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On the Predictive Power of Consumer Confidence

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Abstract

We investigate on the predictive power of the consumer confidence indexes in Chile, as a coincident indicator as well as a leading indicator for aggregate consumption. The results provide evidence that consumer confidence measures can predict current aggregate consumption growth, and provide additional information to other macroeconomic variables.

Keywords: consumer confidence, consumption.

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1. Introduction

Policymakers, investors and the public usually consider consumer confidence as an important concept to understand and predict the behavior of consumers, aggregate demand, and economic activity. In the way they are constructed, measures of confidence reflect consumers appraisal of the aggregate macroeconomic environment, including their perception of income level, labor market conditions, and household finances. This view is partially supported by the hypothesis that consumer confidence is affected by macroeconomic variables (Ludvigson, 2004), and some of its predictive power on aggregate consumption could be attributed to those variables. In addition, consumer confidence measures are usually available on a monthly basis, with little or no lag, in contrast with aggregate consumption data, which is usually available on a quarterly basis, with a two to three months lag. Thus, changes in consumer confidence are usually considered as a good proxy for the unobserved, current aggregate consumption.

Despite its intuitive attractiveness, the use of measures of consumer confidence to proxy or predict consumption growth is at odds with the hypothesis of rational expectations applied to intertemporal consumption decisions, i.e. the Life Cycle - Permanent Income Hypothesis (hereafter, the LC-PIH), originally developed by Modigliani, Brumberg and Friedman in the 1950s. The theory proposes that consumers maximize utility over a long-term horizon. Rather than responding passively to every change in income, consumers smooth consumption over time. Consumer's rational expectations induce changes in consumption by smaller amounts when income changes are perceived as transitory rather than permanent. Finally, assuming certainty equivalence, the

LC-PIH gives no role to uncertainty on consumption and saving decisions (Hall, 1978; Flavin, 1981), since all relevant information to predict future consumption should be already included in the actual level of present consumption. Most of the studies after Hall use more complex utility functions, introduce liquidity constraints, and use a variety of measures of uncertainty to explore the relations between the stochastic characteristics of the expected income process and the optimal behavior of consumption. Using aggregate macroeconomic and survey-based microeconomic data, the studies have provided mixed evidence about the consistency of the empirical relationship between confidence or uncertainty and consumption, with the theoretical models.

In this paper, we build on previous work in the literature to test the predictive power of consumer confidence measures on aggregate consumption. We first estimate a consumption function in which current consumption growth depends only on its lagged values. Then, we add a set of lagged consumer confidence variables, to evaluate if they improve the prediction of consumption growth. Finally, to evaluate if consumer confidence adds information beyond other economic indicators, we add a set of macroeconomic variables that might influence consumer confidence and consumption growth.

We structure the remainder of the paper as follows. Section 2 presents a literature review. Section 3 presents the methodology and hypothesis tested. Section 4 describes the consumer confidence data. Section 5 reports and discusses the main empirical results. The last section presents a summary and the final remarks.

2. Literature review

Several studies have analyzed how consumer confidence affects macroeconomic performance. Matsusaka and Sbordone (1995) find a significant contribution of consumer sentiment measures to predict GDP changes, about one fourth of GDP changes. Merkle et al. (2004) shows that current economic conditions variables, in measures of economic confidence, are better predictors of the beginning of recessions, whereas expectations and future economic conditions are better predictors of the end of recessions. Casey and Owen (2013) find asymmetric reactions in consumer confidence to changes in economic fundamentals. Consumer confidence shows a "negativity bias", reacting more forcefully to adverse events than favorable ones.

Another strand in the literature focuses on the predictive power of consumer confidence measures on aggregate consumption, or household consumption using microeconomic data from surveys. Souleles (2004) using microeconomic data finds that consumer confidence is a good predictor of consumption growth. Carroll et. al. (2004) also show evidence that lagged consumer sentiment has some explanatory power for current changes in aggregate household spending. Ludvigson (2004), testing the predictive power of consumer confidence on services, durables and non-durables consumption, found significant effects even in consumption functions that include other macroeconomic explanatory variables. Howrey (2001) concludes that consumer confidence predicts recessions or expansions of economic activity and personal expenditures. Dées and Soares Brinca (2011) get similar conclusions for the U.S. and Europe. Lahiri et. al. (2012) find an incremental effect of consumer

confidence in the estimation of consumption functions that include lags in consumer confidence, among other financial variables that could proxy for consumer confidence.

