

**Forecasting Power of the Consumer Confidence Indices to Household
Consumption Expenditures**

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Abstract

Consumer confidence can strongly affect future consumption. In this paper, consumer confidence is measured by the consumer confidence indices from the Conference Board of Canada. We examine the ability of the consumer confidence indices to predict future consumption in Canada overall and in the Canadian provinces. For the national level, the results suggest that the consumer confidence indices are able to explain the changes of household consumption expenditures for various consumption categories. The predictive ability of the consumer confidence indices is weakened by adding control variables such as labor income, interest spreads and the Toronto Stock Exchange Index. For the provincial level, consumer confidence indices still predict some of the consumption categories. However, the predictive power is very weak when we include control variables in provincial analysis. Overall, consumer confidence indices are able to forecast Canadian household consumption expenditures.

Key words: Consumer confidence indices, consumption expenditures

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1. Introduction

During the mid-20th century, the use of "consumer confidence" as an economic statistic has been commonly accepted since private consumption is closely related with consumers' attitudes. For example, if consumers feel that they are under financial strain or if they hold negative attitudes towards their future family financial status, they may become reluctant to consume goods. Therefore, consumer confidence may be a very important indicator in analyzing the corresponding future consumption. To measure the consumer confidence quantitatively, in 1940s, the index of consumer sentiment was designed by the Survey Research Center (SRC) at the University of Michigan in the US. Subsequently, in 1967, the Conference Board of Canada constructed the consumer confidence indices. Both indices have been found to be very useful since they contain abundant information from consumers.

Many researchers have tested the ability of the consumer confidence indices in predicting consumption expenditures. Shapiro and Angevine (1969) used the confidence indices to forecast the consumption of automobiles in Canada. Then, five years later, Angevine (1974) examined the forecasting power of the confidence indices on other consumption categories such as semi-durable goods, and non-durable goods and services. Other researchers like Carroll, Fuhrer and Wilcox (1994) tested the incremental predictive power of the consumer confidence indices in the US. They set the lagged consumer confidence indices and control variables as explanatory variables to predict consumption expenditures. The most recent work to analyze the usefulness of the consumer confidence indices in Canada was done by Kwan and Cotsomitis (2006), who concluded that based on the sample period from 1979:Q1 to 2001:Q4, consumer confidence indices are able to forecast household spending.

However, in the recent period from 2002 to 2016, business markets have become more complicated. There are many factors such as unpredictable financial crisis and the fluctuations of the stock market, which could impact the relationship between the consumer confidence indices and consumption expenditures. For example, the US subprime mortgage crisis in 2008 led to the collapse of the housing bubble. Falling housing-related assets in the US contributed to a global financial crisis. With the close relationship with the US, Canada was undoubtedly impacted. Meanwhile, the economic downturn also brought a pessimistic outlook in the stock market. In this situation, consumers holding stocks may undertake more risks, so the relationship between the consumer confidence indices and consumption expenditures can become unstable. Therefore, it appears very important to examine the usefulness of the consumer confidence indices in the recent time.

In our paper, we use the consumer confidence indices from the Conference Board of Canada. Based on the sample period from 2002:Q1 to 2016:Q2, we examine the ability of the consumer confidence indices to predict consumption categories in both Canada overall and the Canadian provinces. In regression analysis, we take the lagged consumer confidence indices as the explanatory variables and consumption categories as the dependent variable. The sum of coefficients of the explanatory variables is calculated to examine the quantitative relationship between the confidence indices and consumption expenditures. Then, the Wald test is conducted to examine the joint significance of the explanatory variables. Since we only use the lagged confidence indices alone as the explanatory variable, the adjusted R^2 s obtained from the regressions are used to evaluate the self-predictive power of the confidence indices. Furthermore, we use additional control variables together with the lagged confidence indices as explanatory

variables to predict consumption expenditures. The adjusted R^2 s are used again to examine the predictive ability of the consumer confidence indices.

Our regression results suggest that the confidence indices still exhibit very good self-predictive power in forecasting consumption categories in Canada overall. The predictive ability of the confidence indices is weakened when we add control variables to the regressions. For the provincial level, the confidence indices only predict consumption categories in British Columbia and Ontario. Most of the confidence indices are not strong enough to explain the changes of the consumption categories in other provinces. Therefore we have to be more cautious when using the consumer confidence indices to predict consumption in those provinces.

In the remainder of this paper, we first review some of the past research papers in Section 2, which inspired our choices of the variables. Section 3 describes the econometric models of this paper. We use three equations to conduct all the regressions. For each regression, we analyze the significance of the explanatory variable and adjusted R^2 s. Then, we introduce our variables and the methods of calculating the confidence indices in Section 4. Section 5 reports the correlation analysis in Canada overall and in five Canadian provinces. We use both graphs and correlation matrixes to analyze the correlations and significant levels between variables. In Section 6, we report the results from the regressions at the Canadian national level and the provincial level. In Section 7, we conduct a robustness check by using the level of the confidence indices in the regression analysis. Finally, we discuss the main conclusions in Section 8.

2. Literature Review

Consumption is a very important macroeconomic variable. It can be affected by various factors, such as consumer confidence, income, tax, unemployment and real interest rates. Many

authors have provided the empirical evidence to support the usefulness of the consumer confidence indices in predicting consumption expenditures.

2.1 The Relationship between Consumer Confidence Indices and Consumption Expenditures.

Acemoglu and Scott (1994) use UK data for the sample period from 1974:Q2 to 1990:Q3 to analyze the importance of the confidence indices. First, they use the lagged values of the confidence indices, unemployment, inflation, real interest rates and financial wealth to predict current changes in labor income. They report that the confidence indices, unemployment and financial wealth are able to predict labor income. Then, they use the same method to set the confidence indices, unemployment, inflation, real interest rates and financial wealth as the dependent variables respectively. The regression results suggest that the confidence indices are able to predict the changes of all other variables. They also find that the confidence indices depend positively upon their past values and financial wealth. On the other hand, the confidence indices are negatively correlated with the current real interest rate and inflation. Therefore, they conclude that the confidence indices are highly associated with the current state of the economy and can be treated as a coincident indicator to predict future economic strength.

The predictive ability of the confidence indices is also supported by Bram and Ludvigson (1998). Based on the U.S. data from 1953 to 1998, they conclude that using the confidence indices from the Conference Board could explain 9.00% more of the variation in the changes of total consumption. Further research by Kwan and Cotsomitis (2004) also conducted an empirical study using the sample period 1961:Q1 to 2002:Q2 for the US. Their results suggest that both the Michigan and the Conference Board lagged confidence indices are jointly significant as explanatory variables in predicting consumption categories (Total consumption, Durables,

Nondurables and Service). Therefore, we can conclude that the confidence index is a very useful indicator of consumption expenditures.

2.2 Other Explanatory Variables

We have discussed that the confidence indices itself are able to predict consumption. However, there might be other variables which could also explain the changes in consumption expenditures and affect the predictive ability of the confidence indices.

Robert Hall (1979) suggests that stock prices are also significant in predicting consumption. In his work based on the linear regression analysis, the four lags of stock prices are jointly significant to explain the changes in current consumption. We can expect a close relationship between the fluctuations of the stock market and the growth of household consumption. According to the research by Karnizova and Khan (2014), a bullish stock market signifies better economic growth which makes people feel richer and stimulates their consumption. On the other hand, an unstable stock market leads to uncertainties on future economic trends. People will tighten their financial belt and put off the plans of major purchases. Therefore, stock prices are closely correlated with consumption expenditures.

Shapiro and Angevine (1969) find that having labor income and confidence indices together as explanatory variables can make estimates more accurate than using labor income alone. Therefore, instead of simply setting the confidence indices as the explanatory variable, we need additional variables in the regression to predict consumption expenditures.

Our paper is inspired by this past research. We consider the effects from other variables such as labor income, interest spreads, and the Toronto Stock Exchange Index (TSE) to examine the ability of the consumer confidence indices to predict consumption.

3. Econometric Methodology

The econometric methodology of this paper relies on the method used by Kwan and Cotsomitis (2006). We evaluate whether the lagged confidence indices can predict household consumption expenditures. The main difference in our paper is that the end of sample period of the consumer confidence indices is extended from 2002:Q1 to 2016:Q2 (Kwan and Cotsomitis (2006) analyzed the data from 1979:Q4 to 2001:Q4).

3.1 Self-predictive Power of the Consumer Confidence Indices

First, we set the consumer confidence indices as the explanatory variable to examine their self-predictive power using the following regression:

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

Since we only use the lagged confidence indices as the explanatory variable, this model allows us to examine the ability of the confidence indices alone in predicting consumption. The dependent variable C_t is household final consumption expenditures, expressed in logarithmic differences. The subscript t in the equation means the current level of variables. The explanatory variables S_{t-i} are the lagged consumer confidence indices. The values α_0 and β_i are the regression coefficients. The research question is whether the past levels of the consumer confidence indices can predict future consumption expenditures. To answer this question, we test if the β_i coefficients are significantly different from zero. More precisely, the null hypothesis is that all of the β_i coefficients are equal to zero. The joint significance of the explanatory variables is examined using a Wald test. The null hypothesis $\beta_i = 0$ for all i will be rejected if the p-values are less than the 5% significant level.

In addition, we evaluate the quantitative importance of the consumer confidence indices in forecasting consumption. The sum of β_i is calculated to check if there is a positive relationship between the lagged confidence indices and consumption expenditures. Then, we analyze the adjusted R^2 of each regression to measure how much percentage of the variation in consumption expenditures can be explained by the lagged consumer confidence indices. Therefore, the adjusted R^2 is the central value that we are going to use to evaluate the self-predictive power of the consumer confidence indices.

There are two estimation issues that need to be addressed. First, since the model is estimated by Ordinary Least Squares (OLS), the error term ε_t is assumed to be serially uncorrelated. Therefore, a serial LM-test is used to identify the issue of autocorrelation. Second, N is the number of lags that we have to use for the consumer confidence indices. In the regression analysis, the confidence indices are more significant when we take four lags than for any other number of lags. Therefore, we set N equal to four in our regressions. This result is also consistent with the lag choice used by Kwan and Cotsomitis (2006).

3.2 Incremental Predictive Power of the Consumer Confidence Indices

In this part, we examine the forecasting ability of the consumer confidence indices in the presence of several control variables:

$$\Delta \log(C_t) = \alpha_0 + \sum_{i=1}^N \beta_i S_{t-i} + \gamma Z_{t-1} + \varepsilon_t \quad \text{Equation 2}$$

Equation 2 contains the same lagged confidence indices as equation 1. Additionally, equation 2 has a vector of control variables Z_t . The vector Z_t includes four lags of the dependent variable (consumption expenditures), four lags of the growth in real labor income, four lags of the

changes in interest spreads and four lags of the logarithmic differences in the real Toronto Stock Exchange Index. Therefore, equation 2 accounts for the effects on consumption from changes in not only the consumer confidence indices but also in real labor income, the national economic situation (interest spreads) and the financial market status (TSE).

We also estimate the following benchmark model without confidence indices:

$$\Delta \log(C_t) = \alpha_0 + \gamma Z_{t-1} + \varepsilon_t \quad \text{Equation 3}$$

This equation is used to compute the quantitative contribution of the consumer confidence measures to consumption as follows. Without the confidence indices, the adjusted R^2 of equation 3 is the measure of the predictive ability of the control variables alone. Since in equation 2 we add the consumer confidence indices as explanatory variables into the regression, the adjusted R^2 in this case accounts for the contribution of both the control variables and the consumer confidence indices. Therefore, we can calculate the difference of the adjusted R^2 s (incremental adjusted R^2) between equation 2 and equation 3 to check how much the adjusted R^2 could be increased by adding the lagged consumer confidence indices into the regressions. We use the term “incremental predictive power” to describe the increased explaining ability from the consumer confidence indices.

3.3 Diagnostic Tests

As our regressions are based on time series data, there is a possibility that the error terms exhibit autocorrelation or heteroskedasticity. First, the Breusch–Godfrey test (serial LM-test) is used to test autocorrelation in the error terms. The null hypothesis is that the lagged residuals are not correlated and the alternative is that autocorrelation exists. Second, we use the White test to

identify whether the variance of the error terms is constant or not. The null hypothesis that there is no heteroskedasticity will be rejected if the p-values are less than the 5% significant level.

Since the assumptions of the OLS estimation will be violated if we have the issues of autocorrelation or heteroskedasticity, we use the heteroskedasticity-robust standard errors in the estimations to correct for the possible presence of these issues. Both diagnostic tests above are conducted in each regression and the results are reported in Appendix D-G: last two rows of tables. In this paper, all of the hypothesis test results are assessed using the conventional significant levels of significance of 1%, 5% and 10%. They are denoted by the marks "***", "**" and "*", respectively.

4. Data

The data used in this paper are mainly from the Conference Board of Canada and the Bank of Canada. Household final consumption expenditures (PCE), consumer confidence indices (ICC), labor income, and interest spreads are taken from the Conference Board of Canada. The Toronto Stock Exchange Index (TSE) is from the Bank of Canada. Since interest spreads and the Toronto Stock Exchange Index are nation-wide data, they are used in the analysis for Canada overall and for the Canadian provinces. For the rest of the variables, different regions have their own values.

4.1 The Growth of Consumption Expenditures

The original datasets of consumption expenditures in Canada at the national and provincial level are collected by the Conference Board of Canada. The sample period is 2002:Q1 to 2016:Q2 and the data is quarterly. The data series is chain-weighted in 2007. According to our model, the data is further processed by taking the first differences of the logarithm of the original data.

At the national level, we examine the consumption categories of total household consumption expenditures (PCE), durable goods (DG), semi-durable goods (SDG), non-durable goods (NDG) and services (SV). For example, commodities like automobiles and bricks, which could yield utilities for a very long time, are classified as durable goods. Textile and small electrical appliances can keep their values for a period of time. They are classified as semi-durable goods. Other goods with a short lifespan, such as food, fuel and cigarettes, are non-durable goods. Each consumption category is used as the dependent variable in one of the exercises in the regression analysis.

At the provincial level, the consumption categories are total household consumption expenditures (PCE), and consumption of all goods (GD) and services (SV). In our specifications, the Atlantic Provinces include Newfoundland, Labrador, Prince Edward Island, Nova Scotia and New Brunswick. The Prairie Provinces include Manitoba, Saskatchewan and Alberta. The consumption expenditures in Atlantic Provinces and Prairie Provinces are the sum of the consumption expenditures from those provinces. Other provinces like Ontario, British Columbia and Quebec have their own values of consumption expenditures.

4.2 Consumer Confidence Indices

The main independent variable of this paper, the consumer confidence indices, is published by the Conference Board of Canada based on a survey that aims at evaluating Canadian consumers' attitudes towards their household economic status. The survey is constructed by four attitudinal questions that investigate households' assessments of their current economic positions, expectations, and buying conditions. It also collects people's level of optimism regarding the job market and overall employment rate. Specifically, the survey contains the following four questions:

Question 1(Household financial position realization): Considering everything, would you say that your family is better or worse off financially than six months ago?

Question 2(Household financial position expectation): Again, considering everything, do you think that your family will be better off, the same or worse off financially six months from now?

