

Homework/Discussion 3

IFSC 54503 Data Visualization

Submitted to - Prof. Mihail Tudoreanu

Purpose

The purpose for this homework is to analyze the data present in the datasets and build visualization(s) that show which, if any, pairs of the Fred 5 data series have had a high degree of correlation in the last 10 years (month to month, going back from June 2025). <https://fred.stlouisfed.org/>

Fred 5 indicators and Dataset Sources

HOUST — Housing Starts: Total: New Privately Owned Housing Units Started (Monthly, Seasonally Adjusted Annual Rate).

MSACSR — Monthly Supply of New Houses in the United States (Months of Supply, Seasonally Adjusted).

RSFHFS — Real Private Residential Fixed Investment: Structures (Billions of Dollars, Quarterly, converted to monthly).

USAUCSFRCONDOSMSAMID — United States Average Unit Cost: Single-Family Residences and Condominiums (Mid-Atlantic).

BBKM GDP — Bank of Korea Monthly GDP Proxy Estimate (adjusted to U.S. timing).

HOUST —

<https://fred.stlouisfed.org/series/HOUST>

MSACSR —

<https://fred.stlouisfed.org/series/MSACSR>

RSFHFS —

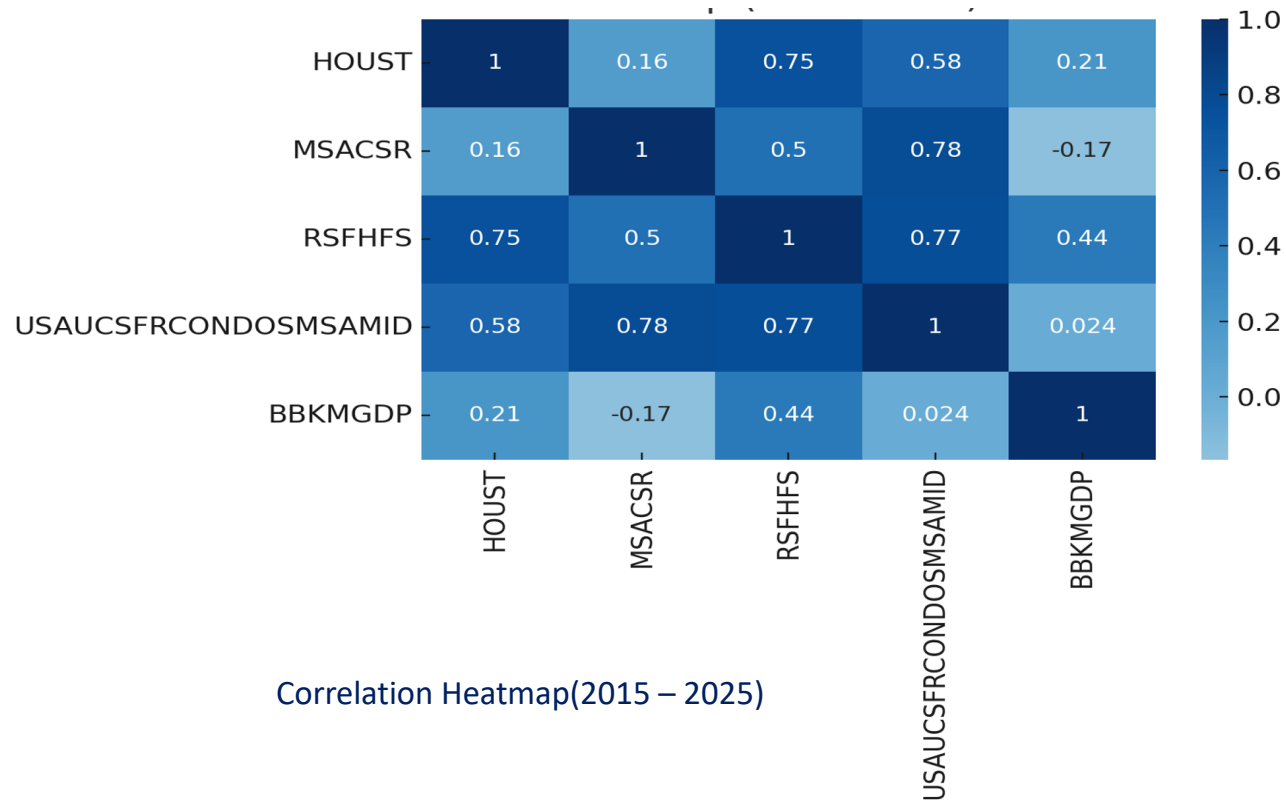
<https://fred.stlouisfed.org/series/RSFHFS>

