How Far into the Future Can Economic Forecasters Actually See?

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The current expansion is getting long in the tooth.

We are in the 38th quarter of the expansion and only one of the previous ten expansions has lived so long, and it perished in the 40th quarter. There is thus a lot of talk lately about a recession in the near future, mostly based on the belief that for both humans and economic expansions old age is an early warning sign of death soon to come.

Another view is that what causes death is not age but excessive consumption of hamburgers, fries and opioids for humans and excessive consumption of homes and cars for expansions.

In the case of humans, it's the parents that get the problems rolling with candy bars and hamburgers and fries for youngsters. In the case of expansions, the parents are the members of the FOMC who dish out low interest rates early in the expansions in an attempt to fatten up the economy following the lean years known as recessions.

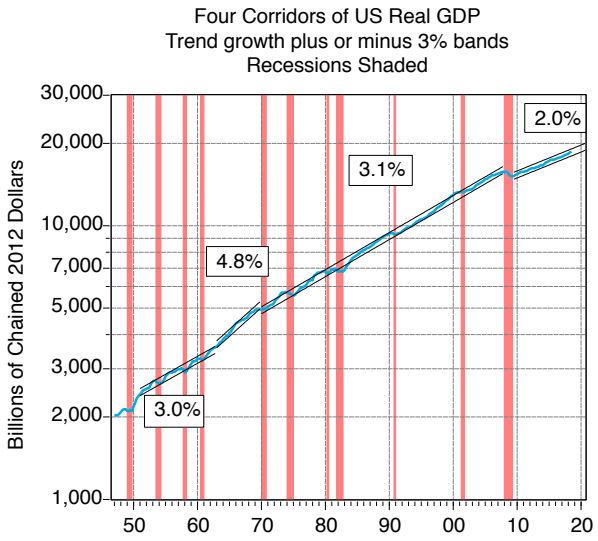
Many a wag has opined that expansions do not die of old age, they are murdered by the Fed when it increases interest rates. An alternative view is that it is not the policies at the end of life that are the problem. It's the hamburgers and fries and low interest rates that are dished out to youthful humans and youthful expansions that set the stage for a fragile elderly life. According to this view, if humans and expansions maintain their youthful fitness, they can live on and on. The economy seems pretty lean still. I feel the same way.

In this document I will shed light on these issues by offering estimated probabilities of recessions in the next two years based on econometric models that include age as one variable but also measures of adverse Fed interest rates policy and excesses in the housing market. We will discover if age matters, and what patterns of interest rates and building permits cause concern.

Images of US Real GDP

Figure 1 illustrates US real GDP from 1947 to 2018q3, with a logarithmic scale that turns constant rates of growth into straight lines. Layered on top of the wiggly real GDP data are four narrow corridors of constant growth with width +- 3%. In the decade of the 1950's US real GDP was growing at the rate of 3.0% but the economy shifted into high gear early in the 1960's when growth jumped up to the 4.8% pace. That did not last long, since around 1970 the US economy reverted

Figure 1 Corridors of US Real GDP



back to 3.1% growth, and stayed at that rate for almost 40 years. But in the aftermath of the recession of 2008/09 the US economy slowed down substantially to the 2% rate. One thing that macroeconomists should be explaining is why the US economy experiences these rapid transitions from one rate of growth rate to another and why the rate of growth is so constant for such long periods of time.

Another feature of Figure 1 is the occasional collapse of real GDP down to the bottom of the growth corridor. These are the recessions. Macroeconomists should be explaining why the US economy experiences these occasional dips in real GDP, and when the next one is likely to occur.

Figure 2 offers a different view of the same data, with the twelve expansions laid on top of each other and with the current expansion displayed as if it ended in 2018q4, the last quarter of data at the date of writing. The end (cycle peak) dates of these expansions are the labels in the legend to the right. If this expansion survives the winter and spring quarters of 2019 it will tie the Bush/Clinton expansion of the 1990's for the longest ever.