3. Methodology

We perform several tests of the predictive power of consumer sentiment on macroeconomic variables. First, we evaluate to what extent it is a coincident indicator of quarterly aggregate consumption, which is usually available with a two to three month lag. Second, we evaluate if consumer sentiment is a reliable leading indicator of aggregate non-durable and services consumption. Third, we evaluate the in-sample and out-of-sample power of consumer sentiment to predict changes in the growth rate of consumption, beyond the information already embedded in other economic indicators. Finally, we evaluate the stability of the estimated coefficients over time.

4. Data

The measures of consumer sentiment that we use in this study are based on two surveys: the consumer perception index (IPeCo), available on a monthly basis from 2005, performed by the Center for Studies in Business and Economics, at Universidad del Desarrollo, and the consumer economic perception index (IPEC), available on a monthly basis from 2001, performed by Adimark and commissioned by the Central Bank of Chile. We performed our empirical analysis using the overall measures of consumer sentiment, as well as the variables that conform them, that include perceptions about current and future income, unemployment and overall economic conditions. We also used several

macroeconomic variables, including real GDP, aggregate consumption, durable and non-durable consumption, services consumption, and total consumer credit.

4.1 Consumer confidence indexes

Consumer perception index

The Consumer Perception Index (IPECO) measures the consumers assessment on actual and expected personal economic and labor market conditions, and expected future income. It is based on the methodology used in the University of Michigan “Consumer Sentiment Index”, and the Conference Board “Consumer Confidence Index”. The index has quarterly data from december 2001 to march 2005, and monthly data thereafter, for about 380 in-person surveys to consumers randomly chosen in shopping centers in the two largest cities in Chile. The survey includes the following five variables: actual economic situation (SEA), future economic situation (SEF), actual unemployment (DA), future unemployment (DF), and future income (IF).

The index is constructed as the weighted average of difussion sub-indexes for each variable, dividing the share of optimists, by the sum of optimists and pessimists. Its is expressed on a basis equal to 100 for December 2001.

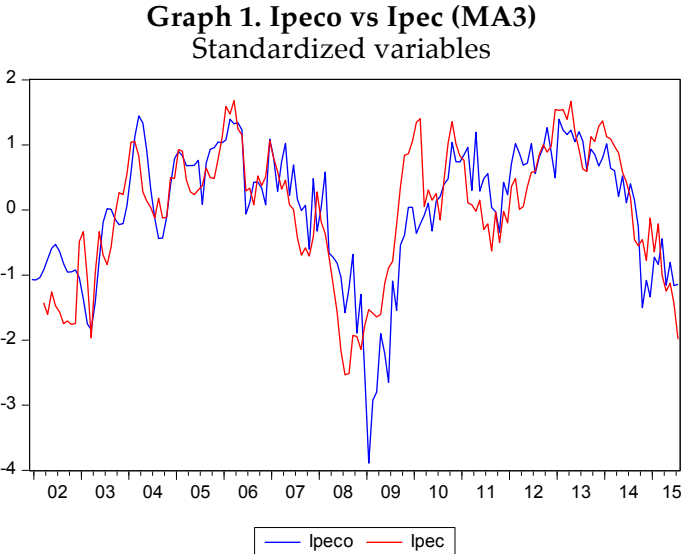
Economic perception index

The Economic Perception Index (IPEC) measures the consumers confidence on actual personal and national economic condition, future national economic condition and economic stability, and actual willingness to purchase durable goods. It is based on the University of Michigan “Consumer Sentiment

Index” The index has yearly data from 1981 to 1985), quarterly data from 1986 to 2001, and monthly data thereafter, for about 1.100 consumers surveyed over the phone in the 18 largest cities in Chile. The questionnaire includes actual personal economic situation (*SEA Personal*), actual national economic situation (*SEA País*), future national economic situation (*SEF País +1yr*), future expected national economic stability (*SEF País +5yrs*), and actual willingness to purchase durable goods (*EXC*).

The index is constructed as the weighted average of sub-indexes for each variable, calculating the net optimism share of answers. The index is centered in 100.

