



Marriage crisis and housing costs: Empirical evidence from provinces of Iran

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Abstract

The term “marriage crisis” is becoming more visible in Iranian public and private debates and constitutes a major issue in political discussions at the time of elections. The increasing proportion of the young working age population in Iran has difficulty establishing families. This has increased political concerns about addressing the basic needs of young Iranians. This study examines the link between housing costs and the marriage rate in Iran, controlling for other relevant economic determinants of marriage. Using a panel of provinces of Iran over a period of nine years (2002–2010) and applying the generalized method of moments (GMM) estimator, our results reveal that there is a negative relationship between housing costs and the marriage rate. We also find that government special loans for marriage, and a lower unemployment rate, increase the marriage rate. Finally, increasing spending on higher education has a dampening effect on the marriage rate.

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1. Introduction

Family formation and changes in fertility rates have significant relevance for policymakers around the world¹. All world regions have experienced a reduction in fertility rates. In some regions, such as the Middle East and North Africa (MENA), the fall in fertility rates is significant: from total of 6.87 births per woman in 1960 (the highest in world) to 2.74 births per woman in 2012, close to the world average of 2.47 (World Bank, 2014). There are different socio-economic, political, and institutional reasons for reduction in fertility rates². Increasing marriage age due to rising economic and financial costs of family formation is one of major drivers of lower fertility rates, especially in countries where unmarried partners with children are rare and not protected by formal and informal institutions, such as in Iran.

During the last decade, one of the major socio-demographic trends taking place in Iran has been an increase in age at marriage and a decrease in the marriage rate. According to *Iran's National Organization for Civil Registration*, 48% of women and 46% of men are of marrying age but have not married yet (BBC, 2013a). Similarly, another survey study conducted by Abhari (2013) showed that 84% of young Iranians³ of marrying age cannot afford to marry.

Table 1 shows the changes in age at first marriage of men and women in Iran. As can be seen, over the last three decades, the mean age at first marriage has risen from 23.8 to 26.7 for men and from 19.9 to 23.4 for women.

In addition to the increase in age at first marriage, the marriage to divorce ratio shows a continual decreasing trend, from 16 in 1993 to a historically low level of 5 in 2013. This is the lowest ratio of marriage to divorce in Iran since 1965⁴. The growth rate of total number of marriages in Iran has been negative for 3 subsequent years: 2011 (−1.9%), 2012 (−5.1%) and 2013 (−6.7%). Such a consistent negative growth trend is also a unique development that was not seen in past decades in Iran.

Delaying family formation and the marriage crisis, among other factors, has resulted in significantly decreasing fertility rates since early 1990s in Iran. On average, each Iranian woman in 1989 had 5 children. This number fell to 1.86 in 2006 and then to 1.91 in 2012. Family control policies, which began in the 1990s, proved to be effective in reducing population growth by increasing the participation of women in the education system, subsidizing family control tools and access to health instruments, and providing more opportunities for women in the job market. Some countries use such historical changes in fertility behavior as a golden opportunity for higher savings, investment and growth. Others fail to benefit from it. The negative trends in fertility rates in Iran and increasing marriage age have become major concerns for the religious leaders of Iran

¹ Decreasing fertility rates of families shape the speed and duration of demographic transition (i.e. increasing working age population). It is shown that when there are good policies for meeting the basic economic and political needs of youth, such a demographic transition can result in a boost for the national economy. If the political institutions and economic structure fail to meet such needs, including affordable housing, then the demographic transition may convert to a demographic curse, destabilizing political systems as reflected in the Arab Uprisings since 2011 and the Green Movement in Iran in 2009 (see Bjorvatn and Farzanegan, 2013 for more details).

² For example, see Hondroyannis and Papapetrou (2005) in which they show that in a sample of 18 European countries, in the long run an increase in real output per capita will be associated with higher fertility while positive employment shocks are responsible for the deterioration of fertility. Or in another study for China, Hasan (2010) shows a negative long-run causal relationship from per capita income to population.

³ Iran is a very young country, with 55% of the population under 30 in 2011.

⁴ Data are from the Iran National Organization for Civil Registration: <https://www.sabteahval.ir/Default.aspx?tabid=4821> (access 11 February 2015).

Table 1
Mean age at first marriage in Iran, 1986–2011.

Year	Men	Women
1986	23.8	19.9
1996	25.6	22.4
2006	26.2	23.3
2011	26.7	23.4

Source: Statistical Center of Iran, available at <http://www.amar.org.ir/Portals/0/PropertyAgent/461/Files/2866/miangin-avalinezdevaj-kol.xls> (access: 13 November 2014)

who are worried about the future population weight of *Shia* Muslims in the Islamic world⁵. In a recent significant policy change in the family control program, the Iranian Supreme Leader, *Ayatollah Khamenei*, issued a 14-point plan in 2014. The plan was shared with the judiciary, executive and legislative branches of government. Several key points of the plan are increasing the fertility rate beyond replacement levels, removing barriers to marriage, decreasing the marriage age and supporting young couples. Other points in plan include more facilities for mothers during pregnancy, insurance coverage for childbirth and dealing with both male and female infertility. The plan also has implications for political-cultural issues: it emphasizes “promoting and institutionalizing an Islamic-Iranian lifestyle and opposing undesirable aspects of the Western lifestyle”⁶. The current leader of Iran, *Khamenei*, has directly expressed his disappointment about the family control policies of past decades in Iran: “One of the mistakes we made in the 1990s was population control,” . . . “Government officials were wrong on this matter, and I, too, had a part,” he conceded. “May God and history forgive us”⁷. The revision of family policies in Iran became significant even before the formal 14-point plan of *Khamenei*. In 2012, former Minister of Health and Medical Education, *Marzieh Vahid Dastjerdi*, reported that “The budget for the population control program has been fully eliminated and such a project no longer exists in the health ministry. The policy of population control does not exist as it did previously”⁸. Of course, Iran is not the only country that has encountered critiques of its family control policies. *Cao and Wang (2010)* also criticize family control policy in China for ignoring long-term risk in favor of short-term gains. Additionally, *Srinivasan (1988)* undermines the common wisdom that population growth hampers economic development, emphasizing rather the negative role of inappropriate policies and institutions.