The dashed line in the midst of all these expansions represents a 3% rate of growth. Looking at the left in this figure reveals that the last two expansions ended short of that 3% goal, although late in the 1990's a surge of growth from the Internet supported growth rates in excess of 3%. The current expansion is not over yet, but the growth so far has been only 19%, compared with 31% if the 3% goal had been attained. So here is an idea: maybe we should measure the age of an expansion by the cumulative increase in real GDP. By that measure, six of the eleven expansions lived longer than our current one. Still plenty of growth to go, perhaps.

Images of Recession Precursors

Next we turn to recession precursors.

The Index of Leading Indicators has ten components, but here I will use only the two components that have clearly demonstrated their ability to warn of recessions soon to come: the slope of the yield curve, and the number of building permits. Out of deference to the current conversations, I also will include the age of the expansion.

Figure 2, which has already been mentioned, illustrates the GDP data in a way that helps answer the question: can these GDP data be used to predict recessions? The recession data

Figure 2 US Real GDP During Twelve Expansions

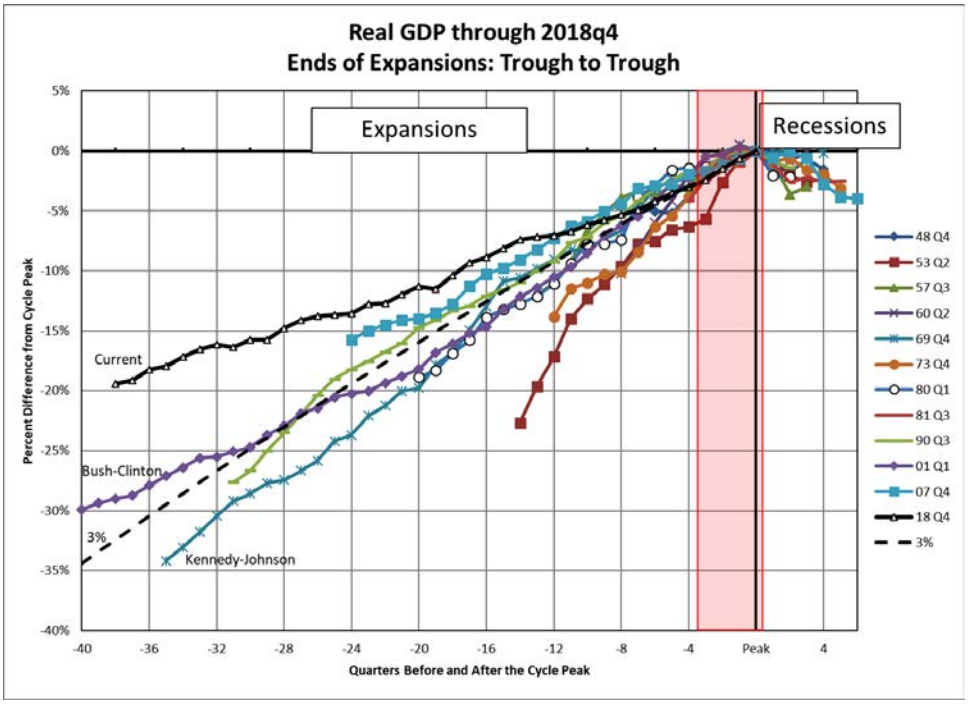
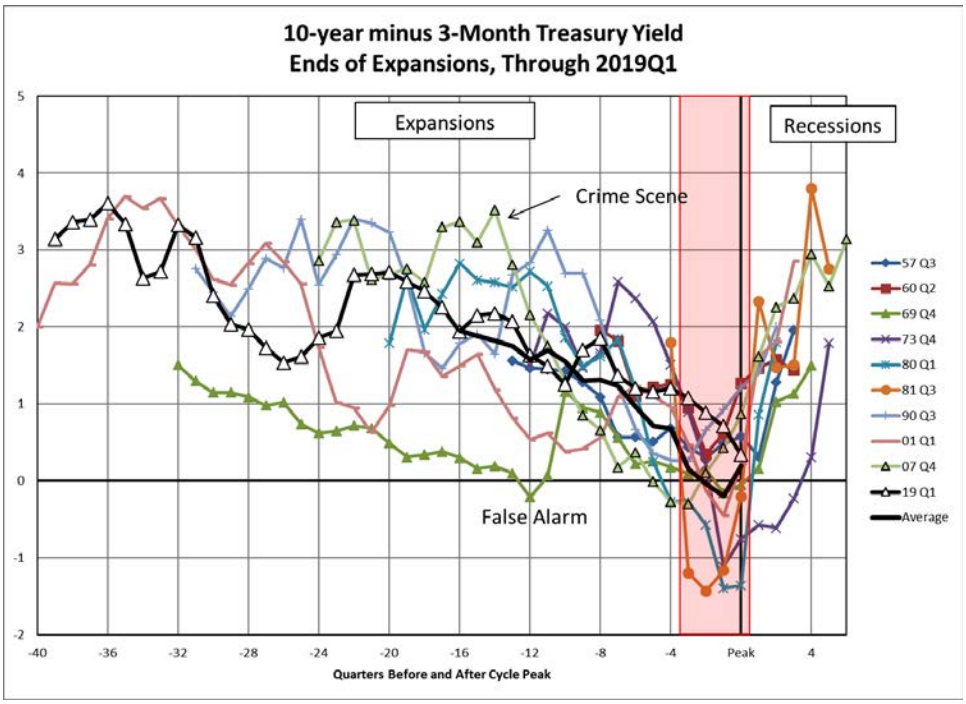