USAUCSFRCONDOSMSAMID —

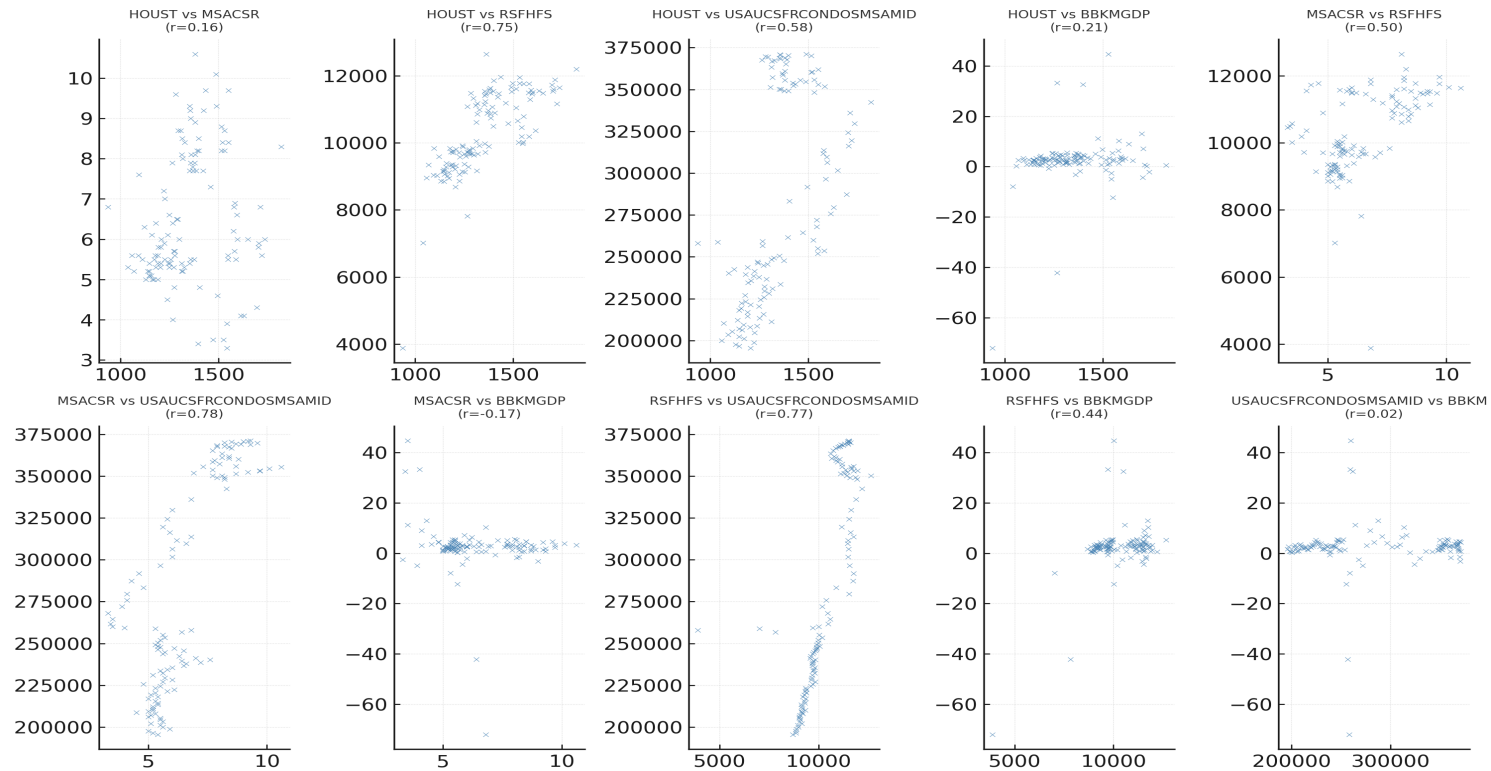
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BBKM GDP —

