Is the Consumer Confidence Index a Sound Predictor of the Private Demand in the United States?[1]

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ABSTRACT

The United States (U.S.) Consumer Confidence Index (CCI) has been widely and unambiguously regarded as a good 'predictor' of the U.S.'s private investment and consumption. In order to demonstrate such with statistical rigor, co-integration and Granger causality tests were applied for 1978:Q1-2003:Q1.

Two crucial results were obtained: a) co-integration was not found between CCI and investment and consumption, and b) CCI does not determine –in the Granger sense– either consumption or private investment. Conversely, we found causality from these two variables over CCI.

Keywords **:** Leading indicator; consumer confidence index; Granger causality test; unit root; structural change; co-integration.

Clasificación JEL*:* C12, D12, E20

¿Es el Índice de Confianza del Consumidor un buen pronosticador de la demanda privada en los Estados Unidos?

RESUMEN

El Índice de Confianza del Consumidor (CCI) de los Estados Unidos ha sido ampliamente, y sin ambigüedades, considerado como un buen pronosticador de la inversión y del consumo privados en ese país. Para comprobar esta afirmación, en este artículo se aplicaron con todo rigor estadístico las pruebas de cointegración y causalidad de Granger (1978:Q1-2003:Q1).

Fueron obtenidos dos resultados cruciales: a) no se encontró cointegración entre CCI y el consumo y la inversión privados, y b) CCI no es causado –en el sentido de Granger– ni por el consumo ni por la inversión. Contrariamente, encontramos causalidad de estas dos variables sobre CCI.

*Palabras clave***:** indicador líder, índice de confianza del consumidor, causalidad de Granger, raíz unitaria, cambio estructural, cointegración.

1. INTRODUCTION

> *Econometricians may well tend to look much where*
> *the light is and too little where the key might be found.*
>
> *David Hendry*
> *Econometrics –Alchemy or Science?*

In microeconomics it is conventionally believed that the economic agents gather the widest amount of economic information –forward and high frequency– upon which to base current and future decisions and thus to maximize their utility function. This statement has received increasing acceptance in theory and practical analysis, especially since the wake of the oil crises of the 1970s. Due to the fact that it is impossible to avoid fluctuations in the macroeconomic and financial variables, diverse institutions have been constructing leading indicators and indexes, in an effort to contribute to the accurate prediction of the agents. Several *leading indexes*,[i] and particularly the *Index of Consumer Expectations* –which is a derivative of the *Consumer Confidence Index* (CCI)– have been widely used as good (sound) predictors of the forthcoming evolution of the main demand side variables of the United States economy such as private consumption (PC) and private investment (PI). We analyze the forecasting power of CCI due to its common use by ordinary investors as well as "by economists and business analysts in determining current economic performance and predicting future direction" (The Conference Board, 2003b). Generally speaking, the following argumentation has been accepted: if the CCI reports a numerical recovery,[ii] it is assumed that these variables will expand and so will the whole economy, and vice versa. During the expansion phase of the 1990s, but especially since the closest previous recession (March-August 2001), private, academic and government analysts have followed the CCI, month after month, and with great interest in the above-mentioned sense.

It should be noted that this line of argumentation has been widely accepted, even though mixed results have been reported in the specialized literature (Golinelli and Parigi, 2003).

Given the worldwide importance of the U.S. economy,[iii] the aim of this article is to test whether there is sound statistical evidence for the long run (1978:Q1-2003:Q1)[iv] that makes it possible to claim that in the U.S. economy, private consumption and investment are caused (in Granger sense) by the evolution of CCI. Our results categorically reject this hypothesis.

In Section II, a review of the literature referring to the subject and a methodological inquiry concerning the construction of the CCI are presented. Afterwards, we depict several historical statistics and develop our econometric methodology in order to test the core hypothesis. The most important results are then discussed; and finally the main conclusions and some ideas to be developed in further research are drafted.