Question 3(Household overall employment perspective): How do you feel the job situation and overall employment will be in this community six months from now?

Question 4(Household buying condition): Do you think that right now is a good or bad time for the average person to make a major outlay for items such as a home, car or other major item?

For each of these questions, the respondents may choose positive answers like "better" or "good", or negative answer "worse" or "bad". They may also select ambiguous answers like "same" or "not sure". The confidence indices for each question are calculated by taking the ratio of the positive answers' percentage rate to the sum of the percentage rate of both positive and negative answers. The indices are then normalized to 100 in 2014. In this way, we obtain an individual confidence index for each question. The aggregate consumer confidence indices (ICC) are the arithmetic average of the individual confidence indices (ICC_Q1 to ICC_Q4).

For Canada overall and for the Canadian provinces, the original data from the Conference Board of Canada contains only the aggregate consumer confidence indices and the percentages of answers for each question. All the series are on a monthly basis. Therefore, each individual confidence index is calculated in this paper. The calculation is double checked since the average of the four individual confidence indices is equal to the corresponding aggregate level provided by the Conference Board of Canada. The sample period of the confidence indices goes from 2002:Q1 to 2016:Q2 and we take the average of the indices for each three months to generate the quarterly series. In the regression analysis, both the aggregate confidence indices (ICC) and the individual confidence indices (ICC_Q1 to ICC_Q4) are used as explanatory variables. For the

provincial level, the consumer confidence indices of the Prairie Provinces and the Atlantic provinces are computed as the arithmetic average of the indices from those provinces.

4.3 Labor Income

The data for the national and the provincial labor income is the compensation of employees in wages and salaries, obtained from the Conference Board of Canada. The data is quarterly and the sample period goes from 2002:Q1 to 2016:Q2. The sum of the labor income in Prince Edward Island, Nova Scotia and New Brunswick contributes to the labor income in the Atlantic Provinces. Similarly, Manitoba, Saskatchewan and Alberta give the total labor income in the Prairie Provinces. Along with the other provinces of British Columbia, Ontario and Quebec, we have data on labor income for five regional areas and Canada overall. As the original data of labor income are at the nominal level, we divide all of the labor income series by the consumer price index (CPI) to eliminate the effects of inflation and then normalize 2002 as the base year.

4.4 The Changes of Interest Spreads

The changes of interest spreads explain the profit margin yielded by lending and borrowing rates. The greater the change of interest spreads, the better the economic status is likely to be. Therefore, we set the changes of interest spreads as an independent variable aims at capturing the effects of national economic conditions in Canada on household consumption expenditures. In this paper, the changes of interest spreads are calculated by taking the difference between the 10-year federal bond rate and the 3-month treasury bill rate. This data is collected by the Conference Board of Canada in the quarterly series from 2002:Q1 to 2016:Q2.

4.5 The Toronto Stock Exchange Index (TSE)

The Toronto Stock Exchange Index (TSE) is an indicator of financial market conditions. The series of the Toronto Stock Exchange Index are obtained from the Bank of Canada, and the time period is, in accordance with the other variables from 2002:Q1 to 2016:Q2 on a quarterly basis. The series of the Toronto Stock Exchange Index are deflated by the consumer price index (CPI). In the regressions, we use the logarithmic difference of the Toronto Stock Exchange Index as an independent variable.

4.6 Consumer Price Index (CPI) and Implicit Price Deflator

Unlike the data on household consumption expenditures that is chain-weighted, the series of labor income and the Toronto stock exchange Index are in nominal levels. In order to eliminate the effects of inflation and compare data changes in different time periods, we need to change these variables to real terms. Two measures are typically used in macroeconomic analysis for this purpose: the consumer price index (CPI) and the implicit price deflator. We can transform the nominal levels of the variables into real terms by dividing them by the consumer price index or the implicit price deflator. In this paper, the quarterly series of both the consumer price index and the implicit price deflator are obtained from the Conference Board of Canada and they cover the period from 2002:Q1 to 2016:Q2. The base year of the consumer price index is 2002 and the series of the implicit price deflator is normalized to 100 in 2007. This paper uses the consumer price index to adjust labor income and the Index of Toronto Stock Exchange Index (TSE). In the robustness check, we use the implicit price deflator to get the real levels and compare which measure is better for our analysis.

4.7 Unit Root Test

For the time series data, many economic variables such as consumption, confidence indices, and the price level may have time trends. In forecasting, we want statistics like the mean and the variance to be independent of time. Therefore, series stationarity is a very important prerequisite for the regression analysis.

To verify whether our series are stationary or not, the Augmented Dickey-Fuller test (ADF-test) and the Phillips-Perron test (PP-test) are applied. The null hypothesis is that there is a unit root in the data and the alternative is that the series is stationary. In our specifications, for the series in levels (such as the consumer confidence indices and labor income), we apply both the ADF-level test with an intercept and the ADF-first difference test without intercept. Other series, like the logarithmic growth of consumption expenditures, the changes of interest spreads and the log differences of the Toronto Stock Exchange Index, are assessed using the ADF-level test with no constant term only. The lag length is automatically selected by the Schwarz Info Criterion. In addition, we use the Phillips-Perron test with an intercept to test all the series in level for comparison. The bandwidth is determined by the Newey-West automatic selection. For both tests, a unit root can be rejected if the p-values are less than the 5% significant level.

Table B1 and Table B1.1 in Appendix B report the test results for the growth of consumption expenditures for Canada overall and for the Canadian provinces. Only the level of the ADF-test and the level of the PP-test are reported. It is clear that all of the series (including the lagged series) are stationary (the absolute critical values are greater than 1.613). Although for some series like the consumption categories of service for Ontario (DLCX_ONSV) and for the Prairie provinces (DLCX_PRSV) we can only reject the ADF-test at the 10% significant level, for all

other series we can strongly reject the null hypothesis of a unit root for both tests (the p-values less than the 5% significant level).

Table B2 reports the results of the unit root tests for both the level and the first difference of the consumer confidence indices. The indices series of Canada overall and the Canadian provinces have been checked for stationarity up to the sixth lag. The last row of the tables reports the critical values and the corresponding significant levels for the different tests. According to the results, for all the series in level we fail to reject the null of a unit root (the p-values greater than the 5% significant level). Therefore, we cannot reject the null hypothesis that the level of the consumer confidence indices is non-stationary.

Next, we perform the ADF-test for the first difference of the consumer confidence indices. This time the test results suggest that all the confidence series are stationary (all p-values are less than the 5% significant level). In addition, the graphs also provide clear evidence for the behaviours of the consumer confidence indices in level and first difference. According to Appendix H1, all of the figures on the left side (reporting the level of the confidence indices series) exhibit time trends. In contrast, the figures on the right side (reporting the first difference of the confidence indices series) look stationary. Therefore, unlike the study by Kwan and John (2006), who use the level of the confidence indices to predict consumption, in this paper, the series of the consumer confidence indices are transformed into first difference for the analysis. In order to compare our results with the conclusions of Kwan and Cotsomitis (2006), we also examine the predictive power of the level of the confidence indices as a robustness check.

For labor income, the test results reported in Table B3 suggest that all of the series in level are non-stationary. In first differences, the hypothesis of a unit root is rejected at the 5% significance

level in all the series except for the Atlantic Provinces and British Columbia. To deal with the issue, we take the second differences in the labor series for the Atlantic Provinces and British Columbia to make them stationary (Table B3.2nd and 5th columns).

As for the changes of interest spreads and the logarithmic difference of the Toronto Stock Exchange Index, the unit root tests are conducted only in level. The results in Table B4 to B5 suggest that all of the series are stationary (all p-values less than 5%).

5. Correlation Analysis

Before processing with the OLS regressions, we use correlation matrixes and graphs to analyze the correlations between the variables in Canada at the national level and at the provincial level. Positive correlations between the confidence indices and the growth of consumption expenditures are expected. First, we examine the correlation between the first differences of the aggregate confidence indices (DICC) and the growth of consumption expenditures (PCE). Second, we also examine the correlation between the first differences of each individual confidence indices (DICC_Q1 to DICC_Q4) and the growth of consumption expenditures. The discussion of correlation analysis is based on the results of correlation matrixes reported in Appendix C. Table C1 to Table C7 and graphs in Appendix H2. Figure 1 to Figure 6.

We examine the correlations between consumption expenditures and the first differences of the aggregate confidence indices (DICC) from the current value to the sixth lag. The results in Appendix C. Table C1 suggest that positive correlations are statistically insignificant when the confidence indices are lagged for more than five periods. Therefore, we only use four lags of the confidence indices in the remainder of our analysis.

5.1 Correlation Analysis for Canada at the National Level

Figure 1 of Appendix H2 shows that the first differences of the aggregate confidence indices (DICC) and the corresponding growth of total consumption expenditures (PCE) exhibit similar fluctuations. Also, the trends fall down dramatically from 2007:Q2 to 2008:Q2, which can be related to the financial crisis. This close relationship between the two time series is supported by more details in the correlation matrix. According to Appendix C, 1st row of Table C1 in Canada, there is a positive and significant correlation which lasts to the third lag. The positive values of the coefficients are all greater than 0.281 and are significant with p-values less than 0.045 (less than the 5% significant level). We also obtain a positive coefficient equal to 0.089 in the fourth lag, but the correlation between the two variables is insignificant (the p-value equal to 0.534, which is even greater than the 10% significant level).

Furthermore, we also observe positive correlations between the confidence indices for the individual questions (DICC_Q1 to DICC_Q4) and consumption expenditures. According to the results in Appendix C. Table C2, all the coefficients are positive. Except for the fourth lag of the confidence indices, most correlations are significant. Therefore, at the national level, the first difference of the confidence indices has a significant and positive correlation with the growth of consumption expenditures.

5.2 Correlation Analysis for Canada at the Provincial Level

For the provincial level, we report graphs and correlation matrixes as well. Figure 1 to Figure 6 in Appendix H2 describe the series of the consumption expenditures and the first differences of the aggregate confidence indices in each province. The results from the correlation matrixes in Appendix C, 2nd to 6th rows of Table C1 (Atlantic Provinces, British Columbia, Ontario, Prairie Provinces and Quebec) suggest weaker correlations. In general, most of the coefficients are still

positive for the current to the fourth lag of the first differences of the aggregate confidence indices (DICC). However, only some of those correlations are significant. For example, in British Columbia, there are significant and positive correlations before the third lag of the aggregate confidence indices (p-values less than 5%). In the Atlantic Provinces, only the first lag of the confidence indices shows a very weak correlation with p-value equal to 0.096, which is significant only at the 10% level. For the other provinces (Ontario, the Prairie Provinces and Quebec), most of the correlation coefficients are insignificant.

From Table C3 to Table C7 in Appendix C, the individual confidence indices (DICC_Q1 to DICC_Q4) have positive and significant correlations in the same lags as their aggregate confidence indices (DICC). Furthermore, compared to the individual indices for question 3 (DICC_Q3) and question 4 (DICC_Q4), the individual confidence indices for question 1 (DICC_Q1) and question 2 (DICC_Q2) exhibit more negative or insignificant correlations, as for instance in the Prairie Provinces (3rd row of Table C6) and Quebec (2nd row of Table C7). In summary, the relationship between the first differences of the confidence indices and the growth of consumption expenditures is not very strong at the Canadian provincial level.

6. Regression results

Following the methodology discussed in Section 3, all the regressions are conducted using the three equations described above, and the results are reported in the tables from Appendix D to Appendix G. In this section, we discuss the incremental adjusted R^2 for each regression. We are also interested in the sum and in the joint significance of the coefficients attached to the confidence indices. In addition, the results of the diagnostic tests are also reported to check for autocorrelation and heteroskedasticity in each regression.

6.1 Regression Results for Canada Overall

Setting the dependent variable as household total consumption expenditures (PCE), durable goods (DG), semi-durable goods (SDG), non-durable goods and services (SV) respectively, we estimate equation 1 to examine the self-predictive power of the first differences of the aggregate consumer confidence indices (DICC) and of the four individual indices (DICC_Q1 to DICC_Q4). The results reported in Table D1 in Appendix D, suggest that 18.70% of the variation in the growth of consumption expenditures can be explained by the first four lags of the aggregate confidence indices differences (adjusted R^2 equal to 0.187). In addition, the sum of coefficients is positive and they are jointly significant (the p-value is equal to 0.004). Therefore, the test results suggest that the confidence indices differences (DICC) have a self-predictive power on the growth of total consumption expenditures (PCE).

When we change the explanatory variables to the individual confidence indices (DICC_Q1 to DICC_Q4), we obtain that the individual indices express good self-predictive power as well. The only exception is the first differences of the individual indices for question 1 (DICC_Q1), which can only explain 3.9% of the variation in the growth of total consumption. On the other hand, the first four lags of the differences in the confidence indices for question 2 (DICC_Q2) can explain 14.40% of the changes in total consumption expenditures. The sum of the coefficients is 0.057, and the coefficients are jointly significant with a p-value equal to 0.004. Moreover, the lagged difference of the confidence indices for question 3 (DICC_Q3) and question 4 (DICC_Q4) are able to explain the changes in total consumption expenditures with an adjusted R^2 equal to 0.172 and 0.129. Therefore, for Canada overall, we can say that the first difference of the consumer confidence indices (DICC and DICC_Q1 to DICC_Q4) have a good self-predictive power for total consumption expenditures (PCE).

Table D1 shows that the confidence indices are also able to explain the changes in other consumption categories. For semi-durable goods (SDG), nondurable goods (NDG) and services (SV), the first differences of the aggregate confidence indices (DICC) are able to explain 5% to 10% of the variation in these consumption categories. In addition, the first differences of the individual indices have a good forecasting ability as well. For example, the individual indices for question 1 (DICC_Q1) can explain 11.10% of the changes in the consumption of nondurable goods (NDG). In addition, the individual indices for question 3 (DICC_Q3) can explain 14.50% of the variation in the consumption of services (SV).

Conversely, the self-predictive power of the confidence indices is weak for consumption of durable goods (DG). In this case, only 3.6% of the variation in the dependent variable can be explained by the first four lags of the differences in the aggregate confidence indices (DICC). The performances of the individual indices for question 1 (DICC_Q1) and question 3 (DICC_Q3) are worse with negative adjusted R^2 s. From these results we can conclude that people might be more cautious about making major purchases like house and car. Although the confidence indices are not strong enough to explain the changes in the consumption of durable goods, in general the first difference of the consumer confidence indices (DICC and DICC_Q1 to DICC_Q4) has good self-predictive power on most consumption categories.

To examine the incremental predictive power of the confidence indices, we first report the adjusted R^2 obtained from equation 3 with only the control variables as the explanatory variables. Second, based on equation 2, we add the lagged differences of the confidence indices as explanatory variables and we compute the new adjusted R^2 . The difference between these two adjusted R^2 s reflects the incremental predictive power of the consumer confidence indices.

