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Consumer Signals

By

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Abstract

Consumers' expenditures reflect their information about employment opportunities, likely future real wage growth, and investment opportunities, as well as current wealth and income. Real, total consumption growth deviations from normal stock market wealth effects lead economic growth in advanced economies in the Americas, in Europe and in AustralAsia. Previous research showed that stock prices and the slope of the term structure of interest rates reflect forecasted economic growth. In this applied article, it is shown that consumer spending deviations improve upon the signals given by the term structure and stock returns, and the combined readings of the "Stocks, Bonds and Consumers Leading Index" (SBCLI) of Breeden (2014) are quite competitive with more complex widely used indexes of leading economic indicators published by the Conference Board and the OECD. The simplicity and intuition of the stocks, bonds, consumers model makes it quite a helpful structure to think about country by country likely future economic growth, which should be of use to investors, businesses, nonprofits and government entities. Consumer signals for 17 "Trillion Dollar Economies" are presented, showing movements in consumer signals throughout the Great Recession and the Sovereign Debt Crisis.

Keywords

Consumption, leading indicator, term structure, global growth, consumption deviation, unemployment

I. Introduction

Forecasting economic growth is crucial to consumers, investors, businesses and governments, as many plans are better made if they are well-adapted to the likely future environment. Indeed, the need for understanding the likely economic environment is so widespread and includes so many who are not economic experts that there is virtue in a simple, intuitive, yet economically strong model that can be communicated to a broad audience. Researchers on decision making have shown that individuals have great difficulty in making good decisions and forecasts with large numbers of factors to consider, as in the Conference Board's Index of 10-11 Leading Economic Indicators (LEI) and in Hatzius, et. al.'s (2010) recent "Financial Conditions Index" of 43 financial and economic variables. Those difficulties of decision making are greatly compounded when some factors have positive influences on the prediction and some have negative influences.

This article builds on the results of Breeden (2013, 2014), which showed that just three key variables were able to forecast key macro variables' movements in the next 2 to 4 quarters nearly as well as (and often better than) the venerable indexes of leading economic indicators by the Conference Board and by the Organization for Economic Cooperation and Development (OECD) in Paris. The three variables are (1) the stock market's real return, (2) the bond market's slope of the term structure of interest rates, and (3) consumers' real expenditure growth deviations from those predicted by stock market moves, $c^{\perp}$ or "c-perp." Each of these variables has quite substantial economic reason to be informative. For the first key factor, it is well known (see Fama 1981) that stock prices are forward-looking, in that they reflect forecasted earnings, which are positively related to forecasted economic growth. For the second factor, Breeden (1986) demonstrated that the term structure of interest rates should reflect the term structures of forecasted consumption growth and its volatility, as well as the term structure of forecasted inflation. Empirical tests of this theory by Harvey (1988, 1989, 1991) showed that the slope of the term structure leads changes in economic growth, both in the U.S. and globally. Steeper slopes portend increasing growth, and downward sloping term structures portend declining growth or even recession, holding the term structures of volatility and inflation constant.

The reasoning for consumption deviations being a leading indicator goes back to the multiperiod consumption and portfolio theory works of Merton (1971, 1973), Breeden (1979, 1984, 2004), and Lettau and Ludvigson (2001a). These authors modeled consumption as a function of wealth and current investment and job opportunities. Breeden showed that with typical risk aversion, optimal consumption will be increasing in the value of the investment and job market opportunity set. Holding wealth constant, higher consumption was shown to indicate that individuals forecasted a better job market (more jobs, higher future wages and bonuses) or a better investment risk/return tradeoff. This was confirmed in the statistical analysis of Lettau and Ludvigson (2001a) and Breeden (2013).

This article seeks to explain the consumer signal, showing how to compute the consumer signal and showing how this signal improves upon economic forecasts based solely on the stock market's performance and the slope of the term structure of interest rates. We will examine the consumer signals through the Great Recession and the Sovereign Debt Crisis for the largest economies in the world, which includes all economies with GDP of $1 trillion or more in 2015.

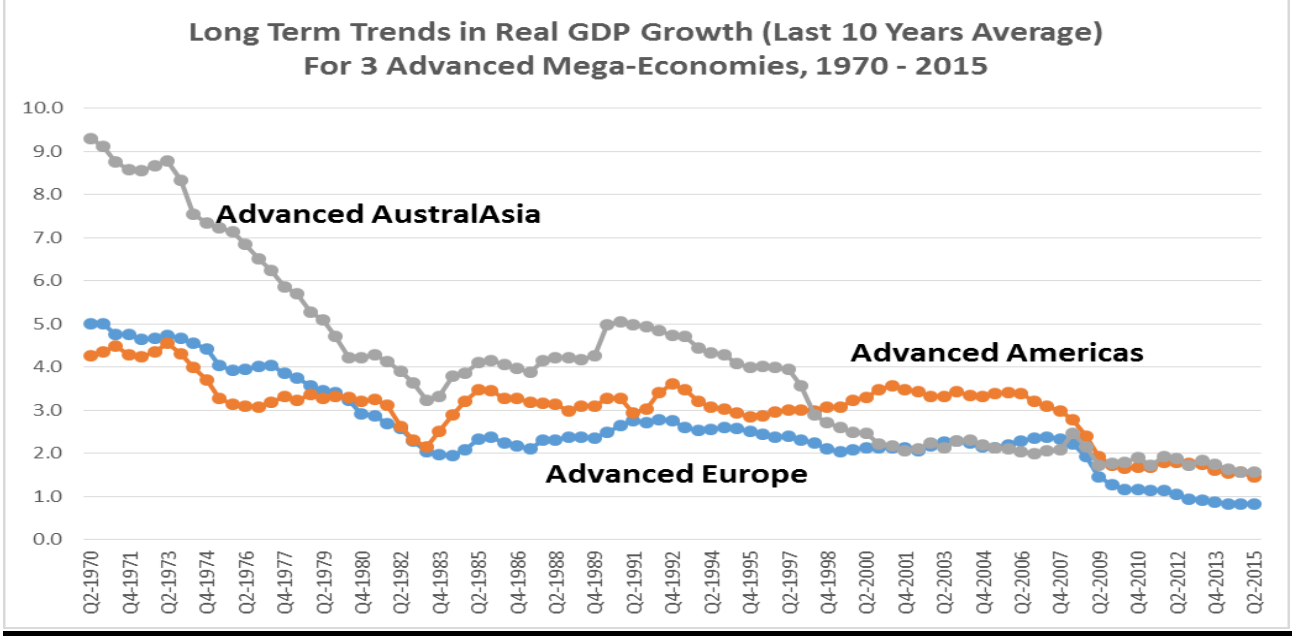
II. Consumer Signal: Consumption Growth Deviations from Stock Wealth Effects

The consumer signal of Breeden (2013, 2014) is a calculation that measures the growth of real consumption in a country, taking out the effects of current and prior movements in the country's stock market. Of course, if stock returns are contemporaneously or have recently been high, people spend more, given their higher wealth -- the "wealth effect." Taking out the wealth effect using regression analysis of real consumption growth on real stock returns and their lagged returns makes the residuals the "consumption deviations from wealth" and gives a signal that is independent of the stock market signal. Breeden called this consumption deviation "c-perp," as it represents the perpendicular, independent movement of consumption relative to wealth. In this section, we examine 50+ years of macroeconomic data for large, advanced economies (where we have such data) in the 3 mega-economies of the Americas, Europe and AustralAsia. We estimate the relationship of real consumption growth in each region to current and past stock market returns. From these relationships, we then estimate the consumer signals (consumption deviations) for each of world's 17 Trillion Dollar Economies.

Our data were obtained from the Paris-based Organization for Economic Cooperation and Development (OECD) website, as well as from the International Monetary Fund's International Financial Statistics (IFS) database, from IHS Global Insight and from Bloomberg Financial Markets. To get the big picture of regional differences and to develop likely more robust coefficient estimates of the sensitivity of consumption to stock returns, data for advanced economies (GDP/capita > $10,000) with over $1 trillion of PPP GDP in 2015 are used to form composites for the three mega-economies. For the Americas, USA (91% PPP GDP weight in 2015) and Canada (9%) make up our composite; for Europe, the composite is Germany (29%), United Kingdom (21%), France (20%), Italy (17%) and Spain (13%); and for AustralAsia, we have Japan (62%), Australia (14%, 1970 on), and South Korea (24%, 1990 on).

The historic growth rates for real GDP have diminished substantially in all regions as countries matured over the past 50 years, as shown in Figure 1. Real growth in advanced AustralAsia has slowed from nearly 10% in the 1960s to under 2% in the past 10 years, while 10-year growth in the advanced Americas has slowed from 4.5% to 1.5% and growth in advanced European economies slowed from 5% to 1%.

Figure 1



Breeden's consumption deviation variable, c-perp, for each global mega-economy is the residual from the following regressions of 2-quarter, annualized real consumption growth on the

historic time trend in real GDP growth and the contemporaneous 2-quarter real stock return and two lags of the real, 2-quarter stock returns. Table 1 has the results from non-overlapping data for the 54 years from 1961 to 2014. (See Breeden (2014) for more details of the calculations.)