2. THE BASIC DISCUSSION

Dominitz and Manski (2003: 2) found 78 references on the subject in *EconLit* (between 1996 and February 2003). They argue that most of the analyses are based on consumption models in terms of some measure of consumer confidence and their "forecasting power over that of other macroeconomic indicators" (Golinelli and Parigi, *op. cit.*: 7). As reported in their search, we also found problems derived from: a) the data,[v] b) ambiguity of the concepts, and c) inaccuracies coming from the absence of theory-based models.

Regarding the first factor (data generating process), some authors argue that the results of the surveys may be biased due to several problems in their very origin. Among those we found, one of the utmost importance: "people's answer to questions about their well-being, seems to depend mainly on how they are faring economically relative to their neighbors, whether they themselves have had a bad day, or some noteworthy event in the news" (Howrey, 2001: 214, quoted by Golinelli and Parigi, 2003: 10).

By the same token, these authors claim that "insufficient attention is (has been) paid" to different or asymmetric reactions captured by polls related to country regions, wealth, education, phase of the business cycle, etc.[vi]

In reference to the second factor, Golinelli and Parigi (2003: 10) argue that studies that analyze the prediction power of confidence indexes are seldom micro-fundamented; furthermore, they claim that such studies assume that variables involved are sufficiently well known. Consequently, crucial factors that determine the outcomes are obviated or may even mislead.

Finally, there is a strong debate regarding the causality of the variables involved. Desroches and Gosselin (2002: 1), *e.g.*, point out that "many economists think that consumer confidence is endogenous and is a reflection of current macroeconomic conditions, whereas others, in line with Keynes' notion of animal spirits, argue that psychological factors that are not captured by economic variables can influence consumers' decisions".

In the following section we grouped the works surveyed into two antagonistic approaches, regarding what they state about the causal relationship between private consumption and investment and CCI.

2.1. Positive Empirical Evidence

Carroll, Fuhrer and Wilcox (1994) found that lagged values of the Consumer Sentiment Index (CSI)[vii] significantly explain about 14% of the growth in personal expenditure on consumption. However, with the incorporation of other forecasting variables into the model (such as interest rates and price changes), the percentage falls to 3%.

Bram and Ludvigson (1998) extended the former model by adding expenditure on automotive vehicles, services and durable goods. The analysis was for 1967:Q1-1996:Q3 and they found that the CCI provides information regarding future consumption.

Batchelor and Dua (1998) estimated a VAR model (1978:07-1993:06) including consumption, GDP and CCI. They arrived at mixed results in that although they argue that the analysis of the CCI could have helped to predict the recession of 1991, caused by the expectations at the commencement of the Gulf War, the results however cannot be generalized for other years.

Golinelli and Parigi (*op. cit.*) used VAR models to analyze a set of eight developed countries,[viii] and concluded that: "a) the CSI has a significant and quantitatively relevant effect on the evolution of the GDP; b) the index leads the GDP independently of other macroeconomic variables; c) in some countries the leading property of the index emerges only after taking into account the simultaneous link with GDP" (*ibid.*: 22).

2.2. Negative Empirical Evidence

Leeper (1992) found that the CSI on its own was a significant predictor for industrial output; nevertheless, when additional variables were included in the model, the predictive power of the CSI decreased.

Garrett (2003) estimated a model through OLS for 43 states of the U.S. and the

District of Columbia (1973:Q2-2002:Q1), using both the CCI and the CSI. The empirical results suggested that both the consumer's contemporary confidence and its lags are relatively poor predictors of retail sales growth. On average they only explain 8% of the variable.

The only work that explicitly deals with the CCI-consumption causality is that of Desroches and Gosselin (2002: 3), and it argues that "The fact that consumer confidence can help forecast consumption is, in itself, not consistent with the pure permanent income hypothesis". And it concludes: "the confidence indexes contain relatively little information to forecast aggregate consumer spending in the United States" (*ibid.*: 15). Nevertheless, they also state that the confidence index may also be helpful during periods in which relevant economic or political events occur,[ix] because the ensuing uncertainty affects consumption spending.

