The Predictive Power of the Index of Consumer Sentiment in Korea*

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This paper examines the suitability of the consumer sentiment index for forecasting consumption expenditures in South Korea. The two most widely known measures of consumer sentiment in South Korea - from Samsung Economic Research Institute and the Bank of Korea - were used for empirical testing. Only the future consumption index released by the Bank of Korea was found to have some predictive power in forecasting consumption growth. It needs to be recognized, however, that the predictive power of the future consumption index from the Bank of Korea is restrictied in that the formal announcement of the index is made one and half a months later than that of Samsung Economic Research Institute.

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I. Introduction

Consumption expenditure plays an important role in a national economy. In Korea, consumption expenditure represents about 60 percent of GDP, and changes in consumption expenditure have a significant influence on business fluctuations.[1)] In spite of strong export growth, the recovery of the Korean economy has been delayed because of depressed consumption. In the United States, the share of consumption expenditure in GDP is about 70 percent, which is larger than in Korea. The Bush tax cut in the first half of 2003 was implemented for economic recovery through consumption growth, and it is considered to be an important reason for the strong recovery of the United States economy since the second half of 2003.

Economists have tried to forecast consumption expenditure, which has significant influence on the business cycle. Some economists including Hall(1978) argue that since consumption follows a random walk, it is not possible to predict changes in consumption. However others consider that it is still possible to forecast consumption spending and we need to pay attention to the consumer sentiment index(CSI) as an indicator of future consumption changes.

The CSI indicates the mind-set of consumers who make consumption decisions. That is, the CSI represents consumer evaluation and expectations as to present and future economic conditions, and reveals consumer psychology that is hard to obtain with traditional economic variables. Thus, the CSI is expected to be a useful tool in forecasting future consumption. However others argue that because the CSI is influenced by present economic conditions, it does not predict future consumption but only reflects the current state. In the final analysis, the answering the question of whether the CSI is useful in predicting future consumption depends upon empirical tests.

The purpose of this paper is to test hypotheses about the relationship between the CSI and future consumption, i.e., to examine whether the CSI has any predictive power once one controls for information contained in other variables available to economic forecasters. Previous empirical results vary depending on countries or reporting institutes of the CSI. While the data of the United

1) Consumption expenditure in GDP account consists of private consumption expenditure and government consumption expenditure, but the consumption expenditure in this paper only considers private consumption expenditure. In 2002, private consumption expenditure and government consumption expenditure represent 60.2 percent and 10.6 percent of Korean GDP, respectively. This paper does not consider government consumption expenditure because it is a part of government fiscal policy and controlled directly by the government for its policy purposes.

States(Carroll, Fuhrer, and Wilcox, 1994) and the United Kingdom(Acemoglu and Scott, 1994) showed that the CSI is useful in predicting future consumption, studies with the data of Hong Kong(Fan and Wong, 1998) and New Zealand(Goh, 2003) did not indicate that the CSI was useful. Interestingly, even with the data from the United States, Bram and Ludvigson(1998) reported that the Conference Board Index contains meaningful information about future consumption, but not so in the case of the Michigan University Index. However, Ludvigson(2004) examined the United States data until 2002 and found that neither the Conference Board Index nor the Michigan University Index provided significant useful information about future consumption. Croushor(2004), who considered the availability of data, also found that the CSI′s in the United States were not useful in consumption forecast.

In Korea, the CSI is widely used as an indicator of future consumption expenditure. Despite its popularity, the reliability of the index has not been thoroughly examined. There has been little academic research on the predictive power of the Korean CSI′s for future consumer spending. The reason for the lack of research on the CSI in Korea seems to lie in the short history of surveys of consumer confidence. Samsung Economic Research Institute(SERI) has reported the CSI from the 4th quarter of 1991, the Bank of Korea(BOK) from the third quarter of 1995, and the Korea National Statistical Office(KNSO) from November in 1998. A study by Choi(2002) seems to be the only one on Korean CSI′s. Choi(2002) reports that the SERI CSI provides significant information about future consumption, but his results have a problem in that sum of the coefficients for the first three quarters appears to be zero.

Currently the CSI compiled by SERI provides quarterly data for 12 years, and the BOK reports quarterly data for 8 years.[2)] With these accumulated data on the CSI in Korea, it seems to be time for a meaningful study on the predictability of the CSI on consumer spending.

The empirical model in this paper is suggested by Carroll et al.(1994) and Bram and Ludvigson(1998), and we test the predictability of Korean CSI based especially on the model in Bram and Ludvigson(1998). These are the baseline models widely used in testing the CSI. This paper investigates not only the baseline models but also modified models that consider proxy variables to overcome the data availability problem, that consider changes of the CSI from the previous quarter, or that include changes of consumption expenditure from the previous year.

2) If we consider the consumption planning index of the BOK, the BOK data series shrinks to 7 years.

The empirical method in this paper focuses on the changes in adjusted $R^2(\bar{R}^2)$ when the CSI is added into the explanatory variable. If the adjusted $R^2(\bar{R}^2)$ increases significantly, we consider that the CSI is useful in predicting future consumption expenditure. Although this approach looks simple, it provides a clear and useful tool in evaluating the predictability of the CSI. If the CSI appears to be useful in predicting consumption from our empirical test, we could use this index for business cycle forecasting, which is greatly influenced by changes in future consumption. On the other hand, if our empirical evidence reveals a serious limitation of the CSI, we need to be very cautious in using it.

The variables considered in this paper are macroeconomic variables. In general, the variables included in investigating the predictability of the CSI for future consumption are macroeconomic variables (Carroll, et al.(1994), Acemoglu and Scott(1994) etc.). Microeconomic variables such as the increasing number of individuals with bad credit history and unstable employment status, which have often been cited as important factors in the recent lack of consumption growth in Korea by several economic research institutes such as the Korea Development Institute and the BOK are not included in our empirical analysis.

In Chapter II, we briefly explain the concept of the CSI and different types. We outline the methodology of investigation for predictability of the CSI on future consumption, the data in this analysis, and our baseline empirical model in Chapter III. We test the baseline model and the modified model, and interpret the results in Chapter IV. The usefulness of the CSI is determined not just by the relationship between the CSI and consumption expenditure, but by additional predictability of the CSI beyond the information contained in other economic variables. In Chapter V, we provide a conclusion and some implications.

II. An Overview of the Consumer Sentiment Index

The consumer sentiment index(CSI), a kind of indicator that represents economic agents′ perception of economic conditions, is compiled from the numbers indexed from consumer surveys on consumers′ financial situation and economic condition, and their intention to buy consumption goods. The CSI has been developed under the mantle of behavior at psychological economics. Although the CSI is not a traditional economic indicator, it is recognized as a useful tool in understanding consumption fluctuations and business cycles

because it measures psychological changes of economic agents who determine consumption spending. Especially in the United States, changes in consumption expenditure on housing and cars play an important role in determining the phase of the business cycle.

One of the leading representative CSIs in the United States is the University of Michigan′s Index of Consumer Sentiment, which began in 1946. The University of Michigan also reports the present conditions index reflecting consumer confidence in the present economic situation and the expectations index indicating consumer confidence in future economic situation.

Another widely-followed measure of U.S. consumer sentiment is the Conference Board′s Consumer Confidence Index launched in 1967. It also reports the present conditions index and the expectations index like the Michigan index. The Conference Board index and the Michigan index typically show a similar fluctuation pattern (correlation coefficient = 0.78), but sometimes they give conflicting signals.