In spite of political support for reducing the marriage age and increasing fertility rates of women, economic hardships have played a major role in individuals’ cost-benefit analysis for family formation in Iran. Our focus in this study is the specific role of increasing housing costs in discouraging Iranians from marriage and thus keeping fertility rates below replacement levels. The literature suggests that high housing prices and rents are among the main factors deterring

⁵ Of course, there are also economic concerns behind an aging population. For example, *Hondroyannis and Papapetrou (2001)* show in a case study of Greece that an increase in the old-age dependency ratio and a decrease in the fertility rate will reduce overall economic performance in the long run.

⁶ <http://www.al-monitor.com/pulse/originals/2014/05/khamenei-plans-increase-iran-population.html> (access February 2015).

⁷ <http://www.economist.com/news/middle-east-and-africa/21603477-irans-leaders-are-worried-about-their-countrys-declining-population-make-more> (access 11 February 2015).

⁸ <http://iranprimer.usip.org/blog/2012/aug/29/iran-reverses-family-planning-calls-more-children-0> (access 11 February 2015).

many young Iranians from marriage and family formation (BBC, 2013a; Abhari, 2013; Entekhab, 2013; Moaveni, 2009; Gholipour, 2012; Moghadasjafari & Yaghobi, 2007). Homeownership or at least having a rented house before marriage has traditionally been important in Iran. Given the persistent increases in housing prices and rents many young Iranians cannot afford to provide housing to form a household. Over the last decade, housing prices and rents have soared across the country⁹.

As an example, the capital city of Iran, Tehran, shows the degree of the housing crisis for the young population. According to Statistical Center of Iran, the average annual income for an urban household was IRR 130,301,445 in 2011. At the same time the average annual rental cost for a 75 square meter house was IRR 71,786,700 in Tehran. This means that 55% of an average households' income would be allocated to rental costs in Tehran. Similarly, the average price for a 75 square meter house was IRR 1671,075,000 in Tehran in 2011. This means household income for a year in Tehran was just 7.79% of the price of a 75 square meter house. In fact, for Iranian households, expenditures on housing constitute approximately 30% of total household expenditures in urban areas (e.g., Gholipour, 2012; Abbasinezhad & Yari, 2009). The ratio is approximately 40% or more for low-income groups in big cities, according to the [Unit of Housing Economics and Planning \(2010\)](#), Ministry of Roads and Urban Development. Due to low availability of housing finance (2.8% of GDP)¹⁰ purchasing an average house in Tehran is a challenging task for an average household. The same increasing trend in house prices and rents can be observed in other urban and rural areas but with lower severity than in Tehran. In fact, Iranian households, particularly middle and low-income groups, spend the largest portion of their income on housing (Gholipour, 2012).

In this paper, we examine the relationship between housing prices, rents and the marriage rate using data from provinces of Iran over the period of 2002–2010. We look for evidence of a link between high and persistent housing prices and rents and the significant marriage decline experienced by Iran in last decade, controlling for other drivers of family formation, province-specific characteristics, such as norms and traditions, and year-specific shocks, such as family control policy changes that affect all provinces at the same time. Our results from panel generalized method of moments (GMM) estimations show that higher housing prices and rents significantly decrease the marriage rate in Iran, *ceteris paribus*. Our results undermine the meaningfulness of political plans from the Iranian leadership to increase the marriage rate and fertility by top-down approaches. The analysis shows fundamental economic factors behind the increasing marriage age and declining marriage rate in the Islamic Republic of Iran.

The contributions of this paper to the literature on macro determinants of marriage are two-fold. *First*, while there have been a number of conceptual and descriptive works such as [Vahidnia \(2007\)](#), [Mirzaie \(2005\)](#), [Aghajanian and Thompson \(2013\)](#), [Abbasi-Shavazi and McDonald \(2006\)](#), [Mahdavi \(2007\)](#), [Moghadasjafari and Yaghobi \(2007\)](#) and [Kazemipour \(2004\)](#), who have examined marriage, fertility and divorce trends for Iranian society, very few empirical studies have

⁹ Economists and observers have mentioned several factors that pushed housing prices and rents up in Iran in last decade, such as excess demand in the housing market (particularly investment demands); speculation of real estate agents; high level of inflation; injection of petro-dollars into the economy; increases in costs of construction due to reduction of subsidies of goods and services during Ahmadinejad presidency as well as sanctions imposed on the economy of Iran by the United Nations (UN), the United States (U.S.) and the European Union; increases in land prices; and the currency crisis (e.g., [BBC, 2013b](#); [Gholipour, 2012](#); [Hadavandi, Ghanbari, Mirjani, & Abbasian, 2011](#); [Abbasinezhad & Yari, 2009](#); [Rahimi, 2012](#)).