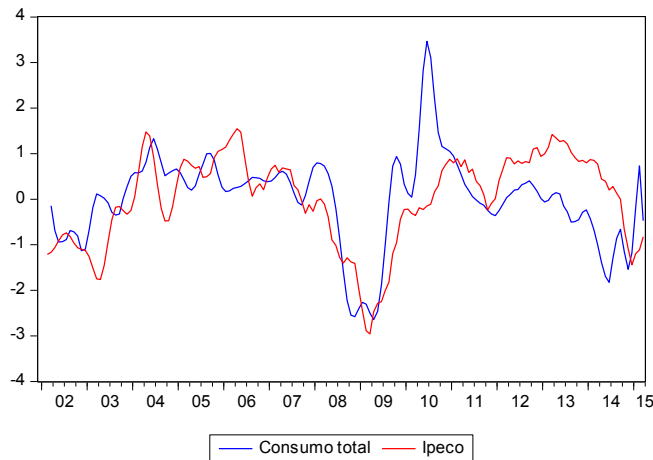
Both consumer sentiment indexes perform relatively closely. Graph 1 plots the monthly data, and despite the differences in the surveys, it shows a high correlation, suggesting either measure could be used for empirical estimation.



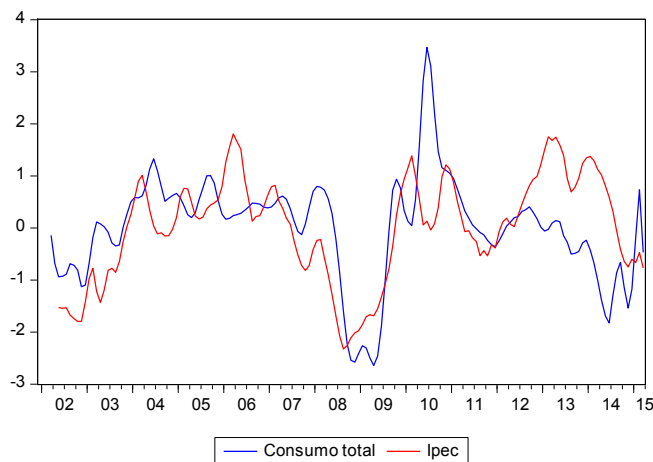
4.2 Consumer confidence measures and consumption

A graphical comparison between the consumer confidence measures and the change in consumption suggests that both variables move very closely (Graphs 2 and 3).

Graph 2. Total consumption growth (MA3), Ipeco (MA3)
Standardized variables. Monthly total consumption growth (seasonally adjusted)



Graph 3. Total consumption growth (MA3), Ipec (MA3)
Standardized variables. Monthly total consumption growth (seasonally adjusted)



5. Predictive power of consumer sentiment

5.1 Consumer sentiment as a coincident indicator

In this section we analyze if consumer sentiment moves simultaneously with aggregate consumption measures. Since consumer sentiment is measured monthly, with a short lag, whereas aggregate consumption data is measured quarterly, with a two to three month lag, if consumer sentiment is a coincident indicator of consumption it can be very helpful to predict the unobservable, current consumption.

To test this hypothesis, we regressed monthly consumption variables on consumer sentiment variables as well as other current macroeconomic variables. We regressed the change in per-capita non durable and services consumption on overall consumer sentiment as well as detailed measures, the change in per-capita disposable income, the change in a housing price index IPV -as a proxy for the change in household real state wealth, the change in the stock market price index IGPA -as a proxy for the change in household financial wealth, the change in the unemployment rate (as a proxy for income uncertainty), and the change in the one-to-three month consumer loans interest rate, as a proxy for the availability of credit. We used the logarithm for all the variables, standardized, and expressed in real terms. We performed spline interpolation on the available quarterly macroeconomic and survey data, to match the monthly frequency of the estimations, and increase the sample size.

First, we performed the following OLS regression with Newey-West standard errors:

$$\begin{aligned} \Delta Consumption_t &= c + Confidence_t + \Delta Income_t + \Delta IPV_t + \Delta IGPA_t \\ &+ \Delta Unemployment_t + \Delta ic_t + \varepsilon_t \end{aligned}$$

Where IPV is the housing price index, IGPA is the stock market price index, and *ic* is the consumer credit short run interest rate on one-to-three months loans.

Estimation with contemporaneous regressors could incorporate endogeneity problems, arising from a simultaneous determination of all the variables included in the model. To overcome this problem, we also performed a GMM instrumental variables estimation, using as instruments the lagged values of the variables as regressors. We chose the optimal lag using the Sargan-Hansen test.

