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Macroeconomy and consumer sentiment: performance of the Finnish consumer barometer after ten years

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BANK OF FINLAND DISCUSSION PAPERS

20/97

Kari Djerf – Kari Takala

Economics Department

22.12.1997

Macroeconomy and Consumer Sentiment: Performance of the Finnish Consumer Barometer after Ten Years

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Macroeconomy and Consumer Sentiment: Performance of the Finnish Consumer Barometer after Ten Years*

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Kari Djerf** – Kari Takala

Abstract

The Finnish Consumer Barometer was introduced in autumn 1987. Data were first collected twice a year and from August 1991 until September 1995 quarterly. After Finland joined the European Union in 1995, the survey was adopted as one member of the Harmonised Consumer Survey of the European Communities. Since October 1995, data have been collected monthly.

Performance of the Consumer Barometer has already been evaluated by means of descriptive studies (see Djerf 1990). As the survey matures, it becomes feasible to make a more thorough study on the usefulness of the survey. Here we are, for example, interested in investigating how consumers were able to predict the long-lasting recession of our economy.

The consumer confidence index and the five questions used for calculating it are compared to various components of Finnish macroeconomic time series. Additionally, we analyse the coincidence of other common measures (unemployment expectations, inflation expectations, etc.) as well as other, less frequently studied indicators such as the willingness to save and borrow with their possible counterparts in the real economy. It is important to evaluate whether consumer assessments about different economic questions are useful in predicting various macroeconomic variables i.e. we look for the additional information contained in barometer answers. We end by considering the usefulness of various indicators for specific macroeconomic behavioural equations.

Key words: consumer barometer, economic forecasting, causality testing

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** Statistics Finland.

Tiivistelmä

Viimeisten parin vuosikymmenen aikana taloudenpitäjien odotusten rooli on noussut kiinnostuksen kohteeksi taloudellista käyttäytymistä ennakoivana ja siihen vaikuttavana tekijänä. Odotukset eivät toki aina toteudu, mutta saattavat vaikuttaa ratkaisevasti taloudelliseen aktiivisuuteen käyttäytymispäätösten kautta. Kuluttajabarometrikyselyn tarkoituksena on arvioida kuluttajien käsityksiä menneestä sekä selvittää heidän odotuksiaan ja aikomuksiaan. Kuluttajabarometri on havaittu tuottavan myös makrotaloudellisen ennakkoinnin kannalta arvokasta informaatiota, jota ei ole välttämättä saatavilla mistään muusta tilastolähteestä. Esimerkiksi Suomen 1990-luvun kysyntälama olisi ollut paremmin ennakoitavissa, jos kuluttajien luottamusindikaattoriin taloudellisen toimeliaisuuden tunnuksena olisi jo tuolloin uskallettu paremmin luottaa. Taloudellisen aktiivisuuden vaihteluista merkittävä osa liittyy kotitalouksien kulutuskysynnän vaihteluun jo pelkästään siitä syystä, että yli puolet bruttokansantuotteesta on yksityistä kulutusta.

Euroopassa kuluttajabarometrikyselyjä on tehty säännöllisesti jo 1970-luvun alkupuolelta asti, mutta Suomessa vasta vuodesta 1987 lähtien. Suomessa kyselyä tehtiin aluksi kahdesti vuodessa, vuoden 1991 syksystä neljännesvuosittain ja vuoden 1995 lokakuusta lähtien kuukausittain. Keskuspankin inflaatiotavoitteen kannalta kiintoisia käsityksiä kuluttajien inflaatio-odotuksista on suoraan vuosiprosentteina kysytty niin ikään vuoden 1995 lopulta alkaen. Tätä aiemmin inflaatio-odotuksista on saatu tietoa ns. saldolukujen avulla.

Tässä selvityksessä arvioidaan kotitalouksien odotusten ennustekykä kuluttajabarometriaineiston valossa. Kuluttajien luottamusindikaattori, joka muodostetaan viiden erillisen koko maan ja kuluttajan omaa taloudentilaa selvittävän kysymyksen avulla, mittaa jo varsin tarkasti bruttokansantuotteen muutoksia. Kuluttajien arvioiden luontevin alue on kuitenkin kulutus- ja säästämiskäyttäytyminen, jonka ennakkointiin barometrikyselyt tuottavat usein hyödyllistä ja nopeasti valmistuvaa aineistoa. Kukapa muukaan voisi tietää paremmin esimerkiksi kestokulutushyödykkeiden, kuten asunnon tai auton ostoaikeita kuin kotitalous itse? Selvitämme barometriodotusten ennustekykä, ennustehorisonttia sekä lisäselitysvoimaa myös osana makrotaloudellisia ennusteyhtälöitä, jolloin näiden odotusten merkitys varsinaisesti punnitaan. Kuluttajien odotuksilla ja aikomuksilla on eräissä ennusteyhtälöissä ilmeisen merkittävää ennustekykä.

Asiasanat: kuluttajabarometri, taloudellinen ennustaminen, kausaalisuustestit

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1 Introduction

Macroeconomic forecasters have observed the usefulness of barometer surveys for several decades. In Finland, the last 10 years have seen the major breakthroughs for barometer indices. Barometer studies are used in predicting corporate activity (both large manufacturing and medium sized firms), investment and consumer expenditure. Without doubt, forward-looking economic agents know something about their future economic behaviour. It is another matter though, whether these expectations, intentions and plans are necessary in forecasting forthcoming economic activity, and whether the consumer sentiment is a cause of the observed activity.

In this paper, we study the relationship between economic activity and consumer assessment about the most important macroeconomic variables. In particular, we are interested in the predictive power included into consumer responses concerning major macroeconomic variables. The similarity in growth rates and coincidence of turning points with the actual changes are also important to record. One major mistake during the deep recession of the 1990s was the negligence of the wealth effect in macroeconomic consumption functions. At least partly these forecast errors would have been avoided by giving more attention to consumer assessment about the growth of the economy. The same applies to Sweden (Berg and Bergström 1996).

We try to assess the usefulness of consumer sentiment variables as leading indicators of economic activity. Related questions are how much lead indicators provide and how reliable they are in giving correct signals about forthcoming activity. In particular we are interested whether consumer sentiment indicators give forecasters early warning of economic slowdown or overheating.

In practical forecasting work, barometer surveys can also be useful for macroeconomic forecasters in giving a fresh update about current economic activity as official statistics lag at least a quarter or so from the current situation. In this sense, the usefulness of sentiment variables is not limited by the role of having leading indicator status, even a coincidence could be enough.

It is possible in principle that consumers have additional information about their forthcoming behaviour that is not available to econometric forecasters. Thus, we may approach this question by classifying the information sets of agents by weak rationality, semi-strong and strong rationality. Weakly rational expectations (sentiments) are based on past and present of the variable in interest. Semi-strongly rational expectations can also use any publicly available information related to the variable in interest like official statistics. Strongly rational expectations use any relevant information affecting the variable, including subjective motives that may affect the development of the variable.¹ As a research strategy, we first test the weak rationality of the sentiment expectations and proceed these stronger forms of rationality by estimating few model-based information sets using sentiment variables as additional variables in behavioural equations. The problem in stronger forms of

¹ In fact, one approach would be to analyse whether the changes in the distribution of the sentiment answers as characteristic values carry information about the uncertainty of economic activity. Currently, the calculation of the characteristic values as difference between those who expect growth to those who expect decline does not react to the share of those who answer the situation to be unchanged. However, it may well be that the share of those regarding the situation to be unchanged may reflect the uncertainty of the net change. Therefore this 'second order' information may be useful sometimes in constructing statistical confidence bounds to responses.

rationality is naturally the ambiguity of the information set. Therefore, an ultimate answer could be out of the scope of any study. However, some sort of qualitative answer clearly is possible.

2 Background of the Finnish consumer barometer

The Finnish consumer barometer was introduced lastly in late 1987. In most central European countries – France, Belgium, Denmark, Italy, Holland, UK and Sweden – consumer surveys were started along with the EU survey already in the early 1970's. In the beginning consumer survey was done twice a year, but soon it was frequented to quarterly basis. In October 1995, the consumer barometer was then switched to a monthly basis. Over time there has been changes in some of the questions.² Some definitional improvements have also been made e.g. the assessment about forthcoming inflation is now published as a percentage and not as characteristic values, which are somewhat more difficult to assess.

In most questions, the classification basis is still ordinal in scale and average of the characteristic values is used in measuring the overall sentiment. As the typical range of the characteristic value is not known, it is only possible to learn the usefulness of the answers by measuring them for some time. The consumer barometer is done by interviews, which also makes production rapid. The time lag from the start of interviews is currently 2–3 weeks. The Finnish survey is based on standard EU definition of overall consumer confidence indicator (CCI), which is made up as an average of five questions (figure 1):

1. The financial situation of households now compared to 12 months ago
2. The expectation of the financial situation of households over the next 12 months
3. The general economic situation now compared to 12 months ago
4. The expectation of the general (Finnish) economic situation during the next 12 months
5. How favourable it is to purchase capital (durable) goods at present

In questions 1–4 consumers answer whether situation is a lot/a little better or worse, about the same or 'do not know'. In the characteristic value these responses are weighted by weights ± 1 , ± 0.5 or zero respectively. Question 5 contains only response options favourable, unfavourable and neither ... nor in addition to the 'do not know' answer.³ Since there are two pairs of questions that are backward and forward-looking and one last question whose timing balance is close to present, it can be said roughly that CCI is balanced to current time. CCI did not indicate significant seasonal variation, but there is slight tendency for consumers to be more optimistic in spring than in the second half of the year. Seasonality was not found either in forward-

² For example the question of the regularity of saving has been replaced by questions that concerns the ability to save, which is more properly related to consumption function theory (see Takala 1995b).