3. WHAT DOES THE CCI REALLY MEASURE?

"The Consumer Confidence Survey (CCS) is a monthly measure (released by The Conference Board) of the public's confidence in the health of the U.S. economy. Industries that rely on the survey for forecasting include manufacturers, retailers, banks, the Federal Reserve, and United States government agencies" (The Conference Board, 2003b).

Although it is commonly used, not many analysts (policymakers and economic forecasters) know exactly how the CCI is constructed, and consequently what it really measures or reflects.

In the U.S., the CCI was first calculated every two months in 1967 and it then became monthly as of June 1977. From the beginning, its purpose was to reduce instability in business and it became a leading indicator of the evolution of economic activity. The CCS and its derivative –the CCI– are drawn up for The Conference Board.[x] Their outcome is based on a questionnaire mailed to a 'representative' sample of 5,000 different families chosen randomly[xi] every month, of which approximately 3,500 send in a response. The questions in the survey are:
1. How would you rate present general business conditions in your area? [good/normal/bad]
2. What would you say about available jobs in your area right now? [plentiful/not so many/hard to get]
3. Six months from now, do you think business conditions in your area will be [better/same/worse]?
4. Six months from now, do you think there will be [more/same/fewer] jobs available in your area?
5. How would you guess your total family income to be six months from now**?** [higher/same/lower] (The Conference Board, 2003a).
The responses are concentrated in three different indexes:
a) *Consumer Confidence Index*. Is the average of the five all indexes (answers).
b) *Present Situation Index*. It is the average of the two first indexes.
c) *Expectations Index*. Average of indexes for the three last QUESTIONS.

4. THEORETICAL RELATIONSHIPS AND BASIC STATISTICS

Economic theory has always stressed the importance of private demand (consumption and investment) on the evolution of GDP, in at least two aspects: a) in any economy, but especially in the United States, PC + PI have historically represented around 80% of GDP; b) variations in PI have had fundamental incidence on the business cycle: in the Keynesian model through the demand

multiplier, and in the neoclassical one through its positive effect on capital accumulation. In sum, in both theoretical frameworks, private investment is crucial in determining economic growth.

The sustained growth of PC, but even more so, its proportion of the GDP, has been fundamental in the U.S. long-term performance. For 1951-2003 this coefficient rose from 60% to almost 70%; while the PI coefficient was fairly stable at around 13% until 1991. From that year and until 2000 it grew substantially and almost reached 20% (see Figures 1A and 2A in the Appendix).

If we take only the time period 1978:Q1-2003:Q1, we can claim that PC and PI in real dollars showed a positive trend. Conversely, CCI had a clearly cyclic evolution that does not seem to have a long-term stable relationship with either of the two other variables. This historical path –at this point– warns us about the possibility of no co-integration.