Table 1

Removing the Wealth Effect from Consumption in 3 Mega-Economies:

Real Consumption Growth Predicted by Stock Returns

2 Quarter Changes (Q2-Q4-Q2). 54 Years: 1961Q2 – Q4/2014

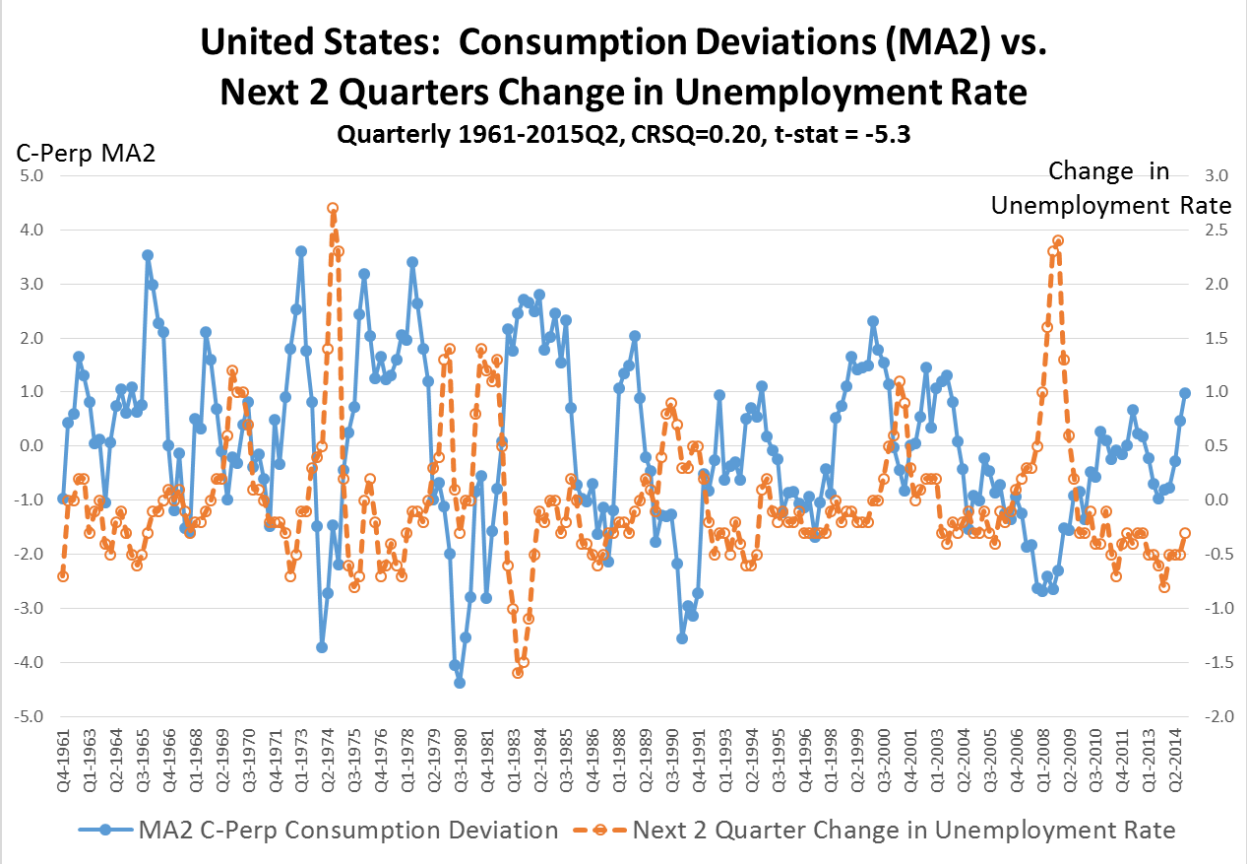
Dependent Variable Real Total Consumption Growth (2Q%,Ann)	Real Stock Return 2Q% Current	Real Stock Return 2Q% Lag 1	Real Stock Return 2Q% Lag 2	20 Year Historic Trend Growth RI GDP	Constant	Corr RSQ
Advanced Americas	**0.098**	**0.059**	**0.042**	**1.02**	**-0.37**	**0.39**
1961Q2-2014Q4	**t=6.0**	**t=3.7**	**t=2.6**	**t=4.7**	**t=-0.5**	**N=108**
Advanced Europe	**0.029**	**0.042**	**0.029**	**1.17**	**-0.95**	**0.54**
1961Q2-2014Q4	**t=2.5**	**t=3.6**	**t=2.5**	**t=10.8**	**t=-2.7**	**N=108**
Advanced AusAsia	**0.057**	**0.030**	**0.019**	**0.85**	**-0.60**	**0.55**
1961Q2-2014Q4	**t=3.3**	**t=1.8**	**t=1.1**	**t=10.9**	**t= -1.3**	**N=108**

Table 1 shows that real stock market returns affect real consumption growth significantly in all three regions, but most in the Americas, where stock ownership is more widespread. Long-term trend variables are stronger effects in Europe and in AustralAsia. Lagged effects of stock returns are clearly present, as individuals often adjust consumption spending to higher or lower wealth levels with lags that appear to go as long as a year. Lags beyond those shown were statistically insignificant. For example, for the Americas, an incremental 10% real stock return is associated with a contemporaneous increase of 1.0% in annualized real consumption growth, say from 2.0% to 3.0%, followed by another 0.6% boost in the following 2 quarters and another 0.4% boost 3-4 quarters later.

Figure 2 plots the consumption deviation variable for the USA versus the change in the unemployment rate in the following 2 quarters. The consumption deviation is the Table 1 regression residual, averaged with its lagged value for a 2-period moving average covering 4

quarters. It shows visually that positive consumption deviations lead drops in the unemployment rate, and negative ones lead increases in the unemployment rate. With a t-statistic of -5.3 (from nonoverlapping semiannual data) in this simple relationship, we see that consumers do appear to have significant information about the job market to use in their spending decisions. When their consumer spending signal is positive, the unemployment rate subsequently declines. When they reduce consumer spending relative to wealth, the unemployment rate tends to increase subsequently, reflecting their knowledge of the poor job market.

Figure 2



France (and many other countries) also shows an ability of consumption deviations to predict changes in the unemployment rate, as shown in Figure 3:

Figure 3

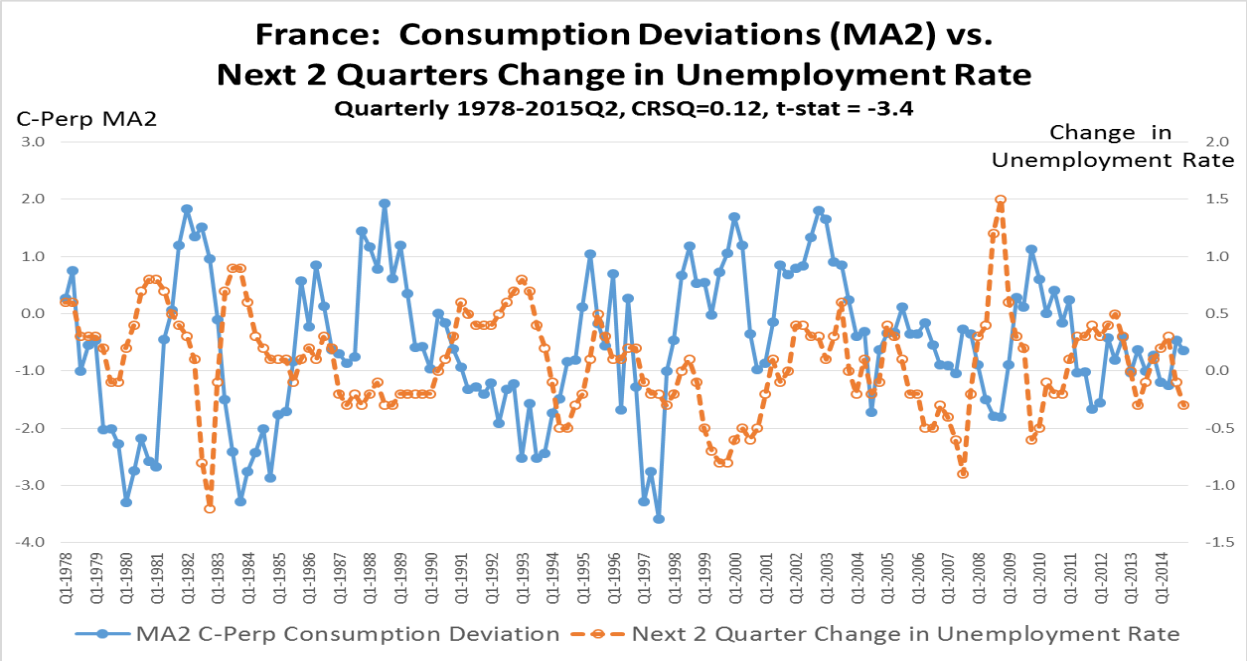
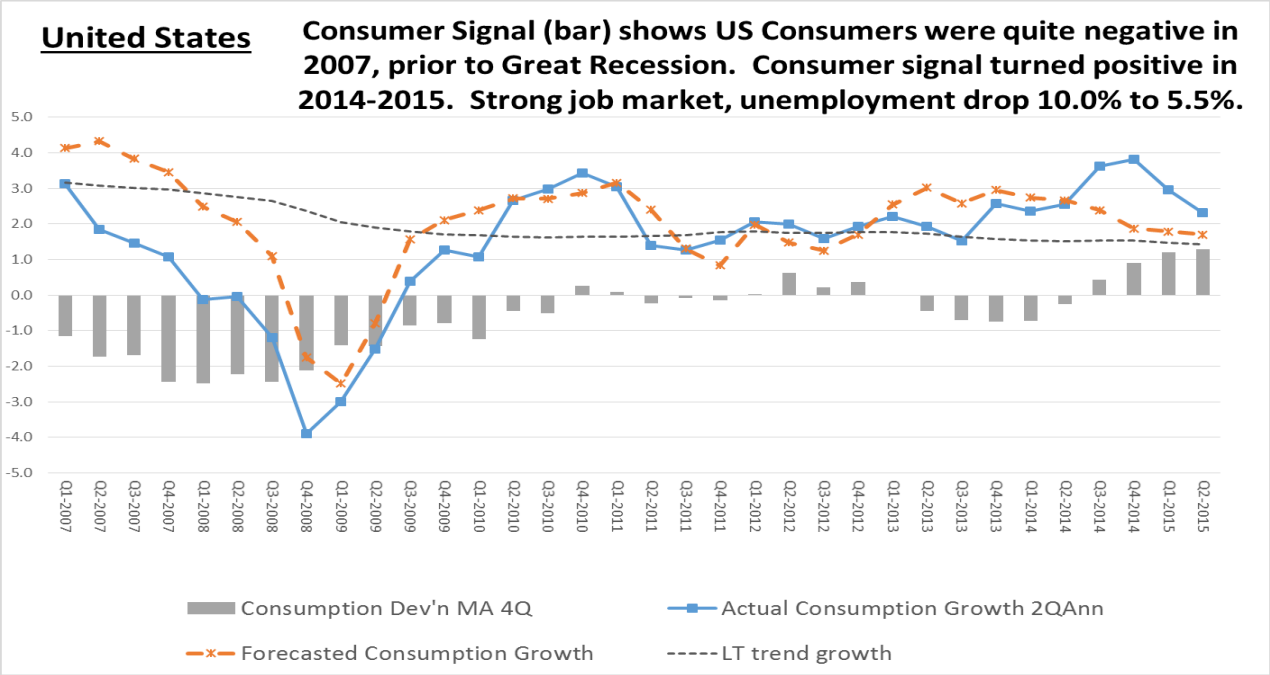


Figure 4 plots for the United States (1) the 10-year trend growth rate of real GDP (1.4% in 2015), (2) the real consumption growth rate predicted by current and past real stock returns using the coefficient estimates in Table 1, (3) the actual 2-quarter annualized real consumption growth rate, and (4) the deviation of actual minus forecast growth:

Figure 4



Note that the growth rate of consumption that is forecasted from real stock returns varies quite a lot. While historic trend growth was 3.0% in mid-2007, the stock market had been strong, hitting a record high over 1500 in mid-2007 on the S&P 500, so forecasted growth for consumption was about 4.0%. However, consumers held back, with real consumption growth of only 2.0%, a deviation of *minus* 2.0% in mid-2007, giving a Z-score of approximately -1.2 standard deviations. Consumers were prescient, as the economy fell into recession within 6 months and the unemployment rate surged to 10% in the Great Recession. Note that consumers were negative in mid to late 2007, precisely when the stock market was hitting new highs, so consumers were giving a very different signal than what the stock market was giving. Real estate prices had begun to fall in some places and debt loads were pinching, which led to an increase in delinquencies on consumer loans and mortgages. Consumers likely started reducing spending growth as their home equity dwindled and to increase savings and reduce debt.

