

# Special Analysis



# How are purchasing power and household consumption linked in France in 2019?

## An analysis of the different categories of households and forms of consumption

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*In 2018 the purchasing power of households' gross disposable income (GDI) fluctuated greatly from one quarter to the next, falling at the start of the year and growing toward the end, particularly as a result of the fiscal calendar. At the same time, household consumption was relatively resilient in Q1 2018 but did not keep pace with the increase in income in Q4. The sub-annual trajectory of the savings ratio of households, i.e. that portion of their income which is not spent on consumption, fluctuated significantly as a result. In order to comprehend these variations, this Special Analysis proposes to examine the links between income and consumption, with reference to the standard of living of households and the nature of their expenditure.*

*Over the long term, the structure of both income and consumption has changed. Firstly, the socio-fiscal system appears to have become increasingly committed to the principle of redistribution, increasing the proportion of income which comes from social benefits but also, in return, ramping up the scale of compulsory contributions. As such, quarterly fluctuations in income are now more sensitive to variations in taxes and social contributions. The structure of consumption has also evolved, in favour of forms of expenditure which are less sensitive to short-term variations in income, particularly expenditure defined as "pre-committed" (compulsory expenditure, such as housing costs).*

*The analysis can be refined down to the different categories of households, specifically their standard of living. The 20% of households with the lowest income are more dependent on social transfers for their income, and a large share of their consumption is devoted to expenses which cannot easily be avoided. At the other end of the scale, the 20% of wealthiest households live primarily on earned income and property income; a greater share of their consumption goes on "discretionary" expenditure (leisure activities, accommodation and restaurants, capital goods etc.).*

*This Special Analysis applies a dual analytical framework (household category and type of consumption) to the links between income and consumption. We thus constructed various error correction models, arriving at a model based on types of consumption, then broad categories of expenditure depending on their sensitivity to income level (pre-committed, non-discretionary and discretionary spending). Aggregating these forecasts for each type of consumption appears to be more effective than using a traditional equation designed to study total consumption.*

*The results confirm the importance of forms of expenditure which are sensitive to variations in purchasing power and exogenous factors affecting household expenditure when it comes to understanding the short-term fluctuations of aggregated consumption. In 2018, discounting exceptional short-term factors, the relative sluggishness of consumption growth could be explained by the time it takes for household consumption to adapt, on account of the nature of their expenditure and the delayed effects on purchasing power. ■*

## How are purchasing power and household consumption linked in France in 2019 ?

*Purchasing power has seen sizeable quarter-to-quarter fluctuations since 2018*

In 2018 the variation in household purchasing power, i.e. households' gross disposable income corrected for consumer price variations, fluctuated sharply from one quarter to the next, falling early on in the year and accelerating considerably towards the end. These jolts were largely caused by measures modifying (in both directions) consumer prices and the rate of tax applied to household income, introduced in different quarters, as well as the rise in oil prices. In 2019, after increasing rapidly in Q1 as a result of the "economic and social emergency measures," purchasing power should return to a rate of growth more in line with the long-term trend.

*The savings ratio displayed major fluctuations, indicating that the increases and decreases in purchasing power were not immediately passed on to consumption.*

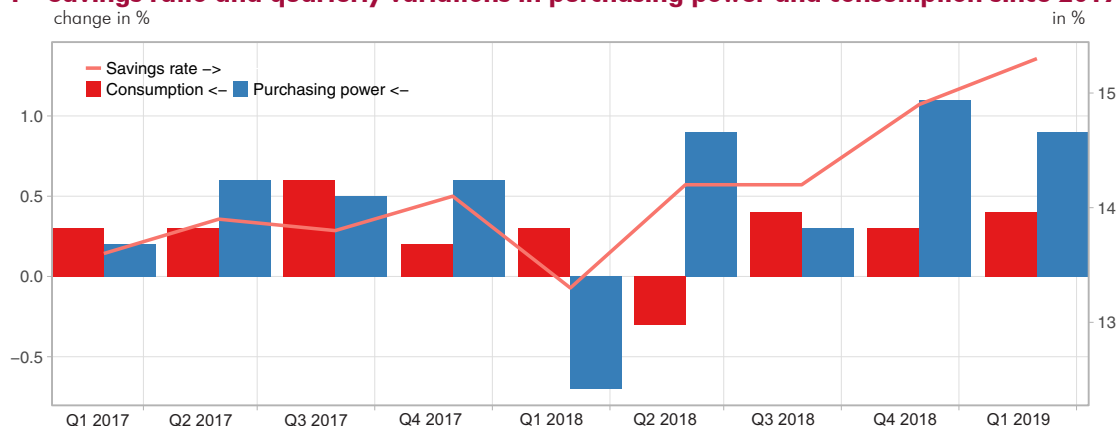
The savings ratio (respectively, the average propensity to consume) corresponds to the share of income flows allotted to savings (respectively, to consumption). Since early 2018, the savings ratio has also witnessed severe jolts which reflect the fact that, in the immediate short term, household consumption has not mirrored fluctuations in income (Figure 1). In Q1 2018 purchasing power fell by 0.7%, the most severe quarterly fall since the recession-hit quarters of 2008 and 2012. In the meantime, consumption nevertheless increased by 0.3%, causing the savings ratio to fall from 14.1% to 13.3%. Towards the end of the year, the savings ratio jumped to 14.9% as consumption slightly increased by 0.3%, even though purchasing power saw its biggest quarterly increase in 12 years. In Q1 2019 the savings ratio hit 15.3%, as purchasing power again grew more rapidly than consumption.

