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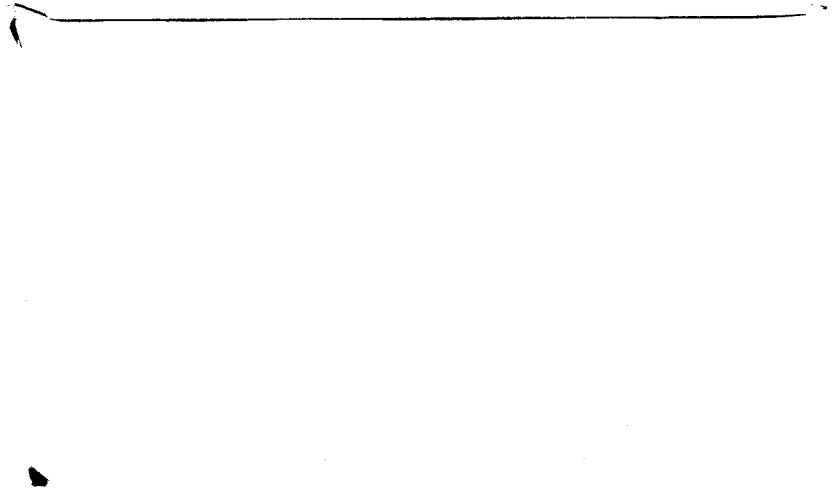
**Consumer confidence and consumer spending
in France**

Tassos Belessiotis



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Consumer confidence and consumer spending in France

1. Introduction

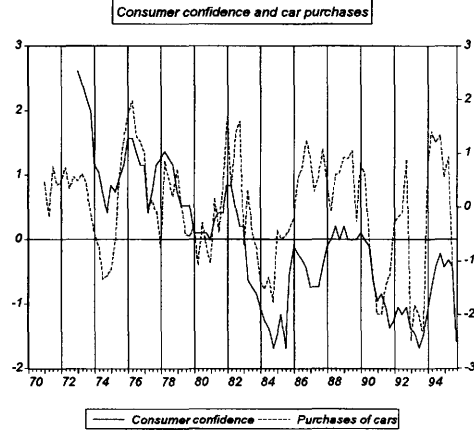
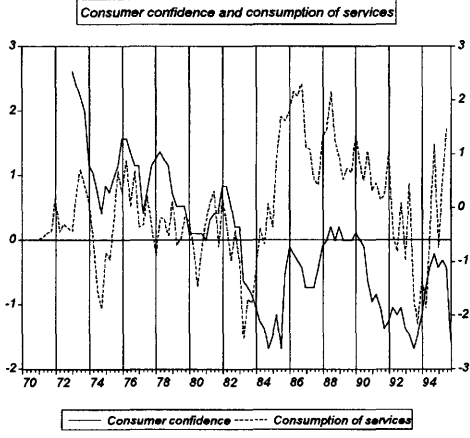
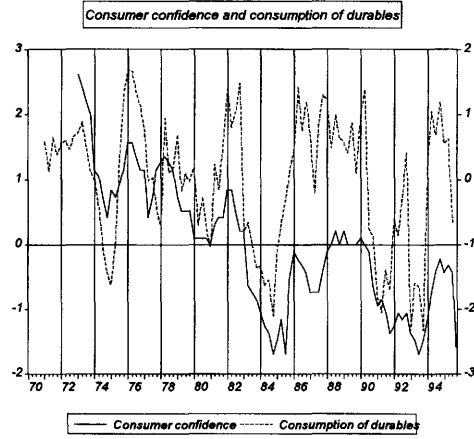
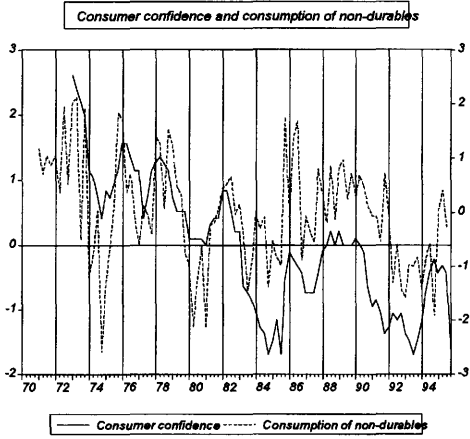
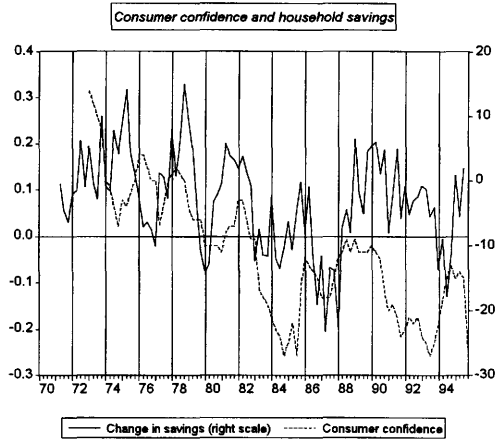
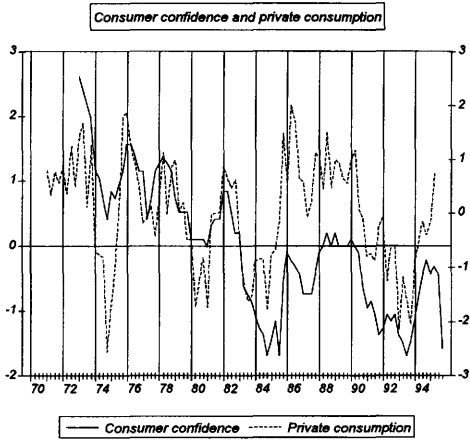
Over much of the period since the late 1970s consumer confidence in France, according to the consumer surveys prepared by the Commission, has generally been weak, with the balance between those consumers responding positively and those responding negatively to the questionnaire, in percentage terms, being negative. The negative balance peaked in 1984:Q4 and 1985:Q3 (-27) and, subsequently, in 1993:Q3 (also -27); corresponding to these periods, private consumption spending also troughed. Following some considerable strengthening after 1993:Q3, consumer confidence has continued to remain weak, with the balance of respondents with negative sentiment dominating the survey¹ - see Graph 1. Such weakness has correlated highly with consumer spending and it appears to presage a downturn in economic activity. These concerns have become particularly pronounced since the last quarter of 1995 and in the beginning of 1996 when, once more, consumer sentiment has dipped towards the level of previous troughs.

As can be seen in Graph 1, where the annual change in consumer spending measured in real terms and the balance of responses in the survey are shown, these concerns are generally supported by the strong correlation between consumer confidence and consumer spending. In the sample 1973:Q1-1995:Q2, the highest correlation in the data shown in Graph 1 is between consumer confidence and spending on consumer durables (0.51), and the weakest between confidence and consumption of services (0.02); the correlation with consumer non-durables is 0.46 and the correlation with purchases of cars is 0.45, while the correlation for total consumption spending and consumer confidence is 0.48². These correlations are generally consistent with the intuition that the state of confidence may have an impact on the flow of spending. Typically, consumption theories do not assign an independent role to consumer confidence in explaining consumption. Thus, permanent income or life-cycle theories argue that current spending reflects largely flows out of expected income rather than current income. Therefore,

¹ The survey is based on four main themes: households' opinion on the general economic situation affecting consumption and savings; opinion regarding their personal financial situation and their ability to save; purchase intentions for consumer durables; and housing intentions. For a description of the survey and the methodology, see European Economy (1991).

² For the sample 1973:Q1-1994:Q1 the correlation coefficient between the growth in total consumption and the confidence indicator is 0.66; between the growth in the consumption of durables and the confidence indicator is 0.61; with the consumption of non-durables, 0.55; with the consumption of cars, 0.53; and with the consumption of services, 0.59.

Graph 1
France: Consumption, savings, and consumer confidence



consumer confidence by itself should have no explanatory power in consumption functions. Nevertheless, the correlation between consumer confidence and spending may reflect the fact that when household expectations about family (or general) economic prospects deteriorate this may not only restrain current spending but it may also contribute to giving negative responses to surveys; thus a contemporaneous positive correlation between consumer sentiment and consumer spending could be interpreted as reflecting the indirect relationship between consumer confidence and income prospects, and in this regard it is entirely consistent with the conventional consumption theories. In this case, it is of interest to examine what information the confidence indicator for French consumer encompasses in the determination of consumption. In particular, two questions may be raised: first, does the indicator of consumer confidence predict on its own future changes in consumption; and, secondly, does consumer confidence have independent information, over and above the information of other determinants of consumption, about future prospects for consumption?

If consumer confidence predicts changing income prospects, it is likely that it is correlated with household savings. The top right-hand side window in Graph 1 shows the change in savings and the confidence indicator. It is evident that there is a negative correlation between the two, variables, and when in particular in the 1990s savings increased as confidence declined. The saving rate troughed 1987:Q4 at 9.8 percent of household income, bringing to an end the negative trend in this ratio, but it has since risen to close to 14 percent in 1995³. Ostry and Levy (1995) suggest that of all possible explanations of savings behaviour in France in recent quarters the role of precautionary motives is the most important⁴. Using Campbell's (1987) idea that savings is a predictor of declines in future income, a clear implication of the permanent income hypothesis, they show that a measure of constructed permanent income forecasts quite well savings changes, and that the rise in savings during recent years may be associated with a less optimistic outlook concerning the flow of expected income. However, they found no effect from the variability of income, the pure precautionary motive.

These issues have become important especially since the latest drop in consumer confidence has occurred at the same time as the government has proposed measures to reform France's social security system and it has re-affirmed its commitment to meeting the budgetary convergence criteria within the timetable of the Union Treaty. Also coincident to this has been the slowdown of the economy, with consumer spending accounting for a large part of this, and the persistently high saving ratio. It is possible to argue that the deterioration of consumer confidence mirrors a downward revision of permanent income on the part of households, itself associated not only with the plans to reduce the social security deficit but also with uncertainty arising from the persistence of unemployment; this would imply that consumer confidence could correlate with the expected level of future income, as seen from the present perspective, but also with its

³ This is significantly lower than the levels reached in the 1970s when a peak of slightly over 21 percent of household income was registered (1974:Q4 and 1978:Q4); the halving of the saving ratio may have been induced by the gradual financial liberalisation which has been taking place particularly since 1980.

