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Article

Investigating the government's role in the boom-and-bust cycles of the housing market

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Abstract: Governments intervene in the housing market via implementing various monetary, fiscal, foreign exchange and credit policies. By this, the housing market undergoes cycles of boom and bust as well as significant swings in value added and housing prices. Therefore, the main goal of this research is to consider the effect of the government's change on the monetary and financial policy's impact on the business cycles of the housing sector during the period of 1978–2020. On the other hand, we estimate the impact of monetary and fiscal policies on housing business cycles concerning government's change. To calculate housing business cycles (boom and busts), the housing value added were initially de-trended using the Hodrick–Prescott filter. This paper takes a novel use of the threshold regression model with government's change as threshold variable. According to the study's findings, there are three threshold effects (two threshold levels or three regimes) of monetary and fiscal policy on housing business cycles. For instance, the money supply coefficient in the first regime was −1.68, indicating that the effect of monetary policy in this regime is countercyclical. in the second and third regimes, it was 0.19 and 0.03, respectively; indicating its alignment with the housing business cycle. Regarding the estimated models, we may derive several interesting conclusions. In first regime, the money supply is countercyclical and government expenditure is pro-cyclical. This means that monetary policy exacerbates recession and fiscal policy weakens it. in the second and third regimes, the money supply is pro-cyclical and government expenditure is countercyclical. As a result, while formulating their monetary policies, governments should give the housing sector more consideration. Additionally, when putting this policy into practice, the housing sector has to be carefully examined.

Keywords: government; boom and bust; housing sector; Iran

1. Introduction

Housing is a fundamental human need (Chopra, 2018; Haizzan et al., 2018), a highly special non-cash asset (Li and Cheung, 2017; Martins et al., 2021), and a considerable amount of a household's lifetime income is spent on supplying it (Doojav and Damdinjav, 2021; Sánchez-Marcos and Low, 2022). Housing is an essential component of the economy, a source of employment, investment and GDP growth (Trojanek, 2021). A number of variables, including supply and demand trends, the money and capital markets, the price of gold and other precious metals, oil revenues, the cost of energy carriers, household income, demographic factors, liquidity, and inflation, housing purchase facilities, the market for housing production inputs, governmental policies, and laws governing urban planning unquestionably affect the housing sector (Nemati et al., 2018). In light of this, housing differs from other consuming and capital commodities due to distinct qualities. The dual nature of housing, which has both the characteristic of consumption and is recognized as an

asset, is its first distinguishing feature. Due to its significant contribution to gross capital formation in all economies, housing is a sort of asset that, on the one hand, is impacted by economic shocks and, on the other, shocks the economy (Jin and Zeng, 2004). The housing sector experiences boom and bust cycles as a result of economic shocks, and as an asset, it leads to significant price fluctuations. Housing makes up a significant portion of these assets and capitals in society, therefore fluctuations in the housing market have the potential to pose a devastating impact on the economy and trigger financial and economic crises (Akbari and Yarmohammadian, 2012; Chegeni and Ghaedi, 2014). The recent example is the global financial system crisis that began with the US housing market crisis in early 2007 (Ascheberg et al., 2014; Bhutta, 2015; Justiniano et al., 2019; Kaplan et al., 2020; Keys, 2012; Lyons, 2018; Lee and Song, 2015; Martins et al., 2021; Phiri, 2016; Wang et al., 2020). And in 2008, it marked the culmination of a significant cycle of boom and bust of housing prices in the United States (Adarov, 2021; Caines, 2020; Kuchler et al., 2022), and led to a dramatic decline in house prices across numerous nations (Jang et al., 2020). At first, it was believed that these issues were under control, but in the summer of 2007, the situation grew, leading to a wider bust in the US housing sector and a financial crisis that extended to Europe as the initial wave of financial mistrust developed (Agnello and Schuknecht, 2011). To this end, governments formulated and enforced real estate policies to recover the economy and revitalize the housing sector. However, these policies failed to revive the housing sector, so governments intervened and adopted new mechanisms and policies to ensure its stability (Jang et al., 2020; Machado, 2021). government's intervention is done with four goals such as: "shaping the market", "market regulation", "market stimulation" and "capacity increasing" (Laskowska and Torgomyan, 2016). Governments' monetary, fiscal, credit, and exchange rate policies had a direct influence on the housing sector and caused many fluctuations in the housing sector (Meshkini et al., 2011). However, some policies may be defined only for a specific period, or even the existential philosophy of these policies was a goal other than helping the poor settlement (for example, in the United States, the federal mortgage banking system and the housing organization have not been created with the aim of helping the vulnerable people, but the main goal was to help the loan institutions and accelerate the exit of the United States economy from recession) (Ahmadi, 2004). Since the housing sector is one of the leading sectors in Iran's economy, any record or boom in this sector has directly and indirectly affected many production sectors. The population growth in the country and the increasing need for housing have caused it to be an essential commodity (Falah Shams et al., 2012). This sector accounts for 6.6% of GDP, 43.9% of total investment, and 13.5% of employment, and every Iranian household spends about one-third of its annual cost on housing, which includes rent. In the housing sector, the total investments made by households in recent years have reached more than 50% in some years, and the added value of the construction sector is about 6.6% of the total added value of the economy, which is a significant part of Iran's oil economy (Tavakolian et al., 2019). Therefore, the preservation of housing as an asset by households, private sector investment in this sector, and its strong and forward connection with other economic sectors, shows the importance of paying attention to this market during the implementation of macroeconomic policies, in the first degree of monetary politics. Due to the severe shocks in housing prices in Iran

during the past periods, many losses have been caused to various social groups. Especially the low-income groups affected by these periodic fluctuations in housing prices in a way that price increases, their purchasing power decreased or vanished and removed them from the group of effective housing applicants or delayed their purchase time (Dehghan and Ramezani, 2019). Iran's housing policy has had several ups and downs during the past forty years. Construction has seen both periods of boom and bust as a result of these policies, and has had a variety of repercussions on households, the performance of other economic sectors, and even the financial system, both positive and negative (Gholizadeh and Kamyab, 2008). The housing sector has experienced numerous peaks and troughs as a result of the various governments that have come to power in Iran since the Islamic Revolution and the relevant economic policies, which have led to periods when the boom becomes stronger or weaker and periods when the bust was indeed stronger or weaker. More importantly, Iran's economy has been heavily dependent on oil revenues after the revolution, so there is a direct relationship between the decrease or increase in oil revenues and the periods of the housing market in Iran; However, the historical background indicates that the oil factor is considered an aggravating or mitigating factor of housing market cycles—based on the natural process of housing supply and demand. Therefore, it is important to understand the status of housing business cycles in Iran and to investigate the involvement of governments in these cycles. This research may also help us understand how government policies affect the expansion of housing boom and bust in Iran. Eventually, this study aims to provide possible answers to these two fundamental queries: How is the current state of the Iranian housing sector? And secondly, how have different governments' economic strategies changed since the Islamic Revolution in terms of their ability to amplify or weaken business cycles (boom and bust) in the housing sector? First, de-trending of boom-and-bust cycles and the status of business cycles were assessed employing indicators of value added in the construction and real estate sectors using the Hodrick–Prescott filter. The role of governments in business cycles (boom and bust) was then explored using a threshold regression model with the aid of four indicators: Money supply, government expenditure, exchange rate, and credits issued to the housing sector. This article's continuation is structured as follows. Section 2 reviews the available body of literature; we discussed the research indicators and techniques of data analysis in Section 3. Section 4 discussed and evaluated the involvement of governments in the housing sector while also providing the study findings in the form of tables and graphs. Section 5 concluded with offering recommendations for how to strengthen the housing sector and find a way out of the current predicament.

