US Business Cycle Risk Report

There's still no shortage of risk factors to worry about for looking ahead when it comes to the US economy, but the latest run of numbers betrays no sign of trouble on the near-term horizon.

Composite Recession Probability Index
daily probit model estimates

Current: 0.7%

Dec-31-1998   Aug-31-2003   May-01-2008   Dec-31-2012   Sep-01-2017

gray bars indicate NBER-defined recessions

CapitalSpectator.com   Data: St. Louis Fed, Philly Fed, Chicago Fed, Quandl

Although US private payrolls grew less than forecast in August, the Labor Dept. reported on Friday, the year-over-year trend remained steady at a moderately brisk 1.7% pace – unchanged from the previous month. The Consumer Sentiment Index eased slightly in August but was still close to its highest level since 2000. Meantime, the ISM Manufacturing Index jumped to a six-year high for last month's print.

The generally upbeat data of late kept recession-risk probability at a virtually nil reading, based on the Composite Recession Probability Index (see chart at left and p. 7). Meanwhile, today's debut of near-term projections for the Economic Trend and Momentum indices through October suggest that economic growth will endure (bottom chart on p. 2).

Note, too, that the median estimate for third-quarter GDP growth (drawn from several sources) remained steady at 2.9%, unchanged from last week's forecast (see p. 8). The current Q3 GDP projection is a touch below last week's revised 3.0% rise in Q2, but the outlook for this quarter still reflects confidence that the eight-year-old recovery is in no immediate danger of crumbling, according to data published to date.

The positive bias isn't likely to change in the week ahead, thanks to a light schedule for US economic releases:

Mon, Sep 4 Labor Day Holiday – no releases and markets closed
Tues, Sep 5 Factory orders (Aug)
Wed, Sep 6 Int'l trade (Jul), Services PMI (Aug), Non-Mfg. Index (Aug)
Thurs, Sep 7 Jobless claims (wk 9/2), productivity & costs (Q2)
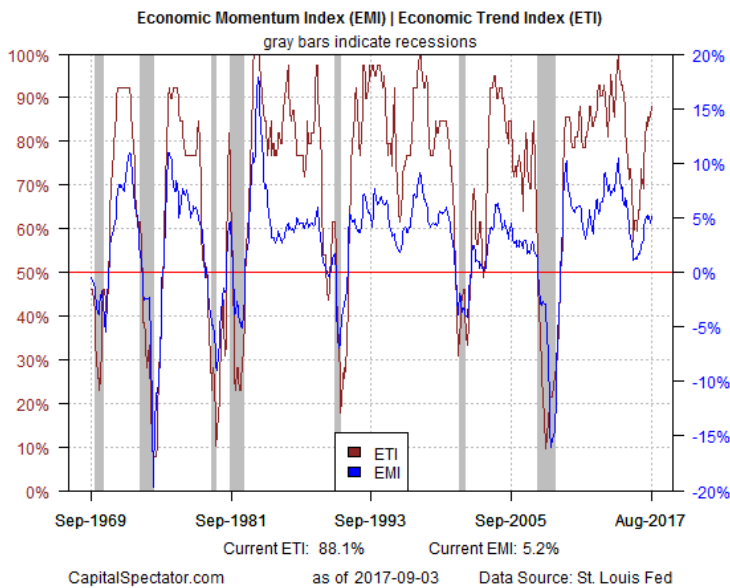**Fri, Sep 8** Wholesale trade (Jul), consumer credit (Jul)

Business Cycle Index Values				Recession-Risk Probability Estimates *		
	Current	Signal			Current	Signal
ETI	88.1%	↑		ETI	0.0%	↑
EMI	5.2%	↑		EMI	0.7%	↑
MMRI	7.6%	↑		MMRI	0.0%	↑
CFNAI-MA3	-0.05	↑		CFNAI-MA3	4.2%	↑
ADS Index	-0.048	↑		ADS Index	0.7%	↑
				CRPI	0.7%	↑
as of: 9/3/2017				* based on probit model estimates		

↑	low risk		↓	medium-high risk
↑	medium-low risk		↓	high risk

see parameter-rule definitions on p. 9

ETI and EMI

Economic Momentum Index (EMI) | Economic Trend Index (ETI)
gray bars indicate recessions