¹⁰ See [Warnock and Warnock \(2008\)](#).

investigated the relationship between housing costs and the marriage rate in Iran. Even such analyses for other Middle East and North African countries are rare due to lack of reliable housing costs and marriage data. To the authors' knowledge, most studies in this area cover the U.S., European and East Asian countries. *Second*, there have been many cross-country and time-series studies on the economic determinants of marriage and household formation such as Borsch-Supan (1986), Ahn and Mira (2001), Clark (2012), Ermisch and Di Salvo (1997), Ermisch (1999), Haurin, Hendershott and Kim (1993), Hughes (2003) and Mulder and Billari (2010). To the best of our knowledge, no empirical works have examined the economic determinants of marriage or household formation by using panel data from a sample of provinces of a country¹¹. Thus, our paper adds to our understanding of housing market-family formation in a developing oil rich country that is experiencing a significant demographic transition by applying province-level data. Our analysis also has implications for the oil curse-related literature where Dutch disease following positive oil revenue shocks can increase prices in the non-tradable sector of the economy, e.g., real estate, thus partly explaining marriage crises in countries similar to Iran¹².

The paper proceeds as follows: Section 2 provides a brief background on the importance of marriage and family formation in Iran as an Islamic country. Section 3 presents a theoretical explanation for the relationship between housing costs and marriage and also reviews some of the relevant studies. Section 4 describes data and empirical methodology. Section 5 presents the empirical results and Section 6 concludes this paper with policy recommendations.

2. Religious and cultural background on marriage

Understanding the factors contributing to the delay in marriage in Iran is an important issue at the national level due to following reasons: First, Iran, as a Muslim-dominant country¹³, used to be a society in which people married young. In a Muslim society that views male-female relationships before marriage and premarital sex as taboo, decreases in the marriage rate have worried Iran's religious government, which promotes the virtue of chastity and views young people's shifting attitudes toward sexuality as a direct threat to the Islamic Revolution's core values¹⁴ (Moaveni, 2009). Generally, the institution of marriage has been given tremendous importance and it is highly recommended in Islam, particularly in the *Shia* branch of Islam. There are approximately 40 sayings (*Hadith*) of Prophet Muhammad and his companions (*Shia Imams*) about the impacts and advantages of marriage on human life and society. Second, historically, families have been the primary units for organizing nearly all of the social activities of life, including production, consumption, education, socialization, reproduction, leisure, and living arrangements in Iran. Establishing, maintaining, and continuing family units have been encouraged through a strong idealized family morality integrating pre-Islamic religion (Zoroaster) and Islamic values (Aghajanian & Thompson, 2013). Third, marriage has been a hot topic in almost all political election debates and campaigns. For example, in the 2013 Iranian presidential election, the candidates' highest priorities were to increase youth employment and marriage (Mehrnews, 2013). This social issue has also been utilized as an efficient instrument to critique past government officials. Fourth, it is argued that the fertility decline and low population growth rate in Iran are largely

¹¹ Farzanegan and Gholipour (2015) have investigated the housing costs and divorce rates in Iran.

¹² For related literature on the oil curse and its transmission channels see Farzanegan and Markwardt, 2009; Farzanegan, 2013a, 2014; Bjorvatn, Farzanegan, & Schneider, 2012, 2013.

¹³ The results of the 2011 national census showed that 99.4% of Iranians are Muslim.

¹⁴ *Shia* Muslims are in the majority in Iran.

products of changes in marriage patterns as well as increases in contraceptive use (e.g., [Vahidnia, 2007](#)). According to the *Statistical Center of Iran*, the annual average growth rate of the population from 1996 to 2006 was 1.62% while the rate declined to 1.29% for the period of 2006–2011. Given the above arguments, analyzing the determinants of marriage in Iran will provide valuable insights for policymakers so they can create better strategies to increase the marriage rate in Iran.

3. Review of theoretical and empirical literature

We use the Easterlin hypothesis ([Easterlin, 1980](#)) and the explanation provided by [Hughes \(2004\)](#) as a conceptual foundation of this study. The Easterlin hypothesis attempts to explain the baby boom that followed *World War II* and the decline in the U.S. fertility that began in 1967. The basic concept of this hypothesis is that favorable (unfavorable) labor market conditions for young workers looking for entry-level employment and consequently higher (lower) incomes of young adults relative to their parents can cause a higher (lower) fertility rate ([Jeon & Shields, 2005](#)). In other words, this hypothesis argues that young people assess their economic well-being relative to the standard of living they enjoyed in their parents' households when they are considering childbearing and marriage. For example, when economic conditions are good, young people reach their parents' standard of living more easily and form families earlier ([Hughes, 2004](#)). Similar to the Easterlin hypothesis, [Hughes \(2004\)](#) argues that young adults measure their income and their economic readiness (including home ownership) for marriage against their material aspirations. If young adults are able to achieve home ownership (which is an important marker of economic security and future economic well-being) and income is high relative to aspirations, then it will be easier to marry sooner and have more children.

Given the sharp increases in housing prices and rents in Iran and since most young Iranians live with their parents until marriage, therefore, based on the Easterlin hypothesis and [Hughes' \(2004\)](#) argument, we can expect that expensive housing markets can encourage young Iranians to delay their marriages. Our expectation is also consistent with findings of [Hughes \(2003\)](#), who shows that marriage, which is perceived as an expensive living arrangement, should be less common in unfavorable housing and labor markets.