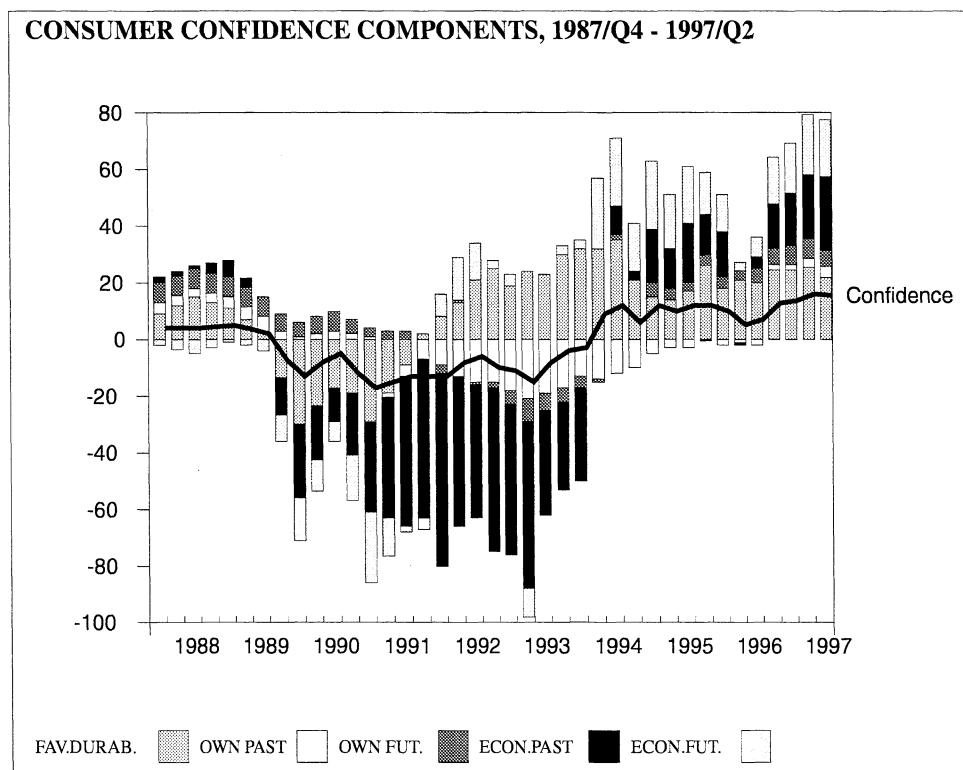
³ The weights 1 and 0.5 seem somewhat arbitrary and it should be analysed whether a more optimal weighting could be achieved e.g. by weighting with normal distribution based on central-limit theorem.

looking expectations about one's own economic situation or general economic situation. In this respect the series are quite different from the Swedish data, that showed strong seasonality in both these forward-looking indices (Berg and Bergström 1996). It must be remembered however, that the Finnish series are much shorter.

The component which correlates the most with the CCI is the past year of the economy ($r = .91$). The between components correlation is strongest between the past and future of one's own economic situation. This symmetry may not be surprising since there is high autocorrelation and therefore inertia in household income and consumption. In fact, households are trying keep their consumption as smooth as possible according to major consumption function theories. Especially in Finland, income transfers have risen rapidly during the last recession, and have kept the purchasing power of households much smoother than overall economic growth. The correlation with CCI is stronger to the general economic situation than to household's own situation. Surprisingly the perceived favourableness of time for large purchases is slightly negatively correlated with a household's assessment of its own economic situation.

There is a small bias downwards in the CCI compared to GDP growth, but the major difference lies in the volatility of characteristic values. The standard deviation of CCI is twice that of GDP. Consumer assessment about the past economic performance is also much more volatile than that of forthcoming economic growth, which is also an incorporated property of optimal forecasts.

Figure 1. CCI and its components



If we look closer to the CCI components, we see e.g. that consumers' assessment about their own economic situation seems to be generally much more stable than the assessment of the economy as a whole (Figure 2). One explanation for this could be the fact that the social security transfers received by households have risen enormously during the recession. The same phenomenon can also be seen in the share of static (no change) assessment about the own economic situation (Figure 3). It can be seen also that consumer expectations about the future are in general brighter than the assessment about the past. Partly this may be due to overall economic growth. There are also other signs of optimism bias. During recession the past year of the economy was assessed to be a lot worse by 40–50 % of households, but this did not affect at all the assessment about forthcoming year of the economy. According to normal inertia of the economic growth, however, some signs of continuing slowdown would have been expected.

It can be seen that the actual variation in consumer assessment takes place in answers "a little better/worse", their contributions to the characteristic values are usually larger than those answers indicating "a lot better/worse". Consumers are inherently more uncertain about the future than the past as indicated by the 'Do not know' -answers. Of course the amount of information is also asymmetric for these two types of questions, since past is already gone while future has not happened yet. The uncertainty reflected in the 'Do not know' answers is systematically higher (9–20 %) in the question concerning the favourability to buy durables, while for the other questions their share has been always below 9 percent. The answers concerning the favourable time to buy capital goods has increased the level of the confidence index in 1990's (Figure 4).

It is also interesting to examine which CCI components have contributed most to the overall consumer confidence in different periods. The business cycle has clearly affected CCI contributions. As mentioned consumer assessment of the past year's economy were most strongly correlated with the CCI index. During the severe recession May 1990 – November 1992, this correlation declined significantly and expectations about the forthcoming year of the economy contributed more clearly the CCI. During the present growth period (August 1994 – June 1997) the advantage of buying durables has lost its significance in relation to other CCI determinants.

We may assume that the share of consumers that responds "the situation stays the same (or is expected to be the same)" reflects the certainty or the probability of the actual outcome (Figure 5). The ordinary consumer confidence indicator is measuring especially the change in assessment and expectations. It is therefore possible to weight the characteristic value with the uncertainty (1 – share of static responses) concerning the balance of those answers indicating change. So greater uncertainty about the change will be dampened by weighting the characteristic value (Figure 6). Greater certainty about the change will give more weight to the confidence indicator. However, the weighting did not change dramatically the correlation of the CCI with the actual GDP growth (Figure 7). One technical problem in weighting is related to the limiting maxima and minima of the weighted CCI, although the ranges are now closer to actual percent changes of GDP.

Figure 2.

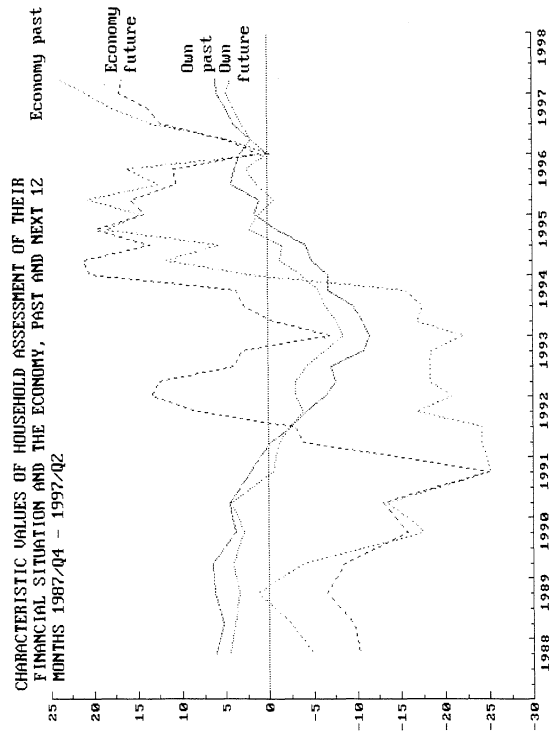


Figure 3.

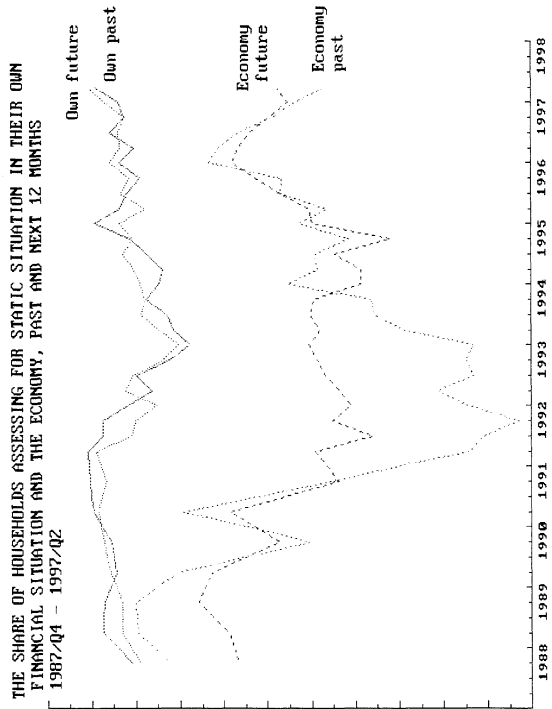


Figure 4.

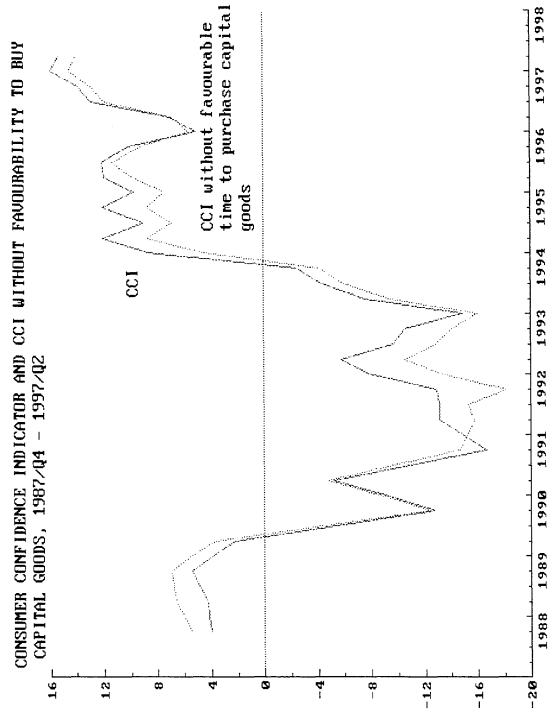


Figure 5.

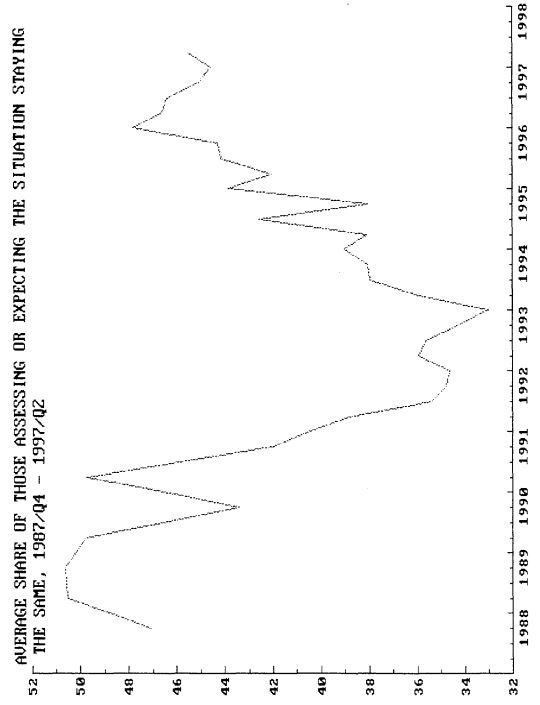


Figure 6.