According to Table E1 of Appendix E, the third column ("Adjusted R^2 exclude the confidence indices"), the control variables have good predictive power for the changes in total consumption, and in the consumption of durable goods and services (the adjusted R^2 s are equal to 0.229, 0.229 and 0.091 respectively). When we include the confidence indices, the adjusted R^2 s computed from equation 2 decrease in the categories of total consumption expenditures (first three rows of "Incremental Adj- R^2 " in Table E1) and the consumption of semi-durable goods (11th row of "Incremental Adj- R^2 " in Table E1). In addition, the results of the joint significant tests on the lagged confidence indices suggest that none of them are jointly significant ("p-values of joint significant test", first and third categories, Table E1). Therefore, the predictive ability of the confidence indices is impacted by the presence of additional control variables in the regression.

On the other hand, the inclusion of the confidence indices increases the adjusted R^2 when predicting the changes in the consumption of durable goods and services. For instance, at least 8.30% of the variation in the consumption of durable goods can be explained by the first four lags of the aggregate confidence indices differences (6th row of "Incremental Adj- R^2 ", Table E1). The coefficients on the explanatory variables are also jointly significant, with p-value equal to 0.030 (6th row of "p-values of joint significant test", Table E1). Furthermore, the indices for question 2 (DICC_Q2) and question 3 (DICC_Q3) increase the adjusted R^2 by 0.125 and 0.003. Finally, neither the control variables alone, or the control variables and the confidence indices together, generate positive adjusted R^2 s when predicting the consumption of nondurable goods. Even so, adding the consumer confidence indices to the regressions does increase the adjusted R^2 s ("Incremental Adj- R^2 ", 4th category, Table E1).

In summary, the results from equation 1 suggest that the first differences of the consumer confidence indices (DICC) have a good predictive power for most consumption categories.

Moreover, when additional control variables are included as the explanatory variables, the results from equation 2 suggest that the predictive power of the confidence indices is increased for the consumption of durable goods, non-durable goods and services. These results differ from those of Kwan and Cotsomitis (2006), which suggest that adding the consumer confidence indices (ICC) in levels to the regressions can increase the adjusted R^2 s for all the consumption categories. The reason for this discrepancy could be the different sample periods or the different types of consumer confidence indices (first differences versus levels) employed in the analysis.

6.2 Regression Results for Canadian Provinces

We examine the self-predictive power and the incremental predictive power of the aggregate consumer confidence indices and the individual confidence indices by estimating equation 1 and equation 2 at the provincial level. For the provincial analysis, total consumption expenditures (PCE), all goods expenditures (GD) and services expenditures (SV) are selected as the dependent variables. The regression results for the five regions (Atlantic Provinces, British Columbia, Ontario, Prairie Provinces and Quebec) are reported in Appendix F to G.

Atlantic Provinces

The results of equation 1 for the Atlantic Provinces are reported in Appendix F. Table F1, which suggest poor self-predictive power of the first differences of the confidence indices. All of the lagged first differences of the confidence indices (DICC_AT) are unable to explain the changes in total consumption expenditures (PCE) and services expenditures (SV). The adjusted R^2 s are negative and the explanatory variables are jointly insignificant (1st and 3rd consumption categories, "Incremental Adj- R^2 ", Table F1). The results are more positive for the consumption of all goods (GD). With the exception of the indices for question 1 (DICC_ATQ1), all other

confidence indices exhibit good predictive ability. In particular, the individual indices for question 3 (DICC_ATQ3) can explain 10.80% of the variation in the growth of all goods expenditures (GD). The coefficients of the explanatory variables are also jointly significant with p-value equal to 0.036 (9th row of "p-values of joint significant test" in Table F1).

The results reported in Table G1 suggest a good incremental predictive power of the first differences of the confidence indices (DICC_AT) for consumption expenditures in all goods (GD). With the exception of the indices for question 4 (DICC_ATQ4), the adjusted R²s are increased by at least 0.047 (7th row of "Incremental Adj-R²" in Table G1). Also, the control variables are able to explain 10.50% of the variation in the dependent variable ("Adj-R² exclude the confidence indices", 2nd category, Table G1). In contrast, including the confidence indices decreases the adjusted R²s ("Incremental Adj-R²", 1st and 3rd categories in Table G1) for total consumption expenditures (PCE) and services expenditures (SV). The coefficients on the added confidence indices are jointly insignificant.

Therefore, for the Atlantic Provinces, the consumer confidence indices are weak predictors of the changes in most consumption categories. In addition, with the control variables alone as explanatory variables, the adjusted R² is negative and equal to -0.162 ("Adj-R² exclude the confidence indices", 1st category, Table G1) when we predict total consumption expenditures. This is probably because the series of the consumption categories other than all goods (GD) and services fluctuate greatly and decrease the stability of total consumption expenditures (PCE).

British Columbia

The consumer confidence indices have good self-predictive power in British Columbia. Table F2 in Appendix F shows that the lagged differences of the aggregate consumer confidence

indices (DICC_BC) can explain 24.20% of the variation in the growth of total consumption (1st row of "Incremental Adj-R²" in Table F2). From 12.40% to 34.70% of the variation in the consumption of all goods (GD_BC) ("Incremental Adj-R²", 2nd category in Table F2) can be explained by the first difference of the aggregate confidence indices (DICC_BC) or the first difference of the individual confidence indices (DICC_BCQ1 to DICC_BCQ4). The coefficients of all the explanatory variables are jointly significant. Although the consumer confidence indices are unable to explain the changes in services expenditures ("Incremental Adj-R²", 3rd category in Table F2), they are useful in predicting most consumption categories in British Columbia.

For British Columbia, the results from equation 2 further support the conclusion about the forecasting power of the confidence indices. Table G2 in Appendix G shows that the control variables are able to explain 24.7% of the variation in total consumption expenditures. An increase of 0.081 in the adjusted R² is obtained by including the first difference of the confidence indices (1st row of "Incremental Adj-R²" in Table G2). In addition, the adjusted R² is negative when we use the control variables alone as explanatory variables to predict the consumption of all goods ("Adj-R² exclude the confidence indices", 2nd category in Table G2). However, the adjusted R²s are boosted when we add the confidence indices to the regressions. For example, the incremental adjusted R²s are equal to 0.314, 0.266 and 0.250 ("Incremental Adj-R²", 6th, 8th and 10th rows in Table G2) after adding the first differences of the aggregate confidence indices (DICC_BC), the individual indices for question 2 (DICC_BCQ2), and the individual indices for question 4 (DICC_BCQ4), respectively. For the consumption of service (SV), we have similar results as those obtained from equation 1, which confirm that the confidence indices are unable to explain the changes in services expenditures for British Columbia.

Ontario

Table F3 in Appendix F shows that the first difference of the consumer confidence indices has a good self-predictive power for all of the consumption categories. The adjusted R^2 s are all positive in the column of "Incremental Adj- R^2 ". In addition, the sum of the coefficients is positive and the coefficients of the explanatory variables are jointly significant. Particularly, the lagged differences of the aggregate confidence indices (DICC_ON) can explain 28.3% of the variation in total consumption expenditures (PCE). The individual indices for question 2 to question 4 (DICC_ONQ1 to DICC_ONQ4) are able to explain more than 20% of the variation in the dependent variable ("Incremental Adj- R^2 ", 1st category in Table F3). Furthermore, all types of the consumer confidence indices are jointly significant ("p-values of joint significant test", 1st category in Table F3.).

Compared to the conclusions obtained from equation 1, equation 2 gives more complex results. In Table G3, the control variables are weak in explaining the changes in the dependent variable. Adding the confidence indices into the regression increases most adjusted R^2 s. In addition, when predicting total consumption expenditures (PCE), the coefficients of the aggregate confidence indices (DICC_ON) and the coefficients of the individual indices for question 1 to question 3 (DICC_ONQ1 to DICC_ONQ3) are jointly significant. For other categories, such as the consumption of all goods and services, only some of the confidence indices are able to improve the adjusted R^2 . In summary, the consumer confidence indices have good self-predictive power on consumption expenditures. Although the addition of the control variables makes the situation more complex to interpret, the inclusion of the confidence indices increases the explaining power for some consumption categories.

Prairie Provinces

For the Prairie Provinces, the results from Equation 1 suggest that the predictive power of the aggregate confidence indices is good for total consumption expenditures and all goods expenditures. More specifically, Table F4 suggests that 10.90% of the variation in total consumption expenditures and 15.90% of the variation in all goods expenditures can be explained by the lagged aggregate confidence indices ("Incremental Adj-R²", 1st and 6th rows in Table F4).

An unexpected result arises when we use the lagged individual indices for question 2 (DICC_PRQ2) as explanatory variables. These indices have good predictive power, since they can explain over 10% of the variation in total consumption expenditures and all goods expenditures. However, the sums of the coefficients are all negative and jointly significant ("p-values of joint significant test", 3rd and 8th rows in Table F4), which suggest a significant negative relationship between the confidence indices for question 2 (DICC_PRQ2) and those two consumption categories (PCE and GD). Since question 2 is asking households about their expectations of future financial conditions, we can conclude that for the Prairie Provinces, the consumption expenditures are negatively affected by these expectations.

The results from equation 2 for the Prairie Provinces are reported in Table G4. We can observe that the control variables can explain the changes in consumption expenditures. However, including the lagged difference of the confidence indices does not increase the adjusted R²s in most regressions. In addition, the sum of the coefficients is negative and the coefficients on the explanatory variables are jointly significant. Therefore, for the Prairie Provinces, although the confidence indices can predict consumption expenditures to some degree, their predictive power is weakened by the addition of control variables.

Quebec

The results for equation 1, reported in Table F5 of Appendix F, suggest that most of the consumer confidence indices can explain the changes in consumption expenditures. The sum of the coefficients is positive and most of the coefficients on the lagged differences of the confidence indices are jointly significant. Moreover, the consumption of services can be explained by most types of the consumer confidence indices. Except for the individual confidence indices for question 1 (DICC_QBQ1), over 18% of the variation in the consumption of services can be explained by the lagged first differences of the consumer confidence indices.

In contrast, the results are not as expected when we use the confidence indices and the control variables together as explanatory variables. As we can see in the column of "Adj-R² exclude the confidence indices", the control variables are unable to explain the changes in total consumption expenditures and in all goods expenditures. Although there are several positive values in the column of "Incremental Adj-R²", the results of the Wald test suggest that only three of the confidence indices are jointly significant. In general, when additional control variables are included, most of the confidence indices are not strong enough to improve the adjusted R²s in the regressions. Nonetheless, the lagged differences of the consumer confidence indices alone are able to predict consumption expenditures in Quebec.

7. Robustness Check

In this section, we conduct a robustness check to examine the predictive power for the level of the consumer confidence indices. Since all of the confidence indices above are transformed into first differences to make sure that the series stationarity, the results about the incremental adjusted R² in our sample from 2002:Q4 to 2016:Q2 are not comparable to the results from

1979:Q4 to 2001:Q4 reported by Kwan and Cotsomitis (2006). To examine whether our results about the predictive ability of the consumer confidence indices are consistent with those of Kwan and Cotsomitis (2006), we repeat the analysis using the level of the confidence indices (ICC) in the regressions.

In addition, the quarterly series of the consumer confidence indices used in the main analysis are calculated by taking the arithmetic average of the monthly indices. Therefore, to check the robustness of the results, in this section we perform an additional exercise in which we use another method to compute the quarterly series of the confidence indices. More specifically, we use the indices from the last month of each quarter to get the quarterly series and we check the changes of the predictive power when the confidence indices are computed in this way.

Finally, the levels of labor income and the Toronto Stock Exchange (TSE) are deflated by the consumer price index (CPI) in this study. Therefore, we perform a final robustness check by replacing the CPI with the implicit price deflator to compute the real labor income and the real Toronto Stock Exchange Index.

7.1 Level of the Consumer Confidence Indices

Canada National

In this section we use the level of the consumer confidence indices (ICC) as explanatory variables. For equation 1, the regression results at the national level are reported in Table D2. The result shows that the adjusted R^2 s are all increased when we use the level of the confidence indices to predict each category of the consumption expenditures. In our specifications, when we use the level of the aggregate confidence indices (ICC) to predict total consumption expenditures (PCE), the adjusted R^2 rises from 0.187 to 0.271 (the column of "Adj- R^2 ", 1st row of Table D &

D1). Similarly, the adjusted R^2 is increased by 0.169 when we use the level of the individual confidence indices for question 4 (ICC_Q4) to predict services expenditures. In addition, the results of the Wald test suggest that more explanatory variables are now jointly significant.

The results in Table E2 of Appendix E suggest that in equation 2, most levels of the confidence indices have positive incremental predictive power. Comparing these results with those obtained from the first differences of the confidence indices, we can observe that more explanatory variables are jointly significant when the levels are used. Therefore, the levels of the aggregate confidence indices and the levels of most of the individual indices can increase the adjusted R^2 s of the regressions. We can conclude that the level of the confidence indices is able to predict the national consumption expenditures in the more recent period from 2002:Q1 to 2016:Q2 as well as in the 1979:Q4 to 2001:Q4 studied by Kwan and Cotsomitis (2006).

Atlantic Provinces

The reason for paying particular attention to the Atlantic Provinces is that the first difference of the confidence indices (DICC_AT) delivered a very poor predictive power and a negative incremental predict power. To determine whether this result depends on the transformation of the data to first differences, we repeat the regressions using the level of the consumer confidence indices for the Atlantic Provinces. The results in Table F1.1 of Appendix F suggest that the adjusted R^2 s are not improved when we use the level of the confidence indices as explanatory variables. For example, the level of the aggregate confidence indices (ICC_AT) is able to explain an extra 0.8% (6th row of "Incremental Adj- R^2 " in Table F1.1) of the changes in the consumption of all goods. This is less than the results obtained using the first difference of the confidence indices, in which the incremental adjusted R^2 is 4.5% (6th row of "Incremental Adj- R^2 " in Table

F1). Since the level of the consumer confidence indices does not improve the adjusted R^2 , we can conclude that both the level and the first difference of the confidence indices have weak predictive power on all consumption categories for the Atlantic Provinces.

Ontario

The first difference of the confidence indices has a good predictive ability for consumption in Ontario. We now examine whether the level of the confidence indices can improve the adjusted R^2 further. For equation 1, the results in Table F3.1 of Appendix F suggest good adjusted R^2 s. However, comparing these results with those obtained using the first difference of the confidence indices, we can conclude that the level of the confidence indices is relatively weaker in predicting total consumption expenditures and all goods expenditures.

The results for equation 2 reported in Table G3.1 of Appendix G suggest that the level of the confidence indices can increase the incremental adjusted R^2 s. Especially, in forecasting total consumption and services expenditures, the incremental adjusted R^2 s are much higher compared to the case in which the first difference of the confidence indices is employed. For instance, using the level of the confidence indices, the incremental adjusted R^2 is equal to 0.259 (1st row of the column "Incremental Adj- R^2 " in Table G3.1). On the other hand, when the first difference of the confidence indices is used, the incremental adjusted R^2 is equal to 0.144 (1st row of the column "Incremental Adj- R^2 " in Table G3.). Therefore, an additional 11.5% of the variation in total consumption is explained when the level of the confidence indices is employed in the regression.