2. Literature review

2.1. effects of housing cycles on the rest of the economy

The housing market is an important and at the same time special part of the national economy. Its importance stems from two main factors: the size of the housing market and the functions that residential properties perform. In mature market economies, the share of the housing sector broadly in gross value-added averages is 20% (including housing services, housing financing, and housing construction (Lama

and Denis, 2014), while the scale of housing expenditure investment is 4%–6% of the national GDP (Bandt et al., 2010). Accordingly, the housing market, similar to other markets as well as the entire economy, develops unevenly. The housing sector is inherently prone to business cycles (boom and bust) due to some distinctive features, such as inflexible supply, infrequent transactions, uncertainty, short-term financing for construction, and long-term financing for occupation (Igan and Loungani, 2012). Additionally, it has often led to significant global economic cycles of boom and bust. In emerging economies, boom and bust cycles are a typical occurrence (Hui, 2013). This has received much documentation and discussion in the current real estate sector (He et al., 2017; Hirata et al., 2013). There are four main phases of a business cycle: crisis, bust, recovery, and boom. Cycles are characterized nowadays along the course of long-term economic growth (trend) and are more adopted as regular variations of economic assemblages (Chegeni and Gaedi, 2014; Zelazowski, 2017, 2018). Two primary stages are identified during this cycle: recovery, which is marked by an increase in economic activity, and bust, which is characterized as a decrease in economic activity relative to the long-term trend. A classical cycle and a modern cycle in the housing market may be distinguished based on the concepts of the business cycles provided above. The housing sector cycle is described in the classical method as "fluctuations in market activity (measured by changes in residential property values, the number of residential transactions, or the amount of money invested), and absolutely recognized by variable levels or by variable growth rates" (Lis, 2015; Zelazowski, 2017). According to the modern perspective, "housing market fluctuations are defined by demand, supply, housing prices, and the tendency of housing sector to vary around a long-term or medium-term trend." Two fundamental types of housing sector cycles are frequently highlighted more in the literature. Demand cycle—with an average duration of 4–5 year, which is determined by changes in demand, and strongly correlated with the economic situation. For example, housing prices increase, when there is a shock or changes in the factors outside the housing sector. speculative demand and efficiency in the housing sector will increase, immediately. professional and non-professional investors enter the housing sector, subsequently. the issuance of building permits increases and this causes prosperity in the housing sector.

Supply cycle arising from changes in market supply activity, which is around 10 years longer and slightly less tied to the state of the economy as a whole (Zelazowski, 2017, 2018). When there is a change or a shock in housing development factors, or when the increase in housing supply and market saturation occurs with a time lag, it causes stability in housing prices, which immediately reduces speculative demand. non-professional and part of Professional investors leave the housing sector. Furthermore, a recession occurs in the housing sector, followed by a decrease in housing supply and an increase in consumer demand with a time lag.

In this regard, Trojanek (2021) calculated that the average housing business cycle lasts for about 12 years, while Huber et al. (2016) estimated that the average cycle lasts for 11.7 years. This implies that boom times are longer than bust periods and that cycles tend to last longer. The average period of the housing sector cycle, according to Girouard et al. (2005) and André and Girouard (2009), is roughly 10 years. Regarding the business cycles of housing prices in Iran between 1988 and 2014,

Khiabani and Poorjaberi (2017) have identified two regimes of boom (5 year) and bust (5 year). They argued that the likelihood of remaining in the regime of bust was higher than that of maintaining in regime of boom. In contrast, Abbasi Nejad and Shahab Lavasani (2013) projected periods of housing price boom and bust in the 1990 to 2011 time series. They claimed that the boom-and-bust periods of the housing sector were asymmetrical and lasted, on average, 1.5 and 4.5 years, respectively. To put it another way, the boom periods, which last an average of a year and a half, terminate earlier than the bust periods, which typically linger for four and a half years.

As a result, there are two basic ways to characterize the quantity and quality of business cycle formation in the housing sector: The first method places a focus on the housing sector's technical and endogenous aspects. These components result from the technical framework of development, particularly the duration of the construction phase. The second strategy involves macro variables that amplify/attenuate, or accelerate/slow down boom and bust cycles in the housing sector. These factors mainly include macroeconomic variables such as monetary and fiscal policy, liquidity, credit, exchange rates, general price levels, oil revenues, government policies, etc. (Maleki, 2016). Given that the primary goal of this study is to investigate the role of government in the housing business cycle, the second approach is our macroeconomic policy, which includes the money supply, credit to the housing sector, government expenditure, and exchange rates, which are directly adopted by governments.

Many experts have concentrated on the housing business cycles due to the prominence of the housing market in many countries' economy. Ge et al. (2022) and Gai et al. (2020) claim that China's business cycles are driven by both financial and housing shocks. According to Garcia (2022), buying a second house is a significant contributor to the housing boom and bust cycle. In most countries, housing indices are proven to be the primary driver of business cycles, and this is increasingly pronounced over the long run (Huang et al., 2020). Schellekens and Yaseri (2021) investigated the role of household lending capacity in the Netherlands housing boom and bust cycle using housing income and pricing indices. Chodorow-Reich et al. (2021) evaluated the American housing cycle in the 2000s with a vision of 2020 based on Neokindelberger framwork. Agnello et al. (2020) used a panel of 20 countries and the housing price index to evaluate the effect of business cycles on the growth of housing loan and finance sector between 1970 and 2015. De Roiste et al. (2021) examined the impact of housing pricing on boom-and-bust cycles from 2006 to 2016 utilizing household financial characteristics (expenditures, income, credit, and property value). The impact of housing prices on UK business cycles was examined by Canepa et al. (2020) and Kim and Chung (2016). Cesa-Bianchi (2013) claimed that housing prices are subject to frequent cycles of boom and bust, and that a housing bust can be very costly in terms of declining production. Some other studies (Catte et al., 2004; Nguyen, 2018) examined the interplay between the housing market and the business cycle as well as the real estate market and business cycle fluctuations. Norris and Coates (2014) investigated the key components of the housing boom and how it came about. The importance of construction to Spain's housing boom was investigated by Garriga (2010).

2.2. Effects of governmental regulations on housing cycles

The connection between monetary policy, the housing sector, and the global financial crisis (GFC) has once again come up for discussion. Two axes divide this argument. One is that Leamer (2007) claims that speculative real estate investment causes crises, whereas Singh and Nadkarni (2017), Taylor (2007) and Leamer (2007) contend that unjustified monetary policy led to the housing boom and subsequent bust cycles. The real estate sector serves as one of the mechanisms via which monetary policy shocks are conveyed to the entire economy, making both viewpoints partially valid (Naikoo et al., 2021). According to economic theories, monetary policy can affect the housing market and the entire economy by increasing or decreasing the interest rate directly or indirectly through six channels. Through the direct effect of interest rates such as the cost of using capital, expectations of future housing price changes, and housing supply, and also indirect effects like wealth due to housing price changes, the impact of mortgages on consumer spending, and the impact of mortgages on housing demand (Shahbazi and Kalantari, 2012). According to Drechsler et al. (2021) the impact of monetary policy on the housing sector will result in housing boom due to rising interest rates and the expansion of mortgage loans. On the other hand, Moons and Hellinckx (2019) argued that monetary policy that is adapted to each country's needs may promote housing by preventing a major rise in housing prices. In contrast, according to Lambertini et al. (2013), there is no trade-off between traditional monetary policy goals and the desire for boom-and-bust cycles. Other research (Bjrnland and Jacobsen, 2010; Eickmeier and Hofmann, 2013; Simo-Kengne et al., 2013) assert that housing prices are substantially responding to the shock of monetary policy and that the influence of monetary policy on the housing market is effective and asymmetric. According to Saghi et al. (2018) and Keshtkaran et al. (2021), monetary policy has an asymmetrical influence on the Iranian housing sector, with the impact being much stronger during a housing bust than that of boom cycles, Gholizadeh and Barati (2011) also found that monetary policy is more significant than fiscal policy in residential investment which it plays an important role in identifying and creating business cycles.