Figure 3 Slope of the Yield Curve Over Ten Expansions



on the right of the figure are separated by a vertical line that marks the last quarter of the expansion. The shaded area that extends to the left of that vertical line captures the four quarters before the recession.

Can you see anything different in the shaded region compared with a year or two earlier. Does the economy go into "stall speed" with slower growth before the negative growth of the recession, as many commentators presume? You will need some special glasses to see that if it is there. Clearly, there is not much in the GDP data on which to base an alarm of a soon-to-come recession.

But take a look at Figure 3 which has the same design but uses data on the slope of the yield curve equal to the 10-year Treasury yield minus the 3-month Treasury yield, annualized. Here we see what looks like a very accurate alarm: an inverted yield curve with the 10-year yield less than the 3-month yield seems like a very reliable indicator of a recession to come within a year. This is not a market move in interest rates. This is the Fed increasing short-term rates out of fear of inflation with little or no effect on the ten-year yield.

This image is pretty clear circumstantial evidence that the Fed has murdered our recessions, but perhaps a more accurate metaphor would be "accidentally run over an unsuspecting pedestrian in the crosswalk while distracted by a billboard with the word "INFLATION" in bold red letters." The words "Crime Scene" three years before the recession when the spread exceeded 300 basis points are designed to suggest that the Fed has often held interest rates too low for too long, and produced an overinvestment in homes, durables and automobiles which require a Hayekian time-out for the economy to catch up, aka a recession.

From the ten expansions illustrated in Figure 3 I have extracted three for Figure 4, the current one, and the ones that ended in 1969q4 and 2001q1. Here I am searching for something to offset the alarming news in the current data which has the slope of the yield curve diving toward zero. Might this be a false alarm? The expansion of the 1960's has a false alarm when the yield curve inverted, and the Fed quickly addressed the problem and boosted the spread above 100 basis points. Alas, however, another inverted yield curve came in 1969 and the recession followed two quarters later. The path of the spread in the 1990's was like a drunken