7.2 Quarterly Series of Consumer Confidence Indices: Last Month

Since 2002, the Conference Board of Canada reports monthly data of the consumer confidence indices. Instead of taking the average of monthly data, we can alternatively use the indices from the last month of each quarter to generate a new quarterly series. More specifically, we set the confidence indices of March as the 1st quarter, June as the 2nd quarter, September as the 3rd quarter and December as the last quarter from 2002:Q1 to 2016:Q2. For equation 2, these new quarterly series are employed for both the first difference of the confidence indices and the level of the confidence indices. The new data is used to predict total consumption expenditures at the national level. According to the result reported in Table E4 of Appendix E, all the incremental adjusted R^2 's are negative when we use the first difference of the confidence indices (the column of "Incremental Adj- R^2 " in Table E4). In contrast, although the level of the individual indices for question 1 and question 2 have negative incremental adjusted R^2 's, the level of the aggregate confidence indices increase the adjusted- R^2 by 7.30%.

In summary, if the series are stationary, the level of the confidence indices is better than the first difference of the confidence indices in predicting consumption expenditures. In addition, in constructing the quarterly series of the confidence indices, taking the average of the monthly data for each quarter seems to be better than simply using the last month in each quarter, since in this way the series of the confidence indices is able to explain more of the variation in consumption expenditures. In general, the consumer confidence indices may fluctuate in a short period, while the corresponding consumption expenditures will change with lags in response. Therefore, taking the average of the monthly indices for each quarter would make the series of the confidence indices more stable and closer in behaviour to the real consumption.

7.3 Real Terms by the Implicit Price Deflator

The original data for labor income and the Toronto Stock Exchange Index are in nominal levels and they need to be adjusted for inflation. There are two price indicators that can be employed to transform the variables into real terms. The first is the Consumer Price Index (CPI), which is used in the main analysis in this paper. However, the CPI is a fixed-weight price index based on a specific basket of goods and services, and it does not take into account the changes in relative prices and consumer preferences. This problem can be solved by using the implicit price deflator of the consumption expenditures, which takes into account that the basket of the goods and services purchased can change year by year with the different patterns of consumption.

First, we recalculate the data series of the national labor income and the Toronto Stock Exchange Index by dividing the nominal data by the implicit price deflator with base year of 2007. Second, we use these newly computed control variables in equation 2. The results reported in Table E3 of Appendix E suggest that the level of the confidence indices has positive incremental predictive power. More results suggest that almost all of the adjusted R^2 s are much higher by using the implicit price deflator. For example, the incremental adjusted R^2 is 0.205 using the implicit price deflator and 0.125 using the consumer price index (the first row of "Incremental Adj- R^2 " in Table E2 & E3). Therefore, using the control variables adjusted by the implicit price deflator, the confidence indices can explain 8.00% more of the variation in total consumption. This result suggests that using the implicit price deflator is better when examining the predictive ability of the consumer confidence indices.

8. Conclusions

This paper uses recent data to examine the predictive power of the Conference Board's consumer confidence indices in Canada at the national and provincial levels. At the national level, the consumer confidence indices have a certain degree of self-predictive power in forecasting total consumption and its sub-categories. Although including additional control variables decreases the predictive ability of the confidence indices, the incremental predictive power of the consumer confidence indices is positive for most consumption categories, such as durable goods, non-durables, and services. At the provincial level, the lagged confidence indices can explain the expenditures in different consumption categories in most provinces, including British Columbia, Ontario, the Prairie Provinces and Quebec. Similarly, as for the national level data, the incremental predictive power is weakened by the addition of control variables in the regression. In British Columbia and Ontario, adding the confidence indices increases the explaining powers of all the control variables on consumption. Therefore, the consumer confidence indices measured by the Conference Board of Canada from 2002:Q1 to 2016:Q2 have good predictive abilities in explaining the changes of consumption in Canada overall. However, we find that more caution is needed when using the consumer confidence indices to predict consumption expenditures for the Canadian provinces, especially for the Atlantic Provinces.

References

1. Acemoglu, Daron, and Andrew Scott. "Consumer confidence and rational expectations: Are agents' beliefs consistent with the theory?" *The Economic Journal* (1994): 1-19.
2. Angevine, Gerald E. "Forecasting consumption with a Canadian consumer sentiment measure." *Canadian Journal of Economics* (1974): 273-289.
3. Bram, Jason, and Sydney C. Ludvigson. "Does consumer confidence forecast household expenditure? A sentiment index horse race." *Economic Policy Review* 4.2 (1998).
4. Bryant, WD Anthony, and Joseph Macri. "Does sentiment explain consumption?" *Journal of economics and finance* 29.1 (2005): 97-110.
5. Carroll, Christopher D., Jeffrey C. Fuhrer, and David W. Wilcox. "Does consumer sentiment forecast household spending? If so, why?" *The American Economic Review* 84.5 (1994): 1397-1408.
6. Côté, Denise, and Marianne Johnson. *Consumer attitudes, uncertainty, and consumer spending*. Bank of Canada, 1998.
7. Flavin, Marjorie A. "The adjustment of consumption to changing expectations about future income." *The Journal of Political Economy* (1981): 974-1009.
8. Friedman, Milton. "The permanent income hypothesis." *A theory of the consumption function*. Princeton University Press, 1957. 20-37.
9. Hall, Robert E. "Stochastic implications of the life cycle-permanent income hypothesis: theory and evidence." NBER working paper R0015 (1979).
10. Karnizova, Lilia, and Hashmat Khan. "The stock market and the consumer confidence channel: Evidence from Canada." *Empirical Economics* (2014): 1-23.
11. Kwan, Andy CC, and John A. Cotsomitis. "Can consumer attitudes forecast household spending in the United States? Further evidence from the Michigan Survey of Consumers." *Southern Economic Journal* (2004): 136-144.
12. Kwan, Andy CC, and John A. Cotsomitis. "The usefulness of consumer confidence in forecasting household spending in Canada: A national and regional analysis." *Economic Inquiry* 44.1 (2006): 185-197.
13. Mueller, Eva. "Ten years of consumer attitude surveys: Their forecasting record." *Journal of the American Statistical Association* 58.304 (1963): 899-917.
14. Shapiro, Harold T., and Gerald E. Angevine. "Consumer attitudes, buying intentions and expenditures: An analysis of the Canadian Data." *The Canadian Journal of Economics/Revue canadienne d'Economie* 2.2 (1969): 230-249.

Appendix

Appendix A: Variables Explanation

DICC_CA/AT/BC/ON/PR/QB	First differences of the aggregate consumer confidence indices for Canada/the Atlantic Provinces/British Columbia/Ontario/the Prairie Provinces/Quebec
ICC_CA/AT/BC/ON/PR/QB	Level of the aggregate consumer confidence indices for Canada/the Atlantic Provinces/British Columbia/Ontario/the Prairie Provinces/Quebec
DLCX_CA/AT/BC/ON/PR/QB	Logarithmic growth in real total consumption expenditures for Canada /the Atlantic Provinces/British Columbia/Ontario/the Prairie Provinces/Quebec
DLCX_CADG	Logarithmic growth in real consumption of durable goods for Canada
DLCX_CASDG	Logarithmic growth in real consumption of semi-durable goods for Canada
DLCX_CANDG	Logarithmic growth in real consumption of nondurable goods for Canada
DLCX_CA/AT/BC/ON/PR/QB SV	Logarithmic growth in real consumption of services for Canada /the Atlantic Provinces/British Columbia/Ontario/the Prairie Provinces/Quebec
DLCX_ AT/BC/ON/PR/QB GD	Logarithmic growth in real consumption of all goods for the Atlantic Provinces/British Columbia/Ontario/the Prairie Provinces/Quebec
CA/AT/BC/ON/PR/QB_LABOR	Real terms of labor income for Canada/the Atlantic provinces/British Columbia/Ontario/the Prairie provinces/Quebec
TSE	Real composite price of Toronto Stock Exchange Index
INSPREAD	Net treasury bill calculated by 10-year federal bond minus 3-month treasury bill.

Appendix B: Unit Root Test (Quarterly Sample from 2002:Q1 to 2016:Q2)

Table B1: Growth in Household Consumption Categories: National

	DLCX_CA		DLCX_CADG		DLCX_CASDG		DLCX_CANDG		DLCX_CASV	
	ADF	PP	ADF	PP	ADF	PP	ADF	PP	ADF	PP
current	-2.752***	-2.539**	-5.988***	-5.992***	-2.009**	-5.607***	-4.670***	-4.584***	-2.319***	-2.588***
Lag1	-2.703***	-2.485**	-5.908***	-5.912***	-1.966**	-5.445***	-4.413***	-4.314***	-2.212***	-2.647***
Lag2	-2.707***	-2.499**	-5.880***	-5.885***	-1.977**	-5.529***	-4.388***	-4.276***	-2.178***	-2.588***
Lag3	-2.672***	-2.461**	-5.794***	-5.799***	-2.027**	-5.539***	-4.185***	-4.049***	-2.181***	-2.599***
Lag4	-2.661***	-2.453**	-5.867***	-5.867***	-2.001**	-5.447***	-3.921***	-3.904***	-2.645***	-2.446***
Critical Value					1% (***)	-2.610				
					5% (**)	-1.947				
					10% (*)	-1.613				

Table B1.1: Growth in Household Consumption Categories: Provincial

	DLCX_AT		DLCX_ATGD		DLCX_ATSV		DLCX_BC		DLCX_BCGD	
	ADF	PP	ADF	PP	ADF	PP	ADF	PP	ADF	PP
current	-6.034***	-6.211***	-8.070***	-8.075***	-4.568***	-4.655***	-4.556***	-4.590***	-6.668***	-6.719***
Lag1	-5.965***	-6.144***	-1.817*	-7.920***	-4.496***	-6.031***	-4.538***	-4.574***	-6.566***	-6.625***
Lag2	-5.934***	-5.996***	-2.089**	-8.318***	-4.465***	-4.546***	-4.506***	-4.543***	-6.541***	-6.564***
Lag3	-5.856***	-5.920***	-2.137**	-7.938***	-4.418***	-4.466***	-4.440***	-4.777***	-6.396***	-6.424***
Lag4	-5.649***	-5.737***	-2.125**	-7.670***	-4.378***	-4.426***	-4.412***	-4.452***	-6.425***	-6.450***
Critical Value					1% (***)	-2.610				
					5% (**)	-1.947				
					10% (*)	-1.613				

Table B1.1: Growth in Household Consumption Categories: Provincial (Continued)

	DLCX_BCSV		DLCX_ON		DLCX_ONGD		DLCX_ONSV		DLCX_PR	
	ADF	PP	ADF	PP	ADF	PP	ADF	PP	ADF	PP
current	-6.265***	-6.248***	-3.249***	-3.071***	-5.226***	-5.396***	-1.721*	-3.051***	-3.524***	-3.481***
Lag1	-6.028***	-6.007***	-3.199***	-3.017***	-5.149***	-5.330***	-1.754*	-3.089***	-3.488***	-3.390***
Lag2	-6.148***	-6.126***	-2.984***	-2.763***	-4.853***	-5.073***	-1.769*	-3.069***	-3.395***	-3.301***
Lag3	-6.084***	-6.061***	-3.141***	-2.959***	-5.166***	-5.394***	-1.773*	-3.102***	-3.384***	-3.303***
Lag4	-6.092***	-6.067***	-3.169***	-3.001***	-5.283***	-5.474***	-1.623*	-2.930***	-3.343***	-3.263***
Critical Value					1% (***)	-2.610				
					5% (**)	-1.947				
					10% (*)	-1.613				

Table B1.1: Growth in Household Consumption Categories: Provincial (Continued)

	DLCX_PRGD		DLCX_PRSV		DLCX_QB		DLCX_QBGD		DLCX_QBSV	
	ADF	PP	ADF	PP	ADF	PP	ADF	PP	ADF	PP
current	-4.986***	-5.146***	-1.760*	-4.155***	-1.860*	-3.148***	-6.205***	-6.382***	-2.020**	-1.958**
Lag1	-4.898***	-5.047***	-1.751*	-4.136***	-1.806*	-3.012***	-6.023***	-6.228***	-2.050**	-1.995**
Lag2	-4.662***	-4.696***	-1.701*	-4.094***	-1.881*	-3.140***	-6.101***	-6.276***	-1.995**	-1.939*
Lag3	-4.670***	-4.692***	-1.689*	-4.049***	-1.872*	-3.065***	-5.993***	-6.177***	-2.021**	-1.976**
Lag4	-4.599***	-4.626***	-1.624*	-3.876***	-1.898*	-3.042***	-5.799***	-5.967***	-1.965**	-1.829*
Critical						1% (***)	-2.610			
Value						5% (**)	-1.947			
						10% (*)	-1.613			

Table B2: Consumer Confidence Indices

	ICC_AT			ICC_BC			ICC_ON		
	ADF_LEV	ADF_DIF	PP_LEV	ADF_LEV	ADF_DIF	PP_LEV	ADF_LEV	ADF_DIF	PP_LEV
current	-2.948**	-7.950***	-2.970**	-1.700	-7.712***	-1.815	-2.187	-7.360***	-2.226
Lag1	-2.880*	-8.004***	-2.894*	-1.686	-7.066***	-1.829	-2.082	-7.165***	-2.136
Lag2	-2.770*	-7.741***	-2.790*	-1.506	-6.688***	-1.687	-2.104	-7.078***	-2.164
Lag3	-2.843*	-7.834***	-2.843*	-1.559	-6.579***	-1.730	-2.058	-6.952***	-2.121
Lag4	-2.822*	-7.545***	-2.842*	-1.501	-6.567***	-1.681	-2.055	-6.934***	-2.110
Lag5	-2.643*	-6.795***	-2.700*	-1.475	-6.431***	-1.657	-2.003	-6.818***	-2.066
Lag6	-2.605*	-7.360***	-2.605*	-1.494	-6.451***	-1.660	-1.999	-6.799***	-2.054
Critical	1%-3.550	1%-2.607	1%-3.550	1%-3.550	1%-2.607	1%-3.550	1%-3.565	1%-2.611	1%-3.565
Value	5%-2.914	5%-1.947	5%-2.914	5%-2.914	5%-1.947	5%-2.914	5%-2.919	5%-1.947	5%-2.919
	10%-2.595	10%-1.613	10%-2.595	10%-2.595	10%-1.613	10%-2.595	10%-2.598	10%-1.613	10%-2.598

Table B2: Consumer Confidence Indices (Continued)

	ICC_PR			ICC_QB			ICC_CA		
	ADF_LEV	ADF_DIF	PP_LEV	ADF_LEV	ADF_DIF	PP_LEV	ADF_LEV	ADF_DIF	PP_LEV
current	-1.651	-6.881***	-1.914	-2.732*	-7.587***	-2.727*	-2.118	-6.682***	-2.118
Lag1	-1.098	-6.603***	-1.453	-2.537	-7.546***	-2.540	-1.906	-6.396***	-1.906
Lag2	-1.626	-6.707***	-1.968	-2.588	-7.518***	-2.593	-2.011	-6.379***	-2.011
Lag3	-1.895	-6.667***	-2.125	-2.570	-7.447***	-2.576	-1.966	-6.271***	-1.966
Lag4	-2.232	-6.678***	-2.427	-2.550	-7.374***	-2.559	-1.985	-6.252***	-1.985
Lag5	-2.303	-6.281***	-2.467	-2.518	-7.157***	-2.527	-1.976	-6.137***	-1.976
Lag6	-2.534	-6.840***	-2.629*	-2.219	-6.585***	-2.228	-1.928	-6.060***	-1.928
Critical	1%-3.550	1%-2.612	1%-3.550	1%-3.565	1%-2.612	1%-3.565	1%-3.565	1%-2.612	1%-3.563
Value	5%-2.914	5%-1.947	5%-2.914	5%-2.919	5%-1.947	5%-2.919	5%-2.919	5%-1.947	5%-2.919
	10%-2.595	10%-1.613	10%-2.595	10%-2.598	10%-1.613	10%-2.598	10%-2.597	10%-1.613	10%-2.597