FIGURE 1
U.S.: PRIVATE CONSUMPTION AND INVESTMENT AND CCI, 1978:Q1-2003:Q1
(QUARTERLY NORMALIZED DATA)
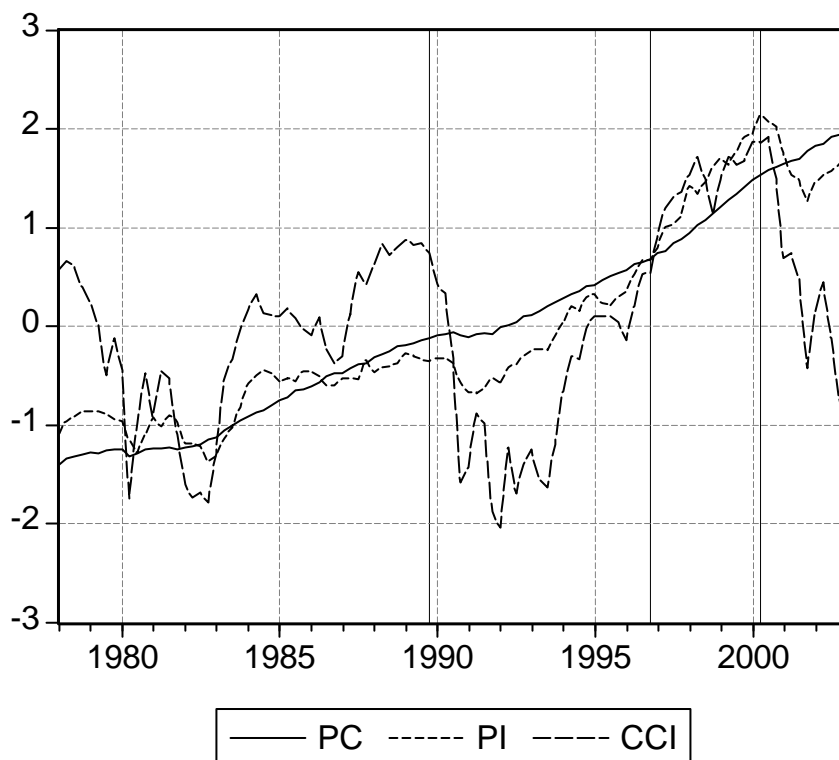
Note: PC and PI are quarterly seasonally adjusted (BEA, 2003); CCI is the arithmetic average of the quarter. PC and PI before normalized are expressed in billions of 1996 dollars, while CCI is a numeric index, 1985 = 100.
In order to compare directly the three variables, we applied the following common normalization process: $\dfrac{x_{it} - \bar{x}_t}{S.D.}$, where S.D. = Standard Deviation.
Source: Own elaboration based on The Conference Board (2003a) and BEA (2003) data.

The next step consisted of analyzing the partial correlation among the three variables (see Figure 2). A positive and stable relationship between them stands out

until 1990:Q4. From then on, and although there was an unprecedented economic expansion in the U.S. economy, the three correlations lost a great deal of strength. It is surprising that the CCI is negatively associated to PC in an environment of high economic growth. As from the first two months of 2001, a great disassociation was seen yet again among the variables. That is, CCI-PC recovered, while CCI-PI dropped abruptly.

FIGURE 2
PARTIAL CORRELATIONS, 1978:Q1-2001:Q1
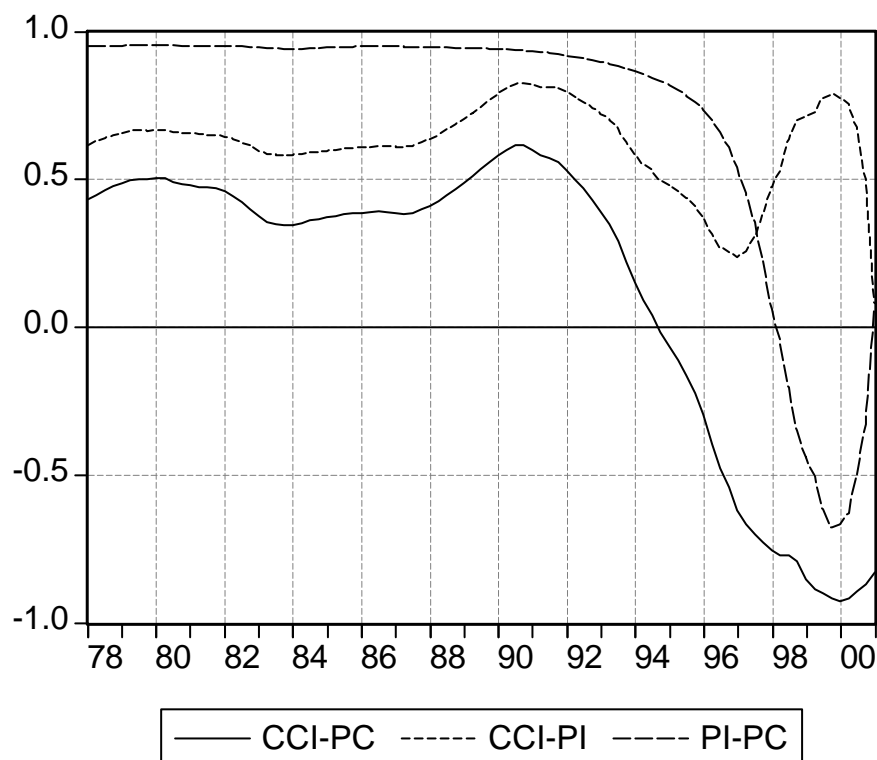
Source: Own calculations.