In order to comprehend these sizeable variations in the savings ratio, it is necessary to analyse the two aggregates from which it is derived: gross disposable income (GDI) and the final consumption expenditure of households. On the one hand, because variations in income are not similar from one category of standard of living to the next, and because consumption habits differ over time and between categories. On the other hand, because consumption may evolve independently of short-term fluctuations in income.

### The structure of income varies over time and between categories of households

Over the long term, the socio-fiscal system appears to have become increasingly geared towards redistribution. The rate of taxes and social contributions levied on gross disposable income increased from 21% in the 1950s to more than half in the period 2010 - 2016. Meanwhile, social benefits accounted for 16% of household income in the 1950s and now account for an average of around 35%. In all, the proportion of income

#### 1 - Savings ratio and quarterly variations in purchasing power and consumption since 2017



Source: national accounts ,INSEE

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*More unearned income for the wealthiest households, more social transfers for the most modest*

which is dependent upon fiscal and social policy is greater now than in the past, which may induce significant fluctuations in purchasing power in the immediate short term, particularly when new measures are introduced.

It is possible to break down the household account using the standard of living scale (*Box 1*). It thus becomes evident that the respective proportions of taxes and social benefits are distributed differently between the different categories of households (*Table 1*). Social benefits account for more than half of the GDI of households in the lowest quintile of the standard of living scale (the 20% of households with the lowest standard of living), and only just over a quarter for households in the top quintile (the richest 20% of households). The opposite is true of taxes and social contributions. As a result – although any measure affecting the taxation of income has a more substantial effect on purchasing power in the short term, for all households – the effect varies considerably from one category of household to the next. For example, a uniform increase in a given social benefit will have a stronger impact on the purchasing power of households at the bottom end of the scale.

**Table 1 - Structure of the gross disposable income of households by category of standard of living in 2011**

As a % of gross disposable income <sup>t</sup>	Q1	Q2	Q3	Q4	Q5	Household income*
<b>Net earned income</b>	46	56	62	67	63	61
Net wages	36	49	57	64	54	54
Net primary income of sole proprietors	10	7	4	3	9	7
<b>Unearned income</b>	8	11	15	18	29	20
Property income	0	0	0	2	14	6
Income from housing	8	11	15	16	16	14
<b>Net transfers received</b>	45	33	23	15	8	19
Social benefits	53	43	36	30	26	33
Taxes	-5	-9	-11	-14	-20	-15
Other transfers	-3	-2	-1	-1	2	0
<b>Gross disposable income</b>	100	100	100	100	100	100

Key: In 2011, for the 20% of households with the lowest standard of living (Q1), earned income accounts for around 46% of total income, with 36% coming from net wages and 10% from the net primary income of sole proprietors.

N.B.: (\*) i.e. sharing the same primary residence, not necessary a joint budget.

Source : INSEE, national accounts

*In the short term, substantial variations (positive and negative) in income are essentially caused by variations in taxes and social contributions*

Analysis of the quarterly variations in purchasing power over the long term reveals significant fluctuations (*Figure 2*). Taxes and social contributions are the main contributing factors to the short-term variability of purchasing power, whereas the contribution of earned income is relatively stable in comparison. Those quarters with strong variations (both positive and negative) in purchasing power are characterised by a high contribution of income and wealth tax and social contributions. The year 2000 is a good example, with fiscal measures introduced to reduce the level of tax paid by households: cuts to the tax rate in the first two income tax bands, a cut in the rate of VAT and a reduction in local residence tax. The year 2012 provides a counter-example, with the alignment of the taxation of capital with that on earned income. Furthermore, in both 1998 and 2018, the structure of compulsory contributions changed (increase in CSG and reduction in employers' contributions)<sup>1</sup>. In 2018,

1. In 1998, the rate of the general social contribution (CSG) was increased from 3.4% to 7.5% while social contributions paid by households were reduced. In 2018 the rate of the CSG was increased by 1.7 points while the social contributions paid by employees and independent workers were reduced.