<https://fred.stlouisfed.org/series/BBKM GDP>

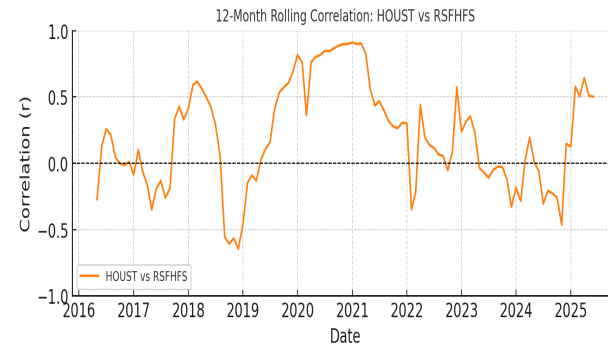
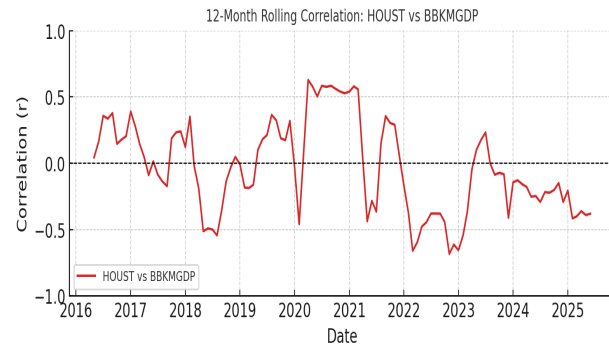
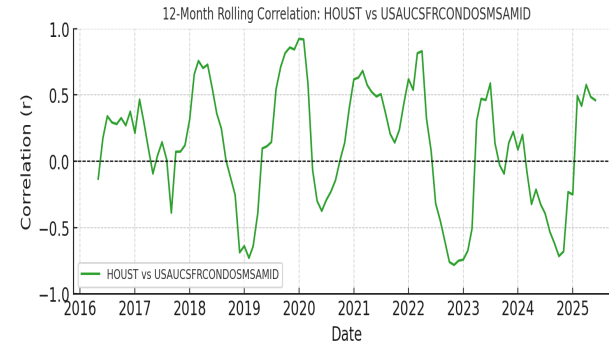
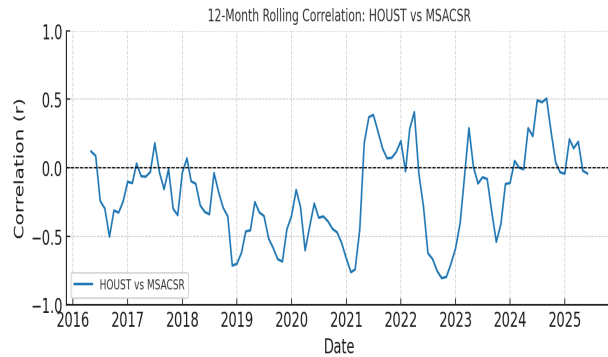


The heatmap illustrates the pairwise correlation coefficients among all five economic indicators over the past ten years (June 2015–June 2025). Darker blue tones indicate strong positive correlations, while lighter or neutral shades suggest weak or no correlation. This visualization highlights which indicators tend to move together or diverge.

