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## Evaluating the Bloomberg ® Consumer Comfort Index <sup>TM</sup> in Predictive Analysis and Stock Market Relationships

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The Bloomberg Consumer Comfort Index (CCI) is a weekly, probability-based survey of consumer attitudes conducted continuously since December 1985.<sup>2</sup> Owned and produced by Langer Research Associates, the CCI has been branded by Bloomberg L.P. since 2011.

The index is closely followed for its high frequency measurement of the American public's economic attitudes, long-term historical trend and concurrent and predictive validity in relation to a variety of other economic indicators. This paper extends previous research by describing the CCI's utility in predicting other economic indicators, with personal expenditures as a test; and its potential relationship with stock market prices.<sup>3</sup>

#### Using the CCI to Predict Personal Expenditures

There are substantial theoretical grounds for a correlation between consumer confidence and consumer spending. Katona (1975) argues that consumption should be seen not only in light of ability to pay, but also willingness to pay, both of which should be connected to confidence. Al-Eyd et al. (2009) point out that an increase in confidence should lead an increase in consumption.

Given its importance in GDP, considerable research has sought to forecast personal expenditures, traditionally by using variables including income growth, unemployment, share prices and U.S. Treasury bill rates. We explored whether consumer sentiment can improve such forecasts, comparing the three

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<sup>&</sup>lt;sup>2</sup> See CCI results at COMF < GO > on the Bloomberg terminal, <u>http://consumercomfortindex.com</u> for background, <u>http://www.langerresearch.com/uploads/Bloomberg\_CCI\_Fact\_Sheet.docx</u> for a methodological fact sheet and <u>http://www.langerresearch.com/uploads/CCI\_Sample\_Comparison\_AAPOR\_2013.pdf</u> for full details on the survey

methodology, as presented at the 2013 annual meeting of the American Association for Public Opinion Research.

<sup>&</sup>lt;sup>3</sup> The main analysis presented here was conducted by Pavle Gegaj, then of the University of Montenegro, with review by Gary Langer and Julie Phelan, Langer Research Associates.

longest-standing consumer confidence measures – the monthly University of Michigan Index of Consumer Sentiment, the monthly Conference Board Consumer Confidence Index and the weekly CCI.

Expenditures are reported quarterly. For comparability, we transformed the CCI (through 2012) into a monthly index using the last data point of any given month as that month's value; we then added three months of data for each index to represent each quarter. We used these values to forecast personal expenditures and each of its subcategories – motor vehicle expenditures, goods excluding motor vehicles, durable goods excluding motor vehicles and services.

In a first series of regression models we used four quarterly lags of consumer confidence to explain expenditures. We then added contemporary consumer confidence to the equation, testing whether it improved the prediction of expenditures (released on a one-month delay).

The first part of Table 1, listing the adjusted R<sup>2</sup> for each model, shows that consumer confidence does explain a substantial amount of variance in personal expenditures.<sup>4</sup> Relative to the others, the CCI best explains expenditures on durables and motor vehicles, the Conference Board on goods excluding motor vehicles and Michigan on total expenditures and expenditures on services.<sup>5</sup>

In a second series of models, we added contemporary confidence values to these predictors. As shown in the second part of Table 1,<sup>6</sup> the adjusted  $R^2$  was notably higher than the original models approximately half of the time, indicating that current confidence significantly improved these models, explaining variance beyond what was explained by lagged confidence.

		Conferen	ce	CCI	CCI	CCI Buying	
	CCI	Board	Michigan	Economy	Finances	Climate	
	Adjusted	$\mathbf{R}^2$ for models	including for	ır lags of quar	terly consume	er confidence	
	Overall index			CCI subindices			
Personal expenditures overall	.1941	.2456	.2493	.1747	.1795	.1614	
Motor vehicles	.0809	.0353	.0155	.0920	.0063	.0367	
Goods, excl. motor vehicles	.0865	.1143	.0959	.0671	.0915	.0778	
Services	.1918	.3087	.3330	.1826	.1856	.1716	
Durables, excl. motor vehicles	.1504	.1463	.1375	.1090	.0910	.1727	

#### Table 1 - Amount of variance in personal expenditures explained by consumer confidence

 $<sup>{}^{4}</sup>$  R<sup>2</sup> is a measure of the amount of variance in the outcome variable (in this case, personal expenditures) that is explained by the predictor variables (in this case, four lags of consumer confidence). For example, the table shows that 19 percent of the variability in personal expenditures is predicted by differences in the CCI.

