The effect of increasing house prices on marriage (de)formation in the United States

Master Thesis

Real Estate Studies

Rijksuniversiteit Groningen

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June, 2024

Colophon

Title	The effect of increasing house prices on marriage (de)formation in the United States
Version	Draft version
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Date	30-6-2024

Abstract

This study examines the relationship between changing house prices and marriage (de)formation within U.S. Metropolitan Statistical Areas (MSAs) from 2020 to 2021. Utilizing logistic regression analysis on data from the Current Population Survey Annual Social and Economic Supplement (CPS ASEC) and the Federal Housing Finance Agency (FHFA) House Price Index (HPI), this research investigates the effects of house price increasements on divorce and marriage numbers, considering differences between homeowners and renters. The findings reveal that house price changes did not significantly impact marriage (de)formation. The results suggest that economic resilience, government interventions, delayed financial effects, differential impacts on homeowners and renters, and the multifaceted nature of marital decisions all shape marriage (de)formation. These insights highlight the complexity of marital decisions and the importance of comprehensive policies addressing economic and socio-economic factors to support family stability. This research provides valuable insights into the complex interplay between socio-economic factors and marital behaviour, offering guidance for future policy interventions and research.

Keywords: Marriage (de)formation, house prices

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1 | Introduction

1.1 | Motivation

The numbers of marriages and divorces in the United States (U.S.) has seen a changing trend in the past decades (Ortiz-Ospina & Roser, 2020). After slight increasement during the 1930s and a high peak during the second World War, the divorce numbers dropped again to 2.20 per 1000 inhabitants in 1960 (Ortiz-Ospina & Roser, 2020). From here it started to increase steadily in the next two decades resulting in a divorce number of 5.30 per 1000 inhabitants in 1981 (Ortiz-Ospina & Roser, 2020). Although this may sound like a low number, compared to other countries in the world the U.S. always belonged to the top countries when it comes to divorce numbers (Wang et al., 2022). However, after 1981, the number of divorces kept declining gradually until 2.90 per 1000 inhabitants in 2018 (Ortiz-Ospina & Roser, 2020). This long declining trend is remarkable when looking at the graphs of most other Western countries that fluctuated around the same level since the 1980s. This can be explained partly by the fact that less people get married, and thus less marriages will break (Wang et al., 2022). Although the number of marriages saw a period of increase since 1960, since 1980 the number of marriages per 1000 people have been declining to an all-time low of 6.50 (Ortiz-Ospina & Roser, 2020). Thus, the numbers of both marriages and divorces started a declining trend from 1980 onwards. Although the number of marriages per 1000 people in the U.S. still is one of the highest compared to other Western countries in the world (Ospina & Roser, 2020).

Marriage formation and deformation often are influenced by a multifaceted array of factors and understanding these factors provides insight into the dynamics of marriage (Raley & Bumpass, 2003; Conger et al., 2010; Schoen & Cheng, 2006; Xu, 2022). For example, socio-economic phenomenon often play a crucial role in the formation or deformation of marriages. Financial instability and unemployment heighten marital stress, leading to increased divorce rates (Netemeyer et al, 2018; Yao & Zhang, 2023). Conversely, higher household income and stable employment are associated with lower divorce rates (Conger et al., 2010). Education level also matters; higher education correlates with lower divorce rates, as educated individuals tend to marry later and enjoy better economic stability (Raley & Bumpass, 2003). Economic conditions influence divorce trends, with economic recessions potentially lowering divorce rates as couples delay divorce due to financial constraints (South, 1985). The role that one's financial situation potentially plays in marriage formation and deformation, therefore, can be seen as very important. One economic factor that can influence an individual's financial situation are changing house prices. Rising housing prices can potentially influence the decision to marry due to their impact on financial stability and housing

accessibility, which are critical considerations for couples contemplating marriage (Gonzáles-Val, 2022). High housing prices increase the financial burden on individuals and couples, making it more challenging to achieve the economic security deemed necessary for marriage (Gholipour & Farzanegan, 2015). South and Lloyd (1992) found a strong association between financial stability and the likelihood of marriage, concluding that a positive correlation is present between economic resources and marriage rates. Additionally, the accessibility and affordability of housing play a crucial role in marriage decisions. In urban areas with escalating housing costs, couples may find it difficult to secure suitable living arrangements. Lauster (2006) highlighted that the availability of affordable housing is a significant factor in family formation decisions. As housing prices increase, the reduced availability of affordable housing options can discourage couples from marrying, particularly those from lower-income backgrounds who are disproportionately affected by housing market fluctuations (Gholipour & Farzanegan, 2015).

Besides economic variables affecting marriage (de)formation, demographic and social factors potentially play an important role as well in this phenomenon. Marrying at a younger age significantly increases divorce risk, with couples who marry in their late teens or early twenties more prone to marital instability (Lehrer, 2008). Additionally, individuals with divorced parents have a higher propensity for divorce, potentially due to inherited attitudes towards marriage and conflict (Wolfinger, 2000). Children also impact marital stability, often reducing divorce likelihood, although persistent high conflict can temper this effect (Waite & Lillard, 1991). Cultural and social expectations also intertwine with economic factors, there often is, for example, a societal expectation that married couples should own their homes rather than rent (DiPasquale & Glaeser, 1999). This norm can place additional pressure on couples to delay marriage until they can afford homeownership, aligning with societal standards and personal aspirations of stability and permanence (DiPasquale & Glaeser, 1999). Therefore, possible changes in the factors mentioned above might affect the marital status of a couple and, thus, potentially can have noticeable consequences for a household.

1.2 | Academic relevance

However, so far only a few researchers have been studying the effect of house price changes on the likelihood of marriage formation and deformation. These studies have been performed in different parts of the world and, although treating a similar primary topic, all have their slight differences in focus. Farnham et al. (2011), for instance, focused more on an asymmetric effect between house price growth and shrinkage. González-Val (2022) focused on how house price increasements affected younger adults that want to enter the housing market and start marriage formation. Changing house

prices as a result of land reform and its effect on marriage formation was studied by Hu et al. (2023). While Klein (2017) also showed the importance of whether a change in house prices is expected or unexpected.