Table 1 shows the OLS estimation for non durable and services consumption. The first column in each panel presents the results of regressing consumption on its determinants, whereas the second and third column show the results including consumer sentiment as a regressor. The two measures of consumer sentiment, Ipeco and Ipec were statistically significant at 10% and 1% respectively, even after including other determinants of consumption. All other regressors were also significant. In the services consumption estimation, only Ipec was significant. Among the economic determinants of consumption, only the housing price index and the consumer credit interest rate were significant. The non-durable consumption estimations that included consumer confidence had a higher adjusted R^2 . The services consumption estimation, although, showed mixed results, with a lower adjusted R^2 when the Ipeco measure of

consumer sentiment was used, and a higher adjusted R^2 when the Ipec measure of consumer sentiment was used.

Table 1. OLS estimations of consumption equation.

| Dep. V. | Nondurables | Nondurables | Nondurables | Services | Services | Services |
|---------------------------------|-------------|-------------|-------------|-----------|-----------|-----------|
| Ipeco | | -0.1101* | | | -0.0435 | |
| | | (0.0620) | | | (0.6160) | |
| Ipec | | | -0.1721*** | | | -0.1989** |
| | | | (0.0020) | | | (0.0120) |
| Income (GNDI per capita) | 0.4221*** | 0.4263*** | 0.4629*** | 0.0272 | 0.0288 | 0.0743 |
| | (0.0000) | (0.0000) | (0.0000) | (0.7700) | (0.7560) | (0.4320) |
| IPV (housing wealth) | 0.1634** | 0.1657** | 0.1620*** | 0.5398*** | 0.5407*** | 0.5381*** |
| | (0.0140) | (0.0120) | (0.0090) | (0.0000) | (0.0000) | (0.0000) |
| IGPA (financial wealth) | -0.1158*** | -0.1228*** | -0.1020** | -0.0336 | -0.0363 | -0.0176 |
| | (0.0080) | (0.0040) | (0.0140) | (0.6020) | (0.5620) | (0.7680) |
| Unemployment | -0.4283*** | -0.4323*** | -0.4230*** | 0.0079 | 0.0063 | 0.0140 |
| | (0.0000) | (0.0000) | (0.0000) | (0.9240) | (0.9400) | (0.8640) |
| Interest rate | 0.1269*** | 0.1558*** | 0.1405*** | 0.1658** | 0.1772*** | 0.1815*** |
| | (0.0050) | (0.0000) | (0.0010) | (0.0110) | (0.0090) | (0.0060) |
| Constant | 0.0269 | 0.0365 | 0.0388 | 0.0511 | 0.0549 | 0.0648 |
| | (0.6380) | (0.5200) | (0.4810) | (0.5640) | (0.5320) | (0.4510) |
| N | 150 | 150 | 150 | 150 | 150 | 150 |
| adj.R2 | 0.6726 | 0.6820 | 0.6995 | 0.2913 | 0.2894 | 0.3285 |

Standardized variables. Newey-West errors

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

The results from the GMM estimations in Table 2 were similar to the previous estimations in Table 1. In the non durable consumption estimation, both consumer sentiment measures were significant, but in the services consumption estimation only the Ipec measure was significant.

In all the estimations, the coefficient on the consumer sentiment measure was negative. This result is puzzling, since an increase in current consumer sentiment should be associated with an increase in current consumption. One possible explanation could be the presence of a specification bias in the model. This explanation finds some support in the results we get after the inclusion of the first lag in consumer sentiment. In this case, the coefficient on current

consumer sentiment is positive, although not significant, and the coefficient on the lag of the consumer sentiment measure is negative and significant. In the next section we explore in more detail the contribution of the lagged consumer sentiment measures.