A large number of studies have tested the relationship between home ownership, housing costs and marriage or household formation. The majority of these studies have shown that young people may postpone marriage/household formation and parenthood if they cannot get access to homeownership or if housing costs are too high (e.g., [Borsch-Supan, 1986](#); [Haurin et al., 1993](#); [Hughes, 2003, 2004](#); [Clark, 2012](#); [Mulder & Billari, 2010](#); [Hui, Zheng, & Hu, 2012](#)). For instance, based on a sample of U.S. youths in their twenties, [Haurin et al. \(1993\)](#) show that real housing rents and earning capacity are important determinants of the decisions to leave the parents' home, to marry, and to live with a group or separately. The same results are found by [Di and Liu \(2006\)](#) for the U.S. Using Annual Housing Survey 1976–1977 from the U.S. metropolitan areas. [Borsch-Supan \(1986\)](#) finds strong responsiveness of household formation to housing prices and income. Moreover, his results suggest that housing allowances have a strong impact on household formation. [Clark \(2012\)](#), using the American Community Survey for 2006–2008, shows that women delay family formation and fertility in expensive housing markets. Based on the U.S. census 1990 Public Use Microdata Samples, [Hughes \(2003\)](#) documents that individuals (aged 18–35) are more likely to be married than to live in any of the alternative arrangements (living alone, living with a partner, living with roommates, living with parents) when potential earnings are high and housing costs are low. In a subsequent study, [Hughes \(2004\)](#) finds that higher costs

of owner-occupied housing decrease marriage. In addition, she finds that the effects of housing values on marriage are similar for blacks and whites and more pronounced among young adults without a college degree. Kent (1992) finds that income, housing costs, and government aid to families with dependent children, age at first marriage and male education level affected young household formation in the U.S. during 1961–987.

Ermisch and Di Salvo (1997) show that higher housing prices discourage the formation of partnerships for young women and men in Britain. Moreover, their findings suggest young people's permanent income has a significant effect on men's departures from the parental home to live alone or with friends/others, and also on women's exit to live with a partner or friends/others. The same results were found by Ermisch (1999) who provided evidence that tighter housing markets decrease the formation of partnerships, while young people with larger current incomes are more likely to leave the parental home in Britain. Other studies of Britain have also suggested that couples defer marriage because they cannot afford to buy a house (e.g., Ineichen, 1981).

Hui et al. (2012), using aggregate annual time series data spanning the period 1976 to 2010 for Hong Kong, find that increases in housing prices and the elderly dependency ratio leads to decreases in birth rate and conclude that housing market restrictions lead to the postponement of couple formation and fertility. Similarly, using cross-sectional data from 18 Western countries, Mulder and Billari (2010) show that family formation and fertility are hampered in countries with difficult access to homeownership and low access to mortgages. Lauster (2006), using the Swedish Family Survey, also finds greater access to housing increases the likelihood of family household formation. Martínez-Granado and Ruiz-Castillo (2002) emphasize the role of housing costs and income as the basic determinants of household formation and related demographic decisions in Spain. Focusing on the economy of Portugal, Martins and Villanueva (2009) find that higher costs of home mortgages significantly decrease household formation.

4. Data and empirical methodology

4.1. Data

The objective of this paper is to examine the relationship between housing prices, rents and the marriage rate in a panel data setting. Iran is administratively divided into 31 provinces (*Ostans*) in 2012. We used annual data for 30 provinces of Iran from 2002 to 2010 because Alborz province was formed in 2010 and the data for this province is not available. Moreover, the choice of the data period for the empirical analysis is based on the availability of data series.

The data for number of registered marriage in each province was obtained from *Iran's National Organization for Civil Registration*. Then, we calculated the marriage rate per 1000 population for each province. The highest annual average marriage rate is in Khorasan Shomali¹⁵ (13.86), Ardabil (13.50) and Zanjan (13.01) whereas Tehran (8.83) and Semnan (9.45) had the lowest marriage rate over the period of this study.

Information on average housing prices per square meter (1000 IRR) and average rents (including a 3% deposit agreed to in contracts concluded between landlord and lease-holder) per square meter (IRR) was taken from the *Statistical Center of Iran*. It should be noted that information on housing prices and rents are gathered from the capital city of each province. The data show that

¹⁵ Data for Khorasan Shomali and Khorasan Jonobi are only available from 2005 to 2011.

Table 2
Descriptive statistics.

	MG	UE	ED	IF	HP	HR
Mean	11.64	11.49	252,783.70	15.51	4630.69	17,665.56
Max	22.68	21.10	6854,432.00	27.60	18,647.00	69,026.00
Min	5.69	4.10	11,065.93	7.50	1047.00	1322.00
Std. Dev.	1.84	3.13	695,019.80	4.31	2789.41	9090.54

Note: MG is the marriage rate; UE is unemployment rate; ED is total expenditures in higher education in public and private education institutions (in millions of IRR); IF is inflation rate, HP is housing price per square meter (in 1000 IRR); HR is housing rent per square meter (in IRR). The results are based on a sample of 30 provinces over the period of 2002–2010.

industrialized provinces, such as Tehran, Isfahan, and Qazvin, are ranked as the most expensive housing markets over the period of the present study.

In considering the relationship between housing prices, rents and marriage, it is important to control for other relevant factors. This ensures that housing costs can be evaluated with less concern about omitted variables. Thus, following existing studies on marriage and household formation and also based on current arguments by Iranian sociologists and economists, we selected unemployment rate, education, living costs and government special loans for marriage as control variables in the model specification. Table 2 reports descriptive statistics of variables.

