Advantages and Disadvantages of using Monthly, Weekly and Daily Data

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We were asked to share our thoughts on advantages and disadvantages of forecasting at monthly vs weekly vs daily levels.

Monthly:

Advantages – Fast to compute, easier to model, easier to identify changes in trends, better for ***strategic*** long term forecasting

Disadvantages – If you need to plan as the daily level for capacity, people and spoilage of product then higher levels of forecasting won't help understand the demand on a daily basis as a $1/30^{th}$ ratio estimate is clearly insufficient.

Causal variables that change on a frequent basis (ie daily/weekly – price, promotion) are not easily integrated into monthly analysis

Integrating Macroeconomic variables like Quarterly Unemployment requires an additional step of creating splines.

Weekly:

Advantages – When you can't handle the modeling process at a daily level you "settle" for this. When you have very systematic cyclical cycles like "artic ice extents" that follow a rigid curve and not need for day of the week variations.

Disadvantages – Floating Holidays like Thanksgiving, Easter, Ramadan, Chinese New Year change every year and disrupt the estimate for the coefficients for the week of the year impact which CAN be handled by creating a variable for each.

The number of weeks in a year is subject to change and creates a statistical issue due to the fact that every year doesn't have 52 weeks. We have seen the need to allocate the 53rd week to a "non-player" week to make the data a standard 52 week period which is workable, but disruptive compared to daily data.

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Daily:

Advantages – Weekly data can't deal with holidays and their **lead/lag** relationships. If a holiday has days 1,2,3 before the holiday as very large volume a daily model can forecast that while the weekly won't be able year in and year out model and forecast that impact as the day of the week that the holiday occurs changes every year.

Daily data is superior for short-term/medium ***tactical*** forecasting. Days of the week have different patterns which can be identified at this level.
Days of the month also can be identified due to pay schedule.
Long weekends, Fridays before holidays on Monday, and Mondays following Friday holidays can be identified as important.

Particular weeks of the month may have an identifiable pattern for build up in anticipation for pay schedules. You would want to use daily data as financial forecasting is often quite inaccurate when they employ "ratio estimates".

It is quicker at reacting to level shifts and changes in trends as the data is being modeled daily vs waiting a week/month to observe the new data. Companies missed the 2008 financial crises as they were not modeling the data at a daily level.
The goal is not just forecasting, but also about "early warning" detection of changes in business demand.
This detection can be viewed across all lines of business through the use of reporting on level shifts and pulses from a macro view to flag changes.

Disadvantages – Slower to process, but this can be mitigated by reusing models.

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Tags: Tagged in: forecasting daily monthly weekly holidays