Increasing the knowledge on the relationship between house prices and the (de)formation of marriage in the U.S. is relevant because an average American citizen have substantial shares of their total wealth in housing (Kuebler, 2013). This reliance on real estate for wealth underscores the sensitivity of family stability to fluctuations in the housing market. Therefore, a better understanding of what changing house prices could mean for a household's or a couple's total finances is important, especially in relation to marriage (de)formation. When a few years ago house prices saw significant and unexpected increasements throughout the whole country. In march 2020, the COVID-19 pandemic started in the U.S. (Malaczewska & Malaczewski, 2022). This drastic event soon had its effects on the U.S. housing market, where a disruption arose due to lockdown measures and economic uncertainty (Lee & Huang, 2022). Buying and selling activity declined, housing supply stagnated and shifts in housing preferences occurred, causing soaring house prices (Gamber et al, 2023; Contat & Rogers, 2022). Therefore, indirectly a person's wealth also was affected by the increasing house prices in that period. Whether these consequences affected marital (de)formation is not studied yet, which emphasizes the relevance of this study. Moreover, the unexpected tendency of these drastic changes also make it even more important to investigate the effects on marriage (de)formation.

Furthermore, although certain studies found a relationship between house price changes and numbers of marriages and divorces, graphs showing the trend of these three things over time do not show similar patterns. While marriage and divorce showed an increase from 1960 to 1980, it both had a declining trend from there onwards, as mentioned earlier. However, looking at the evolution of house prices in the U.S. it has always been gradually growing in the long-term (U.S. Census Bureau and U.S. Department of Housing and Urban Development, 2024). Therefore it is relevant to investigate the relationship between these two phenomena more and improve the understanding of these dynamics better.

1.3 | Research problem statement

As mentioned in paragraph 1.2, further studying the relationship between house prices and marriage (de)formation can add to the existing literature on this topic. During the COVID-19 pandemic unprecedented increases in house prices across the U.S. were measured, driven by factors such as

low interest rates, supply chain disruptions, and changing housing preferences (Lee & Huang, 2022; Gamber et al., 2023). Understanding how these extreme rises in price impact marriage (de)formation is important, both academically and societally, due to the earlier mentioned reasons. Insights into these dynamics can inform policies aimed at promoting marital stability, which is essential for the well-being of households. Analysing the consequences of soaring house prices on marital decisions provides valuable knowledge that can guide policymakers in creating supportive measures to enhance household stability in future economic fluctuations.

Therefore, this research will investigate how the house price increasements during the years 2020 and 2021 affected divorce and marriage numbers within U.S. Metropolitan Statistical Areas (MSA). Besides that, it will try to research potential differences between homeowners and renters, since changing house prices often have contradicting effects on the financial situation of these two groups. Furthermore, it will be tested whether other individual socio-economic characteristics affected the dissolution and/or formation of marriage. To research these phenomena the following research question is proposed;

RQ: *To what extent do unexpected soaring house prices affect marriage (de)formation in the U.S.?*

The sub-questions below are drafted to help answering the main research question.

i. How are house prices and a person's wealth related to each other?
ii. What are the different effects among homeowners and renters of increasing house prices on marriage (de)formation?

Answering this research question will aim to fill the gap in the literature by evaluating data that comes from a period with unexpected and severe house price increasements. Besides that, it will create a better understanding of the relationship between the trend in house prices on the one hand, and the trend in marriage and divorce numbers on the other hand. The proposed sub-questions will add to answering the main research question by explaining the consequences of changing house prices on a person's financial situation, also taking into account the differences between homeowners and renters.

1.4 | Outline

The remainder of this study is structured as follows: Section 2 presents the theoretical framework, for which academic literature is consulted. In section 3 the empirical and statistical approach are

discussed and the chapter provides an overview of the data and the exploratory analysis conducted. Furthermore, the results concerning the theories presented in section 2 are given and discussed in section 4. Finally, section 5 concludes the study.

2 | Theoretical framework

2.1 | House prices and individual wealth

Many studies found a relationship between house prices and the financial situation of a person or a household (Campbell & Cocco, 2007; Browning et al., 2013; Disney et al., 2010). An increase in house prices generally benefits homeowners by boosting their home equity, which can enhance their net worth and provide opportunities for refinancing or obtaining home equity loans (Stroebel & Vavra, 2019; Farnham et al., 2011). This additional capital can be used for investments, home improvements, or paying off other debts, potentially improving a household's overall financial health. Furthermore, higher property values can lead to increased borrowing capacity and financial flexibility (Turk, 2015). Conversely, rising house prices can be detrimental to prospective homebuyers, as it increases the entry barrier to homeownership (Sissons & Houston, 2019). This can lead to higher mortgage payments, larger down payments, and increased overall debt burden, potentially straining a household's finances.

Moreover, higher property values can result in increased rent prices, further squeezing disposable income and limiting savings and investment opportunities (Gallin, 2008). On the other hand, a decline in house prices can have adverse effects on homeowners by reducing home equity, potentially leading to negative equity situations where the mortgage owed exceeds the property's value (Foote et al., 2008). This can limit mobility, as selling the home might not cover the remaining mortgage balance, and can also restrict access to home equity loans, impacting the household's financial options. Additionally, falling house prices can negatively affect consumer confidence and spending, further straining economic stability at the household level (Disney et al., 2010).

Min et al. (2023) studied the relationships between credit supply, house prices, and financial stability using data from China spanning January 2003 to December 2019. According to their results, fluctuations in house prices significantly impact an individual's financial situation, influencing both wealth accumulation and economic stability. More wealth accumulation can be the result of increasements in house prices, and make homeowners experience an increase in their net worth due

to the appreciation of their property assets (Min et al., 2023). This increase in home equity can enhance financial security and provide opportunities for further investment or consumption, reinforcing economic stability. Therefore, fluctuations in house prices play an important role in shaping the financial situation of an individual.

2.2 | Financial situation and marriage (de)formation

Previous research on the drivers of marriage and divorce showed that financial factors often have an important role in the considerations for marriage and divorce. Conger et al. (1990), for example, studied the effects of financial stress on family dynamics by evaluating the Family Stress Model. The Family Stress Model explains this relationship by proposing a theoretical framework that particularly focuses on how financial difficulties affect individual and relational well-being within families. The model posits that economic pressures, such as income loss, unemployment, and financial instability, lead to increased emotional distress among parents, which in turn negatively affects parenting practices and child development. This can lead to marital conflict and potentially results in marital dissolution. Given the fact that changes in house prices potentially affect a household's financial situation, the Family Stress Model and its dynamics are interesting to consider for this research.

González-Val (2022) studied the influence of house prices on the formation of marriage in Spain. The study employs econometric techniques, including panel data models with fixed effects and dynamic panel data models, to analyse the data. The research reveals a significant negative correlation between house prices and marriage rates (González-Val, 2022). This means that as house prices increase, the rate of marriages tends to decrease. The study highlights that economic factors, such as the substantial rise in house prices in Spain until 2006, followed by a sharp decline post-2008, significantly influence family formation decisions. The negative correlation between house prices and marriage rates that was found by González-Val (2022) is interesting, since increasing house prices can both improve and deteriorate one's financial situation (Farnham et al., 2011). González-Val (2022) reckons that high house prices obstruct the accessibility of homeownership for young adults especially, which does not stimulate family formation.