Unemployment generally delays couple formation and people's household formation because high unemployment rates suggest a weak labor market and decrease economic opportunities for potential mates that can reduce the earnings potential and desirability of partners for marriage. In other words, because marriage and childbearing involve long-term commitments, high unemployment can bring enormous uncertainty regarding future careers and income as well as lower current income for many individuals and households, which in turn can inhibit marriage (e.g., [Ahn & Mira, 2001](#); [Ermisch & Di Salvo, 1997](#); [Ekert-Jaffe & Solaz, 2001](#)). Thus, it is to be expected that the unemployment rate is negatively associated with marriage in Iran (e.g., [Abbasi-Shavazi & McDonald, 2006](#); [Abhari, 2013](#); [Kazemipour, 2004](#); [Moghadasjafari & Yaghobi, 2007](#)). The annual unemployment rate of provinces was taken from the *Statistical Center of Iran*.

In prior studies in Iran, researchers document a delaying effect of education (particularly women's education) on marriage and fertility (e.g., [Vahidnia, 2007](#); [Abbasi-Shavazi & McDonald, 2006](#); [Moaveni, 2009](#); [Kazemipour, 2004](#)). In recent years, an increasing number of young Iranians delaying marriage and child-rearing and engaging in higher education into their 20s could be encouraging a slower rate of new household formation. Furthermore, the wide expansion of education in Iran has significantly contributed to the modernization of young Iranians and their lifestyle, which likely has an indirect effect on postponement of marriage. On the other hand, it is argued that education has a positive impact on the probability of forming a household because more educated individuals (particularly men) are also those with higher earning capacity and, most likely, they would enter the marriage market sooner ([Martínez-Granado & Ruiz-Castillo, 2002](#)). The results of existing studies in other countries also support the view that education is an important determinant of marriage and household formation (e.g., [Ekert-Jaffe & Solaz, 2001](#); [Hughes, 2003](#)). In this study, we used total expenditures in higher education in public and private education institutions in each province as a proxy for education. The data on education expenditures (in millions of IRR) are from the *Statistical Center of Iran*.

Furthermore, several observers argue that high living costs (e.g., expensive wedding ceremony, home appliances, and increasing cost of rearing children) have been a major factor in the postponement of marriage (e.g., [Abbasi-Shavazi & McDonald, 2006](#); [Entekhab, 2013](#); [Moghadasjafari &](#)

Yaghobi, 2007; Ilias, 2010). We used the inflation rate as a proxy for living costs. It is expected that a higher level of inflation would reduce the marriage rate. We obtained data on inflation rates from the *Central Bank of Iran*.

Finally, we control for the impact of government special marriage loans on the marriage rate by including a binary variable in the model (1 if 2006–2010, 0 elsewhere). Since 2006, the government of Iran has implemented a pro-marriage policy, namely the *Youth Marriage Facilitating Law*, which provides marriage loans with low interest rates for young Iranians in order to increase marriages. Some of the characteristics of the loan are as follows: Each Iranian couple can apply for IRR 30,000,000 (approximately USD 1000) only once. The loan interest rate is 4%, which is considered a low rate in comparison to the interest rates charged on other typical loans, which ranged between 12 to 14% during that period. Couples repay their loans in equal installments over 36 months. The repayment starts one month after the loan is granted¹⁶.

4.2. Model

Based on the above discussion, the empirical model we used is as follows:

$$\begin{aligned} \text{MG}_{it} = & \text{cons} + \beta_1 \times \text{UE}_{it} + \beta_2 \times \ln \text{EDU}_{it} + \beta_3 \times \text{IF}_{it} + \beta_4 \times \ln \text{HC}_{it} \\ & + \beta_5 \times \text{DMGLOAN} + \alpha \times \text{MG}_{it-1} + v_i + \Omega_t + u_{it} \end{aligned} \quad (1)$$

Eq. (1) is a dynamic panel model that allows for dynamic effects (MG_{it-1}), individual fixed province effects (v), fixed time effects (Ω), error term (u), and where $i = 1, \dots, N$ denotes the province, $t = 1, \dots, T$ denotes the time period, \ln is the natural logarithm, MG is the marriage rate, UE is unemployment rate, ED is total expenditures in higher education in public and private education institutions, IF is inflation rate, HC is housing costs including housing prices (HP) and rents (HR), and DMGLOAN is dummy for the marriage loan (1 if 2006–2010, 0 elsewhere). We did not take the natural logarithm of the MG , UE and IF . This is because the MG is number of marriages as a percentage of population and UE and IF are as a rate.

4.3. Methodology

We applied the dynamic panel generalized method of moments (GMM) to estimate the relationships between the explanatory variables and marriage rate. The main justification for using this approach comes from the fact that there is an endogeneity problem¹⁷ in the model. For example, we assumed that housing costs make the marriage more expensive and that as a result, young people are less willing to form households. On the other hand, household formation is an important factor in determining aggregate housing demand and prices (Borsch-Supan, 1986; Ermisch, 1996; Mulder, 2006; Kent, 1992). This form of endogeneity of explanatory variables is called simultaneity. This arises when one or more of the explanatory variables are jointly determined with the dependent variable (Wooldridge, 2009). Furthermore, the macro datasets that we use in this study typically lack controls for couple demographic characteristics and may suffer from

¹⁶ For more details, see <http://ve.cbi.ir/Conditions.aspx>.