In Korea, the Samsung Economic Research Institute(SERI) began to report a CSI named ′the Consumer Attitude Index′ in 1991, the first in Korea. In 1995, the Bank of Korea(BOK) launched ′Consumer Attitude Survey′ and it releases indexes such as the present financial condition index and the financial condition expectations index. The Korea National Statistical Office(KNSO) started ′Consumer Expectations Survey′ at the end of 1998 and reports the consumer′s present confidence index, the consumer expectations index, etc. every month. The indexes from SERI and BOK are reported quarterly.

The SERI survey is done at the end of the first month of the specific survey quarter, the BOK is from the end of the second month to the beginning of the third month of the survey quarter, and the KNSO is every month in the week on which the 22nd day falls. When SERI and BOK are compared for timeliness each quarter, the BOK starts its survey about one month later than SERI.

In the questionnaire, SERI compares the economic conditions between the current situation and the situation one year before/later, while BOK and KNSO compare the current status with that 6 month before/later. That is, SERI questions how consumers evaluate the current condition relative to that one year earlier and how they expect economic conditions to be during the one-year period from the current survey period. In the questions of BOK and KNSO, consumers are asked to compare the current economic conditions with the condition six month, before and also how they expect their economic conditions to be in the next six months. This difference seems to come from the fact that SERI follows the Michigan survey, which compares the economic conditions

relative to one year before/later, and BOK and KNSO are modelled on the Conference Board survey, which considers conditions of six month, before/later.

The three CSI′s in Korea fluctuate in a similar pattern. When we calculate the correlation coefficients between the representative indexes, they are 0.85 between SERI and BOK, 0.81 between SERI and KNSO, and 0.94 between BOK and KNSO.[3] The Korean CSI′s also have some periods moving different directions like the U.S. case. For example, in the 4th quarter of 2003, the indexes of BOK and KNSO showed a recovery in consumer sentiment, but SERI′s index was deteriorating.

III. Methology

1. Empirical Model

This paper tests the predictive power of Korean CSI′s for future consumption expenditure based on the generally used models in the literature as suggested by Carroll et al.(1994) and Bram and Ludvigson(1998). We estimate the following baseline model.

$$\Delta \log(C_t) = \alpha_0 + \sum_{i=1}^{N} \beta_i S_{t-i} + \varepsilon_t \quad (1)$$

$$\Delta \log(C_t) = \alpha_0 + \gamma Z_{t-1} + \varepsilon_t \quad (2)$$

$$\Delta \log(C_t) = \alpha_0 + \sum_{i=1}^{N} \beta_i S_{t-i} + \gamma Z_{t-1} + \varepsilon_t \quad (3)$$

C is real private consumption expenditure, $\Delta log(C_t)$ is the growth rate of real private consumption expenditure, S is the CSI, and Z is the control variable. Equation (1) includes the CSI as the only independent variable and test whether the index explains future consumption spending. Equation (2) introduces control variables without the CSI, and equation (3) examines the additional predictive power of the CSI beyond the predictive power of the control variables. Here ′the additional predictive power′ depends on the size of the change in the adjusted R^2 in equation (3) from equation (2) as well as the estimated coefficients of the CSI in equation (3).

3) SERI announces a representative index called Consumer Attitude Index, but BOK and the KNSO do not report representative indexes. Thus we construct representative indexes for BOK and KNSO using a method similar to SERI; KNSO reports the index monthly, so we use the quarterly average to calculate the correlation coefficients.

This kind of baseline model was suggested by Carroll *et al*.(1994) and Bram and Ludvigson(1998), and commonly used in previous studies on the usefulness of the CSI. Carroll et al.(1994) test the predictive power of the CSI on private consumption expenditure by comparing equations (1) and (3) after controlling other economic variables. Bram and Ludvigson(1998) compare equations (2) and (3), and focus on additional predictive power of the CSI over typical macroeconomic variables. This paper considers the model of Carroll et al.(1994), but mainly uses a version of Bram and Ludvigson(1998)′s model.

This paper also examines three kinds of modified models to confirm stability of the test and to improve reliability of the test results. First, we consider the availability of the data. Consumption expenditure is publicized a few months later than the CSI reports. Thus, in forecasting consumption expenditure for the next quarter, current CSI is available, but current consumption expenditure is not. The consumption expenditure data for the current quarter is announced at the end of the next quarter. That is, for example, consumption expenditure of the fourth quarter is available at the end of the following March. When we want to forecast consumption expenditure for the first quarter of next year at the end of the 4th quarter, the most recent consumption data are from the third quarter. Since consumption expenditure and the wholesale-retail sales index are highly correlated, we use the wholesale-retail sales index as a control variable in forecasting consumption expenditure for the next quarter.[4)]

Second, we may need to consider the changes in the CSI instead of the level of CSI in estimating consumption equations. Most of the variables in the estimation equation are growth rates while the CSI is used as a level. The main reason for using the level data of the CSI is that questions in consumer surveys asks consumer evaluation of the changes of economic conditions between two periods; thus there might be little reason to obtain changes or growth rates again. However, while the period of comparison in the CSI is six months or one year, the estimation equation includes lagged variables of 1~2 quarters (1~4 quarters in most foreign studies), thus the comparison periods are not clear in the estimation equation. Moreover, since the representative CSI is derived from the average of the confidence indexes of present and future expectations, the comparison periods become more blurred. Thus it seems to be necessary to check whether the changes in the CSI help explain future consumption. Moreover, quarterly changes in consumption may fit more closely with the changes in the CSI instead of the level of the CSI. Since unit root tests of a few

4) During the sample period of our analysis, from the 4th quarter of 1991 to the third quarter of 2003, the correlation coefficient between the consumption expenditure and wholesale-retail sales index is 0.88.

CSI′s could not reject the null hypothesis of unit root, differentiation of the data seems to help in securing stability of the estimation results.

Third, it may be meaningful to consider the year-on-year growth rate of consumption instead of the growth rate from the previous quarter. This is because consumer evaluation of economic conditions seems to be influenced by comparison from the previous year, especially in Korea where most of macroeconomic variables including consumption expenditure are announced in year-on-year growth rates. Thus, the CSI may be more correlated with the year-on-year growth rate of consumption than the growth rate of consumption from the previous quarter. Moreover, the smoothly changing pattern of the year-on-year growth rate of consumption may fit better with the slow movements of the CSI rather than the growth rate of consumption from the previous quarter.

2. Variables and Data

Carroll et al.(1994) include growth in consumption expenditure and labor income as control variables. Labor income is defined as wages and salaries plus transfers minus personal contributions for social insurance, all deflated by the implicit deflator for personal consumption expenditure. In Korea, since quarterly labor income data are not reported in the GDP account, we use disposable income as a control variable. Carroll et al.(1994) used labor income instead of disposable income as a control variable because the kind of income affecting quarterly changes in consumption is labor income rather than capital income. Consumers earning capital income most likely make consumption decisions according to their life cycles, thus changes in current income may not lead directly to the changes in current consumption. When we used disposable income as a control variable in estimating equations for the U.S., however, we found similar results to Carroll et al.(1994). Hence in our Korean study, inclusion of disposable income as a control variable will not change the estimation results significantly.

