



Further Improving the Use of the ECRI WLI

By Dwaine van Vuuren and Georg Vrba

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Last week, we [described](#) how best to use the growth figure of the Economic Cycle Research Institute's Weekly Leading Index (WLI) to predict recessions, but we also highlighted an impediment to our research –an inability of outsiders to replicate the index (and thus know its components) and its “growth figure” which ECRI publishes weekly. Last week, however, the formula to calculate the WLI growth figure (which we will refer to simply as “WLIg”) was found. Armed with that data, we have made further progress to improving the recession-dating performance of the WLI.

Doug Short's last [commentary](#) on this same topic prompted an exchange of e-mails among him, Franz Lischka – he's the person who cracked the formula for the WLIg – Georg Vrba, and Dwaine van Vuuren on how this – fairly arcane and counterintuitive – formula worked and why. Franz's formula has four components, namely a first moving average MA1, a second moving average MA2, a power coefficient n and a constant m. We do not understand why ECRI has kept this formula a secret for so long.

“MA1” = 4 week moving average of the WLI

“MA2” = 53 week moving average of MA1

“n” = 2

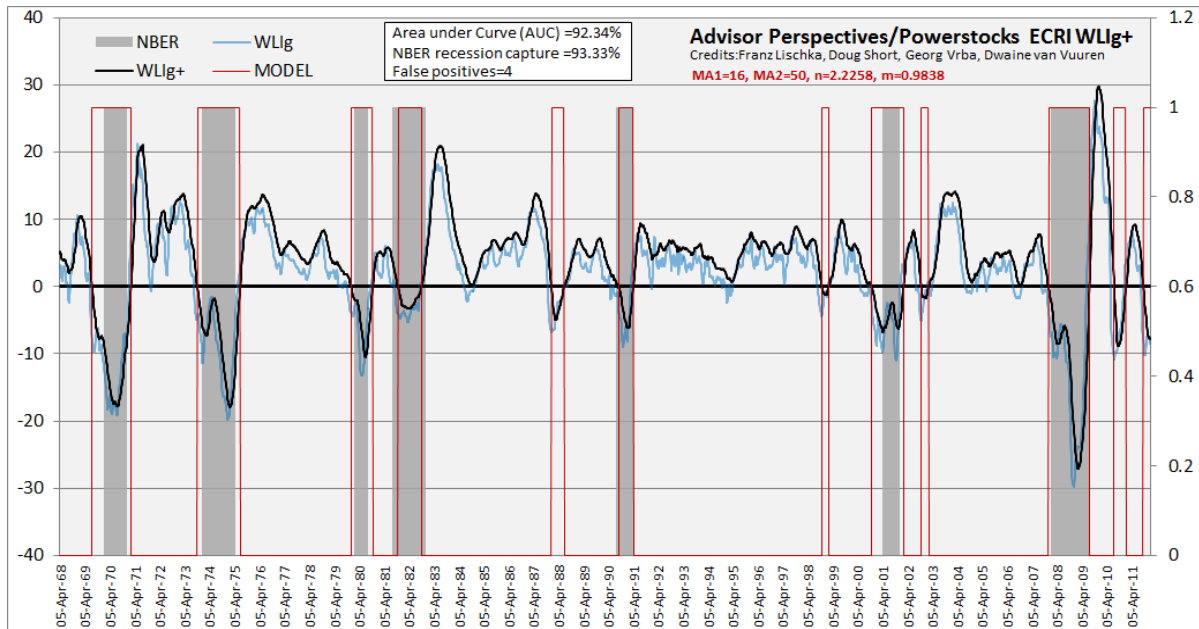
“m” = 1

$$\text{WLIg} = [(\text{MA1}/\text{MA2})^n - m] * 100$$

This produces a virtually identical replicate of the WLIg, with a correlation of 1.0 and an average deviation of 0.0026 from the published WLIg number. As a result of these discussions, we decided it would be useful to perform an optimization on Franz's formula to see if we could obtain better recession-dating performance from a new WLIg derived from the WLI using the same performance measurement methods we described in our previous article. The results were surprising – and quite pleasing.

Those who read last week's article may recall that even our best recession-predicting method with WLIg yielded four false positives. This time around, we found a WLI growth metric (we decided to call it “WLIg+” which uses MA1=16, MA2=50, n=2.2258 and m=0.9838) that raised the area-under-the-curve (AUC) metric from 0.904 to 0.923 and National Bureau of Economic Research (NBER) capture rate from 86.1% to 93.3%. That last change is deceiving – it is actually a *massive improvement*, given that there are only

