

THE SHORT TERM IMPACT OF INCOME, STOCK MARKET RETURNS AND INFORMATION SHOCKS ON CONSUMPTION

Evidence from weekly panel data for France

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Abstract

The aim of this paper is to evaluate and analyze the short term effect of income, stock market and information shocks on consumption by relying on an original high frequency panel survey. First it provides an estimate of the impact of income shocks on consumption. We show that fluctuations in consumption within a month are driven by the reception timing of incomes. Second, it examines the effects of unpredictable changes in stock market returns on consumption. We find that consumption responds significantly and strongly to fluctuations in stock market returns for at least two weeks after a change occurred, regardless of the level of income or wealth of individuals. Third, it gives some insight about the nature of this short term correlation by investigating the existence of wealth effects and confidence effects. We show no tendency for a specific wealth effect in the short run. However, information shocks appear instead as the very basis of changes in expectations which condition thereafter the parallel evolution of consumption plans and stock market returns. Indeed, given the correspondence between the expectations of both consumers and market operators, our analysis comes down sharply in favour of the existence of an indirect confidence effect over the short run.

Keywords: high frequency panel, consumption, income, expectations, stock market, information shocks

JEL Classification: D12, E21, E44, C23

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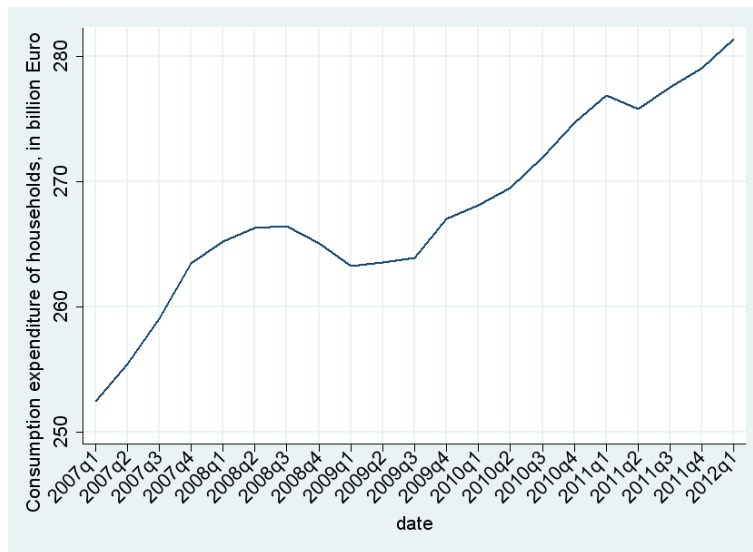
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1 Introduction

Consumption expenditure of households plays an essential role in cyclical evolutions of the French economy. It amounts to nearly 55% of Gross National Product (GDP) and constitutes the largest item of final demand. Moreover, even if the amplitude of its variations is lower than for other demand items, such as investment, it accounts for about 30% of the volatility of GDP each quarter. But since the outbreak of the financial and economic crisis of 2008, household savings have increased jumping from 15.4% in 2007 to 16.1% in 2011, and consumption has declined, growing at a lower average rate than before the crisis (0.1% per quarter between 2008 and 2012 against 0.5% per quarter between 2000 and 2007).

Figure 1: Consumption expenditure of French households, in billion € (2007-2012)



This slowdown has been explained in the literature by traditional determinants of household consumption. On the one hand, the unexpected depreciation of real incomes and financial wealth is seen as responsible for a wealth effect that lowered consumption. On the other hand growing uncertainty about a series of macroeconomic indicators is regarded as responsible for an increase in pessimism that changed expectations about future incomes, which in turn led consumers to constitute precautionary savings.

1.1 Wealth effects

1.1.1 The cases of the US and the UK

The life-cycle hypothesis considers that individuals plan their consumption and savings behaviour over the long term in order to smooth consumption along the life cycle (Ando and Modigliani [1963]). Other things being equal, an unexpected drop in stock market or real estate prices decreases people's wealth, which may make them revise their consumption plans. This "wealth effect" has been estimated for the US on aggregate data (Modigliani and Tarantelli [1975], Modigliani et al. [1977], Ludvigson and Steindel [1999], Case et al. [2011]) but also on microeconomic data, for the effect of house prices on consumption in the UK (Campbell and Cocco [2005]).

On macroeconomic US yearly data, a positive correlation between aggregate wealth changes and

aggregate spending can be observed, although it appears rather unstable over the 1953–1997 period. The authors find on average that the marginal propensity to consume out of wealth, that is the average increase in consumer spending associated with an increase in wealth, is approximately in the order of 0.05. In other words roughly five cents of each dollar of an increase in wealth is spent soon after it is earned.

As Ludvigson and Steindel [1999] point out, although this amount seems small, when we are looking at trillion-dollar losses in wealth from the stock market, a five-cent decrease in spending per dollar of losses will add up to tremendous amounts.

1.1.2 The case of France

In France, wealth effects on consumption have also been estimated in macroeconomic studies (Chauvin and Damette [2010], Slacalek [2006]) and in a microeconomic study by Arrondel et al. [2011]. The empirical tests reveal also a small but significant wealth effect: with aggregate data, the marginal propensity to consume out of wealth lies at around 0.8 to one cent on annual consumption for a one euro increase; with micro-level data, this effect lowers to 0.3 cents in annual consumption in response to a one euro increase in wealth.

Arrondel et al. [2011] find three reasons why this wealth effect is smaller in France than in the US or the UK. First, they stress the fact that house wealth is less used as collateral in France than in Anglo-Saxon countries, so that an increase in house prices doesn't relax any potential borrowing constraints which could help increase expenditures (Lustig and Van Nieuwerburgh [2005], Ortalo-Magne and Rady [2006]). Secondly, they argue that the preference for bequest in France could explain this low sensitivity of consumption to housing wealth. But mostly, they shed some light on the low proportion of stockholders in France (20% according to the 2009 Enquête Patrimoine (Insee) against approximately 27% in the UK and 48% in the US according to the Family Resources Survey and the Survey of Consumer Finance).

Thus, the drop in consumption experienced during the crisis could be attributed to a significant wealth effect driven mostly by financial wealth in France (as house prices did not decrease significantly during the crisis). This effect is estimated to be higher for stockholders and house owners. However another underlying cause may be at work, which we will refer to as a “confidence channel”.

1.2 The confidence channel

Faced with rising unemployment and with growing uncertainty regarding the fall in stock prices, the tightening of financial constraints, and a fear of the break up of the Euro zone, households' expectations seem to have changed during the crisis, leading them to constitute precautionary savings. There is an abundant literature going all the way back to Pigou [1967] and Keynes [1936], suggesting that changes in expectations may be a key element driving economic fluctuations. As emphasized by Poterba [2000] and Arrondel et al. [2011] this indirect effect could be interpreted as a confidence channel.

1.2.1 The “animal spirits” and the “information” interpretation of the role of confidence on consumption

Some recent papers have tried to test empirically the impact of these changes in expectations on economic activity and business cycles. Using survey responses to forward-looking questions, Barsky

and Sims [2006] for the US, and Arrondel et al. [2011] for France have shed some light on the impact of these direct measures of confidence on consumption, respectively on macro data (using the Michigan Consumer Index over the period 1961–2006) and micro data (using the PATER survey over the period 2007–2009). It appears that confidence innovations have strong implications for labour productivity, income and consumption, as pessimistic households are more likely to reduce their consumption, with its consequences on real activity.

However, as Barsky and Sims [2006] point out, there are two alternative explanations of the role of confidence on macroeconomic activity. The first one, the “animal spirits” view as they define it, considers autonomous fluctuations in beliefs and consumption that in turn have causal effects on economic activity. These shocks, they argue, should be associated with “overshooting” of consumption that would attenuate when agents come to grips with their erroneous expectations. On the other hand, they describe the second view of the nature of the impact of confidence, the “information view”, as a relation between confidence and macroeconomic activity that arises because confidence measures contain information about the future of the economy. Shocks of information about the long term future should be followed by gradual movements in macroeconomic variables that could not be subsequently reversed.

The analysis of Barsky and Sims [2006] comes down sharply in favour of the information view: the results of their empirical tests suggest that confidence innovations have strong implications on consumption, GDP and labour productivity many quarters in the future, and show no tendency to attenuate even after a number of years.

1.2.2 The stock market: a continuous forward-looking measure of confidence?

In parallel, some authors have argued that the informational content of several measures of confidence was incorporated into the principal component of the stock market. Barsky and Sims [2006] have plotted their forward-looking measure of consumer confidence along with the S&P 500 across time, and show that these series are, with few exceptions, the nearly identical images of one another. Indeed, as Fama [1990] and Schwert [1990] have shown, stock price movements could be reflecting the future of the economy, like forward-looking measures of consumer confidence, as they appear to incorporate information about future cash flows, future technological opportunities, and thus future growth rates. The authors demonstrated that in the period from 1889 to 1988, monthly, quarterly and annual stock returns were highly correlated with future production growth rates. On the theoretical side, Beaudry and Portier [2004] and Jaimovich and Rebelo [2006] have attempted to establish both the information structure and real features of the economy necessary for a theory that would fit the data in which news about future productivity changes, incorporated into stock prices, could lead to strong movements in economic activity, well in advance of the realization of the productivity change.

Consequently any unexpected change in asset prices may be concomitant with a revision of households’ expectations about their future income and thus to modify their consumption plans. In that sense, we could think of the stock market as a proxy for the information set that continuously conditions households’ expectations.

To represent it formally in a simple framework, we can consider a representative consumer who wants to maximize the following program:

$$\left\{ \begin{array}{l} \max_t \int_t^\infty e^{-\delta(s-t)} U(C_s) ds \\ s.t : \dot{W}_t = rW_t + Y_t - C_t \end{array} \right. \quad (1)$$

If we use a log-utility function, after iterating the Budget Constraint we obtain the following expression for Consumption at time t :

$$C_t = \delta e^{-rt} W_t + \delta \int_t^{\infty} e^{-r(s-t)} \mathbb{E}_t(Y_s | I_t) ds \quad (2)$$

Where W_t is the present stock of wealth, Y_t the present income, δ the discount factor, r the interest rate, and I_t the information set that conditions the individual's expectations of future incomes.

Now, it becomes clear that an unanticipated fall of asset prices may lower consumption via two channels. First a direct wealth effect as we saw, via the change in the value of W_t . Second, a "confidence channel" effect which may come from the adaptation of income expectations, if we prove that stock market returns are a good proxy for this information set I_t .

The objective of this paper is to use a panel of 1200 individuals whose consumption and income are actualized on a weekly basis to distinguish among these alternative explanations for the stock market return-consumption correlation over the very short term.

The paper is organized as follows. Section 2 describes the data and presents some summary statistics. Section 3 presents estimation results for our baseline regression, which consists of regressing changes in individual consumption on changes in income and in stock market returns. In section 4 we develop some measures to explore the nature of the relation between stock market returns and consumption. Section 5 concludes.