Bram and Ludvigson(1998) add financial market indicators as control variables such as the real S&P 500 index growth rate and the changes in the three-month Treasury bill rate. These financial market variables reflect expectations about the business cycle and may provide useful information on consumer spending. Following Bram and Ludvigson(1998), we include an interest rate and a stock price as control variables. The interest rate is the change in the three-month CD rate, and the stock price is the growth rate of the real Korean Composite Stock Price Index, where the real value of the composite

stock price is calculated using the implicit deflator for private consumption expenditure. Therefore, the control variables considered in this paper are past real consumption growth, real disposable income growth, changes in the three-month CD rate, and real stock price growth.

In most of the previous foreign studies, the lags of independent variables in the regression equation are 1~4 quarters. When we applied Akaike and Schwartz criteria to determine the lags for Korean data, the appropriate lags were 1~2 lags, so we include 1~2 lags of independent variables in the regression. For Korean data where time series of the CSI data is relatively short, the lags in the equation may need to be short so as not to lose degrees of freedom.

This paper investigates the predictive power of the CSIs complied by SERI and BOK. The sample period for the SERI index is 1991:4Q~2003:3Q, and for the BOK index it is 1996:2Q~2003:3Q.[5] The SERI announces ′a representative index′ named ′the Consumer Attitude Index′. Since the BOK does not report a representative index, we derive a representative index for the BOK similar to the SERI and compare those two indexes in the analysis. The representative index provides consumer confidence with one number, but it does not indicate consumer confidence both for the present and for the future. Hence, we separate an expectations component from the representative index to construct ′the expectations index′ to test the predictive power. The questionnaire in the survey includes questions on future consumption planning, and the SERI reports the answers to that question with ′the future consumption index′ and the BOK with ′the consumption planning index′. Since answers from consumers on consumption planning may have information relevant for predicting future consumption, we will examine the predictability of ′the future consumption index′ from both institutes.

The consumption expenditure data in this paper are total private consumption expenditure and the components of total private consumption expenditure such as durable consumption expenditure, semi-durable consumption expenditure, non-durable consumption expenditure, and service consumption expenditure. The reason for breaking down total consumption expenditure into detailed components of consumption is to consider the possibility that consumer sentiment may affect consumption behavior differently with different consumption items. For example, the changes in consumer sentiment may affect spending on durable goods like cars and refrigerators stronger than non-durable goods like food.

5) The BOK began to report the CSI from 1995:3Q, but since the consumption planning index was released from 1996:2Q, the sample period for the BOK in the analysis starts at 1996:2Q.

Table 1 Summary of the Data

Variable Name	Sample Period	Derivation	Source
SERI Representative Index	1991:4Q ~2003:4Q	Consumer Attitude Index (= Average of Present financial condition index, Future financial condition index, Present economic condition index, Future economic condition index, and Durable good purchase index)	SERI
SERI Future Index	1991:4Q ~2003:4Q	Average of Future financial condition index and Future economic condition index (calculated by authors)	SERI
SERI Future Consumption Index	1994:2Q ~2003:4Q	Future consumption spending index	SERI
BOK Representative Index	1996:2Q ~2003:4Q	Average of Present financial condition index, Future financial condition index, Present economic condition index, Future economic condition index, and Future consumption planning index (calculated by authors)	BOK
BOK Future Index	1996:2Q ~2003:4Q	Average of Future financial condition index, Future economic condition index, and Future consumption planning index (calculated by authors)	BOK
BOK Future Consumption Index	1996:2Q ~2003:4Q	Future consumption planning index	BOK
Growth Rate of Private Consumption Expenditure	1991:4Q ~2003:3Q	Log differencing publicized seasonal adjusted real value from the previous quarter; Annualized (Year-on-year growth rate is from differencing a year ago)	BOK
Growth Rate of Household Durable Good Consumption Expenditure	1991:4Q ~2003:3Q	Seasonal adjustment using Census X-12 Multiplicative method from EViews; Log differencing seasonal adjusted real value from the previous quarter; Annualized (Year-on-year growth rate is from differencing a year ago)	BOK
Growth Rate of Household Semi-Durable Good Consumption Expenditure	1991:4Q ~2003:3Q	Same as the above	BOK
Growth Rate of Household Non-Durable Good Consumption Expenditure	1991:4Q ~2003:3Q	Same as the above	BOK
Growth Rate of Household Service Consumption Expenditure	1991:4Q ~2003:3Q	Same as the above	BOK
Growth Rate of Disposable Income	1991:4Q ~2003:3Q	Making the nominal income real using implicit deflator from private consumption expenditure data in GDP account; Seasonal adjustment using Census X-12 Multiplicative method from EViews; Log differencing seasonal adjusted real value from the previous quarter; Annualized	BOK

Variable Name	Sample Period	Derivation	Source
Growth Rate of Stock Price Index	1991:4Q ~2003:3Q	Calculating quarterly average from daily index. Getting real value using implicit deflator from private consumption data in the GDP account; Log differencing from the previous quarter	FnGuide
Change in CD Rate	1991:4Q ~2003:3Q	91 day CD rate (annualized); Differenced from the previous quarter	BOK
Growth Rate of Wholesale-Retail Sales Index	1991:4Q ~2003:3Q	Log differencing the announced seasonal adjusted real index (annualized); Growth rate for the first two months is growth of the average index of the first two month from the previous quarter	KNSO

Note : Annualized by multiplying log differenced number from the previous quarter by four.

The variables used in the estimation are summarized in [Table 1]. The names of the sub-categories of the CSI's released by the SERI and the BOK are different; thus we adopt common names in the analysis such as 'representative index', 'future index', and 'future consumption index'. Other economic variables are seasonally adjusted real values. If the data are released without seasonal adjustment, we apply Census X-12 Multiplicative method from Eviews for seasonal adjustment. The deflator used to derive real value is the implicit deflator from the private consumption expenditure in the GDP account.

The ADF(Augmented Dickey-Fuller) test is used for unit root test, and appropriate lags are set based on the Akaike criterion. For most of the variables, the null hypothesis of unit root was rejected at the 5 percent significance level, but the SERI representative index was rejected at the 10 percent level, and the SERI future consumption index was not rejected even at the 10 percent level. Although those indexes may not be free from stability problems, following the previous studies such as Carroll et al.(1994), we include the level of the CSI's as independent variables in the baseline regression model. In the modified model estimation, we will estimate the regression with first difference of the CSI, and see if there is any change.

Table 2 Unit Root Test Results

Variable Name	Lag	t-value	p-value
Growth Rate of Private Consumption Expenditure	0	-5.075	0.000 ***
Growth Rate of Household Durable Good Consumption Expenditure	0	-4.324	0.001 ***
Growth Rate of Household Semi-Durable Good Consumption Expenditure	0	-3.164	0.029 **
Growth Rate of Household Non-Durable Good Consumption Expenditure	0	-6.337	0.000 ***
Growth Rate of Household Service Consumption Expenditure	0	-6.003	0.000 ***
Year-on-year Growth Rate of Private Consumption Expenditure	1	-3.517	0.012 **
SERI Representative Index	1	-2.884	0.055 *
Change in SERI Representative Index	0	-5.694	0.000 ***
SERI Future Index	0	-3.115	0.032 **
SERI Future Consumption Index	1	-2.280	0.184
Change in SERI Future Consumption Index	0	-5.237	0.000 ***
BOK Representative Index	3	-3.288	0.026 **
BOK Consumption Index	3	-3.425	0.019 **
BOK Future Consumption Index	1	-3.496	0.016 **
Growth Rate of Disposable Income	0	-4.387	0.001 ***
Growth Rate of Stock Price Index	0	-4.828	0.002 ***
Change in CD Rate	1	-5.756	0.000 ***
Growth Rate of Wholesale-Retail Sales Index	0	-4.166	0.002 ***
Growth Rate of Wholesale-Retail Sales Index for the first two months in a quarter	0	-4.968	0.000 ***

Notes : 1) ADF test with a constant; Lags determined from the Akaike criterion.
2) *, **, *** : Statistically significant at the 10%, 5%, and 1% levels, respectively.