⁴ The other explanations are that savings behaviour is reflecting the impact of disinflation-induced high real interest rates, or wealth effects associated with asset price deflation.

variability, possibly associated with the objective probability of becoming unemployed, the rate of unemployment.

Whether it is appropriate to postulate the relationship between consumer confidence and consumer spending through the permanent income hypothesis depends on whether French consumers behave in the manner consistent with the permanent income hypothesis. When all or a fraction of consumers are found to behave in a manner inconsistent with the permanent income hypothesis, this evidence alone amounts to a rejection of the permanent income hypothesis itself. Previous work on French consumption functions suggests that a substantial fraction of consumers determine their consumption out of current rather than permanent income⁵ thus rejecting the permanent income hypothesis. In this case, a decline in confidence may forecast a decline in current consumption (growth) since confidence reflects current rather than permanent income prospects. It is of interest, therefore, to examine whether the data suggest that French consumers behaving according to the predictions of the permanent income hypothesis dominate the sample.

The larger the share of current-income consumers in the sample, the greater the impact of fiscal shocks to consumption will be; when such consumers dominate the sample, fiscal consolidation through expenditure cuts and/or tax increases, by affecting current income, it affects directly consumption growth. More generally, when the permanent income hypothesis is rejected by the data, or, equivalently, when current-income consumers are present in the sample, then the response of consumption to transitory fiscal actions (temporary tax and expenditure changes) is substantially greater than predicted by the permanent income/consumption smoothing hypothesis. One interpretation of the reluctance some Union governments reveal in undertaking and in fully implementing fiscal adjustment has been the possibility that the output costs of such actions will be large; this conjecture, among other things, is consistent with the presence of consumers who do not behave in a manner consistent with the permanent income hypothesis. Without constructing estimates for expected income, this issue is taken up in an empirical sense that the data are permitted to reveal historical correlations on their own.

The present note is organized as follows: in section II some preliminary evidence on the role of the consumer confidence indicator as a predictor of consumption growth is reviewed; in section III the Campbell-Mankiw (1991) model, which is used as a vehicle to determine the fraction of current-income consumers in France, is discussed; in section IV the estimation results from this model are presented; in section V the model is augmented by allowing a role for the rate of interest and for some other specification issues; in section VI the role of financial liberalization in making possible a reduction in the share of current-income consumers is reviewed; in section VII the question of policy and other shocks as determinants of the variance of consumption growth is addressed through a simple vector-autoregressive (VAR) model; in section VIII a related question concerning the long-term relationship between consumption growth, income growth, and the real rate of interest as well as its short-term dynamics, is discussed through a VAR framework; and, finally, section IX concludes. The sources and time-series properties of the data used in the empirical work is discussed in an accompanying Annex at the end of the paper.

⁵ See Campbell and Mankiw (1991).

II. Preliminary evidence on the role of consumer confidence

Granger-causality tests provide strong support to the hypothesis that the consumer confidence indicator contains information relevant to the forecasts of consumption. As can be seen from Table 1, where total and four categories of consumption are used on the sample 1973:Q1-1995:Q4 (see annex Table A1 for the data sources), the null hypothesis is decisively rejected in each case, and the probability value is virtually zero in all cases except in consumption of services; but even here, the probability value is in the range of 1 percent.

We turn now to the question of how much explanatory power does the consumer confidence indicator has in predicting private consumption. In order to examine the information content of the confidence variable alone, reduced-form regressions were prepared where the dependent variable is a category of expenditure and the independent variable initially is a vector of four lags on the confidence indicator; in the second stage, a broadly similar equation was estimated with addition of other appropriate explanatory variables. The predictive power of the variable alone and relative to the other variables is then examined by comparing the adjusted R² of the first set of regressions with that of the second set of regressions for total consumption and for each consumption expenditure category⁶.

The general form of the equations is as follows:

$$\Delta \log(C_i) = a + \sum_{i=1}^4 b_i \cdot ICC_{t-i} + h \cdot Z + e_t \quad (1)$$

where $\Delta = x_t - x_{t-4}$, C = private consumption (1980 prices) aggregate and disaggregated into consumption of durables, consumption of non-durables, consumption of cars, and consumption of services; ICC = consumer confidence indicator, balance between positive and negative replies to the questionnaire⁷; and Z is a vector of other relevant variables which will be discussed below; all consumption and income measures are seasonally adjusted in 1985 prices. In order for the confidence variable to have predictive power, particularly if it reflects predictions about future income, then lagged rather than contemporaneous values of ICC should enter the equation; these lags were set at four quarters ($i = 1$ to 4). Note that all the consumption variables and the ICC variable are $I(1)$, as discussed in the annex. In the first set of regressions vector h is set to zero⁸.

The results are presented in Table 2. As can be seen in the first column, the confidence indicator has substantial explanatory power in all cases, and in all cases the probability that the set of the b_i coefficients is zero, is zero; thus, the reported adjusted R² is non-random

⁶ This strategy is followed by Carroll, Fuhrer, and Wilcox (1994).

⁷ See footnote 1.

⁸ In this case, the equation could be used to provide an indirect test of Hall's (1978) model that the change in consumption from the previous to the current quarter cannot be predicted if consumers are reasonably well-informed and consume out of permanent income, because the difference in their expectation about permanent income between last quarter and the current quarter is also unforecastable. Hall's random walk hypothesis requires that, jointly, coefficients $b_i = 0$; this restriction can be tested.

Table 1 Granger-causality for consumer confidence and consumption spending (probability values in parentheses)		
Null: Consumer confidence does not Granger-cause:		
	Lag	F
Total consumption	3	5.26 (0.002)
Durables	3	6.93 (0.000)
Non-durables	3	4.61 (0.005)
Cars	3	5.17 (0.003)
Services	6	2.92 (0.013)

Lags were chosen so that the value of the F statistic is maximized; this is consistent with minimizing the Akaike final prediction error criterion; the p values measure the extent to which the relationship is random.

Table 2 The predictive power of consumer confidence in reduced-form consumption equations (probability values in parentheses)			
	R ²	Incremental R ²	
		Disposable income	Labour income
Total consumption	0.49 (0.000)	0.00 (0.054)	0.00 (0.061)
Durables	0.55 (0.000)	0.05 (0.000)	0.04 (0.000)
Non-durables	0.24 (0.000)	-0.05 (0.112)	0.00 (0.157)
Cars	0.48 (0.000)	0.04 (0.010)	0.02 (0.017)
Services	0.28 (0.000)	-0.02 (0.023)	0.00 (0.009)

The R² is the adjusted R²; the incremental adjusted R² reflects the contribution of consumer confidence to the prediction of each category of consumer spending in the general equation; under the null hypothesis that all the coefficients on the consumer confidence variable are zero, the probability value tests whether this is random.

and, furthermore, consumption itself does not follow a random walk, an indirect refutation of the permanent income hypothesis⁹. The lags on consumer confidence variable explain 49% of the variance of total consumption, and as much as 55% of the variance of the consumption of durables and 24% of the variance of the consumption of non-durables.

We now examine whether the information of the consumer confidence variable survives when other determinants of private consumption are taken into consideration in the equation. This amounts to specifying explicitly vector Z in equation (1). A simplest way to achieve this is to make use of the assumption that consumption depends on disposable income. Clearly, this would violate the permanent income hypothesis, but for the present, this assumption is intended to simply reveal the information power of the consumer confidence indicator. In addition to income, lagged values of the dependent variable are also included in the information set. Results based on such a specification are presented in the second and third columns of Table 2. The result report the incremental adjusted R² due to the consumer confidence indicator when the complete equation (1) is estimated.

The income variable used in the estimation is total disposable income. If the French economy is composed of life-cycle and of current-income consumers, then it is appropriate to use actual accruing income in the equation as the relevant explanatory

⁹ See footnote 8; the literature which essentially rejects the permanent income hypothesis in its pure form is large; see some discussion in Attanasio and Browning (1995).

variable¹⁰. The equation is defined over various lags on the independent variables chosen up to the one which maximized the adjusted R².

It is clear that the confidence indicator does not survive in its entirety as a statistically significant variable in this reduced-form equation. It contributes nothing to the explanation of the variance of total consumption in either specification; it has a zero or negative contribution to the variance of the consumption of non-durables and services; and it only contributes to explaining anywhere between 2 percent and 5 percent to the variance of consumption of durables and of cars. Furthermore, in the case of non-durables the probability value is between 11 and 16 percent.

The present results compare favourably with those of Carroll, Fuhrer, and Willcox (1994) based on US data. They also find that the incremental contribution of the US consumer confidence indicator to the variance of US consumption is limited and, depending on the sample¹¹, it is negative in the case of total consumption and in consumption of services. In both France and the US, consumer confidence does not contribute incrementally to the explanation of the variance of service consumption or total consumption; on the other hand, it plays a modest role in the prediction of car purchases and, in the case of France, in the prediction of durables. It is possible that both consumption of durables and of cars require a greater financial commitment than the consumption of non-durables and services. In such a case, French consumers may be behaving in a manner consistent with the permanent income theory in the case of purchases where the flow of services is not simply instantaneous, and as rule-of-thumb consumers in the case of instantaneous consumption (non-durables and services). In the former case the financing of consumption may be related to the flow of permanent income; in the latter case, it may be affected by current-income considerations. Thus, the role of consumer confidence can be seen as a predictor of income growth for rule-of-thumb consumers.

III. Current-income consumers in France: The Campbell-Mankiw model

Campbell and Mankiw (1991) have proposed a simple modification of the lifecycle/permanent income hypothesis¹². They start from the assumption that not all consumer are optimizing their consumption by consuming out of permanent income, but that some of them, a fraction λ , set their consumption equal to their current income. Leaving "open the question of why any consumers should set their consumption equal to their current income"¹³, they focus on the implications of this assumption.

¹⁰ Campbell and Mankiw (1991) estimate, on quarterly seasonally adjusted 1972:Q1-1988:Q1, that at most all, and at least 65%, of French consumers, depending on equation specification, consume out of current income; see their Tables 1 and 3.

¹¹ Carroll, Furher, and Wilcox (1994) use a quarterly sample 1955:Q1-1992:Q3 and a monthly sample 1978:M1-1992:M3.