Table B3:Labor Income

	AT_LABOR			BC_LABOR			ON_LABOR		
	ADF_LEV	ADF_2dDIF	PP_LEV	ADF_LEV	ADF_2dDIF	PP_LEV	ADF_LEV	ADF-DIF	PP_LEV
Lag1	-0.170	-7.923***	0.365	-1.088	-8.532***	-0.645	-0.546	-5.735***	-0.568
Lag2	0.112	-7.996***	0.670	-0.589	-8.446***	-0.606	-0.542	-5.464***	-0.564
Lag3	-0.066	-7.883***	0.351	-0.789	-8.184***	-0.792	-0.962	-5.702***	-0.964
Lag4	-0.193	-7.806***	0.361	-0.737	-8.089***	-0.745	-0.991	-5.632***	-0.993
Critical Value	1%-3.550	1%-2.610	1%-3.550	1%-3.550	1%-2.610	1%-3.550	1%-3.550	1%-2.610	1%-3.550
	5%-2.915	5%-1.947	5%-2.915	5%-2.915	5%-1.947	5%-2.915	5%-2.915	5%-1.947	5%-2.915
	10%-2.595	10%-1.613	10%-2.595	10%-2.595	10%-1.613	10%-2.595	10%-2.595	10%-1.613	10%-2.595

Table B3:Labor Income(Continued)

	PR_LABOR			QB_LABOR			CA_LABOR		
	ADF_LEV	ADF_DIF	PP_LEV	ADF_LEV	ADF_DIF	PP_LEV	ADF_LEV	ADF_DIF	PP_LEV
Lag1	-1.670	-1.974**	-1.076	-0.117	-2.497**	0.026	-0.642	-3.060***	-0.642
Lag2	-1.413	-3.137***	-0.896	-0.540	-2.694**	-0.494	-0.558	-3.045***	-0.566
Lag3	-1.536	-2.917***	-0.830	-0.557	-2.670**	-0.514	-0.717	-2.943***	-0.711
Lag4	-1.387	-2.786***	-0.551	-0.519	-2.657**	-0.464	-0.533	-5.817***	-0.546
Critical Value	1%-3.550	1%-2.610	1%-3.550	1%-3.550	1%-2.610	1%-3.550	1%-3.550	1%-2.610	1%-3.550
	5%-2.915	5%-1.947	5%-2.915	5%-2.915	5%-1.947	5%-2.915	5%-2.915	5%-1.947	5%-2.915
	10%-2.595	10%-1.613	10%-2.595	10%-2.595	10%-1.613	10%-2.595	10%-2.595	10%-1.613	10%-2.595

Table B4:Growth in Interest Spreads

	ADF_LEV		PP_LEV		Critical Value
Lag1	t-Statistic	-5.007***	t-Statistic	-5.058***	1%(***) -2.608
Lag2	t-Statistic	-5.018***	t-Statistic	-5.072***	5%(**)-1.947
Lag3	t-Statistic	-4.970***	t-Statistic	-5.023***	10%(*)-1.613
Lag4	t-Statistic	-4.881***	t-Statistic	-4.934***	

Table B5:Logarithmic Growth in Toronto Stock Exchange Index

	ADF_LEV		PP_LEV		Critical Value
Lag1	t-Statistic	-5.731***	t-Statistic	-5.513***	1%(***) -2.608
Lag2	t-Statistic	-5.598***	t-Statistic	-5.439***	5%(**)-1.947
Lag3	t-Statistic	-5.501***	t-Statistic	-5.277***	10%(*)-1.613
Lag4	t-Statistic	-5.530***	t-Statistic	-5.389***	

Appendix C: Cross Correlation Analysis (Quarterly Sample from 2002:Q1 to 2016:Q2)

Table C1. Aggregate Consumer Confidence Indices in Different Areas

	Current	Lag1	Lag2	Lag3	Lag4	Lag5	Lag6	
Growth of Total Consumption Expenditures	Canada	0.381 (0.006)	0.342 (0.014)	0.281 (0.045)	0.297 (0.034)	0.089 (0.534)	-0.077 (0.593)	-0.148 (0.299)
	Atlantic Provinces	0.131 (0.358)	0.236 (0.096)	0.092 (0.520)	-0.135 (0.346)	0.038 (0.792)	-0.332 (0.017)	0.189 (0.185)
	British Columbia	0.298 (0.034)	0.318 (0.023)	0.408 (0.003)	-0.029 (0.841)	-0.146 (0.308)	0.014 (0.921)	-0.023 (0.870)
	Ontario	0.061 (0.668)	-0.009 (0.947)	0.158 (0.270)	0.472 (0.000)	0.353 (0.011)	0.011 (0.938)	-0.145 (0.311)
	Prairie Provinces	0.450 (0.001)	0.351 (0.012)	0.231 (0.104)	0.089 (0.534)	0.063 (0.662)	0.102 (0.477)	0.026 (0.856)
	Quebec	0.218 (0.124)	0.152 (0.285)	0.358 (0.010)	0.316 (0.024)	-0.066 (0.647)	-0.048 (0.737)	-0.142 (0.320)

Note: The values in parentheses are p-values

Table C2. Individual Consumer Confidence Indices: Canada

	Question 1	Question 2	Question 3	Question 4	
Growth of Total Consumption Expenditures	Current	0.433 (0.001)	0.241 (0.082)	0.265 (0.055)	0.288 (0.037)
	Lag1	0.229 (0.099)	0.221 (0.112)	0.317 (0.021)	0.287 (0.037)
	Lag2	0.266 (0.055)	0.157 (0.262)	0.256 (0.064)	0.155 (0.267)
	Lag3	0.091 (0.517)	0.254 (0.067)	0.227 (0.102)	0.233 (0.093)
	Lag4	0.082 (0.558)	0.004 (0.978)	0.100 (0.476)	0.069 (0.622)

Note: The values in parentheses are p-values

Table C3. Individual Consumer Confidence Indices: Atlantic Provinces

	Question 1	Question 2	Question 3	Question 4	
Growth of Total Consumption Expenditures	Current	0.002 (0.986)	0.138 (0.326)	0.036 (0.799)	0.363 (0.008)
	Lag1	0.119 (0.394)	0.125 (0.374)	0.273 (0.048)	0.081 (0.564)
	Lag2	0.012 (0.931)	0.164 (0.241)	0.015 (0.914)	-0.012 (0.935)
	Lag3	-0.095 (0.498)	-0.158 (0.259)	-0.163 (0.244)	0.030 (0.832)
	Lag4	0.056 (0.691)	-0.008 (0.955)	0.022 (0.877)	0.008 (0.955)

Note: The values in parentheses are p-values

Table C4. Individual Consumer Confidence Indices: British Columbia

	Question 1	Question 2	Question 3	Question 4
Current	0.414 (0.002)	0.044 (0.754)	0.235 (0.091)	0.221 (0.111)
Lag1	0.134 (0.338)	0.182 (0.192)	0.278 (0.044)	0.362 (0.008)
Growth of Total Consumption	0.227 (0.102)	0.259 (0.061)	0.283 (0.040)	0.373 (0.006)
Expenditures	-0.229 (0.099)	-0.108 (0.440)	0.183 (0.190)	0.047 (0.740)
Lag3	-0.126 (0.369)	-0.029 (0.836)	-0.099 (0.480)	-0.220 (0.114)
Lag4				

Note: The values in parentheses are p-values

Table C5. Individual Consumer Confidence Indices: Ontario

	Question 1	Question 2	Question 3	Question 4
Current	0.211 (0.129)	-0.009 (0.949)	0.034 (0.808)	-0.019 (0.893)
Lag1	-0.003 (0.984)	-0.120 (0.394)	0.126 (0.367)	-0.042 (0.767)
Growth of Total Consumption	0.223 (0.108)	0.049 (0.728)	0.066 (0.637)	0.152 (0.278)
Expenditures	0.267 (0.053)	0.383 (0.005)	0.395 (0.004)	0.338 (0.013)
Lag3	0.166 (0.236)	0.234 (0.092)	0.310 (0.024)	0.372 (0.006)
Lag4				

Note: The values in parentheses are p-values

Table C6. Individual Consumer Confidence Indices: Prairie Provinces

	Question 1	Question 2	Question 3	Question 4
Current	0.267 (0.053)	-0.202 (0.148)	0.379 (0.005)	0.435 (0.001)
Lag1	0.317 (0.021)	-0.243 (0.079)	0.274 (0.047)	0.246 (0.076)
Growth of Total Consumption	0.179 (0.199)	-0.245 (0.778)	0.197 (0.157)	0.040 (0.777)
Expenditures	-0.078 (0.580)	-0.041 (0.771)	0.118 (0.398)	0.041 (0.769)
Lag3	-0.020 (0.887)	0.139 (0.322)	0.142 (0.310)	0.070 (0.618)
Lag4				

Note: The values in parentheses are p-values

Table C7. Individual Consumer Confidence Indices: Quebec

	Question 1	Question 2	Question 3	Question 4
Current	-0.232 (0.095)	0.226 (0.104)	0.190 (0.173)	-0.003 (0.982)
Lag1	-0.245 (0.078)	0.080 (0.568)	0.052 (0.713)	0.124 (0.375)
Lag2	-0.155 (0.268)	0.196 (0.159)	0.380 (0.005)	0.290 (0.035)
Lag3	-0.113 (0.421)	0.240 (0.084)	0.236 (0.089)	0.295 (0.032)
Lag4	-0.043 (0.758)	-0.068 (0.630)	-0.051 (0.715)	-0.121 (0.390)

Note: The values in parentheses are p-values

Appendix D: The Regression Results for Equation 1: Canada Overall

Table D1. Self-Predictive Power of the Consumer Confidence Indices (First Differences)

Consumption Categories	Indices Types	Adj-R ²	Sum of coefficients	P-values of joint significant test	P-value of Breusch–Godfrey test	P-value of White test
Total PCE	ICC	0.187	0.049	0.004***	0.476	0.000***
	Question 1	0.039	0.026	0.588	0.073*	0.112
	Question 2	0.144	0.057	0.004***	0.222	0.002***
	Question 3	0.172	0.023	0.071*	0.374	0.340
	Question 4	0.129	0.044	0.096*	0.076*	0.191
Durable Goods	ICC	0.036	0.117	0.348	0.167	0.254
	Question 1	-0.028	0.063	0.828	0.205	0.026**
	Question 2	0.105	0.170	0.118	0.114	0.365
	Question 3	-0.009	0.040	0.780	0.234	0.189
	Question 4	0.093	0.128	0.073*	0.507	0.061*
Semi-Durable Goods	ICC	0.070	0.078	0.016**	0.138	0.076*
	Question 1	0.025	0.060	0.128	0.341	0.763
	Question 2	0.038	0.077	0.112	0.179	0.376
	Question 3	0.043	0.034	0.100*	0.140	0.005***
	Question 4	0.041	0.069	0.175	0.324	0.064*
Nondurable Goods	ICC	0.050	0.028	0.006***	0.654	0.664
	Question 1	0.111	0.019	0.000***	0.463	0.398
	Question 2	0.012	0.028	0.069*	0.522	0.632
	Question 3	0.012	0.011	0.031**	0.661	0.554
	Question 4	0.041	0.024	0.130	0.897	0.722
Services	ICC	0.101	0.039	0.016**	0.148	0.210
	Question 1	-0.014	0.016	0.411	0.123	0.830
	Question 2	0.055	0.042	0.088*	0.046**	0.248
	Question 3	0.145	0.022	0.002***	0.328	0.520
	Question 4	0.022	0.029	0.465	0.074	0.725

Table D2. Self-Predictive Power of the Consumer Confidence Indices (Level)

Consumption Categories	Indices Types	Adj-R ²	Sum of coefficients	P-values of joint significant test	P-value of Breusch–Godfrey test	P-value of White test
Total PCE	ICC	0.271	0.009	0.000***	0.807	0.000***
	Question 1	0.047	0.002	0.177	0.107	0.033**
	Question 2	0.204	0.011	0.000***	0.659	0.000***
	Question 3	0.210	0.004	0.033**	0.639	0.780
	Question 4	0.279	0.009	0.001***	0.776	0.041**
Durable Goods	ICC	0.053	0.015	0.071*	0.087	0.230
	Question 1	-0.031	0.005	0.828	0.111	0.408
	Question 2	0.114	0.012	0.068*	0.073*	0.407
	Question 3	-0.004	0.007	0.707	0.150	0.182
	Question 4	0.104	0.013	0.012**	0.364	0.003***
Semi-Durable Goods	ICC	0.105	0.016	0.000***	0.018**	0.009***
	Question 1	0.020	0.005	0.138	0.188	0.322
	Question 2	0.035	0.021	0.001***	0.108	0.130
	Question 3	0.074	0.007	0.014**	0.037**	0.000***
	Question 4	0.096	0.016	0.000***	0.050*	0.224
Nondurable Goods	ICC	0.060	0.005	0.022**	0.602	0.555
	Question 1	0.101	0.003	0.000***	0.498	0.280
	Question 2	-0.017	0.005	0.427	0.644	0.425
	Question 3	0.024	0.002	0.169	0.580	0.681
	Question 4	0.062	0.004	0.040**	0.831	0.519
Services	ICC	0.172	0.009	0.001***	0.610	0.042**
	Question 1	-0.016	0.001	0.501	0.089*	0.067*
	Question 2	0.124	0.012	0.000***	0.222	0.014**
	Question 3	0.167	0.004	0.000***	0.533	0.573
	Question 4	0.191	0.010	0.001***	0.765	0.484

Appendix E: The Regression Results for Equation 2&3: Canada Overall

Table E1. Incremental Predictive Power of the Consumer Confidence Indices (First Differences)