Current ETI: 88.1%   Current EMI: 5.2%

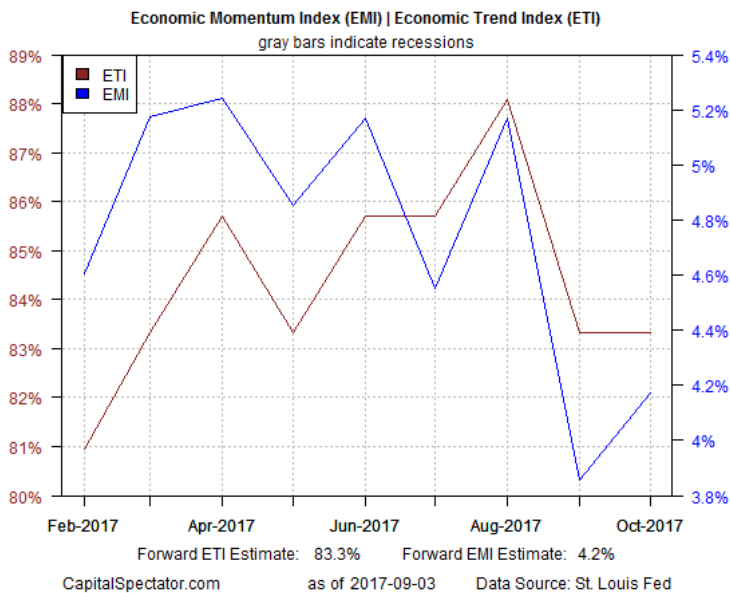CapitalSpectator.com   as of 2017-09-03   Data Source: St. Louis Fed

ETI is a diffusion index (i.e., an index that tracks the proportion of components with positive values) for the 14 leading/coincident indicators (see p. 8). ETI values reflect the 3-month average of the transformation rules defined in the table on p. 8. EMI measures the same set of indicators/transformation rules based on the 3-month average of the median monthly percentage change for the 14 indicators.

ETI values above (below) 50% align with growth (recession). EMI values above (below) 0% align with growth (recession).

The methodology for calculating ETI and EMI is detailed in:

Nowcasting The Business Cycle:
A Practical Guide For Spotting Business
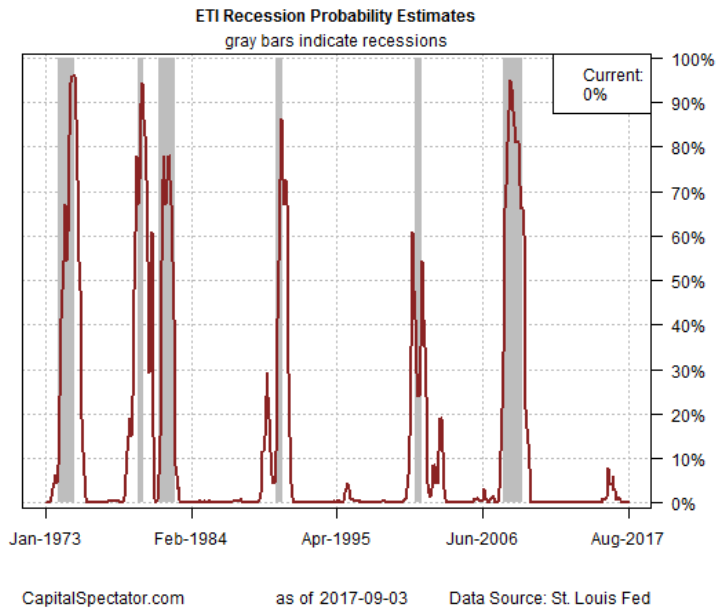Cycle Peaks
(2014, Beta Publishing).

Near-term projections: ETI and EMI

Economic Momentum Index (EMI) | Economic Trend Index (ETI)
gray bars indicate recessions

Forward ETI Estimate: 83.3%   Forward EMI Estimate: 4.2%

CapitalSpectator.com   as of 2017-09-03   Data Source: St. Louis Fed

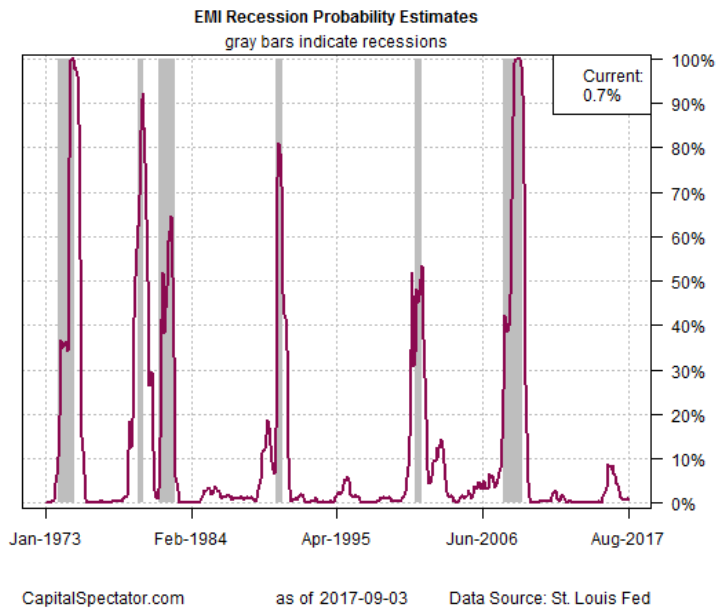*For near-term projections of ETI and EMI, the missing data points are estimated with an ARIMA model.*