As previously announced, this erratic trend suggests that there are no stable long-term relationships. In order to rigorously test this, we estimated the order of integration of the series, and found that the three series are I(1) (see Table 1A). We took special care with CCI due to its erratic behavior. The identification of unit roots is frequently erroneous when highly volatile series are analyzed due to the likely presence of structural breaks. Thus, we applied additional tests, like those proposed by Perron (1997) and Zivot and Andrew (1992, quoted by Granger *et al.*, 1998) (see Table 2A).[xii]

We know that the linear combination of I(1) series may, under certain circumstances, generate co-integrated series. Based on the Engle and Granger (1987) and Johansen (1992) procedures, it was not possible to obtain a co-integration vector between either CCI-PC or between CCI-PI. These results were already predictable through the statistical tests previously applied. However, this does not rule out the existence of causality in the Granger sense. Granger *et al.* (1998: 8) claim that the test is valid even in the absence of co-integration. We must recall that co-integration expresses a long time equilibrium relationship for the variables involved, while causality –in the Granger sense– reflects statistical precedence in shorter periods of time of one variable over another. Therefore, in the presence of series I(1) we can regress the test in first difference. See Patterson

(2000: 545).

Consequently, we tested for it through the traditional Granger (1969) procedure:

(1) $$\Delta y_t = \alpha_0 + \sum_{i=1}^{k} \alpha_{1i} \Delta y_{t-i} + \sum_{i=1}^{k} \alpha_{2i} \Delta x_{t-i} + u_{1t}$$

(2) $$\Delta x_t = \beta_0 + \sum_{i=1}^{k} \beta_{1i} \Delta y_{t-i} + \sum_{i=1}^{k} \beta_{2i} \Delta x_{t-i} + u_{2t}$$

In (1) we test the statistical significance of the α_{2i} through an F test. It is assumed that u_{1t} and u_{2t} are not correlated. The hypotheses are:

H$_0$: $\alpha_{21} = \alpha_{22} = \alpha_{23} = \ \ .... = \alpha_{2i} = 0$, which rejects Granger causality. And conversely:

H$_1$: $\alpha_{21} = \alpha_{22} = \alpha_{23} = \ \ .... = \alpha_{2i} \neq 0$, that is, that at least one α_{2i} is statistically significant at 95% of confidence.

The same contrastive procedure was applied in (2) for the β_{1i}.

Because the Granger causality test is very sensitive to the lag structure, the *t-sig* method (see Ng and Perron, 1995) was followed to determine the optimal (k) lags; that is to say, when a robust model was obtained (with $k = 2$).[xiii] The following regressions were estimated for this purpose:

(3) $\Delta PC_t = f[c, \Delta PC_{t-i}, \Delta CCI_{t-i}]$

(4) $\Delta CCI_t = f[c, \Delta PC_{t-i}, \Delta CCI_{t-i}]$

(5) $\Delta PI_t = f[c, \Delta PI_{t-i}, \Delta CCI_{t-i}]$

(6) $\Delta CCI_t = f[c, \Delta PI_{t-i}, \Delta CCI_{t-i}]$

5. RESULTS

For the complete period (1978:Q1-2003:Q1) there is no evidence of causality between CCI and PC, but there is a fragile bi-directional causality between CCI and PI that rapidly disappears if we reduce the time sample.

As part of our progressive search, we reduced the time sample until the following stable causality was found: PC → CCI as from 1980:Q4. We must stress that the former was not reverted nor lost, even if we reduced the period of analysis. We also found the following stable relationship: PI → CCI only as from 1983:Q3. In sum, we empirically found that CCI is statistically caused by PI and PC, and not the other way round.