Later, when Lehman Brothers fell in September 2008, c-perp was almost minus 2 standard deviations, as consumers were very likely reflecting in their spending cuts the surge in layoffs and unemployment and the very poor prospects for real wage growth and yearend bonuses. As the stock market came roaring back from March 2009 to the end of 2009, real consumer spending growth increased, but less than expected, as consumers continued to restrain their spending growth, likely with knowledge of the continuing weak job market, the worst since the Great Depression of the 1930s. Finally, at the end of 2011, when the stock market fell with the budget impasse and European Sovereign Debt Crisis worries were very high, consumer spending growth held and even increased, giving the first positive consumption deviation in the past 5 years in the USA. This is consistent with the improving job market and the falling unemployment rate, as well as with the significantly reduced debt service ratios (with lower interest rates) and reduced loan delinquencies.

More recently, in 2013 to early 2015, stock market performance was quite strong in the USA and in many countries. Figure 3 shows that, while this strong stock performance would normally be associated with increasing real consumption growth, consumption growth in the USA changed very little in 2013 and early 2014, hovering around 2% to 2.5%. Consumers were "leaning against the wind," apparently thinking that things are not quite as good as the stock

market would indicate and being conservative on spending. In late 2014, consumption growth increased, while the stock market's percentage gains slowed, giving positive consumption deviations. So the consumer signal in mid-2015, $c^{\perp}$, from the USA was positive versus what is expected, given stock market returns. This is consistent with their knowledge of the strong job market in the U.S. and an unemployment rate decline from 10.0% to below 5.5%.

This is just an illustration of the analysis of consumer signals that we can do for each country. Given space constraints, we cannot do that for each country in this article, so the Appendix has graphs with header comments indicating some of the major moves since 2007 in consumer signals in each of the G-7 countries, plus Spain and the BRICs.

III. A Stocks, Bonds and Consumers' Leading Indicator (SBCLI)

Does the Consumer Signal Improve Forecasts of Stocks and Bonds?

In the previous section, we focused on the real consumption growth deviation variable. However, Breeden (2013, 2014) also showed that stock returns and the term structure slope have predictive power as well, reflecting the information held by stock market investors and bond market borrowers and lenders. In this section, we examine Breeden's "Stocks, Bonds, Consumers Leading Index" (SBCLI), which combines standardized readings from all three variables into a composite ranking that has values from approximately +10 to -10, with positive numbers indicating above-normal growth, and negative numbers indicating below-normal growth. We first transform all readings at time t of the key variables (stocks, bonds, consumers), k=1-3, into their standardized Z-scores, which are defined as the actual observations minus their long-term means, scaled by dividing by the volatility of the key variable. Mathematically:

$$Z_{kt} = \frac{(x_{kt} - \mu_k)}{\sigma_k} \qquad \{for\ k = 1, 2, 3\} \qquad (1)$$

These Z-scores have the intuitive interpretation of measuring the number of standard deviations the observation is from the mean for each variable. Thus, with a normal distribution, Z-scores should exceed 1.0 in absolute value approximately 1/3 of the time, and should exceed 2.0 in

absolute value approximately 5% of the time. As Z-scores are linear in the original independent variables, in typical OLS regressions with constant terms, using Z-scores gives R-squareds and t-statistics that should be identical to regressions with the same underlying variables. This transformation is done to build an intuitive index, rather than for statistical power.

The Z scores for stocks, bonds and consumers likely forecast deviations from long-term trend growth rates for the macro variables, in that a strong stock market should precede a positive deviation from trend growth of GDP or industrial production or employment growth. Thus, the 10 or 20-year trend growth rate of real GDP is included, as growth has slowed considerably in the 54-year period from 1961 to 2015 for advanced economies, and real consumption growth slowed, too.

The stock market return variable is found by Breeden (2013) to be the most influential key variable over the 50 year period for each mega-economy. The stock market appears to have explanatory power up to 4 quarters in advance, with the greatest weight being the most recent 2-quarter real return, but also with significant weight on the prior nonoverlapping 2-quarter real return. For the term structure variable, typically only the most recent lagged reading is significant. And for consumption deviations, c-perp appears to lead real GDP growth and the growth of industrial production by only one 2-quarter period. In contrast, employment growth and unemployment rate changes appear to be more slow-moving, and c-perp leads those typically by 4 quarters in the Americas, so an average of 2 lags of c-perp are included in those regressions.

As our desire is to compute a simple, robust index of the information held by stock and bond market investors and consumers, we compute the "Stocks, Bonds and Consumers Leading Index" (SBCLI) as simply the sum of the Z-scores for the term structure and for consumption deviations, plus **double** the Z-score for the real stock return. This reflects the significantly larger explanatory power of real stock returns that we find. So, we have:

$$SBCLI = 2Z_{RStock} + Z_{Slope} + Z_{Cperp} \qquad (2)$$

Of course, one can get better statistical fits by letting the coefficients of these variables vary, but then one has to worry more about data mining and whether those coefficients could be estimated precisely in advance.

The time series of SBCLI index values is given for the two halves of our sample, 1961-1987 and 1988-2015 Q2, in the next two graphs, Figures 5A and 5B:

Figure 5A

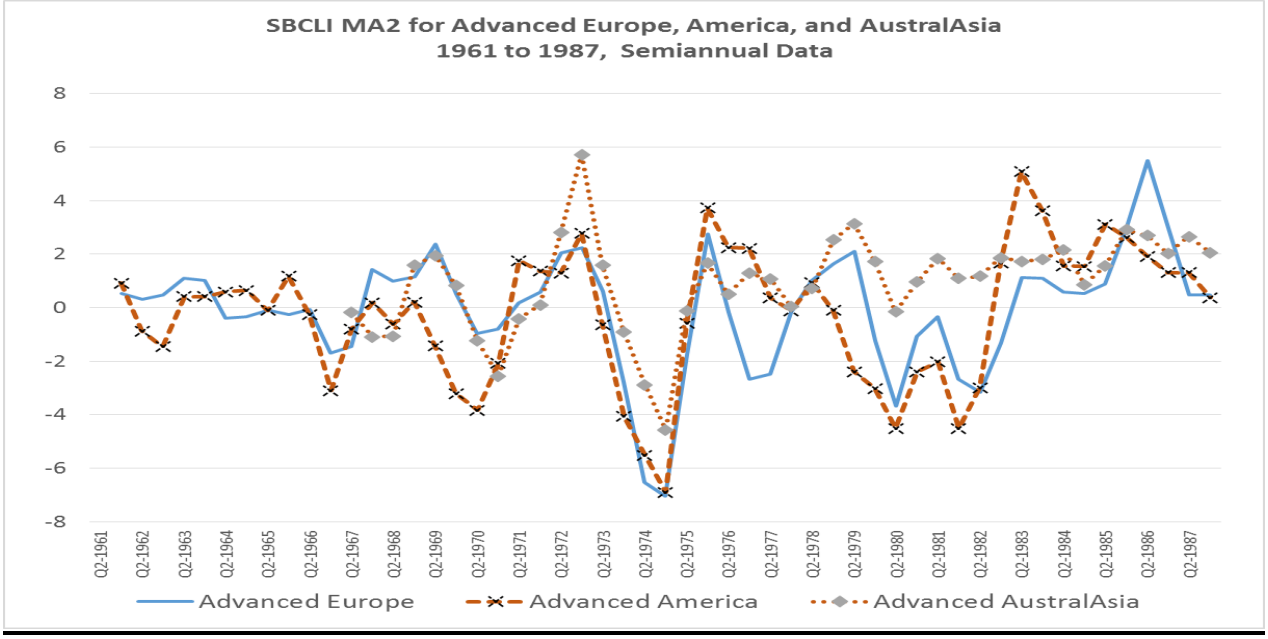
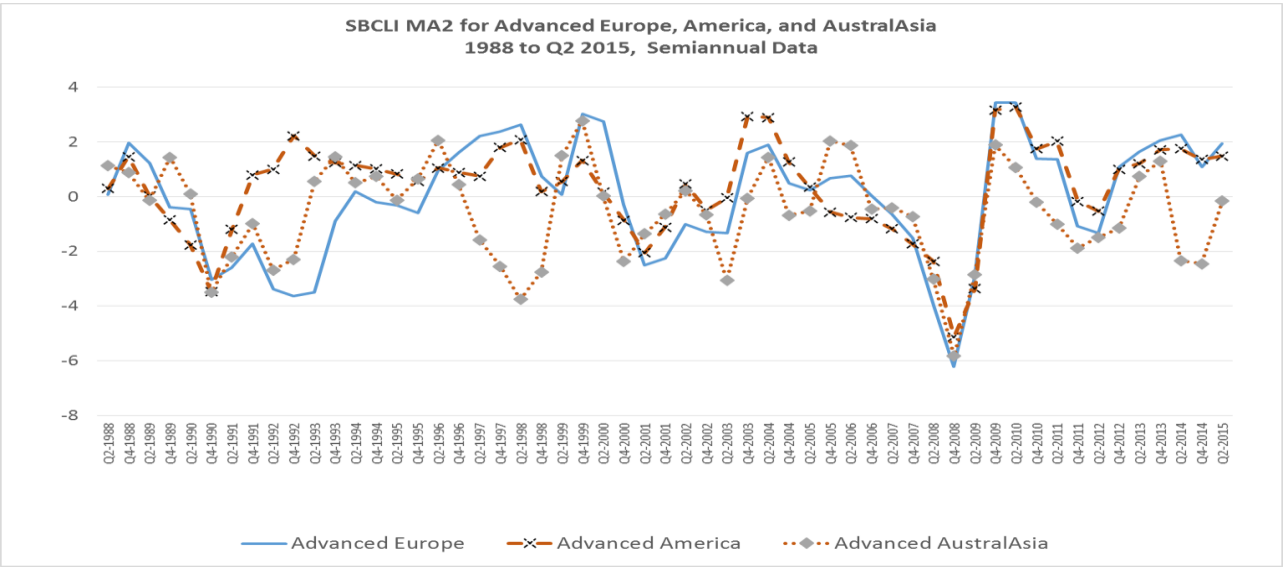