## Box 1: Methodology used to construct accounts for the different categories of households

### General methodology

Household surveys provide a better understanding of households' income and consumption, and the disparities between different types of households by going beyond the average figures calculated in the national accounts. These surveys also serve to obtain more detailed information on their income and consumption, breaking down the different components of income and consumption for the different categories of households (Accardo et al, 2009).

Data from household consumption surveys are currently only available for the year 2011 (the 2011 Family Budget survey)<sup>1</sup>. However, there are annual data for the period 2011 – 2016 covering the different components of income (the Fiscal and Social Income surveys 2011-2016). The socio-demographic data required to calculate the number of households in each category are derived from the Labour Force Survey, calibrated using the number of households listed in the satellite account for each home.

The various components of disposable income and consumption expenditure are broken down by category of household, in a three-step process<sup>2</sup>:

- Beginning by calculating average values for each category of households (mean wages for each quintile on the standard of living scale, for example);
- Then calculating the total amounts involved, multiplying the averages by the number of households in each category;
- Finally, the different mass values obtained from this process are recalibrated with the total mass calculated in the national accounts (2014 base).

We can thus obtain, for each component of disposable income and consumption expenditure, a breakdown by category of households of the aggregate figures in the national accounts. The sum of these components gives the total disposable income total and consumption for each category; this allows us to deduce total savings and the savings ratio.

The difficulty of this exercise is to effectively treat the differences between the scopes and concepts used in the national accounts and in these surveys.

### Differences of scope

The national accounts cover the whole population residing in France, while the surveys used here only cover so-called "ordinary" households and excludes those living in collective accommodation (workers' hostels, retirement homes etc.). A correction is performed on the total values from the accounts to adjust them to the field covered by the surveys.

Financial intermediation services indirectly measured (FISIM), corresponding to the margin rates applied to deposits and loans by banks, are not measured by the surveys. We have therefore excluded FISIM from disposable income and consumption as measured in the national accounting system.

### Conceptual differences

Gross disposable income (GDI) as defined in the national accounting system is not measured in the same way in the surveys. The latter do not effectively cover some of its components. For example, social contributions and fraud or undeclared work are not covered by the surveys. Furthermore, GDI as defined in the national accounting system also includes "imputed" rents (rents that home-owners are deemed to pay to themselves).

In order to assign each household in the survey to a quintile on the scale of gross disposable income, we need to estimate GDI. Household GDI is initially calculated using the fiscal and social income survey (ERFS). Incomes which are not so well covered by this survey (income from financial investments) are calculated using econometric estimates recalibrated with reference to the macroeconomic data. The missing components (interest on consumer loans, fraudulent income, undeclared labour etc.) are estimated using a number of hypotheses. An explanatory equation for disposable income is then estimated econometrically in the ERFS, using variables present in the different surveys. The estimated coefficients associated with the variables in the equation are then used to deduce disposable income as per the definition used in the national accounting system in the Family Budget Survey (for 2011). This leaves a classification of households into five quintiles based on GDI which is identical for both surveys. ■

1. The first results of the 2016/2017 survey have been published and should make it possible to update the accounts by household category in the near future.

2. This general approach should be slightly modified when the category considered is the quintile of gross disposable income per consumption unit (see *below*).

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in light of the implementation schedule for these measures (the reduction in employers' contributions was introduced in two phases), purchasing power was certainly affected in Q1, but changed relatively little over the year as a whole.

The growing weight of social transfers within GDI, as noted above, goes some way to explaining these different contributions to the variability of purchasing power.

### Over the long term, the structure of consumption has evolved in favour of forms of expenditure which are relatively unaffected by variations in income

How is household consumption affected by variations in income in the immediate short term? Or to put it differently, when income increases by 1%, how much does household consumption increase immediately and over the ensuing quarters?

In order to answer this question, we can break down consumption into broad categories based on its destination (or groups of products consumed, whether they are goods or services), and their degree of sensitivity to variations in income.