¹² Campbell and Mankiw draw on a long intellectual tradition on consumption function studies; see the references in Campbell and Mankiw (1991). However, their model is not without its critics; see Cochrane (1991), for example.

¹³ Campbell and Mankiw (1991): p. 728.

The model implies a consumption function of the following form:

$$C_t = \lambda * Y_t + (1-\lambda) * YP_t \quad (2)$$

where C = consumption, Y = aggregate current household income, YP = permanent income, and λ is the fraction of consumers whose consumption equals their income. An interpretation of this specification is that aggregate consumption is a weighted average of consumption out of current income and out of permanent income consumers, with the weights representing the share of consumers in the population who receive a fraction λ of aggregate income, and a share of consumers who receive a fraction $(1-\lambda)$ of aggregate income. A significant coefficient for λ is evidence that the permanent income hypothesis does not hold in the data. Furthermore, λ can be interpreted as representing the "excess sensitivity" of consumption to current income¹⁴ due to the fraction of current-income consumers in the sample.

Savings, defined as the difference between current income and consumption, is given in this model by:

$$S_t = -(1-\lambda) \sum_{i=0}^{\infty} (1/r)^i E_t[\Delta YL]_{t+i} \quad (3)$$

where S = savings, r = gross rate of interest, E = expectations operator, and YL = labour income equal to the flow labour compensation ($i = 0$ to ∞). Savings function (3), first proposed by Campbell (1987), can be derived from the permanent income hypothesis. It is clear that savings is a predictor of future declines in labour income. If consumers have any information additional to the history of income itself, then it is savings which must have such information about income. Indeed, for (3) to hold it is necessary that savings Granger-causes labour income, a hypothesis supported in the data¹⁵.

Recognizing that both consumption and current income are non-stationary, and also that the flow of permanent income is unforecastable from period to period, equation (2) can be written as:

$$\Delta C_t = \lambda * \Delta Y_t + (1-\lambda) * \Delta YP_t = \lambda * \Delta Y_t + (1-\lambda) * \varepsilon_t \quad (4)$$

where $\Delta X_t = X_t - X_{t-1}$ and ε represents the fact that the flow permanent income is unforecastable, an assumption consistent with Hall's (1978) hypothesis. Equation (4) is the basic estimating equation and can be re-written as:

$$\Delta C_t = \lambda * \Delta Y_t + (1-\lambda) * \varepsilon_t = k + \lambda * \Delta Y_t + u_t \quad (5)$$

¹⁴ The term "excess sensitivity" is due to Flavin (1981) and it is used to describe statistically significant coefficients on current or lagged income terms in consumption equations; the permanent income hypothesis predicts that these coefficients would not be different from zero since, in its pure form, consumption can be represented as a random walk; see footnote 8.

¹⁵ The hypothesis that savings Granger-cause labour income yields an F-statistic equal to 4.09 (p value = 0.004); the hypothesis that savings Granger-cause total disposable income yields an F-statistic equal to 4.52 (p value 0.001); the hypothesis that disposable income Granger-causes savings is rejected decisively in the sample 1970:Q1-1995:Q4.

where k is a constant and u_t is an error term which, as will be discussed below, is assumed to follow a moving average process MA(1).

Campbell and Mankiw (1991) note the following implications of the model¹⁶: first, they show that if changes in current and changes in permanent income are not highly and negatively correlated, then the R^2 obtained from a regression of consumption on all the relevant variables will be lower than the R^2 from a regression of disposable income on all the relevant variables; by implication, whatever the value of λ , if changes in income are not forecastable, then changes in consumption will not be highly forecastable either; secondly, since only the permanent income consumers save, then household savings will be a multiple $(1-\lambda)$ of its value under the permanent income hypothesis; it is, as a result, perfectly correlated with forecast declines in labour income, but it is less variable¹⁷; thirdly, the model suggests that consumption will be smooth since the variability of the change in consumption equals λ times the variance of current income plus $(1-\lambda)$ times the variance of permanent income plus the λ -weighted covariance; this variability will be less than either the variance of current income or the variance of permanent income, as long as the covariance term is not too large; and, finally, the model implies that consumption and disposable income follow an error-correction process by both being forecast by savings.

Since u_t in equation (5) may be correlated with ΔY estimating the equation by OLS is not appropriate and an instrumental variables technique would be necessary. However, various authors have stressed that, even if consumers consume out of permanent income, the error term in equation (5) will follow a moving-average process MA(1)¹⁸. Since this is the maintained hypothesis for the specification of the model, the estimate for the coefficient on the moving average process is of critical importance. Assuming that all the most recent information is relevant for the determination of consumption, that is, all information dated from $t-1$ and before, equation (5) can be written as the basic estimating model:

$$\Delta C_t = k + \lambda \Delta Y_t + w_t - \theta w_{t-1} \quad (6)$$

where w is the orthogonal error term and θ is the moving average parameter; the latter can be estimated directly through an iterative non-linear method; the results depend crucially on whether the assumption regarding the error term is supported in the data, that is, on whether the θ coefficient is statistically different from zero .

Equation (6), augmented with the consumer confidence indicator, is also estimated in the next section. It is essential to note, however, that lagged values of the confidence indicator, according to the lifecycle/permanent income hypothesis, cannot be admitted in

¹⁶ See Campbell and Mankiw (1991) for the details.

¹⁷ This is consistent with the Ostry and Levy (1995) model mentioned previously.

¹⁸ See Carroll, Furher, and Wilcox (1992) and Attanasio and Browning (1995). One interpretation of this hypothesis is that consumption decisions are made continuously but the data are measured as time-aggregates; another is that the change in spending will be MA(1) if consumption refers to a durable good; and yet another is the presence of measurement errors. Attanasio and Browning (1995) argue that in their model, even in the absence of measurement error, taking the first difference in data of cohort means induces MA(1) errors.

the equation as an independent variable unless they reflect predictions about future income growth; in this case, it could only be admitted as an instrumental variable for current income growth. An alternative hypothesis is to postulate that consumer confidence has independent information on its own, not only as a predictor of current income growth, but also about private consumption spending. This could be the case where the indicator also reflects household uncertainty and, in this regard, it would be correlated with changes in savings¹⁹.

IV. Estimation results from the basic model

The data used in the estimation of model (6) are: aggregate private consumption, private consumption of durables, non-durables, cars and services; and household disposable income; the data, which are in 1980 prices, are quarterly 1970:Q1-1994:Q4, from the "Séries Trimestrielles de Comptabilité Nationale de l' INSEE" databank - see Annex for details.

Two versions of the model are estimated, one without the consumer confidence indicator, and a second with this variable. Estimation results are presented in Table 3. The sample is 1970:Q1-1994:Q4; instrumental variables have been used, with a constant and the following instruments, lagged up to four periods: change in consumption, change in income, and change in the rate of unemployment. Lags are dated from period $t-1$ to allow for the MA(1) error structure. In accordance with Campbell and Mankiw (1991), the data are specified in terms of logarithmic differences²⁰. The maintained hypothesis is that λ is different from zero and, therefore, the permanent income hypothesis is not consistent with the data.

As can be seen from the first two columns of Table 3, the results provide decisive support for the model and for the specification hypothesis concerning the behaviour of the error term. In all the equations the coefficient θ is very well determined and highly significant²¹. The value of the estimate for the share of consumers to whom current income accrues is approximately 60 percent, substantially smaller than the Campbell-Mankiw estimate of between 65 percent and 100 percent. The present results may well reflect the impact of financial liberalization on consumption in France, information which was not included in the Campbell-Mankiw sample 1972:Q1-1988:Q1 - we return to this issue later. Note also that the results essentially reject the permanent income hypothesis because they suggest a significant presence of current-income consumers in the sample. This, as noted previously, has important implications for the conduct of stabilization policy.

At the same time, however, there are considerable differences in the estimate of λ across the four categories of consumption. In the cases of durables and cars, the estimate ranges

¹⁹ See Carroll, Furher, and Wilcox (1994) for some speculation about why consumer confidence may be relevant for predicting private consumption growth.

²⁰ See Campbell and Mankiw (1991) for the implications of the logarithmic specification.

²¹ This contrasts with the Carroll, Furher, and Wilcox (1994) results where the moving-average error generating process is rejected on the US data.

Table 3
The basic Campbell-Mankiw model
on French consumption data
(Instrumental variables estimates,
absolute t-statistics in parentheses)

Dependent variable	Without confidence indicator		With confidence indicator		p value
	λ	θ	λ	θ	
Consumption	0.59 (5.93)	0.76 (10.05)	0.20 (1.87)	0.61 (5.91)	0.000
Durables	1.94 (4.66)	0.76 (10.15)	-0.46 (0.96)	0.53 (5.30)	0.000
Non-durables	0.61 (5.58)	0.94 (21.98)	0.32 (2.60)	0.27 (2.21)	0.211
Cars	1.63 (3.50)	0.77 (10.11)	-0.80 (1.29)	0.48 (4.63)	0.002
Services	0.29 (5.33)	0.65 (8.39)	0.21 (2.99)	0.60 (6.72)	0.331

Instruments in the first set of regressions are a constant, four-period lags in the dependent variable, the change in real labour income variable, and the change in the rate of unemployment; in the second set of regressions, a constant, four-period lags on the consumer confidence indicator have also been included in the instrument list; the p value tests that the coefficients on the lagged confidence indicator are zero.

between 1.63 and 1.94; in the cases of services and non-durables, it ranges between 0.29 and 0.61. A pattern similar to this, except in a slightly different aggregation, was found by Carroll, Furher, and Wilcox (1994) to characterize US consumption. Clearly, these estimates, at least in consumption of durables and cars, are not consistent with the notion that λ is the fraction of income accruing to current-income consumers since in two cases λ exceeds unity. However, it is also clear that consumption of goods which require a greater financial commitment (durables and cars) appear to be characterized by a high value of λ than those which possibly engage lesser financial commitment (non-durables and services). Alternatively, not only the question of financial commitment but also the

question of durability of consumption is perhaps playing a role in the present estimates, with consumption of durable goods characterized by greater λ than consumption of non-durables and services; in this regard, Carroll, Furher, and Wilcox (1994) show that if current-income consumers change their consumption, as opposed to their consumer expenditure, according to contemporaneous changes in their income, then coefficient λ becomes an increasing function of the durability of goods.