Figure 4 Slope of the Yield Curve Over Three Expansions

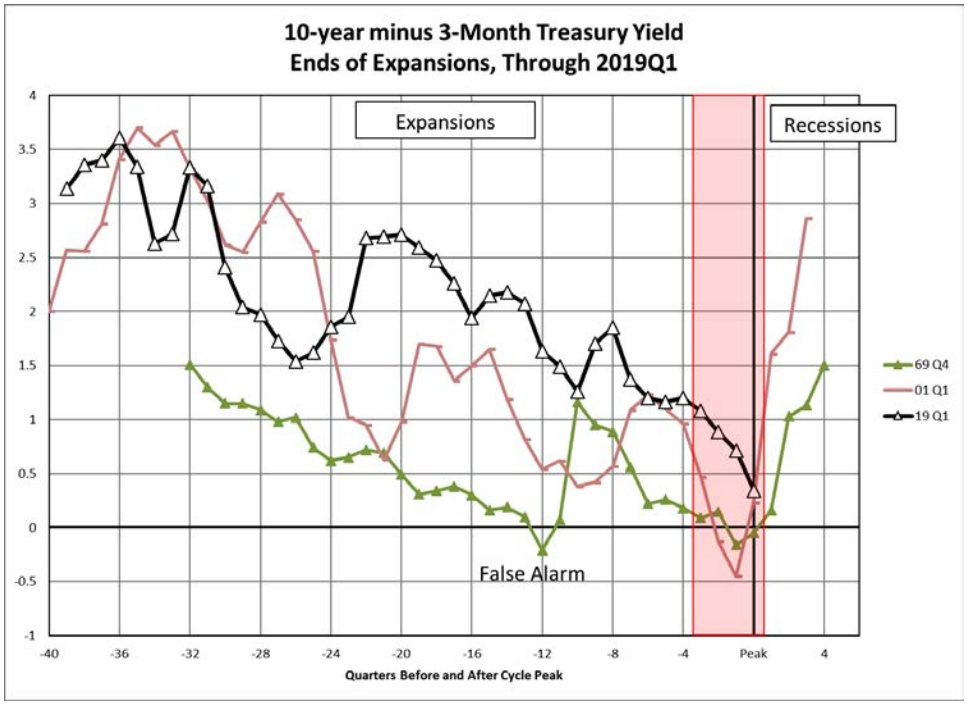
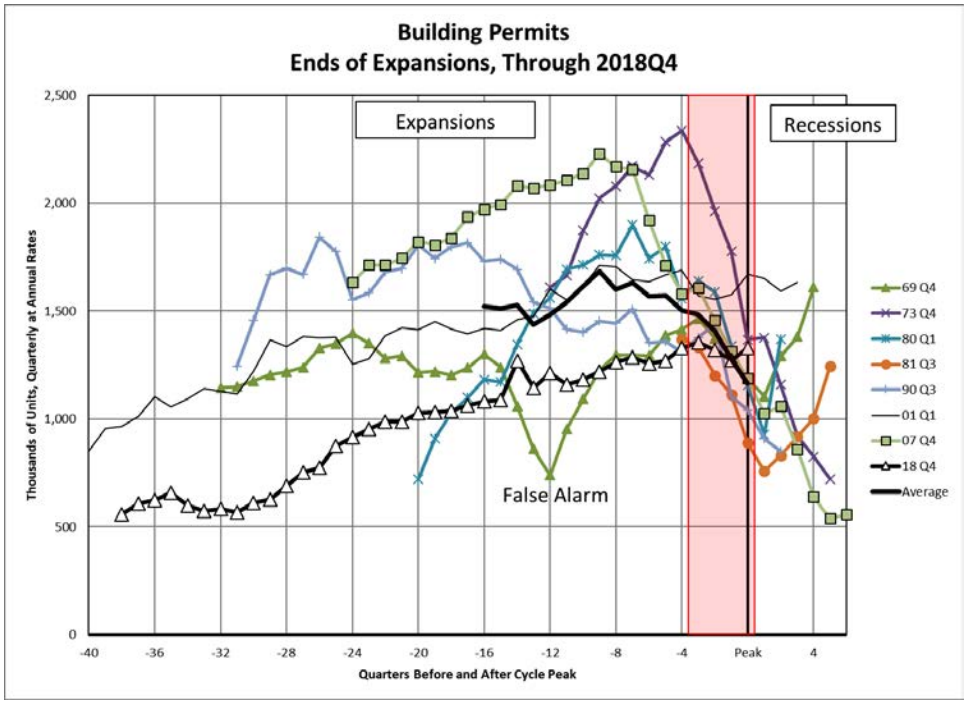