Expansionary or contractionary fiscal policies, by affecting the general level of prices, change the variables of the housing market. The negative effect of the price appears in the form of a decrease in the purchasing power of the people and its positive effect is that when the households observe the growth of prices in order to preserve and stabilize the value of their assets if the level of risk and the rate of return of investment in other economic activities is not the optimal level, move towards the construction and purchase of residential units, but the effect of this increase in the general level of prices on housing prices depends on the type of inflation in different years. Thus, a sudden increase in the general level of prices with an increase in the cost of housing production will reduce investment in housing and increase the price of housing, but chronic and long-term inflation will reduce this effect (Nemati et al., 2018).

Recent economic research demonstrates the crucial role that credit volume and residential housing prices play in boom-and-bust cycles in causing financial instability and crises (Rünstler and Vlekke, 2018). In this way, the excessive use of expensive

mortgages has contributed to rising debts and expropriation, ultimately causing the financial crisis of 2007–2008 and the subsequent bust (Horioka and Niimi, 2020). According to some researchers, changes in the supply of facilities, which are caused by restrictions on mortgage lending, drive the boom or bust of housing market. Other researchers, however, contend that the factors that cause cycles of the housing boom and bust include housing price expectations and exogenous preferential shocks (Doojav and Damdinjav, 2021). The amount of bank facilities and credits in the housing sector and access to it has a positive effect on investment in the housing sector, such that an increase in credits and a decrease in the real interest rate lead to housing prosperity, and on the other hand, an increase in the real interest rate leads to a contraction of loans. It will reduce mortgages and housing construction and will eventually cause stagnation (Qaderi and Izadi 2016). According to Guerrieri and Uhlig (2016), On the one hand, a boom-bust in housing prices can cause a boom-bust in the credit market, and on the other hand, a boom-bust in credit markets can potentially trigger a boom-bust in housing prices. Khiabani and Shajari Poorjaber (2019) and Qolizadeh and Bakhtiaripoor (2011) discovered that there is a one-way causal relationship between the availability of facilities and housing prices, as well as a positive and significant relationship between the facilities provided by banks to the housing sector.

The effect of the exchange rate on the housing market has two different effects. First, an increase in the exchange rate increases the general level of prices in the macro economy and the housing economy. This factor has a consistent effect on the price of housing and mainly affects the production and supply of housing in terms of cost pressure. Secondly, the foreign exchange market is one of the alternatives to the housing market. Therefore, the increase in the exchange rate affects the attractiveness of investment in the housing market and causes the reluctance of capital to enter the housing market (especially speculative capital). This will not only reduce the demand for housing but also be accompanied by a decrease in the desire to invest in construction. This factor has an uneven effect on housing prices and mainly affects this market from the area of housing market demand (Maleki, 2016). Kaghazian et al. (2014) and Maleki (2016) investigated the effects of exchange rates on housing prices in Iran and found that during times of increased exchange rate changes, housing investors prefer to spend their money on buying foreign currency. As a result, there will be less demand for housing and less interest in making development investments.

The housing business cycles have been studied using a variety of economic indicators and models. In this respect, scholars have independently evaluated the impact of one or more economic policies, such as monetary and credit policies, on the boom-and-bust cycles. The main issue of this research is to determine the role of governments in the housing market boom and bust, detrend the boom-and-bust cycles in the time series 1399–1357, examine the role of governments in the housing boom and bust using the threshold time series regression model, and calculate the impact of each government's economic policies at different points in time.

3. Materials and method

3.1. Case study

The present study population consists of cities in Iran. Iran has 373 cities with a population of 15.8 million and a 47% urbanization rate, according to the 1976 population and housing census. Based on the most recent census, which was performed in 2016, there were 1242 cities, with a total population of 59.1 million and an urbanization rate of 75% (Statistical Center of Iran, 2016). It can be said that the number and population of cities has quadrupled over the past 4 decades. Since 1970 onwards, Iran has struggled with a housing shortage, particularly in large cities, due to the country's rapid population growth and strong propensity to move into urban areas. And this is due to the fact that the quantity and quality of housing production and supply have constantly lagged behind demand in recent years. Various policies and strategies have been put in place, but Iran's housing market has nonetheless experienced numerous ups and downs. On the demand side, the ongoing escalation in housing prices and the decline in real household income have steadily lowered applicants' purchasing power and prevented a sizable segment of applicants from housing demand. On the supply and construction side, Housing production has had an inconsistent trend in recent decades and has gone through multiple business cycles. When the market vision was positive, investors' financial resources poured into the housing industry, which led to a rise in construction. Construction has decreased during bust periods as a result of financial resources being pulled out of the market. The following are the features of housing periods in Iran following the Iran-Iraq war, as reported by studies: (1) In contrast to general inflation, the increase in housing prices does not follow a nearly smooth trend (increase in housing prices is staggered). (2) When compared to general inflation, the growth rate of housing prices varies from year to year. (3) The housing price growth rate curve has a sinusoidal tendency that varies around overall inflation. (4) In the past 30 years, the country's overall inflation rate has never been negative; nevertheless, the nominal price of housing has seen negative growth in the last three years (Maleki, 2016). Iran was chosen as the perfect case study to examine the role of governments in housing business cycles as a result of the characteristics outlined regarding Iran's housing market.

3.2. Research variables and indicators

The main object of this research is to consider the effect of the government's change on the monetary and financial policy's impact on the business cycles of the housing sector. Therefore, it seems necessary to use a model that can be used to evaluate the effect of changes in different governments after the revolution on the boom and bust of the housing sector. in fact, the emergence of different governments changes the relationship between monetary (and financial) policy indicators with business cycles in the housing sector from a linear relationship to a non-linear relationship. Threshold regression models are one of these candidates. One of the important advantages of threshold regressions is that it is very easy to estimate the coefficients and interpret them. In these models, one or more variables are considered threshold variables, and by changing this variable, the effect of explanatory variables (such as indicators of monetary and financial policies) on the dependent variable (business cycles of the housing sector) changes. We have considered the government's change as a threshold variable, whose values are defined as positive integers. In this

way, the number 1 was given from 1978 to 1980, and from 1981 onwards until 2020, the numbers 2 to 12 were given for every four years. For example, for the first four years of Khatami's government, the number is 6, and for the second four years of his government, the number is 7. Usually, in the first four years, governments try to implement policies that gain maximum public satisfaction. But in the second four years, the political structure of the governments will be different. For this reason, the numbers defined for the first and second four years are different in each government.

The research's dependent variable is the business cycles of the housing sector which calculate by detrending the housing value added using Hodrick–Prescott filter. Its time trend is shown in **Figure 1** and it compared with macro business cycle in **Figure 2** (boom and busts in gross domestic product).

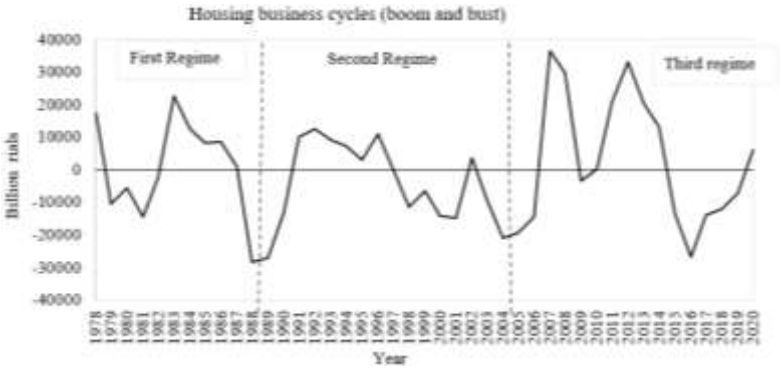

Figure 1. The Time trend of the housing business cycles (boom and bust) in Iran.
Note: Data from Central Bank (http://www.cbi.ir) and Statistics Center of Iran (http://www.amar.org.ir).

