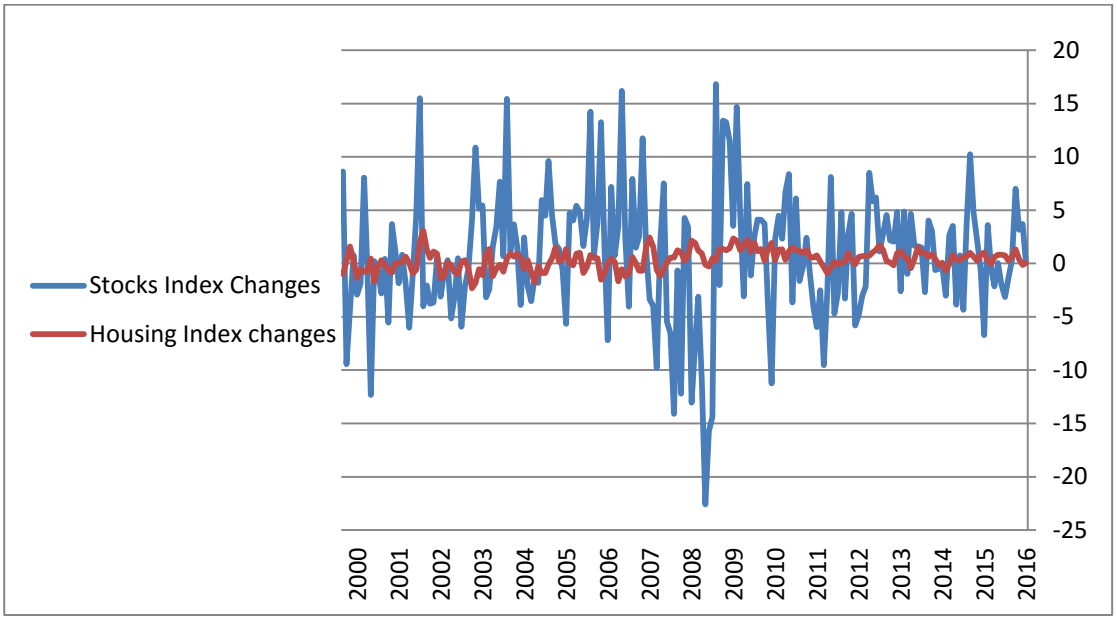

Figure 2. Monthly changes of real estate stock index, and of housing prices index, Israel

Figure 2 indicates that the financial market is much more volatile monthly than real estate prices. This phenomenon explains why many investors prefer to invest in real houses than in real estate stocks (TARE), which inflate house prices.

This study now designs four regression models (Equation 2-5) that tentatively try to predict nominal and inflation adjusted real estate prices changes using lagged and non-lagged TARE and TA100 monthly changes. Incorporating lagged data into the regressions models is based on the idea that the financial markets react much quicker to a new relevant information than real economics prices like real estate prices. Inflation adjusted real estate changes were calculated using Equation 1:

$$RHN_I = \left[\frac{1+RHN_n}{1+I} - 1\right] * 100 \qquad (1)$$

Where RHN_n = Nominal real estate monthly change at month *n*, I = monthly inflation rate.

$$RHN_n = \alpha_1 + \alpha_2 * TARE_L, \quad L = n, \ \ldots \ , n-5 \qquad (2)$$

Where RHN_n = Nominal real estate monthly change at month *n*, $TARE_L$ = Tel Aviv real estate stocks index monthly changes at month *L*.

$$RHN_n = \alpha_1 + \alpha_2 * RTA\,100_L, \quad L = n, \ \ldots \ , n-5 \qquad (3)$$

Where RHN_n = Nominal real estate monthly change at month *n*, $RTA100_L$ = Tel Aviv100 stocks index monthly changes at month *L*.

$$RHR_I = \alpha_1 + \alpha_2 * TARE_L, \quad L = n, \ \ldots \ , n-5 \qquad (4)$$

Where RHR_I = Inflation adjusted real estate monthly change at month *n*, $TARE_L$ = Tel Aviv real estate stocks index monthly changes at month *L*.

$$RHR_I = \alpha_1 + \alpha_2 * RTA\ 100_L, \quad L = n, \ \ldots, n-5 \qquad (5)$$

Where RHR_I = Inflation adjusted real estate monthly change at month *n*, $RTA100_L$ = Tel Aviv-100 stocks index monthly changes at month *L*.

4. Results

Table 1 summarizes the regression models that captures TARE and TA 100 prediction power of the nominal real estate prices changes.