Table 1

Results of the Granger Causality Test

H$_0$: No causality			$k = 2$	F (probability)*	Causal inference
1978:Q1-2003:Q1					
ΔPC	--/-->	ΔCCI		2.424 (0.094)	No causality
ΔCCI	--/-->	ΔPC		0.173 (0.841)	No causality
ΔPI	--/-->	ΔCCI		3.519 (0.033)	Causality
ΔCCI	--/-->	ΔPI		9.018 (0.000)	Causality
1980:Q4-2003:Q1					
ΔPC	--/-->	ΔCCI		3.265(0.043)	Causality
ΔCCI	--/-->	ΔPC		0.556 (0.575)	No causality
1983:Q3-2003:Q1					
ΔPI	--/-->	ΔCCI		4.198 (0.018)	Causality
ΔCCI	--/-->	ΔPI		2.751 (0.070)	No causality

* Acceptance of H$_0$ at 95% of confidence.

6. CONCLUSIONS

We did not find co-integration between CCI-PI nor between CCI-PC, which means that any kind of association among these variables in the long run would be spurious. Nevertheless, when searching for statistical causality or precedence, we applied the traditional Granger causality test in first difference for the period 1978:Q1-2003:Q1. We found that CCI is not a good forecaster of the private demand of the U.S.; and conversely, found that private consumption and private investment have statistical precedence over CCI of order 2, namely six months.
One plausible explanation of our findings could be the following. When uncertainty arises due to dramatic and unforeseen political or economic shocks or to the specific phase of the business cycle at which people were polled, psychological factors should not be neglected (DeBoef and Kellstedt, 2003; Katona, 1977, and Golinelli and Parigi, *op. cit.*). It is likely that under these circumstances the CCI will worsen although the general economy is doing well.

The same applies when we are in the expansive phase of the business cycle but people feel that it is not sustainable for much longer. Therefore consumers and investors could bring their economic decisions forward, with which the effective result is exactly the opposite to what is commonly (popularly) believed.[xiv] Thus, it is very likely that 'consumer pessimism' (such measured through the decay of CCI) stimulates present consumption and investment, both derived from a rational behavior. These results are backed by Desroches and Gosselin (2002: 15), who suggest that "... periods of high uncertainty are usually associated with strong volatility in consumer confidence, suggesting that large swings in confidence matter for consumption".

Our main results opens up many questions concerning the real causal relationships in the formation of expectations and, above all, in reference to the correct selection and construction of leading indexes. In support of this, we claim that an in-depth review of the methodology as well as a search of other indexes should be carried out, particularly in terms of the representativeness of the sample.

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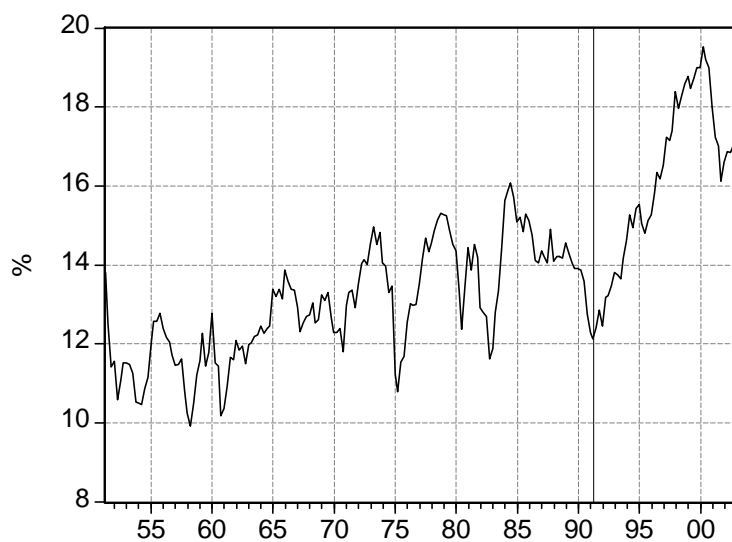**APPENDIX**