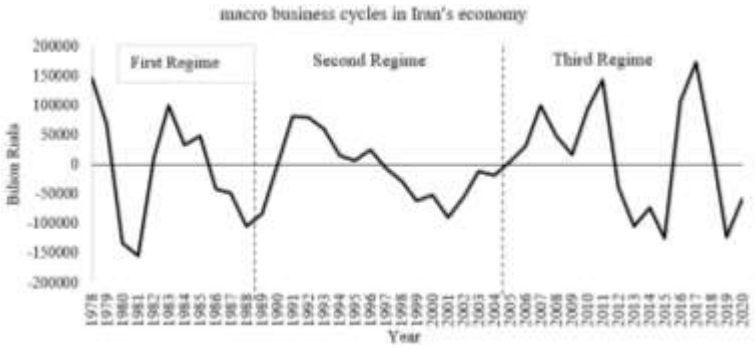

Figure 2. The Time trend of the macro business cycles (boom and bust) in Iran.
Note: Data from Central Bank (http://www.cbi.ir) and Statistics Center of Iran (http://www.amar.org.ir).

First, it can be seen from **Figure 1** that there have been several oscillations in the added value of the construction and real estate sector across the time series from 1978 to 2020, leading to the identification of 8 regimes of boom and 8 regimes of bust. Secondly, the duration of bust regimes is longer than that of boom regimes. Thirdly, 5 regimes have had modest boom, meaning they have lasted 2 years or less, while 5 have experienced profound bust, demonstrating that the likelihood of Iran remaining in a bust regime is far higher than that of boom.

Comparing business cycles of the housing sector with macro business cycles in Iran's economy.

To see if the business cycles of the housing sector are affected by the business cycles in Iran's economy and vice versa and if they are simultaneous or not. We put

both charts together. The results obtained from the two graphs showed that the business cycles of the housing sector are affected by the overall business cycles and that they coincide with each other.

Explanatory variables are: (1) money supply (monetary policy); (2) government expenditures including construction and current, (3) credits granted to the housing (credit policy); and (4) the exchange rate (**Table 1**). All data gathered from the website of the Central Bank of the Islamic Republic of Iran and the Statistical Center of Iran for time period 1978–2020.

Table 1. Research variables.

Variable	Measuring unit	Source	Period	Abbreviation
Money supply	billion Rials	Central bank of Iran	1978–2020	MS
Government expenditures	billion Rials	Central bank of Iran	1978–2020	GEX
Domestic credit to housing sector	billion Rials	Central bank of Iran	1978–2020	CGH
Exchange rate	Rials per dollar	Central bank of Iran	1978–2020	EXR
Housing value added	billion Rials	Central bank of Iran	1978–2020	AVA
Housing business cycles (dependent variable)	billion Rials	Calculated by HP filter	1978–2020	HBC

Note: Data from Central Bank (http://www.cbi.ir) and Statistics Center of Iran (http://www.amar.org.ir).

3.3. Threshold time series regression model

The regression equation's structure for a time series threshold regression with two regimes is as follows:

$$y_t = \beta_1' x_t I(q_t \le \gamma) + \beta_2' x_t I(q_t > \gamma) + e_t \quad (1)$$

The aforementioned equation may be expressed in the following form:

$$y_t = \begin{cases} \beta_1' X_t + e_t q_t \le \gamma \\ \beta_2' X_t + e_t q_t > \gamma \end{cases} \quad (2)$$

In the equations above, q_t is the model's threshold variable and γ is the threshold value that divides the equation into two regimes with coefficients β_1 and β_2. As a result, observations are classified into two regimes based on whether the value of the threshold variable q_t is smaller or larger than the threshold value γ. $\beta_1$and β_2 are the vectors of regression coefficients in the two different regimes. We also postulate that the threshold variable q_t is not constant with respect to time and the error term e_t is independent and identically distributed, with a zero mean and constant variance σ^2. The slope coefficient β might be estimated using the OLS method as follows for each assumed γ:

$$\hat{\beta}(\gamma) = \left(X(\gamma)X(\gamma)\right)^{-1} X(\gamma) Y$$

The value of $\hat{\beta}(\gamma)$ indicates the estimation of the coefficient of β by the OLS method. In the same way, the vector of residuals will be:

$$\hat{e}^*(\gamma) = Y^* - X^*(\gamma)\hat{\beta}(\gamma)$$

And the residual sum of squares is equal to:

$$S_1(\gamma) = \hat{e}\,(\gamma)\hat{e}(\gamma) = \acute{Y}\left(I - X(\gamma)\left(X(\gamma)X(\gamma)\right)^{-1} X(\gamma)\right) Y^*$$

Thus, the following will be the OLS estimation for γ:

$$\hat{\gamma} = arg\ min\ S_1(\gamma)$$

3.3.1. Single threshold test

Testing for a threshold effect is the same as testing for whether the coefficients are the same in each regime. The null hypothesis and the alternative hypothesis (the linear versus the single-threshold model) are $H_0: \beta_1 = \beta_2$, $H_1: \beta_1 \neq \beta_2$.

The *F* statistic is constructed as

$$F_1 = \frac{(S_0 - S_1(\hat{\gamma}))}{\hat{\sigma}^2}$$

If the resulting F_1 is greater than the desired critical value, the null hypothesis of no-threshold effect will be rejected.

3.3.2. Multiple thresholds test

The Equation (1) was assumed to have a single threshold. In some practical cases, we may encounter multiple thresholds. For example, a regression with two thresholds is written as follows:

$$y_t = \beta_1' x_t I(q_t \leq \gamma_1) + \beta_2' x_t I(\gamma_1 < q_t \leq \gamma_2) + \beta_3' x_t I(\gamma_2 < q_t) + e_t \quad (3)$$

So that $\gamma_1 < \gamma_2$.

We only refer to Hansen (1999) to analyze the estimate technique and perform tests relating to the presence of multiple thresholds because the model hired in this study contains only a threshold.

The Equation (3) might be linear with no threshold or non-linear with one or more thresholds. F_1 was previously offered as a statistic for comparing whether a threshold exists or not. We need a second test to establish whether one or more thresholds exist if F_1 rejects the null hypothesis. In order to estimate the second threshold as $S_2^r(\hat{\gamma}_2^r)$ with the estimated variance of $\hat{\sigma}^2 = \frac{S_2^r(\hat{\gamma}_2^r)}{(T-1)}$, the residual sum of squares must be minimized. As a result, the following definition applies to the test of the approximate likelihood ratio of one threshold vs two thresholds:

$$F_2 = \frac{S_2(\hat{\gamma}_1) - S_2^r(\hat{\gamma}_2^r)}{\hat{\sigma}^2}$$

The hypothesis of a single threshold vs two thresholds will be rejected if the value of F_2 is greater than critical value.

4. Findings

According to the main research question; how have government's change affects the relationship between monetary (and fiscal) policies on housing boom and bust? In order to draw conclusions with respect to this question, it is necessary to first establish a threshold variable that denotes a change in government and estimate the threshold regression function based on it. According to the data, there are two estimated thresholds and three regimes.

Pro-cyclical, indicates that the implementation of these measures has accelerated the housing boom while it is already in progress. Additionally, the implementation of these policies prolonged the housing bust. Countercyclical, indicates that the implementation of these measures caused the housing boom to decline during periods of boom and the bust to drop during periods of bust.

The results of **Table 2** show that in the first regime the coefficient of the money supply was negative (countercyclical), while the coefficients of credits, government

expenditure, and exchange rate were all positive (procyclical). Contrary to the first regime, the second and third regimes money supply coefficient was positive (procyclical), whereas the coefficients of credits, government expenditure, and exchange rate were negative (countercyclical).