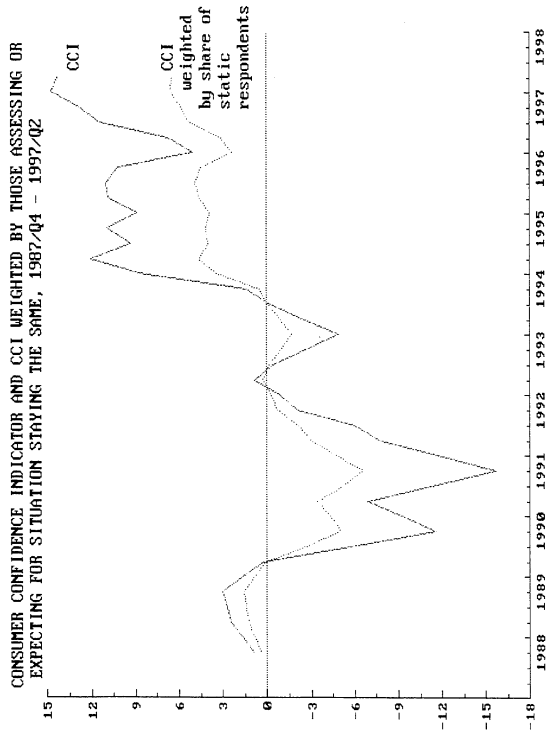
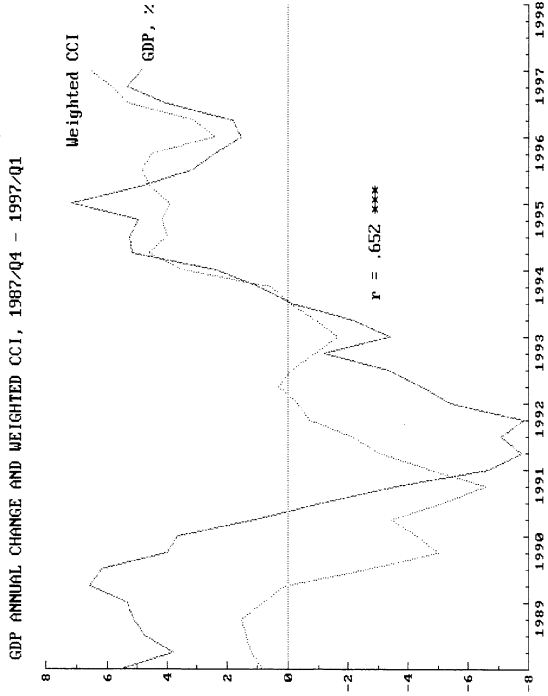


Figure 7.



3 Consumer sentiment variables and the macroeconomy

The Finnish consumer barometer study contains a fairly broad amount of questions about main macroeconomic and household-related variables. However, it is not always clear what variable correlates with what barometer question. In this section we try to identify some of the closest relations observed.

The consumer confidence indicator (CCI) itself contains information on both the economy as a whole and economic situation of the individual household in particular. The developments in these indicators may not always coincide, but aggregating these to the economy level should tell us the overall picture. The key issue is, of course the representativeness of the survey. The sample size in the survey has varied. At present it is about 1,700 individuals of which we normally obtain more than 1,500 responses. The response rate has been about 85 per cent. Each respondent represents about 2,600 individuals. When households are considered each response represents about 1,500 other households. We have not found indications of bias due to nonresponse or measurement errors so far. Nevertheless, the reliability of some questions may not be as good as should be needed. That is especially true when the respondents are asked questions of rather infrequent phenomena, for example plans to acquire a house.

One way to assess the quality and usefulness of the questionnaire would be to compare the household assessment about the past to that actually recorded by statistical officials. In Figure 8 we see the GDP for four-quarter growth and consumer assessment about the past 12 months of the economy in same range plotting. Clearly, it can be seen that consumer assessment correlates very closely to the actual changes and that turning points are almost identical. Private consumption contributed also a great deal the 1991–93 recession. In Figure 9, GDP growth is compared to household ex ante predictions one year ahead of the economy lagged four quarters to match the time periods. The correlations, are rather convincing. In fact they are better than many other macroeconomic forecast models for early 1990s (Figure 10). However, it can be seen that consumer expectations about the general economic situation gave two major misleading signals and overall CCI could be better in indicating economic activity (Figure 11). First, consumers expected a slowdown in growth during 1993, which did not happen. Second, households did not foresee the temporary slowdown in growth in late 1995 and beginning of 1996.

The same pattern holds closely for inflation and inflation expectations, too (Figures 12–13). Consumers know very well the past rate of inflation, and in overall they seem to predict acceleration or deceleration of forthcoming inflation superbly. Households have made only one major mistake in inflation expectations in late 1991. Households expected a clear acceleration in inflation during 1992 due to devaluation of the Finnish markka in November 1991 by 12 %. Against the widely discussed devaluation-cycle theory and our past experience, inflation did not accelerate, however, as the price competitiveness of the export firms did not improve enough and the domestic recession did not abate as quickly as expected. Devaluations have previously increased the markka import prices, but this time this inflation channel was not as strong as earlier because of larger tendency for pricing to the market of importers. However, the household expectations were revised almost optimally in the next barometer round in spring 1992. The floating of the Finnish markka started in

September 1992, which further declined the external value of the markka until late spring of 1993.

Household assessment about their own economic and financial situation seemed to have an incorporated optimism during the last recession. The past 12 months has always been more gloomy than that expected ahead in the barometer history (Figure 14). The same applies to comparison of the lagged expectation and assessment about the recent past (Figure 15). Even though the recession was deeper than most macroeconomic forecasters expected, it looks somewhat odd that consumers are as cautious and conservative in predictions as other forecasters. Historically, consumers have shown systematic optimism bias in assessment of their futures, which has to be corrected. The household expectation of their own financial situation was regressed on the assessment of the past 12 months change, and the bias was 4.8 and only the current evaluation of the own past was significant.

One would expect that CCI should have close relationship with consumption, but it looks as if CCI has even closer relationship with the durable consumption, or more correctly, with durables purchases as measured in National Accounts (Figures 16–17). In this respect results are similar to those found for Sweden (Ågren and Jonsson 1991). Explaining durable purchases can be helped using the question concerning favourable time to buy durables (Figure 18). Durable purchases have been found to depend on unemployment rate in many studies, as increasing the unemployment means rising income uncertainty. Households seem to foresee the forthcoming changes in unemployment amazingly well (Figure 19). Consumer assessment of other aspects of their behaviour is in general also useful. E.g. household borrowing plans seem efficient predictors for actual borrowing (Figure 20) and consumer assessment to save correlate with interest rates evolvement (Figure 21). Table 1 presents the closest relationships found between consumer sentiment forward indicators and macroeconomic variables, while in most cases, it is self-evident what the question measures, but a few interesting relationships emerge. Even though the maximum correlation lag did not appear to be exactly four in most expectations with one year horizon, the correlation was in most cases almost as high because of serial correlation.

Table 1.

Consumer sentiment variables and the corresponding macroeconomic variables

Based on cross-correlation functions

Sentiment variable	Macroeconomic variable	Max correlation	Max correlation found on lag
CCI	GDP, %	.761	1
CCI	C, %	.750	1
CCI	CD, %	.847	1
Household own financial future	C, %	.852	2
Future of the economy	GDP, %	.481	4
Inflation expectation	CPI, %	.895	3
Favourable time for large purchases	CD, %	.801	6
Fav. time for saving	Saving rate, %	.582	3
Fav. time for borrowing	Saving rate, %	.650	4
Fav. time for saving	Lending rate, %	.865	0
Plans for raising a loan	Borrowing, %	.939	0
Unemployment expectation	Change in unemployment, %	.734	2

Abbreviations:

- GDP, % = Four-quarter GDP growth, %
 CD, % = Four-quarter change in durables purchases, %
 C, % = Four-quarter change in private consumption, %
 CPI, % = Four-quarter change in consumer price index, %
 CCI = Consumer confidence indicator

Figure 8.

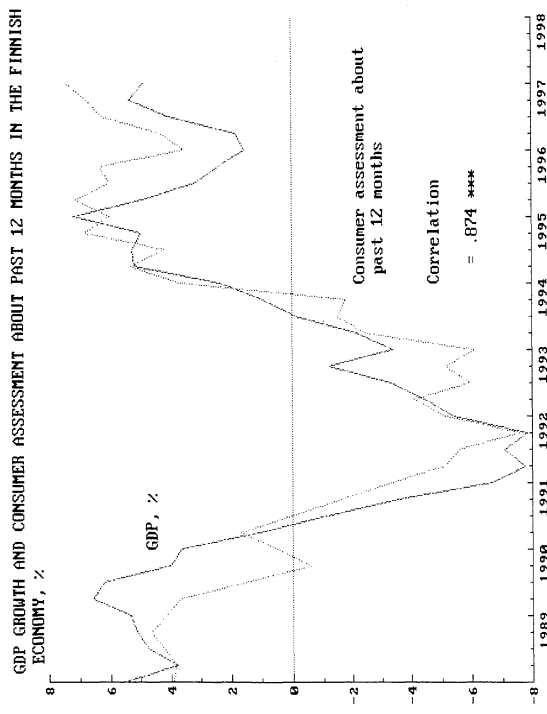


Figure 9.

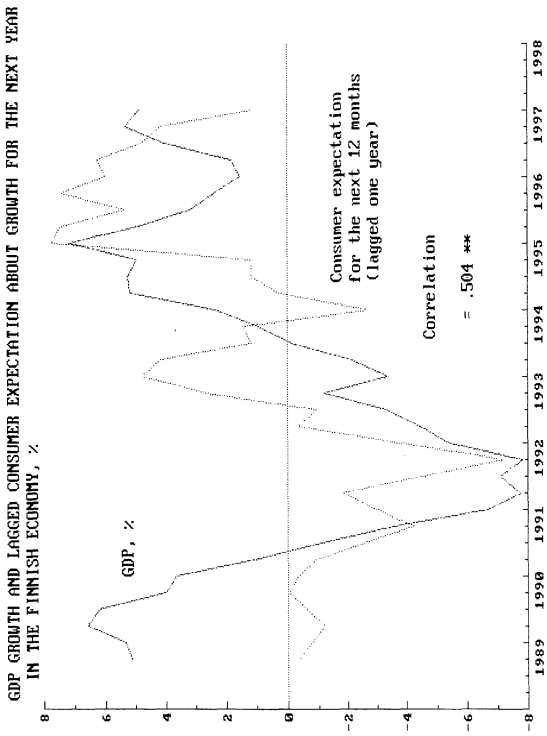


Figure 10.