2 The data

A major problem of the empirical literature of the impact of confidence or wealth shocks on consumption is that it relies exclusively on data whose frequency is annual (e.g. Barsky and Sims [2006], Arrondel et al. [2011]) or quarterly (e.g. Campbell and Cocco [2005]). The difficulty arises when we recognize that we have no grounds for supposing that the quarterly or annual data that are used for calculations correspond to the periods over which consumers respond to shocks and make their decisions. Consumers may actually revise their plans whenever new information creates a need to do so, and if the data are averages over several decision periods we may lose some crucial information on the timing of consumption response to an unexpected shock, and the size of its short term effects.

2.1 The database

To remove this bias, we have found a database that has no equivalent, and which comprises every single bank and savings account transaction of more than 1.200 people in the period going from July 1st, 2011 to March 31st, 2012. The originality of this database lies in the weekly frequency of the observations, and on the fact that each transaction is automatically classified by an algorithm into 98 well defined subcategories of spending grouped into 15 large classes of expenses. This latter functionality is actually the reason why our sample of individuals decided to download the application from which the database is extracted, as it offers them a quick, automatic and precise way to control and manage their personal finances over time. Naturally the extraction of the data has been handled with great legal care given the extreme sensitivity of this data.

In short, the database that we have at our disposal is the faithful reproduction of more than 1200 anonymous bank statements, where each transaction label has been categorized into a specific class of expenses.

The individuals composing the database have downloaded the application at different time periods and some people have a short history of data, but no one left the database before the end of March. We obtain an average of 6 months of observation per individual (for which we unfortunately dispose of no qualitative information), which gives us an unbalanced panel with no bias of selection of more than 30.000 observations. Moreover, as the data is collected automatically, no measurement error could bias our sample.

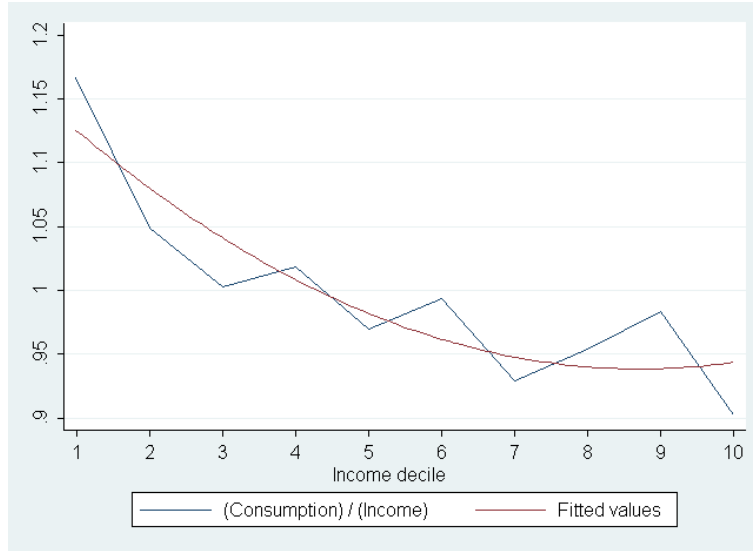
2.2 Some descriptive statistics

2.2.1 The flows of income and spending

The individuals composing our database are wealthier than the French average. Indeed, they earn on average 5.700€ per month (without taxes and social contributions) for an average monthly spending of 5.500€ (and thus an average savings rate of approximately 4%), whereas in France the average disposable income amounts to approximately 2.700€ per month (Insee, 2012). This large gap in income may come from the fact that the individuals had to have the latest generation Smartphone to be able to join the database, and that they are composed of very wealthy people, which pushes up the average of our relatively small sample. However as shown in table 1, an analysis decile by decile enables us to disentangle this bias: thanks to large income volatility within our set of individuals, it could indeed be possible to transform the database to simulate one that would be more representative of the French population.

This analysis decile by decile reveals another interesting feature of the data. As shown in figure 2, we find the intuitive result that the propensity to consume is a decreasing function of income. Below the fourth decile, individuals tend on average to consume strictly more than their monthly income, and have thus a tendency to dissave.

Figure 2: Propensity to consume, by income decile



2.2.2 The stock of disposable wealth

In the sample, 80% of the individuals reported one bank account, 18% reported two and 2% reported three. Besides, we found out that each bank account was on average affiliated with three subaccounts: two saving accounts (e.g. Livret Jeune, Compte d'Épargne...) and one current account from which most of the transactions are made. In addition to the exhaustive description of every transaction received or performed by the individuals per week, we also have information on the stock of money on each of their subaccounts at the beginning of the period.

The hypothesis that these amounts reveal the entire volume of their savings is too strong as we have no information concerning the true number of bank accounts the individuals in our sample have, and which of them they decided to declare. However, we allow ourselves to believe that the stock of money we find for each individual could be used as a good indicator of their stock of disposable wealth, or buffer-stock, which could be used furthermore as a proxy of their true financial wealth. Indeed, as table 1 shows, the stock of wealth people detain on the bank accounts they declared represents a bit less than one monthly income flow, when macro accounting of income and wealth in France suggest that people are provided with approximately 35.000€ in financial wealth on average which represents roughly one annual income flow.

Table 1: **Average disposable income, average spending and average disposable wealth by income decile, in € per month**

Decile	Average disposable income	Average spending	Average buffer-stock
D1	791	924	818
D2	1 507	1 581	1 193
D3	1 972	1 977	1 573
D4	2 533	2 579	1 923
D5	3 162	3 067	2 513
D6	3 972	3 946	2 872
D7	4 884	4 539	3 213
D8	6 347	6 054	4 653
D9	9 313	9 158	6 635
D10	23 763	21 182	7 890

2.3 The source of incomes and the components of consumption

We realized that people were receiving on average strictly more than one stream of income per month. Once we removed all intra-transfers (that is flows that go from one account – or sub-account – to the other), we found that the biggest positive income people receive accounts for 55% of total monthly entries on average, whereas the second biggest entry accounts for 20% of total monthly entries, and 10% for the third. In the end, the sum of the five largest inflows represents on average 93% of total monthly earnings. It is unfortunately not possible to track the source of these revenues, which are most of the time classified under the Transfer label.

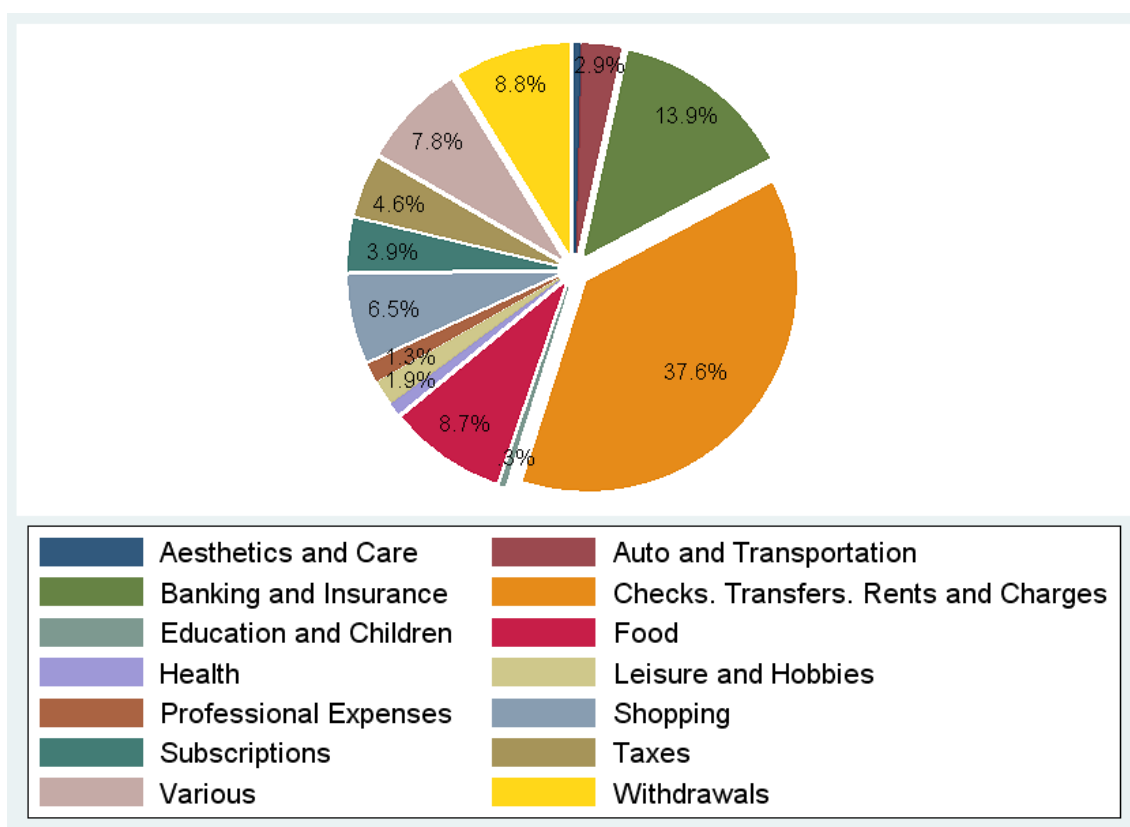
Regarding consumption, an analysis of the different categories of expenses reveals that most of the income is spent on Rent, Charges, Transfers and Checks (2070€ per month on average), that is mostly expenses that are automatically deducted from the bank account towards other entities (as shown by their strong seasonality), or that correspond to the purchase of durable goods.

Banking and Insurance are in second position (764€ on average per month). A closer analysis reveals that this amount is mostly due to the reimbursement of previously contracted loans (a precise description of the different subcategories can be found in the Appendix, table 9). Then comes Withdrawals (that is withdrawing of money from ATM's, for an amount of 482€ per month on average), Food (480€) and Various (429€). This latter category is somehow problematic as it comes from an inherent difficulty of the algorithm in classifying perfectly each spending. However, the application offers the possibility to the user to classify by hand a spending that had not been categorized automatically; so that each time the database is refreshed the percentage of unknown spending diminishes, and the problem will thus be solved.

Afterwards comes Shopping (361€) and then Taxes (252€). Concerning the latter category, the specific nature of the French system enables taxes to be paid either in a lump-sum or in several instalments. Because our sample of individuals is not balanced in time, added to the fact that we do not dispose of an entire year of observations, this category of expenses only partially reflects the share of taxes in people's budget.

The other eight categories of spending account for about 10% of all expenses, with Subscriptions (210€), Automobile & Transportation (160€), and Leisure & Hobbies (105€) representing the biggest part of this remaining budget.

Figure 3: The components of consumption



Although the classification process is found to be imperfect, these problems completely vanish when we aggregate the data over a week. This comes from the fact that all expenses are exhaustively reported and suffer no measurement error.

2.4 Stock market data

We obtain stock price data for France from July 2011 to March 2012 by using the benchmark French stock market index, the CAC 40. This index represents a capitalization-weighted measure of the 40 most significant values among the 100 highest market capitalizations on Euronext Paris.