Consumption Categories	Indices Types	Adj-R ² exclude Confidence Indices	Adj-R ² include Confidence Indices	Incremental Adj-R ²	Sum of Indices coefficients	P-values of joint significant test	P-value of Breusch– Godfrey test	P-value of White test
Total PCE	ICC		0.197	-0.032	0.029	0.276	0.398	0.691
	Question1		0.154	-0.075	-0.006	0.800	0.303	0.953
	Question 2	0.229	0.175	-0.054	0.017	0.487	0.350	0.740
	Question 3		0.240	0.011	0.018	0.192	0.444	0.905
	Question 4		0.239	0.010	0.026	0.295	0.298	0.897
Durable Goods	ICC		0.312	0.083	0.245	0.030**	0.075*	0.868
	Question1		0.269	0.040	0.136	0.235	0.070*	0.667
	Question 2	0.229	0.354	0.125	0.246	0.013**	0.171	0.495
	Question 3		0.232	0.003	0.090	0.031**	0.054*	0.624
	Question 4		0.276	0.047	0.190	0.164	0.138	0.759
Semi-Durable Goods	ICC		-0.031	-0.044	0.056	0.668	0.711	0.677
	Question1		-0.012	-0.025	0.005	0.589	0.666	0.756
	Question 2	0.013	-0.026	-0.039	0.024	0.500	0.389	0.480
	Question 3		-0.021	-0.034	0.041	0.643	0.308	0.281
	Question 4		-0.039	-0.052	0.047	0.728	0.882	0.474
Nondurable Goods	ICC		-0.003	0.081	0.044	0.027**	0.225	0.977
	Question1		0.039	0.123	0.022	0.015**	0.784	0.953
	Question 2	-0.084	-0.065	0.019	0.022	0.201	0.470	0.970
	Question 3		-0.047	0.037	0.027	0.086*	0.322	0.483
	Question 4		0.015	0.099	0.018	0.010**	0.155	0.908
Services	ICC		0.117	0.026	0.014	0.090*	0.445	0.781
	Question1		0.017	-0.074	-0.011	0.661	0.482	0.610
	Question 2	0.091	0.055	-0.036	0.015	0.415	0.197	0.717
	Question 3		0.138	0.047	0.014	0.267	0.129	0.466
	Question 4		0.081	-0.010	0.005	0.253	0.312	0.556

Table E2. Incremental Predictive Power of the Consumer Confidence Indices (Level)

Consumption Categories	Indices Types	Adj-R ² exclude Confidence Indices	Adj-R ² include Confidence Indices	Incremental Adj-R ²	Sum of coefficients	P-values of joint significant test	P-value of Breusch–Godfrey test	P-value of White test
Total PCE	ICC		0.356	0.125	0.021	0.002***	0.966	0.951
	Question1		0.174	-0.057	0.004	0.742	0.607	0.964
	Question 2	0.231	0.269	0.038	0.017	0.084*	0.927	0.797
	Question 3		0.283	0.052	0.007	0.148	0.960	0.903
	Question 4		0.321	0.090	0.009	0.000***	0.707	0.974
Durable Goods	ICC		0.460	0.231	0.067	0.006***	0.207	0.106
	Question1		0.431	0.202	0.048	0.051*	0.271	0.463
	Question 2	0.229	0.480	0.251	0.062	0.004***	0.496	0.081*
	Question 3		0.225	-0.004	0.015	0.325	0.121	0.440
	Question 4		0.271	0.042	0.023	0.134	0.515	0.716
Semi-Durable Goods	ICC		0.090	0.077	0.039	0.002***	0.722	0.853
	Question1		0.004	-0.009	0.017	0.103	0.454	0.661
	Question 2	0.013	0.069	0.056	0.037	0.011**	0.784	0.714
	Question 3		0.020	0.007	0.015	0.182	0.665	0.548
	Question 4		0.039	0.026	0.021	0.025**	0.663	0.566
Nondurable Goods	ICC		-0.017	0.067	0.004	0.049**	0.681	0.991
	Question1		0.018	0.102	0.000	0.009***	0.993	0.952
	Question 2	-0.084	-0.097	-0.013	0.000	0.306	0.686	0.979
	Question 3		-0.048	0.036	0.001	0.089*	0.550	0.558
	Question 4		0.016	0.100	0.002	0.015**	0.183	0.981
Services	ICC		0.189	0.098	0.017	0.012**	0.058*	0.874
	Question1		-0.014	-0.105	0.002	0.987	0.033**	0.438
	Question 2	0.091	0.111	0.020	0.013	0.131	0.124	0.698
	Question 3		0.152	0.061	0.007	0.337	0.080*	0.613
	Question 4		0.197	0.106	0.013	0.004***	0.072*	0.747

Table E3. Adjusted by Price Deflator: Incremental Predictive Power of the Consumer Confidence Indices (Level)

Consumption Categories	Indices Types	Adj-R ² exclude Confidence Indices	Adj-R ² include Confidence Indices	Incremental Adj-R ²	Sum of coefficients	P-values of joint significant test	P-value of Breusch–Godfrey test	P-value of White test
Total PCE	ICC		0.350	0.205	0.022	0.000***	0.638	0.922
	Question1		0.098	-0.047	0.004	0.644	0.441	0.951
	Question 2	0.145	0.214	0.069	0.017	0.009***	0.869	0.739
	Question 3		0.255	0.110	0.006	0.007***	0.945	0.604
	Question 4		0.274	0.129	0.009	0.000***	0.804	0.942
Durable Goods	ICC		0.456	0.296	0.051	0.000***	0.210	0.276
	Question1		0.404	0.244	0.049	0.016**	0.062*	0.710
	Question 2	0.160	0.527	0.367	0.054	0.000***	0.123	0.582
	Question 3		0.249	0.089	0.010	0.051*	0.180	0.091*
	Question 4		0.281	0.121	0.018	0.022**	0.709	0.477
Semi-Durable Goods	ICC		0.167	0.184	0.041	0.001***	0.451	0.435
	Question1		0.009	0.026	0.022	0.063*	0.453	0.593
	Question 2	-0.017	0.138	0.155	0.039	0.006***	0.681	0.336
	Question 3		0.083	0.100	0.014	0.121	0.386	0.203
	Question 4		0.066	0.083	0.022	0.016**	0.502	0.478
Nondurable Goods	ICC		0.010	0.125	0.002	0.004***	0.820	0.586
	Question1		0.039	0.154	0.001	0.000***	0.389	0.963
	Question 2	-0.115	-0.052	0.063	0.000	0.041**	0.537	0.533
	Question 3		-0.099	0.016	-0.001	0.237	0.656	0.279
	Question 4		0.034	0.149	0.001	0.001***	0.769	0.557
Services	ICC		0.216	0.098	0.016	0.021**	0.259	0.782
	Question1		0.040	-0.078	0.001	0.923	0.648	0.186
	Question 2	0.118	0.120	0.002	0.011	0.109	0.726	0.416
	Question 3		0.184	0.066	0.006	0.300	0.377	0.339
	Question 4		0.218	0.100	0.012	0.019**	0.148	0.733

Table E4.Last Month of Each Quarter: Incremental Predictive Power of the Consumer Confidence Indices (First Differences and Level)

	Consumption Categories	Indices Types	Adj-R ² exclude Confidence Indices	Adj-R ² include Confidence Indices	Incremental Adj-R ²	Sum of coefficients	P-values of joint significant test	P-value of Breusch–Godfrey test	P-value of White test
First Differences of The Last Month Indices		ICC		0.175	-0.054	0.016	0.288	0.626	0.857
	Total Household consumption Expenditures	Question1		0.172	-0.057	-0.006	0.694	0.170	0.982
		Question 2	0.229	0.176	-0.053	0.011	0.471	0.467	0.737
		Question 3		0.207	-0.022	0.021	0.250	0.871	0.975
		Question 4		0.221	-0.008	0.017	0.354	0.602	0.810
Level of the Last Month Indices		ICC		0.303	0.073	0.018	0.012**	0.964	0.823
	Total Household consumption Expenditures	Question1		0.176	-0.054	0.004	0.558	0.795	0.981
		Question 2	0.231	0.266	0.036	0.016	0.058*	0.992	0.317
		Question 3		0.227	-0.003	0.009	0.323	0.273	0.868
		Question 4		0.297	0.067	0.008	0.017**	0.779	0.843

Appendix F: The Regression Results for Equation 1: Canadian Provinces

Table F1. Atlantic Provinces: Self-Predictive Power of the Consumer Confidence Indices (First Differences)

Consumption Categories	Indices Types	Incremental Adj-R ²	Sum of coefficients	P-values of joint significant test	P-value of Breusch–Godfrey test	P-value of White test
Total PCE	ICC	-0.005	0.014	0.242	0.061*	0.284
	Question1	-0.056	0.006	0.719	0.174	0.519
	Question 2	-0.013	0.022	0.502	0.074*	0.149
	Question 3	0.002	0.006	0.185	0.138	0.832
	Question 4	-0.073	0.007	0.868	0.158	0.397
All Goods	ICC	0.045	0.037	0.007***	0.004***	0.924
	Question1	-0.021	0.038	0.303	0.006***	0.982
	Question 2	0.024	0.051	0.021**	0.001***	0.515
	Question 3	0.108	0.007	0.036**	0.010***	0.451
	Question 4	0.010	0.022	0.220	0.036**	0.734
Services	ICC	-0.057	0.004	0.771	0.451	0.183
	Question1	-0.030	-0.010	0.466	0.300	0.751
	Question 2	-0.036	0.014	0.574	0.473	0.342
	Question 3	-0.035	0.005	0.778	0.313	0.214
	Question 4	-0.015	0.000	0.207	0.544	0.842

Table F1.1. Atlantic Provinces: Self-Predictive Power of the Consumer Confidence Indices (Level)

Consumption Categories	Indices Types	Incremental Adj-R ²	Sum of coefficients	P-values of joint significant test	P-value of Breusch–Godfrey test	P-value of White test
Total PCE	ICC	0.004	0.005	0.205	0.022**	0.218
	Question1	-0.056	0.001	0.734	0.159	0.166
	Question 2	-0.002	0.007	0.459	0.028	0.272
	Question 3	0.005	0.001	0.124	0.092	0.503
	Question 4	-0.064	0.003	0.840	0.089	0.323
All Goods	ICC	0.008	0.012	0.106	0.003***	0.386
	Question1	-0.055	0.011	0.432	0.001***	0.670
	Question 2	-0.029	0.014	0.294	0.002***	0.353
	Question 3	0.116	0.004	0.058*	0.003***	0.707
	Question 4	-0.016	0.002	0.277	0.010***	0.898
Services	ICC	-0.066	0.001	0.963	0.340	0.002***
	Question1	-0.025	-0.007	0.309	0.374	0.232
	Question 2	-0.036	0.006	0.403	0.359	0.303
	Question 3	-0.037	0.000	0.726	0.394	0.001***
	Question 4	-0.045	0.003	0.698	0.325	0.365

Table F2. British Columbia: Self-Predictive Power of the Consumer Confidence Indices (First Differences)

Consumption Categories	Indices Types	Incremental Adj-R ²	Sum of coefficients	P-values of joint significant test	P-value of Breusch–Godfrey test	P-value of White test
Total PCE	ICC	0.242	0.046	0.017**	0.889	0.489
	Question1	0.086	0.000	0.131	0.357	0.287
	Question 2	0.091	0.057	0.360	0.503	0.232
	Question 3	0.152	0.024	0.005***	0.752	0.497
	Question 4	0.247	0.057	0.000***	0.504	0.179
All Goods	ICC	0.347	0.086	0.000***	0.212	0.937
	Question1	0.124	0.040	0.098*	0.619	0.600
	Question 2	0.289	0.136	0.000***	0.452	0.976
	Question 3	0.165	0.030	0.014**	0.732	0.455
	Question 4	0.236	0.104	0.000***	0.433	0.237
Services	ICC	-0.041	0.021	0.691	0.449	0.125
	Question1	0.045	-0.012	0.046**	0.540	0.475
	Question 2	-0.041	0.014	0.304	0.413	0.013**
	Question 3	0.035	0.018	0.182	0.626	0.227
	Question 4	-0.049	0.021	0.865	0.531	0.708

Table F3. Ontario: Self-Predictive Power of the Consumer Confidence Indices (First Differences)

Consumption Categories	Indices Types	Incremental Adj-R ²	Sum of coefficients	P-values of joint significant test	P-value of Breusch–Godfrey test	P-value of White test
Total PCE	ICC	0.283	0.049	0.000***	0.870	0.079*
	Question1	0.120	0.037	0.007***	0.561	0.055*
	Question 2	0.228	0.051	0.000***	0.741	0.094*
	Question 3	0.211	0.021	0.002***	0.906	0.431
	Question 4	0.202	0.039	0.000***	0.977	0.177
All Goods	ICC	0.076	0.063	0.065*	0.847	0.189
	Question1	0.074	0.046	0.189	0.828	0.680
	Question 2	0.036	0.071	0.043**	0.872	0.099*
	Question 3	0.087	0.025	0.058*	0.931	0.039**
	Question 4	0.037	0.052	0.055*	0.775	0.516
Services	ICC	0.114	0.036	0.043**	0.101	0.032**
	Question1	0.092	0.027	0.169	0.006***	0.121
	Question 2	0.003	0.018	0.298	0.006***	0.023
	Question 3	0.166	0.019	0.002***	0.164	0.652
	Question 4	0.118	0.031	0.001***	0.060*	0.191

Table F3.1 Ontario: Self-Predictive Power of the Consumer Confidence Indices (Level)

Consumption Categories	Indices Types	Incremental Adj-R ²	Sum of coefficients	P-values of joint significant test	P-value of Breusch–Godfrey test	P-value of White test
Total PCE	ICC	0.209	0.007	0.009***	0.630	0.255
	Question1	0.080	0.004	0.072*	0.893	0.005***
	Question 2	0.176	0.010	0.001***	0.964	0.789
	Question 3	0.160	0.003	0.002***	0.906	0.252
	Question 4	0.148	0.007	0.014**	0.823	0.007***
All Goods	ICC	0.015	0.004	0.285	0.845	0.584
	Question1	0.020	0.004	0.125	0.968	0.462
	Question 2	-0.010	0.007	0.113	0.967	0.260
	Question 3	0.052	0.001	0.055*	0.964	0.171
	Question 4	0.010	0.004	0.465	0.882	0.475
Services	ICC	0.236	0.010	0.000***	0.934	0.000***
	Question1	0.096	0.003	0.129	0.031**	0.119
	Question 2	0.101	0.010	0.005***	0.086*	0.000***
	Question 3	0.273	0.007	0.000***	0.964	0.083*
	Question 4	0.226	0.009	0.000***	0.838	0.076*

Table F4. Prairie Provinces: Self-Predictive Power of the Consumer Confidence Indices (First Differences)

Consumption Categories	Indices Types	Incremental Adj-R ²	Sum of coefficients	P-values of joint significant test	P-value of Breusch–Godfrey test	P-value of White test
Total PCE	ICC	0.109	0.072	0.045**	0.235	0.372
	Question1	0.065	0.030	0.121	0.041**	0.466
	Question 2	0.104	-0.053	0.001***	0.104	0.624
	Question 3	0.077	0.043	0.069*	0.173	0.890
	Question 4	-0.005	0.046	0.104	0.051*	0.545
All Goods	ICC	0.159	0.121	0.009***	0.948	0.659
	Question1	0.077	0.065	0.014**	0.541	0.780
	Question 2	0.118	-0.086	0.001***	0.614	0.969
	Question 3	0.116	0.066	0.006***	0.722	0.894
	Question 4	0.029	0.088	0.074*	0.727	0.495
Services	ICC	-0.013	0.045	0.076*	0.445	0.628
	Question1	-0.012	0.017	0.163	0.385	0.920
	Question 2	-0.006	-0.039	0.213	0.593	0.936
	Question 3	-0.011	0.028	0.258	0.352	0.837
	Question 4	-0.042	0.024	0.441	0.589	0.331