The predictive power of the consumer sentiment indicator is explored in the second set of regressions, the results of which are shown in the third and fourth column of the Table 3, while the last column tests the hypothesis that the coefficient of the lagged values of the indicator are zero. To implement this, the confidence indicator is used both as an independent variable in the regression and as an instrumental variable, lagged four periods.

The results change dramatically with the addition of the confidence indicator in the regressions. While the MA(1) process characterizing the model is supported decisively in the data (all the coefficient estimates for θ are highly significant), the estimate of λ are now entirely different from those obtained in the initial set of regressions. In particular, λ is significant only in the case of non-durables and of services, while in the case of durables consumption and consumption of cars λ is insignificant; in addition, for aggregate private consumption λ , while correctly signed, it is not well determined (its t-statistic is significant only at the 95 percent level). These results, which are notably intuitive, are consistent with the notion that current-income consumers dominate consumer spending on non-

durables and on services, while permanent-income consumers dominate in the spending categories of durables and cars.

Therefore, the basic model, augmented with the inclusion of the confidence indicator, discriminates among the population of consumers between those who appear to optimize their consumption flow over multiple periods and those who consume only out of their current income; consumption of durables and of cars is dominated by permanent-income consumers (the fraction of current-income consumers here is negligible), while 32 percent of current-income consumers are present in the consumption of non-durables, and 21 percent in the consumption of services.

Finally, the results reject the hypothesis that the confidence indicator serves only to predict future income; the indicator has predictive power all by itself in the consumption function, reflecting, as noted previously, a vector of uncertainties.

V. Results from an augmented model

The basic model of consumption can now be augmented in two respects: first, to take account of the possibility that current-income consumers base their consumption not only on current but also on last period's income, consistent with the excess sensitivity of consumption postulate; and, secondly, to estimate the impact of monetary policy on the growth of consumption expenditure through an explicit inclusion of the rate of interest in the equation.

Campbell and Mankiw (1991) find that, in the case of France, a weighted average approximation of the income variable is necessary in order to fit the data, with the current income weight equal to between 0.33 and 0.40²²; thus, last period's income can be an important determinant of consumption. On the other hand, in order to examine the impact of monetary policy on consumption growth, the short-term rate of interest, deflated by the rate of inflation measured by the private consumption deflator, is introduced explicitly in the equation. The augmented model is:

$$\Delta C_t = k + \lambda * [\phi * \Delta Y_t + (1-\phi) * \Delta Y_{t-1}] + h * STRR_t + w_t - \theta * w_{t-1} \quad (7)$$

where ϕ is the weight of last period's income in the consumption of current-income consumers. When $\phi = 1$, equation (7) becomes the basic model (6); when $\phi = 0$, it is last period's rather than current period income which determines current consumption; and STRR is the real short term rate of interest. A statistically different from zero coefficient on the lagged income term would be a reflection of what Flavin (1981) calls the "excess sensitivity" of consumption to income, which is also a rejection of the permanent income hypothesis.

The role of the rate of interest in consumption is intended to reflect the intertemporal substitution process where the cost of current consumption is the income forgone from savings. The coefficient on this variable is expected to be negative, implying that the substitution effect dominates the income effect. With a log-linear model of income and

²² See Campbell and Mankiw (1991): op. cit., Tables 2 and 3, and subsequent Tables.

consumption, the permanent income hypothesis can be reformulated to yield an equation similar to the basic model estimated here²³. At the same time, interest rates may have an effect on current consumption in cases of liquidity-constrained consumers for whom there exist upper bounds in their ratio of private debt to their income and who must adjust their consumption spending in the event of increases in interest rates; while the nominal rather than the real rate of interest may be more appropriate to capture this effect, it is likely that the present specifications does bias the results.

As noted previously, the consumer confidence indicator has considerable predictive power on its own and apart from its role in predicting income growth. Initial estimates of equation (7) generally confirmed this finding in the augmented model as well. However, the results gave the confidence indicator the largest explanatory power and effectively reduced the model to a relationship between private consumption and lags in the confidence indicator which has no immediate economic rationale. In order to obtain results which are consistent with economic theory, the equation was estimated without the confidence indicator as an independent variable but as an instrumental variable. Its role, therefore, is assumed to be simply that of a predictor of disposable income and its additional independent information is disregarded.

The MA(1) representation of the error process governing the residual of equation (7) is retained. Equation (7) is non-linear in its parameters, and the structural parameters can be estimated indirectly from the reduced form parameters. In particular, it is clear that $\lambda^*\phi = a_0$ and $\lambda^*(1-\phi) = a_1$, where a_0 and a_1 are the reduced form coefficient estimates on ΔY_t and ΔY_{t-1} . The results, estimated over the sample 1972:Q1-1994:Q4, have been obtained with instrumental variables, with the following instruments starting with lag in period t-1: four lags in the dependent variable, in the disposable income variable, in the change in the rate of unemployment, in the short-term real rate of interest, and in the confidence indicator²⁴.

The results, which are presented in Table 4, support the augmented model well. In the aggregate consumption equation the reduced form coefficients are statistically significant and they imply virtually identical weights on current and last period's income (0.47 for current income and 0.53 for last quarter's income), thus supporting Flavin's (1981) notion of excess sensitivity of consumption²⁵. This, however, does not carry to the rest of the equations. In the cases of cars and services the weight of current income in consumption is the highest (1.00) while in the case of non-durables it is the lowest (0.26) even though

²³ Campbell and Mankiw (1991) show this, p. 729-730.

²⁴ Dropping the confidence indicator from the list of instruments yielded a notable deterioration in the explanatory power of the equation.

²⁵ It is worth stressing that the permanent income hypothesis is easily rejected on the French data. Using Hall's (1978) reduced form estimation procedure of regressing the first difference of consumption on a constant and eight quarterly lags on the first difference of disposable income yields a coefficient which is significantly different from zero on the first lag, and the restriction that the eight coefficients on the lagged income terms are jointly equal to zero is rejected with an F statistic = 9.91 and a probability value of 0.000. Flavin (1981) shows that Hall's (1978) equation can be derived from a structural consumption model; thus, the rejection of the permanent income hypothesis is not simply a matter of rejecting the reduced-form model.

Table 4 The augmented Campbell-Mankiw model [equation (7)] on French consumption data (Instrumental variables estimates, absolute t-statistics in parentheses)								
Dependent variable	$\lambda*\phi$	$\lambda*(1-\phi)$	λ	ϕ	h	θ	R ²	DW
Consumption	0.20 (1.91)	0.23 (2.44)	0.43	0.47	-0.01 (1.10)	0.63 (6.93)	0.55	1.84
Durables	1.10 (2.04)	0.55 (1.14)	1.65	0.67	-0.01 (0.58)	0.85 (13.80)	0.51	1.88
Non-durables	0.11 (0.82)	0.32 (2.70)	0.42	0.26	-0.01 (0.58)	0.25 (2.22)	0.37	1.94
Cars	1.42 (2.76)	0.00	1.42	1.00	-0.01 (0.76)	0.78 (11.00)	0.47	1.86
Services	0.26 (4.38)	0.00	0.26	1.00	-0.01 (1.65)	0.67 (8.43)	0.51	1.86

Instruments are a constant, four-period lags in the dependent variable, the real disposable income variable, the real short-term interest rate, the change in the unemployment rate, and in the consumer confidence indicator; R² is the adjusted R²; DW is the Durbin-Watson statistic.

in this case the estimated reduced form coefficient $\lambda*\phi$ is not well determined and not statistically different from zero.

The implicit fraction of current-income consumers is estimated to be 0.43. Comparing not only this but also the other estimates of λ in Table 4 with those obtained in Table 3 under the columns without the confidence indicator, it is clear that once this variable is included, either as an independent or as an instrumental variable, it tends to reduce the estimated value of the fraction of current-income consumers. The largest reduction occurs in the estimate of the consumption of durables and in the case of services, the two λ coefficients are identical. Nevertheless, the original ranking of the λ coefficients by size shown in Table 3 is maintained in the present estimates, with durables and cars having λ coefficients greater than one and non-durables and cars less than one.

The data also support well the MA(1) error specification. All estimates of coefficient w are well determined and highly significant. As previously, the time-aggregation of the data, assumed to give rise to the MA(1) error process, cannot be rejected at the most stringent level of significance.

The coefficient on the real short-term interest rate is correctly signed in all equations but is not statistically different from zero, and experimentation with a long-term interest rate did not produce results different from those with the short-term interest rate. Varying the list of instrument and/or the lags used did not affect the results. As a first approximation, the results suggest that monetary policy may have little effect on consumption growth when other determinants of consumption are taken into account. This clearly is a minimal interpretation of the present evidence; it is quite possible that a contractionary monetary policy influences directly consumer confidence and as, a result, the effect of interest rates on consumption is already incorporated in the instrumental variables. The possibility that

this is the case finds support later, when the long-run cointegrating relationship between the growth of private consumption, and of its components, the growth in disposable income and the real rate of interest, is examined.

VI. The possible²⁶ impact of financial liberalization

The presence of current-income consumers in our sample can be regarded as a reflection of incomplete financial markets where consumers facing constraints are unable to optimize the flow of consumption over time. Jappelli and Pagano (1994) find that this fraction of consumers (or, alternatively, the excess sensitivity of consumption) across countries is high where consumers borrow little from capital markets. Assuming that excess sensitivity arises from liquidity constraints²⁷ alone, the excess sensitivity of consumption, λ , must be a function of the degree of financial repression and of the binding nature of liquidity constraints. Conversely, financial liberalization such as that which has taken place in virtually all the Member States in accordance with the requirements for stage II of EMU, should have contributed to raising the fraction of permanent income consumers in the sample and to bringing closer to realization the predictions of the permanent income hypothesis. Since the early 1980s a process of financial liberalization has been taking in France, with the result that in the 1990s financial markets are fully liberalized. At the same time, however, while in a fully liberalized financial environment λ should be approximately equal to zero, it is possible that remaining financial constraints and rigidities in the banking system may act as implicit constraints, or preferences with respect to household borrowing and debt, could explain deviations of λ from its theoretical value. In the present section the attention is directed towards the question of a changing value of λ in the sample.