The index has seen its value drop from 4010 points from July 2011 to 2750 in September 2012, equivalent to a loss of more than 30% of its value in less than three months. After a rebound in September and October it collapsed again to hit in November a value of 2820 points. Afterwards and until the end of the considered period, the index rose at a steady pace to reach the value of 3580 points in March 2012.

When we look at weekly returns (precisely the mean of intra-days variations over a week) we observe that within this period, the average weekly return was approximately zero (-0.05%) for a maximum of 1.93% and a minimum of -1.86%.

With monthly returns (the mean of intra-days variations over a month) the average is equal to -0.03% for a maximum of 0.31% and a minimum of -0.79%.

Figure 4: CAC 40 price index (July, 2011 - March, 2012)

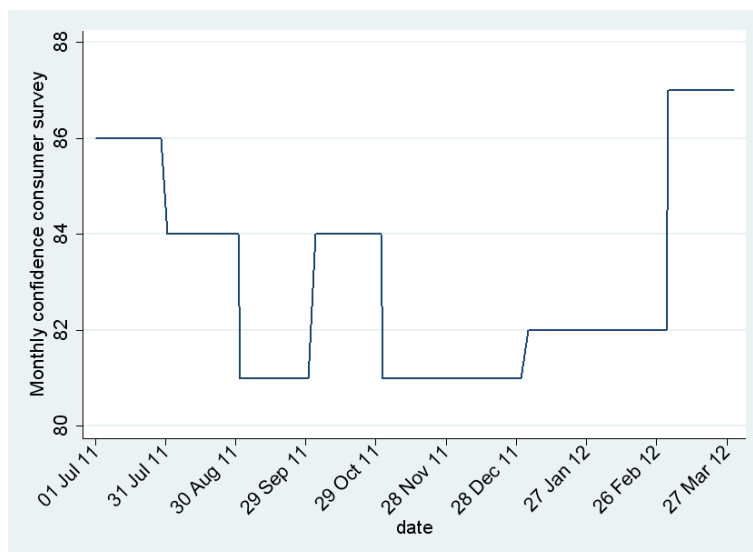


2.5 Monthly confidence consumer survey

We obtain a synthetic monthly indicator of consumers' confidence using the database constructed by Insee. This survey gives an overview of households' opinions on their economic environment and some aspects of their personal economic situation. It provides information on consumer behaviour, and their expectations in terms of consumption and savings.

On the period that goes from July 2011 to March 2012, this index has attained a maximum of 87 and a minimum of 81.

Figure 5: Monthly confidence consumer survey (July, 2011 - March, 2012)



3 The impact of stock market returns and income shocks on consumption

3.1 Baseline structural regression

We first present our baseline regression, which consists of regressing consumption on stock market returns lagged several times controlling for income also lagged several times. More precisely we estimate for $t=1,2,\dots,40$ for each individual the following regressions:

$$C_{i,t} = \alpha_i + \sum_{s=0}^T \beta_s Y_{i,t-s} + \sum_{s=1}^T \gamma_s Rcac_{t-s} + u_{i,t} \quad (3)$$

$$\log(C_{i,t}) = \alpha_i + \sum_{s=0}^T \beta_s \log(Y_{i,t-s}) + \sum_{s=1}^T \gamma_s Rcac_{t-s} + u_{i,t} \quad (4)$$

Where Consumption is denoted by $C_{i,t}$, income by $Y_{i,t}$ and CAC 40 return by $Rcac_t$. α_i denotes here the unobserved fixed effect, $u_{i,t}$ the idiosyncratic error, and T the last significant lag.

Those two specifications have been set to capture the structure and the response timing of consumption to income flows and to variations of stock market returns within a month.

Our models incorporate contemporaneous income but not contemporaneous stock returns: indeed we can assume that individuals receive advance signals concerning the timing of their income flows so that even if an income is received at the end of a given week, consumption is more likely to react at the beginning of this week. The fact that the timing of income is expected makes the use of contemporaneous income quite natural in the regression.

We can however assume that it cannot be the case for stock market returns, as an unpredicted shock that happens in the middle or at the end of a given week is likely not to have any impact on aggregate consumption that precise week but, if any, on the upcoming one. This structural assumption also finds its grounds in the way the data is collected: banks often debit or credit weekend expenses and revenues the upcoming Monday, so that our week goes actually from Saturday to the next Friday whereas stock market opens from Monday to Friday. Hence, if we include contemporaneous stock market returns in the regression, we will not be able to capture their effects on a whole week of consumption but on a truncated one, as the upcoming weekend expenses will not be included. We should allow at least a week of observations after the shock happens to be able to capture unbiased effects of stock market shocks on consumption, and this explains why we choose not to include contemporaneous stock market returns in the regression.

3.2 Methodology

As our database contains no qualitative information about consumers (e.g. sex, marital status, years of schooling...), the heterogeneity of our population is bound to be unobserved in the data and it has to be either controlled for in our regressions or simply removed.

For this purpose we will cover two methods for estimating unobserved effects panel data models that are widely used in econometrics. These two methods are consistent once we assume that this unobserved heterogeneity is constant over time, which is very likely to be the case over our relatively short 9 month period.

The first one consists of taking a first difference, and the second one in running a fixed or random effects model. In both cases any time invariant component of the model will be removed prior to estimation.

The use of the fixed effects model instead of a random effects model is quite clear here, as we can obviously fail to reject the correlation between the individual specific effects and our independent variables. It is quite natural to think that the age or the level of education of an individual, for instance, are very likely to be correlated with income. This hypothesis has been confirmed by a Hausman test.

3.3 Weekly results

In this section, we present the principal results of our weekly regressions. We evaluated the impact on consumption of several shocks. The first one is an income shock. We show that consumption fluctuates within the scope of a month, and that this fluctuation is dictated by the reception timing of incomes. The second shock we evaluated is a stock market return shock. We show that consumption overreacts to the latter, whatever the individuals' level of disposable income: when stock market returns experience a 1% decrease (respectively a 1% increase), consumption will tend to decrease (respectively to increase) by 20% with respect to its weekly average a week after the shock, by 7% the second week and by -2% the third week. Finally we discover that stock market returns volatility explained roughly 10% of the variations of the mean share of weekly consumption that is not explained by income.

In all subsequent regressions, a serial correlation test has ruled out the presence of first-order autocorrelation, but the standard errors reported in parentheses in the following tables are corrected for heteroscedasticity.

3.3.1 The response of consumption to income within a month

The estimated coefficients on income suggest, whether income is put in log or not, that individuals are consuming *asymmetrically* within the scope of a month. The estimated impacts of income on consumption are very much alike at every lag whether we run the regression in fixed effects or in first difference (see Appendix, table 10).

Table 2: The weekly response of consumption to income shocks - Fixed Effects model

Variables	Expenditures	Variables	log(Expenditures)
Income _t	0.35*** (0.06)	log(Income _t)	0.08*** (0.003)
Income _{t-1}	0.14*** (0.03)	log(Income _{t-1})	0.06*** (0.003)
Income _{t-2}	0.07*** (0.01)	log(Income _{t-2})	0.03*** (0.002)
Income _{t-3}	0.03*** (0.008)	log(Income _{t-3})	0.01*** (0.002)
Observations	30003		29527
R-squared	0.21		0.07

Notes: Robust standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 2 shows that the response of consumption to an income shock is not flat, as consumption tends

to react roughly twice more to an income that has been received in a given week than to an income received a week before it.

The fixed effects model is a time-demeaned transformation, which means that the coefficients have been obtained as the OLS estimator on the following cross-sectional equations:

$$C_{i,t} - \bar{C}_i = \sum_{s=0}^3 \beta_s (Y_{i,t-s} - \bar{Y}_i) + \sum_{s=1}^3 \gamma_s (Rcac_{t-s} - \overline{Rcac}) + u_{i,t} - \bar{u}_i \quad (5)$$

$$\log(C_{i,t}) - \log(\bar{C}_i) = \sum_{s=0}^3 \beta_s (\log(Y_{i,t-s}) - \log(\bar{Y}_i)) + \sum_{s=1}^3 \gamma_s (Rcac_{t-s} - \overline{Rcac}) + u_{i,t} - \bar{u}_i \quad (6)$$

Hence, to understand the values of our estimates from the first specification, let us consider an individual who earns 4000€ per month on average at a fixed date and consumes on average 96% of it (3840€), as dictated by our empirical 4% average savings rate.

When we replace \bar{C}_i and \bar{Y}_i by their respective weekly means (960€ and 1000€), and β , β_1 , β_2 and β_3 by their estimates (0.35, 0.14, 0.07, and 0.03), our model suggests, all other things equal, that the individual will consume 1770€ the first week, 930€ the following week, 650€ the third week and finally 490€ the fourth week, in response to a 4000€ income shock. After a month, all effects of the variation of income on consumption were found to be insignificant in this specification. Hence, the individual in our example is consuming above his 960€ weekly average the week when income is received, and consumes less than his weekly average the three following weeks.

Symmetrically, our logarithmic specification indicates that a deviation of 1% of the income a given week from its average results in a 0.08% deviation in consumption from its own mean the current week, 0.06% the second week, 0.03% the third week and 0.01% the final week. Similarly, after four weeks, all effects of the variations in income on consumption were found to be insignificant in this logarithmic specification. This indicates, as did the results of the first specification, that consumption fluctuates within the scope of a month, but remains however smoother than income. This finding is corroborated by the analysis of the variances of both weekly series: the standard deviation of weekly consumption *within* the panel is found equal to 4840, while the one of weekly incomes is equal to 6850.

Therefore, there seems to be an increase in consumption immediately after wages have been received, and this reaction seems to attenuate and then disappear a month after this income was capitalized. This is the first original contribution of the use of a high frequency database.

3.3.2 The weekly response of consumption to stock market returns

We now turn to the most interesting feature of our model. We examine the effects of unpredictable changes in stock market returns on consumption once corrected for the impact of income. In all specifications for both models we find that consumption responds positively and very strongly to stock market returns, at least one and two weeks after a shock has happened.

Fixed effects model

In the first specification, and once controlled for income at all relevant lags, we find a strong positive and significant reaction of weekly consumption to a 1% deviation of the CAC 40 return from its zero mean. The results of the estimations can be found in table 3. The parameter is estimated to be around 155 a week after the 1% shock has happened, and roughly 57 the week after. All subsequent lags were found to be insignificant in this specification. In other words, given the structure of the fixed effects model, this means that if the CAC 40 experiences a 1% decrease on average in a given week, people will tend to decrease their consumption spending by about 155€ the following week and 57€ the week after, both with respect to their weekly averages.

In the second specification, the parameter is estimated to be 0.2 for a 1% variation of the stock market return the first week, 0.07 the second week, against -0.02 the third week. All lags were found to be insignificant afterwards. It means that when stock market returns deviate from their mean by one percent, weekly consumption is estimated to deviate by 20% from its weekly average one period after the shock has happened, 7% two weeks after and -2% three weeks after.