Table F5.Quebec: Self-Predictive Power of the Consumer Confidence Indices (First Differences)

Consumption Categories	Indices Types	Incremental Adj-R ²	Sum of coefficients	P-values of joint significant test	P-value of Breusch–Godfrey test	P-value of White test
Total PCE	ICC	0.188	0.034	0.000***	0.759	0.386
	Question1	0.032	-0.039	0.108	0.490	0.969
	Question 2	0.100	0.037	0.065*	0.728	0.624
	Question 3	0.136	0.013	0.000***	0.702	0.034**
	Question 4	0.149	0.031	0.004***	0.417	0.843
All Goods	ICC	0.047	0.026	0.000***	0.395	0.112
	Question1	-0.063	-0.025	0.658	0.567	0.955
	Question 2	0.001	0.030	0.096*	0.382	0.746
	Question 3	0.081	0.010	0.001***	0.600	0.000***
	Question 4	0.028	0.027	0.013**	0.544	0.068*
Services	ICC	0.299	0.040	0.001***	0.000***	0.878
	Question1	0.187	-0.050	0.016**	0.000***	0.743
	Question 2	0.201	0.041	0.008***	0.000***	0.180
	Question 3	0.181	0.014	0.005***	0.000***	0.565
	Question 4	0.183	0.034	0.033**	0.000***	0.892

Appendix G: The Regression Results for Equation 2&3: Canadian Provinces

Table G1. Atlantic Provinces: Incremental Predictive Power of the Consumer Confidence Indices (First Differences)

Consumption Categories	Indices Types	Adj-R ² exclude Confidence Indices	Adj-R ² include Confidence Indices	Incremental Adj-R ²	Sum of coefficients	P-values of joint significant test	P-value of Breusch–Godfrey test	P value of White test
Total PCE	ICC		-0.186	-0.024	0.037	0.520	0.488	0.361
	Question1		-0.247	-0.085	0.023	0.739	0.270	0.408
	Question 2	-0.162	-0.175	-0.013	0.047	0.433	0.387	0.277
	Question 3		-0.197	-0.035	0.018	0.351	0.372	0.374
	Question 4		-0.237	-0.075	0.026	0.231	0.412	0.583
All Goods	ICC		0.183	0.078	0.082	0.003***	0.297	0.642
	Question1		0.152	0.047	0.072	0.020**	0.189	0.239
	Question 2	0.105	0.165	0.060	0.089	0.024**	0.657	0.322
	Question 3		0.221	0.116	0.022	0.009***	0.445	0.948
	Question 4		0.108	0.003	0.052	0.132	0.155	0.738
Services	ICC		0.177	-0.021	-0.017	0.364	0.538	0.595
	Question1		0.168	-0.030	-0.023	0.289	0.458	0.598
	Question 2	0.198	0.161	-0.037	-0.015	0.449	0.617	0.503
	Question 3		0.164	-0.034	0.002	0.673	0.924	0.026**
	Question 4		0.170	-0.028	-0.019	0.666	0.823	0.804

Table G2. British Columbia: Incremental Predictive Power of the Consumer Confidence Indices (First Differences)

Consumption Categories	Indices Types	Adj-R ² exclude Confidence Indices	Adj-R ² include Confidence Indices	Incremental Adj-R ²	Sum of coefficients	P-values of joint significant test	P-value of Breusch–Godfrey test	P-value of White test
Total PCE	ICC		0.328	0.081	0.008	0.025**	0.344	0.261
	Question1		0.314	0.067	-0.008	0.038**	0.313	0.518
	Question 2	0.247	0.336	0.089	0.018	0.016**	0.333	0.264
	Question 3		0.214	-0.033	0.002	0.410	0.045**	0.017**
	Question 4		0.352	0.105	0.008	0.033**	0.597	0.469
All Goods	ICC		0.274	0.314	0.072	0.000***	0.616	0.875
	Question1		-0.081	-0.041	0.058	0.356	0.148	0.769
	Question 2	-0.040	0.226	0.266	0.128	0.001***	0.532	0.918
	Question 3		0.036	0.076	0.013	0.110	0.665	0.141
	Question 4		0.210	0.250	0.055	0.007***	0.134	0.676
Services	ICC		0.036	-0.046	-0.016	0.608	0.428	0.591
	Question1		0.301	0.219	-0.043	0.017**	0.293	0.644
	Question 2	0.082	0.115	0.033	-0.039	0.163	0.954	0.588
	Question 3		0.098	0.016	0.008	0.266	0.368	0.410
	Question 4		0.114	0.032	-0.020	0.279	0.545	0.620

Table G3. Ontario: Incremental Predictive Power of the Consumer Confidence Indices (First Differences)

Consumption Categories	Indices Types	Adj-R ² exclude Confidence Indices	Adj-R ² include Confidence Indices	Incremental Adj-R ²	Sum of coefficients	P values of joint significant test	P-value of Breusch–Godfrey test	P-value of White test
Total PCE	ICC		0.241	0.144	0.044	0.007***	0.329	0.436
	Question1		0.169	0.072	0.029	0.053*	0.165	0.281
	Question 2	0.097	0.229	0.132	0.045	0.020**	0.222	0.818
	Question 3		0.214	0.117	0.019	0.013**	0.363	0.793
	Question 4		0.086	-0.011	0.031	0.369	0.129	0.522
All Goods	ICC		-0.033	0.078	0.094	0.050**	0.778	0.822
	Question1		-0.009	0.102	0.090	0.011**	0.501	0.884
	Question 2	-0.111	-0.111	0.000	0.075	0.286	0.779	0.903
	Question 3		-0.011	0.100	0.034	0.131	0.953	0.639
	Question 4		-0.114	-0.003	0.065	0.377	0.657	0.847
Services	ICC		0.065	0.009	0.038	0.628	0.177	0.105
	Question1		0.144	0.088	0.022	0.065*	0.024**	0.302
	Question 2	0.056	0.028	-0.028	0.002	0.746	0.159	0.207
	Question 3		0.097	0.041	0.019	0.331	0.253	0.117
	Question 4		0.072	0.016	0.046	0.379	0.182	0.613

Table G3.1 Ontario: Incremental Predictive Power of the Consumer Confidence Indices (Level)

Consumption Categories	Indices Types	Adj-R ² exclude Confidence Indices	Adj-R ² include Confidence Indices	Incremental Adj-R ²	Sum of coefficients	P-values of joint significant test	P-value of Breusch–Godfrey test	P-value of White test
Total PCE	ICC		0.356	0.259	0.016	0.000***	0.509	0.348
	Question1		0.324	0.227	0.014	0.000***	0.609	0.376
	Question 2	0.097	0.296	0.199	0.001	0.020**	0.489	0.801
	Question 3		0.199	0.102	0.005	0.045**	0.942	0.819
	Question 4		0.215	0.118	0.010	0.050**	0.207	0.323
All Goods	ICC		-0.059	0.052	0.015	0.044**	0.468	0.756
	Question1		0.155	0.266	0.015	0.081*	0.937	0.861
	Question 2	-0.111	-0.099	0.012	0.075	0.286	0.779	0.903
	Question 3		-0.038	0.073	-0.004	0.260	0.607	0.856
	Question 4		-0.135	-0.024	0.008	0.591	0.481	0.938
Services	ICC		0.251	0.195	0.015	0.002***	0.706	0.101
	Question1		0.185	0.129	0.006	0.047**	0.065*	0.326
	Question 2	0.056	0.102	0.046	0.011	0.029**	0.159	0.207
	Question 3		0.294	0.238	0.014	0.005***	0.872	0.625
	Question 4		0.223	0.167	0.011	0.004***	0.503	0.336

Table G4. Prairie Provinces: Incremental Predictive Power of the Consumer Confidence Indices (First Differences)

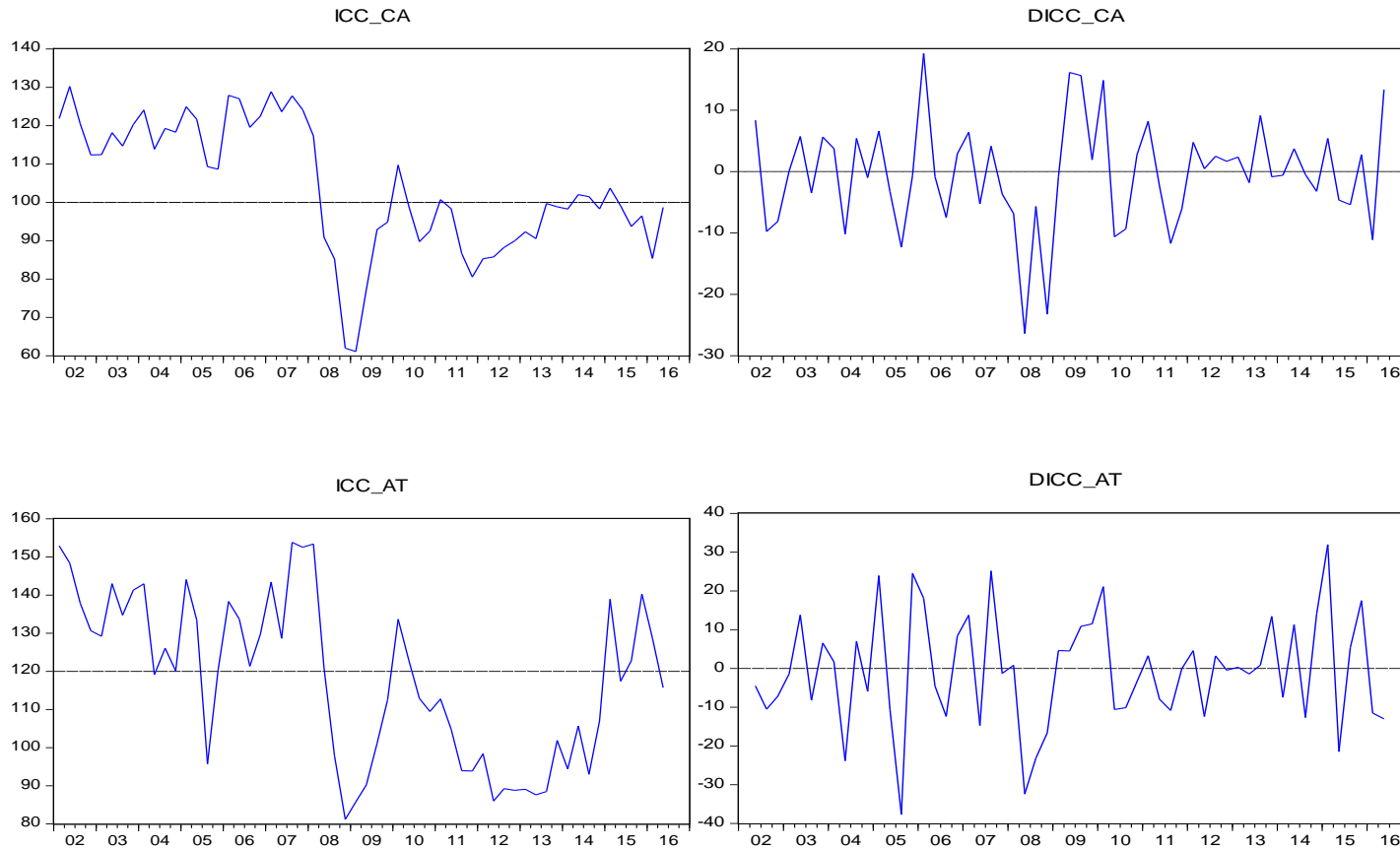
Consumption Categories	Indices Types	Adj-R ² exclude Confidence Indices	Adj-R ² include Confidence Indices	Incremental Adj-R ²	Sum of coefficients	P-values of joint significant test	P-value of Breusch–Godfrey test	P-value of White test
Total PCE	ICC		0.151	-0.022	-0.023	0.064*	0.430	0.988
	Question1		0.204	0.031	-0.040	0.036**	0.858	0.999
	Question 2	0.173	0.150	-0.023	0.005	0.081*	0.741	0.999
	Question 3		0.110	-0.063	0.028	0.580	0.490	0.985
	Question 4		0.158	-0.015	-0.066	0.315	0.555	0.991
All Goods	ICC		0.185	0.145	0.037	0.003***	0.973	0.984
	Question1		0.070	0.030	-0.027	0.003***	0.265	0.977
	Question 2	0.040	0.035	-0.005	-0.035	0.069*	0.575	0.100
	Question 3		0.105	0.065	0.067	0.066*	0.397	0.993
	Question 4		0.145	0.105	-0.051	0.003***	0.739	0.918
Services	ICC		0.047	-0.048	0.030	0.475	0.473	0.967
	Question1		0.095	0.000	-0.058	0.103	0.749	0.980
	Question 2	0.095	0.019	-0.076	0.000	0.804	0.419	0.972
	Question 3		0.147	0.052	0.057	0.000***	0.850	0.950
	Question 4		0.030	-0.065	0.001	0.524	0.341	0.559

Table G5. Quebec: Incremental Predictive Power of the Consumer Confidence Indices (First Differences)

Consumption Categories	Indices Types	Adj-R ² exclude Confidence Indices	Adj-R ² include Confidence Indices	Incremental Adj-R ²	Sum of coefficients	P-values of joint significant test	P-value of Breusch–Godfrey test	P-value of White test
Total PCE	ICC		-0.039	0.035	0.031	0.288	0.282	0.459
	Question1		-0.132	-0.058	-0.031	0.595	0.284	0.285
	Question 2	-0.074	-0.072	0.002	0.025	0.272	0.409	0.714
	Question 3		-0.045	0.029	0.012	0.057*	0.201	0.392
	Question 4		-0.063	0.011	0.025	0.359	0.043**	0.022**
All Goods	ICC		-0.211	-0.029	0.043	0.423	0.396	0.509
	Question1		-0.267	-0.085	-0.039	0.758	0.570	0.466
	Question 2	-0.182	-0.218	-0.036	0.026	0.454	0.400	0.951
	Question 3		-0.106	0.076	0.025	0.027**	0.715	0.168
	Question 4		-0.257	-0.075	0.030	0.751	0.214	0.329
Services	ICC		0.388	0.063	0.015	0.261	0.336	0.977
	Question1		0.322	-0.003	-0.026	0.323	0.109	0.930
	Question 2	0.325	0.406	0.081	0.021	0.055*	0.523	0.877
	Question 3		0.291	-0.034	0.003	0.651	0.575	0.933
	Question 4		0.332	0.007	0.012	0.543	0.510	0.974