<sup>&</sup>lt;sup>5</sup> Jonsson and Linden (2009) say individuals are better at estimating their own situation than the overall economy; this suggests that the CCI's buying climate and personal finance subindices may be better in predicting consumption than the economy subindex. This holds true only in the models predicting expenditures on durable goods, in which the CCI buying climate subindex is a stronger predictor than the economy subindex.

<sup>&</sup>lt;sup> $^{6}</sup> Asterisks indicate a statistically significant improvement in R<sup><math>^{2}$ </sup> over the models without contemporary confidence.</sup>

						CCI
		Conference	:	CCI	CCI	Buying
	CCI	Board	Michigan	Economy	Finances	Climate
	Overall index			CCI subindices		
Personal expenditures overall	.1937	.2872***	.2736**	.1774	.2291***	.1540
Motor vehicles	.0713	.0512	.0397*	.0877	.0063	.0331
Goods, excl. motor vehicles	.0801	.1334*	.0987	.0760	.1101*	.0733
Services	.2010	.3261*	.3401	.1904	.2348***	.1696
Durables, excl. motor vehicles	.2625***	.2622***	.2496***	.2163***	.2278***	.2355***

Our next step was to see if these measures improved the explanatory power of traditional models used for predicting personal expenditures. We first predicted personal expenditures using a traditional baseline model, including personal income growth, stock market prices measured by the S&P 500, the three-month T-bill rate, unemployment and lagged personal expenditures as predictors. We then tested models that added the four lagged values of consumer sentiment as predictors. By comparing these models, we could determine how much additional variance in expenditures was explained by consumer sentiment. As above, we then ran additional models with contemporary confidence added as a predictor.

The first part of Table 2 shows the changes in adjusted  $R^2$  that resulted from adding lagged consumer sentiment to each of the traditional baseline models. The addition of lagged versions of the CCI improved the models predicting motor vehicle and durable expenditures by small but statistically significant amounts (4.1 and 4.5 percent, respectively). The buying climate subindex of the CCI, moreover, was particularly useful for improving the traditional model – for example, it explained an additional 9.6 percent of the variance in expenditures on durable goods. Neither the Conference Board nor Michigan indices improved upon the baseline model.

The second part of Table 2 shows the change in modeling results when contemporaneous values also were added as predictors. While all three consumer indices improved some of the traditional baseline models, the CCI did so most strongly – explaining an additional 5.6 percent of the variance in spending on goods overall and 7.3 percent of the variance in spending on durables.

In short, even with usual predictors included, consumer confidence – and especially the CCI – can contribute unique explanatory power to models predicting personal expenditures. A further step would be to explore using the CCI in models predicting other economic indicators.

	CCI	Conference Board Index	Michigan Index	Economy Index	Finance Index	Buying Index	
	Increase of adjusted $R^2$ when augmenting baseline equation with four lags of quarterly CCI data						
	Overall index			CCI subindicies			
Total	.0002	.0042	.0111	.0011	0081	.0048	
Motor vehicles	.0407*	.0207	0075	.0316*	.0111	.0358**	
Goods, excl. motor vehicles	.0070	0179	0084	0064	0189	.0202*	
Services	.0001	.0057	0001	.0031	.0039	0068	
Durables, excl. motor vehicles	.0447*	.0047	.0026	.0262*	0228	.0959***	
	Increase of adjusted R <sup>2</sup> when augmenting baseline equation with contemporary consumer confidence and its four lags						
	Overall index			CCI subindicies			
Total	0006	.0067	.0170	0041	0052	.0049	
Motor vehicles	.0218*	.0368*	.0059	.0118	.0383*	.0457**	
Goods, excl. motor vehicles	.0559**	0032	.0153*	.0195*	0021	.0702***	
Services	0051	0001	.0028	0066	0069	0061	
Durables, excl. motor vehicles	.0733***	.0151*	.0443*	.0342*	.0455**	.0983***	

Table 2 - Increase in explanation of variance in personal expenditures produced by adding consumer sentiment to a traditional model

An additional test of the relationship between the CCI and personal expenditures was reported by Bloomberg Finance economists Robert Lawrie and Joseph Brusuelas in the "Bloomberg Brief" report of May 6, 2014. They correlated an index derived from a separate element of CCI data – measuring consumer expectations on a monthly basis – with personal expenditures, finding that it provides "a clear leading indicator for investors on personal consumption." Further exploration of the relationship of these variables with personal expenditures is warranted.