Table 3: The weekly response of consumption to stock market returns - Fixed Effects model

Variables	Expenditures	log(Expenditures)
CAC 40 return _{t-1}	155.6*** (17.6)	0.20*** (0.009)
CAC 40 return _{t-2}	57.6*** (16.4)	0.07*** (0.009)
CAC 40 return _{t-3}	- -	-0.02** (0.009)
Observations	30003	29527
R-squared	0.22	0.07

Notes: Robust standard errors in parentheses

** $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$*

Control variables: income lagged 4 times

These estimates from both specifications advocate strongly in favour of a probably overestimated overshooting of consumption expenditures to stock market shocks. This large response of consumption is however likely to be subsequently reversed three weeks after the shock happens. This is emphasized by the negativity of the estimated γ_3 in specification 2, and by the non-significance of all coefficients after lag 3. This overreaction is thus likely to be very short lived.

The relation between stock market returns and consumption for different levels of income

By interacting households' income (decomposed by quintile) with income and stock market returns, we find that the impact of stock market shocks on consumption is almost a decreasing function of income.

Households in the bottom of the income distribution are more likely to reduce consumption when facing a negative shock. For instance, the percentage decrease of monthly consumption rises to 28% when a 1% negative shock hits for three weeks in a row for individuals belonging to the first quintile while it decreases consumption by 21% for the individuals belonging to the fifth quintile.

Table 4: The weekly response of consumption to stock market returns, by Income quintile - Fixed Effects model

	Q1	Q2	Q3	Q4	Q5
Average income by quintile	1149€	2252€	3567€	5615€	16 538€
Variables	log(Expenditures)	log(Expenditures)	log(Expenditures)	log(Expenditures)	log(Expenditures)
CAC 40 return _{t-1}	0.20*** (0.02)	0.23*** (0.02)	0.21*** (0.02)	0.20*** (0.02)	0.16*** (0.02)
CAC 40 return _{t-2}	0.08*** (0.02)	0.11*** (0.02)	0.04** (0.02)	0.07*** (0.02)	0.05** (0.02)
CAC 40 return _{t-3}	- -	- -	-0.05** (0.02)	-0.05** (0.02)	- -
Observations	5905	5906	5905	5905	5906
R-squared	0.08	0.08	0.07	0.09	0.07

Notes: Robust standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Control variables: income lagged 4 times

Although we find some heterogeneity, the finding of table 4 is that stock market shocks affect all individuals whatever their income profile.

A graphical overview: the problem of seasonality

One way to have a graphical overview of our results is to regress consumption on income lagged four times, and to extract the idiosyncratic errors of the model for each individual at each time. Averaging these residuals for each week and each individual gives us the mean part of consumption that is not explained by income over time, for our entire set of individuals. For more tractability of the coefficients on the y-axis, we have plotted these idiosyncratic residuals' means using the logarithmic specification against the estimated response of consumption to stock market returns.

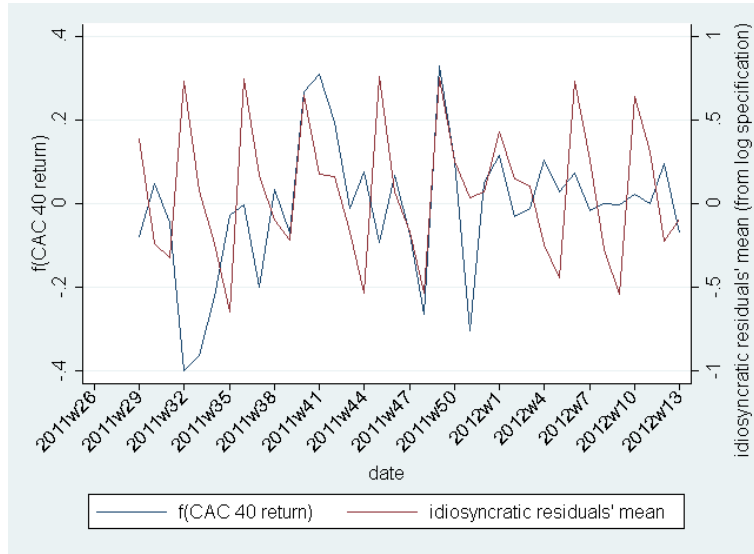
More specifically we have plotted on figure 6, $\forall t \in [1; 40]$:

- Idiosyncratic residuals' mean = $\frac{1}{1200} \sum_{i=1}^{1200} u_{i,t}$
- $f(\text{CAC 40 return}) = 0.20 \cdot \text{CAC 40 return}_{t-1} + 0.07 \cdot \text{CAC 40 return}_{t-2} - 0.02 \cdot \text{CAC 40 return}_{t-3}$

We can see from this figure that the idiosyncratic errors' mean extracted from the fixed effects model is extremely seasonal over the period. This prevents us from observing clearly the effect of stock market returns on the unexplained part of consumption, even though the result of our regression in panel clearly indicates a causal relationship.

One way to remove this periodicity is to seasonally adjust these residuals' means, by adding some dummies. This new series turns out to fit much more the estimated response of consumption to CAC

Figure 6: Idiosyncratic residuals' mean and estimated response to stock market returns - Fixed Effects method, log specification



40 returns, but the residuals' means appeared so close to zero (the lowest seasonally adjusted residual's mean was equal to $-5.55e-17$) that we cannot give this graphical illustration any weight.

A second way to remove this periodicity is to look at the outcomes of the first difference model.

First Difference model

With this method, as shown in table 5, all coefficients of CAC 40 returns are as strongly significant, and of roughly the same amplitude (although higher and thus even less reasonably realistic) than the one we found using the fixed effects model. These results however corroborate our previous results that stock market price evolutions have a strong short term and short lived impact on consumption.

Table 5: The weekly response of consumption to stock market returns - First Difference model

Variables	Δ Expenditures	$\Delta\log(\text{Expenditures})$
$\Delta\text{CAC 40 return}_{t-1}$	209.8*** (30.2)	0.28*** (0.014)
$\Delta\text{CAC 40 return}_{t-2}$	132.4*** (26.02)	0.16*** (0.014)
$\Delta\text{CAC 40 return}_{t-3}$	60.6* (29.7)	0.07*** (0.013)
Observations	28232	27429
R-squared	0.15	0.056

Notes: Robust standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Control variables: $\Delta\text{income}/\Delta\log(\text{income})$ lagged 4 times

One parameter's sign however differs, and it concerns the impact of the stock market return lagged

three times on consumption. In the fixed effects model, this coefficient was found either insignificant at the 5% level in the first specification, or significantly negative in the logarithmic specification, whereas it is positively significant in both specifications in the first difference model.

This difference between the estimators is natural when $T > 4$ as Wooldridge (2009) explains, and the choice between the two seems rather difficult to make. However, given that the idiosyncratic errors are here serially uncorrelated, Wooldridge informs us that the use of the fixed effects method is more efficient than first differencing. We will consequently rely more on the amplitude of the parameters estimated with the fixed effects model.

There is nevertheless a great advantage of dealing with the first difference method as it enables us to seasonally adjust the idiosyncratic errors of our regression, and thus to remove the periodicity of our series (as we can immediately see from figure 6 below).

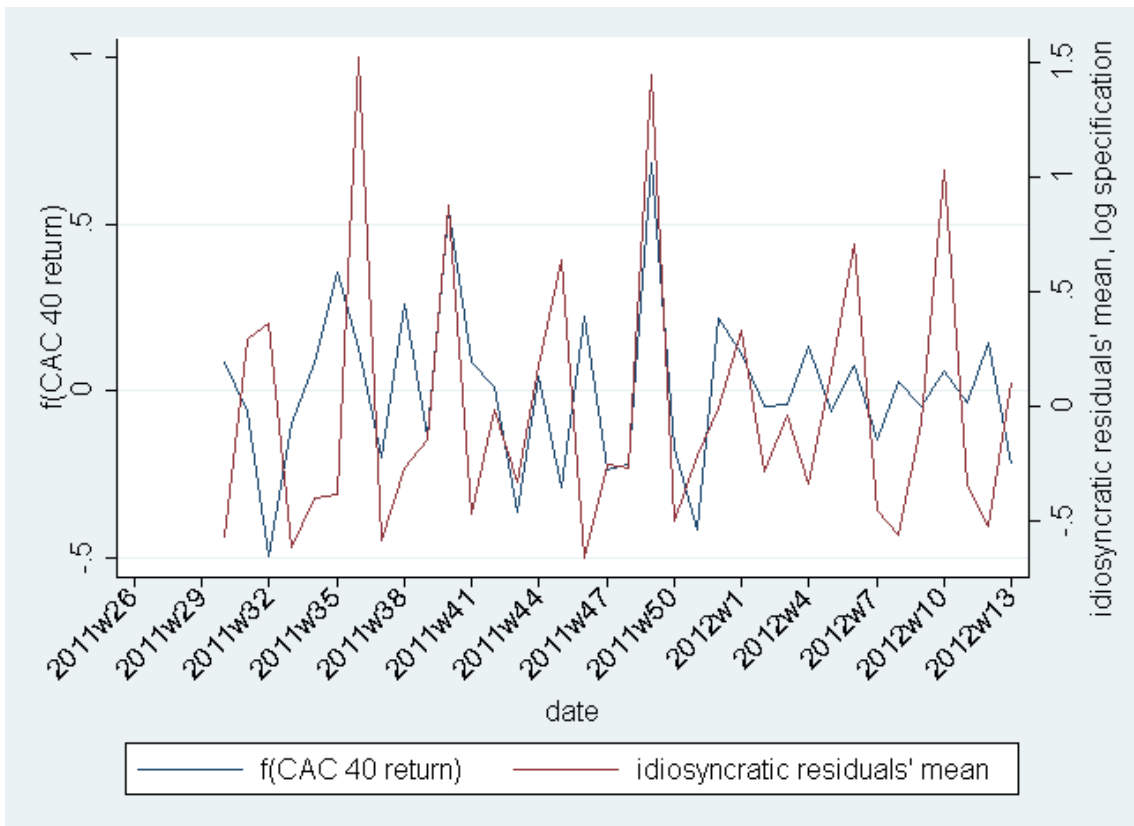
A graphical overview: the disappearance of the problem of seasonality

Here, we have gathered on the same graph the idiosyncratic residuals' mean series, extracted from the first difference model using the logarithmic specification, together with the estimated response of the variation of consumption to CAC 40 return differences.

Formally, we have plotted, $\forall t \in [1; 40]$

- Idiosyncratic residuals' mean = $\frac{1}{1200} \sum_{i=1}^{1200} u_{i,t}$
- $f(\text{CAC 40 return}) = 0.28 \cdot \Delta \text{CAC 40 return}_{t-1} + 0.16 \cdot \Delta \text{CAC 40 return}_{t-2} + 0.07 \cdot \Delta \text{CAC 40 return}_{t-3}$

Figure 7: Idiosyncratic residuals' mean and estimated response to stock market returns - First Difference method, log specification



We can now clearly see from figure 7 that much of the consumption variations that are not explained by income could be attributed to the changes in stock market returns, as indeed both series seem to behave similarly over the period.