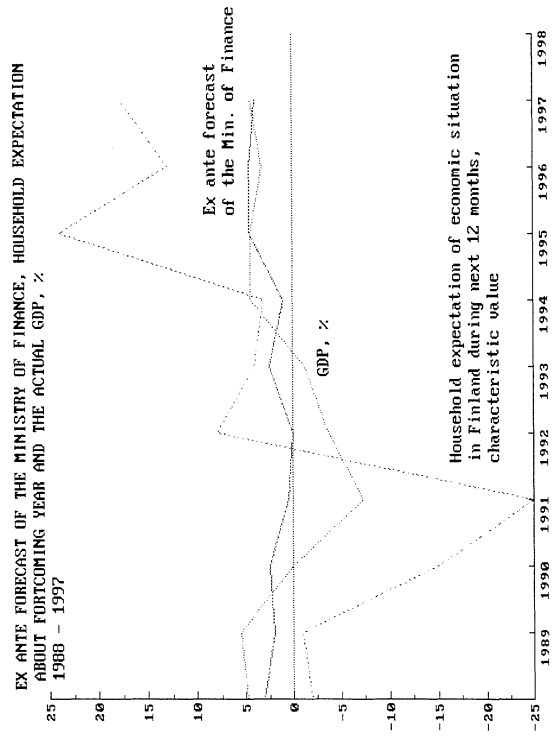


Figure 11.

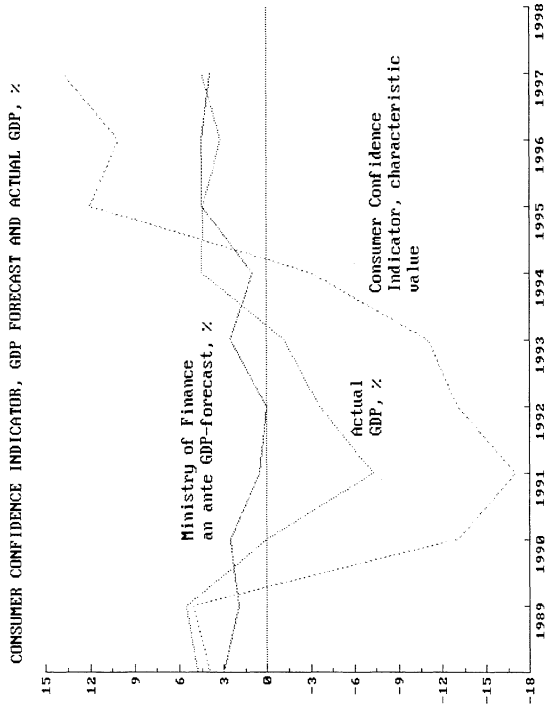


Figure 12.

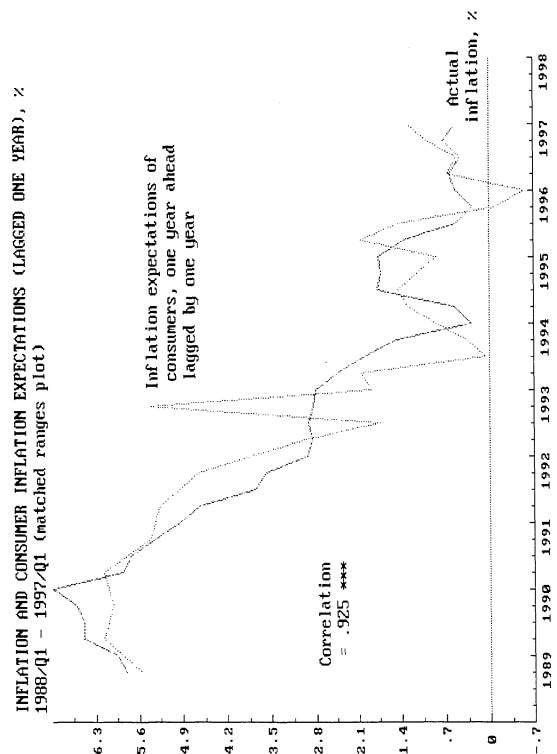


Figure 13.

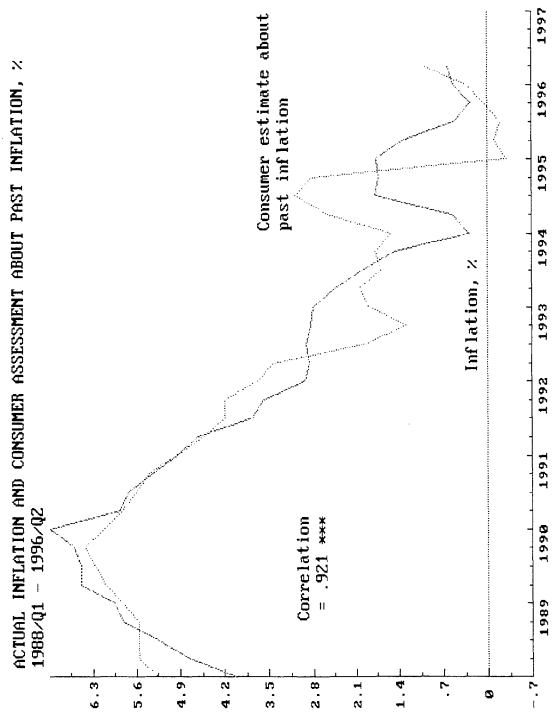


Figure 14.

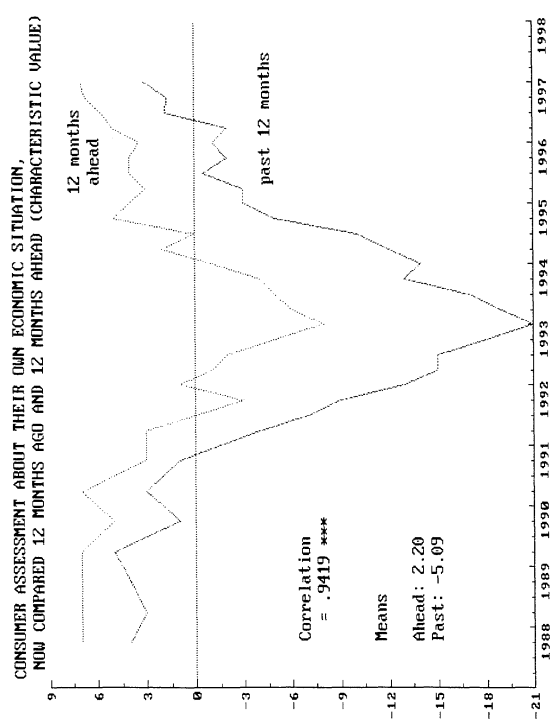


Figure 15.

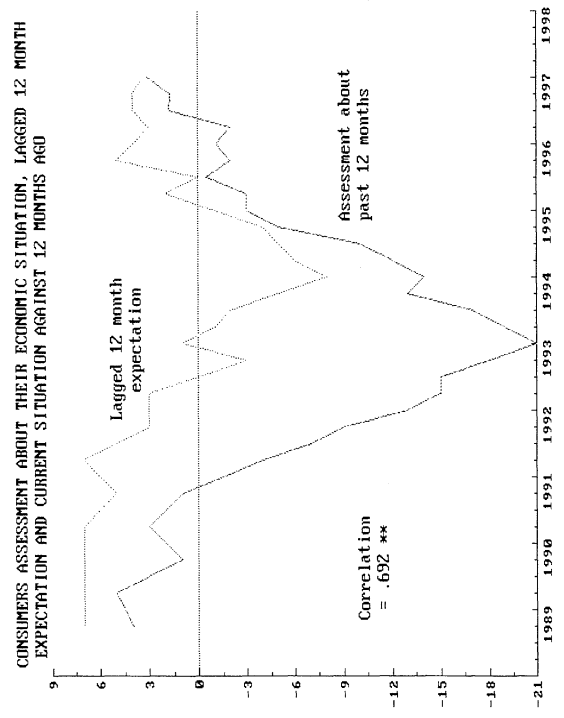


Figure 16.

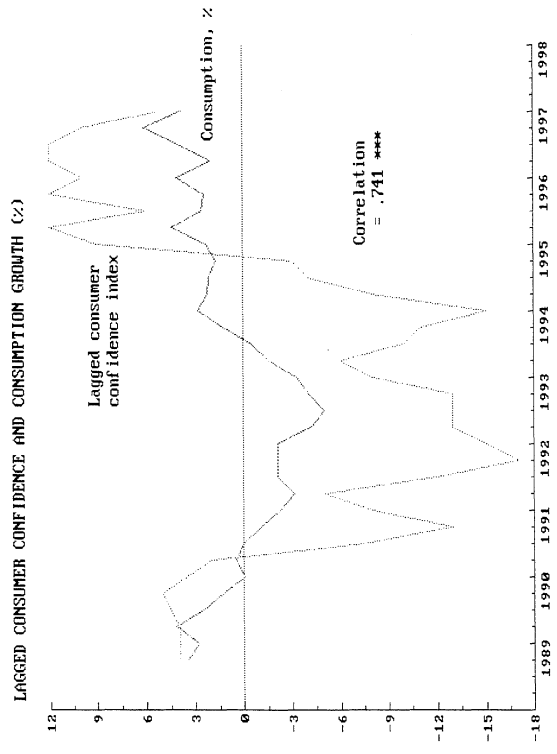


Figure 17.

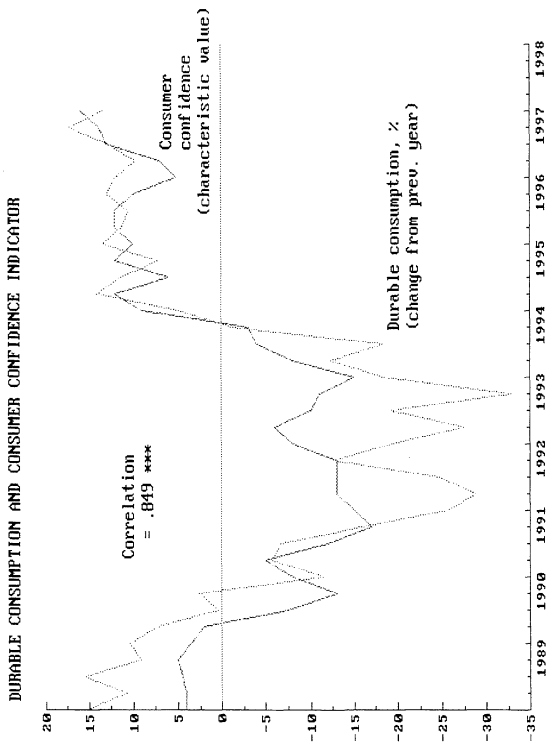


Figure 18.