Financial liberalization in France was not completed until January 1990 when the last remaining restrictions on international financial flows were removed²⁸. However, the process of liberalization had started earlier, with the passage of the Banking Act of 1984 which altered the financial environment fundamentally. Subsequent reforms saw the deepening of the money market, reforms of the bond market, greater than heretofore risk management opportunities, and increased competition in the banking sector. A reflection of the expanding financial opportunities was the behaviour of household savings, which declined significantly throughout the period of financial liberalization measures, as noted in the introduction.

The decline in the estimate for the value of current-income consumers in France in the present results compared to those of Campbell and Mankiw (1991) is undoubtedly related to this process of financial liberalization since the early 1980s. Campbell and Mankiw find that the value of λ has not changed in France, in their sample 1972:Q1-1988:Q1, either in

²⁶ "Possible" because the method used in the estimation relies on a dummy variable to identify the effect of financial liberalisation on consumption; see text.

²⁷ Although perhaps the principal reason, there are additional reasons why the permanent income hypothesis may be rejected in the data, for example, non-rational expectations about the path of permanent income, improper specification of preferences in the model, improper time aggregation which might reject the MA(1) specification, etc.

²⁸ See EC Commission, DG-II (1991).

the case where the presumed change in the financial environment is identified with a dummy variable splitting the sample in 1979:Q4, or in the case where it is assumed that a continuous process of falling λ characterizes the data²⁹.

To re-examine the hypothesis of a changing λ in the longer sample used here, the equation was re-specified to incorporate either a shift in 1989:Q1, with a dummy variable whose value is equal to zero prior to this date and one afterwards (variable D89), or with a continuous change where λ is a linear function of time³⁰; the alternative versions are shown in the estimating equations (8) and (9), respectively.

$$\Delta C_t = k + (\lambda_0 + \lambda_1 * D89) * [\phi * \Delta Y_t + (1 - \phi) * \Delta Y_{t-1}] + h * STRR_t + w_t - \theta * w_{t-1} \quad (8)$$

and

$$\Delta C_t = k + (\lambda_0 + \lambda_1 * Time) * [\Delta Y_{t-1}] + w_t - \theta * w_{t-1} \quad (9)$$

where the new variables are: λ_0 = the pre-1989 value of λ ; λ_1 = the post-1989 value of λ ; Time = a time trend. Note that in equation (8) the specification implies a one-time shift in the value of λ from the first quarter of 1989 onwards; in the case of equation (9), the specification gives the change in λ per quarter over the whole sample. In the specification with the dummy variable, the complete equation was estimated, where the data determined the weights to current and last period's income in consumption. To simplify matters, and taking account of the estimated coefficients in equation (8), a less complicated form was used in the second case, as can be seen in equation (9). Both equations are non-linear in their parameters and, consequently, the procedure followed in the previous section to identify the structural coefficients is used once more in the present case.

The results from the first specification are presented in Table 5. The equation is estimated with a list of instrumental variables composed of a constant, the dummy variable, and three lags in the dependent variable, the change in disposable income, the short-term real rate of interest, the change in the rate of unemployment, and the consumer confidence indicator; thus, this variable is treated as if it is only a predictor of future income. While four-period lags in the list of instruments produced results very similar to that of a three-period lag, results from the latter were somewhat better and these are reported in the Table. In addition, the MA(1) error process was retained. The results show that the weight of current income in consumption, either in the pre- or in the post-1989 period, is not different from zero, thus contradicting the finding of the augmented model reported in Table 4. It is likely that the estimates for the weights are not robust but sensitive to model specification. Campbell and Mankiw (1991) also found that, while the weighted average specification of income is necessary to describe the French consumption data, the estimate

²⁹ Their hypothesis finds support only in the case of the UK where substantial liberalisation measures adopted at the end of the 1970s led the way to furthering liberalisation in other Member States.

³⁰ Ostry and Levy (1995), following Jappelli and Pagano (1994), implement the hypothesis by incorporating the stock of consumer credit outstanding as an independent variable in their saving equation, and they find a significant impact from financial deregulation on savings in France.

Table 5
The augmented Campbell-Mankiw model [equation (8)]
and financial liberalization in the 1990s
(Instrumental variables estimates, absolute t-statistics in parentheses)

Dependent variable	$\lambda_0^*\phi$	$\lambda_0^*(1-\phi)$	λ_0	ϕ	θ	$\lambda_1^*\phi$	$\lambda_1^*(1-\phi)$	λ_1	ϕ
Consumption	-0.05 (0.33)	0.43 (3.11)	0.43	0.00	0.46 (4.18)	0.07 (0.37)	-0.43 (2.48)	-0.43	0.00
Durables	-0.68 (1.12)	1.03 (1.89)	1.03	0.00	0.87 (50.65)	0.28 (0.54)	-1.08 (1.74)	-1.08	0.00
Non-durables	-0.18 (0.98)	0.61 (3.84)	0.61	0.00	0.05 (0.44)	0.06 (0.30)	-0.38 (1.90)	-0.38	0.00
Cars	-0.10 (0.11)	0.93 (1.24)	0.93	0.00	0.74 (8.81)	0.89 (0.93)	-1.89 (2.21)	-1.89	0.00
Services	0.03 (0.24)	0.17 (1.87)	0.17	0.00	0.65 (7.45)	0.03 (0.29)	-0.22 (1.98)	-0.22	0.00

Instruments are a constant, the dummy variable, three-period lags in the dependent variable, the real disposable income variable, the real short-term interest rate, the change in the unemployment rate, and in the consumer confidence indicator.

of λ was sensitive to the procedure adopted. The fact that the estimated value of ϕ is not different from zero implies effectively that the unweighted model describes the data better than the augmented model, with the exception that the dating of the income variable is t-1. Dropping the current income term from the equation proved a successful strategy and the results were not very different from those of the augmented model shown in the Table. This finding is used in the specification and estimation of equation (9) below, with the income variable dated accordingly. Finally, note that support for the unweighted model with income growth dated t-1 is an indirect way of rejecting the permanent income hypothesis since it implies that current consumption growth is dependent on income growth in a manner inconsistent with the permanent income theory³¹.

The data found no support for the role of the real interest rate, although the coefficient of this variable was correctly signed in all equations (the estimates are not shown in the Table but are available on request); in subsequent regressions the equation was estimated without this variable. The results, which support the MA(1) specification across the equations, suggest that there has been a substantial decrease in the fraction of current-income consumers in the post-1989 period, thus providing support to the hypothesis concerning financial liberalization. The estimates for λ_1 , which are negative in all categories of consumption, are well determined and statistically significant. This finding is in contrast to the Campbell and Mankiw (1991) finding that there had been non shift in the parameter. As noted previously, dating the dummy variable in the last quarter of 1989 rather than in 1980 appears to be appropriate for the estimation of the effects in question.

³¹ See Flavin (1981) and Hayashi (1982) on this.

Table 6 The augmented Campbell-Mankiw model [equation (9)] and declining financial constraints (Instrumental variables estimates, absolute t-statistics in parentheses)					
Dependent variable	λ_0	$100*\lambda_1$	θ	R ²	DW
Consumption	0.68 (6.62)	-0.68 (3.10)	0.44 (4.57)	0.58	1.82
Durables	2.61 (4.39)	-3.07 (2.80)	0.69 (8.39)	0.49	1.72
Non-durables	0.69 (8.01)	-0.52 (2.82)	0.05 (0.48)	0.49	1.92
Cars	2.52 (3.42)	-4.35 (2.66)	0.69 (8.46)	0.40	1.77
Services	0.42 (5.26)	-0.65 (3.63)	00.66 (8.21)	0.54	1.78
Instruments are a constant, the time trend, three-period lags in the dependent variable, the real disposable income variable, the real short-term interest rate, and the change in the unemployment rate.					

The results also show that there has been a process of a declining share of current-income consumers in the whole sample. As can be seen in Table 6, where the basic model with a one-period lag in income (equation (9)) is used, the data is characterized by a significant negative trend, representing the negative growth of λ per quarter (In the Table, the value λ has been multiplied by 100). This coefficient is better determined than in the regressions reported in the previous Table, with standard errors in the present case in all categories of consumption ranging between 2.7 and 3.6 times the value of the λ . In addition, the MA(1) error

process is also supported by the data. These results, once more, contradict the Campbell and Mankiw (1991) finding that there had been no trend decline in the fraction of current-income consumers.

The present results are consistent with the finding reported in Ostry and Levy (1995), that financial deregulation has played an important role in saving behaviour in France. However, the evidence against any role for the real rate of interest in the growth of consumption is problematic. An important consequence of financial liberalization is to remove liquidity constraints and to lower the fraction of consumers who consume out of current income, and, in addition, to increase the sensitivity of consumption to interest rate shocks. It is possible that the equation cannot discriminate between financial liberalization and interest rate effects in the data and an alternative specification may be necessary.

The implication of the results is that with the fraction of permanent-income consumers increasing over time, the output cost of deficit-reduction measures will be less costly in terms of current output as more consumers optimize the flow of their consumption through intertemporal smoothing. On the other hand, however, the expenditure impact of monetary policy will also be reduced as financial constraints become less binding and consumer optimize the flow of consumption through borrowing.

VII. Shocks to consumption growth

The dependence of consumption on current and permanent income raises some important issues about the impact of deficit reduction on the growth of spending and, by implication, on the economic growth. The traditional approach, which assigns positive multipliers to

government expenditure and negative to taxation, would argue that meeting the budgetary convergence objectives would be difficult since the impact of deficit reduction would ultimately lower household incomes and consumption expenditure. Other theories would argue that intertemporally behaving households will smooth their consumption over time and in so doing they would flatten out the impact of the fiscal consolidation on growth³². It is evident that the greater the proportion of permanent-income households in the nation, the less the output cost of fiscal consolidation. The evidence on the decline in the value of λ in France would suggest that fiscal consolidation in the 1990s could be achieved at a lesser cost compared to the earlier years.

In the present section the data are used to address the following question: what is the contribution of current income components to the variability of the growth of consumption over time and, in particular, what is the contribution of fiscal variables in the growth of consumption? To provide an answer, a vector-autoregression (VAR) framework is used³³, where three fiscal variables are explicitly included: the growth in direct taxes paid by households, in transfers received, and in transfers paid; in addition, the income variables is decomposed into the growth of labour income and the growth of non-labour income (all variables are in constant 1985 prices). Thus, without taking sides on the two views of stabilization, the VAR approach permits the data to develop the answer to the question posed.