Indeed, although the unexpected part of consumption seems sometimes to overreact with respect to movements in stock market (especially after the fourth week of 2012) most of the variations in the errors are in line with the variations of the estimated response of consumption to stock market returns.

A closer analysis of these two time series reveals that actually 10% of the variance of this averaged unexplained part of consumption could be attributed to the variance of this function of CAC 40 returns ($R^2 = 10\%$). In other words, we could explain almost 10% of the weekly variations in the unexplained part of consumption by variations in weekly stock market returns.

3.4 Monthly results

We have tried in this section to see whether these weekly variations of consumption to CAC 40 returns could also be seen on a monthly scale with our data. The answer is positive: when we regress monthly consumption on monthly income and monthly CAC 40 returns (that is the average of daily variations over a month) using the fixed effects method, we obtain coefficients that are significant at less than 0.01% and that have the required sign, as shown in table 6.

Table 6: The monthly response of consumption to stock market returns - Fixed Effects model

Variables	Expenditures	log(Expenditures)
CAC 40 return _t	463,2*** (193.11)	0.1*** (0.0267)
CAC 40 return _{t-1}	-	-
Observations	6835	6835
R-squared	0.35	0.16

Notes: Robust standard errors in parentheses

** $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$*

Control variables: monthly Income/log(Income)

These monthly figures are in line with the one we found on a weekly scale as they reveal here again a strong significance of the coefficient of monthly stock market returns in the regression. The latter are however of smaller magnitude: A 1% negative deviation of monthly CAC 40 returns will lead on average to a decrease of 10% in monthly consumption all other things being equal.

Thus, when the time reference becomes the month, the model smoothens out weekly fluctuations in CAC 40 returns and in consumption in a way that makes the estimates more realistic than those found using a weekly scale.

This result can be analyzed from a graphical perspective. When we regress consumption on income and extract the idiosyncratic errors of the model for each individual at each time, and after averaging these residuals for each month and each person, we obtain, as previously, the mean part of monthly consumption that is not explained by income over time for our entire set of individuals.

Because the seasonality problem we encountered when working with weekly frequencies disappears when months become the time reference, we can unveil the graphs extracted from the fixed effects model for both specifications:

Figure 8: Idiosyncratic monthly residuals' mean and monthly stock market returns - Fixed Effects method, volume specification

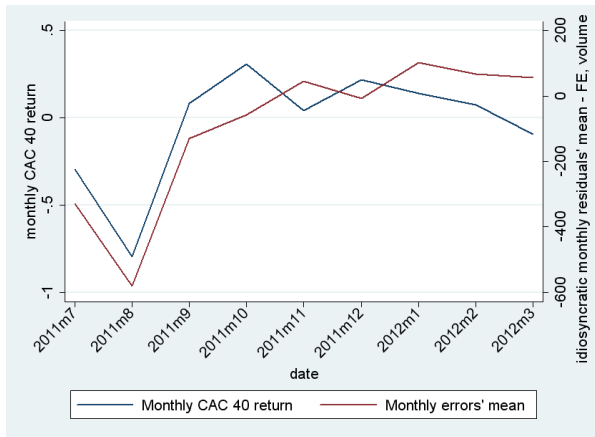
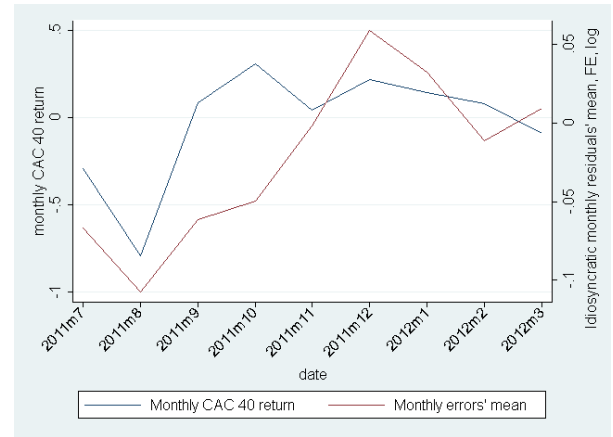


Figure 9: Idiosyncratic monthly residuals' mean and monthly stock market returns - Fixed Effects method, log specification



As we can see, much of the unexplained part of consumption can be explained by variations in monthly stock market returns. More precisely, when we regress monthly idiosyncratic residuals' means on monthly CAC 40 returns we obtain a R^2 of more than 72% under the first specification (figure 8), and of more than 43% using the logarithmic specification (figure 9).

These striking results show that CAC40 returns are very good predictors of the volatility of consumption both on a weekly and on a monthly basis.

To have a look now at the detail of the types of goods people are choosing to decrease (or increase) their expenditures of when there is a fall (or an increase) in stock market prices, we have divided consumption into classes using the native algorithm of the application, and applied the same methods we used for aggregate consumption on each one of them. We show in the next section the categories of goods that are the most and the least elastic to stock market return shocks.

3.5 The impact of stock market returns on different categories of expenses

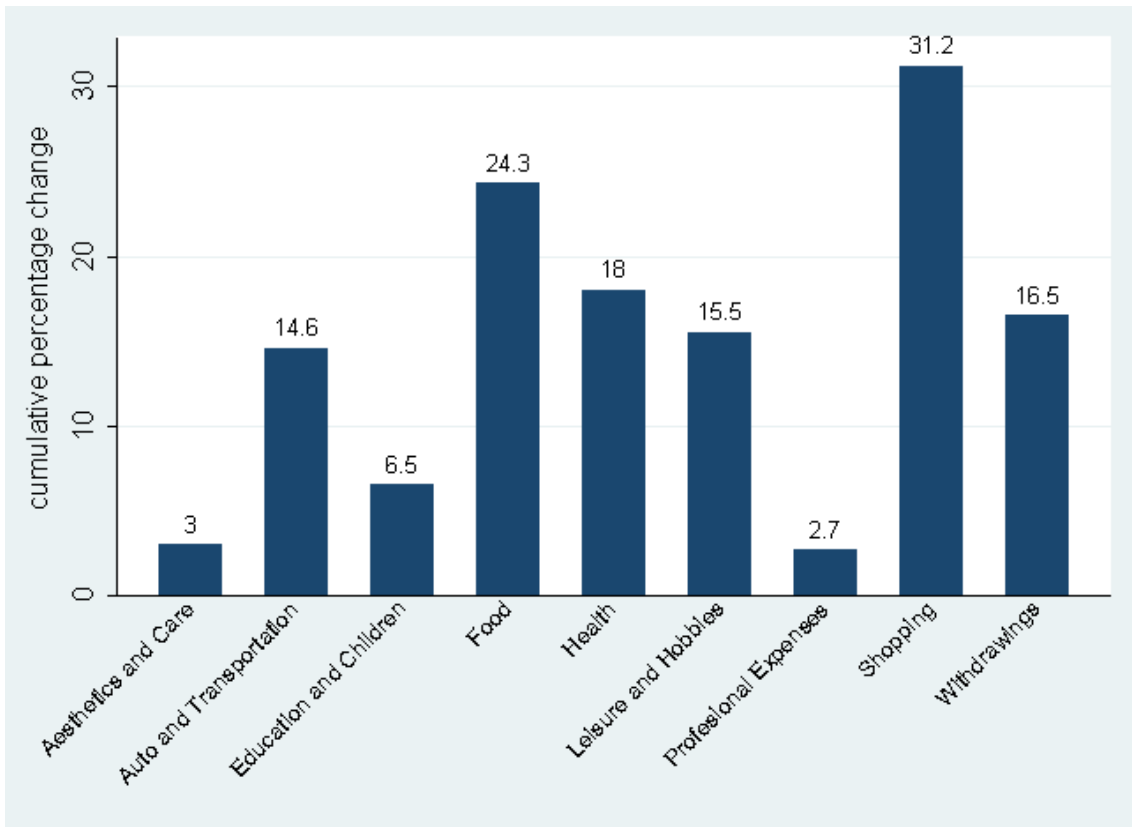
To calculate the cumulative percentage change in categories of expenses in response to a 1% stock market return deviation, we have simply regressed in fixed effects the amount of spending on each class of goods separately on several lags of income and of CAC 40 return using the logarithmic specification for a better tractability of the results:

$$\log(C_{i,t}^{category}) = \alpha_i + \sum_{s=0}^T \beta_s \log(Y_{i,t-s}) + \sum_{s=1}^T \gamma_s Rcac_{t-s} + u_{i,t} \quad (7)$$

Then we have added the values of the estimated γ coefficients, when they were significant, to obtain the cumulative percentage change in consumption by categories to a 1% change in CAC 40 returns.

We have decided to remove the indefinite classes of expenses (Taxes and Various, as we have justified it in section 2) in addition to those which are partially automatically deducted from bank accounts (Checks, Transfers, Rent and Charges, and Banking and Insurance). These categories are indeed very hard to pin down: for example the subcategories Transfers, Checks, or Credit Card Expenses are mixed with automatically deducted expenses like Rent although they could correspond to the purchase of durable goods for example. These ambiguous categories have thus to be put aside pending a future refinement of the subcategories they are composed of.

Figure 10: Cumulative percentage change in consumption by categories to a 1% change in stock market returns



We discover that the category of expenses that is the most likely to adjust when a stock market shock happens is Shopping: a 1% deviation in average over a week, a decline for example, will tend to decrease shopping expenditures by 31.2% over a month (15% a week after the shock, 7% two weeks after and 8% three weeks after), compared to its monthly average. Shopping, that is the purchase of goods like books, High tech products, clothes, shoes... (see table 9 in Appendix) is hence seen as the most elastic spending item when stock market shocks hit.

The second one in importance is Food whose expenses tend to decrease in average by about 24% when a 1% negative deviation of CAC 40 returns hit. Then come Health, Withdrawals, Leisure and Hobbies, and Auto and Transportation whose cumulative effects of a 1% deviation of CAC 40 returns all lie above 10%.

In the end, the last three categories of spending, Aesthetics and Care, Education and Children and Professional Expenses are found to be the least elastic categories of spending. Their cumulative percentage change in consumption to a 1% deviation of stock market returns happen to be below 6.5%.

We have so far analyzed the variations of stock market returns to construct a series that we have linked to individuals' consumption, and we have shown that people reacted robustly to these fluctuations within the scope of a month.

However, the nature of our data, especially the fact that we do not have information about the true financial wealth of the individuals composing our database, has not allowed us to investigate directly whether these very short term fluctuations in consumption were due to a wealth effect, or to the indirect "confidence channel" effect, to use the distinction made by Poterba [2000] and Arrondel et al. [2011]. The next section tries to give some insight about the nature of this relation.

4 Wealth effects or confidence effects? Evidence from proxies of financial wealth, pure information shocks and consumers' confidence survey

A first way to test the nature of this relation between consumption and stock market returns is to use the proxies for financial wealth we can find in our dataset (namely the amount of buffer-stock) and check whether the individuals with low buffer-stock of disposable wealth react to stock market returns as much as the ones who have higher levels of disposable wealth. We show that the data provides no tendency for a rule making wealthiest people react more strongly to CAC 40 shocks.