Table 2. Consumption equations, GMM estimation.

| Dep. V. | Nondurables | Nondurables | Nondurables | Services | Services | Services |
|---------------------------------|------------------------|------------------------|------------------------|---------------------|---------------------|-----------------------|
| lpeco | | -0.1604** (0.0330) | | | -0.1895 (0.1100) | - |
| lpec | | | -0.2121*** (0.0010) | | | 0.2772*** (0.0040) |
| Income (GNDI per capita) | 0.3412*** (0.0000) | 0.3179*** (0.0000) | 0.3933*** (0.0000) | 0.0910 (0.4240) | 0.0818 (0.4890) | 0.1487 (0.1980) |
| IPV (housing wealth) | 0.2200** (0.0440) | 0.2237** (0.0320) | 0.1773* (0.0750) | 0.7755** * | 0.7948** * | 0.7788*** (0.0000) |
| IGPA (financial wealth) | -0.4680** (0.0160) | -0.4301** (0.0260) | -0.3290* (0.0780) | -0.4310 (0.1260) | -0.4241 (0.1960) | -0.2930 (0.3150) |
| Unemployment | -0.7785*** (0.0000) | -0.8276*** (0.0000) | -0.8303*** (0.0000) | 0.3286* (0.0770) | 0.3353* (0.0960) | 0.3116* (0.0750) |
| Interest rate | -0.0005 (0.9980) | 0.0694 (0.7010) | 0.0077 (0.9630) | 0.4573* (0.0710) | 0.6747** * | 0.6568** (0.0120) |
| Constant | 0.0539 (0.3780) | 0.0712 (0.2390) | 0.0720 (0.2040) | 0.0075 (0.9270) | 0.0136 (0.8780) | 0.0040 (0.9620) |
| N | 148 | 148 | 148 | 148 | 148 | 148 |
| adj.R2 | 0.5787 | 0.5961 | 0.6263 | 0.1724 | 0.1522 | 0.2050 |

Standardized variables. Instruments: 2 lags. Eicker-White standard errors.

* p < 0.05; ** p < 0.01; *** p < 0.001

5.2 Consumer confidence and rational expectations

According to the rational expectations assumption in permanent income – life cycle hypothesis (PI-LCH), the change in consumption should be a fraction of the updated permanent income expectations. If consumer confidence

summarizes the changes in consumer expectations about future income, then it would be a good coincident indicator.

Based on Acemoglu and Scott (1994), we analyze if consumer sentiment predicts future income. We tested, then, the ability of lagged consumer sentiment to predict changes in actual income, which is equivalent to test if actual consumer sentiment can predict changes in future income:

$$\Delta Income_t = c + \sum_{i=1}^p \phi_i \Delta Income_{t-i} + \sum_{i=1}^p \beta_i Sentiment_{t-i} + \sum_{i=1}^p \lambda_i \Delta Controls_{t-i} + \varepsilon_t$$

We chose the number of lags using the bayesian information criteria (Schwarz). The optimal number of lags was equal to 3, and we performed ML estimation using the Kalman filter.

We first regressed income on its own lags, and then we analyzed the inclusion of the consumer sentiment indicators (Table 3). The coefficients on both measures of consumer sentiment were not significant. Then, we regressed income on the first three lags of the other variables. In this case, the coefficient on the Ipec measure of consumer sentiment was significant, although small.

We also performed out-of-sample estimations with one to three lags, to predict income in the last 24 months, with and without consumer sentiment measures. The results did not show significant differences among them.

Table 3. Income estimation.

| Dep. V. | Income | Income | Income | Income | Income | Income |
|---------------------------------|---------------------------|---------------------------|---------------------------|-----------------------|-----------------------|-----------------------|
| Income (GNDI per capita) | 0.5709** * (0.0000) | 0.5815** * (0.0000) | 0.5585** * (0.0000) | 0.6962*** (0.0000) | 0.7025*** (0.0000) | 0.7131*** (0.0000) |
| lpeco | | 0.0338 (0.6882) | | | -0.0593 (0.7055) | |
| lpec | | | 0.0612 (0.1864) | | | 0.0196*** (0.0000) |
| IPV (housing wealth) | | | | 0.1679*** (0.0000) | 0.1622*** (0.0000) | 0.1995*** (0.0000) |
| IGPA (financial wealth) | | | | -0.0861 (0.7995) | -0.0796 (0.8348) | 0.1249*** (0.0000) |
| Unemployment | | | | 0.4857*** (0.0011) | 0.4882*** (0.0021) | 0.5024*** (0.0000) |
| Interest rate | | | | -0.2447* (0.0973) | -0.2243 (0.1594) | 0.2358*** (0.0000) |
| N | 159 | 157 | 154 | 148 | 148 | 148 |
| adj.R2 | 0.7664 | 0.7634 | 0.7715 | 0.8295 | 0.8275 | 0.8362 |