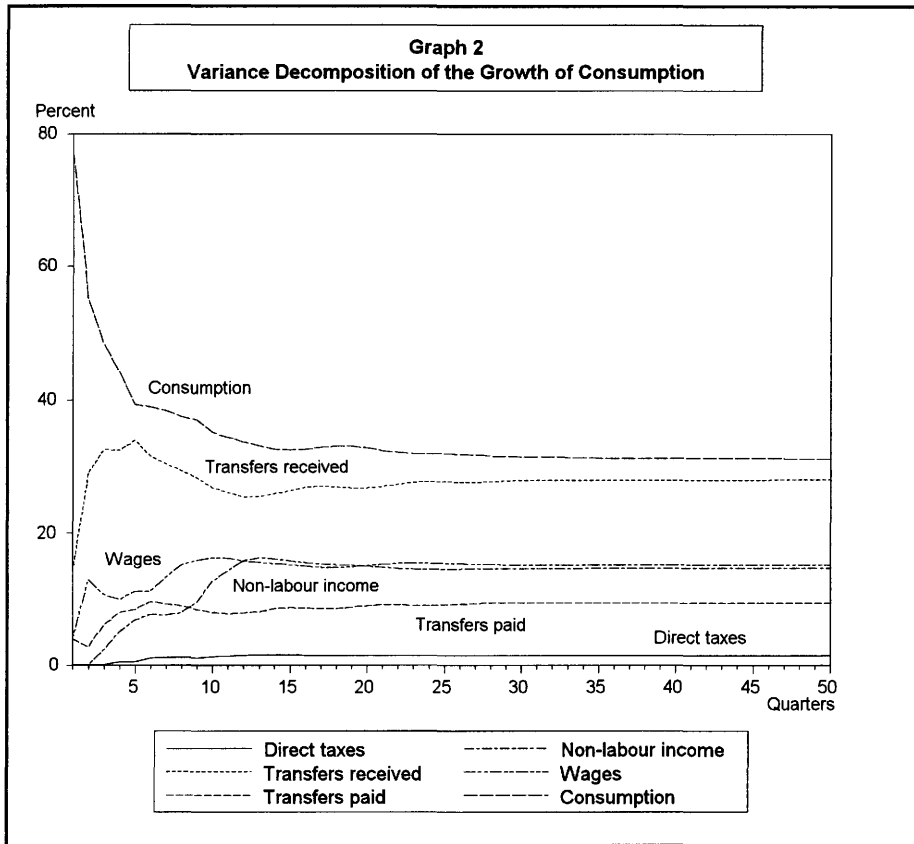
The VAR framework used here is six-dimensional, defined over the five variables mentioned above and the growth in private consumption, and it is estimated over a four-quarter lag on the sample 1972:Q1-1994:Q4³⁴. The variance decomposition analysis makes possible the attribution of the forecasts error over a given horizon to the innovations (errors) in each individual determinant of the system. Thus, the forecast error for the growth in private consumption in quarter j , made j quarters earlier, can be attributed to innovations in the variables included in the VAR during the j intervening quarters. Such a decomposition is useful in highlighting and ranking the importance of each variable in forecasts errors for consumption, and it makes possible the attribution of these errors to each variable.

The results of the VAR are presented in Graph 2. It is evident that the contribution of innovations in the growth of consumption itself accounts for the largest part of the forecast variance of the growth of consumption in the early quarters up to around five

³² See for example Giavazzi and Pagano (1990), and Giavazzi and Pagano (1995).

³³ VAR analysis is now widely used to describe the dynamic behaviour of empirical models and when structural VARs are defined, to give economic meaning to the dynamics of the model; in the developing literature see, for example, Blanchard and Quah (1989) and Blanchard (1989).

³⁴ A seventh variable, the rate of unemployment, was also experimented with and the results were very good. While the ranking of the contribution of the variance of the remaining variables to the variance of consumption was not affected, the contribution was correspondingly apportioned differently; shocks in the rate of unemployment were found to account for over 12 percent of the variance of consumption, around the same as shocks to labour income; it is clear that the high correlation between labour income and unemployment makes difficult to separate these effects and, besides, it was felt more important to highlight the effect of variables related to fiscal policy.



years (20 quarters), and then it stabilizes at 31 percent³⁵. The second important contributor are innovation in transfers received; these innovations account for over 30 percent of the variance of consumption growth in the first eight quarters, and subsequently fall to around 27 percent. Undoubtedly, this reflects the importance of such transfers to household income, which accounted for around 30 percent in 1975 and approximately 42 percent in 1994. Transfers are received predominantly by current-income consumers and, as a result, shocks to transfers have an important effect on the growth of consumption.

Innovations in the income variables rank third, contributing around 15 percent each to the variability of consumption. Goodfriend (1992) has shown that the process governing the autoregression of the income variable has implications for the response of consumption to innovations in permanent income. In particular, if the income process can be written as $\Delta Y_t = \delta \cdot \Delta Y_{t-1} + u_t$ then for values of δ equal to unity the response of consumption to income innovations will also be unity since shocks to current income imply equivalent shocks to permanent income; alternatively, when δ is somewhat less than unity the response of consumption to income innovations declines dramatically since the shocks

³⁵ The decomposition of the variance shown in Graph 2 has been obtained in EVIEWS through the Choleski method from the following recursive model: Growth in direct taxes, in transfers received, in transfers paid, in non-labour income, in labour compensation, and in consumption. Therefore, the model specifies consumption as the "most" endogenous variable, the last equation in the six-equation VAR which depends on all the previous five equations. The ordering of the variables, and the implicit structural model, are crucial in the interpretation of impulse responses and variance decomposition in such systems. Experimentation with alternative orderings, assuming that the first three variables are the "most" exogenous, made little difference to the responses shown in Graph 2, which appeared to be robust across the models.

are of transitory character³⁶. The rather low contribution of income shocks to the predictability of consumption could be a reflection of the slow response of permanent income to shocks in current income.

Transfers paid account for approximately 10 percent of the variability of consumption growth, and finally, direct taxes contribute around 1.5 percent to the explanation of the variance of the growth in consumption.

The results suggest that fiscal shocks, such as those related to fiscal consolidation, play an important role in the prediction of consumption growth. It is possible that the proposed social security reforms in the autumn of 1995 in France may have been seen as a shock to the flow of transfers to household and correspondingly, has depressed consumption growth; in addition, these shocks may have a more pronounced impact on the consumption of current-income consumers. In a sense, both the social unrest in France, and the low consumer confidence since last summer, can be given a consistent explanation on the basis of the empirical message of the reduced-form equations used here.

VIII. Short-run dynamics and long-run consumption growth

The present section aims at characterizing the long-term relationship between growth in private consumption, growth in disposable income and the level of interest rates. In section V and VI above it was noted that no statistically significant relationship between consumption growth and the level of the short-term rate of interest was supported by the data. However, the coefficient on this variable was negative, as hypothesized a priori, suggesting that some effect is present although inadequately determined. In the present section an alternative methodology is employed to examine the impact of monetary policy, approximated as before by the real short-term rate of interest, on the growth of consumer spending, both as in the aggregate and in disaggregated equations for the four categories of consumer spending used previously.

The basic equation used is an error-correction representation³⁷ of consumption growth of the following form:

$$\Delta^2 C_t = -\gamma^*[\Delta C_{t-1} - g - \psi^*\Delta Y_{t-1} + \xi^*STR_{t-1}] + \Sigma h_i Z_{t-i} \quad (10)$$

³⁶ King (1996) summarises this effect by showing that, when the autoregressive process governing income is of the first order, then the change in permanent income is proportional to the innovation in current income with a proportionality factor equal to $r/(r+1-\delta)$, where r is the real rate of interest. When $\delta=1$, the ratio is unity and the effect of income innovations imply equivalent innovations in permanent income, thus causing consumption to change by the same amount; when $\delta=0$, the ratio is closer to zero than to one. In the data used here $\delta=0.88$ (with t-statistic 19.26). Taking as an example $r=0.05$, the implied response of permanent income to current income innovations is 0.29 and, correspondingly, the response of consumption to income innovation is low. Clearly, depending on the value of the autoregressive parameter δ , the response of consumption to income growth could change dramatically.

³⁷ Error-correction models are now widely used to represent economic time series; see D. Hendry (1995) for a discussion of these models and their properties. Hendry (1991) reports that his error-correction model of consumption performs well on French data.

where Δ^2C is the first difference of the growth in consumption, γ is the error-correction term, ΔC is the first difference in the level of consumption, ΔY is the first difference in the level of real household disposable income, g is the implicit average equilibrium growth rate of consumption when income growth and the real rate of interest are zero, and STR is the level of the real short-term rate of interest - all variables have already been defined previously; monetary policy, therefore, is identified by the level of the real short-term interest rate³⁸; the terms in vector Z under the summation sign represent the short-term dynamics of consumption and they are first-difference terms on all the variables, all dated $t-1$ and before. The VAR system is defined over the three endogenous variables (growth in consumption, growth in disposable income, and the real rate of interest) but we are interest only in the consumption equation and its dynamics.

The terms in bracket represent the long-term relationship between the growth in consumption, the growth in disposable income, and the real rate of interest. This formulation has the interpretation that changes in the real rate of interest contribute to accelerating or decelerating consumption growth; in recent quarters it has been argued that reductions in interest rates are essential to boost consumption growth and the French government has taken steps to reducing the interest rate applying to savings accounts with this purpose in mind³⁹. It is postulated that the coefficient on income is positive ($\psi > 0$) and that the coefficient on the rate of interest is negative ($\xi < 0$). ψ is akin to the propensity to consume. If consumption was growing at the rate consistent with the growth of income and of the real rate of interest, the short-term dynamic part of the equation would be unnecessary. However, adjustments to consumption may be costly either because of indivisibilities (adjusting consumption of housing services), or because of liquidity constraints and of other financial costs and because of non-economic costs of adjusting habit-determined consumption. In the presence of such costs, even if all consumers were to behave in accordance with the permanent income hypothesis, current consumption growth could deviate from its long-term/permanent income path and would give rise to an short-run disequilibrium process; the adjustment towards equilibrium is captured by the dynamic terms of equation (10). In addition, temporary shortfall of income and shocks to interest rates could also contribute to disturbing the consumption/income relationship for current-income consumers as well.