Figure 5 Building Permits OVer Nine Expansions



sailor staggering down and up toward the inversion crisis. The current expansion has it's own meandering path toward inversion. Why do our monetary authorities do this???

Figure 5 illustrates the other variable we will study: Building Permits. In only one of previous cases did permits get through the (shaded) year before the recession without collapsing – that was the expansion that ended in 2001q1, illustrated in the figure with a thin black line. Housing then wasn't in an obviously overbuilt situation. What was overbuilt then was equipment and software that was used for prospecting for gold in the streams washing down from the Internet. Housing is not in an obviously overbuilt situation now.

Probit Models for Assessing the Probabilities of Future Recessions

Next we turn to the power of econometrics to help identify what matters.

Table 1 reports an estimated Probit model with a binary dependent variable that identifies the 12 months preceding the recessions. The explanatory variables that are used to identify this period are building permits, the spread between the 10-year yield and the 3-month yield and the age of the expansion. The data set omits the recessions and the first two years of the expansions, which is designed to exclude

Table 1 Forecasting a Recession Next Year Using the Spread, Building Permits and Age

Dependent Variable: REC_12MO_BEFORE				
Method: ML - Binary Probit (Quadratic hill climbing / EViews legacy)				
Date: 02/23/19 Time: 16:50				
Sample: 1946M01 2020M12 IF RECESSION=0 AND EXPANSION_YEAR1=				
0 AND EXPANSION_YEAR2=0				
Included observations: 429				
Convergence achieved after 6 iterations				
Coefficient covariance matrix computed using second derivatives				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-1.650	0.513	-3.22	0.0013
SPREAD(-6)	-1.016	0.165	-6.16	0
PERMIT1	0.001	0.000	3.10	0.0019
PERMIT1-PERMIT1(-12)	-0.002	0.000	-5.07	0
EXPANSION_AGE	0.004	0.004	1.07	0.2855
McFadden R-squared	0.3979	Mean dependent var		0.193
S.D. dependent var	0.3955	S.E. of regression		0.313
Akaike info criterion	0.6149	Sum squared resid		41.533
Schwarz criterion	0.6622	Log likelihood		-126.89
Hannan-Quinn criter.	0.6336	Deviance		253.78
Restr. deviance	421.47	Restr. log likelihood		-210.73
LR statistic	167.69	Avg. log likelihood		-0.296
Prob(LR statistic)	0			
Obs with Dep=0	346	Total obs		429
Obs with Dep=1	83			

Figure 6 Recession Probabilities for Subsequent Year, Based on the Spread, Building Permits and Expansion Age