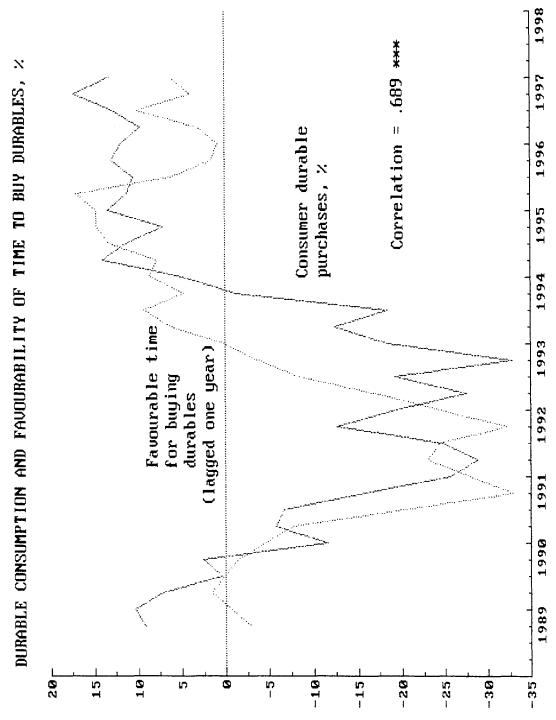


Figure 19.

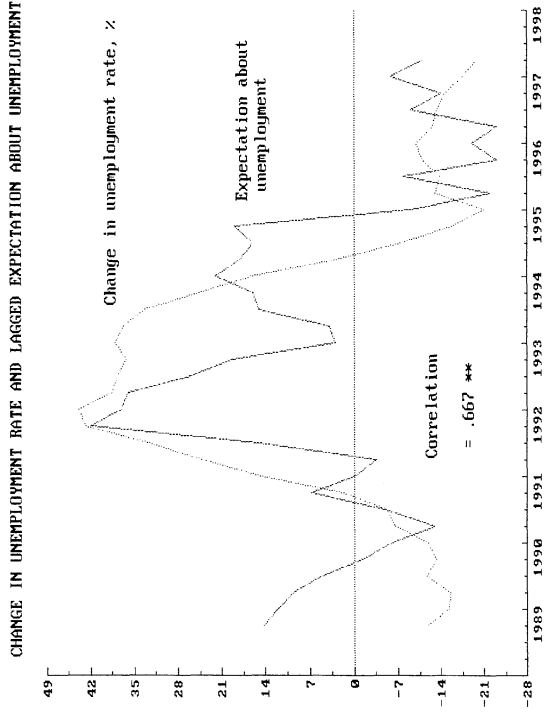


Figure 20.

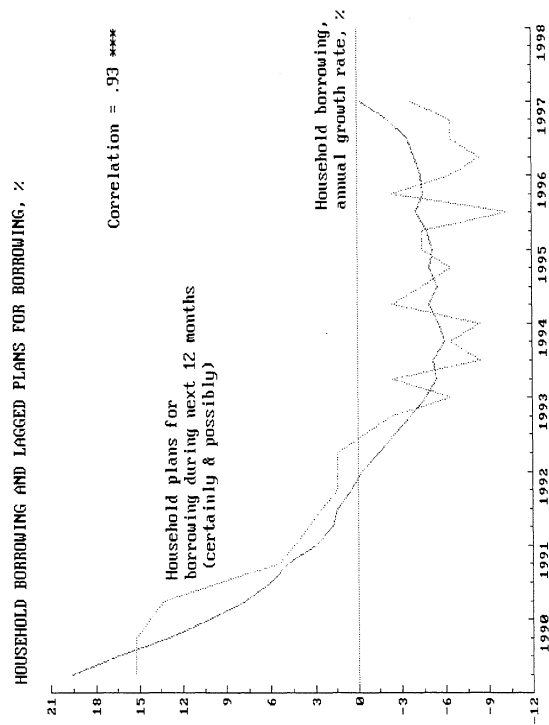
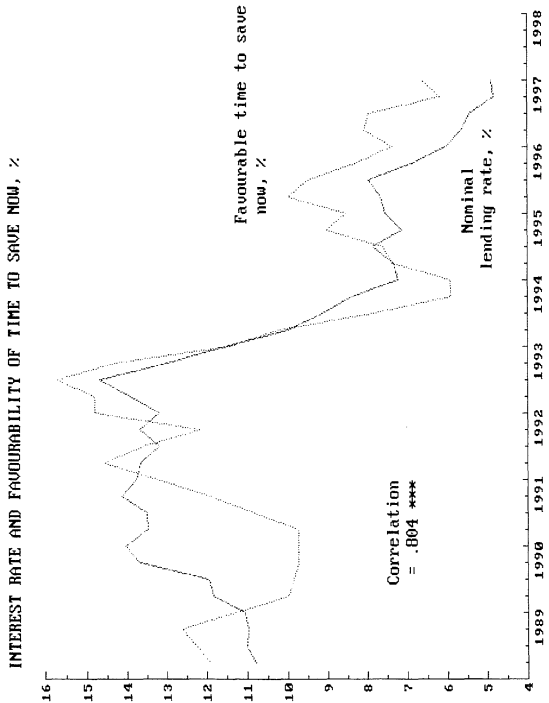


Figure 21.



4 Macroeconomic activity and confidence indicators

In this section we ask the basic question whether sentiment variables contain leading or coinciding information about actual macroeconomic activity variables. In addition, the timing of the answers with respect to that actual macroeconomic variation is utterly important as the purpose is to find out the usefulness of sentiment variables for forecasting. The reliability of such information is also important, since false signals are problematic.

The usefulness of the sentiment indicators must be based on views about their role in the forecasting procedure. Dieden and Kennedy (1997) classify two basic views about the status of confidence indicators that summarize either observable or unobservable economic conditions.

It is either the case that sentiment indicators reveal economic conditions not observable from other macroeconomic variables, or they actually measure non-economic psychological factors, which nevertheless affect the economy. In the sense that consumer sentiment variables truly reflect expectations of macroeconomic variables and therefore carry information about forthcoming behaviour, it must be the case that confidence indicators contain also an unobservable component.

In general, it would be surprising if consumer intentions did not reflect future behaviour. Nobody else knows, for instance when household plans to take a housing loan, considers buying a durable like car or will decide to save regularly. At the time of the survey, no statistics are available for some of the indicators. As all expectations are formed on basis on past and current information, consumer sentiment variables are functions of the past. If household expectation formation exhausts optimally and sufficiently the past, there should not be any bias in ex post expectations.

Macroeconomic variables as such cannot include any forward-looking effects e.g. decided policy changes, whereas in econometric models, these effects have to be included explicitly through exogenous variables. Expectations of consumers include such policy changes or even household reactions to these changes, and therefore, the information set of consumers is by definition larger than in backward looking econometric models.

Carroll, Fuhrer and Wilcox (1994) ask whether consumer sentiment indicators include predictive power over consumption, and whether the sentiment indicator contains additional predictive power about consumption not included into any other relevant explanatory variable. They also discuss whether confidence variables simply reflect economic situations or actually cause economic volatility. Do we necessarily need confidence indicators as additional variables e.g. in explaining consumption? In the case of consumption, this question has special interest since it accords with the famous hypothesis of Robert Hall (1978), whereby the lagged consumption level should reflect the best forecast for current consumption. Halls theory is based on a utility maximising consumer with rational expectations. This theory also implies that observed consumption apart from durables should follow a random walk as only current innovations will disturb consumption from the chosen equilibrium level manifested in the lagged consumption.

If consumer sentiment variables are regarded only as expectations to actual macroeconomic variables, it may likely be that sentiment and corresponding macroeconomic variable are also cointegrated. Rational expectations should also coincide in the long run with the observed development of the variable. The only

practical problem is that confidence indicator is presented in differences i.e. they are stationary. As cointegration may prevail only between integrated variables, consumer sentiment variables should be first aggregated to levels.⁴ We also need theoretical background concerning the relationship to test these properties within a bivariate VAR-system framework. As consumer sentiment and corresponding macroeconomic variable should be cointegrated, the short-run discrepancy (error-correction term) should predict either one or both of the integrated variables. In this case most likely it will predict the forthcoming changes in sentiment.

In the market, only a few 'price variables' are forward-looking like, e.g. dwelling prices indicating discounted present value of housing services and therefore income expectations. Long-term interest rates also fundamentally reflect the intertemporal price of consumption, which is compounded from rather constant real interest rate and expected inflation. Otherwise, there is scarcely information about future beliefs and actions of economic agents.

4.1 Granger causality tests

Granger causality tests can be applied to analyse the predictive causality between two stationary variables. As dependent variable we use four-quarter changes of macroeconomic variables and as explanatory variables various consumer sentiment variables. The purpose is to find out whether consumer sentiment variables include any additional information over the past of the dependent variable. Granger causality tests are performed by two linear regressions, one containing the lagged values of the consumer sentiment variable in the equation and one without. The Granger causality test is then based to F-test for the lagged consumer sentiment variables as a group. If this F-test is significant, we can conclude that consumer sentiment variable reduces the forecast error of the macroeconomic variable and it is therefore useful at least over autoregressive univariate model.

In addition, we perform Granger causality tests on the opposite (feedback) direction, to see whether consumer sentiment assessment is truly forward-looking and not simply an autoregression of the past of the macroeconomic variable. This test checks the efficiency of the expectation formation. For few variables also the past of the macroeconomic variable is checked (such as GDP, CPI and own financial situation) in the barometer questionnaire, in these cases it is possible to analyse if consumers have any bias or inefficiency in formulating their expectations. In this paper, we do not investigate what variables likely affect mostly the confidence indicators.

In principle there are caveats with respect e.g. to a third factor relating the consumer sentiment expectation and the macroeconomic variable at question (Hsiao 1982). Although, in this particular setting, this kind of situation is methodologically unclear, the scope of Granger causality test is limited and should not be regarded as a proof for a strict structural relationship between variables.

⁴ Performed ADF-unit root tests did not prove very convincingly that the sentiment variables would be stationary. The characteristic values calculated are clearly bounded, since they are calculated from the population shares of respondents, and should therefore be stationary in the longer run.

The results from the Granger causality tests are presented in Table 2 pairwise, first testing the Granger causality from consumer sentiment indicator to macroeconomic variable and then checking the feedback. The tests are performed for four-quarter changes with different lag lengths covering 1–4 quarters.

Statistically the overall consumer confidence indicator (CCI) seems to predict the overall economic growth very well. This predictive power, i.e. the p-value of CCI, is almost 5 per cent even one year ahead. On the other hand, there is clearly no feedback at all from the GDP growth to CCI. One may think that this relationship is due to the large share of consumption from the overall demand and spending, but according to these tests this is not the full explanation.