Standardized variables. The results show the sum of the coefficients on the lags for each variable, and the p-value for a Wald test of joint significance. * p < 0.05; ** p < 0.01; *** p < 0.001

Finally, we performed one of the tests that Hall (1978) proposed to analyze if the rational expectations assumption in the PI-LCH is consistent with the empirical evidence. If the income equation includes the first lag of consumption as a regressor, then any additional variable should lose predictive power, since all information in t-1 about future income should be included in lagged consumption. We estimated the following model, with the variables in levels:

$$\begin{aligned}
 \text{Income}_t = c + \sum_{i=1}^p \phi_i \text{Income}_{t-i} + \sum_{i=1}^p \beta_i \text{Sentiment}_{t-i} + \sum_{i=1}^p \lambda_i \text{Controls}_{t-i} \\
 + \varepsilon_t
 \end{aligned}$$

The results from this estimation (Table 4) show that when we include the first lag of non durable goods consumption, lagged income and the housing price index IPV are significant predictors of income. Additionally, when including lagged service consumption, the coefficients on lagged income, housing price index and unemployment are also statistically significant. These results are at odds with the prediction from the PI-LCH.

Table 4. Hall's test for future income.

| Dep. V. | Income | Income | Income |
|---------------------------------|------------------------|------------------------|------------------------|
| Nondurables | | 0.2985*** (0.0000) | |
| Services | | | 0.2407** (0.0376) |
| Income (GNDI per capita) | 0.9993*** (0.0000) | 0.9988*** (0.0000) | 0.9987*** (0.0000) |
| lpec | 0.0062 (0.2733) | 0.0088 (0.3955) | 0.0179 (0.3219) |
| IPV (housing wealth) | -0.0385 (0.2824) | -0.0609*** (0.0001) | -0.0693*** (0.0047) |
| IGPA (financial wealth) | 0.0741 (0.6724) | 0.1470 (0.1336) | 0.0411 (0.8863) |
| Unemployment | -0.1836*** (0.0000) | -0.0496 (0.1442) | -0.1962*** (0.0000) |
| Interest rate | -0.0491 (0.3892) | -0.0577 (0.1297) | -0.0604 (0.2349) |
| N | 149 | 149 | 149 |
| adj.R2 | 0.9860 | 0.0000 | 0.9921 |

Standardized variables. The results show the sum of the coefficients on all the lags for each variable, and the p-value for a Wald test of joint significance of all lags.

* p < 0.05; ** p < 0.01; *** p < 0.001

5.3 Consumer sentiment as a leading indicator

In this section, we analyze if consumer sentiment is a leading indicator for consumption. A leading indicator is a variable that changes ahead of another. Thus, their changes can help to predict or anticipate the change on the other variable.

This section follows the methodology used by Carroll et. al. (1994), Ludvigson (2004) and Lahiri et. al. (2012). First, we analyze the predictive power of consumer sentiment on consumption growth. Then we explore if the information in the consumer sentiment measures is already embedded in other economic indicators.

Consumer sentiment and consumption growth

Using a simple consumption model in which consumption growth depends on its own lags as well as lagged consumer sentiment, we compare the results with the ones from a benchmark model in which consumption growth depends only on its own lags.

The benchmark model we estimate is:

$$\Delta Consumption_t = c + \sum_{i=1}^p \phi_i \Delta Consumption_{t-i} + \sum_{i=1}^p \beta_i Confidence_{t-i} + \varepsilon_t$$

The results, shown in Table 5, do not support the hypothesis that none of the consumer confidence measures is a significant predictor of future changes in consumption. The lack of significance might be the result of specification bias in the model. Nevertheless, when we included the Ipec consumer sentiment measure in the estimation of non durable consumption, the adjusted R² increased.

Table 5. Future consumption estimation.

| Dep. V. | Nondurables | Nondurables | Nondurables | Services | Services | Services |
|--------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Ipeco | | 0.0658 (0.5433) | | | 0.0569 (0.7478) | |
| Ipec | | | -0.1019 (0.2281) | | | -0.0332 (0.4265) |
| Nondurables | 0.6648*** (0.0000) | 0.6772*** (0.0000) | 0.6737*** (0.0000) | | | |
| Services | | | | 0.5488*** (0.0000) | 0.5517*** (0.0000) | 0.5834*** (0.0000) |
| N | 159 | 157 | 154 | 159 | 157 | 154 |
| adj.R2 | 0.8545 | 0.8406 | 0.8619 | 0.7941 | 0.7795 | 0.7692 |