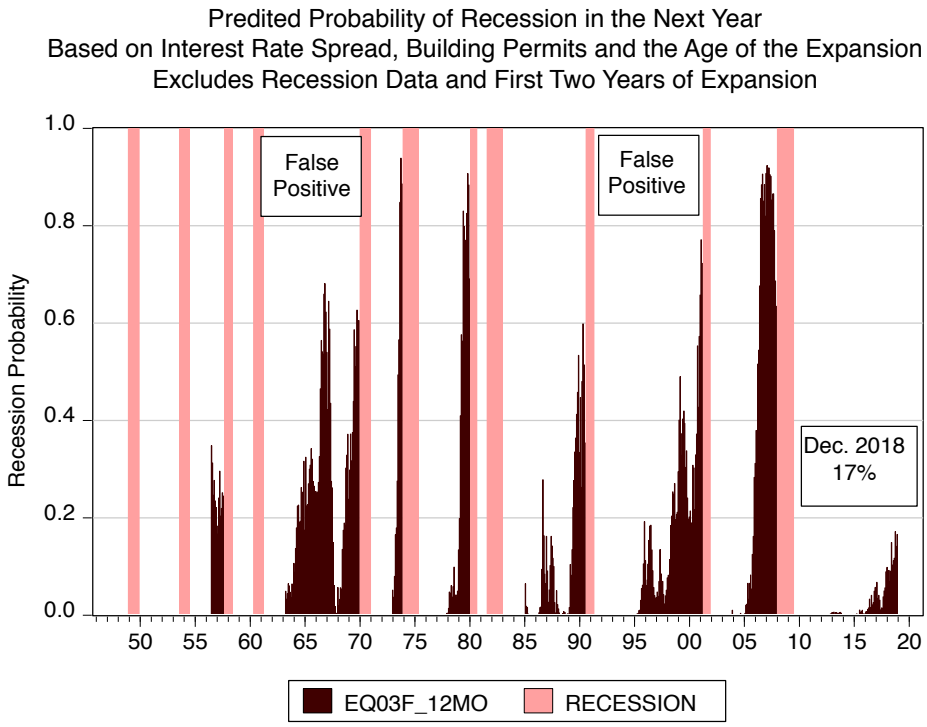
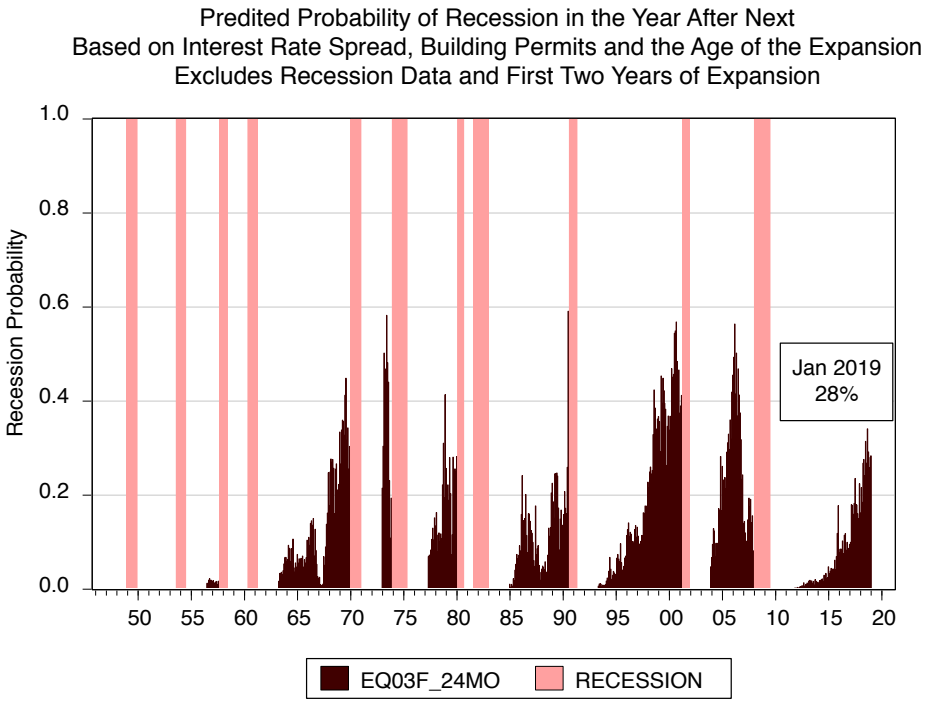


Figure 7 Recession Probabilities in the Year After Next, Based on the Spread, Building Permits and Expansion Age



the recession with negative growth and the recoveries that typically has unusually strong growth, a steep yield curve and little prospect of a recession to come. We don't want that experience to affect our assessment of the current situation which is late in an expansion, not early.