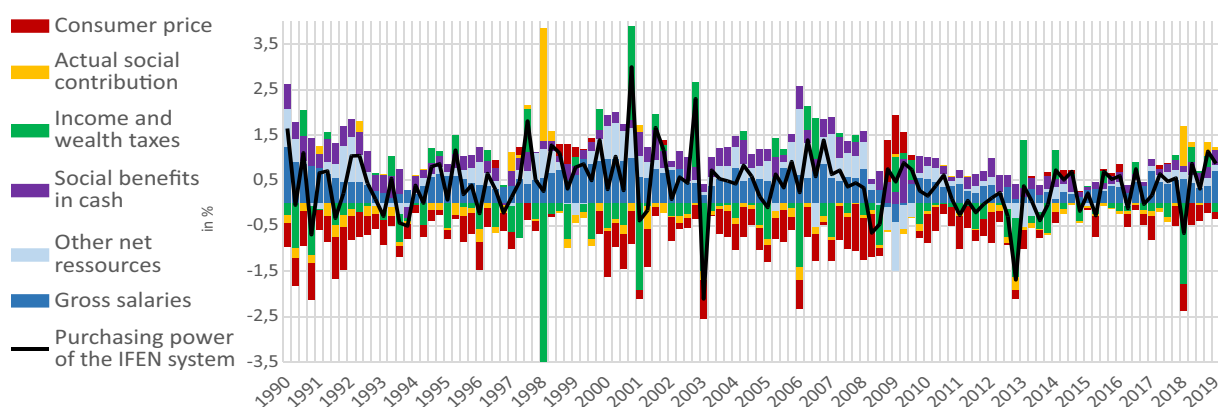
*Household consumption can be broken down into three broad categories: from most sensitive to least sensitive to variations in income*

The first category corresponds to pre-committed or compulsory expenditure, that is, spending governed by contracts which are very difficult to negotiate in the short term. This category essentially corresponds to housing costs and associated expenses (water, electricity and other regular charges), as well as financial services and insurance (excluding life insurance plans), school meals, TV licence fees, etc. (Table 2). At the macro-economic level, while these expenses may be adjusted in the long term – a permanent variation in income may lead to a change in spending on housing – they are non-negotiable or relatively inflexible in the immediate short term. A change in income will have virtually no effect on housing consumption in volume terms within the timeframe of a few quarters.

The second category corresponds to spending which can be defined as non-discretionary, which is to say forms of consumption that are difficult to modulate in the short term because they correspond to basic needs. These include food, healthcare, education, fuel and transport services<sup>2</sup>, particularly the cost of commuting. As with pre-committed expenditure,

2. "Fuel" and "transport services" are considered non-discretionary spending because they are essential for certain categories of household (rural households for fuel, urban households for transport services; Ferret & Demoly, 2019).

## 2 - Contributions to variations in the purchasing power of households



Source: INSEE, national accounts

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albeit to a lesser extent, a variation in income will have little short-term impact on the volume of consumption of these goods and services. However, a long-term change in household income may lead to more substantial changes.

Finally, the third category corresponds to discretionary spending, i.e. spending which can be more easily adjusted and is thus, at least in theory, more sensitive to variations in income. This category contains spending on durable goods and other products (furniture, vehicles, clothing and shoes) and more contingent expenditure (leisure activities and culture, alcohol and tobacco, hotels and restaurants, etc.).

This typology is based on the concept of pre-committed expenditure, developed and utilised by INSEE since 2007, but also on an a priori assessment of the flexibility or inflexibility of different forms of consumption. As with all classifications of this nature, it seems likely that the choices will not be as intuitive to some as to others. Nevertheless, the estimates of the sensitivity of these forms of consumption to variations in income – presented in this Special Analysis – enable us to gauge their empirical pertinence.

**Table 2 -Classification of final consumption expenditure by households**

<b>Pre-committed (compulsory) expenditure</b>	<b>No-discretionary expenditure</b>	<b>Discretionary expenditure</b>
Housing, water, gas, electricity and other fuel	Food products and non-alcoholic drinks	Clothing and shoes
Telecommunication services	Healthcare	Furniture, household items and day-to-day maintenance
Television services	Fuel and lubricants	Leisure and culture excluding television services
Canteen costs	Transport services	Hotels, cafes and restaurants excluding canteens
Insurance, not including life insurance plans	Education	Alcohol and tobacco
Financial services		Other goods and services excluding insurance (except life insurance) and financial services
		Communications excluding telecoms services

Note: the item names correspond to the INSEE classification of types of household consumption (COICOP, 2016).