IV. Emprical Results

1. Baseline Model

1) Representative Consumer Sentiment Index

Estimation results of equation 1 using the representative CSI as the only independent variable are shown in Table 3. Most of the sum of coefficients for the CSI have positive sign except durables.[6] That is, the consumer index and

6) In a polynomial distributed lag model, estimated coefficients generally have either positive or negative signs, so the effect of independent variables on dependent variable is often explained by the sum of estimated coefficients.

consumption growth are positively related.[7)]

However, adjusted R^2($\overline{R}^2$) for total consumption in the equation of SERI index is only 0.01. That is, the CSI explains only 1% of total consumption variation. In detailed consumption categories, adjusted R^2's are very low except for semi-durable goods, and Wald test(null hypothesis: $\beta_1 = \beta_2 = 0$) indicates that the coefficients are not statistically significant except for semi-durable goods.

For the estimation with the BOK indexes, the adjusted R^2 for total consumption is 0.29, but the coefficients are not significant in the Wald test. The adjusted R^2 of the BOK indexes are higher than the SERI indexes in most of the detailed consumption categories, but they are not statistically significant except for durables and semi-durables. Although durables are statistically significant, the result does not seem to be meaningful because the sum of the coefficients is negative.

In the analysis with the representative CSI, the SERI index and BOK index do not have a meaningful prediction power for future consumption. Except for the case of semi-durables, the indexes from the two institutions do not show significant and meaningful test results. When we consider adjusted R^2 only, however, the BOK index appears to have greater predictive power than the SERI index.

A possible reason for the high predictive power of the BOK representative index is the different sample period. The sample period of the SERI index is from 1992:2Q to 2003:3Q, while that of the BOK index is from 1996:4Q to 2003:3Q. Hence we make the sample period of the SERI index the same as that of the BOK index, and see if any difference occurs. However, we do not see any significant difference in the SERI index between the test results from the sample period of 1996:4Q to 2003:3Q and the whole sample period. Since the choice of sample period does not make any significant difference to the test results, we use all the available data in the estimation.

Since the questions in the SERI survey ask about the changes in a one-year

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For an example, Ludvigson(2004) used the sum of coefficients to explain the relationship between the CSI and future consumption expenditure.

7) In theory, the positive relationship between the CSI and future consumption is based on a high correlation between future consumption and future income (or future wealth) and the reflection of future income on CSI, which are suggested by the existence of rule-of-thumb consumers(Campbell and Mankiw, 1989) or liquidity constraints(Zeldes, 1989). At the same time, an increase in the CSI implies a drop in future uncertainty. Thus, consumers could reduce precautionary saving, increase current consumption, and decrease future consumption. Thus, the CSI and future consumption growth may have a negative relationship.(Carroll, 1992) In most of the empirical studies, however, the sum of coefficients of the CSI is positive, so the theory that relates CSI to future consumption based on a precautionary motive does not seem to be supported by empirical studies, at least in simple estimation models such as Carroll, et al.(1994) and Bram and Ludvigson(1998).

Table 3 Estimation Results (Representative Index)

$$\Delta \log(C_t) = \alpha_0 + \sum_{i=1}^{N} \beta_i S_{t-i} + \varepsilon_t \qquad (1)$$

Panel 1. SERI Representative Index (1992:2~2003:3)[8]

	Estimated Coefficient			$\bar{R}^2$
	Lag 1	Lag 2	Sum	
Total Consumption	0.591 ** (0.022)	−0.408 (0.106)	0.183	0.01 * (0.069)
Durables	1.808 * (0.054)	−1.834 (0.122)	−0.026	0.03 (0.147)
Semi-durables	2.042 *** (0.001)	−1.337 *** (0.004)	0.705	0.19 *** (0.003)
Non-durables	0.388 ** (0.043)	−0.282 (0.141)	0.106	−0.01 (0.110)
Services	0.190 (0.351)	−0.073 (0.701)	0.116	−0.02 (0.519)

Panel 2. BOK Representative Index (1996:4~2003:3)

	Estimated Coefficient			$\bar{R}^2$
	Lag 1	Lag 2	Sum	
Total Consumption	0.665 * (0.059)	−0.597 ** (0.041)	0.068	0.29 (0.107)
Durables	2.020 *** (0.009)	−2.065 *** (0.002)	−0.045	0.36 *** (0.005)
Semi-durables	1.288 *** (0.000)	−1.012 *** (0.000)	0.276	0.46 *** (0.000)
Non-durables	0.537 * (0.054)	−0.500 ** (0.040)	0.037	0.31 (0.113)
Services	0.319 (0.133)	−0.294 * (0.091)	0.025	0.20 (0.189)

Notes : 1) p-values in the parenthesis; The values in parentheses under $\bar{R}^2$ are the p-values with the null hypothesis $\beta_1=\beta_2=0$.; Newey-West standard errors are used to correct heteroscedasticity and serial correlation.
2) *, **, *** stand for significance levels of 10%, 5%, and 1%, respectively.

period while those in the BOK survey ask the changes in a six-month period, the two quarter lags in the estimation equation may result in higher predictive power for the BOK index. Thus, we estimate the equations with four lags, but the BOK index still seems to be better in prediction.[9]

8) When we estimate the models of Carroll et al.(1994) and Bram-Ludvigson(1998) with the U.S. data, in many cases the coefficients for the first lag are positive and those for the second lag are negative. Interpretation for this result has not been provided in the literature.

Table 4 Estimation Results (Control Variables)

$$\Delta \log(C_t) = \alpha_0 + \gamma Z_{t-1} + \varepsilon_t \qquad (2)$$

Panel 1. Independent Variables : Consumption, Disposable income, Stock price index, Interest rate (1~2 quarter lagged)

	Consumption	Disposable income	Stock price index	Interest rate
Total Consumption	0.650 (0.201)	−0.796 (0.298)	0.112 * (0.094)	0.740 (0.489)
Durables	0.696 (0.107)	−2.437 (0.275)	0.216 ** (0.012)	−1.347 (0.822)
Semi-durables	0.804 * (0.075)	−0.699 (0.119)	0.099 *** (0.004)	1.397 *** (0.006)
Non-durables	−0.099 (0.472)	0.044 (0.599)	0.256 (0.314)	−0.999 (0.573)
Services	0.426 (0.153)	−0.189 (0.221)	0.188 (0.218)	−0.399 (0.587)

Panel 2. Independent Variables : Consumption, Stock price index (1~2 quarter lagged)

	Consumption	Stock price index
Total Consumption	0.080 * (0.092)	0.283 * (0.062)
Durables	0.324 * (0.067)	0.447 ** (0.011)
Semi-durables	0.500 *** (0.001)	0.248 *** (0.000)
Non-durables	−0.107 (0.211)	0.241 (0.196)
Services	0.126 (0.654)	0.030 (0.382)

Notes : 1) Estimation period is 1992:2Q~2003:3Q; The values are the sum of the coefficients from lag 1 and 2.
2) The values in parentheses are the p-values with the null hypothesis $\beta_1=\beta_2=0$.; Newey-West standard errors are used to correct heteroscedasticity and serial correlation.
3) *, **, *** stand for significance levels of 10%, 5%, and 1%, respectively.