Forecasts are always suspect, of course, but recent projections of ETI & EMI for the near-term future have proven to be relatively reliable guesstimates vs. the full set of published numbers that followed. That's not surprising, given the broadly diversified nature of ETI & EMI. Predicting individual components, by contrast, is prone to far more uncertainty in the short run. The assumption here is that while any one forecast for a given indicator will likely miss the mark, the errors may cancel out to some degree by aggregating a broad set of predictions. That's a reasonable assumption based on the historical record for the forecasts.

2

Recession risk probability: ETI

ETI Recession Probability Estimates
gray bars indicate recessions

Current: 0%

CapitalSpectator.com   as of 2017-09-03   Data Source: St. Louis Fed

A probit model translates ETI's values into recession-risk probabilities on a monthly basis by comparing the index with the historical record of NBER's recession dates.

Recession risk probability: EMI

EMI Recession Probability Estimates
gray bars indicate recessions

Current: 0.7%

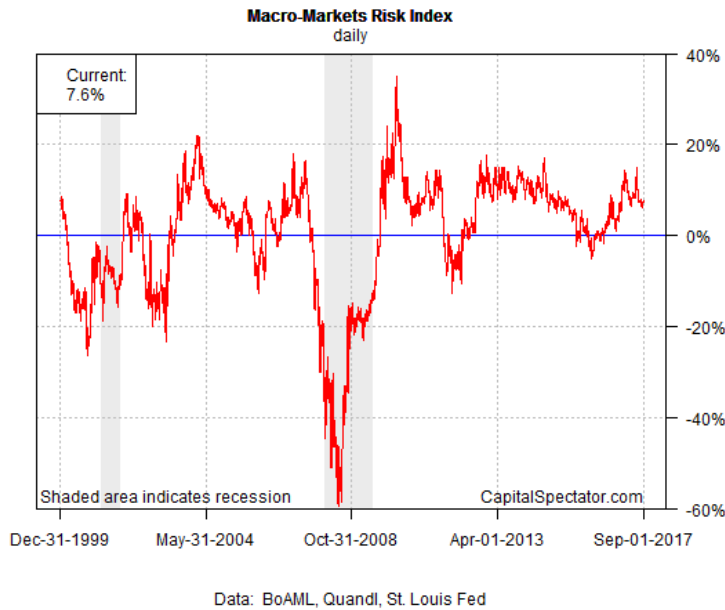CapitalSpectator.com   as of 2017-09-03   Data Source: St. Louis Fed

A probit model translates EMI's values into recession-risk probabilities on a monthly basis by comparing the index with the historical record of NBER's recession dates.

Macro-Markets Risk Index

Macro-Markets Risk Index
daily

Current:
7.6%

Shaded area indicates recession

CapitalSpectator.com

Dec-31-1999   May-31-2004   Oct-31-2008   Apr-01-2013   Sep-01-2017

Data: BoAML, Quandl, St. Louis Fed

Recession risk probability: MMRI

MMRI Recession Probability Estimates
daily via probit model estimates based on oil prices, yield curve, credit spread, S&P 500