The second way is to extract over the period all the relevant economic, political and financial news that was broadcast between July, 2011 and March, 2012 and see whether it has a direct impact on consumption, together with a counterpart in terms of stock market price fluctuations. We show that consumption reacts systematically to news shocks, and these shocks seem to be incorporated contemporaneously and sometimes in advance into stock market prices.

Finally, we link the French monthly indicator of consumer confidence (Insee) with CAC 40 price index; although we deal here with monthly frequencies, the proximity of their variations makes us conclude that market investors are likely to detain roughly the same information when evaluating stocks as consumers when forming expectations about future income, so that the channel through which consumption is affected by a stock market return variation is very likely to be a confidence channel.

4.1 The impact of stock market returns on consumption for different levels of wealth and incomes

By dividing the sample in quintiles with respect to the amount of disposable wealth, we were able to distinguish the reaction of all 5 categories of individuals to a stock market return shock, both in volume and in percentage. We have presented the outcomes of the fixed effects model. Incomes are used as control variables but their estimated coefficients do not figure in the tables.

The first part of Table 7 reflects the amount of money people with different levels of wealth tend to save (or dissave) when they experience a 1% decrease (or increase) in weekly CAC 40 prices. What we observe from these estimated coefficients is that the relation between the impacts on weekly consumption of weekly stock market fluctuations is not linear with respect to wealth. We can see for example that the people endowed with the lowest level of disposable wealth tend to decrease their consumption by an amount that exceeds the amount saved by the second most fortunated (190€ for a month against 145€ after a 1% shock, both with respect to their monthly average).

The second part of table 7 is even more striking: we observe that the lower the amount of money the individuals have in their bank accounts, the higher the effects of stock market return fluctuations on consumption in percentage. The sum of the estimated coefficients γ_1 , γ_2 and γ_3 sum up to 34% for the people who detain on average -716€ in their bank accounts, 27% for those who have 711€, 29% for those who detain 1.730€, 22% for those who have 3.600€ and finally 16% for the people endowed with 11.700€. There is thus a decreasing relationship between disposable wealth and the aggregate percentage response of consumption within a month to stock market returns shocks.

Table 7: The weekly response of consumption to stock market returns, by disposable wealth quintile - Fixed Effects model

	Q1	Q2	Q3	Q4	Q5
Average disposable wealth by quintile	-716€	711€	1730€	3600€	11697€
Variables	Expenditures	Expenditures	Expenditures	Expenditures	Expenditures
CAC 40 return _{t-1}	133*** (22)	83*** (14)	173** (30)	145*** (30)	217*** (63)
CAC 40 return _{t-2}	57*** (23)	38** (16)	62*** (23)	- -	- -
CAC 40 return _{t-3}	- -	-36** (13)	- -	- -	- -
Observations	5905	5906	5905	5905	5906
R-squared	0.44	0.28	0.19	0.33	0.15

Variables	log(Expenditures)	log(Expenditures)	log(Expenditures)	log(Expenditures)	log(Expenditures)
CAC 40 return _{t-1}	0.23*** (0.02)	0.19*** (0.02)	0.22*** (0.02)	0.19*** (0.02)	0.16*** (0.02)
CAC 40 return _{t-2}	0.11*** (0.02)	0.08*** (0.02)	0.07** (0.02)	0.06*** (0.02)	- -
CAC 40 return _{t-3}	- -	- -	- -	-0.03* (0.02)	- -
Observations	5905	5906	5905	5905	5906
R-squared	0.13	0.08	0.07	0.08	0.05

Notes: Robust standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Control variables: $\log(\text{income})$ lagged 4 times

This result is perfectly in line with the one found by Arrondel et al. [2011] on their yearly micro data when they analyse heterogeneity along the wealth distribution: they find out that the impact of wealth changes on consumption is decreasing with wealth, and analyze these differences by the heterogeneity in the precautionary saving behaviour, as wealthy people tend to save less in proportion than others for precautionary motives.

Another explanation of this decreasing relationship may arise from the recognition that people with low amounts of disposable wealth may be borrowing constrained. In consequence, if stock market decreases, borrowing constrained people may think they will have more difficulties in finding ways to get financed if they want to borrow, as banks are likely to increase their collateral requirements, and may thus save more in proportion when the shock hits.

This explanation aside, these findings enable us to have a better insight into the nature of the short run relation between stock market returns and consumption. Indeed, if we assume that the amount of disposable wealth can be seen as a proxy for the true amount of financial wealth people detain, the results above contradict the “wealth effect” hypothesis in trying to explain this very short term relationship between stocks and consumption.

Indeed, if we return to equation (2), the higher the wealth of individuals W_t , the higher should be the amount of money they should save when a stock market shock hits. This result must hold although the amount they save is lower *in proportion* than those of the poorest individuals. The data, given our assumption, has however contradicted this hypothesis in the short run.

Thanks to this first finding, we could think of the wealth effect channel as a long term explanation of the relation between stock prices and consumption (a year for example, as demonstrated by Arrondel

et al. [2011]), but not a short term explanation. In that sense, when the CAC 40 plunges it might be a fear of low future incomes that leads people to constitute precautionary savings in the very short run.

In the next section, we deepen our investigation into the nature of this relationship between consumption and stock market returns by turning to a more factual description of the information set I_t that might condition people's expectations. By isolating widely broadcast news that carried a negative perspective for the future of the economy, or "pure information shocks", we were able to reconstruct the link between stock market return shocks and variations in consumption. Indeed, we show that the reaction of consumption to these news shocks happens to be systematic, very high, and very short lived. We also found that these information shocks were most of the time, and sometimes in advance, incorporated into stock prices. We assume then that the common short term source of stock market shocks and consumption fluctuation might be Information.

4.2 The impact of information shocks on consumption

This section examines in detail the economic information set that may have conditioned the individuals' expectations to try to catch the importance of the direct impact of a news shock on consumption and on stock market prices. We define here a news or information shock as a piece of economic or political information that has been broadly released in the press and that carries a negative perspective for future economic activity. Our goal is to see whether these information shocks have a contemporaneous or a delayed impact on consumption (once controlled for income shocks) on a weekly scale.

4.2.1 News shocks and consumption

We identified a sample of political and economic events using the chronological database of economic, business and finance events of Wikipedia and we restricted our set by considering only those which concerned directly European countries and especially France from July, 2011 to March, 2012.

We removed from our sample all events that happened within a week where a "positive" piece of information was simultaneously released. Only one pair of events actually corresponded to that situation: in March 2012, the same week, the information that unemployment in the Eurozone had risen to its highest level in history was released together with the news that a majority of members of the European Union succeeded in signing a new "fiscal compact". The ambiguity of the potential reception of such a pair of events led us to remove it from our sample.

Table 8 draws a list of the 14 major events that happened during this turbulent period that saw the culmination of the European sovereign debt crisis.

Table 8: Major economic events that happened in Europe between July, 2011 and March 2012 and that carried a negative outlook

Events	Date
The economy of Germany grows by only 0.1% in the second quarter of 2011, raising concerns about the European economy as a whole.	Tuesday, August 16, 2011 (week 33)
Standard & Poor's lowers Italy's credit rating from A+ to A, due to concerns about its high level of debt and the stability of its government.	Monday, September 19, 2011 (week 38)
World stock markets plunge amid growing global fears of recession.	Thursday, September 22, 2011 (week 38)
A measure to support expansion of the Eurozone bailout fund is halted due to its failure to pass in the Parliament of Slovakia.	Tuesday, October 11, 2011 (week 41)
Credit rating agency Standard & Poor's cuts Spain's credit rating to AA- with a negative outlook, as the European debt crisis deepens.	Friday, October 14, 2011 (week 41)
Moody's downgrades Spain's credit rating to A1 after Standard & Poor's and Fitch downgraded Spain's rating two weeks ago.	Tuesday, October 18, 2011 (week 42)
The government of Germany states that national GDP growth in 2012 will be significantly lower than initially predicted, due to the Eurozone's ongoing economic crisis.	Thursday, October 20, 2011 (week 42)
Italy's cost of borrowing reaches a record high, with interest rates on 10-year loans rising to 7%, as fears grow of an escalating economic crisis.	Wednesday, November 9, 2011 (week 45)
Mario Monti is sworn in as Italian prime minister and temporary finance minister, with the task of implementing austerity measures.	Wednesday , November 16, 2011 (week 46)
Credit rating agency Moody's downgrades the ratings of France's three biggest banks, Crédit Agricole, BNP Paribas and Société Générale.	Friday, December 9, 2011 (week 49)
Fitch Ratings lowers France's rating outlook while maintaining a AAA rating and puts the grades of six nations including Spain and Italy on review due to Europe's failure to find a solution to the debt problem. (Bloomberg via Business Week). Moody's Investors Service downgrades Belgium's credit rating two notches to Aa3.	Friday, December 16, 2011 (week 50)

The Standard & Poor's credit rating agency lowers its long-term credit ratings on the Eurozone countries of Cyprus, Italy, Portugal, and Spain by two notches each and Austria, France, Malta, Slovakia, and Slovenia by one notch each.

Friday, January 13, 2012 (week 2)

The Standard & Poors credit rating agency lowers its long-term credit rating on the EFSF, the Eurozone's bailout fund to help indebted European countries with their finances, from AAA to AA+ following the downgrade of France and Austria, who are two of the fund's backers.

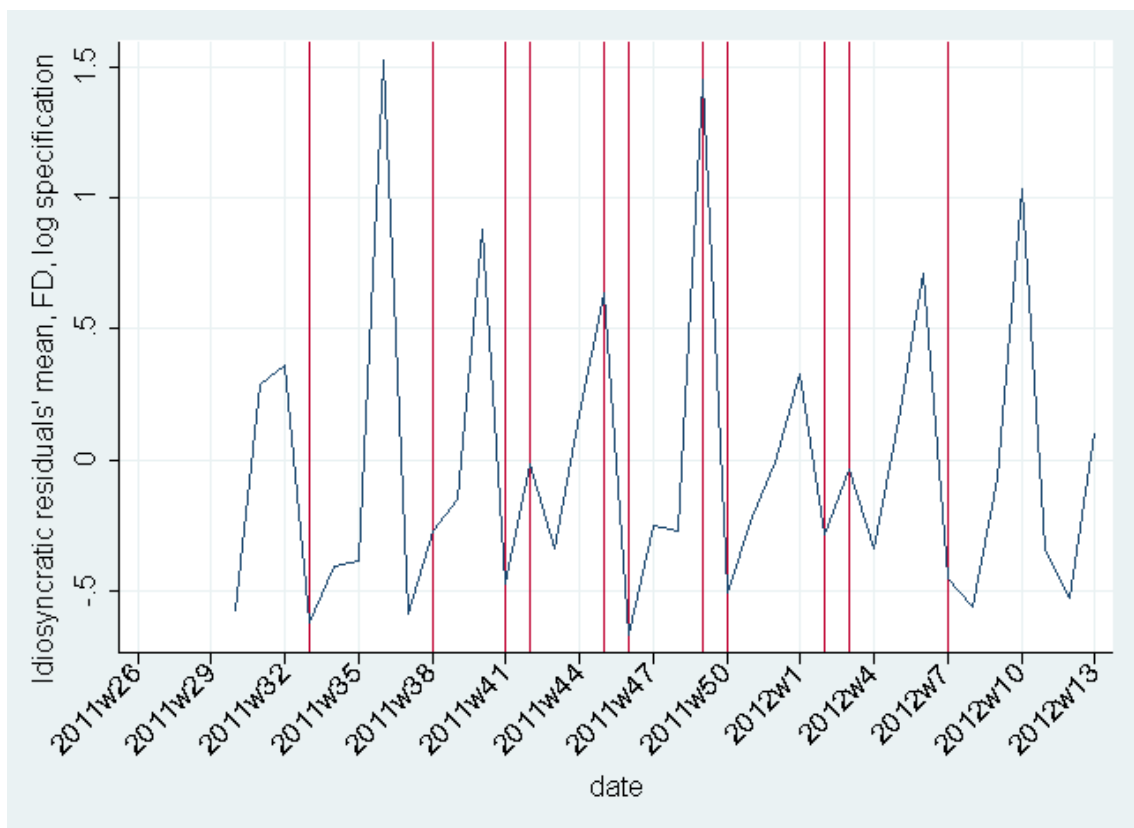
Monday, January 16, 2012 (week 3)

Moody's Investors Service downgrades the credit ratings of several European Union members including Italy, Malta, Portugal, Slovakia, Slovenia and Spain and issues a negative outlook for the ratings of Austria, France and the United Kingdom.