### *More pre-committed expenditure and less discretionary spending.*

Since 1960, the structure of consumption expenditure has changed. Whereas compulsory expenditure accounted for just 15% of households' final consumption expenditure in 1960, that figure stood at just over 34% in 2016 (Figure 3). This increase is primarily due to the growing weight of housing costs, driven both by rising rents (price effect) and the increase in the quality and quantity of homes (volume effect) (Consales et al., 2009).<sup>1</sup> The proportion of discretionary and non-discretionary spending has shrunk as a result, and these two categories respectively accounted for 42% and 24% of final consumption expenditure in 2016, compared with 52% and 33% in 1960. Nevertheless, since the mid-1980s the weight of non-discretionary spending has remained stable as a result of the falling cost of spending on food, as the needs of the majority of the population are now saturated by the available supply. Finally, the long-term decline in the weight of spending on furniture, alcohol and tobacco and clothing and shoes has contributed to the declining weight of discretionary spending. All in all, the structure of household consumption has become skewed towards forms of spending which are less flexible, and thus less sensitive to variations in income than was previously the case.



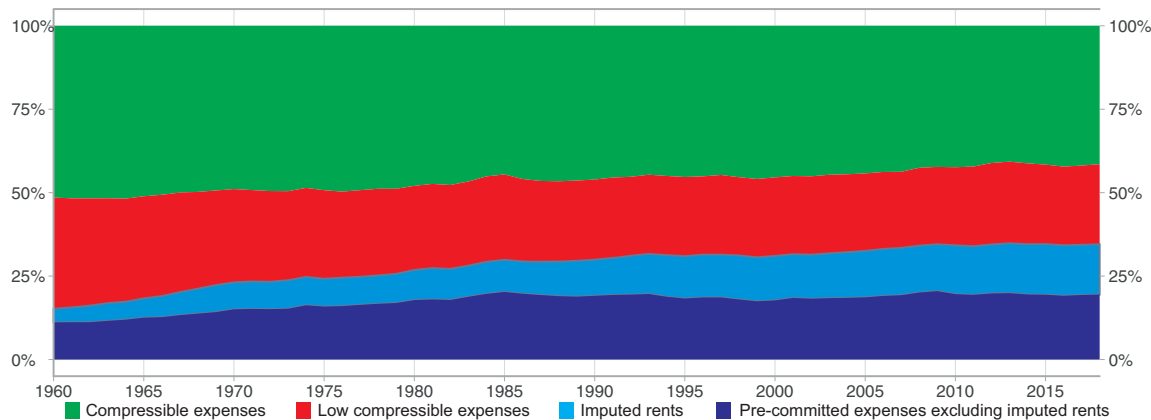
## How are purchasing power and household consumption linked in France in 2019?

*In the short term, some of the variation in household consumption can be explained by the level of compulsory spending, with exogenous shocks also a contributing factor.*

In the immediate short term, major variations in consumption can be attributed to those forms of expenditure most sensitive to income levels, i.e. discretionary spending (Figure 4). The same applies, to a lesser extent, to non-discretionary spending. Finally, pre-committed expenditure, excluding household energy consumption, is naturally the most stable category in terms of sub-annual variation. To be precise, discretionary spending accounts for 65% of the variability in total consumption expenditure, while pre-committed expenditure excluding energy accounts for just 2.3%. Nevertheless, this share rises to 17% when household energy bills are included. Finally, non-discretionary spending accounts for 15% of the variability.