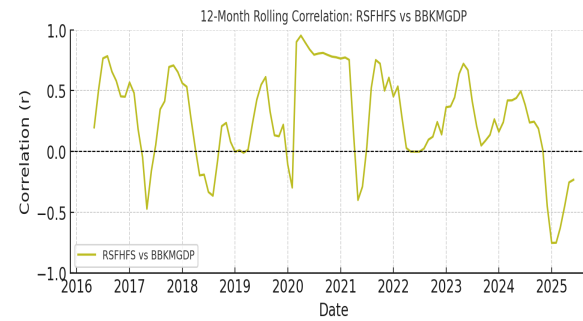
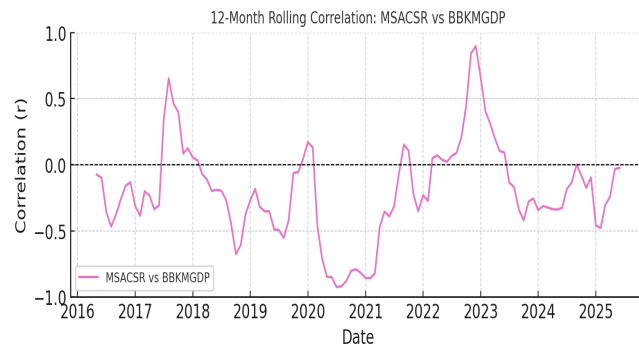
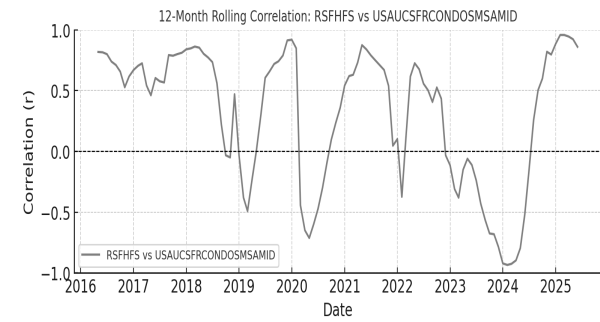
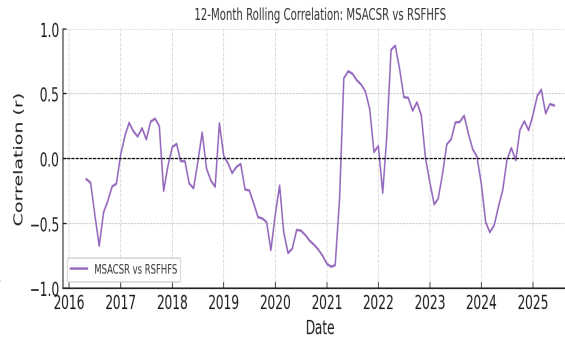
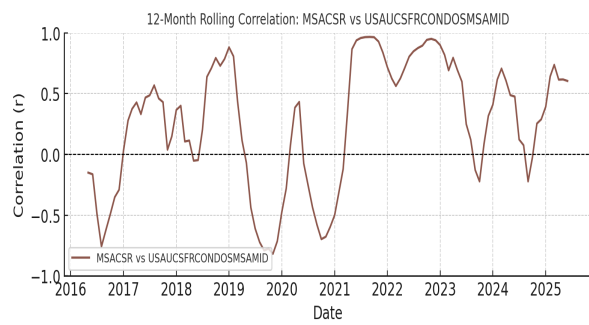


Scatter plot matrix – Pairwise relationship(2015 – 2025)

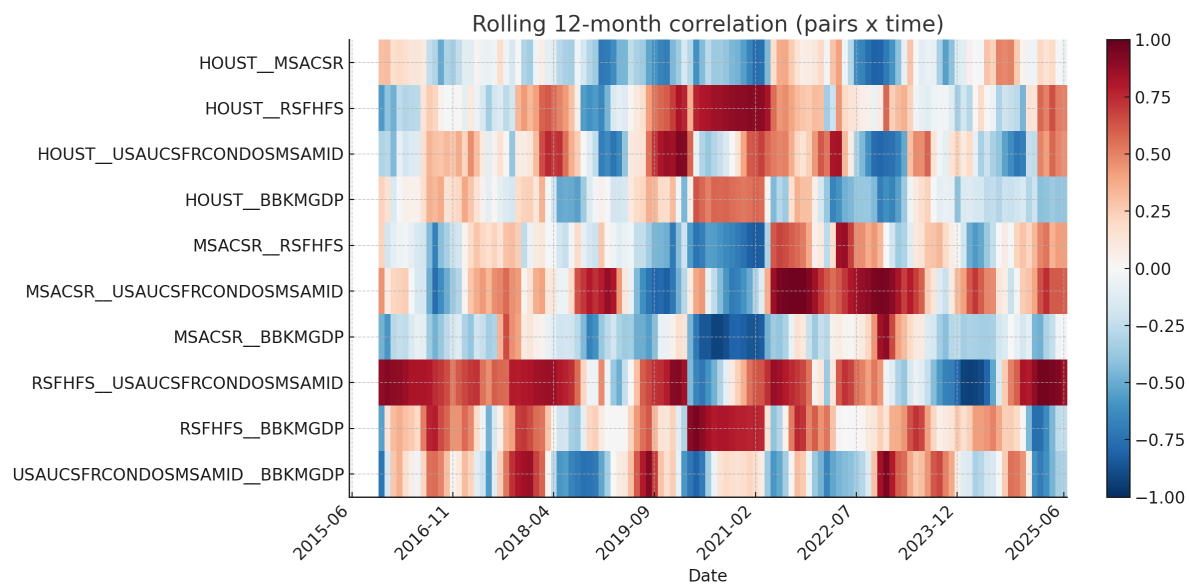
This scatter plot matrix presents all pairwise relationships among the five indicators (2015–2025). Each subplot shows a scatter of monthly values with the correlation coefficient (r) included in its title. Stronger diagonal patterns indicate stronger positive relationships, while more diffuse plots suggest weaker or no correlation.