Households are on aggregate, rather well aware of the general Finnish economic situation. This can be seen from the consumer assessment of the past year in the Finnish economy with respect to actual GDP change. It was already noted that from all CCI components correlates the most with the past general economic performance. In this case, only the first quarter test is significant on 5 per cent level as the question is also posed in the form economic situation now compared to that 12 months ago.

CCI predicts also household consumption and especially durable consumption. This is not very surprising since it has been emphasized that purchasing durables especially with debt financing is preceded by increased confidence on own economic situation. In the case of durables there are some signs of feedback from durables purchases to confidence. Consumers assessment about favourable time to purchase durables is also efficient predictor for durables purchases, which is no surprise either.

Consumers can relatively efficiently predict the changes in inflation, as consumer assessment about forthcoming inflation is clearly a very powerful predictor for inflation for about 3 quarters ahead (see also Kuismanen and Spolander 1995). In this case the feedback is also clean, so consumers do not simply extrapolate inflation from the past experience.⁵

The consumer barometer includes several questions about saving behaviour; the motives, saving ability, saving patterns, saving targets etc. Graphical comparison already shows that the question concerning the favourableness of time to save correlates closely with the interest rate development. It is interesting that, in this case, the interest rate seems to Granger-cause the favourableness of time to save, not the other way around as with most other variables. This observation may reflect the formation of the interest rate in the money market that affects with lag new bank lending rates. However, it could also be the case that if favourableness of saving would indicate changes in the subjective time preference (discount factor between current and future consumption utility), therefore it should Granger-cause interest rate as well. It should be remembered though, that the interest rate is fundamentally a forward-looking variable.

The question concerning the unemployment trend also caused some problems in interpretation. It was found out that actual unemployment rate seems to Granger-cause unemployment rate changes. However, taking the difference from the unemployment rate, i.e. considering the change in unemployment rate, seems to confirm that consumers can predict these changes efficiently.

⁵ Quite recently, this question has been revised into a question presenting the inflation expectations directly in annual percents, which makes it easier to interpret.

In general, it appears that consumer sentiment variables are, if not absolutely necessary in predicting the macroeconomic, at least very useful short-term indicators for several macroeconomic variables. The information sets in the bivariate Granger causality tests are, however, limited to the past of these variables, which correspond with the weak form of rationality. In principle, the information set used by households is unlimited, except that the future cannot cause the present or past. The expansion of the information set could be done by considering the role of confidence indicators as additional variables in specified behavioural equations. Therefore, we will consider specified consumption and saving models.

4.2 Spectral analysis on the CCI and GDP relationship

Spectral analysis could be also helpful in checking the timing or phase difference between the series. Cross-spectrum analysis can be used in studying the strength of the relationship between confidence indicator and economic activity at different frequencies. In the figures shown here, plotting against frequencies have been transformed into periods (quarters) to ease the comparison. From Figure 22 we see that the phase-shift, i.e. the timing difference between the series is around 3–4 quarters as expected, since the timing balance of CCI is about zero, but GDP growth is measured as four-quarter change. The squared coherence, which is a spectral analysis analogue to correlation, is maximized in the short-run around 3 quarters (Figure 23). It is possible that there is some information lag in the household measurement of the economy, therefore the foreseen horizon is shorter than four quarters. This is somewhat longer than was seen in the cross-correlation function analysis. Gain measures a unit impulse in the independent variable until a new equilibrium is found. The gain could then be interpreted as the regression coefficient of the particular frequency of the independent variable CCI on the corresponding frequency component of GDP. The estimated gain also has its short-term peak around 3 quarters (Figure 24).⁶

4.3 Results from behavioural models

In this section we examine whether various consumer sentiment variables add predictive power to the major behavioural model, e.g. household consumption function, saving and borrowing models.

We start with the trite observation that consumer confidence correlates with economic activity. Consumer optimism and pessimism may, therefore simply vary with economic growth as purchasing power varies with labour income. As the average propensity to consume out of disposable income is over 95 % in Finland, it appears that confidence varies with consumption too. One cause for this close relationship arises is the group of rule-of-thumb consumers. Namely Campbell and Mankiw (1991) distinguished two types of consumers. Rule-of-thumb consumers are

⁶ Spectral analysis between confidence and durable purchases showed the phase-shift to be almost exactly four quarters as it should be. The same observation can be made between inflation expectations and actual inflation.

liquidity constrained consumers, who consume all the income they receive. In Finland, the share of liquidity constrained consumers could be about 30–50 percent of the total expenditure (Takala 1995b). Those consumers not limited to current income in their spending behave more or less like rational life-cycle optimizers that can smooth their consumption for longer periods. Life-cycle consumers are not supposed to be as sensitive to variation in growth and are therefore more immune to sentiment volatility. In fact, according to Hall (1978), if every consumer would be rational life-cycle optimizers, the changes of non-durable consumption should be an unforecastable white noise.

Carroll, Fuhrer and Wilcox (1994) note that the Campbell-Mankiw model is particularly useful in this context, since consumer sentiment should affect consumption only indirectly through income. The testable hypothesis, therefore is, whether consumer sentiment has additional explanatory power for consumption, even when lagged income is included as separate regressor.

Table 3 presents a Hall hypothesis test for Finnish quarterly data with and without consumer confidence indicator as regressor for consumption and consumption by durability. From the corrected R^2 measures it can be clearly seen that simple Hall hypothesis is strongly rejected as the CCI is very powerful predictor for changes in consumption. Taken as separate regressor sentiment is much stronger explanatory factor than disposable income. Another approach more closely related to macroeconomic forecasting would be simply to test in the existing specifications for the significance of sentiment variables as additional regressors. This should tell us whether we need to pay attention to consumer sentiment variables as carriers of additional information not included in any other variable we have used in the specification.

Table 4 represents a more fully fledged version of an error-correction model with and without the consumer confidence indicator. For a longer estimation period without the CCI-variables, the EC-model works pretty well despite some serial correlation in the residuals, which arises from using annual differences. The error-correction term is significant and the other explanatory have expected signs (see for details Takala 1995a). Using the 4 quarter lag (or any other lag) on CCI as additional regressor does not however improve the ex post performance of the model. The implication seems to be that CCI contains only information already included in other macroeconomic variables. This casts some doubt on the hypothesis that sentiment variables could be structural causes for observed behaviour.

We found that household expectations of their own economic situation did not correlate at all with the actual annual change of consumption they suppose to predict, on the other hand this expectation correlated strongly with the change in consumption at the time expectations were formed. This observation corresponds to that found in Berg and Bergström (1996). So in practice this expectation can be used to evaluate the current annual change in consumption, which we also lack because of lags in statistics production. Consumer views about the forthcoming year could be a coincident indicator that discounts beliefs about future permanent income and could therefore be useful in forecasting. We tried to use also consumer expectations about next 12 months (PCI) instead of CCI, but this did not prove to be as useful (Figures 25–26).

In Table 5, we represent a saving rate model comparing for the same estimation period the significance of consumer sentiment variable concerning favourable time for saving with one lag.

Here it turned out that the sentiment variable did not include any additional information on saving rate not already in the other variables (see also Takala 1995b).

Although the CCI did not prove to be very efficient in predicting the forthcoming changes in consumption, this may be an exception since by Hall's life-cycle theory consumption is a near random walk process and therefore consumption growth should be unforecastable. Therefore consumer confidence should not contain any useful information for forecasting future consumption growth. In table 6 we show evidence that prediction of consumer borrowing can be aided by the sentiment variable concerning the favourableness of time to raise a loan. Household assessment about how favourable the time is to raise a loan correlates strongly with the real lending rate and negatively with the favourable time to save assessment. Figure 27 shows clearly that the household assessment for borrowing was in deep trouble during the early 1990s recession. Only quite recently it has recovered, which has been accompanied by a change in borrowing patterns. The barometer questionnaire also includes questions on actual intentions for raising a loan, either surely, possibly, maybe not or no. These variables were not useful in our forecasting model. It might be the case that raising a house loans for imply such a rare occasion in Finland that there is sizable measurement error to disturb the indicative power of this question.

One important variable for monetary policy targeting is inflation. In table 7 we present a monthly inflation model using consumer barometer inflation expectations for period 1995/m10 onwards, since the question concerning inflation expectations were revised while consumer barometer was changed into monthly basis (Figure 28). The other explanatory factors in this specification are money supply (M2), import prices for consumer goods, interest rate and tax tariff index. Due to the joining into EU from the beginning of 1995, food prices collapsed and during the adjustment period of 1.5 years a dummy variable was used. In addition a impulse dummy for January 1994 were used. The history so far shows that barometer inflation expectations clearly has potential prediction power over actual forthcoming changes in consumer prices (Figure 29). Using inflation expectations even for this short period as additional explanatory factor seem to have some value depending on the forecast horizon (see also Kinnunen 1996).

An adaptive element in household inflation expectations also seem to exist. This means that expectations are revised according to actual inflation and latest inflation forecast errors. The symmetry in evaluation of the past inflation and anticipated inflation also casts doubt on the view that expectations are myopic.

Table 2.

**Granger causality tests for consumer sentiment indicator
and macroeconomic series, 1987/Q4–1996/Q4**

$$\Delta y_t = \sum_{p=1}^P \beta_p \Delta y_{t-p} + \sum_{p=1}^P \gamma_p \Delta S_{t-p} + \varepsilon_t$$

$$H_0 = \gamma_1 = \dots = \gamma_p = 0.$$

F-test probability value for different lag lengths

Cause	=>	Consequence	1 Quarter	2 Quarters	3 Quarters	4 Quarters
GDP, consumer confident (CCI) and consumer assessment about past year in the economy						
CCI		GDP	.0073 **	.0515	.0286 *	.0595
GDP		CCI	.4086	.8755	.3972	.6374
Cons. View		GDP	.0038 **	.0745	.0970	.2184
GDP		Cons. View	.2736	.6413	.6620	.9315
Consumption (non-durables, durables), confidence and favourableness of durables purchases						
CCI		C	.0134 *	.0779	.1167	.0591
C		CCI	.8186	.5956	.3002	.0951
CCI		CNCD	.0432 *	.1958	.3181	.0317 *
CNCD		CCI	.8545	.9990	.5700	.1291
CCI		CD	.0002 **	.0022 **	.0057 **	.0339
CD		CCI	.4104	.0705	.0486 *	.0744
Fav. Durab.		CD	.0089 **	.0040 **	.0101 *	.0633
CD		Fav. Durab.	.0187 *	.1865	.2786	.3605
Inflation expectations and actual inflation						
Inflation exp.		CPI	.0067 **	.0212 *	.0230 *	.0574
CPI		Inflation exp.	.2723	.5710	.5616	.3147
Interest rates (nominal and real), favourable time for saving and ability to save						
Saving fav.		RLBN	.6830	.1297	.3058	.1576
RLBN		Saving fav.	.0486 *	.0200 *	.0321 *	.0344 *
Saving abil.		ReRLBN	.0509	.5357	.7758	.7701
ReRLBN		Saving abil.	.0661	.0476 *	.1374	.2001
Unemployment expectations and actual unemployment rate						
UR expect.		UR	.0000 **	.2086	.4503	.2764
UR		UR expect.	.0921	.0083 **	.0148 *	.0329 *
UR expect.		D4UR	.0000 **	.0133 *	.0490 *	.0825
D4UR		UR expect.	.9785	.1328	.3044	.5178

Table 3.

