

*PROJECT TEMPLATE ON HOUSING SALES.*

Home construction and sales is highly cyclical, even more than auto sales. A student project may use the following steps to fit an ARIMA process.

Convert housing sales to real dollars (divide by CPI). If the housing sales are in units, not in dollars, you need not convert to real dollars. The Excel work-sheet has sales in units.

Regress housing sales on real per capita personal income. If you use housing sales by state, use state personal income; otherwise use countrywide personal income. The Excel work-sheet has countrywide housing sales.

You may find a leveraged effect: A 3% increase in real per capita personal income causes a 6% rise in new home sales. Fit an ARIMA process to the residuals of this regression.

We speak of built-up demand for new homes. You may compare retail sales of several industries (homes, autos, electronics, furniture, food). Compare the effect of personal income on each industry and the optimal ARIMA model for each industry.

Real per capita personal income is a good explanatory variable, but it is not the only one. You may also use GDP and unemployment rates. But don't use these in combination, or the explanatory variables will be correlated and the regression will not work well.

Housing sales depend on mortgage rates. You may use a multiple linear regression, with real per capita personal income and real mortgage rates as the explanatory variables. You can get mortgage rates from internet sites, or you can use the long-term bond rates as a proxy for mortgage rates.

Housing sales are seasonal. De-seasonalize the data or use a 12 month autoregressive parameter. See the project template on auto sales. Many of the comments about retail car sales apply to home sales as well.

Home sales are sub-divided into "not started," "under construction," and "completed." You can compare the fitted ARIMA process for each series. We expect that sales of homes not yet started depend more on fluctuations in personal income. You can test this hypothesis.