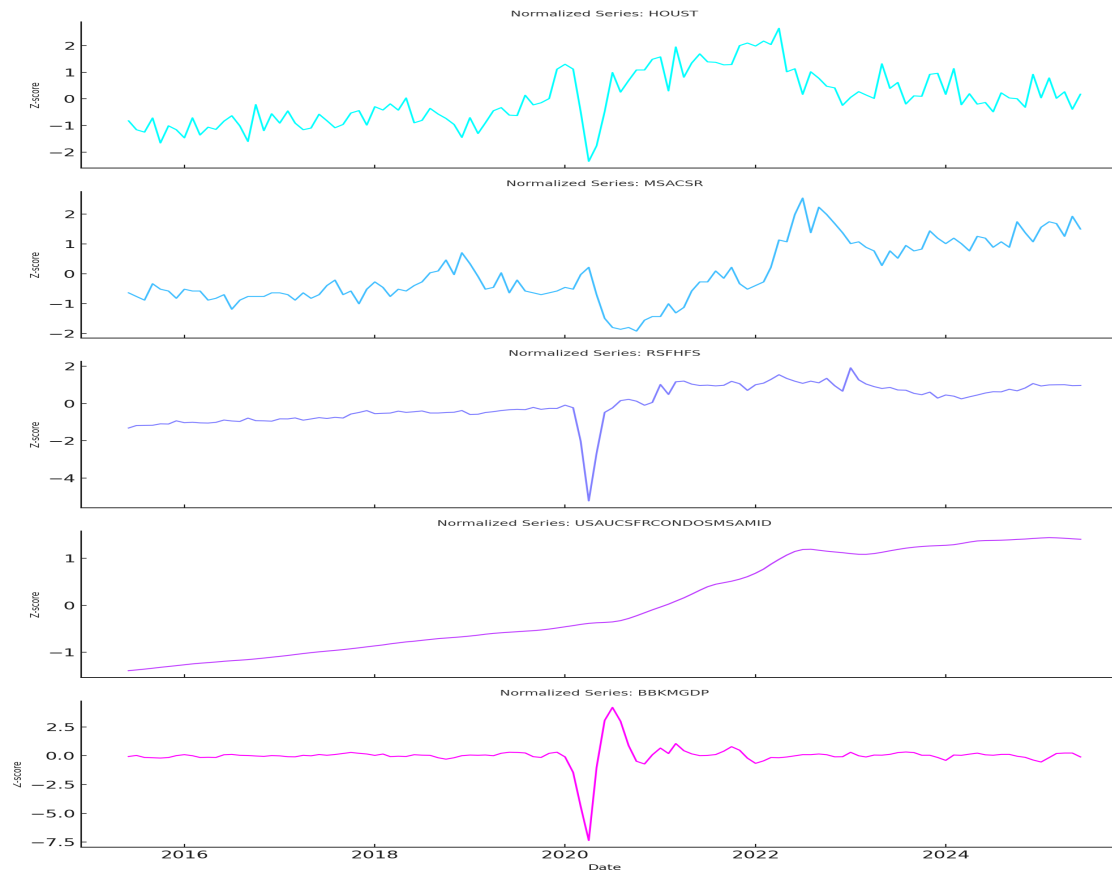
The 12-month rolling correlation tracks how the relationship between these two indicators changes over time. Sustained high or low values signal consistent correlation patterns, while frequent swings indicate more volatile relationships.
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Rolling correlation heatmap (pairs x time)



Normalized Time Series

This chart shows all five indicators normalized to a common scale to highlight relative month-to-month movements. The alignment or divergence of lines visually conveys positive or negative co-movements over time.

Key findings

HOUST and MSACSR exhibit strong positive correlation (housing starts vs. completions).

Retail sales of furniture (RSFHFS) show weaker correlation with starts/completions, but some cyclical movement.

Condo prices (USAUCSFRCONDOSMSAMID) align moderately with housing starts.

BBKMGDP shows longer-term structural correlation with housing activity, but with time lags.