9) The estimation results from independent variables with four lags are:

$$\Delta \log(C_t) = \alpha_0 + \sum_{i=1}^{N} \beta_i S_{t-i} + \varepsilon \qquad (1)$$

	R^2				
	Total	Duriables	Semi-duriable	Non-duriables	Services
SERI Representative Index (1992:2Q ~ 2003:3Q)	-0.03 (0.235)	-0.01 (0.277)	0.17 ** (0.019)	-0.04 (0.381)	-0.07 (0.804)
BOK Representative Index (1996:4Q0 ~ 2003:3Q)	0.29 ** (0.043)	0.40 *** (0.001)	0.43 *** (0.003)	0.39 ** (0.033)	0.22 ** (0.025)

Notes : 1) The values in the parentheses are the *p*-values with the null hypothesis $\beta_1=\beta_2=0$.; Newey-West standard errors are used.
2) *, **, *** stand for significance level of 10%, 5%, and 1%, respectively.

Now we examine if the representative index has any additional predictive power over other economic variables. That is, we want to see the usefulness of the CSI based on the changes in the adjusted R^2 from equation (2) to equation 3, and the significance of the coefficients of the CSI in equation (3).

First, we estimate equation (2) with independent variables such as the lagged growth rate of consumption, disposable income, stock price index, and the lagged change of interest rate. The estimation results, as shown in Table 4, indicate that the stock price index is significant in explaining future consumption. Disposable income and interest rate are not significant in most of the cases, and the signs of the many coefficients are the opposite to what we expected. Using the four independent variables, we find lagged consumption was not significant, either. However, when we include only lagged consumption and stock price as independent variables, predictability of lagged consumption seems to increase. Considering this, and following the methods of other researchers, we include both lagged consumption and stock price among the control variables.

Next, Table 5 reports the usefulness of the CSI when both the CSI and control variables are included as independent variables. The coefficients of the SERI representative index are not significant and the adjusted R^2 does not increase. Semi-durables which were significant when only the CSI was included in the independent variable, are not significant, either.

The BOK index appears significant for durables, but it does not seem to be meaningful because the sum of coefficients is negative. The changes in the adjusted R^2 are very small except for durables. Semi-durables, which were significant in equation (1), are not significant in equation (3) with the SERI index, and neither the adjusted R^2 does not increase.[10] Overall, the representative indexes from both the SERI and BOK do not play any significant role in predicting future consumption.

2) Future Index and Future Consumption Index

The representative CSI is the average value of consumer sentiment on the current situation and future expectations. Although consumer evaluation of the current situation may affect future consumption, this seems to be more influenced by consumer′s expectation on future economy and future financial

10) When we estimate for semi-durables with the SERI index and also when we estimate for services with the BOK index, the adjusted R^2 decreases, which implies that the CSI is not a useful indicator in predicting those categories of consumption. It seems difficult to explain economic reasons for the drop of adjusted R^2 in our estimation with our limited information.

Table 5 Estimation Results (Representative Index & Control Variables)

$$\Delta \log(C_t) = \alpha_0 + \gamma Z_{t-1} + \varepsilon_t \qquad (2)$$

$$\Delta \log(C_t) = \alpha_0 + \sum_{i=1}^{N} \beta_i S_{t-i} + \gamma Z_{t-1} + \varepsilon_t \qquad (3)$$

Panel 1. SERI Representative Index & Control Variables

	Estimated Coefficient			$\bar{R}^2$	$\Delta \bar{R}^2$
	Lag 1	Lag 2	Sum		
Total Consumption	−0.492 (0.329)	0.656 (0.315)	0.164	0.25	0.01 (0.593)
Durables	−2.146 (0.108)	1.414 (0.387)	−0.732	0.30	0.01 (0.174)
Semi-durables	−0.437 (0.525)	0.577 (0.454)	0.140	0.48	−0.01 (0.747)
Non-durables	−0.298 (0.440)	0.521 (0.281)	0.223	0.18	0.02 (0.512)
Services	−0.352 (0.249)	0.379 (0.269)	0.027	0.11	0.00 (0.501)

Panel 2. BOK Representative Index & Control Variables

	Estimated Coefficient			$\bar{R}^2$	$\Delta \bar{R}^2$
	Lag 1	Lag 2	Sum		
Total Consumption	0.579 (0.248)	−0.359 (0.156)	0.220	0.28	0.02 (0.332)
Durables	1.638 * (0.084)	−1.661 *** (0.009)	−0.023	0.30	0.02 ** (0.022)
Semi-durables	0.677 * (0.095)	−0.376 (0.256)	0.301	0.53	0.01 (0.240)
Non-durables	0.683 * (0.068)	−0.439 ** (0.040)	0.244	0.37	0.13 (0.106)
Services	0.292 (0.426)	−0.226 (0.254)	0.066	0.10	−0.01 (0.324)

Notes : 1) $\bar{R}^2$ is from equation 3.
2) The values in parentheses are the p-values with the null hypothesis $\beta_1=\beta_2=0$.; Newey-West standard errors are used to correct heteroscedasticity and serial correlation.
3) *, **, *** stand for significance levels of 10%, 5%, and 1%, respectively.

situation. Thus, estimation with the future index would be more relevant for our purpose than estimation with the representative index. Moreover, if we use the future consumption index from the question on future consumption expenditure, we may have better information on future consumption. Considering these aspects, we include either the future index or the future consumption index as independent variables in predicting future consumption expenditure.

Table 6 Estimation Results (BOK Future Index & Future Consumption Index)

$$\Delta \log(C_t) = \alpha_0 + \sum_{i=1}^{N} \beta_i S_{t-i} + \varepsilon_t \qquad (1)$$

Panel 1. BOK Future Index

	Estimated Coefficient			$\bar{R}^2$
	Lag 1	Lag 2	Sum	
Total Consumption	0.753 ** (0.044)	−0.693 ** (0.036)	0.060	0.37 (0.107)
Durables	2.150 *** (0.005)	−2.243 *** (0.001)	−0.093	0.40 *** (0.004)
Semi-durables	1.366 *** (0.000)	−1.099 *** (0.000)	0.267	0.48 *** (0.000)
Non-durables	0.603 ** (0.042)	−0.569 ** (0.038)	0.034	0.38 (0.109)
Services	0.368 (0.111)	−0.345 * (0.081)	0.023	0.27 (0.175)

Panel 2. BOK Future Consumption Index

	Estimated Coefficient			$\bar{R}^2$
	Lag 1	Lag 2	Sum	
Total Consumption	1.142 *** (0.004)	−1.123 *** (0.003)	0.019	0.52** (0.011)
Durables	3.361 *** (0.000)	−3.575 *** (0.000)	−0.214	0.60*** (0.000)
Semi-durables	2.111 *** (0.000)	−1.979 *** (0.000)	0.132	0.70*** (0.000)
Non-durables	0.794 ** (0.010)	0.777 ** (0.010)	0.017	0.37** (0.031)
Services	0.522 ** (0.031)	0.493 ** (0.025)	0.029	0.31* (0.077)

Notes : 1) p-values in the parenthesis; The values in parentheses under $\bar{R}^2$ are the p-values with the null hypothesis $\beta_1=\beta_2=0$.; Newey-West standard errors are used to correct heteroscedasticity and serial correlation.
2) *, **, *** stand for significance levels of 10%, 5%, and 1%, respectively.