Research on house prices affected by land reform in China also showed that rising housing prices significantly decreased the probability of marriage among young individuals (Hu et al., 2023). Besides that, Hu et al. (2023) emphasize that soaring house prices do not specifically mean that a considered marriage will not happen at all, but rather causes a delay in marriages. Furthermore, the effect is more pronounced in urban areas, where housing markets are more volatile and prices have increased

more sharply compared to rural areas (Hu et al., 2023). This suggests that urban young adults are particularly sensitive to housing affordability when making marital decisions.

Another research on changing house prices and its effect on marriage or divorce was done by Klein (2017). This research focused on house price shocks and, therefore, unexpected changes in house prices by using the residuals from a second order autoregressive process of the house price index (Klein, 2017). The main result in this study is that an increase in house prices generally decreases the risk of divorce. Specifically, a one standard deviation increase in house price shocks reduces the risk of divorce by approximately 13-18% in the following year (Klein, 2017). Besides that, the study states that the effects were stronger among younger households, those with lower educational attainment, and families with relatively low incomes. The results of González-Val (2022) and Klein (2017) suggest that in the case of soaring house prices both marriage and divorce numbers will deteriorate.

The financial situation of a couple or household can also positively influence the likelihood of getting married (Smock et al., 2005). For obvious reasons, financial stability provides the necessary resources to support a wedding, which can be a significant expense. Despite the initial costs, a solid financial footing offers security and the ability to plan for the future, which are critical factors in the decision to marry (Smock et al., 2005). Stable finances can enhance the quality of life, reducing stress and providing a more conducive environment for relationship building (Franz, 2016). Couples with secure incomes and manageable debt levels are more likely to view marriage as a feasible and attractive option, given the reduced financial strain (Hewitt & Baxter, 2012). Furthermore, financial health allows for better planning of long-term goals, such as purchasing a home, starting a family, or saving for retirement, which are often closely tied to the institution of marriage (Fulda & Lersch, 2018). Therefore, understanding the relationship between changing house prices and one's financial situation is very relevant for studying the effects of house price fluctuations on the (de)formation of marriage.

2.3 | Homeowners vs. renters

As was discussed in paragraph 2.1, fluctuations in house prices can affect one's financial situation in several ways. However, a difference in consequences also was visible among two groups, namely; homeowners and renters. The discrepancy between these two groups were also reflected in the results of a study by Farnham et al. (2011). This research looked at the effect of house price changes on divorce using data from 1991 to 2010. Their findings suggest that changing house prices significantly affect the share of a cohort that is divorced, and that these effects are asymmetric with

respect to housing gains versus losses. Moreover, they mention the importance of the different mechanisms among renters and homeowners that become active when house price changes occur. Homeowners experience increases in their real estate value which leads to potential growth of their net worth or provide financial benefits when selling the property (Stroebel & Vavra, 2019). This could result in both an increase or a decrease of divorce risk. For example, increasing house prices raises the couple's wealth, but it also increases the potential costs of living apart from each other, both these effects will lower the chances for a divorce (Farnham et al., 2011). However, increasing house prices also decrease transaction costs, since houses are easier to sell in up markets. Besides that, it will become easier to obtain equity to make down payments on separate residences (Farnham et al., 2011). These factors potentially have an increasing effect on the risk for marriage deformation.

Renters, on the other hand, do not have any equity in the property they live in and, therefore, they do not benefit from the price increasements (Farnham et al., 2011). Assuming that house prices and rents are positively correlated (Gallin, 2008), landlords may raise rental prices to match the higher market values and recover their investment. This can result in higher housing costs for renters without any increase in their wealth, making it more expensive to live separately from each other (Farnham et al., 2011). This could be a financial constraint that harms the divorce numbers (Fischer & Khorunzhina, 2019). Furthermore, it can become more challenging for renters to transition to homeownership, as the down payment and mortgage requirements may become less affordable (Attanasio, 2009). However, there also is sufficient empirical evidence on why renters are more likely to divorce compared to homeowners. Financial security and wealth accumulation can provide stability and certainty in one's financial situation and, consequently, in one's marriage (Dew et al., 2012). A financial shock with negative impact on a renter's wealth could thus lead to financial stress, which increases the divorce risk. Moreover, buying a home often represents a long-term commitment and investment in the future, which can reflect a more stable and committed relationship.

The exact consequences for homeowners and renters depend on which factors of influence are most prevalent. Though, Farnham et al. (2011) emphasizes the asymmetry in the response of divorce risk from house prices losses in comparison to house price gains for homeowners. Three main reasons for this are mentioned; equity constraints, nominal loss aversion and related transaction costs. Limitations on available equity in a property might lead to serious financial issues regarding selling the home (Gathergood, 2012). The concept of nominal loss aversion could cause reticence on selling the house, even if the real value adjust for inflation and other economic factors has remained steady or increased (Stephens & Tyran, 2012). The related transaction costs are higher when the housing market is in a downturn, and thus, homeowners tend to patiently wait selling a house to minimize

these costs (Farnham et al., 2011). The combination of these three concepts creates the asymmetric response of divorce risk to price changes, with a stronger effect when couples see losses compared to when they experience gains.

Changing house prices and the subsequent dynamics are different among homeowners and renters. This is also visualized in figure 1, where the conceptual model for this research is exhibited. The house price dynamics have distinct effects on the two groups and, therefore, on one's financial situation depending on whether an individual is a homeowner or a renter. It is expected that a change in financial possibilities affect marriage (de)formation.

2.4 | Demographic and socio-economic factors

Besides financial factors, previous studies also found demographic and socio-economic factors that affect marriage (de)formation. Brown and Lin (2012) show that divorce rates exhibit significant variability across different age groups. Younger couples may experience different divorce dynamics compared to older couples due to life stage differences, such as child-rearing, career development, and retirement (Brown & Lin, 2012). Besides that, the dynamics of marriage (de)formation can differ significantly between men and women. For instance, financial stress resulting from changing house prices might impact men and women differently due to variations in income, financial independence, and social expectations (Fan et al., 2019).

Another factor that plays a critical role in the (de)formation of marriage is personal income. Conger et al. (2010) found that a higher level of personal income gives someone the ability to better cope with financial stress caused by changing house prices, decreasing divorce probability. Besides that, positive changes in earnings have been associated with greater odds of marriage, suggesting that income growth can stimulate the decision to marry (Gibson-Davis & Murry, 2009). Higher income levels can provide a buffer against financial stress, whereas lower income might exacerbate it (Netemeyer et al., 2018). Furthermore, educational attainment influences divorce rates, with higher education generally associated with lower divorce rates (Raley & Bumpass, 2003). A positive relationship between educational attainment and the probability of marriage for both men and women was found by Schoen and Cheng (2006). Education can also affect individuals' responses to economic changes, such as fluctuations in house prices, due to better financial literacy and stability (Mirzaei & Buer, 2022).