Figure 5B



Studying these graphs, we can see that the SBCLI is negative around the key recessions, such as in 1974/75, 1981/82, 1990/91, and 2008/09. However, from these graphs it may not be easy to see if it really leads the moves in key variables. To ascertain that they do, please examine Figures 6A,B, 7A,B, and 8A,B, which plot the SBCLI versus subsequent movements in real GDP growth and in the unemployment rate for America, Europe and AustralAsia:

Figure 6A

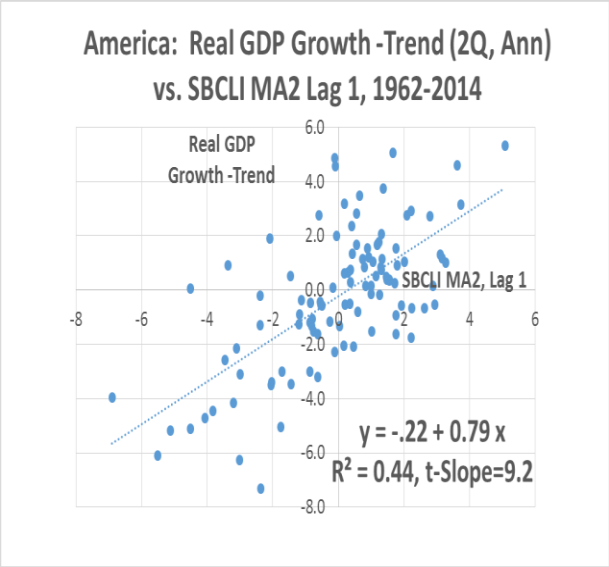


Figure 6B

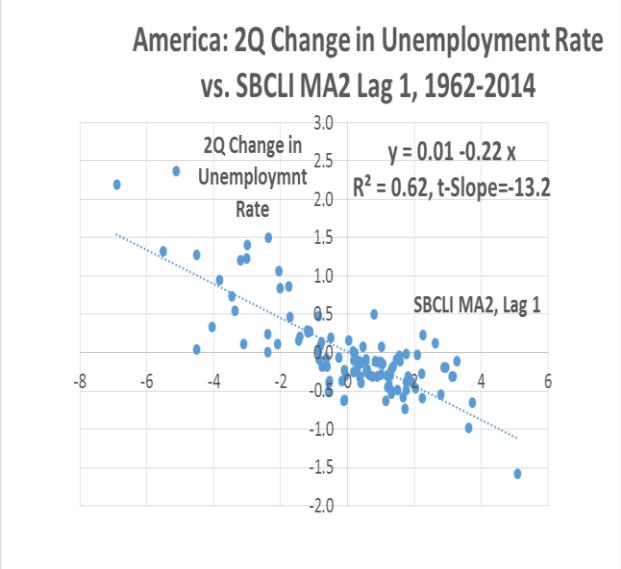


Figure 7A

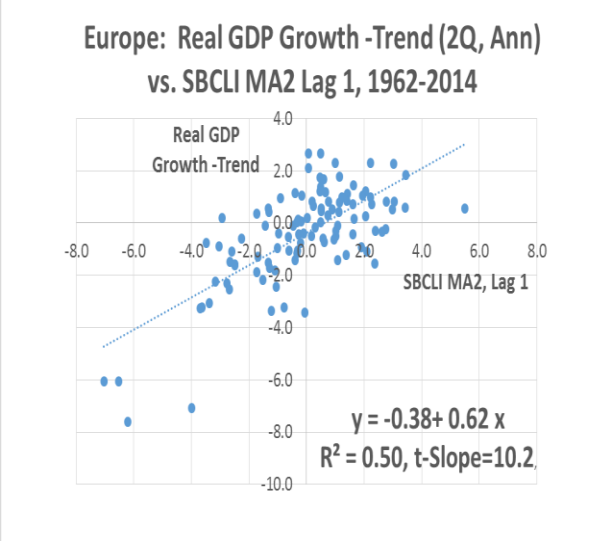


Figure 7B

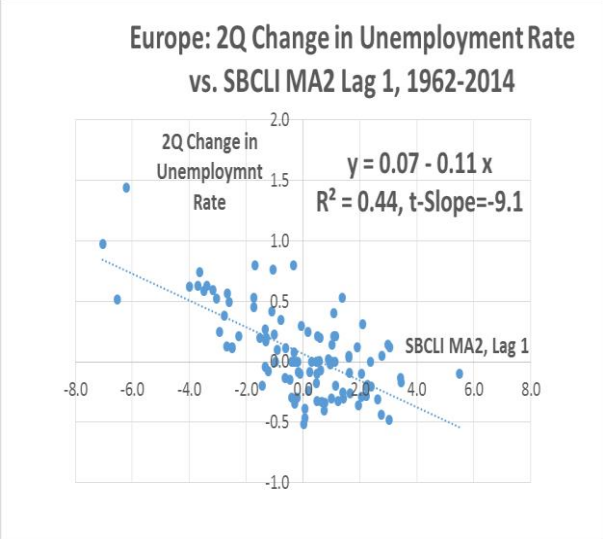
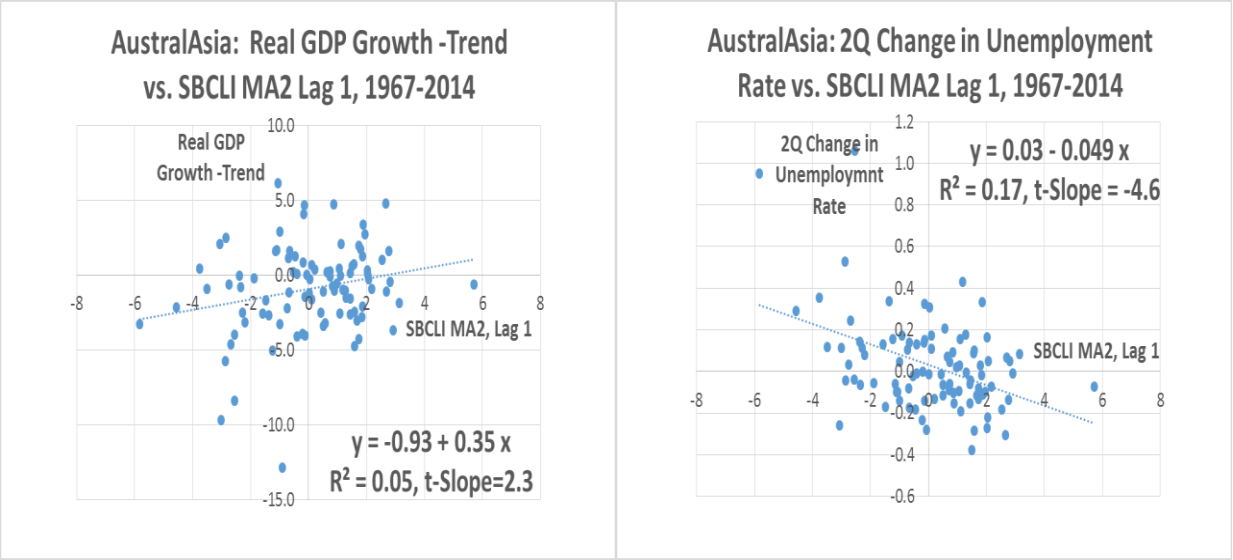


Figure 8A

Figure 8B



From these graphs and their statistics, we see that in all three regions, the SBCLI significantly leads movements in real GDP growth and in unemployment rate changes. GDP and Unemployment t-statistics are 9.2 and -13.2 for America, 10.2 and -9.1 in Europe, and 2.3 and -4.6 in AustralAsia, showing generally very strong relationships of macro variables to SBCLI.

Next, we should ask if the Consumer Signal, $c^{\perp}$, really improves upon the forecasts of stock and bond markets. And, additionally, is the combined signal from stocks, bonds and consumers nearly as good as the venerable and well-researched indexes of Leading Economic Indicators published by the Conference Board in the USA and by the OECD for many countries? We examine 4 key economic variables: movements in (1) real GDP growth, (2) movements in industrial production growth, (3) movements in employment growth (the total number of jobs in the economy), and (4) changes in the unemployment rate. We examine all of these variables over forecast horizons of 2 quarters and 4 quarters. The average correlations for the 4 variables for each forecaster are in Tables 2 and 3. For each time horizon, four forecasters are compared: (1) stocks and bonds, (2) stocks and consumers, (3) stocks, bonds and consumers, and (4) the index of leading economic indicators. Table 2 uses the longest time series where we have data for all four macro variables, starting from 1961 to 1980 for different countries and ending with Q1-2015. Table 3 is only from 2007 Q1 to 2015Q1 to examine a common time period, and one covering both the Great Recession of 2008/2009 and the Sovereign Debt Crisis of 2011-2015.

Table 2

G-7 Economies

Impact of Consumer Signal on Explanatory Power: Correlation of Forecasts with Actuals 2 to 4 Quarters Later
Longest Period with Data for GDP, Industrial Production, Employment Growth, Unemployment Rate

G-7 Country	Begin Date: Ending: 2015-Q2	2-Quarter Forecasts					4-Quarter Forecasts				
		Stocks + Bond Slope	Stocks + Consumers	Stocks, Bonds Consumers	OECD* Leading Indicators	SBCLI-LEI	Stocks + Bond Slope	Stocks + Consumers	Stocks, Bonds Consumers	OECD* Leading Indicators	SBCLI-LEI
United States	1961-Q3	0.56	0.64	0.64	0.67 *	-0.03	0.53	0.60	0.64	0.61 *	0.03
Canada	1961-Q3	0.53	0.41	0.49	0.54 **	-0.05	0.48	0.27	0.43	0.46 **	-0.03
France	1978-Q3	0.38	0.48	0.47	0.49	-0.02	0.39	0.48	0.48	0.47	0.01
Germany	1961-Q3	0.39	0.43	0.44	0.39	0.05	0.46	0.44	0.50	0.37	0.13
Italy	1980-Q2	0.15	0.30	0.26	0.32	-0.06	0.16	0.29	0.26	0.27	-0.01
United Kingdom	1971-Q3	0.43	0.49	0.54	0.43 ***	0.11	0.49	0.50	0.58	0.46 **	0.12
Japan	1967-Q1	0.36	0.35	0.38	0.37	0.01	0.35	0.34	0.38	0.33	0.05
Averages		0.40	0.44	0.46	0.46	0.00	0.41	0.42	0.47	0.42	0.04

*For USA, Conference Board's LEI is used, as it has higher correlations than the OECD's Leading Index.