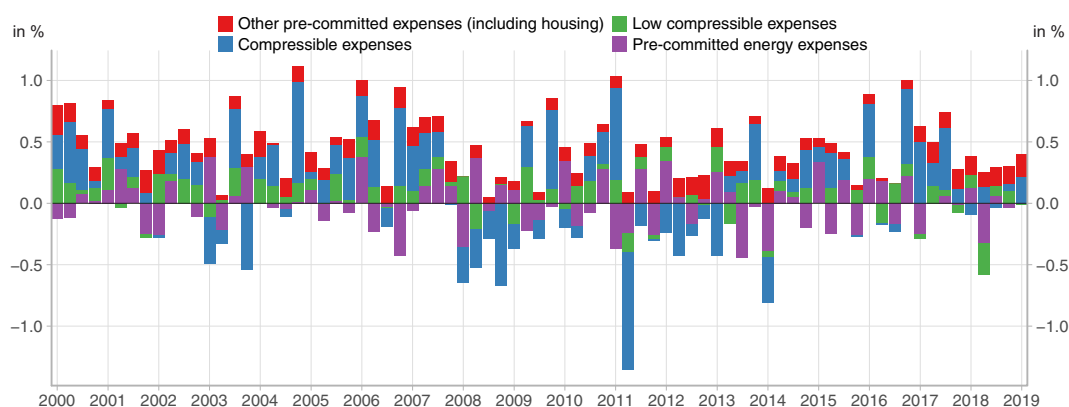
In addition to the variations which can be attributed to the sensitivity of different types of spending to jolts in income, some fluctuations may be caused by exogenous factors independent of the level of income or prices. This is particularly true of household energy bills which, in the immediate short term, are directly connected to variations in recorded temperatures in relation to the seasonal averages. For example, an unusually mild winter means there is less demand for heating, and energy consumption falls as a result. In terms of durable goods, vehicle purchases may be brought forward or pushed back in response to incentives designed to encourage people to buy or sell cars. For example, after the drop-off in the consumption of new cars in 1993, the introduction of scrappage bonuses for old vehicles in the period 1994 – 1996 provided a temporary boost to consumption of transport equipment. Similarly, much of the 1.3% fall in consumption seen in Q2 2011 was caused by the decline in consumption of transport equipment, with -0.8 points of that decline attributed to the termination of the scrappage bonus scheme. In the final quarter of 2018, some households may have postponed their plans to purchase a new vehicle in order to benefit from the scrappage bonus scheme, which was expanded at the start of 2019.

### 3 - Structure of households' final consumption expenditure by type of expenditure, since 1960



Source: INSEE, national accounts

### 4 - Contributions to variation in the final consumption expenditure of households



Source: INSEE, national accounts



## The savings ratio is non-stationary in the long term, and fluctuates considerably in the short term

*Above and beyond short-term variations, the savings ratio also fluctuates in the long term*

Over the long term, household saving (and consumption) decisions are not constant (Figure 5). Over the past two decades the savings ratio has remained relatively stable compared with previous years, fluctuating around a medium-term average of between 14% and 15%. Nonetheless, the savings ratio is also liable to deviate from its long-term average. After the recession of 2008, the savings ratio hit 16% for four consecutive years. During this period, growing uncertainty over future income caused households to increase their precautionary savings (Faure et al., 2011). Although purchasing power was slowing down, savings did not loose pace and this situation led to a decline in consumption expenditure over the period (Gateaud et al., 2015).

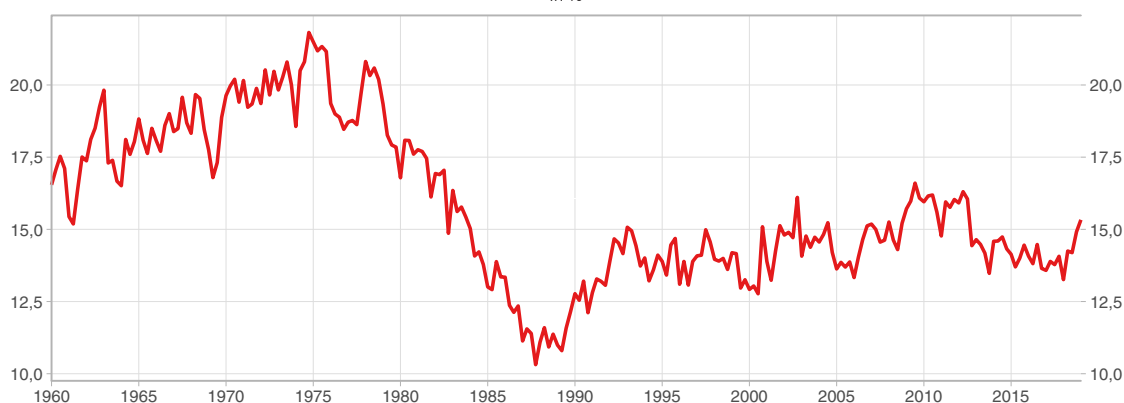
The long-term instability of the savings ratio, coupled with its persistent medium-term deviations, challenge the assumption that the savings ratio is stationary, i.e. that household consumption behaviour is regular and the average propensity to consume remains stable over time. This observation casts doubt on the unit-linking of income and consumption over the long term, as practiced in the traditional consumption equations.