According to Xu (2022), the presence and number of children can also significantly impact the likelihood of marriage (de)formation and how couples respond to financial stress. Families with more

children may face stronger effects compared to those with fewer or no children, influencing their vulnerability to changes in house prices. Additionally, employment status is a critical factor affecting financial resources and possibilities, which in turn influence marriage and divorce rates (Yao & Zhang, 2023). Unemployed individuals may experience higher sensitivity to changes in house prices due to their precarious financial situation. Citizenship status might impact marriage (de)formation due to differences in legal, financial, and social stability. Su et al. (2018), for example, found that social influence and family cohesion have an impact on divorce rates.

2.5 | Conceptual model

In figure 1 the conceptual model for this research is visualised. As explained in paragraph 2.1 there is a relationship between rising house prices and someone's financial situation. Where rising house prices can increase a homeowner's home equity and subsequently their net worth, deteriorating house prices might have an opposite effect. Soaring house prices in the case of renters potentially limits someone's disposable income, thus having negative effects for a renter's wealth. The different consequences among homeowners and renters are further explained in paragraph 2.3. Anyway, from the existing literature it can be concluded that increasing house prices will affect an individual's financial situation, although depending on someone's tenure status. In paragraph 2.2, the relationship between an individual's financial situation and the (de)formation of marriage was explained. These theories result in the conceptual model that is visualized below in figure 1.

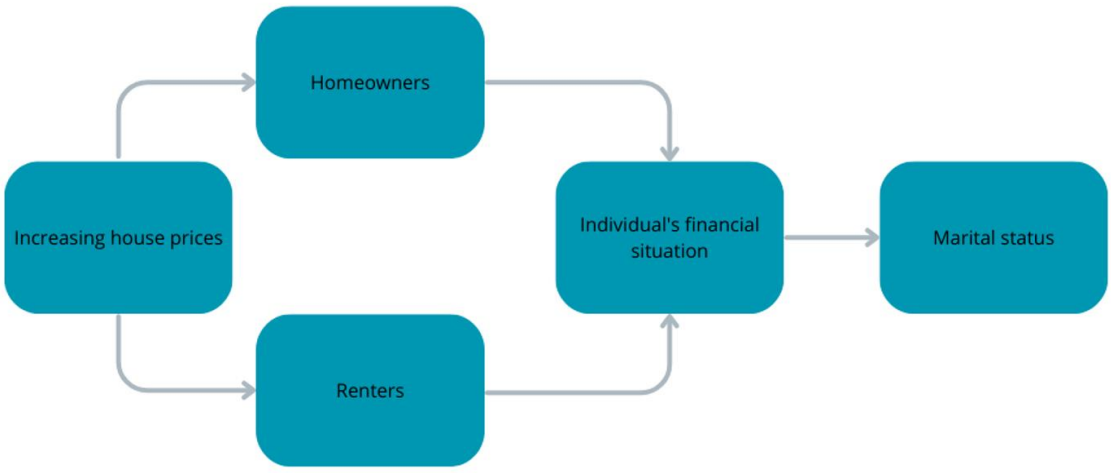

Figure 1: Conceptual model

3 | Methods & Data

This study aims to investigate the relationship between changing house prices and changes in marital status by studying existing literature on this topic and performing quantitative data analysis. In the previous chapter, the literature review provided the existing theories and findings to show which potential dynamics are at play here. In this chapter the focus will switch to the quantitative analysis of these dynamics, the methods used to get to the results and the considerations made during this process. Furthermore, the research design, data sources, sample selection, and analytical procedures will be detailed, providing a comprehensive framework for understanding how housing market dynamics might influence personal life decisions.

3.1 | Methods

For this study, logistic regressions were performed to test the relationship between changing house prices and changes in marital status. This methodological approach is designed to quantify the effects between the two variables, while controlling for some others (Cramer, 2004). The dependent variable in this research has a binary structure and, therefore, logistic regression analysis was employed to investigate the factors influencing the dependent variable. Logistic regression is a powerful statistical method used for modelling binary or dichotomous outcome variables (Cramer, 2004). Unlike linear regression, which is appropriate for continuous outcome variables, logistic regression is designed to handle situations such as presence/absence, or yes/no. This aligns perfectly with the nature of our research question, where the outcome variable takes on one of two possible values. Besides that, this method allows for the inclusion of multiple covariates, thus controlling for various socio-economic and demographic factors that may confound the relationship between house prices and marital status. The coefficients obtained from logistic regression can be transformed into odds ratios, which are straightforward to interpret. These odds ratios provide insights into how each predictor variable influences the likelihood of the outcome occurring (Szumilas, 2010). Furthermore, a linear relationship between the predictor variables and the outcome variable is not assumed in logistic regression. Instead, it uses the logistic function to model the probability of the outcome (Cramer, 2004), which can be particularly useful in capturing the true nature of relationships in socio-economic data.

(1) $$\log\left(\frac{P(Marital\ Status\ Change = 1)}{1 - P(Marital\ Status\ Change = 1)}\right) = \beta_0 + \beta_1 * h + \beta_2 * a + \beta_3 * s + \beta_4 * p + \beta_5 * e + \beta_6 * k + \beta_7 * u + \beta_8 * c$$

In order to perform the empirical study on the effect of house price changes on marriage (de)formation, statistical equation (1) is introduced and is formulated as a logistic regression model. The dependent variable in this model is the binary outcome indicating a change in marital status. For the 'divorce sample' this entails whether people were married in 2020 and divorced or separated in 2021 (0 = no and 1 = yes). In the 'marriage sample' it is the other way around, so whether people were single in 2020 and got married in 2021 (0 = no and 1 = yes). β_0 represents the intercept term, which shows the log odds of the outcome when all predictors are at 0 or their reference level. The main independent variable for this research is the percentage change in house price index from 2020 to 2021. In the equation, β_1 represents the coefficient that belongs to the main independent variable (% change in HPI) that is denoted by *h.* After the main independent variable the control variables used in the regression model are noted. β_2 represents the coefficient of the age group (*a*) of a person, while β_3 stands for the coefficient that is associated with a person's sex (*s*). Another variable that is controlled for is a person's income (*p*), the coefficient for this variable is denoted by β_4. Educational attainment (*e*) is also included in the model, β_5 gives the associated coefficient. The variable (*k*) gives information on whether someone has kids or not, this coefficient here is represented by β_6. Furthermore, a variable on one's employment status (*u*) is added in the model, the calculated coefficient will be β_7. Lastly, a person's citizenship status (*c*) is also accounted for in the model, with the coefficient being denoted by β_8.