**For Canada, note that the MA2 forecasts for Stocks and Bonds and SBCLI are worse than not using the moving average. Use of just the latest observation would increase correlations from 0.53 to 0.53, 0.41 to 0.49 and 0.49 to 0.52, respectively, and 0.48 to 0.52 , 0.27 to 0.38, and 0.43 to 0.49 for 4 quarter forecasts.

**For the U.K., the 4-Quarter moving average is used, as it is higher than the 2-quarter based OECD LEI. No MA2 gives 0.33 vs. 0.43 and 0.41 vs. 0.46.

Table 3

G-7 Economies

Impact of Consumer Signal on Explanatory Power: Correlation of Forecasts with Actuals 2 to 4 Quarters Later
Standard Period from 2007Q1-2015 Q1 Covering the Great Recession of 2008/9 and Sovereign Debt Crisis 2011-2015

G-7 Country	Begin Date: Ending: 2015-Q2	2-Quarter Forecasts					4-Quarter Forecasts				
		Stocks + Bond Slope	Stocks + Consumers	Stocks, Bonds Consumers	OECD* Leading Indicators	SBCLI-LEI	Stocks + Bond Slope	Stocks + Consumers	Stocks, Bonds Consumers	OECD* Leading Indicators	SBCLI-LEI
United States	2007-Q1	0.68	0.77	0.77	0.74 *	0.03	0.57	0.66	0.74	0.64 *	0.10
Canada	2007-Q1	0.56	0.54	0.60	0.69 **	-0.09	0.46	0.24	0.42	0.55 **	-0.13
France	2007-Q1	0.60	0.66	0.64	0.65	-0.01	0.63	0.58	0.66	0.63	0.03
Germany	2007-Q1	0.55	0.53	0.52	0.57	-0.05	0.51	0.43	0.52	0.48	0.04
Italy	2007-Q1	0.49	0.56	0.54	0.58	-0.04	0.55	0.51	0.57	0.54	0.03
United Kingdom	2007-Q1	0.64	0.63	0.69	0.56	0.13	0.58	0.42	0.57	0.54	0.03
Japan	2007-Q1	0.46	0.45	0.44	0.41	0.03	0.33	0.38	0.38	0.21	0.17
Averages		0.57	0.59	0.60	0.60	0.00	0.52	0.46	0.55	0.51	0.04

*For USA, Conference Board's LEI is used, as it has higher correlations than the OECD's Leading Index.

**For Canada, note that the MA2 forecasts for Stocks and Bonds and SBCLI are worse than not using the moving average. Use of just the latest observation would increase correlations from 0.56 to 0.63, 0.54 to 0.73 and 0.60 to 0.72, respectively, and 0.46 to 0.50 , 0.24 to 0.48, and 0.42 to 0.56 for 4 quarter forecasts.

The results in Tables 2 and 3 show that the Consumer Signal adds significantly to the forecasting power of stocks and bonds. Additionally, the combined Stocks, Bonds, Consumers Leading Index (SBCLI) does approximately as well as the venerable indexes of leading economic indicators, despite having only 3 variables, while most of these LEIs have 6 to 10 key variables. Indeed, for the longer, 4-quarter forecast horizon, the SBCLI typically outperforms the OECD's index of leading indicators.

IV. Conclusion

In summary, what is striking from these results from around the globe is that the relatively simple 3-variable, SBCLI indexes (with fixed weights on stocks, bonds and consumption deviations) do well on these tests in comparison to the LEI, which is a composite of 6-10 economic variables with relatively continuous weights. Overall, the performance of the indexes is quite similar. On an absolute basis, as shown by Breeden (2013, 2014), all three key variables are significant in helping to explain subsequent short-term moves in the macro variables, with strong t-statistics and R-squared values, both for in-sample estimations and in simulated out-of-sample tests. Of course, short-term economic forecasting is quite hazardous, as even with the best of forecasts, the errors are often economically large. And longer term forecasting is often even more difficult than short-term forecasts.

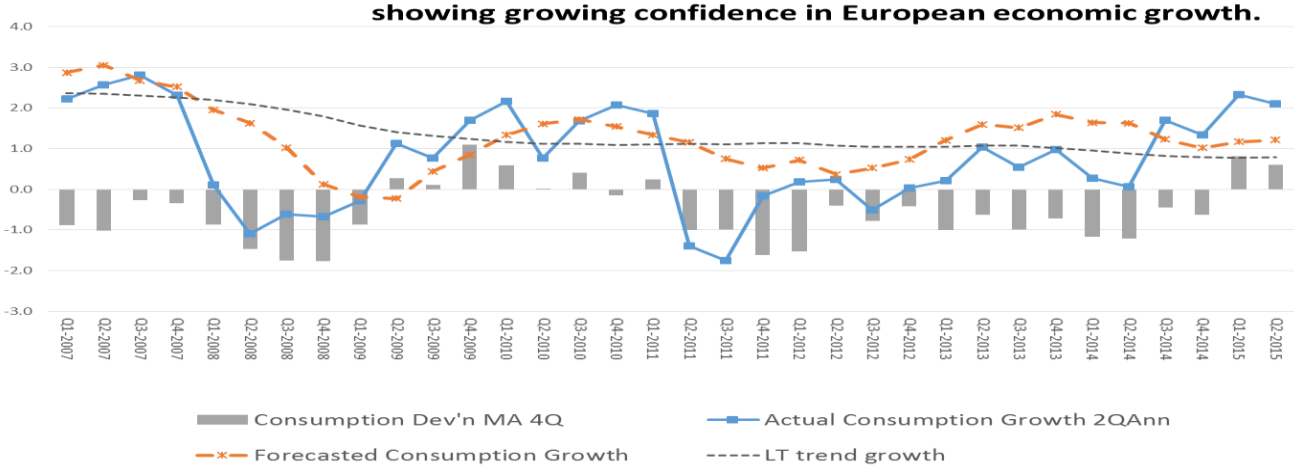
The intuitive nature and relative simplicity of the three major variables in the SBCLI should make it possible for businesses, investors, government and nonprofit employees to understand the genesis of the forecasts of this indicator. They can also do their own updating of forecasts relatively easily, just by observing real stock returns, the slope of the (real) term structure, and whether or not consumers are spending more or less than expected, given stock market movements.

For more details about the SBCLI please see the working paper at the following webpage:
http://www.dougbreeden.net/uploads/Breeden_SBCLI_applied_paper_April_22_2012.pdf.

Appendix: Consumer Signals

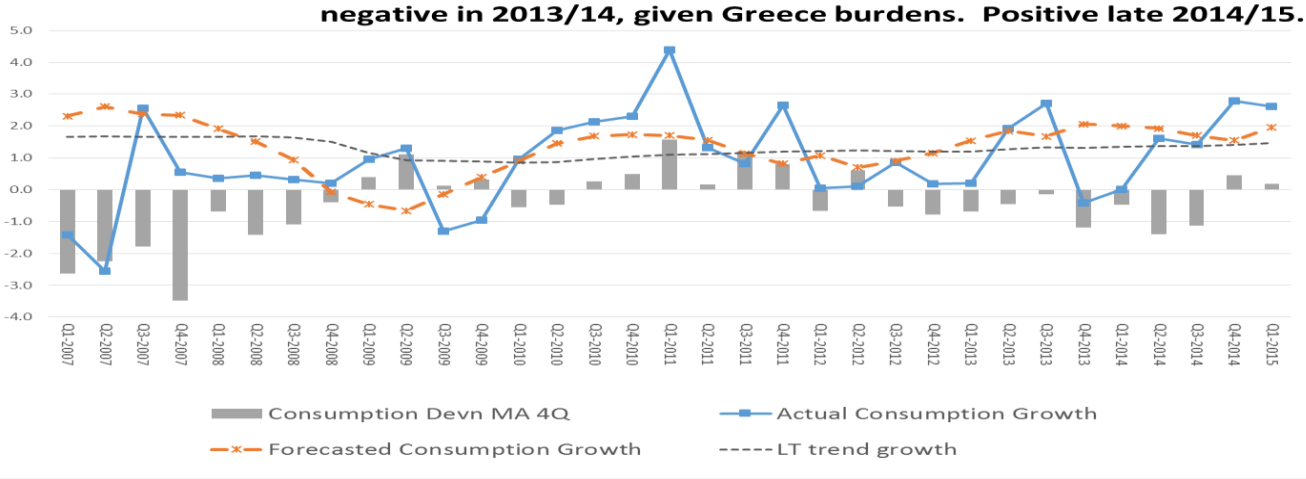
France

France's Consumer Signal was negative in 2011-2014 during the Sovereign Debt Crisis, but turned positive in late 2014 and 2015, showing growing confidence in European economic growth.



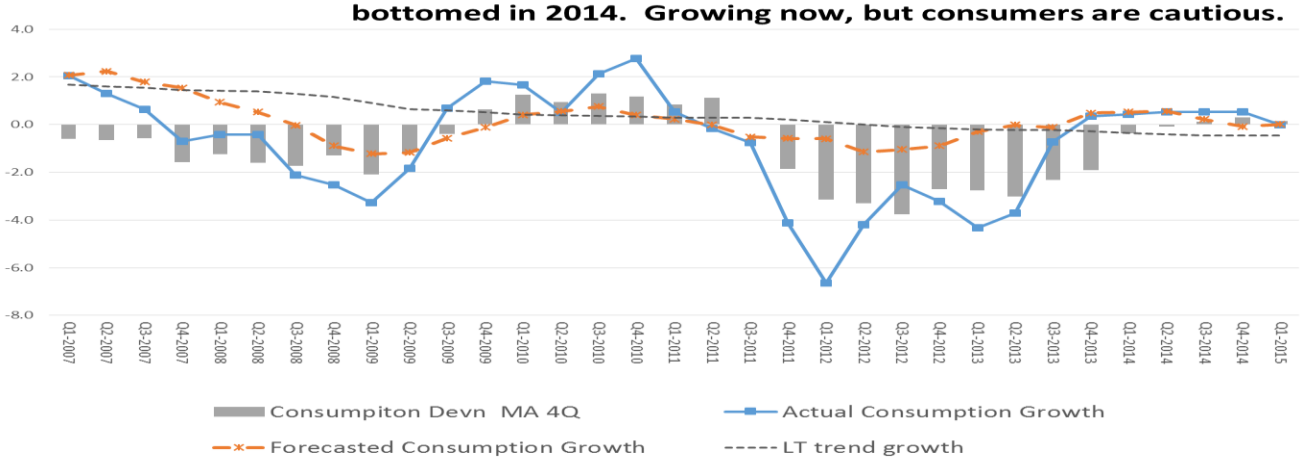
Germany

Germany's Consumer signal was relatively strong from 2009-2012, as unemployment dropped to very low levels. Consumers slightly negative in 2013/14, given Greece burdens. Positive late 2014/15.