Monday, February 13, 2012 (week 7)

When we link those major news shocks with the seasonally-adjusted idiosyncratic residuals' mean (obtained from the first difference model using the logarithmic specification), or to put it differently with the mean part of weekly consumption that is not explained by fluctuations in income, we observe a sticking result: these shocks, when they are taken contemporaneously (figure 11), are linked with a relative decrease in consumption 9 times out of 11, and when we allow consumers to react with a one week lag to the news (figure 12), there happens to be a systematic negative response of consumption to information shocks.

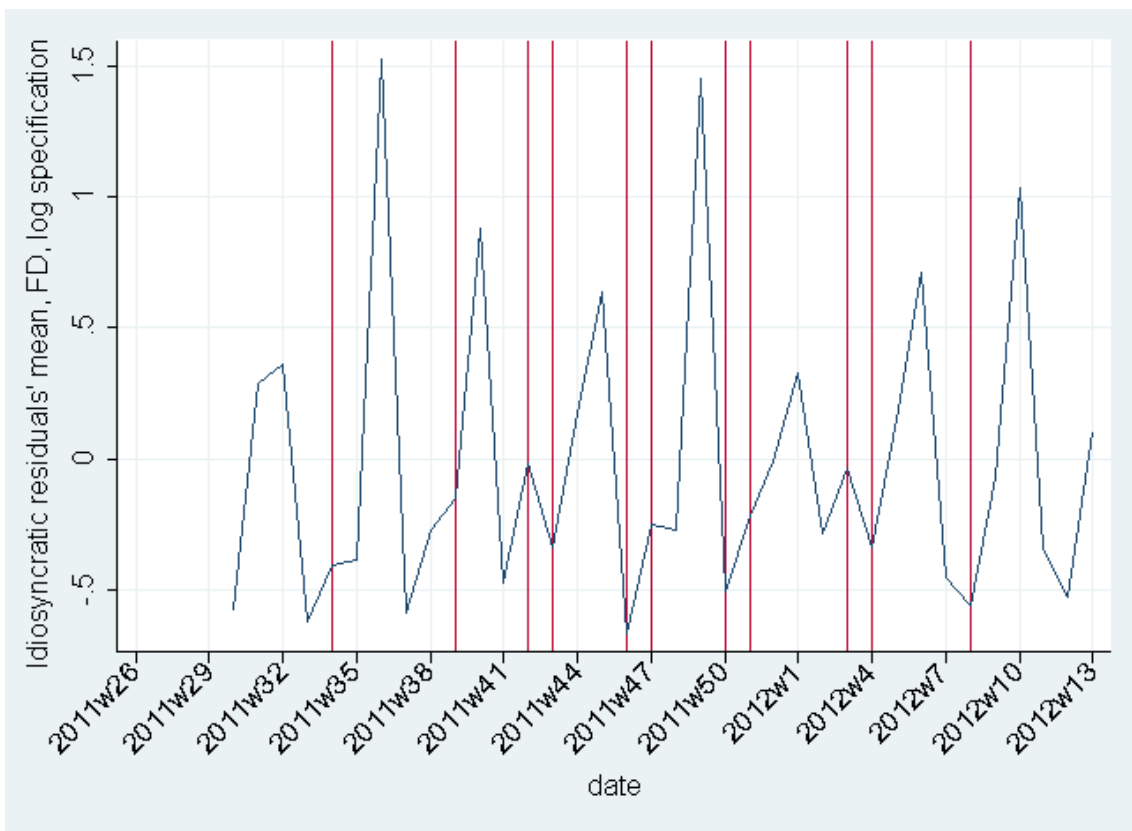
Figure 11: Contemporaneous news shocks and consumption



The justification for the use of information shocks lagged once is the same as that developed in section 3 of this paper: the way weekend incomes and expenses are collected, and the time required for movements in consumption to be visible in the data calls for considering specifically the week that follows any unexpected shock.

However, as we can see from table 8, lots of the events took place at the beginning of the week, so that it remains interesting to consider the effects of consumption the same week the shock happened, with the exception of one notable news shock that happened week 49, where the information that Moody’s investors downgraded France’s three biggest banks corresponds to a high contemporaneous increase in expenditures as we can see from figure 11. However, we can notice that the news was released on a Friday, so that the effect on consumption of such a major shock cannot be found in the week where the shock happened, but the following one. This is exactly what we see from figure 12.

Figure 12: News shocks lagged once and Consumption



We observe hence that the average response of consumption to these shocks (once orthogonalized with respect to all significant lags in income) is extremely large: a shock that happens a given week is expected, all other things being equal, to decrease consumption contemporaneously by about 11% on average as calculated from the table from which figure 11 is extracted, by almost 32% on average the following week, and by 9% on average two weeks after.

These figures suggest that people integrate instantaneously in their consumption plan any pessimistic news about the future when it is broadcast in the media, and become pessimistic in return. This sharp decrease in consumption in the lead up to better news could be likened to a kind of “panic” about the future of the economy and therefore the potential growth of future incomes. This panic however seems very short-lived as figure 11 shows, and is found systematically offset by a strong increase in spending in the two or three weeks that follow the news shock.

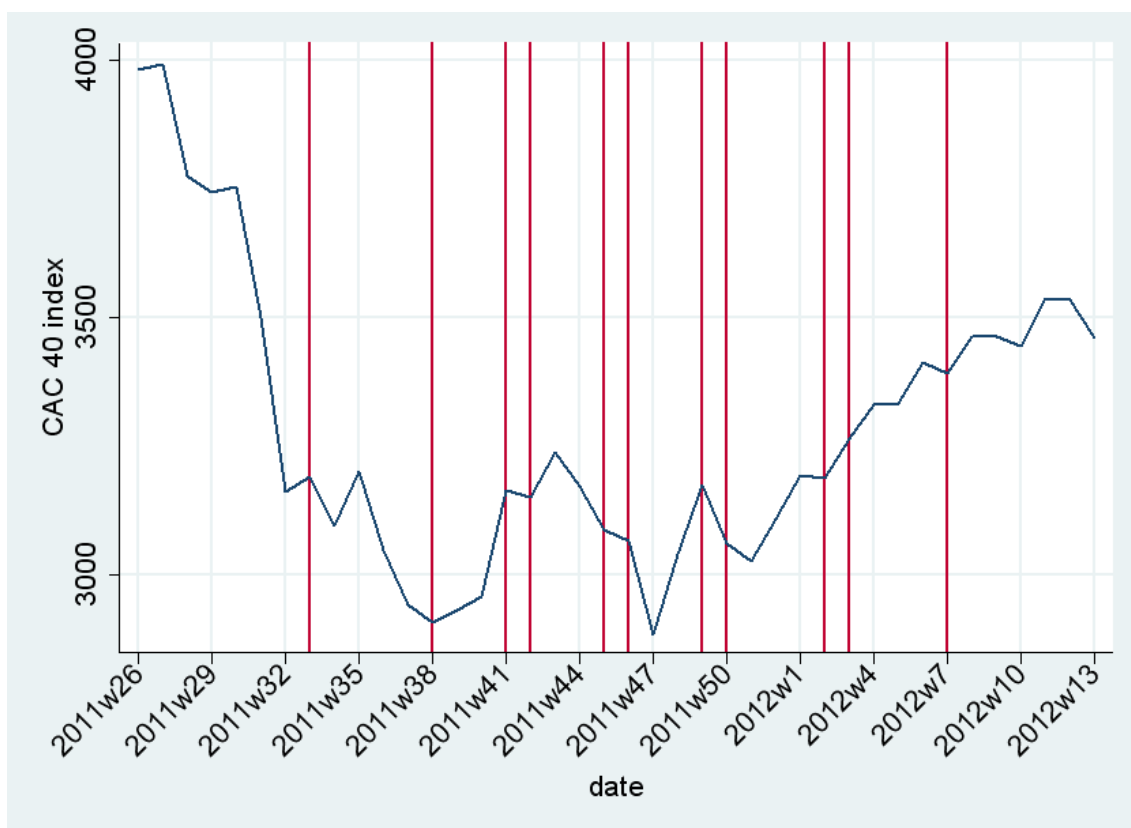
Hence, we have shown that people were systematically responding to negative economic, political and

financial information by a sharp decrease in consumption. Thus, if we succeed in showing that stock market prices incorporate these news shocks, we could thus close our discussion about the relation between stock market returns and consumption, as it would demonstrate that their fluctuation are triggered by the same kind of information, and so that they have the same source.

4.2.2 News shocks and stock market prices index

When we link the news shocks with the CAC 40 price index series as we did on figure 13, we observe that the former correspond most of the time to a contemporaneous decrease in stock market prices, but this relation is not systematic.

Figure 13: Contemporaneous news shocks and CAC 40 price index



We can nevertheless notice, following MacKinlay [1997], that market operators may have superior information about upcoming news, so that the expectation of an event may already be incorporated into stock prices prior to the actual announcement, one week or sometimes even more in advance. A look at pre-event returns can thus be relevant in case we observe an ambiguous increase in stock market linked with a news shock.

We conclude that stock market prices do most of the time incorporate the news that people are informed with. And as people's consumption has been shown to react on average very robustly to news shocks, we can think that the reason why they also react to stock market shocks is that stock market prices do incorporate the news that people are informed with.

