

Forecasting Article – Summer 2003

Respond to Changing Demand with the Smoothing Factor

By Bob Duncan CFPIM, Duncan Consulting

[E-Mail Bob](#) for more information

In the last newsletter we introduced the Slanted Charts as a tool for the forecaster to cope in these economically turbulent times. Here is another technique – selecting the appropriate smoothing factor for forecast revision.

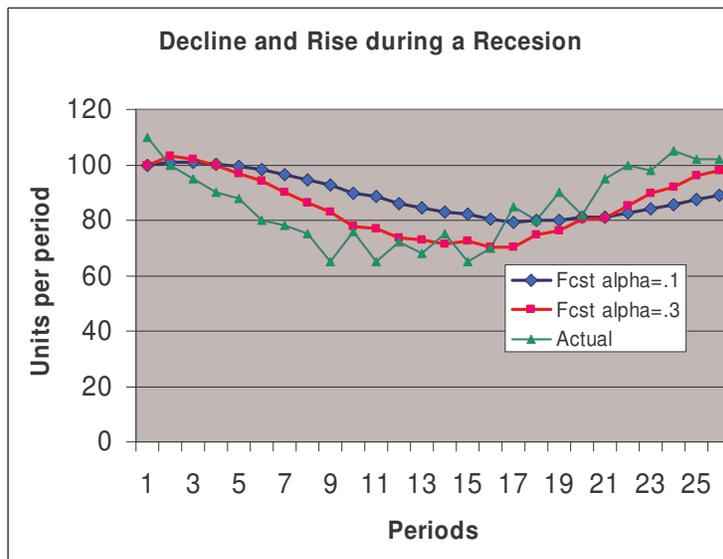
As you know, during the monthly revision process the role of the smoothing factor (SKU.ALPHA) is to slightly adjust the forecast based upon the difference between last period's demand and forecast. The smoothing constant has to balance two conflicting goals:

Be responsive to changing demand ↔ Have efficient, steady supply plans

If the forecast over-responds to the demand, it forces changes in schedules and causes snowballing of other schedules (*cost of stability*). If the forecast under-responds to a change, then either stock-outs or oversupply results (*cost of response*).

In FGS the default smoothing factor is

- For mature products (at least 1 year of history) alpha = 0.10
- For immature products (less than 1 year of history) alpha = 0.25 – This is known as *fast smoothing*.



If demand patterns are radically changing – as you might see going into and out of recession – you might want to consider overriding the default smoothing factor. For example, a SKU may have more than one year of history, but because of radically changing demand patterns it is acting like an immature SKU. You override SKU.ALPHA to be 0.3.

In the graph you see how the **red forecast** using the 0.3 alpha factor tries to catch up with the **green actual** much more quickly than the 0.1 alpha-based **blue forecast**. The higher alpha in this example provides less forecast error. The red forecast with an alpha of .3 has

less error. The error standard deviation for the 0.3 alpha factor is 9.9 compared with an error of 14.5 for a 0.1 alpha factor.

To accomplish this in FGS you can follow the following steps:

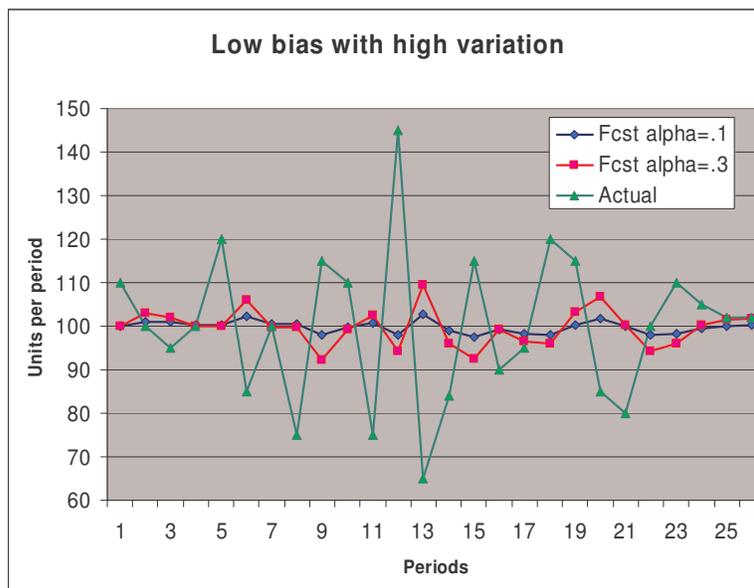
1. Research and identify the SKUs to apply this technique. For example you identify that SKUs in Product line 72 are very subject to recessions and recovery
2. Do an Expression Edit on SKU.ALPHA for those SKUs.
 - a. Path: PARTS,PS
 - b. Conditions: PRODLINE = 72, SKU.ALPHA NE 0.3
 - c. Expression for SKU.ALPHA: 0.3, for example
3. When you do your next revision, the forecast will adapt to the changing market more quickly.

A problem that you will note is that if you refit one of these SKUs, the ALPHA will automatically revert to 0.1. By putting this expression edit in your periodic (usually monthly) revision command – before the revision section, any ALPHAs that were changed during model fit will be changed back to the desired value. When you force these alpha factors, for FGS efficiency reasons, we recommend that they be in multiples of 0.05 (e.g., 0.1, 0.15, 0.2, 0.25, 0.30). Other values work, but are somewhat slower to execute.

Warning – Do not do this for all SKUs!

Remember the “customer” of the forecast is in the supply chain – manufacturing and purchasing. You want to provide good stable forecasts to them. Stable forecasts ensure efficient and stable supply.

On the graph you see how the **red forecasts** using an alpha of .3 seems to overreact to the **green fluctuating demand**. The **blue forecasts** with an alpha of 0.1 react slightly. The **blue forecast with the 0.1 alpha has less forecast error** – 18.3 compared to 20.4 from the red alpha 0.3 forecast.



It is important to monitor these fast-smoothing SKUs to look for the opportunity to take them off of fast smoothing. A tool to help you is the field: SKU.FAST. For every period that the model is on fast smoothing (i.e., SKU.ALPHA > .24), FAST increments by 1. So, if the SKU has been on fast smoothing for 10 months, FAST equals 10. Periodically review SKUs where FAST > some value. This is also helpful as a “birthday” review for no-longer new SKUs.

Link to the [E/Step Software website](#).