The logistic regression approach is chosen for its suitability in handling a binary dependent variable and its ability to estimate the probability of marital status change based on the predictors. Each predictor variable is selected to control for potential confounding factors, ensuring that the effect of changes in house prices on marital status is accurately estimated. In previous research similar control variables were used in regression models (Farnham et al., 2011; Klein, 2017) and theories originating from existing literature mention the potential relationship between the control variables and the dependent variable (see paragraph 2.4). By incorporating these socio-economic and demographic variables, the model aims to provide a comprehensive analysis of the factors influencing marital status changes in the context of housing price fluctuations.

3.2 | Data

The areas of interest in this study are Metropolitan Statistical Areas (MSA) in the United States. The sample entails data on 246 different MSA's, spread over 47 states. Three states are not present in the dataset, these are Alaska, District of Columbia and Wyoming. A MSA is a geographic region that consists of a core urban area with a significant population, along with adjacent communities that have a high degree of social and economic integration with the core (Rosenwaike, 1970). The boundaries of a MSA are, therefore, not limited to the boundaries of a particular city, but can exceed these boundaries and represent a wider geographical area. The MSA's are determined based on a set of criteria regarding population, metropolitan character and integration (Rosenwaike, 1970).

This study utilized two primary sources for data collection; the Current Population Survey Annual Social and Economic Supplement (CPS ASEC) and house price index (HPI) data from the Federal Housing Finance Agency (FHFA). The CPS ASEC is an annual survey conducted by the U.S. Census Bureau and the U.S. Bureau of Labor Statistics. The CPS ASEC provides comprehensive data on, among other things, income, employment, marital status and demographic variables. The survey covers a representative sample of households across the U.S., making it a valuable resource for socio-economic analysis. For this study, we extracted data from the 2020 and 2021 ASEC files. The 2020 ASEC data provide a snapshot of socio-economic conditions prior to the full impact of the COVID-19 pandemic, while the 2021 data reflect the socio-economic environment during the pandemic. The variables collected include the age, sex, marital status, educational attainment, presence of children, personal income, employment status, housing tenure status and citizenship status.

Housing market data were obtained from the FHFA, which publishes a quarterly HPI. The HPI is a broad measure of the movement of single-family house prices in the U.S., derived from repeat sales or refinancing of the same properties (Case & Shiller, 1989). FHFA HPI data provide insights into housing price trends at the national, state, and metropolitan statistical area (MSA) levels. For this research, we collected quarterly MSA-level HPI data covering the same period as the socio-economic data from the CPS ASEC (2020 and 2021). The HPI data were accessed directly from the FHFA website, which offers downloadable files in various formats. Data preparation involved converting the quarterly indices into an annual format to align with the annual socio-economic data from the CPS ASEC. To arrive at a percentage change of the HPI in each MSA, the HPI statistic of the fourth quarter of both years was used. Additionally, the HPI data was merged with the socio-economic dataset based on geographic identifiers to facilitate regional analysis.

3.3 | Data management

Before conducting the logistic regression analysis, several important preprocessing steps were undertaken to ensure the integrity and interpretability of the results. These steps involved the transformation and cleaning of the dataset, as well as the creation of new variables to facilitate a more meaningful analysis. The original 'educational attainment' variable was categorized into many different levels of education, which could complicate the analysis and interpretation. To streamline the analysis and focus on a specific aspect, this variable was recoded into a binary format, indicating whether an individual is highly educated (bachelor's degree or higher) or obtained lower education (below bachelor's degree). The same is done with the variables on the number of kids and employment status. These now indicate whether someone has kids or not and whether someone is employed or unemployed. By doing this, the interpretation and comparison between groups was simplified. Furthermore, this transformation addresses potential issues of overfitting and multicollinearity that might arise from including all the categories separately.

Initial data exploration revealed several observations with negative or zero personal income values. Negative income values likely indicate data entry errors or exceptional circumstances that are not representative of typical economic situations. Therefore, these observations were removed to prevent skewing the results. Subsequently, it was observed that there were an unusually high number of observations with zero personal income, which did not align with the expected number of unemployed individuals. To maintain consistency and data integrity, these zero-income observations were also excluded. This step ensured that the income variable accurately reflects the economic status of the individuals in the dataset, which is crucial for the validity of the logistic regression model. Lastly, due to highly skewed personal income data, the log transformation of the income variable was used in the regression.

Furthermore, age is a critical demographic variable, and its relationship with the outcome variable might not be linear. To better capture the potential nonlinear effects of age, new age cohort groups were created and the minimum age of individuals in the samples was set to 20 years old. These cohorts allow for a more nuanced analysis of how different age groups might influence the dependent variable. Grouping age in this manner facilitates the detection of patterns or trends that may not be apparent when treating age as a continuous variable, thereby improving the robustness of the logistic regression analysis.

For running the logistic regression two primary samples were created to examine the effect of changing house prices on marriage (de)formation. The first sample, referred to as the 'divorce

sample', was limited to individuals who were married in 2020. The binary dependent variable for this sample indicated whether an individual experienced a divorce or separation in 2021. In the second sample, referred to as the 'marriage sample', only individuals who indicated to be single in 2020 are included. Here the binary dependent variable represents whether these individuals got married in the upcoming year. Due to this data preparation, it happened that for some individuals only the 2021 observations remained in the dataset. It was decided to only keep the individuals that showed observations for both years in the dataset. The divorce sample will be used to check for a relationship between the house price changes on divorce, while the relationship between house price changes and marriage will be investigated in the marriage sample.

Furthermore, to analyse the differences between homeowners and renters, subsamples were created. Each primary sample was subdivided based on homeownership status, resulting in two additional subsamples per primary sample. Specifically, within the divorce sample, one subsample consisted exclusively of homeowners, and the other subsample comprised only renters. Similarly, the marriage sample was divided into a subsample of homeowners and a subsample of renters. An overview of the samples that are used in this research can be found in figure 2. The stratification by homeownership status allowed for a more detailed examination of the potential influence of house prices on marriage (de)formation among different forms of tenure.