¹⁷ An endogeneity problem arises in cases where explanatory variables are correlated with the error term. There are three situations where some of the explanatory variables are correlated with error term: omitted variables, measurement error and simultaneity/reverse causation (Wooldridge, 2009).

Table 3
Results of GMM panel estimation regressions.

	Dependent variable: MG			
	Full sample		Sample without Tehran	
	(1)	(2)	(3)	(4)
UE	-0.279*** (-6.645)	-0.105* (-1.728)	-0.170*** (-3.611)	-0.099* (-1.668)
lnED	-1.774*** (-2.955)	-1.451*** (-2.820)	-0.958 (-0.635)	-0.190 (-0.182)
IF	0.108** (2.472)	0.089 (1.521)	0.051 (0.913)	0.155 (1.422)
lnHP	-1.973** (-2.076)	-	-2.321*** (-3.966)	-
lnHR	-	-2.805*** (-4.217)	-	-4.091* (-1.834)
D _{MGL} LOAN	2.108* (1.793)	1.711** (2.144)	4.360*** (3.435)	2.160 (1.333)
MG _(t-1)	1.567*** (8.997)	1.327*** (4.278)	0.957*** (5.897)	1.478*** (2.415)
AR (2) test (<i>p</i> -value)	(0.535)	(0.723)	(0.719)	(0.703)
Sargan test (<i>p</i> -value)	(0.654)	(0.779)	(0.965)	(0.894)

Note: robust *t*-statistics are reported in parentheses.

***, **, * Represent significance at the 1%, 5% and 10% level, respectively. AR (2) is test for second-order serial correlation in the first-differenced residuals. The Sargan test is for test of over-identifying restrictions.

omitted variables. Economically, there is an endogeneity problem if there are factors unobservable to the researcher that affect both dependent variable and the explanatory variables. When there is an endogeneity problem both OLS and fixed-effects estimates will be biased.

The problem can be solved by applying instrumental variable methods, such as GMM (Wooldridge, 2009). The GMM panel estimator provides consistent and unbiased estimates under the assumption that unobserved heterogeneity exists but is fixed or time-invariant (Wintoki, Linck & Netter, 2012). The GMM estimator was introduced by Arellano and Bond (1991). In the present study, we used the difference GMM estimator. In the difference GMM, individual specific unobserved (fixed) effects are eliminated by using a first differencing transformation. After first-differencing, the equation is estimated via GMM. We applied one lagged levels of the explanatory and dependent variables as instruments for the current explanatory variables. That is, we use historical values of unemployment rates, education expenditures, inflation rates, housing costs and marriage rates as instruments for current changes in explanatory variables.

For models estimated by GMM, it is important to calculate the second order (AR (2)) serial correlation statistic proposed by Arellano and Bond (1991). AR (2) is a test for serial correlation in the first-differenced residuals, under the null of no serial correlation. The *p*-value of the AR (2) statistic should be insignificant (Arellano & Bond, 1991). Finally, we test the validity of the instruments used in the GMM estimations by applying the Sargan test. The Sargan test is a test for over-identifying restrictions (a Chi-square test to determine if the residuals are correlated with the instrument variables). The validity of the instrument variables should not be rejected by Sargan test (Arellano & Bond, 1991).

5. Results

5.1. Main analysis

This section presents and discusses the results of our analyses. Columns 1 and 2 of Table 3 present the results of the GMM estimator for the full sample of provinces. To avoid multicollinearity, the HP and HR are added one by one to the model. This is because there is a high

correlation between two variables. In column 1, we include HP and control variables. In column 2, we include HR and control variables.

The results show that changes in the level of HP and HR have negative and significant relationships with the MG in the full sample of provinces. This means that expensive housing markets can encourage young Iranians to delay their marriage. Our finding confirms that the marriage behavior of Iranians can be explained, to some extent, by the Easterlin hypothesis and the explanation provided by Hughes (2004). Moreover, this result from panel data analyses is in line with previous cross-sectional studies, such as those by Kent (1992), Ermisch and Di Salvo (1997) and Hughes (2003, 2004), who found that housing cost is an important determinant of marriage and household formation. The results also indicate that the size of HR (-2.805 , $p < 0.01$) is much larger than the size of HP (-1.973 , $p < 0.05$) meaning that the marriage rate in Iran is more sensitive to rents than housing prices. This is because persistent increases in housing prices reduce the ability for young couples to own houses and as a result increase demands for rented houses by them to start the union. According to the 1390 census, conducted by the *Statistical Center of Iran*, households with rented houses increased from 22.9% in 2006 to 26.6% in 2011 while house ownership by households decreased from 63.4% in 2006 to 56.4% in 2011. The housing affordability index¹⁸ of Iran in 2012 shows that if a family saves a third of their annual income, then it would take them 36 years to buy a 100 m² house. The waiting period for house ownership in 2009 was 17 years¹⁹. Our finding on the significant negative impact of housing costs on family formation is alarming for policymakers. Lack of housing affordability in Iran has political and economic reasons. One of the reasons is rooted in the structure of Iranian economy, which is very vulnerable to oil revenue shocks. In recent years and following increasing oil prices, government expenditures and transfers (subsidies and loans, especially under the eight-year government of *Ahmadinejad*) increased significantly²⁰. Demand for both tradable and non-tradable goods increased. Increasing demand for tradable goods can be addressed by increasing imports of goods from abroad and keeping prices constant at international levels. However, growing demand for non-tradable goods and services, such as real estate, cannot be met by increasing supply or imports, pushing the prices up. These increasing real estate prices will not only add to the financial burden of the young generation, reducing their ability to establish a family, but in long run will also lead to marginalization of industry and manufacturing. The so-called Dutch disease is way of explaining this process. Policymakers in Iran and other oil-based economies need to establish transparent economic institutions, such as a well-functioning oil stabilization fund that can protect the national economy and government budget from asymmetric shocks in oil revenues. Iran established such a fund in 2000, which was later converted into an oil development fund under the *Ahmadinejad* government. However, it suffers from lack of transparency and good governance. Iran's ranking in the 2013 resource governance index was 53rd out of 58 countries²¹.