³⁸ It is possible to use other indicators of the stance of monetary policy, and the level of the long-term rate of interest was also experimented with, with results little different from those reported here. An alternative could have been the growth of the supply of money as was done, for example, by Cover (1992); however, this variable suffers from a number of problems (structural shifts, portfolio related instabilities etc.) and was not felt appropriate to use it here. Nevertheless, even the level of the short-term rate of interest, conventionally controlled directly by the Banque de France, may itself not be representative of the stance of monetary policy, essentially because changes in the rate of interest may not all be reflecting the stance of monetary policy; in periods of fast or slow economic growth, for example, the monetary authority may let interest rate movements to be determined by the money demand function. Furthermore, the exchange rate ought to be taken into account in the determination of the stance of monetary policy.

³⁹ It is interesting to note that by specifying the equilibrium part of the error-correction model as the logarithmic level of the consumption and real income variable and the real rate of interest, of the form $(1, -\psi, \xi)$, it was virtually impossible to find a stable relationship among the variables and γ was positive. The absence of a stable relationship may be an indication that the level of consumption is not determined by the level of current income, or that the failure of the permanent income hypothesis is partial but critically important.

Table 7
Cointegration/Error correction model for consumption, disposable income, and interest rates [equation (10)]
 (absolute t-statistics in parentheses, except critical value at 5% level of significance for the null of no cointegration under the likelihood ratio)

Dependent variable	Lag	g	γ	ψ	$\xi*100$	Lhd ratio	SER	R ²
Consumption	3	1.73 (5.81)	-0.53 (4.95)	0.41 (4.87)	-11.92 (2.54)	54.52 (29.68)	0.008	0.44
Durables	2	3.85 (1.88)	-0.39 (4.66)	0.82 (1.40)	-7.08 (2.09)	35.77 (29.68)	0.041	0.19
Non-durables	2	0.78 (2.14)	-0.71 (4.67)	0.54 (7.30)	-0.52 (1.24)	52.68 (29.68)	0.010	0.61
Cars	3	2.72 (1.75)	-0.54 (5.78)	0.73 (1.53)	-5.82 (2.19)	61.04 (34.91)	0.046	0.37
Services	2	3.19 (9.29)	-0.29 (3.46)	0.23 (2.50)	-1.40 (2.51)	34.24 (30.15)	0.005	0.17

Lhd is the likelihood ratio test for cointegration; SER is the standard error of the regression; R² is the adjusted R².

For these reasons, and in the presence of a still large proportion of current-income consumer in the French consumption data, modelling consumption growth as an error-correction process appears appropriate.

Coefficient γ is the error-correction coefficient; it represents the response of current consumption growth to a disequilibrium in the long-term relationship between consumption, income and the rate of interest. This coefficient is of crucial importance since it not only determines the stability of the relationship but it also indirectly tests whether the variables are cointegrated. When consumption is growing at a rate which is higher than that determined by the long-term relationship (when the term in the bracket is positive) stability requires that growth decelerates; when, on the other hand, consumption is growing at a rate slower than that of the long-term relationship (the term in bracket is negative), then current consumption growth must accelerate to restore the long-term relationship; it is clear, therefore, that for stability to be satisfied, $\gamma < 0$.

The model was estimated as an unrestricted error-correction model and a lag of two quarters and one of three quarters were used⁴⁰. The implicit VAR system, where all the variables are jointly endogenous, cannot be considered as a structural model, although it can be seen as deriving from a structural model of the economy. The estimation results are presented in Table 7. The goodness of fit of the equation varies from equation to equation, although the explanatory power is quite high (given that the equation explains the acceleration or deceleration of consumption growth) with the highest R² found in the case of non-durables. Moreover, in all the equations the constant term in the equilibrium relationship is correctly signed and statistically different from zero. At the same time, in

⁴⁰ The model was estimated in EVIEWS.

all equations the error-correction term is highly significant and signed according to the postulated hypothesis. This provides indirect confirmation that the variables are cointegrated, again formally confirmed by the likelihood ratio test the results of which are also reported in the Table⁴¹. The cointegrating vector is unique in the case of durables and services; while in the remaining cases more than one vectors describe the relationship, the one reported is the only with economic meaning. The presence of multiple vectors ensures, of course, that the relationship under consideration is stable.

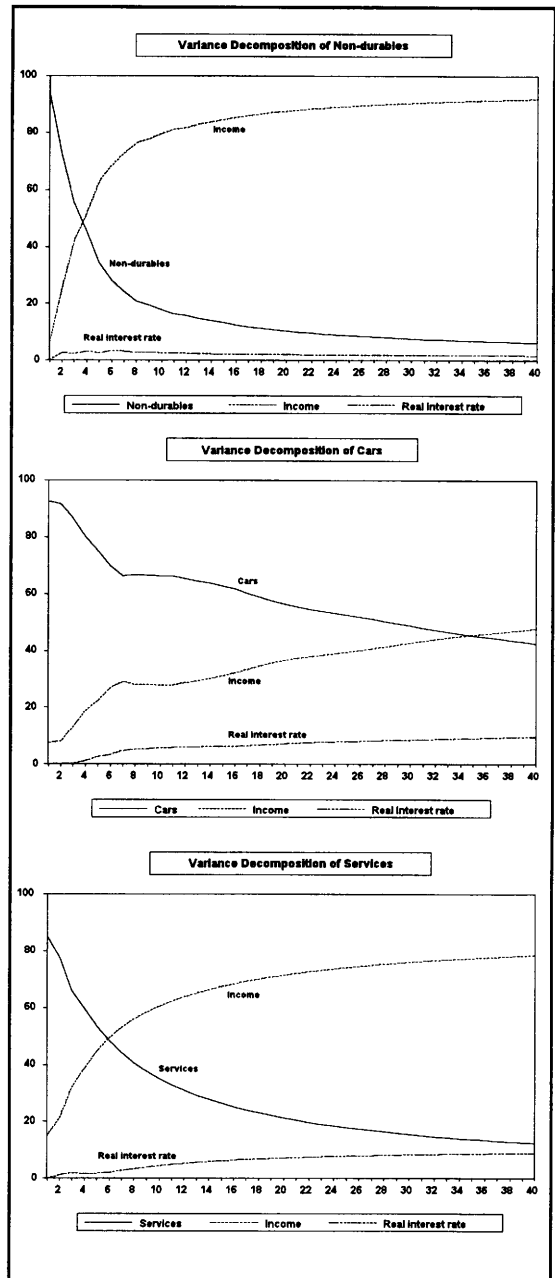
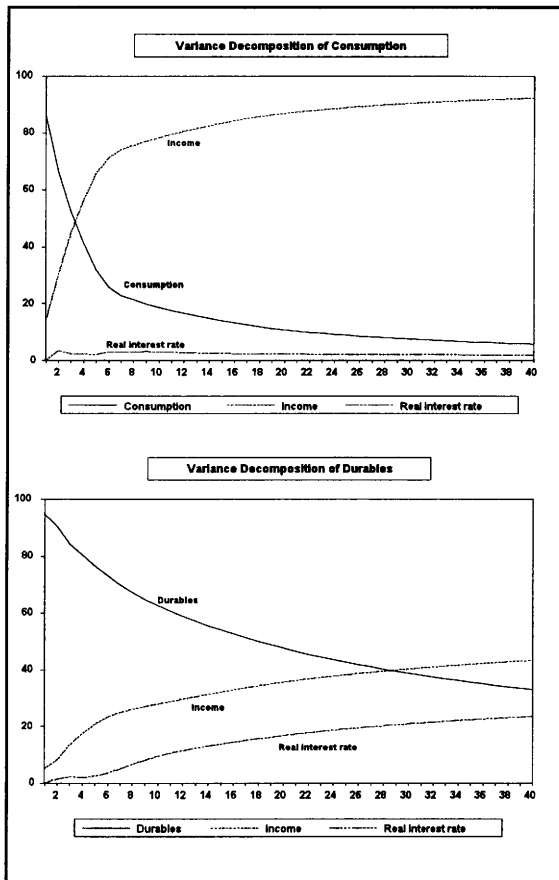
Among the equations, the fastest speed of adjustment to disequilibrium is in the case of non-durables (-0.71) and the lowest is in the case of services (-0.29). Presumably, expenditure flows on non-durables and on services are equivalent to the consumption flows from these categories of spending and, consequently, the error-correction response should be fast; although this is supported in the case of non-durables it is not in the case of services. This may suggest the presence of various inflexibilities in the financing of services such as education and training, medical and related services etc. In the aggregate consumption equation the results imply that over 50 percent of disequilibrium in the growth of consumption is corrected within each quarter, a reasonable estimate given the disparate composition of this variable⁴².

The role of the growth of current disposable income in the growth of consumption is found to be uncertain. On the one hand, in the aggregate equation as well as in the consumption of non-durables and services, the slope of the equation with respect to this variable is correctly signed and statistically significant; on the other hand, in the cases of durables and cars, the growth of current disposable income has a coefficient which, while correctly signed, it is not statistically different from zero. These results support the hypothesis that consumption of durables and, in particular, of cars is determined by permanent income considerations. While current income is closely correlated with permanent income, by itself it plays no role in the current growth of consumption. At the same time, and considering the aggregate consumption equation, the stable long-term relationship between consumption and income growth and the real rate of interest suggests that the saving rate will also be stable. Thus despite the short-term fluctuations in the saving rate in France, these fluctuations are consistent with the stable long-term relationship characterizing its proximate determinants.

The equations show an important effect from real interest rates, suggesting that monetary policy can contribute to accelerating or decelerating consumption spending. The coefficient of this variable is correctly signed and significant in all cases except consumption of non-durables. This finding lends support to the notion that reductions in interest rates and an easing of monetary policy are a first step towards boosting consumption; alternatively, the slow consumption growth in recent years is undoubtedly related to the tight monetary conditions prevailing in France. However, the impact of

⁴¹ The likelihood test ratio is obtained from the Johansen full information maximum likelihood procedure. It tests the null of no cointegration and it is distributed as χ^2 ; values of the ratio greater than the critical value reject the null. The cointegration vector was unique in the case of non-durables and of services, while two cointegration vectors were identified in the other cases; the second vector, however, was, by economic criteria, meaningless.