FIGURE 1A

PRIVATE CONSUMPTION TO GDP, 1951:Q1-2003:Q1
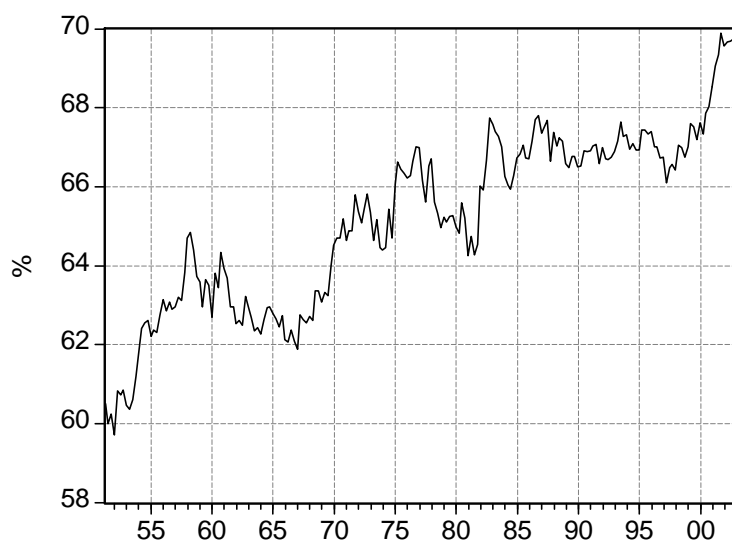
SOURCE: OWN CALCULATIONS, BASED ON BEA, 2003.

FIGURE 2A

PRIVATE INVESTMENT TO GDP, 1951:Q1-2003:Q1

SOURCE: OWN CALCULATIONS, BASED ON BEA, 2003.

1A TABLE

UNIT ROOTS TEST, 1978:Q1-2003:Q1

	ADF(1)	DF GLS(2)	PP(3)	KPSS
CCI	-2.411569[1]	-2.161921[4]	-2.122720[7]	0.079073
ΔCCI	-8.221264	-8.096612[5]	-8.555849	0.096936
PC	6.710224	2.041133	9.966102	0.226857[3]
ΔPC	-2.725529[2]	-2.025469[6]	-8.885380[3]	0.071545[3]
PI	-0.123982[3]	0.750033[3]	1.779266	1.058663
ΔPI	-5.194554	-3.140662	-7.649513	0.127142

Test at 99% of confidence. ADF, without trend and intercept; DF-GLS, with intercept; PP, without trend and intercept; KPSS, with intercept. PP and KPSS test were estimated by Bartlett-Kernel-Spectral method.

[1] With three lags; [2] with two lags; [3] with trend and intercept; [4] valid at 95% of confidence, with three lags; [5] with one lag; [6] valid at 95%; [7] with intercept.

Optimal lags were selected following the reduction approach in order to obtain the best outcome regarding adjusted R^2, Akaike and Schwarz criterions, F test, serial correlation and HAC.

ADF and PP tests critical values are MacKinnon's (E-Views, 2002); DF-GLS test are Elliott-Rothenberg-Stock's (*ibid.*); KPSS test are Kwiatkowski-Phillips-Schmidt-Shin (*ibid.*).

Table 2A
CCI: Unit Root Test and Structural Change

Model	Date of possible change	k (*t-sig*)	$t_{\rho-1}$	$T^*_{\rho-1}$	T
IO1	2002.2	3	-3.058	-5.10	101
IO2	2002.2	3	-3.042	-5.55	101
AO	2002.3	3	-3.208	-4.83	101

Note: IO1 (innovational outlier) with change in the intercept (occur gradually); IO2 (innovational outlier) with change in the intercept and the slope are allowed at time T_b; AO (additive outlier) with change in the slope (occur rapidly); $t^*_{\rho-1}$ critical value at 5% of confidence (Perron, 1997).

