

Housing prices as a benchmark for us economy

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E-574 Applied Econometrics

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Intro

Traditionally, the health of an economy is measured using metrics such as GDP, interest rates, unemployment, and inflation. However, land values offer an alternative lens through which we can assess economic trends. While pure land value data are scarce, housing prices provide a practical proxy, as the land component of property often reflects speculative and cyclical behavior. Historical theories such as Fred Harrison's 18-year property cycle, that suggest land speculation plays a leading role in economic booms and busts. This paper investigates whether land prices, measured via housing prices, can serve as a reliable indicator of broader economic performance in the United States.

Literature review

Studies have explored the role of land in both classical and neoclassical economics. Research by Deaton (2001) and Hirano & Stiglitz (2025) emphasizes the speculative and destabilizing impact of land price surges on long-term economic growth. Empirical studies have linked rising land values to GDP growth, but few have incorporated multiple macroeconomic variables or assessed their forecasting potential. This study fills that gap by analyzing the influence of five key variables on land values and evaluating their predictive power.

Theoretical framework

This research is grounded in macroeconomic theory. GDP growth is expected to increase land values through higher demand. Conversely, rising interest rates typically lower land values by raising borrowing costs. Increases in income enhance purchasing power, often correlating

positively with property prices. Inflation may drive up nominal land prices while simultaneously reducing their real value. Unemployment, by weakening housing demand, is expected to suppress land values.

Model

$$\text{Land Price} = \beta_1 + \beta_2(\text{GDP Growth}) + \beta_3(\text{Interest Rate}) + \beta_4(\text{Income}) + \beta_5(\text{Inflation}) + \beta_6(\text{Unemployment}) + \varepsilon$$

Methodologies

We compiled data from 1982 to 2024 using sources from FRED. Variables were adjusted for inflation when appropriate. An Ordinary Least Squares (OLS) regression was conducted, alongside tests for stationarity (Dickey-Fuller), partial autocorrelation, and residual normality. To address non-stationarity, variables were log-transformed and differenced, helping to reduce spurious correlations. Forecasting methods included Naive and Seasonal Naive approaches, Double Exponential Smoothing, Holt-Winters Additive (with and without log transformation), and Centered Moving Averages.

Results

The initial regression using level data yielded an R-squared of 0.95, indicating a strong historical fit. However, the Dickey-Fuller test confirmed non-stationarity, suggesting that the high R-squared may be misleading. After applying log-differencing, the model's R-squared dropped to 0.13 which is typical for models using change-based data. Among the independent

variables, Real GDP and Interest Rate were statistically significant predictors. Unemployment showed partial significance, while Income and Inflation did not reach statistical significance. Residual analysis supported the assumptions of normality and homoscedasticity. Forecasting with Holt-Winters and exponential smoothing captured short-term dynamics and provided useful confidence intervals. Naive forecasts, though limited in trend detection, served as helpful benchmarks. Log-transformed models yielded smoother and more interpretable results. From a policy perspective we suggest that Land and housing prices can act as early warning signals. Monitoring these prices could improve recession forecasting. Land value taxation or speculative controls might stabilize housing markets. Housing prices, as a proxy for land values, offer valuable insight into economic trends. While traditional indicators remain important, land prices reflect speculative behavior and can serve as both leading and lagging indicators.

References

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