⁴² Error-correction properties to current consumption growth showing significant γ estimates, in a different model from the one presented her, have also been found in US data; see Fuhrer (1992).



monetary policy may not be very pronounced as the estimated coefficients are quantitatively small. In order to boost consumption growth to any significant extent through monetary easing, the required degree of easing would undoubtedly be very significant. Thus, the recent reductions in interest rates would be expected to have only a limited impact on consumption growth. It is evident that income growth generally dominates other variables in the determination of consumption growth, and measures boosting income growth (such as employment growth and growth in productivity) are required.

The dominance of income growth for consumption is supported by the impulse responses and variance decomposition of the VAR equations, the latter presented in the accompanying graphs, where the contribution of each variable to the variance decomposition is shown, in percent, on the vertical axis and the time horizon, in quarters, on the horizontal axis⁴³. The implicit model is based on the hypothesis that income shocks arising from productivity and efficiency in the organization of production have permanent

⁴³ The following ordering has been used in the impulse responses and the variance decomposition: real interest rate, real income growth, and consumption growth; the results were virtually invariant to alternative orderings, although the only meaningful one is the one reported here where consumption growth is the "most" endogenous variable.

effects on consumption because they raise permanent income; on the other hand, shocks arising either from the IS curve, or from the demand for and supply of money have no long-term effects on consumption, and therefore, innovations to monetary policy have only short-lived effects. The impulse responses obtained from a reduced form error-correction model (not shown here) support these hypotheses.

As can be seen from the graphs where the variance decomposition of consumption growth is reported, all responses are dominated by the shocks to income, which can be interpreted as supply shocks. Current income shocks contribute the largest part of the explanation of the variance of total consumption, consumption of non-durables, and consumption of services. On the other hand, shocks to consumption account for a substantial part of the variance of consumption of durables and of cars and, in the case of durables, shocks to the money market are also contributing to the variance of the growth of durables consumption. Nevertheless, even in these two cases the contribution of consumption shocks is diminishing over time while income shocks dominate after 30 quarters. It is possible that the dominance of consumption shocks in the short- to medium-run is a reflection of the nature of the goods in question.

IX. Conclusions

Recent trends in consumer confidence paint an unpromising picture concerning the outlook for consumer spending in France. The consumer confidence indicator appears to not simply forecast changing expectations about the flow of future income, but the data suggest that it also has additional explanatory power in consumption equations, which likely relates to uncertainty about such matters as employment and income prospects, taxes, and government transfers. The importance of this indicator in reflecting uncertainty is increased in population of consumers failing to smooth their consumption over the life-cycle, because declines in confidence likely reflect declines in current incomes. In such cases, weak confidence forecasts weakness in private consumption.

The model tested on French consumption data in the paper was essentially that of current-income consumers proposed by Campbell and Mankiw (1991). If the consumer population is characterized by consumer who behave according to the permanent income hypothesis, then the regressions should show that the fraction of consumer who set their consumption equal to current income is not different from zero. If, on the other hand, the latter type of consumers is present in the data, this amounts to a rejection of the permanent income hypothesis for the population as a whole. In this case, current consumption will be "excessively sensitive" with respect to current income, and the degree of sensitivity is the fraction s of current income consumers in the sample.

Earlier estimates obtained by Campbell and Mankiw (1991) had placed this fraction in the French consumer population between 65 percent and 100 percent. The present estimates, obtained from a longer sample which includes data from the period of financial deregulation and complete liberalization of financial markets, places this fraction as low as 20 percent and no higher than 45 percent. In individual consumption categories, consumers appear to behave more according to the permanent income hypothesis in the case of durables and cars than in the cases of non-durables and services, but the estimates

in the disaggregated equations cannot be given a straightforward economic interpretation; the nature of the goods in question affect the "excess sensitivity" parameter.

The data are consistent with the hypothesis that the removal of financial constraints would tend to lower the fraction of current-income consumers in the population; not only has this fraction declined in the post-1989 period when the process of financial liberalization was completed, but also throughout the period since the early 1970s there has been a trend decline in the share of current-income consumers in France. With consumption-smoothing consumers becoming more important, the output costs of stabilization should also be expected to decline.

Consumption of current-income consumers would show greater variability in response to transitory shocks in general, and those related to fiscal and monetary policy in particular, than consumption of permanent income consumers. The data show that a principal contributor to the error variance of the growth of consumption is transfers to households, second only to shocks to consumption itself. The dependence of consumption on fiscal transfers explain why it may be politically difficult to consolidate the budget through cuts in transfers to households alone. Furthermore, in the event that permanent income has been revised downwards, consumption should show little or no variability due to such fiscal shocks; the evidence rejects this presumption. Last period's deviations of consumption growth from its long-term relationship with income growth and the rate of interest are rapidly corrected in the current period, with a complete adjustment taking place in less than a calendar year; this behaviour is consistent with the presence of a substantial fraction of current-income consumers in the consumer population who keep a strict relationship between current spending and income growth.

This error-correction process provides some insights into private consumption growth in the aftermath of the 1993 recession. Recall that consumption growth has been diminishing since the spring of 1990, and has been below a generally declining trend for over six quarters since 1992:Q1 before recovering in the second half of 1994. The latter recovery may be seen not as a signal of an reversal of the trend in consumption growth but a correction to growth below trend during the recession. Such fluctuations should be seen as normal when there are deviations in the long-term relationship between consumption growth, and income growth and interest rates, as occurred during the recession, which are subsequently corrected. This correction continued through much of negative consumption growth in 1995⁴⁴.

In recent policy steps, the rate of interest on savings has been reduced, and expectations for a strengthening recovery have been laid with easing moves on the part of the monetary authority. The results show that reductions in the rate of interest could contribute to accelerating consumption growth but for this to be a substantial effect it would be necessary to see large reductions in interest rates; in other words, the coefficient on the real interest rate variable is quantitatively small. The problem of sluggish consumption growth can only partially be addressed through relaxation of monetary policy alone in France.

⁴⁴ Private consumption grew, in volume, by -0.2 percent in 1995:Q1, by 1.6 percent in 1995:Q2, by -0.1 percent in 1995:Q3, and by -0.3 percent in 1995:Q4; it also grew by 2.5 percent in 1996:Q1 but declined by 1.0 percent in 1996:Q2.

Annex

Sources and time-series properties of the data

The basic source for the consumption and income data used is the INSEE databank "Séries Trimestrielles de Comptabilité Nationale de l' INSEE". The data are quarterly starting in 1970:Q1 and ending in 1994:Q4 or in 1995:Q4. Data for the nominal short-

Table A1					
Sources and time-series properties (stationarity tests) of the data					
Variable	INSEE code	Level		First difference	
		DF	ADF(1)	DF	ADF(1)
Private consumption	P31_V0T8	-1.93	-1.60	-10.70	-6.57
- Durables	P31_D108	-1.48	-1.63	-10.55	-7.21
- Non-durables	P31_D208+P31_D308	-3.79	-2.61	-13.09	-9.55
- Cars	P31_U5C8	-2.44	-1.87	-11.20	-7.84
- Services	P31_V0T8- (P31_D108+P31_D208 +P31_D308)	-1.62	-1.44	-10.70	-7.94
Disposable income	RN3_N7	-1.89	-1.80	-9.70	-6.18
Wage income	R12_NR7+R13_NR7+ R11_NNR7	-1.91	-1.80	-9.86	-6.28
Non-labour income	RN2_N7+R40_NR7 R40_NE7	-1.66	-1.94	-6.22	-4.66
Direct taxes	R61_NE7	-5.76	-4.21	-13.58	-9.75
Transfers received	R52_NR7+R64_NR7+ R68_NR7+R69_NR7	-2.85	-2.86	-9.38	-6.32
Transfers paid	R12_NR7+R13_NR7+ R51_NR7+R622_NE7 +R623_NE7+ R68_NE7+R69_NE7 +R66_NE7	-1.73	-1.76	-9.09	-5.98
Real interest rate	Commission services	-2.82	-4.04	-7.42	-7.67
Consumer confidence	Commission services	-2.81	-3.02	-8.12	-5.48

Source for all data, except the rate of interest and the confidence indicator, is the INSEE databank "Séries Trimestrielles de Comptabilité Nationale de l' INSEE"; for the remaining variables is the Commission services.

DF and ADF statistics are the Dickey-Fuller and the augmented Dickey-Fuller statistics, respectively; ADF(1) is the ADF statistic of order 1; the critical value for the DF and the ADF statistics, calculated by the MacKinnon method, at the 99% level of significance, is -4.07, and at the 95% level of significance it is -3.46; the test statistics are obtained from an equation defined over an intercept and a time trend; the DF and ADF statistics refer to the INSEE variables in 1980 prices.

term rate of interest and the confidence indicator are from the Commission services. The consumption variables are in 1980 prices; the income, tax, and transfer variables are nominal and they were converted to 1980 prices with the use of the private

consumption deflator. Similarly, the real rate of interest was also constructed on the basis of the 3-month paper rate and of the private consumption deflator. Logarithmic changes are defined as year-over-year; hence, $\Delta \log(X_t) = \log(X_t) - \log(X_{t-4})$. Table A1 shows the exact source and definition of the variables used in the empirical work.

As noted in the text, virtually all variables are non-stationary in level form. In Table A1, formal test for the time-series properties of the data are presented. The data reviewed for stationarity are all in 1980 prices except the consumer confidence indicator which is the balance between positive and negative responses to the relevant questionnaire; the real rate of interest has also been defined by the private consumption deflator. Stationarity is determined on the basis of the MacKinnon response surface statistic. The testing equation was defined over an intercept and a time trend. As can be seen in the Table, with the exception of the variable Direct Taxes, all other variables are non-stationary in level form, and stationarity can be rejected at the 99% level of significance. The Direct Taxes variable is stationary $I(0)$. However, all variables, with no exception, are $I(1)$. In first-difference form, non-stationarity is rejected at the 99% level of significance. This property supports the equation specification used in the estimation work as well as the specification used in the error-correction model of section VIII.

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