Current:
0%

Dec-31-1999   May-31-2004   Oct-31-2008   Apr-01-2013   Sep-01-2017

gray bars indicate NBER-defined recessions

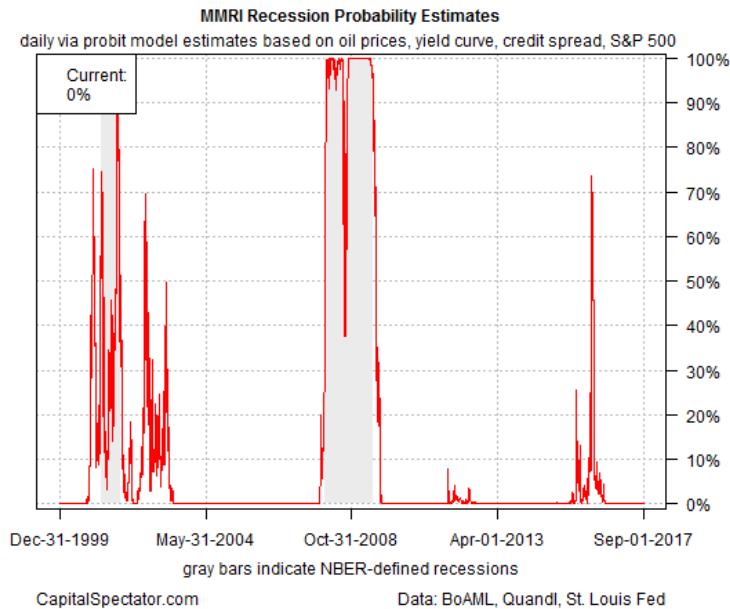CapitalSpectator.com   Data: BoAML, Quandl, St. Louis Fed

The Macro-Markets Risk Index (MMRI) is designed as a real-time proxy for business-cycle risk based on four data sets:

• **US stocks** (S&P 500), 252-trading day % change
• **High yield credit spread** (BofA ML US High Yield Master II Option-Adjusted Spread) inverted 252-trading day % change
• **Treasury yield curve** (10-yr Treasury yield less 3-month T-bill yield)
• **Oil prices** (US benchmark: WTI) inverted 252-trading day % change

Analyzing the market-price components of ETI and EMI separately offers a real-time approximation of macro conditions, according to the "wisdom of the crowd."

Why look to the financial and commodity markets for insight into the economic trend? Timely signals. Conventional economic reports are published with a time lag. This analysis is intended for use as a supplement for developing real-time perspective until a complete data set is published for updating the monthly economic profile.
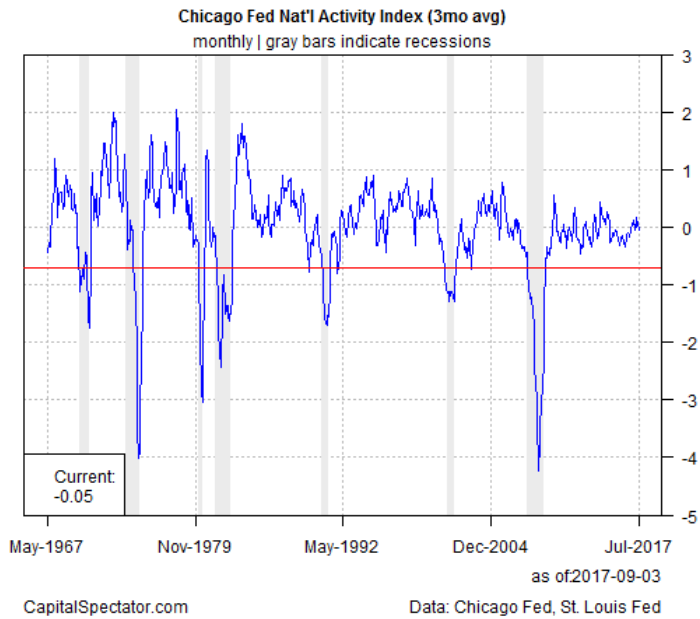
A decline below 0% in MMRI (horizontal blue line in to chart at left) indicates that recession risk is elevated while readings above 0% imply that the economy will expand in the near-term future.

A probit model translates MMRI's values into recession-risk probabilities on a daily basis by comparing the index with the historical record of NBER's recession dates.

Chicago Fed Nat'l Activity Index

Chicago Fed Nat'l Activity Index (3mo avg)
monthly | gray bars indicate recessions

Current:
-0.05

May-1967   Nov-1979   May-1992   Dec-2004   Jul-2017

as of:2017-09-03

CapitalSpectator.com
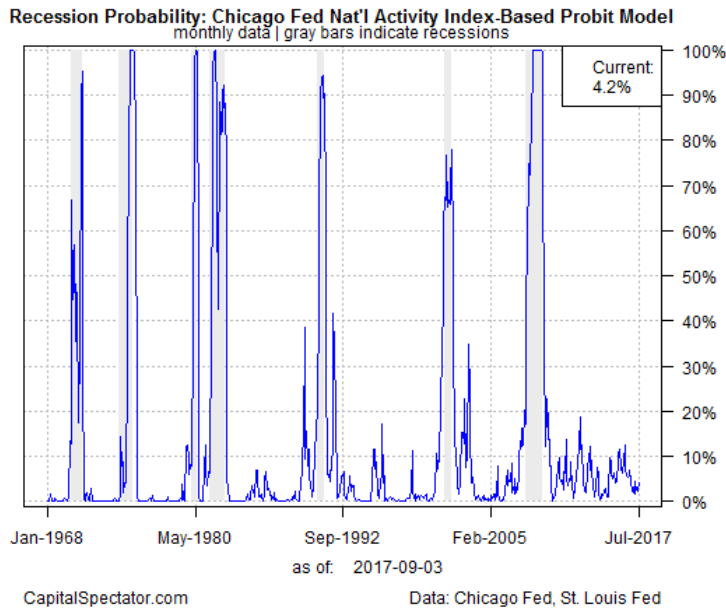
Data: Chicago Fed, St. Louis Fed

