Time-series RV model: Primer

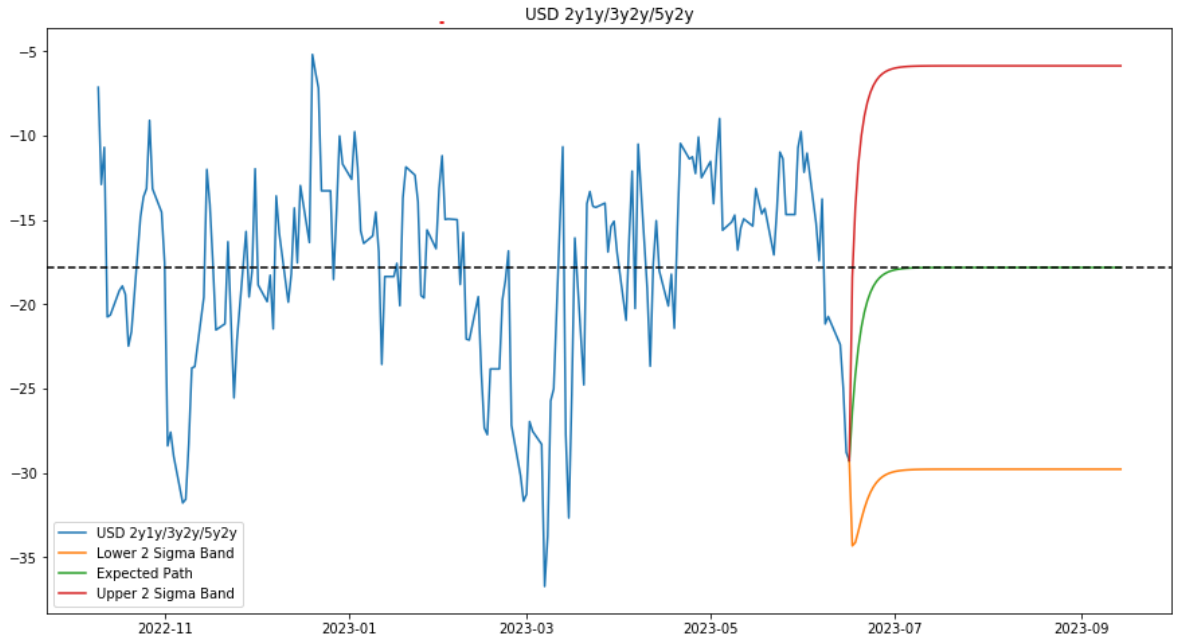
This model aims to find dislocations of trades from their long term averages.

Process:

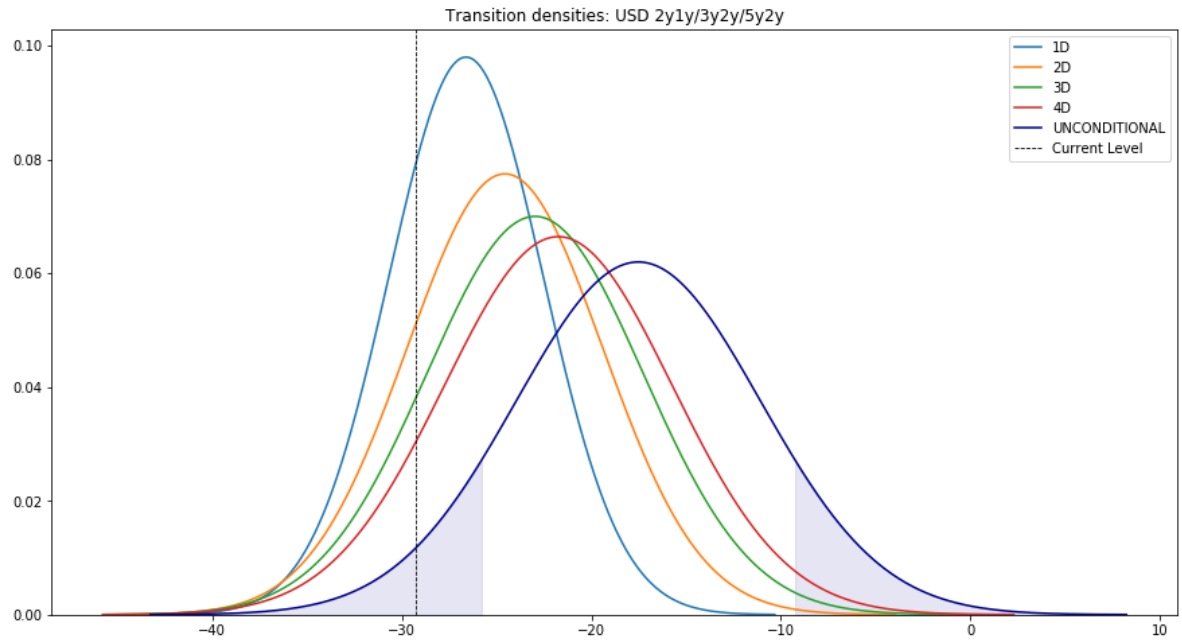
1. We begin with a broader macro filter, choosing to consider curves which are not subject to subject to large macroeconomic flows (such as uncertainty of the monetary policy path in the near term)
2. On the selected curves we have a candidate list of structures that do not trade directionally. These are filtered using time-series statistical tests to ensure the structures are stationary*. Tests are done over various lookbacks to ensure they are robust to sample selection bias
3. The trades that pass this test are then modelled as a mean-reverting process**. The price uncertainty is quantified using a normal distribution, which allows us to use a range of analytics on the trade.
4. Once the model is fit, we produce the following analytics:

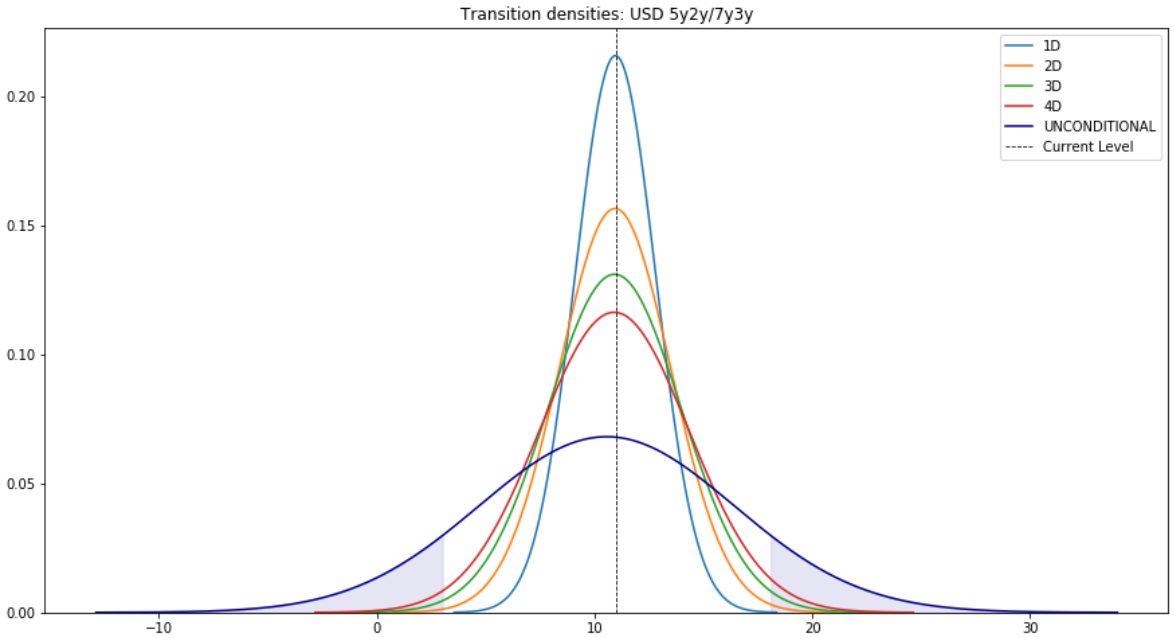
    a. Model summary which includes the current level, model based long run mean, and the half-life. The half-life is the expected number of days it takes for the price to move half the distance between the current level and the model mean.

    b. Forecast future price path, along with a 95% confidence interval for the move



    c. Given that we are using a normal distribution, we can visual the distribution of price move over different time horizons (called conditional densities) as well as over the long run (called the unconditional density). The more the trades are displaced, the more apparent it will be on the conditional v unconditional densities. For illustration note the differences between the forward fly (dislocated) vs the forward curve (not dislocated) . We generally look for the trade to be close to 10% tails of the unconditional distribution (shaded regions).





d. Finally, we choose the target and a stop for the trade and run a simulation. Stop and targets are set to ensure positive expected value. Simulation also gives us an idea of how many trading days, on average, it may take to reach the stop or target.

**a time-series whose mean and volatility do not vary due to time are called stationary series*

***For those interested, the particular process used is an Orstein-Uhlenbeck process.*

DISCLAIMER: All images in the primer are for illustration purposes only