Appendix H: Graphs and Figures

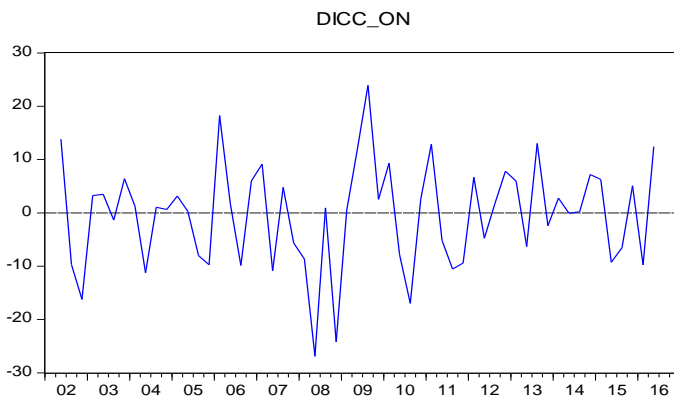
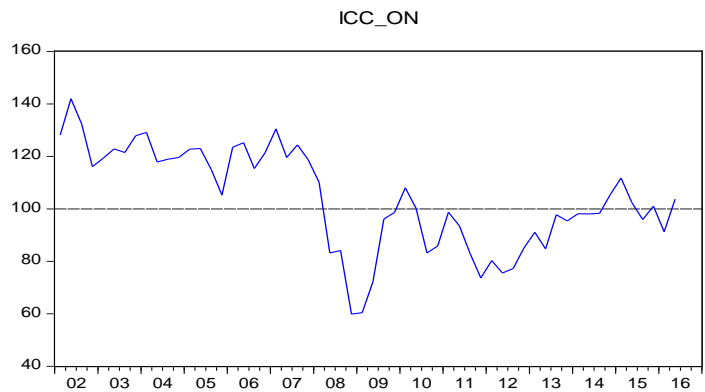
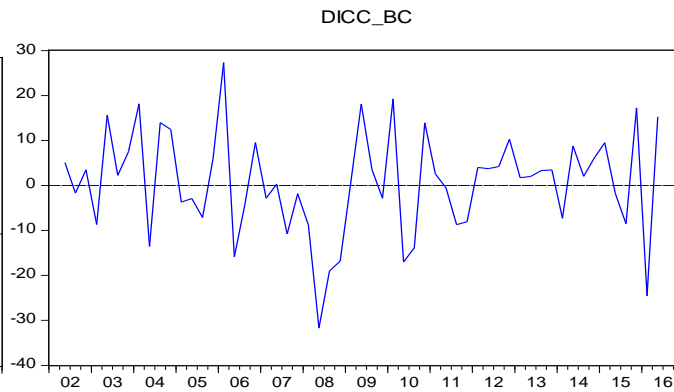
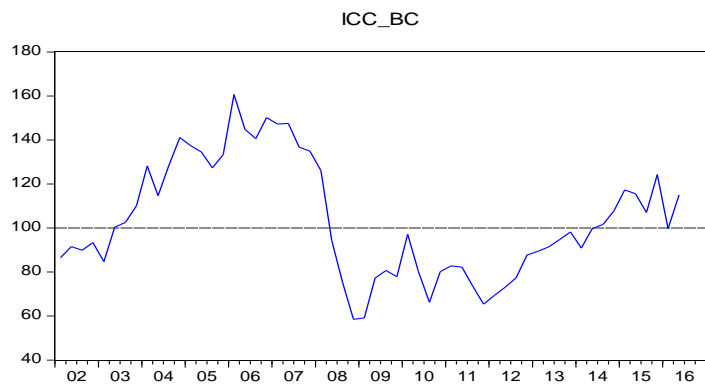
H1: Series of the Consumer Confidence Indices in Level and First Differences (Quarterly Sample from 2002:Q1 to 2016:Q2)



Note:

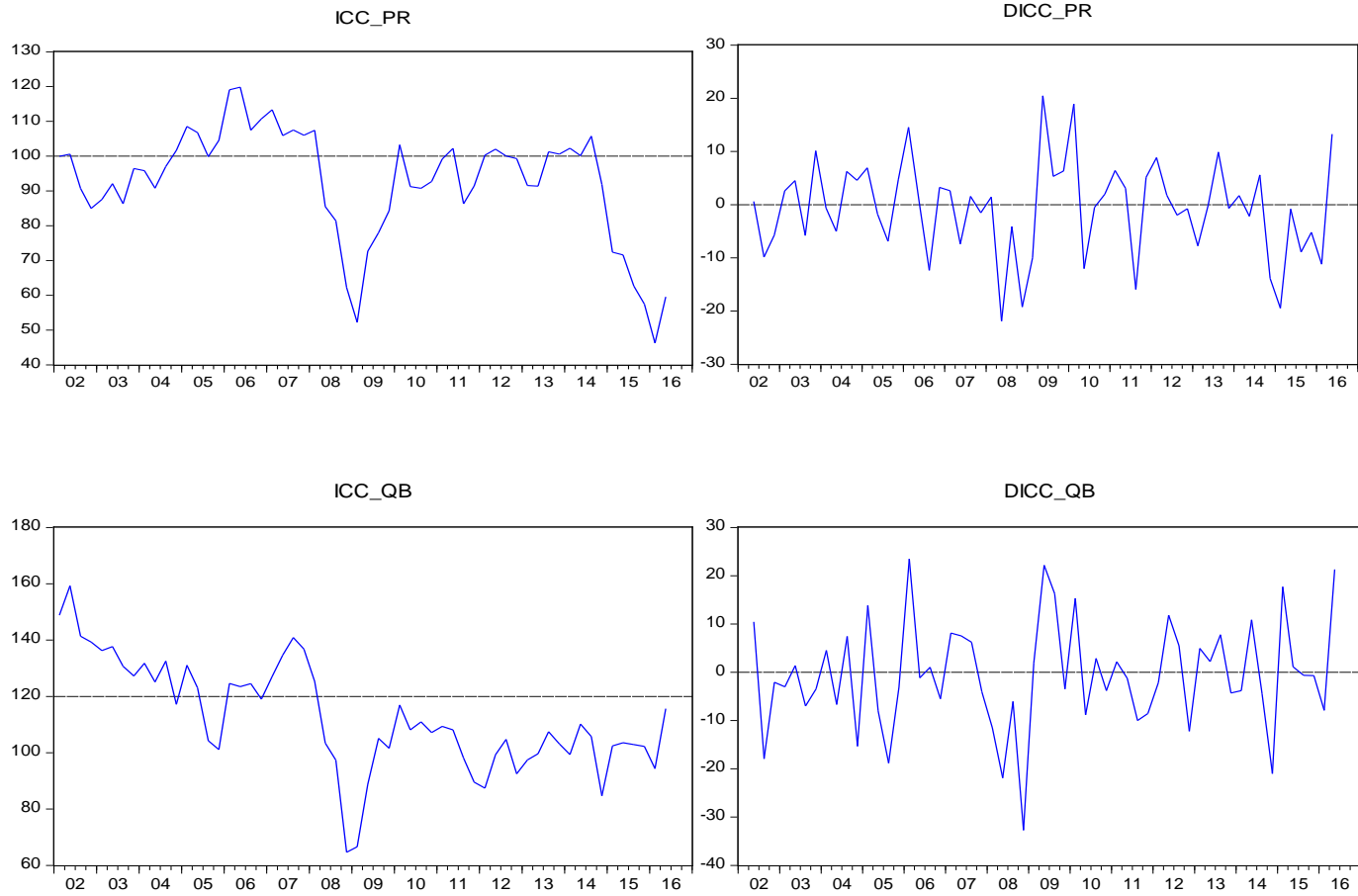
1. Horizontal axis: Quarterly Series from 2002:Q1 to 2016:Q2.

2. Vertical axis: Level of the Consumer Confidence Indices (Left side graphs); Changes of the Consumer Confidence Indices (Right side graphs).



Note:

1. Horizontal axis: Quarterly Series from 2002:Q1 to 2016:Q2.
2. Vertical axis: Level of the Consumer Confidence Indices (Left side graphs); Changes of the Consumer Confidence Indices (Right side graphs).



Note:

1. Horizontal axis: Quarterly Series from 2002:Q1 to 2016:Q2.

2. Vertical axis: Level of the Consumer Confidence Indices (Left side graphs); Changes of the Consumer Confidence Indices (Right side graphs).

H2: Relationship between First Differences Consumer Confidence Indices and Growth in Consumption Expenditures (Quarterly Sample from 2002:Q1 to 2016:Q2)

Figure 1 Canada

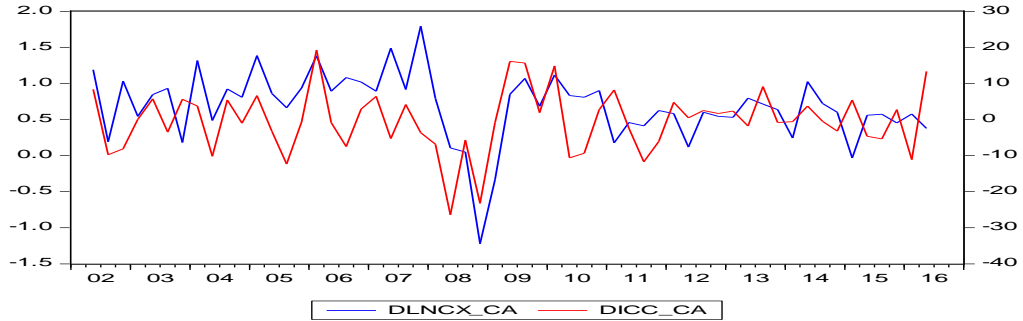


Figure 2 Atlantic Provinces

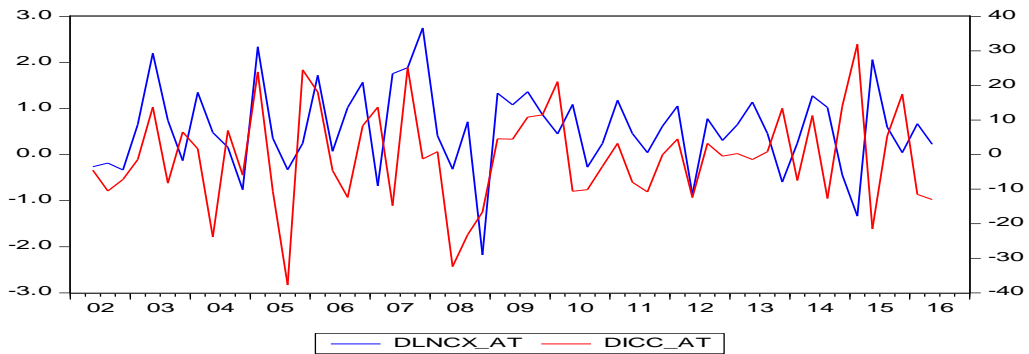
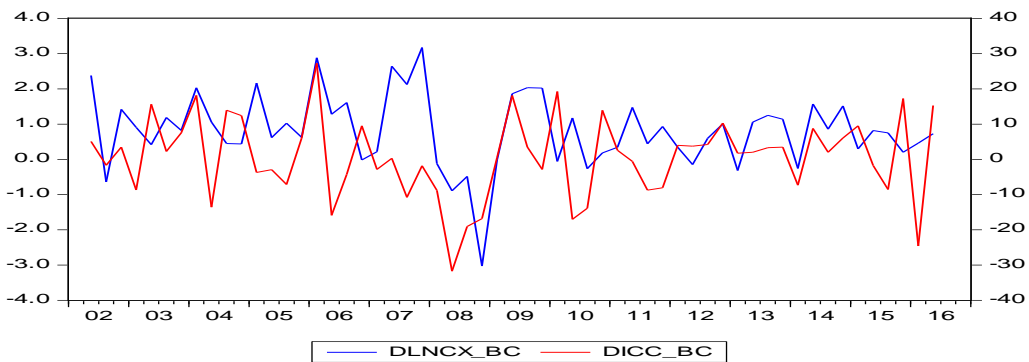


Figure 3 British Columbia



Note:

1. Left vertical axis: % changes of logarithmic growth consumption; right vertical axis: changes of ICC.
2. The blue line represents logarithmic total consumptions growth; the red line represents first differences of confidence indices.

Figure 4 Ontario

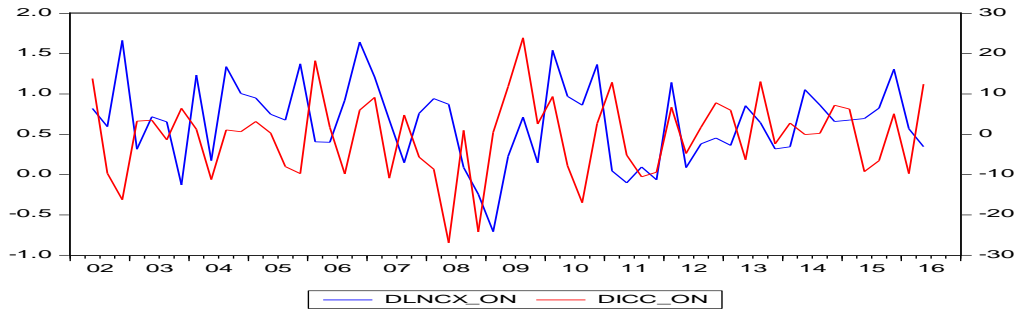


Figure 5 Prairie Provinces

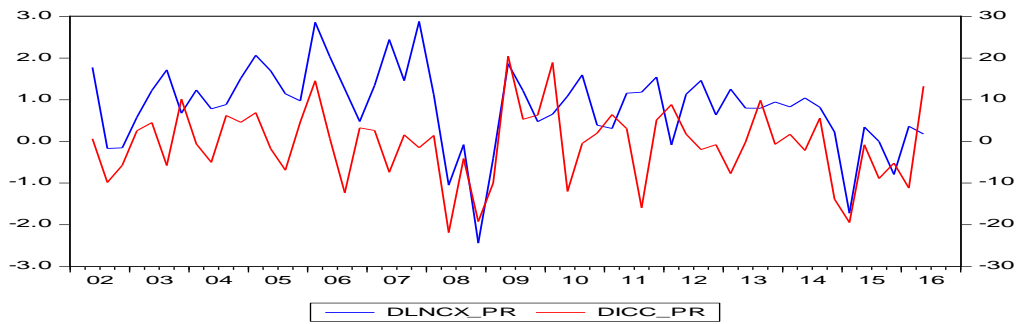
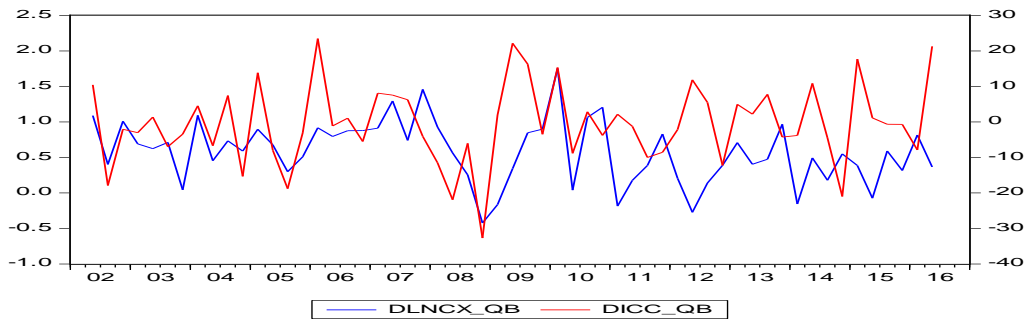


Figure 6 Quebec



Note:

1. Left vertical axis: % changes of logarithmic growth consumption; right vertical axis: changes of ICC.
2. The blue line represents logarithmic total consumptions growth; the red line represents first differences of confidence indices.