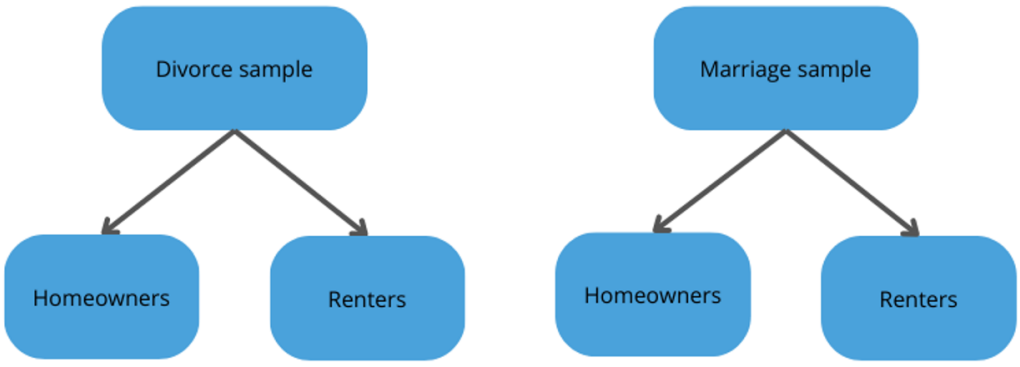

Figure 2: Visualisation of the six different samples used for this research.

Each of these samples were analysed separately to identify patterns and potential predictors of marital transitions, with a particular focus on the role of homeownership. This approach allowed for comparisons not only between the effects on divorced and married individuals, but also between homeowners and renters within each marital transition category. The results of these analyses are intended to shed light on how increasing house prices may correlate with changes in marital status.

3.4 | Data descriptives

The divorce sample consists of 14,842 observations, while the marriage sample has a total of 8,636 observations. The main independent variable (pct_change) shows the percentage change of HPI between 2020 and 2021 for each MSA. Striking to see is that for all MSA's there has been an increase in HPI for this specific time frame. In other words, across all MSA's in the sample the house prices on average went up. The lowest increase was recorded in Odessa, Texas (3.66%), the highest HPI increase was found in St. George, Utah (33.42%). The mean percentage increase in HPI was 18.74% in the divorce sample and 18.56% in the marriage sample. Furthermore, it is interesting to see that significantly more men are represented in the divorce sample, while in the marriage sample this division is a lot more fair. However, in regards of educational attainment there is a much more fair division in the divorce sample compared to the marriage sample, having a lot more lower educated people in the marriage sample than highly educated people. Lastly, the share of renters in the marriage sample also is a lot bigger than the share of renters in the divorce sample. For all the descriptive statistics; see table 1.

Table 1: Descriptive statistics

	Divorce sample				Marriage sample			
	obs	**mean(sd)**	**min**	**max**	**obs**	**mean(sd)**	**min**	**max**
pct_change	14,842	18.74(5.26)	3.659	33.420	8,636	18.56(5.21)	3.659	33.420
log_pearnval	14,842	10.82(0.99)	0.0693	14.457	8,636	10.37(1.02)	0	13.911
marital_status_change								
no change	14,784				8,490			
change	58				146			
age								
20-39	4,336				4,347			
40-64	9,391				3,664			
65+	1,115				625			
sex								
male	8,308				4,105			
female	6,534				4,531			
educational attainment								
low education	7,730				5,723			
high education	7,112				2,913			
presence of kids								
no kids	6,789				6,237			
kids	8,053				2,399			
employment status								
employed	14,514				8,294			
unemployed	328				342			
citizenship								
native	12,280				7,675			
foreign born, US citizen by naturalization	1,366				459			
foreign born, not a US citizen	1,196				502			
tenure status								
owner	12,836				5,661			
renter	2,006				2,975			
Total obs for each sample:	14,842				8,636			

4 | Results

As mentioned earlier, logistic regressions were run in different samples and the theoretically relevant control variables were included in all the models. The results for the two primary samples are shown in table 2. The results of the comparison between homeowners and renters within the two primary samples are given in table 3.

Table 2: Regression outcome baseline models

Variables	(1) Divorce sample	(2) Marriage sample
pct_change	0.9967	0.9927
	(0.0251)	(0.0160)
age_group		
40-64	1.0761	0.8403
	(0.3311)	(0.1499)
65+	1.4486	0.7107
	(0.7924)	(0.2858)
a_sex	1.9496**	0.9373
	(0.5492)	(0.1607)
log_pearnval	0.8642	1.2447**
	(0.1117)	(0.1309)
edu_group2	0.3609***	1.6083***
	(0.3609)	(0.2969)
kids	1.3874	1.9349***
	(0.4018)	(0.3407)
pruntype_binary	1.8309	0.8287
	(1.1105)	(0.4270)
prcitshp		
Foreign born, US citizen by naturalization	0.7573	1.2039
	(0.3967)	(0.4224)
Foreign born, not a US citizen	1.2163	1.5488
	(0.5086)	(0.4797)
Constant	0.0215**	0.0010***
	(0.0354)	(0.0011)
Observations	14,842	8,636
R-squared	0.0343	0.0217

Results presented are odds ratios; standard errors in parentheses; *** p<0.01, ** p<0.05
* p<0.1; dependent variable is change in marital status.

4.1 | Divorce sample

The analysis of the divorce sample aimed to investigate the relationship between changes in house prices and the likelihood of divorce among individuals who were married in 2020. The logistic regression model used in this study included the percentage change in house price index (HPI) as the main independent variable, along with several control variables: age, sex, personal income,

educational attainment, presence of children, employment status, and citizenship status. In the divorce sample, the effect of the percentage change in HPI from 2020 to 2021 on divorce in the same period is not significantly present. This means that increasing house prices did not significantly affect the number of divorces in the sample that included both homeowners and renters. This is in contrast to the hypothesis that soaring house prices would affect a person's financial situation, which subsequently result in an effect on marriage deformation. There can be several possible reasons for why the increasing house prices did not significantly affect the divorce numbers.

Firstly, the economic resilience and buffering mechanisms available to households likely play a crucial role (Clark & Mitchell, 2022). Furthermore, in 2020 and 2021 various government interventions, including stimulus payments, mortgage forbearance programs, and eviction moratoriums, provided substantial financial support to households during a global pandemic (Anderson et al., 2021; Cherry et al, 2021; Leifheit et al., 2021). These measures likely mitigated the financial stress that rising house prices could have imposed. Additionally, many households possess diverse income sources and financial assets beyond housing. Investments, savings, and other resources can buffer the impact of changing house prices (Burrows, 2018), reducing the immediate need to divorce. Therefore, fluctuations in house prices can affect financial stability, but their impact on divorce rates may be mediated by other factors.