*The savings ratio varies substantially at different levels of the standard of living scale*

Data for the different categories of households indicate that the least well-off households had a negative savings ratio in 2011 (-13.4% for households in the first quintile), meaning that their consumption exceeded their income. This reflects the fact that their consumption was probably partly covered by borrowing, or by one-off intra-family transfers. At the other end of the scale, the richest households saved almost 40% of their income (Table 3). This negative savings ratio illustrates the difficulties encountered by the least well-off households when it comes to smoothing their consumption in the immediate short term, i.e. maintaining a stable level of consumption despite jolts in income by adjusting their level of saving. This is made all the more difficult by the fact that the proportion of their total income which is discretionary, i.e. that income which remains after pre-committed expenditure has been covered, is lower than it is for the wealthiest households (Accardo, Billot & Buron, 2017).

If households are once again divided into different categories based on their standards of living, it can be seen that pre-committed expenditure occupies a greater share of the household consumption of lower-income households, primarily due to the cost of housing (Figure 6). At the aggregate level, the ability of households to decide between consuming and saving is reduced when their average outgoings are essentially composed of pre-committed and non-discretionary expenditure. In 2011, the share of consumption allotted to pre-committed expenditure was three points higher for households

**5 - Household savings ratio**  
in %



Source: INSEE, national accounts

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whose standard of living puts them in the lowest quintile (the poorest 20%) compared with those households in the highest quintile (the wealthiest 20%). The gap actually stands at 9 points if imputed rents are excluded from pre-committed expenditure, and increases further still if living standards are segmented more accurately (Lelièvre & Rémila, 2018). Similarly, the proportion of non-discretionary spending is greater among lower-income households (31% compared with 25% for the most well-off), largely as a result of spending on food. Finally, the proportion of discretionary spending is higher among the wealthiest households: these households spend more on leisure activities, culture, and hotels and restaurants.

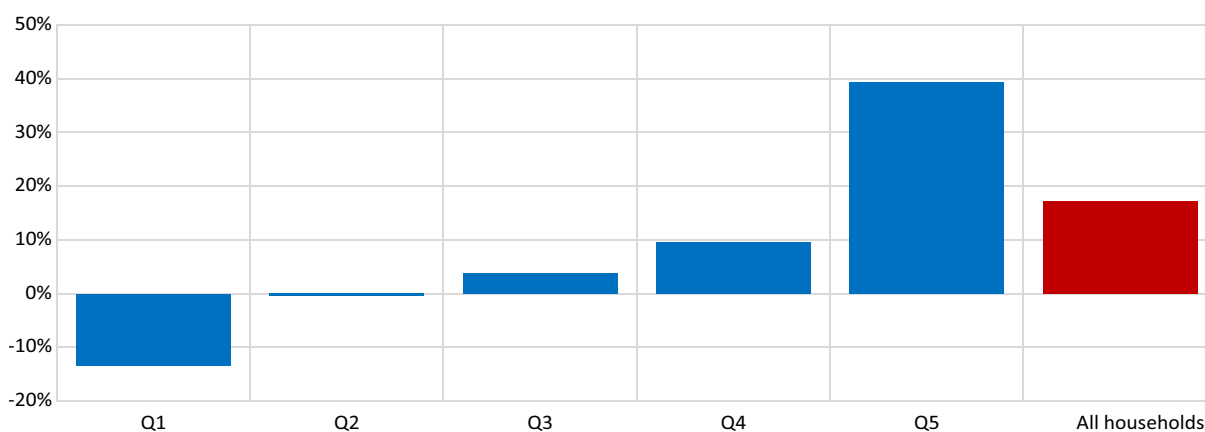
*In the short term, fluctuations in the savings ratio are caused by consumption smoothing and one-off shocks.*

Substantial variations in disposable income, associated with the smoothing of household consumption over time, are the primary explanation for the short-term fluctuations in the savings ratio. To put it slightly differently, shocks may have a lasting effect on purchasing power. For example, changes in the rate of the general social contribution are not instantaneously passed on to consumption. This is also true of the reduction in income tax in 2000, and the increase in both income and wealth taxes in 2012. Such shocks are therefore mechanically passed on to the savings ratio: they initially induce a variation in the savings ratio which is then gradually absorbed, since consumption takes a certain amount of time to respond (between three and seven quarters on average; see *the Annex*). However, since pre-committed expenditure is difficult to avoid in the short term, unlike discretionary spending, it is highly likely that the reaction time is longer for the former than for the latter.

Furthermore, some of the short-term fluctuations in the savings ratio are not caused by the effects of income on consumption, and tend to dissipate more rapidly. For example, a brief drop in the savings ratio may be the result of a period of “over-consumption” by households. In May and June 2018, consumption of television services saw a sharp increase ahead of the football World Cup, before shrinking again in the aftermath. In January and February 2018, tobacco consumption increased in anticipation of the tax increase scheduled for the following month. Moreover, purchasing power may occasionally vary as a result of one-off bonuses paid by businesses. This was the case in Q1 2019, leading to a backlash effect in the following quarter.