An initial probit regression model was estimated using the spread and building permits current values, lagged one month, six months and twelve months. The results in Table 1 but with some of the dependent variables omitted or redefined, with statistically insignificant variables omitted. Here we see some things we expected to see as precursors of recessions: a flat or inverted yield curve, and building permits that are high and declining. The age effect is small and statistically insignificant. (That makes me feel better.) Figure 6 has the predicted probabilities based on this model. If the model is successful these would elevate toward one in the years before recessions, and would hold close to zero otherwise. Per the numbers at the bottom of Table 3, 83 of the 429 months in the data were in the year before recession. Thus the background probability is 83/429 = 19%. For December 2018, we have only a 17% recession probability in the subsequent twelve months, less than the background risk What about the year after next? Table 2 reports a probit model for predicting the commencement of recession after 12 months into the future but before 24 months. For this longer term prediction, the current spread has a smaller impact than for the shorter term model in Table 1, and age is more important, and permits have a different role. For short term forecasting, high and declining permits are the problem. For longer term forecasting it is high and growing permits that create risks of future recessions.

Figure 7 illustrates the predictive probabilities of recessions in two years based on the model in Table 2. In contrast to the first-year case illustrated in Figure 6, these second-year predictive probabilities never get very high, and in January 2019 the probability is only 28%. The future is very blurry, even just two years from now.

Conclusions

Recession risks.

- The probability of a recession beginning in one of the twelve months after December 2018 is 17%, compared with a background risk of 19%.
- The probability of a recession beginning in the twelve months of 2020 is 28%, compared with a background risk of 15%

These probabilities are likely to increase when we get the building permits data through January 2019 when the interest rate spread fell to 34 basis points from 46 basis points in December 2019.

Age

- The age of the expansion is not a significant factor for assessing the recession risk one year into the future, but does play a significant role in forecasting the second year and the combined two years. This is illustrated in two figures which have estimated recession probabilities with and without the aging effect, Figure 8 for next year and Figure 9 for the year after next. Each of these has a blue line for the model's estimates and a red line with the coefficient on age set to zero. These two lines are virtually indistinguishable for the next year estimates but for the year after next much of the elevation of the probabilities is due to the aging effect. If there were no aging effect and the other effects stayed the same, then the estimated probability of a recession in the year after next would be virtually zero in December 2018.

The interest rate spread

- A steep yield curve lowers both the first-year and the second-year recession risks, with the greatest effect for the first-year forecast and less for the second-year forecast.

Building Permits

- For the first-year ahead forecast, the recession risk elevates if permits are high and declining.
- For the second-year ahead forecast, the recession risk elevates if permits are high and growing higher.

It is declining permits that tells us the recession is imminent and it is high and growing permits that lay the foundation for periods ahead of high and declining permits