Secondly, according to the Family Stress Model (Conger et al., 1990), financial stress can lead to marital conflict and dissolution through increased emotional distress. However, this model also suggests that various moderating factors, such as emotional resilience, social support, and effective coping strategies, can diminish the negative effects of financial stress. Households with strong support systems and effective coping mechanisms may manage financial fluctuations without ending up in a divorce, thereby weakening the overall statistical relationship between house prices and divorce. The overemphasis on economic stress as the primary driver of marriage deformation often is mentioned as a limitation of the Family Stress Model by Conger et al. (1990). This also corresponds to other literature on the complex interplay of socio-economic factors beyond house prices, such as age, income, educational attainment, and the presence of children (Smock et al., 2005; Conger et al., 2010). These factors might have stronger immediate impacts on marriage (de)formation than house prices. Cultural and social expectations, such as the societal norm of homeownership before marriage (DiPasquale & Glaeser, 1999), also can play a role. These norms can vary significantly across different communities and demographic groups, contributing to the lack of a clear statistical relationship.

In the regression results, a significant effect of educational attainment on divorce is found, confirming the role of other factors that influence the dependent variable in this research. Individuals that attained high education (bachelor degree or higher) have a lower chance to get divorced compared to individuals with low education. This result reflects a well-documented phenomenon where higher levels of education are linked to more stable and enduring marriages (Raley & Bumpass, 2003). The result supports theories that emphasize that higher education often is accompanied by higher income, which will result in less financial stress, and thus, less marital instability (Raley & Bumpass, 2003).

4.2 | Marriage sample

The same logistic regression was run in the marriage sample to analyse the effect of changes in house prices on the likelihood of marriage among single individuals in 2020. When looking at the results for the marriage sample in table 2, there is no significant relationship between changing house prices and marriages present. Although the existing theories presented in the theoretical framework posit that a better financial situation increases the likelihood of getting married, this can not be proven by the regression results of this study. A reason for this could be that the house price increasements did not have enough impact on a person's wealth to result in a higher likelihood of getting married. Besides that, as shown in table 1, the marriage sample consists of a much larger share of renters in comparison to the divorce sample. As described earlier, increasing house prices could have a negative effects on a renter's wealth and, thus, result in a lower probability of getting married. This might have played a role in the insignificant regression results.

Another possible explanation for the insignificant results are the delayed effects of increasing house prices on a person's wealth. As was also found by Hu et al. (2023), economic hardships, such as rising house prices, may not prevent marriage but could delay it. Couples might wait longer to marry until they achieve sufficient financial stability and can afford housing. This delay, rather than prevention, can result in an insignificant relationship between house prices and immediate marriage rates. While rising house prices can positively impact a homeowner's financial situation (Farnham et al., 2011), the benefits might not be immediately tangible in ways that directly influence marital decisions (Hu et al., 2023). The process of refinancing a mortgage, securing a home equity loan, or selling a home to realize the financial gains can take time. Therefore, the financial benefits might not be immediately available for couples considering marriage. While increased home equity contributes to long-term financial stability, it doesn't necessarily provide immediate liquidity (Boar et al., 2021). Couples might still face short-term financial constraints that affect their decisions about marriage. Therefore, the

timeframe of this study (2020-2021) may be too short to capture the full impact of house price changes on marital decisions, which often unfold over longer periods.

Similarly to the divorce sample, other factors influencing the decision to get married might play a role here as well and the multifaceted nature of marital decisions must be acknowledged (Smock et al., 2005; Conger et al., 2010). As mentioned earlier, there are many factors from different perspectives that impact the decision for marriage (de)formation. Some of these factors may have an immediate impact while others, for example changing house prices, will have a delayed effect on marriage (de)formation. These dynamics make it hard to grasp a significant statistical relationship. Looking at the regression results in table 2, it appears that the variables educational attainment, personal income and the presence of kids have a significant effect on the probability of getting married. Therefore, this seems to correspond with the multifaceted nature of marital decisions and this likely weighs out the effect of house price increasements on marriage.

4.3 | Homeowners versus renters

To analyse the differences between homeowners and renters, the regression model was run in four other samples as well. The divorce sample and the marriage sample both have been limited to either only homeowners and only renters, creating four new samples. The results are presented in table 3.

When looking at the differences between homeowners and renters regarding the effect of increasing house prices on divorce likelihood, no significant relationship was found for both homeowners and renters. Although different effects were expected based on the existing literature that studied this topic (Farnham et al., 2011), this cannot be proven by the results of the logistic regression performed. For homeowners it was expected that increasing house prices would have a positive effect on a person's wealth. It would have been in line with existing literature that this would lower the probability for divorce. On the other hand, renters would experience negative effects on their wealth, leading to an increased number of divorce. A potential reason for the insignificant result again can be found in economic resilience of households (Clark & Mitchell, 2022). As mentioned earlier, many households have diversified income sources and financial assets. Savings, investments, and other financial resources can act as buffers, cushioning the impact of rising house prices (Burrows, 2018). This economic resilience can prevent financial stress from escalating to the point where it influences marital stability.

Table 3: Regression outcome sub-samples

	Divorce		Marriage	
Variables	**(3) Homeowners**	**(4) Renters**	**(5) Homeowners**	**(6) Renters**
pct_change	0.9937	0.9882	0.9747	1.0301
	(0.0315)	(0.0432)	(0.0201)	(0.0276)
age_group				
40-64	1.0919	1.8614	0.6838*	1.1152
	(0.4307)	(0.9131)	(0.1537)	(0.3318)
65+	1.5167	4.4693*	0.7238	0.5417
	(1.0776)	(3.8695)	(0.3206)	(0.5569)
a_sex	2.0240*	1.9889	0.9954	0.8388
	(0.7280)	(0.9141)	(0.2127)	(0.2469)
log_pearnval	0.8814	0.9369	1.4191**	1.0149
	(0.1434)	(0.2192)	(0.1920)	(0.1715)
edu_group2	0.4486**	0.3551	1.6863**	1.4429
	(0.1696)	(0.2275)	(0.3851)	(0.4790)
kids	1.7666	0.9094	1.9332***	1.8297**
	(0.6659)	(0.4162)	(0.4206)	(0.5570)
pruntype_binary	2.2139	0.9541	0.3727	1.2917
	(1.6446)	(1.0103)	(0.3773)	(0.7962)
prcitshp				
Foreign born, US citizen by naturalization	1.0200	0.3284	0.3646	3.9180***
	(0.6244)	(0.3403)	(0.2625)	(1.6864)
Foreign born, not a US citizen	2.5710**	0.1418*	1.8515	1.1914
	(1.2034)	(0.1472)	(0.7487)	(0.5831)
Constant	0.0074**	0.0318	0.0003***	0.0048***
	(0.0154)	(0.0915)	(0.0005)	(0.0088)
Observations	12,836	2,006	5,661	2,975
R-squared	0.0388	0.0690	0.0385	0.0298

Results presented are odds ratios; standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1; dependent variable is change in marital status.