This statement can be furthermore tested over our sample period, nevertheless on a wider frequency, by looking at a direct measure of consumers' confidence constructed by Insee and cross its variations with the variations of stock market prices

4.2.3 Stock market prices index and the Monthly confidence consumer survey

Figure 14 plots the CAC 40 index along with the Monthly confidence consumer survey between January 2000 and July 2012. The positive correlation between the two series is quite straightforward and is prevalent throughout the entire sample period. The same observation can be made when we restrict our observations to the specific period going from July 2011 to March 2012, as shown by figure 15.

Figure 14: CAC 40 price index and Monthly confidence consumer index (January 2000 - March 2012)

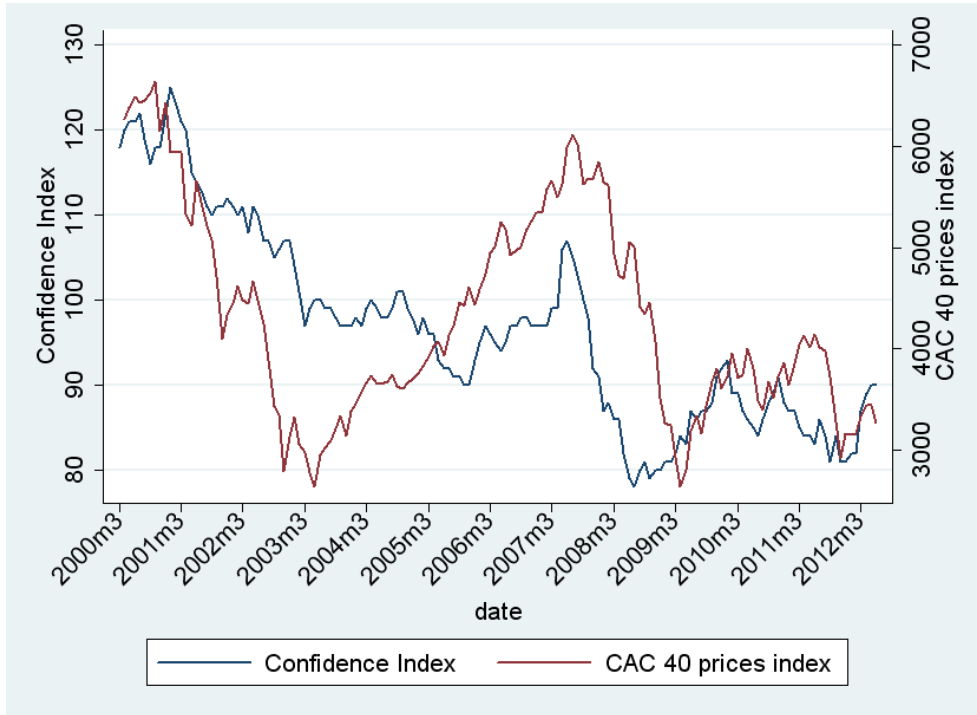
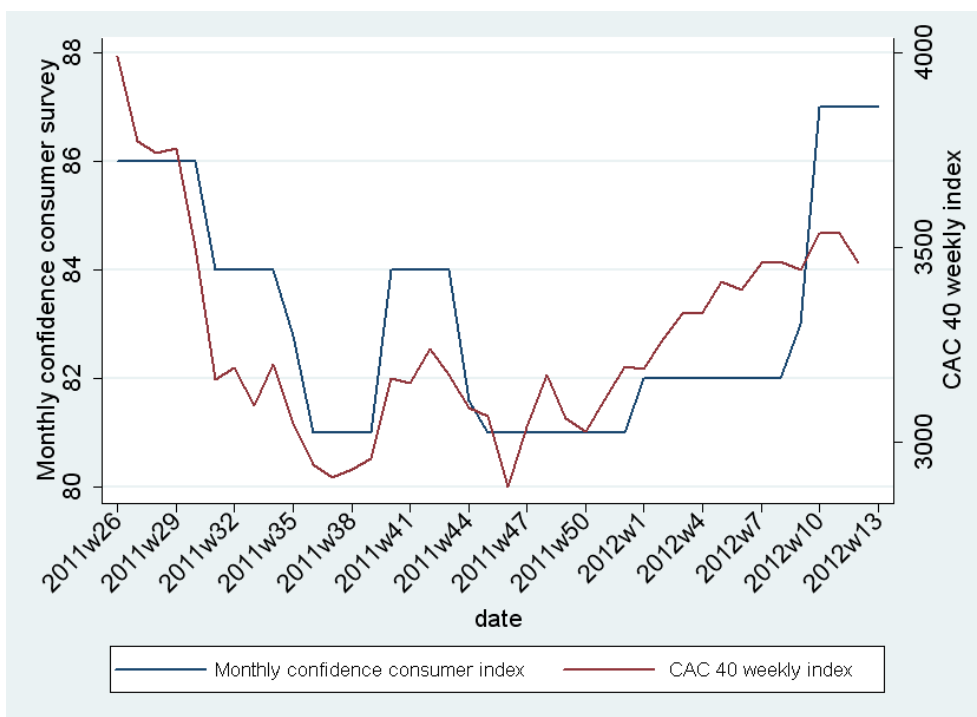


Figure 15: CAC 40 price index and Monthly confidence consumer index (July 2011 - March 2012)



We can see that these series are the mirror images of each other: stock prices and confidence measures reflect similar forces (although their frequencies unfortunately differ). We can easily extrapolate from these graphs that there is a strong correspondence between the expectations of both investors and consumers, and so that the information that stock market operators use in forming their expectations about future dividends is roughly the same as the one used by consumers in forming their expectations about future incomes.

Hence, we can infer that the reason why consumers react so strongly to stock market shocks in the very short term is that consumption and stock market volatility are driven by the same common source: confidence shocks.

Consequently, for instance, a negative piece of information will steer down simultaneously market operators and consumers expectations, which will in turn influence stock market returns and consumption plans, the former probably in advance of the latter.

Hence, the distinction made by Barsky and Sims [2006] between the “animal spirits view” and the “Information view” does not hold anymore over the short run. Our results suggest a middle position. There is a correlation between confidence and real activity because news shocks contain information about the future of the economy. News shocks affect confidence which in turn affects consumption over the very short run. This is in line with the “information view”. However, these shocks are associated with short term overshooting of consumption which attenuates rapidly when agents come to grips with their overreaction. This is a consequence of the “animal spirits” theory, although according to the latter, fluctuations in beliefs are described as autonomous, which is likely not to be the case as they were proved to react to specific identifiable information shocks.

5 Conclusion

Our paper is a first attempt at trying to understand empirically the very short term fluctuations in consumption. We have used a novel and unique database that provided us with weekly micro data on consumption and income for more than 1200 individuals.

First, we have discovered that people tend to increase their consumption immediately after an income is received, and this reaction seems to attenuate and then disappear a month after this income is collected.

Second we have focused on the very short term relationship between consumption and stock market returns. We have found that people, whatever their level of income or wealth, decreased (respectively increased) sharply their consumption, all other things being equal, when stock market prices experienced a decrease (respectively increase). A deviation of 1% of stock market return in given week results in a 20% deviation in consumption from its own mean the following week, 7% the second week, and -2% the third week. This large response of consumption seems however to vanish four weeks after the shock happened.

This positive and significant - but probably overestimated - weekly correlation between stock market prices and consumption is also visible on a monthly frequency and appears to be smoother: a 1% negative deviation of monthly CAC 40 returns will lead on average to a decrease of monthly consumption of 10% with respect to consumption's monthly average.

We also discovered that weekly stock market returns explained approximately 10% of the weekly volatility of the mean part of consumption that is not explained by fluctuations in income, while monthly stock market returns are found to explain up to 72% of the monthly part of consumption not explained by monthly income.

Thirdly, we tried to understand the nature of this relationship, and investigate whether the underlying channel at work is a wealth effect or an indirect confidence effect. We took as a proxy for financial wealth the amount of money people detain on their various bank accounts. We discovered that when a stock market shock hits there is no relation between the amounts of spending people saved or dissaved and their supposed level of financial wealth. This result is likely to disclose the wealth effect hypothesis in trying to understand the very short term relationship between stock market fluctuations and the volatility of consumption.

The remaining hypothesis, the confidence channel, has been formally tested by an evaluation of the response of consumption to what we called a pure information shock, that is to say widely broadcast news that carried a negative perspective for the future of the economy. We have shown that people reacted systematically to the latter by a sharp decrease in their consumption all other things being equal.

Then, linking these news shocks with stock market price index, we discovered that the former were most of the time incorporated into the latter, sometimes a week in advance. But mostly we have linked the stock market prices index with a forward-looking monthly measure of consumers' confidence, and we have seen that both series were the mirror images of each other.

These latter findings enable us to make conclusions about the nature of the relationship between stock market returns and changes in consumption: the common source of their variations seems to be confidence shocks. News about economic, political or financial events affects the information set that conditions the expectations of both stock market operators and consumers. In turn, this leads them to change respectively their evaluations of stock prices and their forecasts about future income. This is likely to explain the short term reaction of consumption to stock market returns.

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6 Appendix

Table 9: Categories & Subcategories

Categories	Subcategories
Subscriptions	subscriptions – other, cable, satellite, internet, phone, mobile phone
Banking and Insurance	bank – other, credit card, savings, banking fees, mortgage, credit card payments, loan reimbursement, banking service, student loan
Various	to be categorized, donations, unknown
Professional expenses	professional expenses – other, office supplies, shipping fees, printing fees, office maintenance, expense reports, advertising, online services
Aesthetics and Care	hairdresser, cosmetics, aesthetics, aesthetics and care – other, spa & massage
Taxes	finances, taxes – other, property taxes, income taxes, taxes
Education and Children	babysitter and nursery, school, school supplies, toys, pension, education and children – other
Food	restaurant, café, fast food, supermarket and grocery store, food – other
Withdrawals	withdrawals
Checks, Transfers, Rents and Charges	checks, transfers, rents, home insurance, insurance, water, gas, electricity, various charges, student accommodation
Auto and Transportation	fuel, public transportation, plane tickets, parking tickets, car rental, vehicle maintenance, toll
Leisure and Hobbies	entertainment, bar & clubbing, cultural trip, leisure and hobbies – other, pet fees, hobbies, sports, trip and holidays, hotels, winter sports
Shopping	clothes and shoes, music, gifts, high tech, shopping – other, books, sporting goods, movies & DVD's, other expenditures, pressing, tobacco
Health	dentist, mutual, doctor, optician, optometrist, pharmacy, health – other

Table 10: The weekly response of consumption to income shocks - First Difference model

Variables	Δ Expenditures	Variables	Δ log(Expenditures)
Δ Income _t	0.36*** (0.06)	Δ log(Income _t)	0.09*** (0.004)
Δ Income _{t-1}	0.15*** (0.03)	Δ log(Income _{t-1})	0.07*** (0.004)
Δ Income _{t-2}	0.08*** (0.02)	Δ log(Income _{t-2})	0.04*** (0.004)
Δ Income _{t-3}	0.03*** (0.009)	Δ log(Income _{t-3})	0.02*** (0.003)
Observations	28.232		27.429
R-squared	0.15		0.056

Notes: Robust standard errors in parentheses

** $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$*