The Chicago Fed National Activity Index is a weighted average of 85 existing monthly indicators of national economic activity. It is constructed to have an average value of zero and a standard deviation of one. Since economic activity tends toward trend growth rate over time, a positive index reading corresponds to growth above trend and a negative index reading corresponds to growth below trend.

When the three-month moving average of the index (CFNAI-MA3) moves below −0.70 (horizontal red line in top chart at left) following a period of economic expansion, there is an increasing likelihood that a recession has begun. Conversely, when the CFNAI-MA3 value moves above −0.70 following a period of economic contraction, there is an increasing likelihood that a recession has ended.
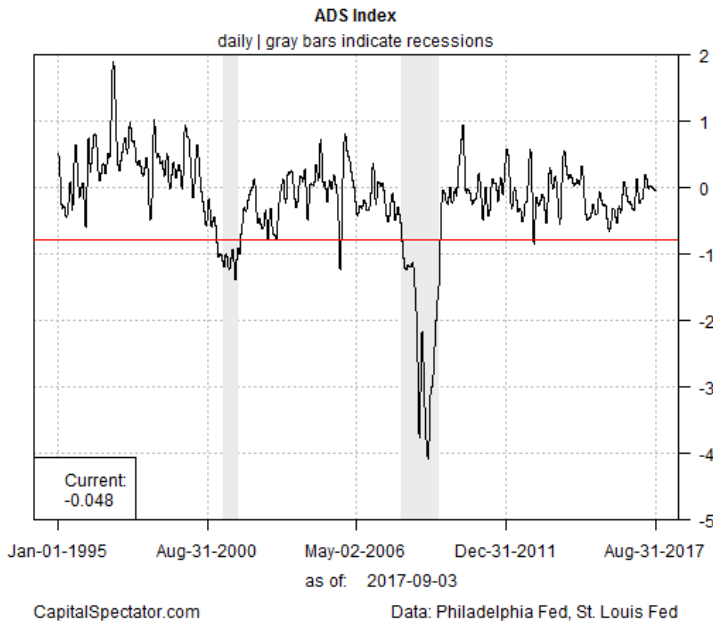
For additional information, see the Chicago Federal Reserve's web site: www.chicagofed.org

A probit model translates CFNAI-MA3 values into recession-risk probabilities on a monthly basis by comparing the index with the historical record of NBER's recession dates.

Recession risk probability: Chicago Fed Nat'l Activity Index

Recession Probability: Chicago Fed Nat'l Activity Index-Based Probit Model
monthly data | gray bars indicate recessions