Standardized variables. The table reports the sum of coefficients of all lags of a variable, and p-values are from the Wald test of joint significance of all lags, * p < 0.05; ** p < 0.01; *** p < 0.001

Consumer sentiment, consumption determinants and consumption growth

We also estimated the contribution of including the consumer sentiment measures in a more complete aggregate consumption equation, including other determinants of changes in future consumption:

$$\Delta Consumption_t = c + \sum_{i=1}^p \phi_i \Delta Consumption_{t-i} + \sum_{i=1}^p \beta_i Confidence_{t-i} + \sum_{i=1}^p \lambda_i \Delta Controls_{t-i} + \varepsilon_t$$

Our results (Table 6) were very similar to the ones in the benchmark estimation. None of the consumer sentiment measures was a significant predictor of future changes in consumption. Nevertheless, the Ipec measure of consumer sentiment was slightly not significant in the non-durable consumption estimation, and it increased the adjusted R² in both, the non-durable and services consumption equation.

In contrast with the evidence found in other studies, the results of our estimations do not allow us to reject the null hypothesis that consumer sentiment

measures are not a leading indicator for consumption. We also find that the change in income, the housing price index IPV and the unemployment rate are significant predictors for future changes in consumption. This result is also at odds with the rational expectations LC-PIH prediction that lagged consumption should be the best and only predictor of future consumption growth.

Table 6. Future consumption estimation, including other consumption determinants.

| Dep. V. | Nondurables | Nondurables | Nondurables | Services | Services | Services |
|---------------------------------|------------------------|------------------------|------------------------|-----------------------|-----------------------|-----------------------|
| lpeco | | 0.0536 (0.5226) | | | -0.0701 (0.9514) | |
| lpec | | | -0.0728 (0.1090) | | | -0.0726 (0.4051) |
| Nondurables | 0.7424*** (0.0000) | 0.7439*** (0.0000) | 0.7751*** (0.0000) | | | |
| Services | | | | 0.8836*** (0.0000) | 0.8914*** (0.0000) | 0.8985*** (0.0000) |
| Income (GNDI per capita) | -0.7018*** (0.0000) | -0.6934*** (0.0000) | -0.7270*** (0.0000) | 1.1742*** (0.0000) | 1.1820*** (0.0000) | 1.1683*** (0.0000) |
| IPV (housing wealth) | 0.0727*** (0.0000) | 0.0589*** (0.0000) | 0.0695*** (0.0000) | 0.2283*** (0.0004) | 0.2353*** (0.0004) | 0.2500*** (0.0007) |
| IGPA (financial wealth) | -0.0276 (0.5705) | -0.0184 (0.5646) | -0.0526 (0.4380) | -0.0483 (0.8302) | -0.0495 (0.8199) | -0.0677 (0.7653) |
| Unemployment | -0.2411 (0.1622) | -0.2149 (0.2704) | -0.2920** (0.0491) | 0.0237*** (0.0047) | 0.0231*** (0.0068) | -0.0279* (0.0863) |
| Interest rate | 0.0161 (0.7108) | 0.0141 (0.5678) | 0.0125 (0.7834) | -0.0957 (0.5009) | -0.0959 (0.5375) | -0.0929 (0.5225) |
| N | 150 | 150 | 150 | 150 | 150 | 150 |
| adj.R2 | 0.6726 | 0.6820 | 0.6995 | 0.2913 | 0.2894 | 0.3285 |

Standardized variables. The table reports the sum of coefficients of all lags of a variable, and p-values are from the Wald test of joint significance of all lags, * p < 0.05; ** p < 0.01; *** p < 0.001

6. Conclusions

The empirical results in this paper suggest that consumer sentiment measures are coincident indicators for non-durables as well as services consumption. One important implication is that high frequency consumer

sentiment measures, which come out with a short lag (monthly) can predict lower frequency unobservable measures of current consumption, that come out with a longer lag (quarterly).

The results also suggest that consumer sentiment measures are not a significant leading indicator for future consumption changes.

Our estimations also reject the rational expectations assumption in the Life Cycle-Permanent Income Hypothesis. A proxy for changes in household wealth in real state, the unemployment rate and the change in income showed as significant predictors for the change in future income, even after controlling for lagged consumption.

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