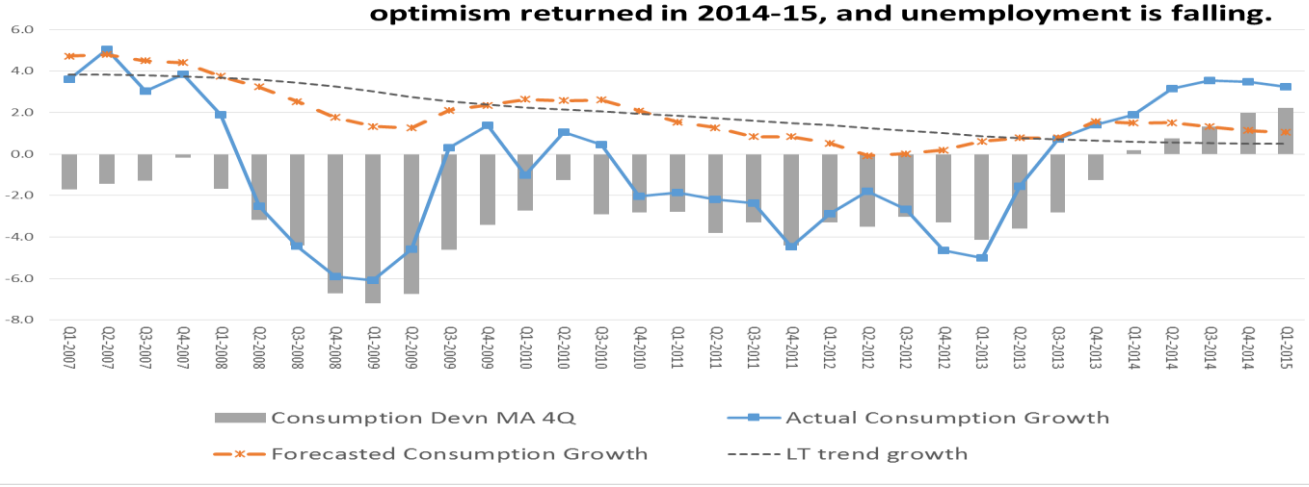
Italy

Italy's Consumer signal was very negative in the Sovereign Debt Crisis 2011-2013, as unemployment surged to 12%+. Economy bottomed in 2014. Growing now, but consumers are cautious.



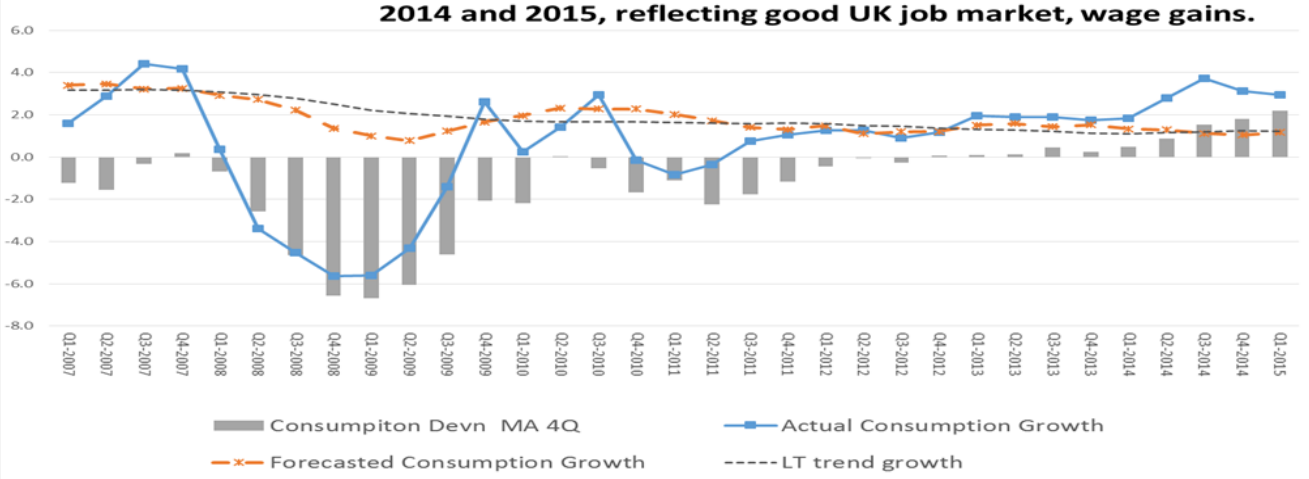
Spain

Spain's Consumer signal was very negative from 2008-2013, as unemployment surged to a Depression level of 25%. Consumer optimism returned in 2014-15, and unemployment is falling.



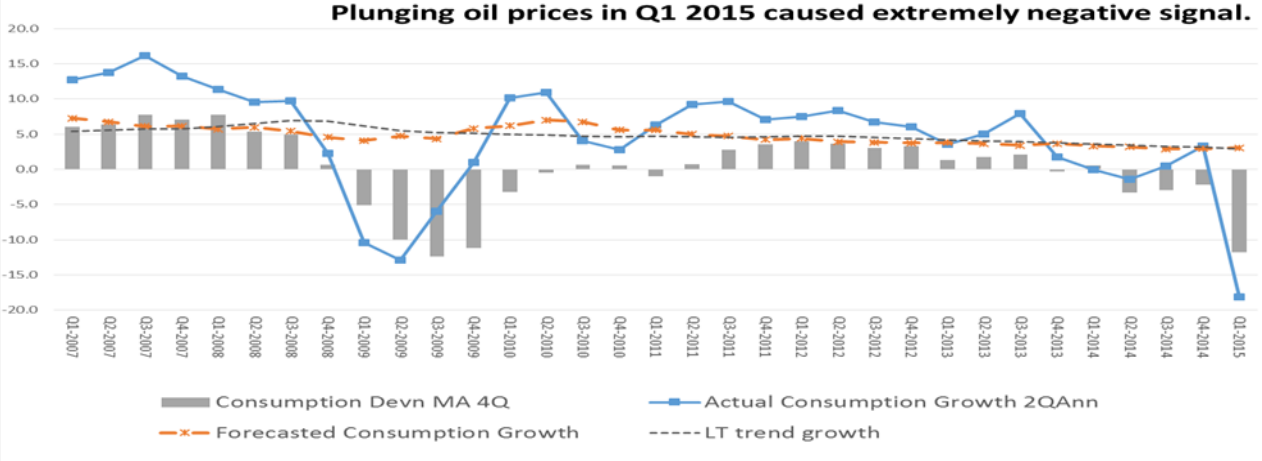
United Kingdom

UK's Consumer signal showed a double dip in 2008/9 and in 2011. Signal was neutral during Sovereign Debt Crisis, turning positive in 2014 and 2015, reflecting good UK job market, wage gains.



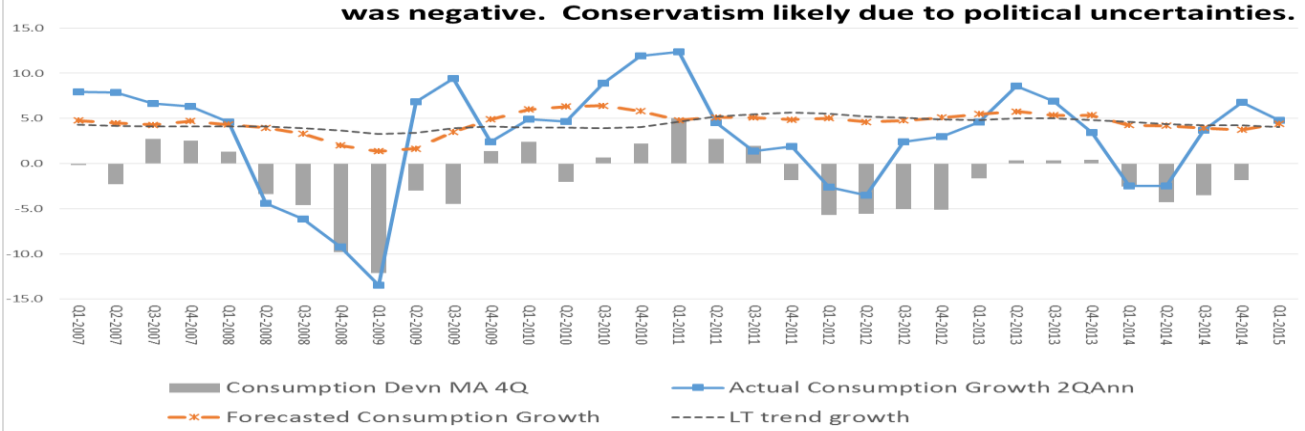
Russian Federation

Russia's Consumer signal was slightly positive 2011-2013H1, but declined in 2013H2-2014 with conflict and embargoes. Plunging oil prices in Q1 2015 caused extremely negative signal.



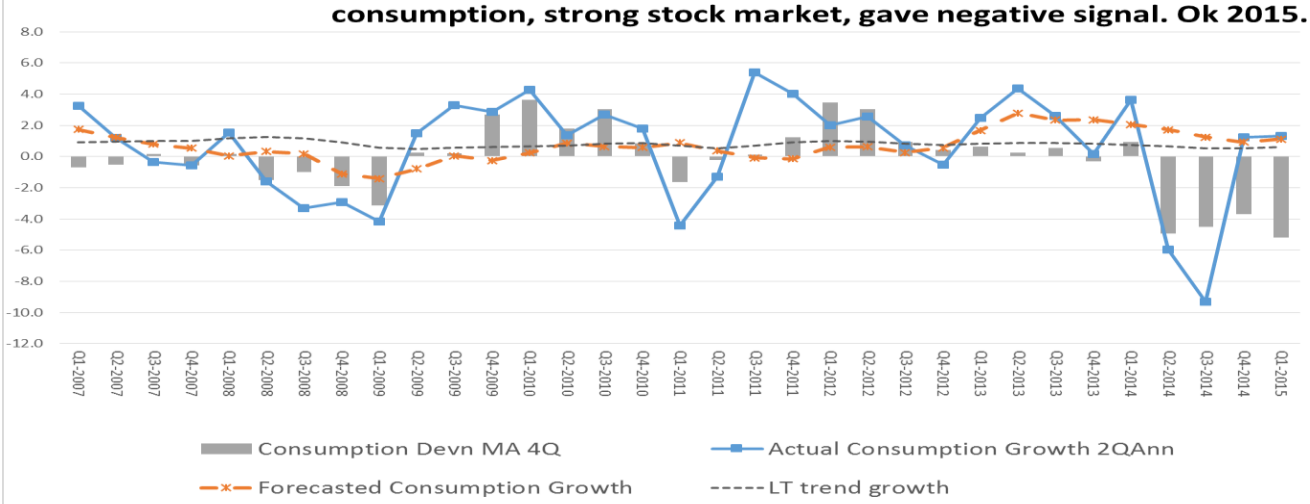
Turkey

After several years of very strong growth, Turkey's consumption growth was very volatile 2007-2015. Consumer signal 2012-2015 was negative. Conservatism likely due to political uncertainties.