Current:
4.2%

Jan-1968   May-1980   Sep-1992   Feb-2005   Jul-2017

as of: 2017-09-03

CapitalSpectator.com

Data: Chicago Fed, St. Louis Fed

5

ADS Business Conditions Index

ADS Index
daily | gray bars indicate recessions

Current:
-0.048

as of: 2017-09-03

CapitalSpectator.com   Data: Philadelphia Fed, St. Louis Fed

Recession risk probability: ADS Business Conditions Index

Recession Probability: ADS Index-Based Probit Model
daily probit model estimates

Current:
0.7%

gray bars indicate NBER-defined recessions   as of: 2017-09-03

CapitalSpectator.com   Data: Philadelphia Fed, St. Louis Fed

The Aruoba-Diebold-Scotti (ADS) Business Conditions Index is designed to track real business conditions at high frequency. Its underlying (seasonally adjusted) economic indicators (weekly initial jobless claims; monthly payroll employment, industrial production, personal income less transfer payments, manufacturing and trade sales; and quarterly real GDP) blend high- and low-frequency information and stock and flow data. The ADS Index is updated as data on the underlying components are released.
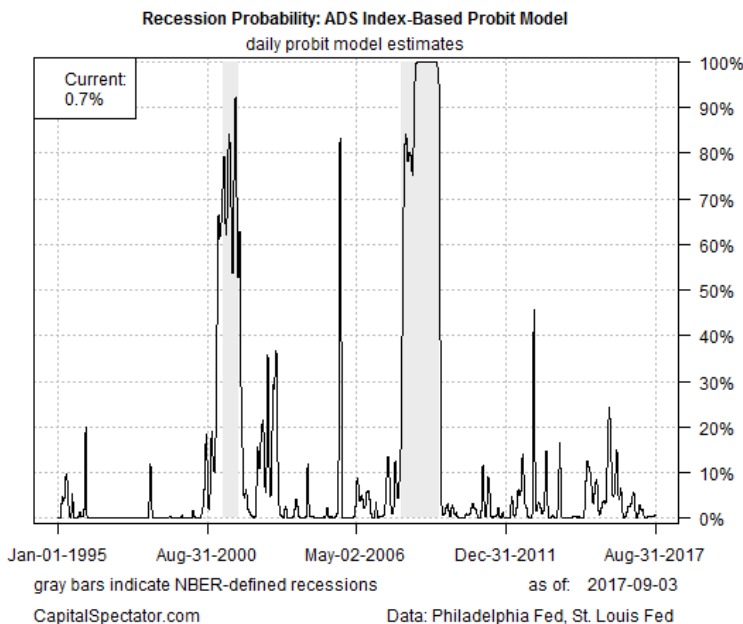
The average value of the ADS index is zero. Progressively bigger positive values indicate progressively better-than-average conditions, whereas progressively more negative values indicate progressively worse-than-average conditions. A value of -3.0, for example, would indicate business conditions significantly worse than at any time in either the 1990-91 or the 2001 recession, during which the ADS index never dropped below -2.0.

Analysis by the San Francisco Fed advises that the "optimal recession threshold" for the ADS Index is -0.80, indicated by the horizontal red line in the top chart at left. For details on this analysis, see: "Diagnosing Recessions" by Òscar Jordà in the Federal Reserve Bank of San Francisco Economic Letter (Feb. 10, 2010) at: www.frbsf.org
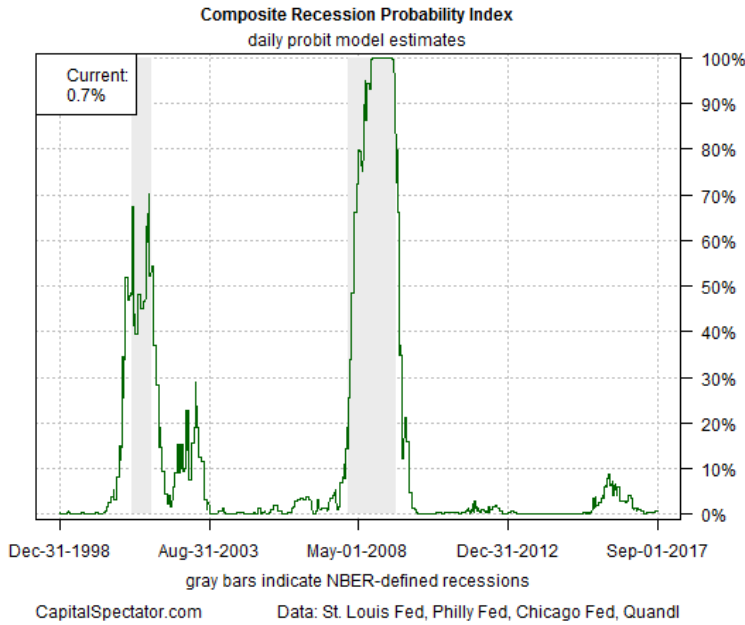
For additional information about the ADS Index, see the Philadelphia Federal Reserve's web site: www.philadelphiafed.org

A probit model translates ADS Index values into recession-risk probabilities on a daily basis by comparing the index with the historical record of NBER's recession dates.

Recession risk probability: CRPI

Composite Recession Probability Index
daily probit model estimates

Current: 0.7%

Dec-31-1998   Aug-31-2003   May-01-2008   Dec-31-2012   Sep-01-2017

gray bars indicate NBER-defined recessions

CapitalSpectator.com   Data: St. Louis Fed, Philly Fed, Chicago Fed, Quandl

The Composite Recession Probability Index (CRPI) reflects the median recession probability via probit modeling of the following indexes:

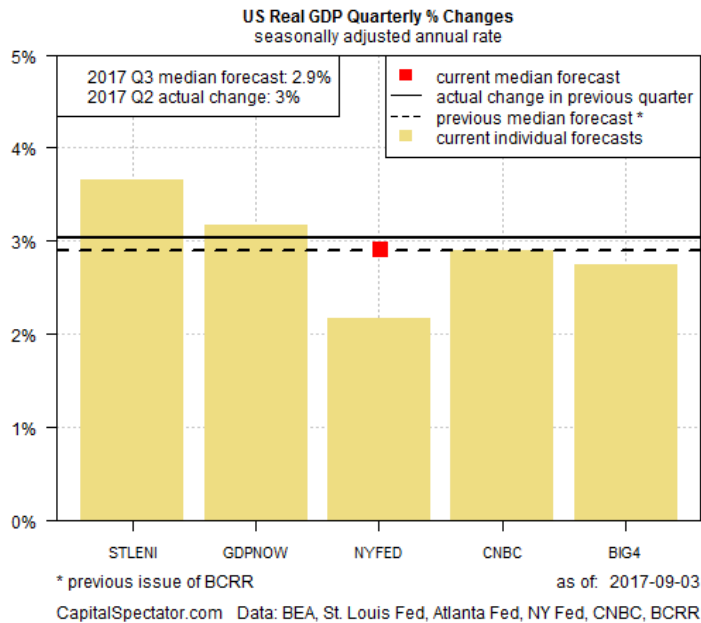1. *ETI (pp. 2-3)*
2. *EMI (pp. 2-3)*
3. *MMRI (p. 4)*
4. *CFNAI (p. 5)*
5. *ADS Index (p. 6)*

CRPI is designed as robust measure of US recession risk that's expected to benefit from the advantages of combining forecasts/nowcasts. The literature is long and deep in this niche, starting with "The combination of forecasts" by J. Bates and C.W.J. Granger in Operations Research Quarterly, *20:451-468, 1969.*

The main takeaway: combining forecasts/nowcasts typically delivers more reliable signals by reducing dependence on any one model. That's because every model is flawed in some degree. Combining the forecasts/nowcasts based on models with different assumptions, parameters, and inputs is a reasonably reliable methodology for improving output accuracy relative to any one forecast/nowcast from a single model.

*For details on the literature, see "Combining forecasts: A review and annotated bibliography" by Robert T. Clemen (*Journal of Forecasting, *5(4):559{583, 1989) and "Forecast combinations" by Allan Timmermann (*Handbook of Economic Forecasting, *1:135-196, 2006).*

Gross Domestic Product Forecasts

US Real GDP Quarterly % Changes
seasonally adjusted annual rate

2017 Q3 median forecast: 2.9%
2017 Q2 actual change: 3%

■ current median forecast
— actual change in previous quarter
--- previous median forecast *
▨ current individual forecasts

STLENI GDPNOW NYFED CNBC BIG4

* previous issue of BCRR

as of: 2017-09-03

CapitalSpectator.com   Data: BEA, St. Louis Fed, Atlanta Fed, NY Fed, CNBC, BCRR

The chart at left summarizes several estimates of the quarterly % change for the next GDP report. For context, the current reported GDP % change for the previous quarter is shown, as calculated by the US Bureau of Economic Analysis (solid black line).

The GDP data doesn't formally factor into the econometric recession-risk estimates for BCRR; rather, the GDP profiling is presented for additional context for assessing the near-term outlook for economic activity.

The red square reflects the median estimate of the following five forecasts based on the latest revisions:

STLENI: St. Louis Fed's Economic News Index, which projects the GDP growth rate for the upcoming report. The methodology is based on economic content from key monthly economic data releases. For details, see: fred.stlouisfed.org

GDPNOW: a "nowcast" model developed by the Atlanta Fed. For details, see: frbatlanta.org

NYFED: A "nowcast" model developed by the New York Fed. For details, see: newyorkfed.org

CNBC: The median forecast of Wall Street analysts based on survey data via the CNBC Rapid Update. For details, see: cnbc.com

BIG4: A BCRR forecast based on a simple linear regression of the so-called Big-4 economic indicators – payrolls, industrial production, real personal consumption expenditures, and real personal income excluding current transfer receipts.

The median of the five forecasts, supplied by different sources via using different methodologies, is expected to deliver a relatively robust estimate of the upcoming GDP report by way of combining projections.[1]

For perspective on how the median forecast has evolved, the dashed black line shows the median projection from the previous issue of BCRR.

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[1] See p. 7 for references on the academic literature related to combining forecasts.