Testing the Hall hypothesis with lagged consumer sentiment about future consumption
 Reduced-form evidence on significance of consumer sentiment and its incremental explanatory power

$$\Delta \log(C_t) = \alpha_0 + \sum_{i=1}^4 \beta_i S_{t-i} + \sum_{i=1}^4 \gamma_i Z_{t-i} + \varepsilon_t,$$

	F-test for the sentiment variable	R ² with sentiment only	R ² with lagged real disp. income only	R ² with sentiment and income	Incremental expl. power of sentiment
Total consumption	.0001 **	.552	.010	.624	.614
Durable goods	.0024 **	.424	.151	.522	.371
Non-durable goods	.0835	.255	.092	.372	.280
Services	.0686	.268	.120	.429	.309

Table 4.

Consumption function with additional sentiment variable,
 Dependent variable: Non-durable consumption, %

Estimation period: 1976/Q3-1996/Q4				1988/Q4-1996/Q4			
Variable	Coefficient	t-value	t-prob	Coefficient	t-value	t-prob	
Constant	4.162	6.217	0.0000	6.893	3.870	0.0007	
d4lReYD	0.227	5.627	0.0000	0.189	2.549	0.0176	
d4lReYD_1	0.060	1.634	0.1065	-0.025	-0.418	0.6795	
d4lReW	0.060	4.174	0.0001	0.037	1.905	0.0688	
ECM_4	-0.252	-5.005	0.0000	-0.159	-1.327	0.1971	
RRLBN_2	-0.178	-2.940	0.0044	-0.703	-2.926	0.0074	
d4UR	-0.357	-3.893	0.0002	-0.190	-1.231	0.2304	
d4lPCP	-0.325	-4.459	0.0000	-0.140	-1.019	0.3183	
CCI_4				0.001	0.039	0.9693	
Model performance				Model performance			
R ² = 0.8521				R ² = 0.9331			
F(7,74) = 60.921 [0.0000]				F(8,24) = 41.846 [0.0000]			
σ = 0.9578				σ = 0.8017			
DW = 1.33				DW = 2.46			
RSS = 67.881				RSS = 15.424			
Diagnostics		Test	p-value	Diagnostics		Test	p-value
AR 1-		1F(1, 73) =	8.9093 [0.0039] **	AR 1-		1F(1,23) =	2.0647 [0.1642]
ARCH 1		F(1, 72) =	0.1284 [0.7211]	ARCH 1		F(1,22) =	2.8498 [0.1055]
Normality		Chi ² (2) =	0.5909 [0.7442]	Normality		Chi ² (2) =	0.6445 [0.7245]
Xi ²		F(14, 59) =	0.6291 [0.8300]	Xi ²		F(16,7) =	0.9891 [0.5403]
Xi*Xj		F(35, 38) =	0.6538 [0.8963]	RESET		F(1,23) =	0.6234 [0.4378]
RESET		F(1, 73) =	1.0557 [0.3076]				
Variables:							
d4lReYD = Four-quarter change in real disposable income, %							
d4lReW = Four-quarter change in real household net wealth, %							
ECM_4 = Lagged (4 quarters) error-correction term from long-run static model, %							
RRLBN = Real bank lending rate for new loans, %							
d4lPCP = Four-quarter change in private consumption deflator, %							
d4UR = Four-quarter change in unemployment rate, %							
CCI_4 = Lagged (4 quarters) consumer confidence indicator							

Table 5. Household sector saving model with and without additional sentiment variable
(Favourable time to save now, percent)
Dependent variable: Saving rate (%), 1988/Q3–1996/Q4

Variable	Without sentiment variable			With sentiment variable		
	Coeff.	t-value	t-prob	Coeff.	t-value	t-prob
d41ReYD	0.4199	5.492	0.0000	0.3928	4.953	0.0000
RePHM	-0.1153	-3.887	0.0006	-0.1112	-3.745	0.0009
UR	0.2054	3.754	0.0008	0.2424	3.865	0.0006
d4UR	0.5127	2.217	0.0349	0.3925	1.563	0.1298
RRLBN	0.5266	2.902	0.0071	0.4579	2.418	0.0226
d41PCP	1.1837	2.835	0.0084	1.1658	2.810	0.0091
FAVOURABLE TIME FOR SAVING (ONE LAG)				0.0466	1.181	0.2478
Model performance			Model performance			
R ² = 0.907			R ² = 0.912			
σ = 1.385			σ = 1.375			
DW = 1.84			DW = 1.91			
RSS = 53.67			RSS = 51.03			
Diagnostics		Test p-value	Diagnostics		Test p-value	
AR 1- 3F(3,25)		= 2.082 [0.1281]	AR 1- 3F(3,24)		= 3.3216 [0.0367] *	
ARCH 3 F(3,22)		= 0.156 [0.9245]	ARCH 3 F(3,21)		= 0.2400 [0.8674]	
Normality χ ² (2)		= 3.185 [0.2034]	Normality χ ² (2)		= 3.3117 [0.1909]	
Xi ² F(12,15)		= 1.981 [0.1057]	Xi ² F(14,12)		= 1.368 [0.2964]	
RESET F(1,27)		= 1.689 [0.2047]	RESET F(1,26)		= 1.3963 [0.2480]	

Variables:

d41ReYD = Four-quarter change in real disposable income, %
 RePHM = Real house price index
 RRLBN = Real bank lending rate for new loans, %
 d41PCP = Four-quarter change in private consumption deflator, %
 UR = Unemployment rate, %
 d4UR = Four-quarter change in unemployment rate, %

Table 6. Household borrowing model, 1989/Q1–1997/Q1
Dependent variable: Four-quarter change in household debt, %

Variable	Coefficient	t-value	t-prob
Constant	17.592	10.980	0.0000
d41PHM	0.116	2.653	0.0132
UR_2	-0.764	-8.678	0.0000
d41PCP_1	0.461	1.541	0.1349
ATTPKUK_4	-1.275	-6.089	0.0000
KBMI14_3	0.055	2.804	0.0092
Model performance		Diagnostics	
R ² = 0.9778		AR 1- 3F(3, 24) = 1.2134 [0.3263]	
F(5,27) = 238.24 [0.0000]		ARCH 3 F(3, 21) = 1.1155 [0.3652]	
σ = 1.25424		Normality Chi ² (2) = 1.4636 [0.4811]	
DW = 1.26		Xi ² F(10, 16) = 1.6533 [0.1784]	
RSS = 42.4742		Xi*Xj F(20, 6) = 2.4563 [0.1344]	
		RESET F(1, 26) = 41.653 [0.0000] **	

Variables:

d41PHM = Four-quarter change in house prices, %
 UR = Unemployment rate, %
 d41PCP = Four-quarter change in consumer price deflator, %
 ATTPKUK = After-capital tax deduction interest rate on household loans, %
 KBMI4 = Favourable time to raise a loan at present, %

Table 7.

Inflation model, 1991/M7-1997/M5

Dependent variable: Inflation (d121CPI), %

Variable	Coefficient	t-value	t-prob
Constant	-0.93932	-5.575	0.0000
d121CPI_1	0.53403	10.417	0.0000
INFLEXP_3	0.25562	2.299	0.0249
INFLEXP_5	0.17468	1.498	0.1392
EHEL3M_6	0.03570	2.674	0.0096
d121M2	0.11063	6.212	0.0000
d121MP90_6	0.03774	2.971	0.0042
d121PT90	0.21127	9.494	0.0000
EUdummy	-0.24073	-2.659	0.0100
i1994p1	-0.80442	-3.950	0.0002

Model performance

Diagnostics

R ² = 0.9760	AR 1- 5F(5, 56) = 0.6810 [0.6396]
F(9,61) = 275.09	ARCH 5 F(5, 51) = 0.3896 [0.8537]
σ = 0.18775	Normality χ^2 (2) = 1.6127 [0.4465]
DW = 1.77	Xi ² F(16, 44) = 0.4635 [0.9519]
RSS = 2.1503	Xi*Xj F(44, 16) = 0.7302 [0.7986]
	RESET F(1, 60) = 0.0628 [0.8029]

Variables:

d121CPI = Inflation measured as CPI annual change from previous year, %
d121M2 = Annual change in money aggregate (M2), %
EHEL3M = Market interest rate (Helibor 3 months), %
d121MP90 = Annual change in import prices for consumer goods, %
d121PT90 = Annual change in tax tariff index, %
INFLEXP = Consumer inflation expectations for next 12 months, % (0 for 1990/m1 - 1995/m9)
EUdummy = Dummy variable for food prices(1 for 1995/M1-96/M5, 0 otherwise)
i1994p1 = Impulse dummy for 1994/January.