#### Exploring the CCI's Potential Relationship with Stock Prices

A substantial number of papers have explored consumer sentiment and stock market movements. Two theories pertain: First, that consumer sentiment affects consumption, which in turn should impact companies' revenue and profitability, translating to market returns. Second, more directly, if consumer sentiment is a proxy for investor sentiment, there should be a connection between measures of confidence and stock prices.

Previous work has not found that consumer sentiment causes stock market movements; indeed it indicates a stronger effect of lagged stock prices on sentiment than vice versa. Other work has explored whether correlations between consumer sentiment and stock market returns are conditioned on the size of the company, its stock's volatility and the possibility of arbitrage, on the hypothesis that higher consumer sentiment misleads retail investors into overvaluing small-company stocks, which are harder to arbitrage.

Taking a different direction, we examined the potential interaction of consumer sentiment with the stock market in terms of returns: hypothetically buying one stock unit on any rise in the CCI, selling all units on any fall in the CCI and holding on no change. Using CCI data from 2004-2012, we found differences in comparison with a buy-and-hold approach. Most were positive, some sharply. Others were negative, including, in a period that included a deep recession, the relationship with two discount merchants.

Asset	June 2004 - January 2012			
	CCI	Buy and hold		
Dow Jones	134.75%	22.51%		
Microsoft	144.07%	32.53%		
Exxon	243.92%	126.69%		
Walmart	-141.46% <sup>7</sup>	29.64%		
General Electric	170.79%	-24.11%		
Coca-Cola	112.47%	65.03%		
Total S.A.	248.66%	57.13%		
McDonald's	-153.86%	356.63%		
PepsiCo.	90.45%	44.08%		

#### Table 3. CCI vs. buy-and-hold

<sup>&</sup>lt;sup>7</sup> Buying, holding or selling the underlying asset every week means it's possible to lose more than the initial single-unit investment. Hence, losses can exceed 100 percent of the starting value.



Figure 1. Examples comparing use of CCI (red, top) vs. buy and hold (blue, bottom)

Notably, returns did not randomly oscillate through the period, to end on the positive or negative side of the stock price, but generally were systematically positive and increasing, or negative and decreasing, throughout the period studied.

A similar evaluation reported by Lawrie and Brusuelas in the Bloomberg Brief of May 6, 2014 tested the CCI as a "momentum indicator," comparing buying and holding the S&P 500 to CCI-based buy/sell ("long/flat") and long/short strategies – in the former, buying on a rise in the CCI, selling on a decline; in the latter, buying on a rise in the CCI, and shorting on a decline – for the period from 2000-2014. They reported a cumulative gain of 28 percent on buy and hold compared with 104 percent and 133 percent on the two CCI-based strategies, with Sharpe ratios of -0.01, 0.28 and 0.22, respectively. (A higher Sharpe ratio indicates better risk-adjusted performance.)



These results find a potential connection between the weekly CCI and stock market returns. Additional explorations could include:

- Repeating the test longer-term, using other subperiods, moving averages and more complex trading approaches.
- Testing further using additional indices, specific sectors and individual companies; testing CCI subindices as well as the full index; and testing bond yields.
- Testing the CCI in conjunction with other potential correlates.
- Further examining positive vs. negative results.

### Future Directions

A report presented in May 2011 at the annual meeting of the American Association for Public Opinion Research demonstrated the CCI's predictive validity against a range of other economic indicators.<sup>8</sup> This report extends that research, showing positive results evaluating the CCI's relationship with personal expenditures<sup>9</sup> and stock prices. Additional research is warranted.

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<sup>&</sup>lt;sup>8</sup> See <u>http://www.langerresearch.com/uploads/Phelan Langer CCI 2011.doc</u>

<sup>&</sup>lt;sup>9</sup> More preliminary work finds that the CCI improves predictions the Michigan and Conference Board indices compared with models simply using previous values of each index alone.

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