ETI and EMI Component Indicators

US Economic Profile
September 3, 2017

	Indicator	Transformation	May-17	Jun-17	Jul-17	Aug-17
1	Labor Market Index [1]	1 yr % change	6.7%	6.6%	5.6%	6.1%
1a	*Private non-farm payrolls*	*1 yr % change*	1.8%	1.7%	1.7%	1.7%
1b	*Initial Jobless Claims [2]*	*1 yr % chg (inverted)*	12.7%	9.2%	6.3%	9.3%
1c	*Employ.-to-Unemploy. Ratio*	*1 yr % change*	9.9%	13.3%	12.4%	11.4%
1d	*Index of Agg. Weekly Hours [3]*	*1 yr % change*	2.2%	2.1%	1.8%	2.1%
2	US Stock Market (S&P 500) [2]	1 yr % change	16.0%	16.8%	14.2%	12.8%
3	Real personal income ex current transfer receipts	1 yr % change	1.5%	1.2%	1.3%	NA
4	ISM Manufacturing Index	% +/- neutral: 50 [5]	9.8%	15.6%	12.6%	17.6%
5	Spot Oil (W. Tex. Intermed.) [2]	1 yr % chg (inverted)	-3.8%	7.3%	-4.4%	-7.9%
6	Consumer Spending Index [6]	1 yr % change	2.5%	2.2%	2.6%	NA
6a	*Real Pers. Cons. Expend.*	*1 yr % change*	2.8%	2.6%	2.7%	NA
6b	*Real Retail Sales*	*1 yr % change*	2.3%	1.7%	2.5%	NA
7	Treasury Yield Curve (10 yr Note less 3 mo T-bill) [2]	current monthly spread [7]	14.1%	12.1%	12.5%	12.0%
8	High-Yield Bond Spread (BofA ML US HY Option-Adjusted Spread) [9]	1 yr % chg (inverted)	40.2%	38.6%	34.6%	27.7%
9	Real Monetary Base (M0)	1 yr % change	-3.4%	-2.9%	-1.3%	NA
10	University of Michigan Consumer Sentiment Index	1 yr % change	2.5%	1.7%	3.8%	7.8%
11	Industrial Production	1 yr % change	2.1%	2.1%	2.2%	NA
12	New Residential Bldg. Permits	1 yr % change	-0.8%	6.9%	4.7%	NA
13	Real Mfg. & Trade Sales [8]	1 yr % change	2.9%	2.7%	NA	NA
14	ISM Non-Mfg. Index [4]	% +/- neutral: 50 [5]	13.8%	14.8%	7.8%	NA

1. Average 1-year % changes of payrolls, jobless claims, employed-to-unemployed ratio, and weekly hours index.
2. Average monthly data.
3. Production and Nonsupervisory Employees: Total Private Industries.
4. Data series begins Jan. 2008.
5. A neutral reading is assumed to be 50. The transformation is calculated as the % deviation for each monthly reading relative to 50.
6. Average of 1-year % changes for real personal consumption expenditures & real retail sales.
7. Monthly difference: 10yr less 3mo % rates, multiplied by 10.
8. Manufacturing & wholesale sales via BEA. Note: retail sales excluded.
9. Average monthly data. Moody's BAA-AAA spread through Nov-1997, HY spread data thereafter.

Note: The Labor Market Index is considered as 1 indicator, comprised of the four indicators in green cells. The same applies to the Consumer Spending Index, which is comprised of 2 indicators.

NA = data not yet available from source

CapitalSpectator.com

The Economic Trend & Momentum indexes are aggregates of 14 economic and financial indicators, as shown in the table at right. A complete data set for each month tends to lag by one to three months, depending on the indicator. Manufacturing and trade sales suffer the longest lag. By contrast, the market figures are available in real time.

To calculate ETI and EMI in the graphs and analysis above, missing data points must be estimated. To fill in the missing data points, an ARIMA model is used.

Parameter Rules for Summary Table on Page 1:

Business Cycle Index Values

		ETI	EMI	MMRI	CFNAI	ADS
↑	low risk	>80%:100%	> 5%	> 5%	> 0.2	> 0.2
↑	medium-low risk	55%:80%	1%:5%	0%:5%	-0.2:+0.2	-0.2:+0.2
↓	medium-high risk	45%: < 55%	-1%: < 1%	-5%: < 0%	-0.7: < -0.2	-0.8: < -0.2
↓	high risk	< 45%	< -1%	< -5%	< -0.7	< -0.8

Recession Risk Probability Estimates

		ETI	EMI	MMRI	CFNAI	ADS	CRPI
↑	low risk			0%:10%			
↑	medium-low risk			> 10%:30%			
↓	medium-high risk			> 30%:50%			
↓	high risk			> 50%			

Numerical range for signal summaries on p. 1