When we include only the SERI future index as an independent variable, it does not show any better results over the representative index, and like the result with the representative index, it does not show any significant results except for semi-durables. When we estimate with the SERI future consumption index, the coefficients are significant, but the sum of the coefficients is negative, which is hardly acceptable as a general case. Thus, the SERI future index and future consumption index do not seem to be useful in predicting future consumption.

Table 7 Estimation Results
(BOK Future Index, Future Consumption Index & Control Variables)

$$\Delta \log(C_t) = \alpha_0 + \gamma Z_{t-1} + \varepsilon_t \qquad (2)$$

$$\Delta \log(C_t) = \alpha_0 + \sum_{i=1}^{N} \beta_i S_{t-i} + \gamma Z_{t-1} + \varepsilon_t \qquad (3)$$

Panel 1. BOK Future Index

	Estimated Coefficient			$\bar{R}^2$	$\Delta \bar{R}^2$
	Lag 1	Lag 2	Sum		
Total Consumption	0.761 (0.186)	−0.548 * (0.097)	0.213	0.32	0.06 (0.148)
Durables	1.915 * (0.059)	−2.061 *** (0.004)	−0.146	0.34	0.06*** (0.007)
Semi-durables	0.771 * (0.092)	−0.560 * (0.051)	0.211	0.53	0.01 (0.227)
Non-durables	0.813 * (0.073)	−0.558 * (0.052)	0.255	0.42	0.18 (0.139)
Services	0.407 (0.338)	−0.338 (0.179)	0.069	0.16	0.05 (0.165)

Panel 2. BOK Future Consumption Index

	Estimated Coefficient			$\bar{R}^2$	$\Delta \bar{R}^2$
	Lag 1	Lag 2	Sum		
Total Consumption	1.383 ** (0.027)	−1.218 ** (0.014)	0.165	0.54	0.28 *** (0.009)
Durables	4.063 *** (0.001)	−4.161 *** (0.000)	−0.098	0.63	0.35 *** (0.000)
Semi-durables	1.794 *** (0.003)	−1.701 *** (0.002)	0.093	0.71	0.19 *** (0.009)
Non-durables	1.001 ** (0.025)	−0.851 ** (0.022)	0.150	0.47	0.23 * (0.067)
Services	0.701 (0.128)	−0.608 * (0.082)	0.093	0.29	0.18 (0.118)

Notes : 1) p-values in the parenthesis; The values in parentheses under $\bar{R}^2$ are the p-values with the null hypothesis $\beta_1=\beta_2=0$.; Newey-West standard errors are used to correct heteroscedasticity and serial correlation.
2) *, **, *** stand for significance levels of 10%, 5%, and 1%, respectively.

The estimation results with the BOK future index and future consumption index are shown in Table 6. The results with the BOK future index are similar to the BOK representative index except for some increase of the adjusted R^2. The estimated coefficients for durables and semi-durables are significant in the Wald test, but the sum of coefficients is negative. The BOK future index is not significant in total consumption, non-durables, and services.

The BOK future consumption index increases the predictability of future consumption over the representative index. Except for durables, which have negative sum of coefficients, the coefficients are significant and adjusted R^2 improves for total consumption and most of the detailed consumption categories. Therefore, the BOK future consumption index appears to predict the changes in future consumption relatively well.

The SERI future index and future consumption index were not significant in predicting future consumption even before including control variables. Thus we do not consider estimation with control variables.

For the BOK index, we include control variables to investigate the usefulness of the future index and future consumption index. The estimation result for the BOK future index shows that the predictive power of the index is not significant. However, the predictability of the BOK future consumption index seems to be meaningful even when past consumption and stock price are controlled. In most of the consumption categories, the adjusted R^2 increases significantly and for the total consumption equation, the coefficients are significant at the 1% level. For durables, the sum of coefficients is negative as with the representative index case, but for semi-durables, the sum of coefficients are positive and statistically significant.

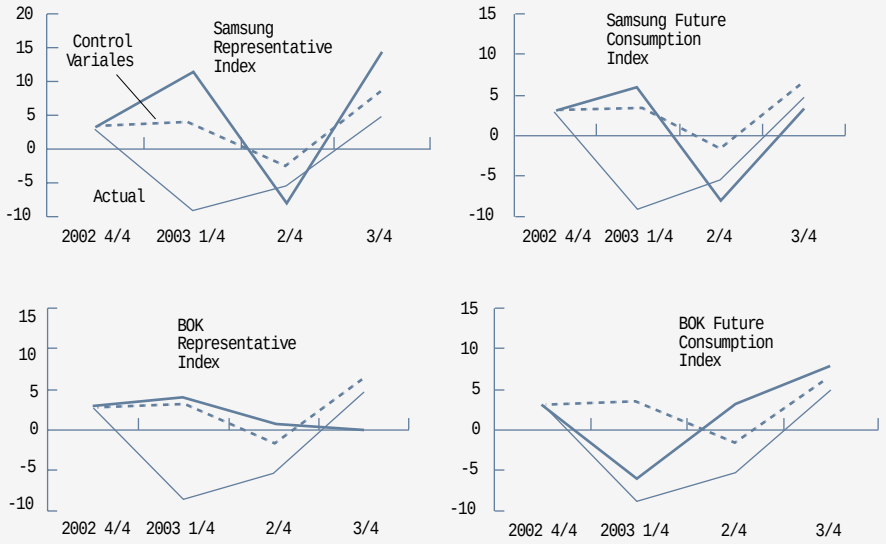
3) Out-of-Sample Forecast

The previous analysis in this paper has examined the predictability of future consumption expenditure based on the estimated equation with the total sample period. However, we need to understand that the estimated equation from the whole sample is not available at one point of time in the middle of the sample period. Thus, we need to pick a point of time, and estimate a consumption equation based on the data until that time, and perform an out-of-sample forecast for consumption after that time period, which seems to be a more meaningful test for the predictability of the CSI.

We consider the period from 2003:1Q and 2003:2Q when consumption dropped significantly, and examine if the CSI explains the episode. Here, the prediction for 2003:1Q is based on the estimation until 2002:4Q, the prediction for 2003:2Q is based on the estimation until 2003:1Q, and the prediction for 2003:3Q is based on the estimation until 2003:2Q. We consider the representative index and future consumption index from the SERI and BOK.

Figure 1 shows that the estimation model with only control variables does not predict the drop of consumption in 2003:1Q. It predicts that the consumption decreases in 2003:2Q, but the prediction is more optimistic than the realized

Figure 1 Out-of-Sample Forecast for Future Consumption



consumption drop.