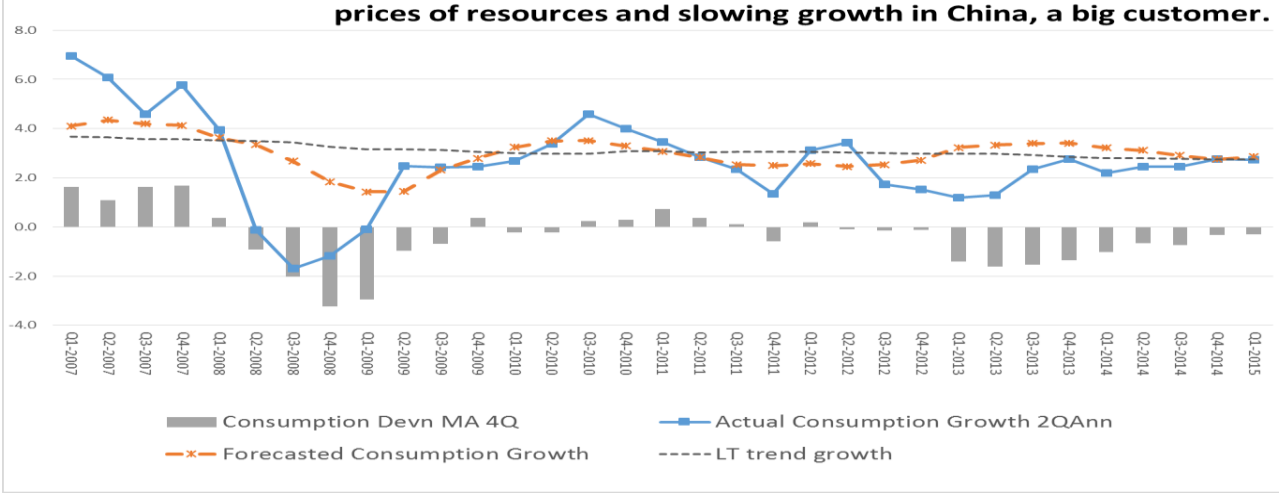
Japan

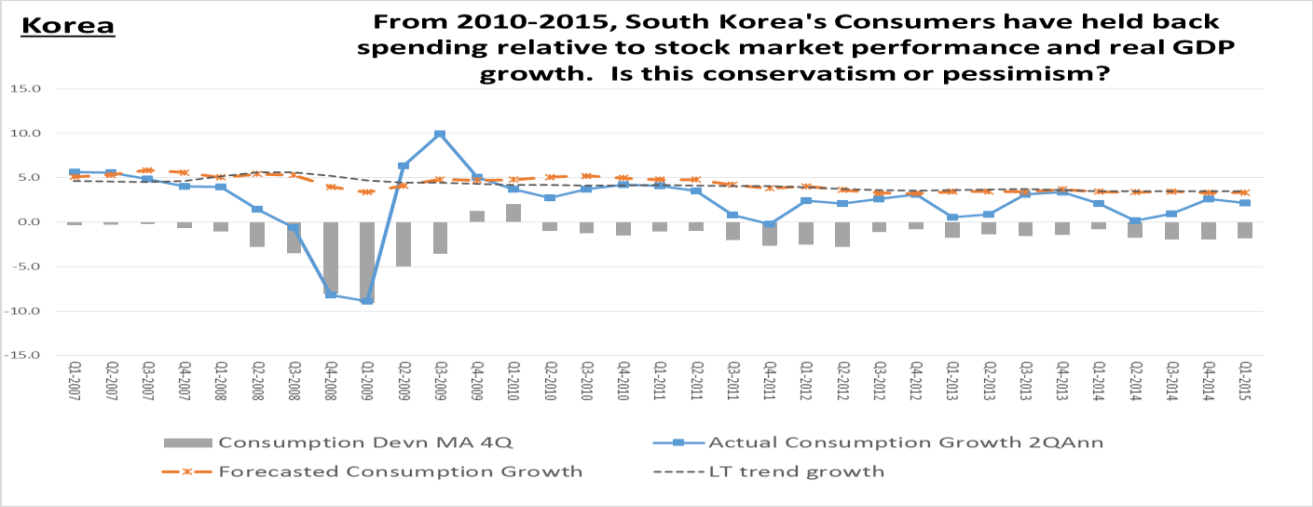
Japan's Consumer signal was positive 2009-2013, with "Abenomics." With VAT increase, sharp cutback in 2014 consumption, strong stock market, gave negative signal. Ok 2015.