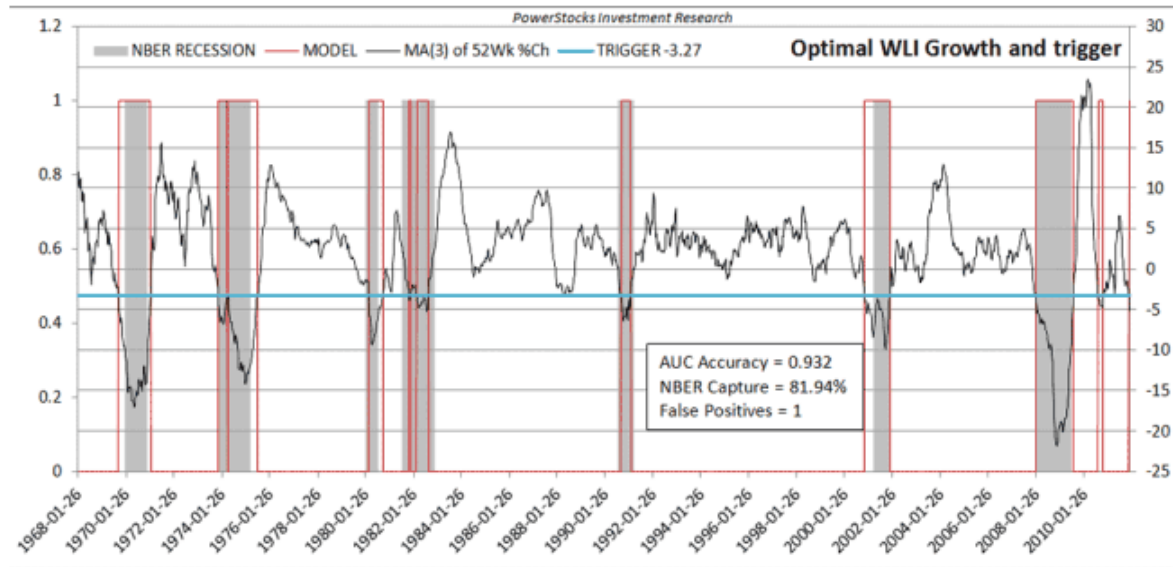
360 weeks of NBER recessions in the last 2,290 weeks of the sample period. The WLIg+ correctly categorized an additional 26 weeks as recession. The resulting “improved” WLIg+ is shown below, together with the original WLIg:



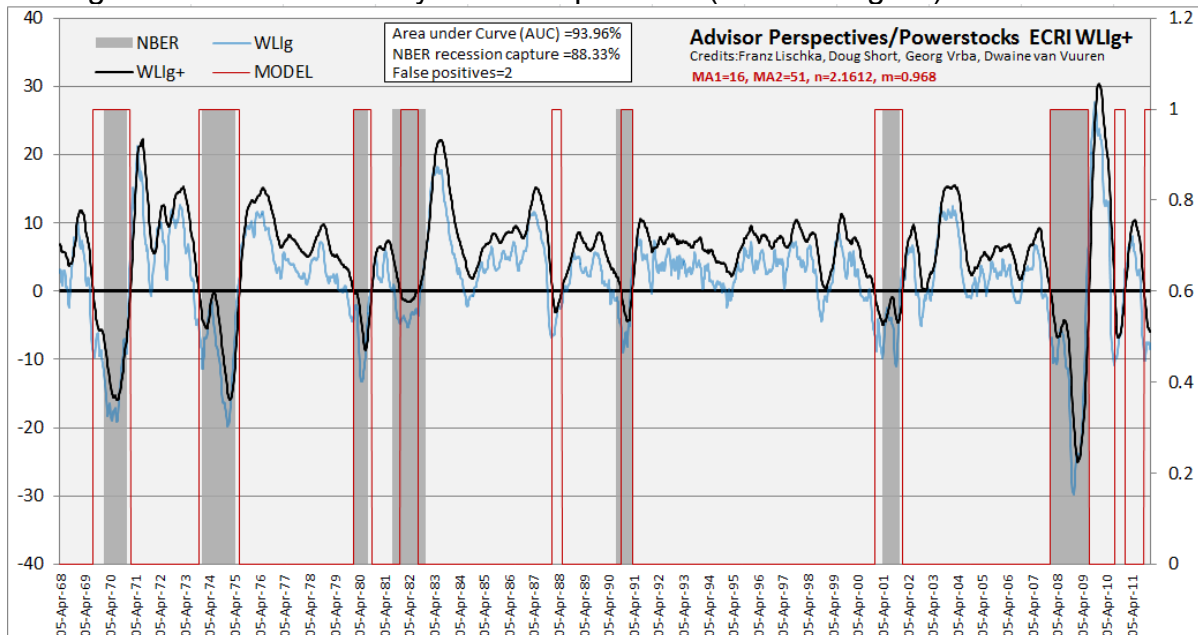
The WLIg+ makes recession calls when it drops below zero, and it calls the end of recessions when it rises above zero. This is another improvement, since one need not remember any ostensibly arbitrary thresholds for triggers (like the -2.638 for the original WLIg). We ignored the last recession signal to the right of the chart when counting false positives, as we cannot yet judge any system until the NBER determines definitively whether we are currently at the beginning of a recession (this takes up to 8-12 months!)

You will notice that this is a much smoother and “lazier” interpretation of WLI growth.