Especially in the case of renters it may have been of influence that the before mentioned government interventions were at play in 2020 and 2021, due to the pandemic in that period (Anderson et al., 2021; Cherry et al, 2021). Specifically eviction moratoriums must have had a relaxing effect on couples, thus decreasing financial stress (Leifheit et al., 2021). According to the Family Stress Model (Conger et al., 1990) this would then reduce the likelihood for divorce, which might explain the insignificancy of the result. However, it does show how government policies focusing on housing market regulations can affect family dynamics.

When looking at marriage among homeowners and renters, no significant relationship between soaring house prices and the number of marriages is found. Here as well, different dynamics among the two groups were expected based on previous research. House price growth was supposed to have positive wealth effects for homeowners and, contradictory, negative wealth effects for renters. These effects on the financial situation of homeowners and renters was expected to impact the

likelihood of marrying among the two groups, increasing this likelihood for homeowners and decreasing this likelihood for renters. Just like in the divorce sample, it might be economic resilience and government interventions that may have affected the regression results. Besides that, certain government interventions may have helped renters to be economically resilient (Leifheit et al., 2021), which would decrease the financial stress of a couple. However, not enough to find significant increases in marriages. Furthermore, as stated earlier, many different factors influence a decision to marry (Smock et al., 2005; Conger et al., 2010). Therefore, statistically proving the relationship between increasing house prices and marriage can be hampered.

Among homeowners a few variables did significantly affect the chances for marriage (de)formation. A significant impact was found for sex, educational attainment and for not being a U.S. citizen on divorce. Besides that, personal income, educational attainment, age and having kids appeared to significantly affect the likelihood chances for marriage among homeowners. For renters, on the other hand, a significant impacts on marriage was found for being a U.S. citizen by naturalization and having kids. Divorce was significantly impacted by age and not being a U.S. citizen.

5 | Conclusion

This study aimed to investigate the relationship between changes in house prices and marriage (de)formation among U.S. Metropolitan Statistical Areas (MSAs) during 2020 and 2021. Using logistic regression models, the research explored how percentage changes in the House Price Index (HPI) impacted marriage (de)formation while considering various socio-economic and demographic control variables. The findings were contextualized within existing theories, including the Family Stress Model and theories related to financial stability and marital decisions.

The primary finding of this research is that changes in house prices did not significantly affect the likelihood of divorce or marriage during the period studied. This result contrasts with theoretical expectations that soaring house prices would influence financial stability and, consequently, marital decisions. Despite the initial hypothesis, the empirical results did not support a significant relationship between house prices and marital status changes. This lack of significance was consistent across different subsamples, including homeowners and renters. While house prices did not show a significant impact, several control variables did. Educational attainment, personal income, age, and the presence of children were significant predictors of marital status changes. These findings

underscore the importance of considering a wide range of socio-economic and demographic factors when studying marital decisions.

One of the primary explanations for the insignificant relationship between house price increasements and marriage (de)formation is the economic resilience and buffering mechanisms available to households. During the period of study, various government interventions, such as stimulus payments, mortgage forbearance programs, and eviction moratoriums, provided substantial financial support to households. These measures likely mitigated the financial stress that rising house prices could have imposed. Additionally, many households possess diverse income sources and financial assets beyond housing. Savings, investments, and other resources can buffer the impact of changing house prices, reducing the immediate need to alter marital status.

The Family Stress Model (Conger et al., 1990) suggests that financial stress can lead to marital conflict and dissolution through increased emotional distress. However, this relationship is complex and mediated by various factors such as emotional resilience, social support, and effective coping strategies. Households with strong support systems and effective coping mechanisms may manage financial fluctuations without resorting to divorce, diluting the overall statistical relationship between house prices and marital status changes. Moreover, rising house prices may not have an immediate effect on marital decisions, but rather have a delayed impact. The financial benefits of rising house prices, such as increased home equity, may take time to realize. Processes like refinancing a mortgage, securing a home equity loan, or selling a home to access financial gains are often lengthy. Consequently, the financial benefits might not be immediately available for couples considering marriage or divorce. This delay can result in an insignificant relationship between house prices and immediate marital status changes.

Homeowners generally benefit from rising house prices through increased home equity and financial stability, but these benefits might not immediately influence marital decisions due to other financial priorities. Renters, on the other hand, face higher rent costs due to rising house prices, which can squeeze their disposable income. However, financial stress from higher rent may not be sufficient to drive a significant increase in divorce rates, especially if renters have access to social support or government assistance. Additionally, renters' inability to transition to homeownership due to high house prices can delay major life decisions, including marriage and divorce.

Marital decisions are influenced by a complex interplay of socio-economic factors beyond house prices. Age, income, educational attainment, and the presence of children significantly affect

marriage (de)formation. These factors might have stronger and more immediate impacts on marital decisions than changes in house prices. Cultural and social expectations, such as the societal norm of homeownership before marriage, also play a critical role. These norms vary across communities and demographic groups, contributing to the lack of a clear statistical relationship between house prices and marital status changes.

The findings of this study have important implications for policy and practice. The insignificant relationship between house prices and marital status changes highlights the importance of government interventions in mitigating the financial stress caused by rising house prices. Policies such as mortgage forbearance programs and eviction moratoriums played a crucial role in buffering households from the economic impacts of the COVID-19 pandemic. These interventions not only provided immediate financial relief but also, according to the Family Stress Model (Conger et al., 1990), contributed to marital stability by reducing financial stress. Policymakers should consider maintaining and enhancing such safety nets to support households during economic fluctuations. Given the significant effects of socio-economic factors on marital decisions, policies aimed at reducing socio-economic disparities could indirectly promote stability in marriage. Programs that enhance educational opportunities, improve income stability, and support families with children can have positive impacts on marriage. Addressing these broader socio-economic issues can create a more supportive environment for families and reduce the likelihood of marital dissolution.

This study underscores the need for further research to explore the complex relationship between economic conditions and marriage (de)formation. Future research could benefit from longer study periods to capture delayed effects, more granular data to better understand local variations, and comprehensive models that integrate a wider range of socio-economic and demographic factors. Additionally, qualitative research could provide deeper insights into the personal and cultural factors that influence marital decisions, complementing the quantitative findings.

In conclusion, this study reveals no significant relationship between rising house prices and changes in marital status during the COVID-19 pandemic period. The findings suggest that economic resilience, government interventions, delayed financial effects, differential impacts on homeowners and renters, and the multifaceted nature of marital decisions all play roles in shaping marriage (de)formation. These insights highlight the complexity of marital decisions and the importance of comprehensive policies that address both economic and socio-economic factors to support family stability. Further research is needed to deepen our understanding of these dynamics and to inform policies that promote marital stability in the face of economic fluctuations.

6 | References

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Appendix

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