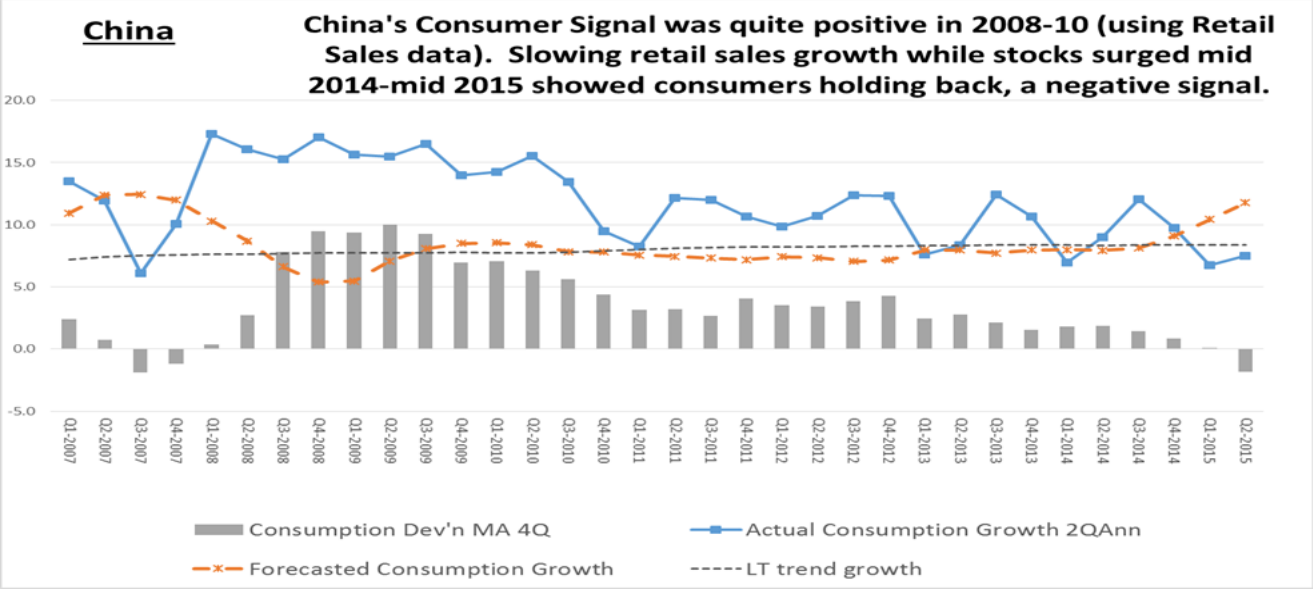


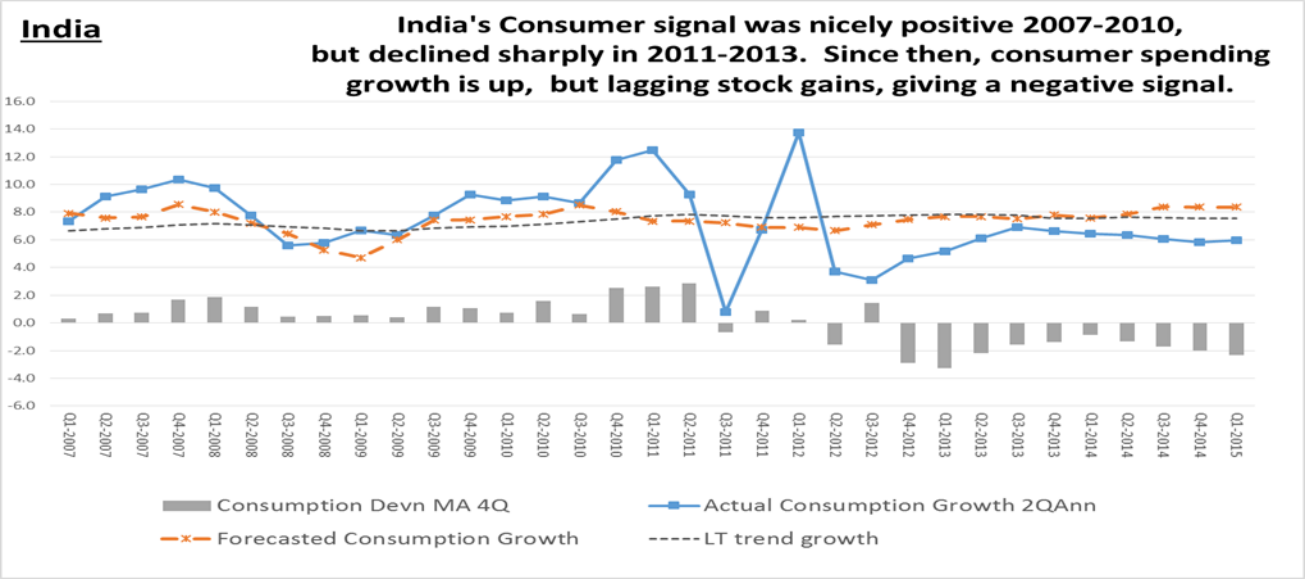
Australia

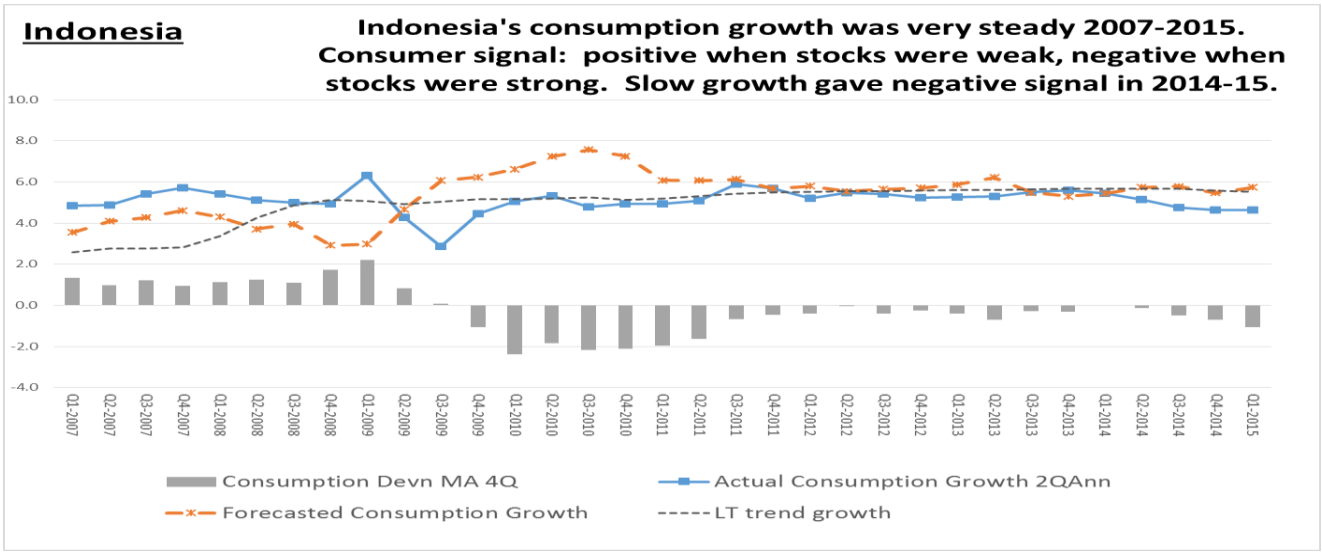
After years of excellent performance, Australia's Consumers held back relative to stock returns in 2013-2014, likely due to plunging prices of resources and slowing growth in China, a big customer.

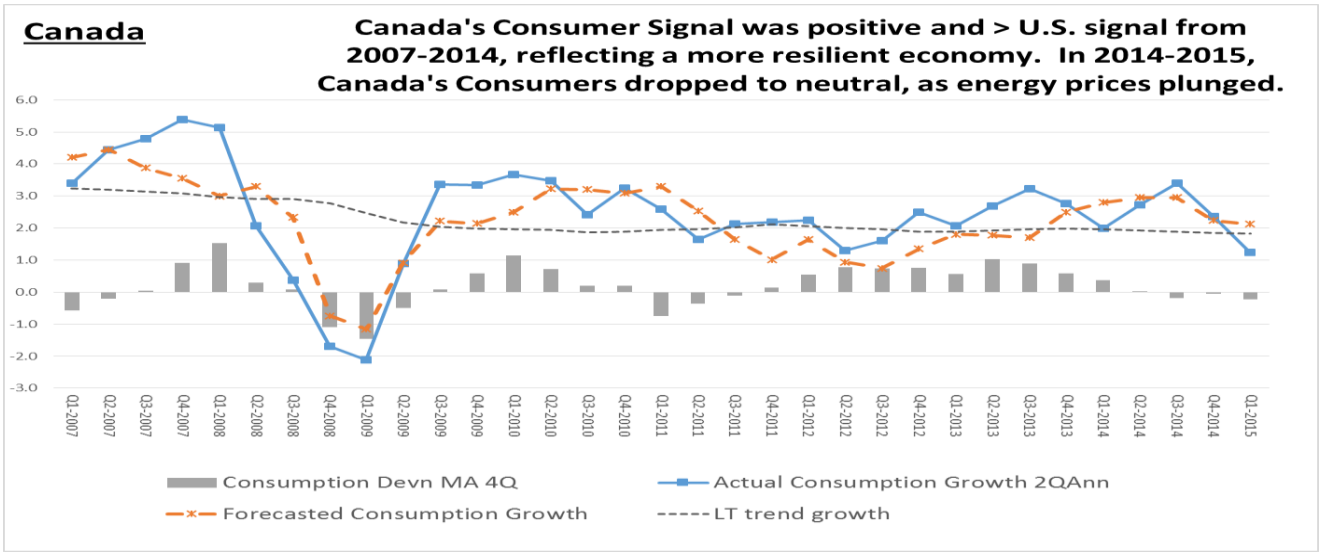


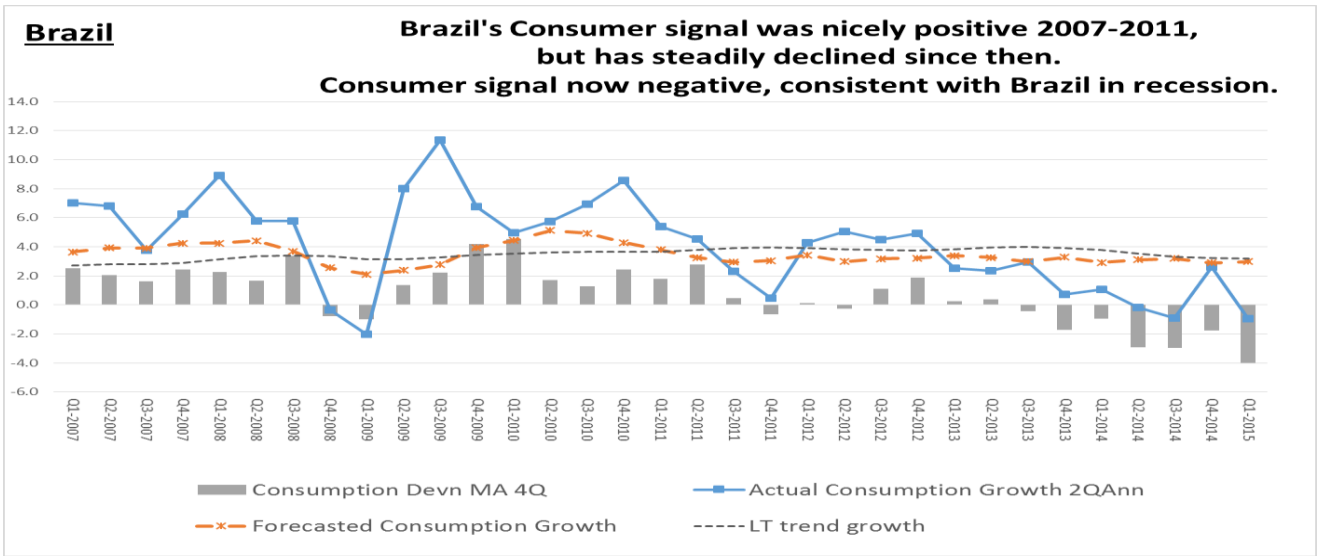

Korea
From 2010-2015, South Korea's Consumers have held back spending relative to stock market performance and real GDP growth. Is this conservatism or pessimism?
Consumption Devn MA 4Q
Actual Consumption Growth 2QAnn
Forecasted Consumption Growth
LT trend growth

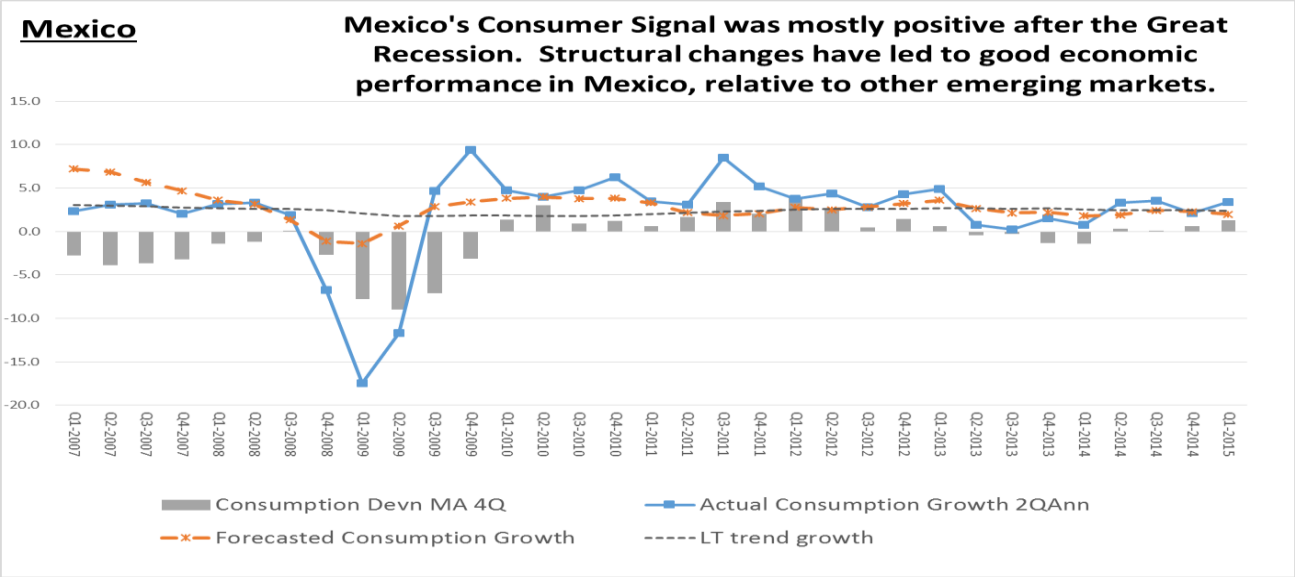

China
China's Consumer Signal was quite positive in 2008-10 (using Retail Sales data). Slowing retail sales growth while stocks surged mid 2014-mid 2015 showed consumers holding back, a negative signal.
Consumption Dev'n MA 4Q
Actual Consumption Growth 2QAnn
Forecasted Consumption Growth
LT trend growth


India
India's Consumer signal was nicely positive 2007-2010, but declined sharply in 2011-2013. Since then, consumer spending growth is up, but lagging stock gains, giving a negative signal.
Consumption Devn MA 4Q
Actual Consumption Growth 2QAnn
Forecasted Consumption Growth
LT trend growth


Indonesia
Indonesia's consumption growth was very steady 2007-2015.
Consumer signal: positive when stocks were weak, negative when stocks were strong. Slow growth gave negative signal in 2014-15.
Consumption Devn MA 4Q
Actual Consumption Growth 2QAnn
Forecasted Consumption Growth
LT trend growth


Canada
Canada's Consumer Signal was positive and > U.S. signal from 2007-2014, reflecting a more resilient economy. In 2014-2015, Canada's Consumers dropped to neutral, as energy prices plunged.
Consumption Devn MA 4Q
Actual Consumption Growth 2QAnn
Forecasted Consumption Growth
LT trend growth


Brazil
Brazil's Consumer signal was nicely positive 2007-2011, but has steadily declined since then.
Consumer signal now negative, consistent with Brazil in recession.
Consumption Devn MA 4Q
Actual Consumption Growth 2QAnn
Forecasted Consumption Growth
LT trend growth



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