Table 1. TARE TA100 prediction power of the nominal real estate prices changes

Regression Trial	Explained Variable	Explanatory Variable	α_1	α_2	*F*	*N*
1	RHN_n	$TARE_L \quad L = n$	0.85 (1.83)	-0.32 (-0.69)	0.48	197
2	RHN_n	$TARE_L \quad L = n-1$	0.36 (0.78)	1.03* (2.20)	4.84	196
3	RHN_n	$TARE_L \quad L = n-2$	0.21 (0.47)	1.38* (2.97)	8.85	195
4	RHN_n	$TARE_L \quad L = n-3$	0.34 (0.73)	1.03* (2.18)	4.75	194
5	RHN_n	$TARE \quad L = n-4$	0.46 (0.99)	0.58 (1.22)	1.49	193
6	RHN_n	$TARE_L \quad L = n-5$	0.65 (1.36)	0.07 (0.15)	0.02	192
7	RHN_n	$RTA100_L \quad L = n$	0.36* (5.61)	-0.02 (-1.88)	3.55	197
8	RHN_n	$RTA100_L \quad L = n-1$	0.34* (5.29)	0.02 (1.90)	3.63	196
9	RHN_n	$RTA100_L \quad L = n-2$	0.33* (5.21)	0.04* (3.60)	13.02	195
10	RHN_n	$RTA100_L \quad L = n-3$	0.33* (5.14)	0.03* (2.51)	6.33	194
11	RHN_n	$RTA100_L \quad L = n-4$	0.35* (5.24)	0.00 (0.71)	0.50	193
12	RHN_n	$RTA100_L \quad L = n-5$	0.36* (5.40)	0.00 (0.67)	0.45	193

Notes: RHN_n = nominal real estate monthly change at month *n*, $RTA100_L$ = Tel Aviv100 stocks index monthly changes at month *L*, the parameters *t* statistics appears at the brackets. Asterisk * indicates statistical significance at the level of $p < 0.05$ or better.

Table 1 shows that non-lagged changes of TARE or TA100 have no influence on real estate price changes. However, one to three lagged regressions have proven that TARE has a predictive power over real estate price changes. Those results indicate on a positive lagged relation between real estate stocks index and housing prices. Table 1 also demonstrates that TA100 has a weaker positive effect on housing prices than TARE and it is statistically significant only when using two to

three months lagged data. Those results indicate that the financial market in general and in particularly real estate stocks have a predictive lagged power over housing prices trends. This tool can be used by policy makers to better understand where home prices are destined.

Table 2. TARE TA100 prediction power of the inflation adjusted real estate prices changes

Regression Trial	Explained Variable	Explanatory Variable	α_1	α_2	*F*	*N*
1	RHR_I	$TARE_L \quad L=n$	0.21** (3.21)	0.00 (0.08)	0.00	197
2	RHR_I	$TARE_L \quad L=n-1$	0.20** (3.04)	0.02* (2.18)	4.78	196
3	RHR_I	$TARE_L \quad L=n-2$	0.19** (2.95)	0.02* (2.23)	5.01	195
4	RHR_I	$TARE_L \quad L=n-3$	0.20** (3.05)	0.01 (0.92)	0.85	194
5	RHR_I	$TARE \quad L=n-4$	0.20** (3.08)	0.01 1.23	1.52	193
6	RHR_I	$TARE_L \quad L=n-5$	0.22** (3.35)	0.00 (0.09)	0.00	192
7	RHR_I	$RTA100_L \quad L=n$	0.22** (3.37)	-0.01 (-1.24)	1.54	197
8	RHR_I	$RTA100_L \quad L=n-1$	0.20** (3.05)	0.03* (2.37)	5.61	196
9	RHR_I	$RTA100_L \quad L=n-2$	0.19** (2.95)	0.04** (3.21)	10.32	195
10	RHR_I	$RTA100_L \quad L=n-3$	0.19** (2.97)	0.02 (1.84)	3.39	194
11	RHR_I	$RTA100_L \quad L=n-4$	0.21** (3.12)	0.00 (0.72)	0.52	193
12	RHR_I	$RTA100_L \quad L=n-5$	0.22** (3.33)	0.00 (0.28)	0. 08	192

Notes: RHR_I =Inflation adjusted real estate monthly change at month *n*, $RTA100_L$ = Tel Aviv100 stocks index monthly changes at month *L*, the parameters *t* statistics appears at the brackets. Asterisks * and ** indicate statistical significance at the levels of $p < 0.05$ and $p < 0.01$, respectively.

Table 2 shows that TARE lagged monthly changes again has a positive impact on inflation adjusted real estate's prices changes however the impact is much weaker than observed before on the nominal housing price changes and it is only statistically significant for one until two lagged information[1]. Table 2 also show that Tel Aviv 100 index has a positive influence on inflation adjusted housing prices for a shorter predictive time (one and two months lagged information). In summary, the general Tel Aviv 100 index has proven more fertile in predicting inflation adjusted prices than TARE.

[1] Opposed to one until three months' time gap between TARE and nominal housing prices (Table 1).

5. Concluding Summary

Real estate prices in Israel have risen dramatically during the last two decades. The question asked by many Israelis is that long time trend is over and the housing prices are going to stable or even start to go down. I used in this research stocks indices data in order to examine the prediction power of those market indices over real estate nominal and inflation adjusted prices trend. I find that TARE has a positive predictive power of housing prices using lagged monthly data. Moreover, TA100 which is a major stock index in Tel –Aviv stock exchange has a positive weaker predictive power over real estate nominal prices trends than TARE while the opposite is true for inflation adjusted housing price trends.

This research has established that both nominal and inflation adjusted housing prices trends can be predicted using a lagged information derived from the financial markets. However, nominal prices prediction is stronger than inflation adjusted prediction.

Looking to the near future, since the TARE index demonstrates a positive return in the past recent months, no real estate prices fading is predicted for the near future in the Israeli housing market.

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