Figure 22. Phase spectrum between confidence indicator and GDP plotted against time in quarters

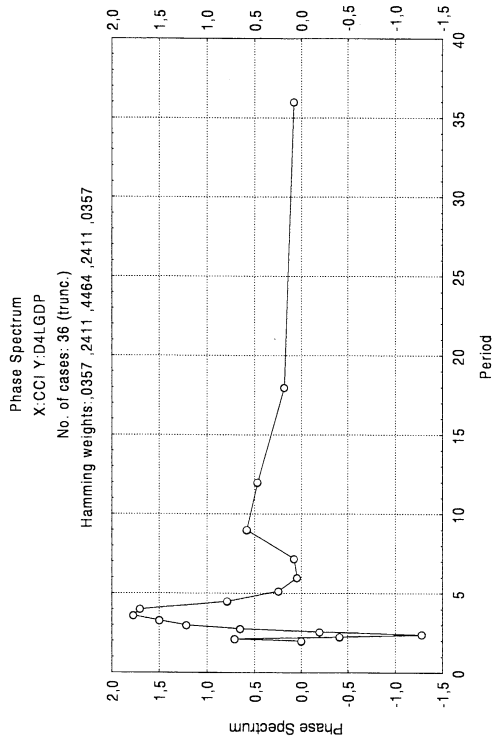


Figure 24. Gain of confidence indicator on GDP growth

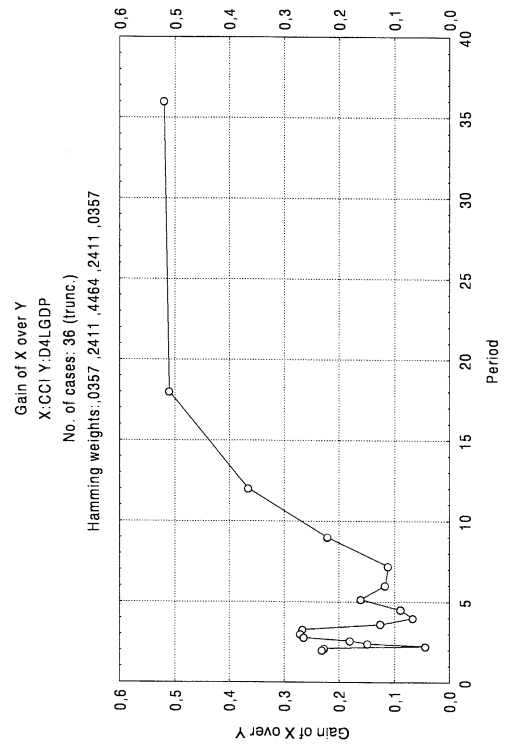


Figure 23. Squared coherence between confidence and GDP, %

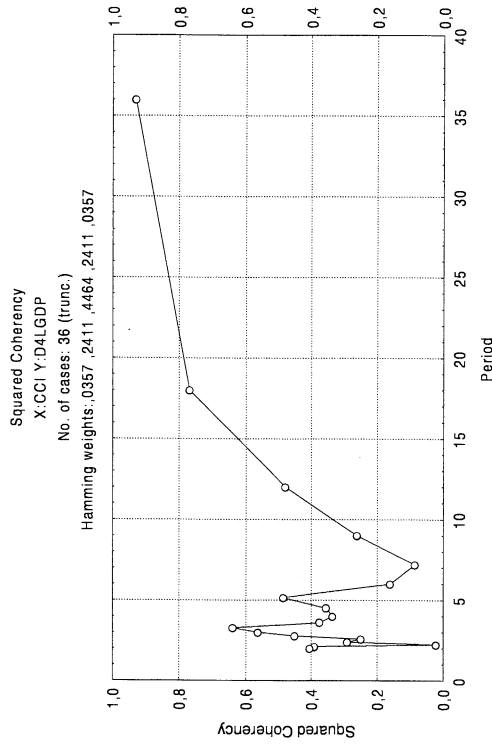


Figure 25.

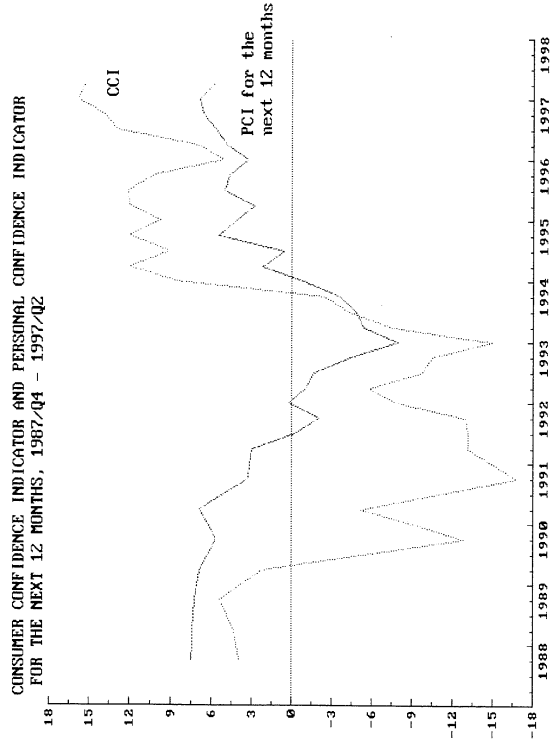


Figure 26.

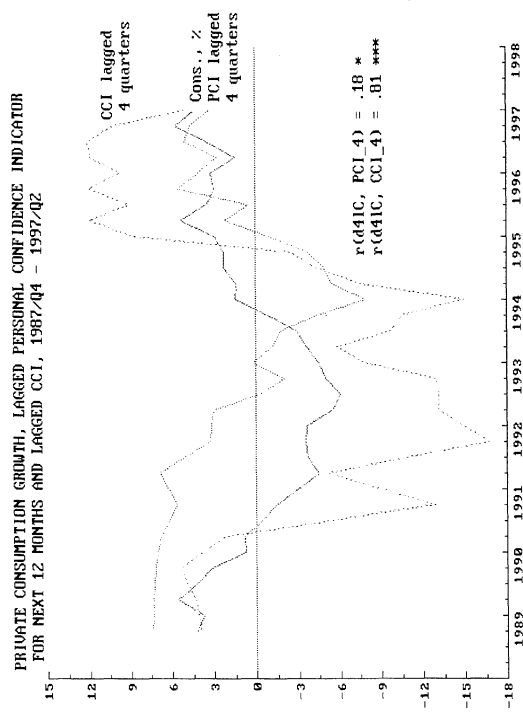


Figure 27.

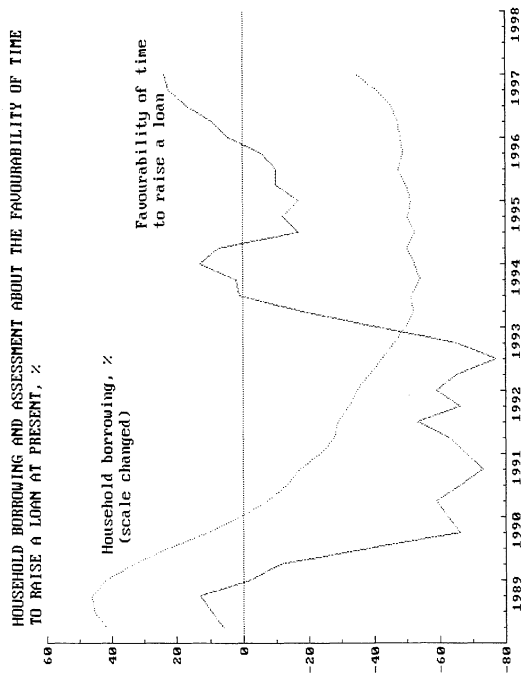


Figure 28.

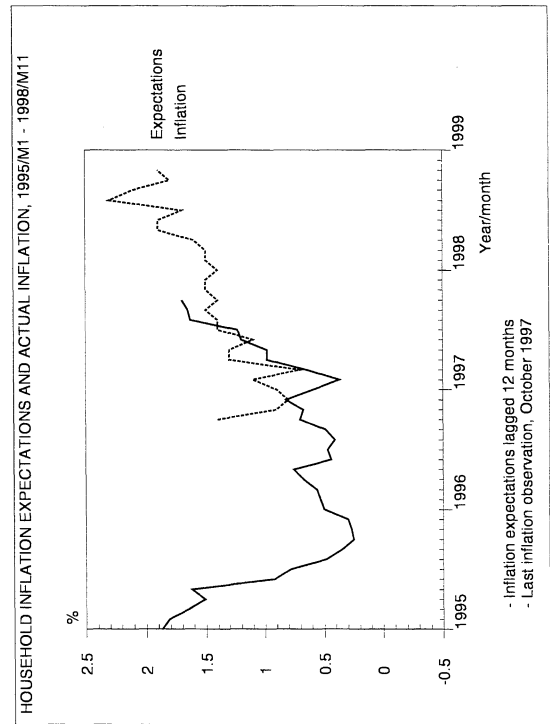
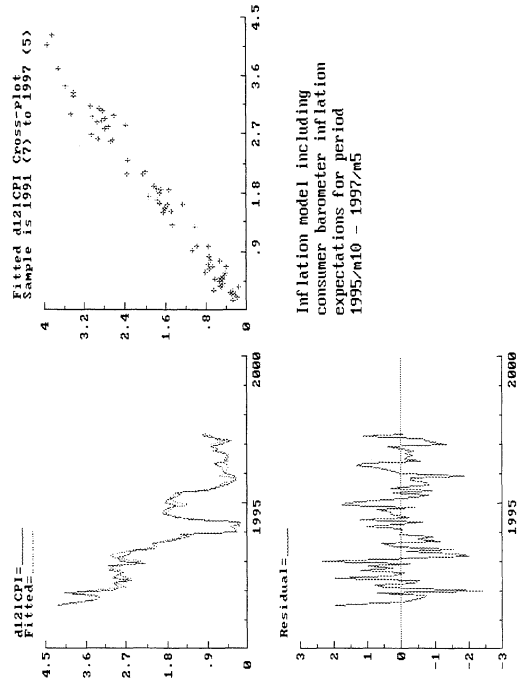


Figure 29. Inflation model performance, %



5 Conclusions

Our comparison of consumer sentiment variables and real economic activity have shown some cases of very close correspondence between households expectations and actually realized changes. In some cases, however the expectation horizon does not reach as far as actually planned, but nevertheless predictive power does exist. The performed tests showed that for most variables there exists a one-sided predictive Granger causality from the sentiment variable to the macroeconomic variable. This confirms that household expectations are truly forward-looking and not simply pure extrapolations from the past.

One interesting, but probably exceptional, case is private non-durable consumption where predictive power is limited as assumed also according to Hall's random walk hypothesis of consumption. In contrast, for durables predictive power is more obvious as recorded also in several other studies.

However, consumer sentiment variables are usually more volatile than actual macroeconomic changes and can therefore produce false signals. For example, consumer confidence predicted a slowdown in growth in early 1994, which did not happen. In addition, consumers did not see the temporary growth slowdown of the Finnish economy in late 1995. The status of sentiment variables varies from expectations to intentions and plans to almost announced commitments to act in a certain way.

A more stringent test for the usefulness of consumer sentiment indicators would be to apply sentiment variables as additional variables in behavioural models. In equations such as the basic consumption function and the household borrowing equation, consumer expectations are potential explanatory factors. It cannot be ruled out altogether that sentiment variables may also have an independent influence on activity. In specifications used in short-term forecasting e.g. expectations to raise a loan seem to be potential explanatory factor. In general it seems that sentiment variables – though not often likely structural causes for macroeconomic variables – can be very helpful in particular small scale forecasting models and pure time series models. For policy uses, the fact that CCI predicts consumption gives some scope for fiscal policy as consumption can be affected through government influence on household expectations. In monetary policy household inflation expectations seem to be useful in assessing real interest rate and guiding inflation targeting.

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