Table 2. Threshold regression estimation results.

Regime	Variable	Coefficient	T statistic	Probability level	Variable effect (Countercyclical and Pro-cyclical)
From 1st to 4th government 1978–1989	Money supply	−1.68	−8.97	0.000	Countercyclical
	Credits	0.02	0.73	0.47	Pro-cyclical
	Government expenditure	0.32	3.39	0.002	Pro-cyclical
	Exchange rate	1.31	9.24	0.000	Pro-cyclical
from 5th to 8th government 1989–2004	Money supply	0.19	3.09	0.004	Pro-cyclical
	Credits	−0.13	−1.73	0.09	Countercyclical
	Government expenditure	−0.26	−2.2	0.035	Countercyclical
	Exchange rate	−0.002	−0.02	0.98	Countercyclical
from 9th to 12th government 2004–2020	Money supply	0.03	1.91	0.06	Pro-cyclical
	Credits	−0.037	−1.75	0.089	Countercyclical
	Government expenditure	−0.14	−1.68	0.1	Countercyclical
	Exchange rate	−0.027	−1.83	0.07	Countercyclical

4.1. First regime

The money supply index had a countercyclical effect on Bani Sadr's government, per the findings of the study in **Table 3**. The housing has been experiencing a bust in this government; as a result, the monetary policies put in place by the Bani Sadr government have lessened the bust; signaling a positive impact on housing sector. Business cycles were influenced favorably by credit, exchange rates, and government expenditure indicators; hence, this has aggravated the housing bust.

Table 3. The results of governments' role (1978–1989) on housing boom and bust cycles (first regime).

Government	Year	Boom and bust	The impact of indicators on business cycles (boom and bust) of housing			
			Money supply (countercyclical effect)	Credits (procyclical effect)	Government expenditure (procyclical effect)	Exchange rate (procyclical effect)
Bani Sadr	1978	Bust	Weakening bust	Strengthening bust	Strengthening bust	Strengthening bust
	1979	Bust	Weakening bust	Strengthening bust	Strengthening bust	Strengthening bust
Bani Sadr and Mousavi	1980	Bust	Weakening bust	Strengthening bust	Strengthening bust	Strengthening bust
Mousavi (1st government)	1981	Boom	Weakening boom	Strengthening boom	Strengthening boom	Strengthening boom
	1982	Boom	Weakening boom	Strengthening boom	Strengthening boom	Strengthening boom
	1983	Bust	Weakening bust	Strengthening bust	Strengthening bust	Strengthening bust
	1984	Bust	Weakening bust	Strengthening bust	Strengthening bust	Strengthening bust
Mousavi (2nd government)	1985	Bust	Weakening bust	Strengthening bust	Strengthening bust	Strengthening bust
	1986	Bust	Weakening bust	Strengthening bust	Strengthening bust	Strengthening bust
	1987	Bust	Weakening bust	Strengthening bust	Strengthening bust	Strengthening bust
	1998	Bust	Weakening bust	Strengthening bust	Strengthening bust	Strengthening bust

The housing market enjoyed success during the first two years of Mousavi's government, but because the money supply index exerted a negative influence on business cycles, it subsequently had a negative influence on the housing boom. Business cycles are positively impacted by credit, exchange rates, and government expenditure indicators, which has boosted the housing boom. The housing market had a bust between 1984 and 1988, but because the money supply index had a countercyclical effect, so it had a positive effect on the housing sector and mitigated the housing bust. Indexes measuring credit, exchange rates, and government expenditure have all been found to have a negative impact on the housing sector and worsen the housing bust. In general, it can be said that the government's policies, like those of the prior government, have exacerbated the housing bust.

It should be note that, we have presented the time trend of time trends of money supply, credits supply, exchange rate, housing production indicators, building permits, government spending, and housing boom and bust cycles in **Figures 3–6**.

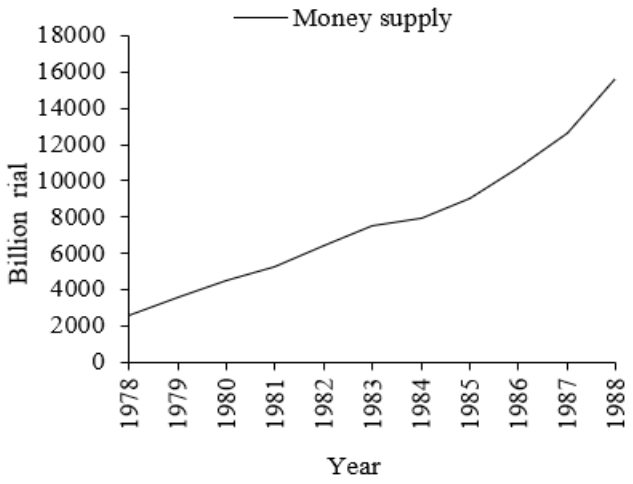

Figure 3. Time trend money supply in the first regime.
Note: Data from Central Bank (http://www.cbi.ir).

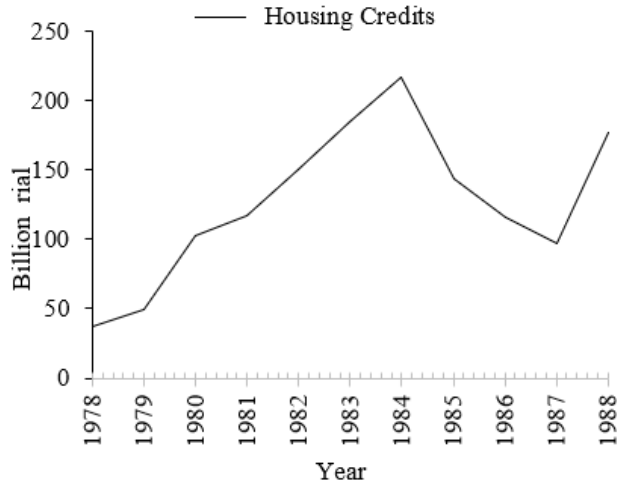

Figure 4. Time trend housing credits supply in the first regime.
Note: Data from Central Bank (http://www.cbi.ir) and Statistics Center of Iran (http://www.amar.org.ir).

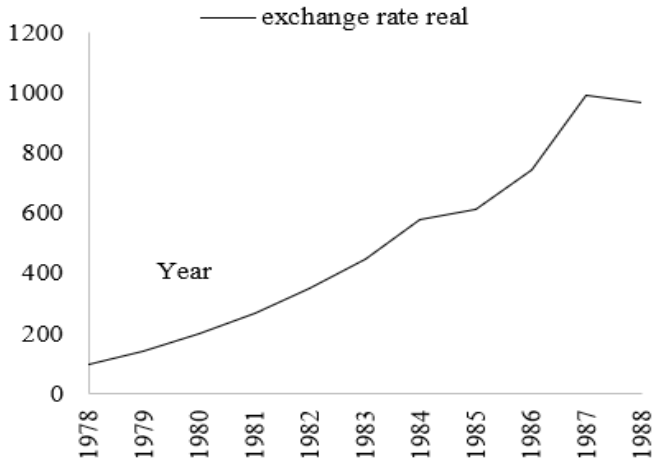

Figure 5. Time trend of exchange rate in the first regime (Rial Per US Dollar).
Note: Data from Central Bank (http://www.cbi.ir).

