

1. Introduction and Research Question The U.S. housing market functions as a vital economic sector because it determines how much value households retain and how financial stability develops. The discussion about mortgage interest rates as a housing market influencer exists because higher interest rates increase home loan expenses. The relationship between mortgage rates and home prices in actual market data remains unknown. Research Question: Does the U.S. mortgage interest rates impact home price values? The research investigates whether elevated mortgage rates result in decreased residential property values. The research question focuses on a widely accepted relationship which scientists have not proven through basic statistical methods.

2. Data Description and Sources The research uses two monthly datasets which contain U.S. 30-year fixed mortgage rates and U.S. Home Price Index (HPI) data. The mortgage rate data originates from the Freddie Mac Primary Mortgage Market Survey. The Home Price Index data comes from the Federal Reserve Bank of St. Louis (FRED) database. The data merge process followed by missing value elimination and numeric value conversion was performed on both variables. The two data sources maintain high reliability standards although home price data shows patterns from long-term economic trends which basic models cannot detect. The observed relationship becomes less strong because of this factor. Before starting the analysis I merged the two datasets by date and then eliminated all missing data points while converting both variables into numeric format. The two data sources

maintain high reliability standards although home price data shows patterns from long-term economic trends which basic models cannot detect. The summary statistics reveal that mortgage rates exhibit average variability but home prices demonstrate steady price growth. The scatterplot between mortgage rates and home prices lacks a defined linear relationship because time seems to affect their connection.

3. Methodology The following simple linear regression model serves to determine the relationship between mortgage rates and home prices:  $\text{HomePrice}_t = \beta_0 + \beta_1 * \text{MortgageRate}_t + \varepsilon_t$  The model includes an intercept term denoted as  $\beta_0$ . The coefficient  $\beta_1$  shows the effect of one percentage point rate change on home price values. The variable  $\varepsilon_t$  represents all unmeasurable elements which affect home price values. The General Linear Model has restrictions because it requires linear relationships between variables and excludes variables that affect results such as income and construction supply and inflation rates and time-dependent factors. The results become affected by omitted variable bias and non-stationary data patterns in the dataset.

4. Results and Analysis The estimated coefficient  $\beta_1$  shows no statistical significance while being small in value which indicates mortgage rates do not effectively predict home price changes during this time period. The direction of  $\beta_1$  fails to establish a robust negative connection between variables. The residual plot

demonstrates that time-related patterns exist in the data instead of random distribution patterns. The model fails to detect pattern changes because home prices follow extended patterns that do not relate to brief rate adjustments. The research indicates that mortgage rates should influence housing demand, but these rates do not create immediate effects on nationwide home price values.

5. Conclusions The research examined how U.S. mortgage interest rates affect home prices through a basic linear regression model. The analysis reveals an insignificant relationship between the two variables. The research indicates that the U.S. housing market responds more to extended economic factors including income expansion and construction limitations and governmental interventions than to brief changes in mortgage rates. Future research should employ complex models which incorporate multiple variables and time-dependent elements to achieve better results. The research findings demonstrate that this basic model fails to show a reliable connection between higher mortgage rates and lower home prices.

6. References Freddie Mac Primary Mortgage Market Survey (PMMS).

Federal Reserve Bank of St. Louis (FRED) — Home Price Index.