Another reason behind increasing housing costs in Iran is mismanagement in international diplomacy. The political decisions on the nuclear program by the Iranian authorities and challenging international conventions during the government of *Ahmadinejad* led to significant economic

¹⁸ Housing affordability index is the average housing price as a share of average household income.

¹⁹ <http://tnews.ir/news/849831831947.html>.

²⁰ See Farzanegan (2009) for populist policies under the Ahmadinejad government in Iran.

²¹ The Index assesses the quality of four key governance components: Institutional and Legal Setting; Reporting Practices; Safeguards and Quality Controls; and Enabling Environment. It also includes information on three special mechanisms used commonly to govern oil, gas and minerals-state-owned companies, natural resource funds and sub-national revenue transfers. For more information see <http://www.resourcegovernance.org/rgi>.

costs under ongoing sanctions. Economic sanctions have also affected housing costs. Sanctions have increased the price of imported construction material and as a result have led to higher housing prices (Shahrestani & Kalbasi, 2008). In addition, increasing inflation rates, decreases in production and higher unemployment rates following economic sanctions have degraded the purchasing power of average Iranians, making securing affordable housing a more challenging task (See Farzanegan, 2011, 2013b for analysis of the sanction-macroeconomy nexus in Iran). In addition to the discussed economic and political problems, Iranian society, similarly to other Middle Eastern countries, is experiencing a significant demographic transition in which the working age population is increasing significantly. This part of the population increases pressure on labor and housing markets.

Increasing working age population also means higher levels of gross saving. A well-developed financial and capital market is key to translating savings into investment in real-estate related projects, addressing the increasing demand following such demographic change. Financial development covers the degree of depth in banking and capital markets. In both of them Iran is behind the average of most other regions. For example, according to the World Bank (2014), domestic credit to the private sector (% of GDP) from 1990 to 2012 in Iran was on average 23%, which is less than for the MEAN (37%), Sub-Saharan Africa (58%), Latin America (33%), East Asia and the Pacific (152%), and the average world (121%). One possible reason for low levels of credit to the private sector in Iran is low and sometimes negative banking interest rate spreads (lending rate minus deposit rate, %). The average interest rate spread in Iran from 2004 to 2011 was 1.18%. In the years 2008, 2009 and 2011 it was even negative due to the direct intervention of ex-president *Ahmadinejad* in reducing interest rates. The average world value for this period was 6.33%. Such a low interest rate spread diminishes the willingness of the banking system to support real estate projects by the private sector. Additionally, the Iranian capital market's development is far behind worldwide levels. On the basis of World Bank figures (2014), the average market capitalization of listed companies (% of GDP) in Iran from 1990 to 2012 is 15.7% while the average world figure is 77% (average of the MENA region is 46%). In addition, the total value of traded stocks as a share of GDP as a proxy for market liquidity is very low in Iran. The average value of this indicator from the 1990s until the current time was 2.7% versus a world average of 87%. Lack of financial development increases investment costs and risks associated with real estate and affordable housing production in Iran.

Apart from housing costs, we find that there is a negative and significant relationship between the unemployment rate (UE) and the marriage rate (see columns 1 and 2 of Table 3), meaning that an increase in the unemployment rate in a province decreases the marriage rate. This is in line with previous studies on the determinants of marriage and household formation (e.g., Ahn & Mira, 2001; Ekert-Jaffe & Solaz, 2001; Moghadasjafari & Yaghibi, 2007). Our findings also indicate that more spending on higher education (as a proxy for education) is negatively associated with the marriage rate, as the coefficient for ED is negative and significant ($p < 0.01$). This finding is consistent with other studies in Iran that documented a delaying effect of education (particularly women's education) on marriage and fertility (e.g., Vahidnia, 2007; Abbasi-Shavazi & McDonald, 2006). Finally, the coefficient of the D_{MGL0AN} is positive and significant suggesting that government special marriage loans to young couples increases the marriage rate. Therefore, this type of financial support should be continued by the government of Iran.

The post-estimation tests for autocorrelation and instrument validity are reported at the bottom of Table 3. For both models (columns 1 and 2), the tests show no evidence of serial correlation as AR (2) is not significant at conventional levels of significance. The Sargan tests indicate no

evidence of mis-specification because the p -value of the Sargan test is not significant. Thus, the dynamic panel model is a good specification for the marriage rate in the sample.

5.2. Robustness check by removing Tehran province from the full sample

We removed Tehran province (capital) from the sample and looked only at other provinces for investigation. This is because Tehran is the only province in the sample where housing prices and rents are much higher than other provinces. Thus, it might be an outlier and its removal may affect our findings. The results of GMM regression for the sample without Tehran are reported in columns 3 and 4 of Table 3. As seen, there is a negative and significant association between HP and MG as well as HR and MG. This suggests that our core evidence on the negative relationship between housing costs and marriage is robust even after removing Tehran from the full sample.