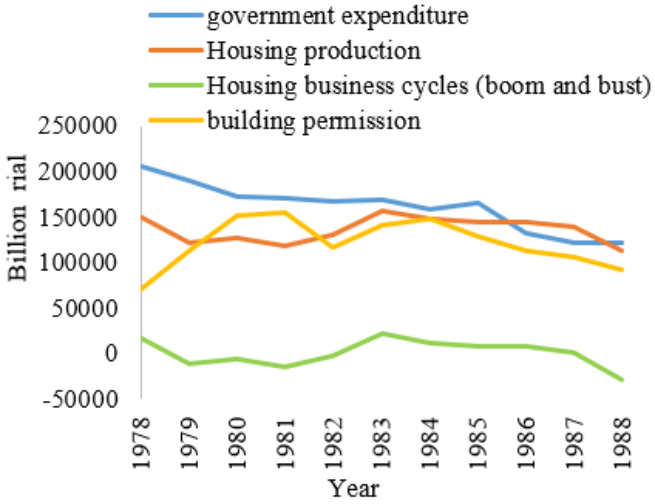

Figure 6. The time trend of housing production indicators, building permits, government spending, and housing boom and bust cycles in the first regime.
Note: Data from Central Bank (http://www.cbi.ir) and Statistics Center of Iran (http://www.amar.org.ir).

4.2. Second regime

According to the findings in **Table 4**, the housing sector experienced a boom between 1990 and 1992. The indicators of credit, exchange rate, and government expenditure during this time had a countercyclical effect, and the implementation of these policies by the very government slowed the housing boom. Since the money supply index has a positive impact on business cycles, it has also benefited and accelerated housing boom.

Except for 1996, housing was consistently experiencing bust from 1993 to 1997. The implementation of these policies has lessened the housing bust since credit, exchange rates, and government expenditure indicators have had the countercyclical impact on the economic at this time. The money supply index has a positive impact on business cycles, which is adverse for the housing boom.

Housing bust took dominance for six out of the eight years of both Khatami governments. **Table 4** findings indicate that the governments' policies mostly

concerned with getting the housing out of the bust period. Adoption of these policies has lessened the housing sector's bust since indicators of credit, exchange rates, and government expenditure have countercyclical impacts at this period. The money supply index influences business cycles positively, which has a negative effect on housing and reduced its boom.

Table 4. The results of the analysis of the governments' role (1989–2004) in the housing boom and bust (second regime).

Government	Year	Boom and bust	The impact of indicators on business cycles (boom and bust) of housing			
			Money supply (procyclical)	Credit (countercyclical)	Government expenditure (countercyclical)	Exchange rate (countercyclical)
Hashemi (1st government)	1989	Boom	Strengthening boom	Weakening boom	Weakening boom	Weakening boom
	1990	Boom	Strengthening boom	Weakening boom	Weakening boom	Weakening boom
	1991	Boom	Strengthening boom	Weakening boom	Weakening boom	Weakening boom
	1992	Bust	Strengthening bust	Weakening bust	Weakening bust	Weakening bust
Hashemi (2nd government)	1993	Bust	Strengthening bust	Weakening bust	Weakening bust	Weakening bust
	1994	Bust	Strengthening bust	Weakening bust	Weakening bust	Weakening bust
	1995	Boom	Strengthening boom	Weakening boom	Weakening boom	Weakening boom
	1996	Bust	Strengthening bust	Weakening bust	Weakening bust	Weakening bust
Khatami (1st government)	1997	Bust	Strengthening bust	Weakening bust	Weakening bust	Weakening bust
	1998	Boom	Strengthening boom	Weakening boom	Weakening boom	Weakening boom
	1999	Bust	Strengthening bust	Weakening bust	Weakening bust	Weakening bust
	2000	Bust	Strengthening bust	Weakening bust	Weakening bust	Weakening bust
Khatami (2nd government)	2001	Boom	Strengthening boom	Weakening boom	Weakening boom	Weakening boom
	2002	Bust	Strengthening bust	Weakening bust	Weakening bust	Weakening bust
	2003	Bust	Strengthening bust	Weakening bust	Weakening bust	Weakening bust
	2004	Bust	Strengthening bust	Weakening bust	Weakening bust	Weakening bust

It should be note that, we have presented the time trend of time trends of money supply, credits supply, exchange rate, housing production indicators, building permits, government spending, and housing boom and bust cycles in **Figures 7–10**.

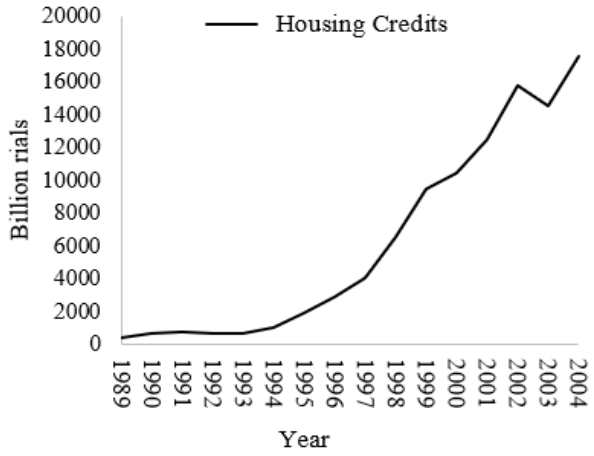

Figure 7. Time trend Housing credits in the Second regime.

Note: Data from Central Bank (http://www.cbi.ir) and Statistics Center of Iran (http://www.amar.org.ir).

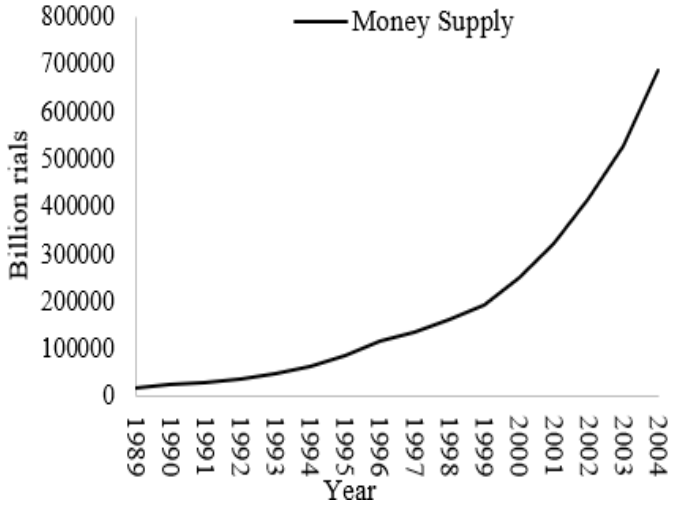

Figure 8. Time trend money supply in the Second regime.
Note: Data from Central Bank (http://www.cbi.ir).

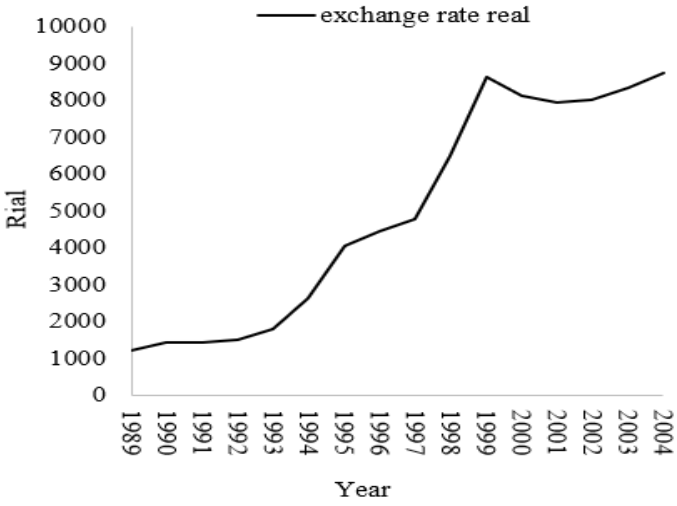

Figure 9. Time trend of exchange rate in the Second regime (Rial Per US Dollar).
Note: Data from Central Bank (http://www.cbi.ir).