The estimation models which include the CSI as well as control variables do not predict the drop in consumption in 2003:1Q except the BOK future consumption index. They are more optimistic than the control variable model. Only the BOK future consumption index predicts the decrease in consumption in 2003:1Q. In 2003:2Q consumption drops again, although the change is smaller than the previous quarter. For 2003:2Q, the SERI indexes predict that the consumption would decrease, but the BOK representative index and future consumption index make wrong signals of positive consumption growth. Even the BOK future consumption index, which predicts the drop in consumption in the first quarter correctly, shows too optimistic a view of consumption for the second quarter. Finally, for the small increase in consumption in 2003:3Q, most of the CSI predict it correctly except the BOK representative index which predicts stagnant consumption expenditure.

When we examine the predictability of the CSI′s for the period of 2003:1Q ~ 3Q using generally used indicators (Table 8), most of the models with the CSI fare badly compared with the model with only control variables. The only exception was the BOK future consumption index. The Theil inequality coefficients, which are supposed to have values between 0 and 1, are greater than 0.6 except for the BOK future consumption index. This implies that most of

the CSI models have low predictive power. Even the Theil coefficient for the BOK future consumption index is 0.4, which is not low enough to predict future consumption with reasonable accuracy.

Table 8 Comparison of the CSI's in Out-of-Sample Predictability

	Control Variables	SERI Representative Index	SERI Future Consumption Index	BOK Representative Index	BOK Future Consumption Index
Root mean squared error	7.81	13.15	9.33	8.58	5.27
Mean absolute error	6.33	10.85	6.55	6.47	4.91
Theil inequality coefficient	0.64	0.72	0.67	0.81	0.40

2. Test with Modified Models

We examine the stability of the baseline model by testing modified models that consider the availability of the data, changes in the CSI, and changes in consumption relative to the same quarter in the previous year.

First, we consider the availability of the past consumption data as independent variables. In the baseline model, the consumption data of t-1 quarter is needed to predict the consumption in t quarter. In reality, however, the consumption data in GDP that account for the quarter of t-1 are published at the end of the t quarter. For example, the consumption data of 2003:4Q required for the prediction of consumption for 2004:1Q are only available at the end of March in 2004. Since the consumption data are not available, we can consider the wholesale-retail sales index that is published every month by the Korea National Statistics Office and that is also highly correlated with consumption expenditure. The published sales index of a particular month is the previous month data, thus available data at the end of each quarter are the sales index of the first two months in that quarter. That is, we can use the first two month sales index data in t-1 quarter instead of the consumption data for t-1 quarter. For example, since the sales indexes for October and November in 2003 are available at the end of 2003, we can use the growth rates of those two month sales index data[11] for the growth rate of consumption in the fourth quarter of 2003. The estimation results from the two-month sales index are similar to the baseline model. As in the baseline model, the SERI representative index and future consumption index, and the

11) The growth rate of the sales index used in our estimation is the growth rate of average sales index of the first two months in a quarter relative to the average index of the three months in the previous quarter.

BOK representative index do not explain future total consumption with any statistical significance. For the case of BOK future consumption index, however, the estimated coefficients are significant and the adjusted R^2 shows a sizeable increase. Therefore, using the sales index in our estimation, we find that the availability of the consumption data do not have any particular influence on the usefulness of the CSI.

Table 9 Estimation Results with Sales Index as a Control Variable

$$\Delta \log(C_t) = \alpha_0 + \gamma Z_{t-1} + \varepsilon_t \qquad (2)$$

$$\Delta \log(C_t) = \alpha_0 + \sum_{i=1}^{N} \beta_i S_{t-i} + \gamma Z_{t-1} + \varepsilon_t \qquad (3)$$

	Estimated Coefficient			$\bar{R}^2$	$\Delta\bar{R}^2$
	Lag 1	Lag 2	Sum		
SERI Representative Index	−0.590 (0.286)	0.737 (0.282)	0.147	0.26	0.02 (0.544)
SERI Future Consumption Index	−1.240 (0.198)	0.796 (0.361)	−0.444	0.25	0.01 (0.103)
BOK Representative Index	0.599 (0.255)	−0.384 (0.146)	0.215	0.27	0.02 (0.291)
BOK Future Consumption Index	1.352** (0.024)	−1.186*** (0.010)	0.166	0.53	0.28*** (0.003)

Notes : 1) $\bar{R}^2$ is from equation 3.
2) Independent variables are constant term, the CSI with lags 1~2, growth rate of stock price index with lags 1~2, growth rate of private consumption with lag 2, wholesale-retail sales index for the firts two months with lag 1.
3) The values in parentheses are the p-values with the null hypothesis $\beta_1=\beta_2=0$.; Newey-West standard errors are used to corred heteroscedasticity and serial correlation.
4) *, **, *** stand for significance levels of 10%, 5%, and 1%, respectively.

Second, we estimate the equation using the changes in the CSI instead of the level of the CSI. The changes of the CSI may be more relevant in forecasting future consumption, and since we could not reject the null hypothesis of unit root for the SERI future consumption index at 10% significance level, we may need to difference the index data to secure stationarity of the data. However, the test result using the changes in the CSI as independent variable is similar to the case with the CSI levels. Still only the BOK future consumption index explains the future total consumption significantly, and the other indexes are not significant.

Third, the growth rate of consumption relative to the same quarter of the previous year instead of the previous quarter is used in estimation. In Korea, the

Table 10 Estimation Results using Changes of the CSI

$$\Delta \log(C_t) = \alpha_0 + \gamma Z_{t-1} + \varepsilon_t \qquad (2)$$

$$\Delta \log(C_t) = \alpha_0 + \sum_{i=1}^{N} \beta_i S_{t-i} + \gamma Z_{t-1} + \varepsilon_t \qquad (3)$$

	Estimated Coefficient			$\bar{R}^2$	$\Delta \bar{R}^2$
	Lag 1	Lag 2	Sum		
SERI Representative Index	−0.777 (0.255)	−0.289 (0.464)	−1.066	0.27	0.02 (0.516)
SERI Future Consumption Index	−1.281 (0.246)	−1.385 (0.206)	−2.666	0.26	0.02 (0.434)
BOK Representative Index	0.369 (0.086)	−0.223 (0.642)	0.146	0.31	0.01 (0.187)
BOK Future Consumption Index	1.083 ** (0.012)	0.108 (0.627)	1.191	0.50	0.18 ** (0.025)

Note : Same as the note to Table 9

Table 11 Estimation Results using Year-on-Year Consumption Growth

$$\Delta \log(C_t) = \alpha_0 + \gamma Z_{t-1} + \varepsilon_t \qquad (2)$$

$$\Delta \log(C_t) = \alpha_0 + \sum_{i=1}^{N} \beta_i S_{t-i} + \gamma Z_{t-1} + \varepsilon_t \qquad (3)$$

	Estimated Coefficient			$\bar{R}^2$	$\Delta \bar{R}^2$
	Lag 1	Lag 2	Sum		
SERI Representative Index	0.308 * (0.079)	0.181 (0.245)	0.489	0.75	0.04 (0.136)
SERI Future Consumption Index	0.198 (0.333)	−0.637 *** (0.000)	−0.439	0.74	0.03 *** (0.000)
BOK Representative Index	0.258 (0.136)	−0.070 (0.517)	0.188	0.79	0.05 (0.317)
BOK Future Consumption Index	0.414 *** (0.007)	−0.307 ** (0.012)	0.107	0.86	0.12 ** (0.024)

Note : Same as the note to Table 9

consumption growth rate is typically growth rate relative to the previous year. Thus, we may need to examine the relationship between year-on-year growth rate of consumption and the CSI, and see if the CSI explains the consumption growth from the previous year. When we include the year-on-year growth rate of consumption in the estimation, the test results are similar to the baseline model. Only in the case using the SERI future consumption index, the coefficients of

the CSI are significant, but the sum of the coefficients is negative, which does not provide a meaningful interpretation.