In our prior article, we showed how taking a three-week moving average of the 52-week percent change of the WLIg produced a recession forecasting/dating system with only one false positive. We will call this WLIg+1 as shown below:



While we could not replicate a suitable “one-false positive” version of the WLIg+, we did manage to build one with only two false positives (call it “WLIg+2”) :



Conclusion

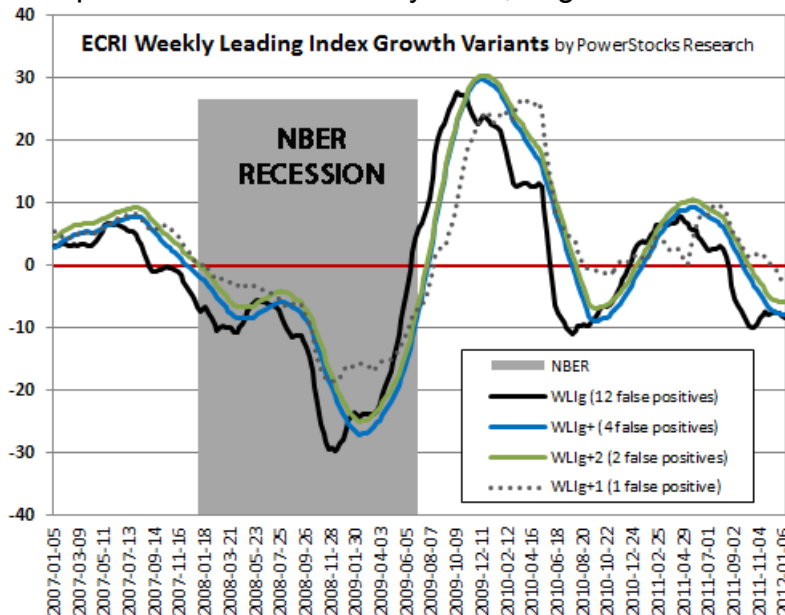
Professor Geoffrey Moore, in his later work "Leading Indicators for the 1990's," laid out in detail his 1980's research into long and short leading indicators, and he also suggested a high-frequency Weekly Leading Index, which, while slightly less reliable, could be updated in a much more timely and frequent fashion. For excellent coverage of a project to



replicate the WLI and discover its components (which remain proprietary to this day), see [an examination of the model for ECRI's black box](#).

Many observers, rather unfairly, compare the WLI to monthly LEIs, such as the Conference Board's. The ECRI WLI, which is a follow-on from Prof. Moore's work, will no doubt use a number of high-frequency components that many of the standard monthly LEIs will not, and its motivating spirit – to be a high-frequency more timely index that may be less accurate – means we should not condemn the WLI too harshly for false positives. The strong point is its generous lead time going into recessions. The WLI never was intended to be the sole arbiter of recession dating, and ECRI itself uses many longer leading indicators in conjunction with the WLI.

For this reason, we suggest the use of the WLI in a three-step process: First observe the WLIg falling below zero as a warning of possible risk of recession in the future. Then monitor WLIg+ for a 2nd opinion. If both WLIg and WLIg+ are in recession territory you could then consult with WLIg+2 for a third confirmation. If you have 3 confirmations, your last step is to consult with WLIg+1. The four WLI growth indices are shown below as at data published on 13 January 2012, to give an idea how this works:



As you can see from the chart above, you sacrifice a few weeks waiting for further confirmation, but you reduce your odds of actioning a false alarm. You can also see that all four WLI growth variants are camped in recession territory (below the zero line). While this is a fairly serious warning, one should never rely on one indicator for a proper action plan around recession avoidance. More appropriate would be a composite approach, such as our Composite SuperIndex [methodology](#). In this model we use nine indicators, and only the WLI is flagging recession currently.



The WLI is a great tool, and – with the WLIg+ growth variants we described above – it is even more useful for assessing recession risk. But, much like the method it improves upon, it remains subject to false positives.

Addendum

At the time of writing we were not aware that the actual formula to calculate WLIg was described in a 1999 article published by Anirvan Banerji, the Chief Research Officer at ECRI: The three Ps: simple tools for monitoring economic cycles - pronounced, pervasive and persistent economic indicators.

Here is the exact formula we derived from this article: (slightly different to the one we used in this article)

"MA1" = 4 week moving average of the WLI

"MA2" = moving average of MA1 over the preceding 52 weeks

"n"= 52/26.5

"m"= 100

WLIg = $[m \cdot (MA1/MA2)^n] - m$

The above provides a deviation of 0 versus our original formula that had an average deviation of 0.0026 from the published WLIg. The differences are negligible between the 2 formulas but the more recent one is a 100% mathematical match. Due to the close match of the 2 formulas, everything we have discussed in this article regarding the use of the WLIg+ growth variants for recession detection/forecasting still holds.

Dwaine van Vuuren is CEO of PowerStocks Investment Research, a South African-based provider of investment research. If you would like to receive the next 4 weeks SuperIndex Recession Reports for free, just email us at research@powerstocks.co.za with FREE SUPERINDEX in the subject line.

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