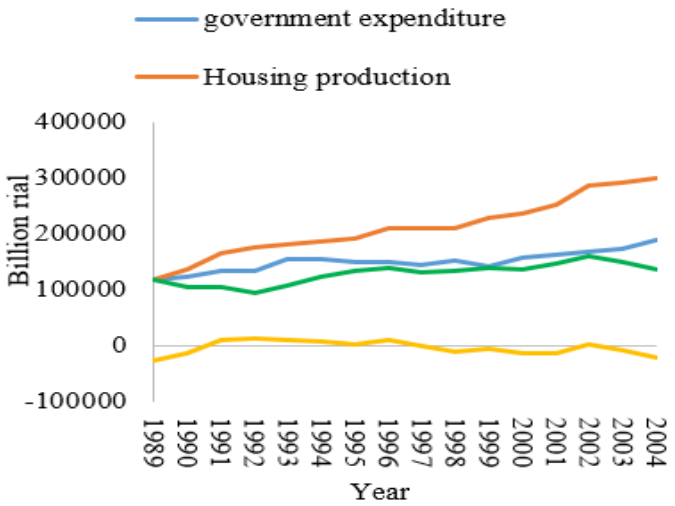

Figure 10. The time trend of housing production indicators, building permits, government spending, and housing boom and bust cycles in the Second regime.
Note: Data from Central Bank (http://www.cbi.ir) and Statistics Center of Iran (http://www.amar.org.ir).

4.3. Third regime

The housing market has been booming for five out of eight years of the Ahmadinejad government, but the study's findings (**Table 5**) show that these governments' policies have mostly been designed to undermine the boom and aggravate the bust periods (in contrast to the Khatami government).

Table 5. The results of the analysis of the government's role (2005–2020) in the housing boom and bust (third regime).

Government	Year	Boom and bust	The impact of indicators on business cycles (boom and bust) of housing			
			Money supply (procyclical)	Credit (countercyclical)	Government expenditure (countercyclical)	Exchange rate (countercyclical)
Ahmadinejad (1st government)	2005	Boom	Strengthening boom	Weakening boom	Weakening boom	Weakening boom
	2006	Boom	Strengthening boom	Weakening boom	Weakening boom	Weakening boom
	2007	Bust	Strengthening bust	Weakening bust	Weakening bust	Weakening bust
	2008	Bust	Strengthening bust	Weakening bust	Weakening bust	Weakening bust
Ahmadinejad (2nd government)	2009	Boom	Strengthening boom	Weakening boom	Weakening boom	Weakening boom
	2010	Boom	Strengthening boom	Weakening boom	Weakening boom	Weakening boom
	2011	Boom	Strengthening boom	Weakening boom	Weakening boom	Weakening boom
	2012	Bust	Strengthening bust	Weakening bust	Weakening bust	Weakening bust
Rouhani (1st government)	2013	Bust	Strengthening bust	Weakening bust	Weakening bust	Weakening bust
	2014	Bust	Strengthening bust	Weakening bust	Weakening bust	Weakening bust
	2015	Bust	Strengthening bust	Weakening bust	Weakening bust	Weakening bust
	2016	Boom	Strengthening boom	Weakening boom	Weakening boom	Weakening boom
Rouhani (1nd government)	2017	Boom	Strengthening boom	Weakening boom	Weakening boom	Weakening boom
	2018	Boom	Strengthening boom	Weakening boom	Weakening boom	Weakening boom
	2019	Boom	Strengthening boom	Weakening boom	Weakening boom	Weakening boom
	2020	Boom	Strengthening boom	Weakening boom	Weakening boom	Weakening boom

Indexes of credit, exchange rate, and government expenditure throughout this period have all contributed to the housing bust increment. Business cycles have only been positively impacted by the money supply index, which has a positive influence on housing sector. The credit index at this period had a countercyclical effect on business because the housing industry was provided credits during this time without receiving any particular support, which later led to significant inflation in the national economy and dampened the housing boom in the ensuing years.

Housing during the first Rouhani government was experiencing a bust; the money volume index had a positive impact on business cycles, which all contributed to the housing bust; and during this period, indicators of credit, the exchange rate, and government spending posed a countercyclical impact on the housing bust. As a result, during Rouhani's first term in office, the government's economic policies helped to shorten the period of housing bust. In the second Rouhani government, housing was in a boom period, as the index of the money supply in this period had a positive effect on the business cycles, which in turn helped the housing sector experience a boom period. However, throughout this period, indicators of credit, exchange rates, and

government expenditure have countercyclical effect on business cycles and dampened the housing boom. Due to the boom's dominance over the housing sector during Rouhani's second government, the adopted economic policies have slowed the housing boom.

It should be note that, we have offered the time trend of time trends of money supply, credits supply, exchange rate, housing production indicators, building permits, government spending, and housing boom and bust cycles in **Figures 11–14**.

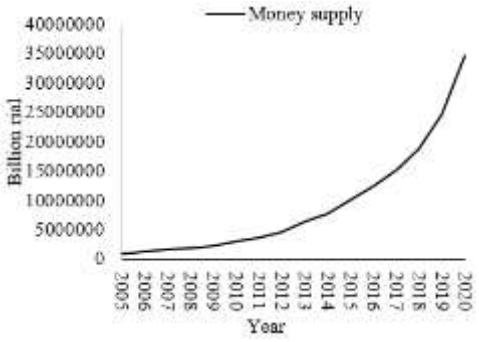

Figure 11. Time trend money supply in the third regime.
Note: Data from Central Bank (http://www.cbi.ir).

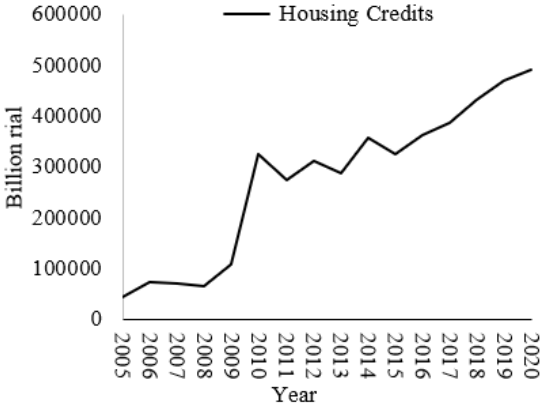

Figure 12. Time trend Housing credits in the third regime.
Note: Data from Statistics Center of Iran (http://www.amar.org.ir).

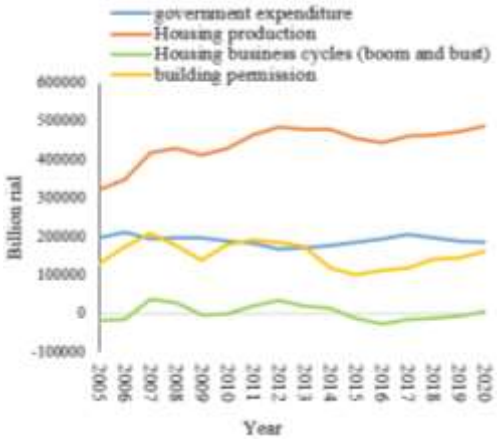

Figure 13. The time trend of housing production indicators, building permits, government spending, and housing boom and bust cycles in the third regime.
Note: Data from Central Bank (http://www.cbi.ir) and Statistics Center of Iran (http://www.amar.org.ir).

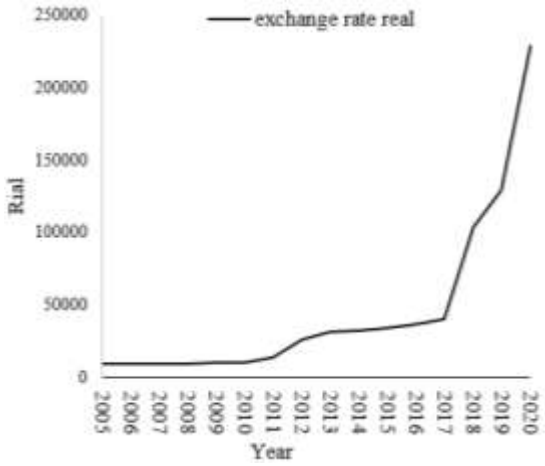

Figure 14. Time trend of exchange rate in the third regime (Rial Per US Dollar).
Note: Data from Central Bank.