Zivot-Andrew's structural change model (see Granger *et al.*, 1998) is specified as:

$$\Delta y_t = \alpha + \beta_t + (\rho - 1)y_{t-1} + \gamma DU_t(\lambda) + \sum_{i=1}^{k-1} \theta_i \Delta y_{t-i} + a_t$$

Where $DU_t(\lambda) = 1$ for $t > T\lambda$, otherwise $DU_t(\lambda) = 0$; $\lambda = T_b/T$ represents the location where the structural break lies; T is sample size; T_b is the date when the structural break occurred.

[i] Such as: the real money supply, index of consumer expectations, building permits, stock prices, average weekly initial claims for unemployment insurance, average weekly manufacturing hours, and manufacturers' new orders for consumer goods and materials, and interest rate spread (The Conference Board, 2003a). Other indicators are also drawn up and published by institutions like *Investor's Business Daily* and *The Economist Intelligence Unit*, among others.

[ii] Related to the previous month or to the same month of the previous year.

[iii] According to a recent survey of the world economy: "... almost 60% of the cumulative growth in world output has come from America, nearly twice America's share of world GDP" (*The Economist*, 2003: 3).

[iv] CCI date is available since 1967, but it was released bimonthly. Since June 1977 is published monthly. In order to match this variable with PI and PC we started our analysis in 1978:Q1.

[v] This is a relevant issue that has to do with the origin of the primary information coming out from the surveys and with the presence of unit roots and structural breaks of the statistical series.

[vi] Broadly speaking, all the leading indicators have the same problem, that is why their forecasting power is continuously under scrutiny. It is worth mentioning (as suggested by the referees) that there is a series of works that deal with contrastive methodologies to find out the best (timely) leading indicators to forecast the business cycle. Among others, there are: Camacho and Perez-Quiros (2002), McGuckin and Ozyildirim (2003), and McGuckin *et al.* (2004). But we have to stress that those works are out of our scope.

[vii] The CSI is another relevant composite index, but commonly ranked second in importance. It is calculated by the Survey Research Centre at the University of Michigan, based on phone survey of five questions (two referring to the current situation and three to the future) applied to 500 different households every month (Bram and Ludvigson, 1998).

There are more composite indexes, such as the Consumer Comfort Index, published by the *ABC News/Money* magazine and which is based on a nationwide phone survey of thousands of adults throughout the country. This survey started in December 1985 (Polling Report, 2003).

[viii] Australia, Canada, France, Germany, Italy, Japan, the U.K. and the U.S. with data from the early 1970s to 2002:Q4. In the case of the U.S., CCI was also analyzed.

[ix] A specific analysis referring to whether consumer confidence has political or economic origins may be consulted in DeBoef and Kellstedt (2003).

[x] "The Conference Board was born out of a crisis in industry in 1916 (...) A group of concerned business leaders, (...) concluded that the time had arrived for an entirely new type of (...) respected, not-for-profit, non-partisan organization that would bring leaders together to find solutions to common problems and objectively examine major issues having an impact on business and society" (The Conference Board, 2003a).

Currently it is a widely recognized source of forecasts, analyses and generation of leading indicators and indexes for the U.S. It also generates business cycles indexes for other countries such as Australia, France, Germany, Mexico, Korea, Japan, Spain and the U.K.

[xi] We did not find information regarding whether this is a restrictive or stratified random sample. In the case of an unrestricted random sample, there could be a severe bias in the

outcome because: a) there could be geographic and socioeconomic asymmetries of those polled; b) it is difficult to discern if there are corrections in consumer expectations or behaviors without a follow-up of the people surveyed; finally, c) it remains to be seen if the sample size is really representative.

[xii] This was necessary because the KPSS test reported that CCI at levels was stationary, while the rest of the tests I(1).

[xiii] According to Akaike (AIC) and Schwarz (SBIC) criteria, R^2 adjusted, and Heteroskedasticity and Autocorrelation Consistent Co-variances (HAC).

[xiv] Permanent Income Hypothesis.