Figure 8 Next Year Probabilities, With and Without the Aging Effect

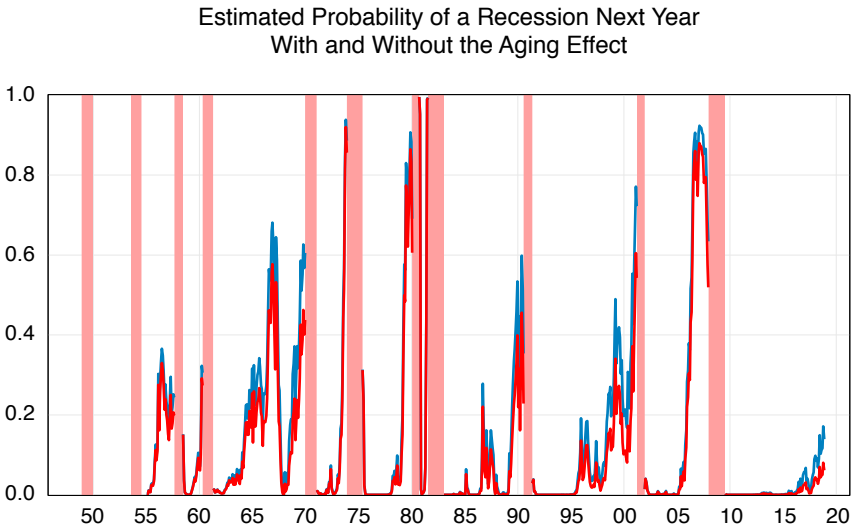


Figure 9 Year after Next Probabilities, With and WIthout the Aging Effect

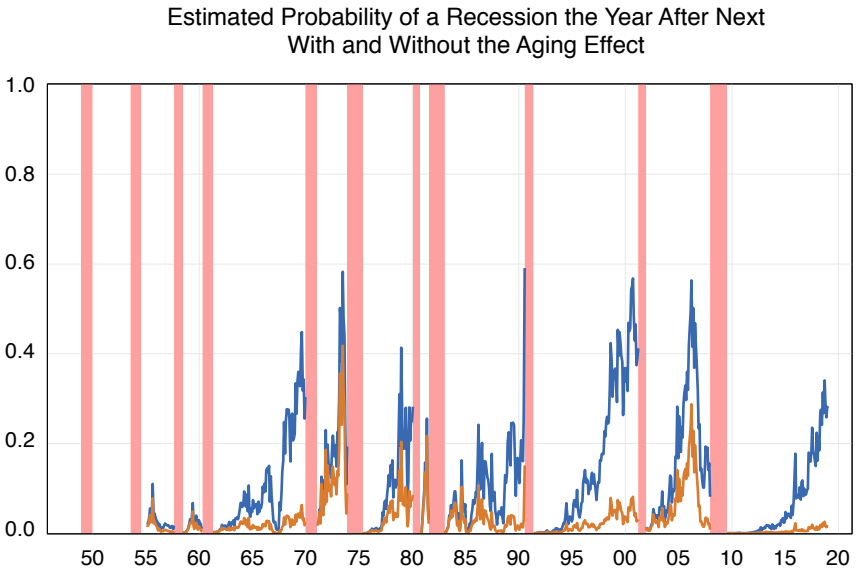


Table 2 Forecasting a Recession in the Year After Next Using the Spread, Building Permits and Age

Dependent Variable: REC_24MO_BEFORE				
Method: ML - Binary Probit (Quadratic hill climbing / EViews legacy)				
Date: 02/24/19 Time: 14:50				
Sample: 1946M01 2020M12 IF RECESSION=0 AND EXPANSION_YEAR1=				
0 AND EXPANSION_YEAR2=0				
Included observations: 417				
Convergence achieved after 5 iterations				
Coefficient covariance matrix computed using second derivatives				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-3.704	0.608	-6.09	0
SPREAD	-0.213	0.097	-2.20	0.028
PERMIT1(-6)	0.001	0.000	4.70	0
PERMIT1(-6)-PERMIT1(-12)	0.001	0.001	2.07	0.0384
EXPANSION_AGE	0.014	0.004	3.73	0.0002
McFadden R-squared	0.1717	Mean dependent var		0.149
S.D. dependent var	0.3562	S.E. of regression		0.333
Akaike info criterion	0.7205	Sum squared resid		45.744
Schwarz criterion	0.7688	Log likelihood		-145.22
Hannan-Quinn criter.	0.7396	Deviance		290.43
Restr. deviance	350.63	Restr. log likelihood		-175.31
LR statistic	60.19	Avg. log likelihood		-0.348
Prob(LR statistic)	0			
Obs with Dep=0	355	Total obs		417
Obs with Dep=1	62			