5. Discussion

Since earlier times, the housing sector has gone through several fluctuations, which may be attributed to a number of factors, including the economic policies implemented by governments. The government's economic policies were examined in this study as the most significant components that may be useful in enhancing/minimizing the housing boom and bust cycles. First, Hodrick–Prescott filter was employed to detrended value added of the housing sector (building and real estate market). Additionally, the significance of each factor, including monetary policy, fiscal policy, foreign exchange policy, and credits granted to the housing sector, in describing the boom-and-bust cycles of the housing sector was explored. The efficacy of the government's and the central bank's policies might vary depending on the government's change, and the implementation of these policies may strengthen or weaken business cycles (boom and bust) in the housing sector. For this, by employing a threshold time series regression model, during the period of 1978 to 2020, the influencing factors on housing business cycles were investigated. Based on the regression model results, three regimes were identified. The first regime includes the first to fourth governments, that is, 11 years after the Islamic revolution, from 1357 to 1368; the third regime consists of the 9th to 12th governments, from 2005 to 2020; from 1384 through 1399, or the 9th through 12th governments, is considered the third regime.

Listed below are key research's most significant findings:

- According to the findings from the role of the governments listed in **Table 3** in explaining business cycles (boom and bust) of the housing sector, indicators (money supply, government expenditure, exchange rate, credit granted to the housing sector) have different coefficients under each regime, demonstrating that each of the governments that have been in power since the Islamic Revolution has adopted a different set of economic policies, and they have differently influenced the housing boom and bust cycles.
- According to **Table 3**, monetary policy was negative coefficient during the first regime and positive coefficient under the second and third regimes. The monetary policies undertaken by the central bank have aggravated the housing bust since

periods of housing bust were more frequent than that of boom cycles. As a result, the government's policies were inappropriate and have had unintended consequences for the housing sector.

- The study's findings are shown in **Table 3**, which reveal that the credit, fiscal, and exchange rate policies had a positive coefficient in the first regime and it was negative in the second and third regimes. Government approval of these policies has widened the housing bust and accelerated the boom cycles since periods of the latter were more frequent than that of former.
- The research's findings indicate that during the first regime, the housing sector experienced a bust for 8 out of 11 years. The onset of an Iran–Iraq War, which consumed the majority of the building budgets and decreased the credit granted to the housing sector, is among influencing factors in addition to the governments' economic policies (The credits of the housing sector amounted to 217 billion Rials in 2013, which decreased to 96 billion Rials in 2016); which has significantly contributed to the current housing bust escalation.
- Based on the results in **Table 5**, in the third regime, the housing sector has been booming for 9 out of 16 years. The Mehr housing project, a sharp increase in oil prices, and the emergence of the Dutch disease in Iran during the second government of Ahmadinejad had a significant impact on the housing sector, in addition to the government's economic policies. This regime differs significantly from other regimes in that the number of years that the housing sector has been in a period of boom is greater than that of bust. However, during the second government of Ahmadinejad, factors such as rampant inflation, an increase in the exchange rate, and an ineffective monetary policy, as well as a decline in oil revenues, stagnant inflation, and an unprecedented increase in the exchange rate during the first government of Rouhani, have weakened the housing boom period.
- The business cycles (boom and bust) of the housing sector and the credit provided to that sector are essentially directly correlated, leading to an almost uniform increase in credit, so that, almost always when credits have increased, the housing sector has subsequently boomed and vice versa, except for cases such as the beginning of the revolution due to the conditions caused by the war and the Ahmadinejad government, when the credits granted to the housing sector increased without any special support. In the end, it significantly increased the country's inflation rate, which shortly after accelerated the housing sector's bust.
- The housing sector in Iran's economy has not enjoyed relative stability, so based on the findings of the research, both periods of bust and boom were short, and periods of bust were more frequent than periods of boom. First, certain governments' failure to consider the housing sector when implementing monetary, fiscal, and credit policies, and second, Iran's economy's overwhelming reliance on oil revenues, are the main contributors to this lack of stability.
- Given that housing is a component of the asset portfolio (which also includes gold, money, stocks, and other commodities), exchange rate fluctuations have occasionally been able to stimulate demand for buying foreign currency. As a result, money from the housing side of the portfolio has essentially flowed to the

currency market, which has reduced investment in the housing sector and ultimately weakened the housing boom period.

In the end, we can provide the following response to the main question of this study, which is whether the boom and bust in the housing sector have been intensified or weakened by various governments' economic policies: First, the time series for study was separated into three regimes, demonstrating governmental transitions and the various impacts of economic policies on both housing boom and bust cycles; second, the different coefficients of each indicator in the regimes; third, the sign of each indicator's coefficients, some of which are negative and indicate a countercyclical influence and others of which are positive and indicate a procyclical effect; fourth, the various impacts of every index in every regime were identified. These all demonstrate how the governments' economic policies either exacerbated or attenuated the housing boom and bust cycles.

6. Conclusions

This article's initial analytical effort was to comprehend the discourses that influence urban housing policies and how they affect the development of the housing boom and bust cycles. The main concept behind this query was that, despite the precautions taken, land and urban housing policies in the country during the last 40 years had a lot of unplannedness and instability in the aforementioned policies, which eventually manifested as a housing boom and bust. Governments after the Islamic revolution had different effects on the housing sector by adopting different economic policies. In some governments, these have led to a housing boom; in some, they have resulted in a housing bust. Our findings indicate that the Iranian housing sector has experienced significant fluctuations since the Islamic Revolution as a result of the lack of appropriate economic policies, particularly monetary policies. And since times of bust are longer than that of boom, and because periods of boom and bust are often less than five years, there was no special relative stability.

By closely inspecting Iran's housing boom periods, it is clear that the amount of government construction credits and the amount of money in some governments have increased, which has expanded investment in the housing sector as well as speculative activities in this regard, subsequently increased housing prices. The high dependence of Iran's economy on oil revenues and the fluctuations resulting from the sale of oil have affected the money supply that in turn, it has affected the housing market.

According to the findings on Iran's housing boom and bust, the change of governments has been the key contributing component. Due to the fact that the new government will alter the economic policies, which will also affect the housing policies. One year after the establishment of the new government, if the housing sector was in a bust cycle, with new policies, it would be boom, albeit falsely. We experienced the housing bust after a few years, particularly during the second term of governments, as a result of implementing economic and monetary policies.

A significant portion of society's lowest strata are unable to find homes, which is an intractable issue. The analysis of discourse elements in each period to understand how the government intervenes in policymaking, acquisition, distribution, allocation and transfer of land and housing revealed that each government's actions and policies

were developed in opposition to those of the one before it. Additionally, it has centered on discourse contests with competing political currents and prior governments rather than just coming up with proper solution to the housing and land issues. This means that the lack of institutionalization in the country's planning system, or the extreme weakness and limitations of governmental institutions and the private sector in policymaking, provision, and supply of land and housing, has resulted in the land and housing management system being unstable as policies and actions have been pushed toward private and personal discourses. After four decades of the revolution, this issue has remained and, in some ways, has become worsened. These policies had a direct impact on the housing sector's boom and bust, instability, and applicants' psychological security, all of which were investigated in the present study in the form of several regimes.

Author contributions: Conceptualization, AM; methodology, SN; software, SN; validation, AM; formal analysis, AM; investigation, AM; resources, SA; data curation, SN; writing—original draft preparation, AM; writing—review and editing, SN; visualization, SA; supervision, AM; project administration, SN; funding acquisition, AM.

Data availability statement: All the information used in the article is mentioned inside it and is available.

Conflict of interest: The authors declare no conflict of interest.

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