3. Summary of the Test Results and Interpretation

This paper tests the usefulness of the CSI in Korea based on the general method suggested by Carroll et. al.(1994) and Bram and Ludvigson(1998). Test results indicate that the representative CSI′s from both SERI and BOK are not statistically significant in predicting future consumption, and the increase in adjusted R^2 is only minimal. Neither are the test results for the future indexes from SERI or BOK useful in explaining future consumption.

On the other hand, the BOK future consumption index appears to explain future consumption in some categories of consumption expenditure. Although the index does not predict future consumption of durables and services, it explains future total consumption and semi-durables consumption at the 1% significance level, and future consumption of non-durables at the 10% significance level. When we include the BOK future consumption index in the equation, the adjusted R^2 increases more than 0.18. However, the SERI future consumption index does not seem to predict fluctuations of future consumption.

When we examine the predictability of CSIs for the consumption drop in the first half of 2003, most of them do not predict the consumption decrease in the first quarter of 2003 except for the BOK future consumption index. However, the BOK future consumption index failed to predict the continued decrease in consumption during the second quarter of 2003.

The test results of the modified models are similar to those of the baseline model. In the modified models, we consider the availability of the consumption data, changes in the CSI, and consumption growth rate from the previous year. In the modified models, the representative and future indexes from both the SERI and BOK, and the future consumption index from the SERI do not explain the future consumption, but the BOK future consumption index seems to have relatively meaningful predictive power for future consumption.

Summarizing the test results, except for the BOK future consumption index, most of the Korean CSIs do not have meaningful predictive power for future consumption. The predictability of future consumption is low when the CSI′s are included as the only independent variable, and additional predictability is even lower when other control variables are included in the estimation.

We need to explain the reason for the relatively high predictive power of the BOK future consumption index while all other indexes show no significant

predictive power for future consumption. Possible reasons might be found in the specific questions in the consumer sentiment survey and the timing of the survey.

First, predictability is better for future consumption when the survey question of the index relates to specific future consumption rather than the economy or the financial situation in general. We have paid more attention to representative indexes or indexes related to business cycles rather than future consumption index even when we want to know the direction of changes in future private consumption.

In the United States, the consumer sentiment survey does not include any specific questions on future consumption expenditure, and the survey results are reported with the representative index, and current and future indexes. Thus, predictive power of the CSI in the United States needs to be analyzed with representative, current, and future indexes. In Korea, however, the survey includes a specific question on future consumption and reports the future consumption index. Therefore, if we want to forecast future consumption, we can use the future consumption index instead of looking at the representative indexes.

Second, the survey timing also seems to influence the predictive power of the CSI. The SERI and BOK conduct their consumer surveys every quarter, so the survey timing could be an important factor in determining the predictive power when the economic situation is changing rapidly. The SERI index is surveyed at the end of the first month of the quarter and published at the beginning of the second month. The BOK index is surveyed during the period from the end of the second month in a quarter to the beginning of the third month, and reported at the end of the third month. There is about a month time lag in the survey timing, and if new information on the economy is released between the two survey periods, a change in consumer sentiment may be observed.

For example, let us consider the currency crisis in Korea that started at the end of November in 1997. Although the Korean economy was moving into recession from the first half of 1997, the outbreak of a currency crisis was hard to predict. The SERI index reported in the fourth quarter of 1997 was based on a survey done at the end of October, thus the information about the currency crisis was not incorporated. However, the BOK index was surveyed at the end of November, so consumers already knew a currency crisis was beginning to break out. When we look at the changes of the CSI, the SERI representative index was 45.7 in the third quarter of 1997, 43.5 in the fourth quarter, and 33.7 in the first quarter of 1998, so the currency crisis was reflected in the first quarter of 1998.

The BOK representative index for the same three quarters showed a drop from 82.0 to 56.4, and 52.6, so the change of consumer sentiment was already reflected in the fourth quarter of 1997. Actually, the growth rate of private consumption expenditure during the same period were 3.9%, -6.6%, and -51.0% (growth rate from the previous quarter, annualized rate), respectively. Consumption began to decrease in the fourth quarter of 1997, and the size of the drop became much greater in the first quarter of 1998.

Overall, the BOK future consumption index is a relatively better indicator than any other indexes in predicting future consumption. However, the role of the BOK future consumption index also limited in that it could not predict the continued drop in consumption for the second quarter of 2003. Moreover, as the BOK index is reported one and half months later than the SERI index, the BOK future consumption index may not be very useful because of its late availability. Also we need to be careful in predicting consumption because of the short sample period of the CSI data.

V. Conclusion

The CSI has been used widely as a useful indicator in predicting future consumption, but we need to prove the usefulness with thorough empirical tests. This kind of empirical study has been done in several foreign countries, but there are few studies in Korea. In the foreign studies, the CSI in the United States seems to predict future consumption, but not all the empirical studies reach in the same conclusion. In other countries, the test results show no consensus. Thus, it is very meaningful to investigate empirically if the CSI in Korea has any predictive power.

The main result in our study is that the CSI′s in Korea generally do not have any significant predictive power for future consumption. One exception is the BOK future consumption index. The BOK future consumption index appears to be a relatively useful index in predicting future consumption. The reasons may be that the BOK survey is done about a month later than the SERI survey and it includes specific questions on future consumption. Thus, if we want to predict future consumption, the BOK future consumption index seems to be a better choice than the representative index or the future index.

We need to remember, however, that the BOK future consumption index is the second best choice. Although it is relatively better than other indexes, it still has

limitations in prediction, and the reporting time is about one and half months later than the SERI index. We have to wait until the end of the quarter to use the BOK index.

The empirical results in this paper are consistent with the general finding in economics that predicting future economic variables is a very difficult job. In the real world where we have to forecast certain economic variables, we need to be careful in using easily accessible indicators such as the CSI. The argument that consumers have the best knowledge about their consumption expenditure may be fallacious as to future consumption. Consumers may have a best understanding on their current situation, but their expectations may not be realized in the future when a lot of unexpected factors intervene. Moreover, consumer expectations about business fluctuations and consumption expenditure could be different. That is, on average consumers may expect economic recovery, but if they see a high degree of uncertainty as to that recovery, consumers may reduce consumption expenditure from a precautionary motive.

This paper examined the usefulness of the CSI by focusing on the predictability of future consumption expenditure. The CSI can be used in other areas, too. It can be used to capture consumer recognition about the business cycle, and to study the relationship between the consumer mindset and the business cycle or other economic variables. In particular, consumer understanding and expectations about the business cycle can be compared with the Business Survey Index collected from business sector. Finally, since the CSI is reported by income levels and ages, it might be interesting to examine the data for specific groups of consumers.

The sample periods in this study are from 1991:4Q to 2003:3Q for the SERI index and from 1996:2Q to 2003:3Q for the BOK index, both of which are much shorter than those of the studies in the United States, for example, where more than twenty-year data are available. It should be noted that the BOK data covers only seven years, thus we may need to wait for further data accumulation to obtain more credible empirical results.

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