6. Conclusion and policy recommendations

We examine the economic reasons for the marriage crisis in Iran by focusing on the role of housing costs. Our dynamic panel estimations from 2002 to 2012 across Iranian provinces suggest that housing prices and rents have had negative and statistically significant effects on the marriage rate in Iran. To reduce the omitted variable bias, we also control for other time-varying relevant socio-economic determinants of marriage, province-specific characteristics (e.g., norms and traditions) and year-specific shocks (e.g., policy changes in the family control program at the national level in a particular year).

The findings of this paper provide some important implications for policymakers. First, policy could be directed towards the development of affordable housing for new married couples to encourage marriage and household formation. Second, government policies could be directed to provide deeper housing finance systems because house loans and mortgages are not common in Iran. Bank Maskan (Housing Bank) is the only bank specialized in the housing sector that offers housing loans (Euromonitor International, 2013).

To some extent, the abovementioned policies have already been put into action by the government through the *Mehr Housing Plan*. Under this plan, property developers are offered free land in return for building cheap residential houses for first-time buyers on 99-year lease contracts. The government has commissioned agent banks to offer loans to property developers, who can then prepare the land and begin construction projects (Euromonitor International, 2013). However, several factors have led many observers to conclude that this plan was not successful in encouraging marriage among young people: (1) the plan is not only for young people and all low- and middle-income households are eligible to apply for this type of housing; (2) the standard and quality of the houses are low and the size of the houses are small; (3) the houses are built far from business and industrial districts (e.g., BBC, 2011; Akhoundi, 2013).

Although the past government (led by *Ahmadinejad*) attempted to contribute to the housing needs of young Iranians in order to increase marriage, the officials of the new government (led by *Hassan Rouhani*) believe that the role of government in the housing market should be reduced, allowing the private sector to balance the housing market (Akhoundi, 2013). This is because the public sector is less efficient than the private sector in housing construction in developing economies (Lee, 2007). Government intervention in the housing market should in a monitoring and adjusting role only. To increase the participation of private investors in the housing industry, government needs to improve economic institutions, such as control of corruption, property rights,

regulatory quality and rule of law. In addition to this, the state needs to be more accountable and tolerant about the freedom of media to reflect the wishes of civil society. Internal political stability is also an important factor for greater engagement of private investors. According to the World Governance Indicators²² almost all dimensions of governance in Iran under the eight-year *Ahmadinejad* presidency (2005–2012) deteriorated. Corruption increased (–0.43 in 2005 to –0.81 in 2012), political stability decreased (from –0.81 in 2005 to –1.32 in 2012), regulatory quality decreased (from –1.28 in 2005 to –1.42 in 2012), rule of law worsened (from 0.77 in 2005 to –0.90 in 2012) and finally the state became a less accountable system (from –1.29 in 2005 to –1.57 in 2012).

In addition to this institutional deficit, the financial market in Iran is not well-developed. This makes the mobilization of savings and promoting efficient allocation of banking credits to the private sector difficult, increasing investment costs and risks in all parts of the economy including the housing industry. For example, domestic credit to the private sector (% of GDP), which shows the degree of private sector access to financial resources, has decreased significantly in recent years, from 30% in 2005 to 12% in 2013 (World Bank, 2014).

The oil-based economy is another factor behind lower affordability of housing in Iran and other similar economies. Oil rents play a significant role in shaping labor and capital movement in the Iranian economy. Dutch disease following positive oil shocks leads to increasing demand for non-tradable sector goods, such as real estate. The extra demand in the real estate sector cannot be filled by increasing imports or domestic production in the short term. Thus, we observe significant increases in real estate prices. This oil-based problem not only makes marriage a costly decision but also as Farzanegan and Gholipour (2015) suggest, it increases family stress and tensions among married partners who are renters, increasing the probability of family break-ups. Well-designed economic institutions, such as a transparent oil stabilization fund, can reduce the negative effects of volatile oil revenues and asymmetric shocks on the national economy. Good economic institutions must be accompanied by good-quality political institutions that guarantee the free flow of information and freedom of the press in-country.

The international politics of the Iranian government are also influencing the whole economy. The recent international sanctions following weak and factional diplomacy on nuclear issues in Iran have significantly diminished consumer welfare by increasing inflation, housing rents and prices because of higher costs of housing construction and higher unemployment rates. Housing costs following recent sanctions have increased not only due to higher costs of production but also due to the change in people's investment patterns. In an inflationary economy in which the value of currency is decreasing, citizens prefer to invest in fixed assets, such as property²³. Increasing investment risk following political tension with the West has affected the housing industry as well.

Our examination shows that policymakers in Iran cannot address the marriage crisis through their ideologically motivated top-down planning. By contrast, the Iranian authorities must address the good governance deficit, and encourage the engagement of civil society in political and economic policy formulation and implementation. Finally, the Iranian government needs to increase transparency and the flow of information in the real estate sector, as well as increase the purchasing power of average Iranians in order to attract foreign investment in the real estate

²² <http://data.worldbank.org/data-catalog/worldwide-governance-indicators>.

²³ For more details on the effects of sanctions on housing industry in Iran see <http://www.bloomberg.com/news/2012-03-08/tehran-housing-boom-is-last-resort-for-iran-s-savers-squeezed-by-sanctions.html> (access 13 November 2014).

branch, which may have complementary effects on private and public investments in the housing industry²⁴.

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²⁴ See Farzanegan and Gholipour (2014) for related literature survey and empirical analysis of real estate transparency and foreign real estate investment nexus.

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