In order to study variations in the savings ratio in greater detail, particularly for the year 2018, we must find an appropriate way of quantifying the sensitivity of consumption to variations in income and consumer prices, taking into account the instability of the savings ratio caused by changes in consumption patterns in the long, medium and short terms.

### 6 - Savings rate by household category in 2011



Scope: ordinary households

Note: Q1 (resp. Q5) corresponds to the 20% of the poorest (wealthiest) households

Source: INSEE, national accounts

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### Modelling consumption by type is better suited to analysis of the immediate outlook

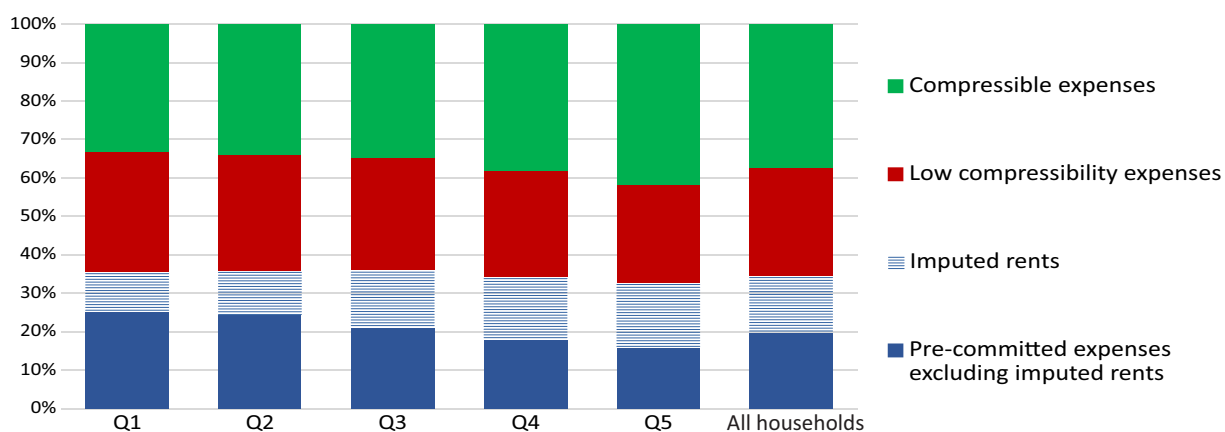
*Aggregating forecasts by type of consumption is more effective than a traditional total consumption equation*

These variations in the savings ratio can be quantified using error correction models estimated for the different types of consumption (a total of seventeen types of consumption, with four defined as “pre-committed expenditure”, five as “non-discretionary spending” and nine as “discretionary spending;” see [Box 2](#)). This approach offers three key advantages. Firstly, it allows us to take into account the differences in sensitivity to income and prices between different types of consumption: spending on housing is less sensitive to changes in income than spending on alcohol and tobacco, for example. Secondly, it allows us to take into account the separate trajectories followed by the average propensity to consume each of the goods and services identified in the long term. For example, the long-term increase in the share of consumption taken up by housing costs and the decline in the share of spending on food can thus be measured, allowing for more accurate adjustment of the long-term ratios. Thirdly, it enables us to more accurately measure the level of precautionary saving, by adjusting the average propensity to consume for the different types of consumption. For example, after 2008 households reduced their spending on clothing and shoes in order to put more money aside, a choice which can be explicitly integrated into our model (Gateaud et al., 2015). Ultimately, the predictive quality of these models is greater and allows us to reduce the overall level of forecasting error for household consumption ([Figure 7](#)).

Once the forecasts have been made for these models, it is possible to aggregate the results to obtain a forecast for each category of expenditure. In the detailed results, it appears that fluctuations in purchasing power contribute little to very short-term variations in pre-committed expenditure ([Figure 8](#)).

The contribution of relative prices is substantial, but follows a fairly stable trajectory from quarter to quarter. On the other hand, the contribution of other variables, especially temperature variations which differ from the seasonal averages, explains the major sub-annual fluctuations in pre-committed expenditure. As for non-discretionary spending, the models reveal a heightened sensitivity to variations in purchasing power and relative prices ([Figure 9](#)). Finally, discretionary spending is the category most sensitive to variations in purchasing power and relative prices ([Figure 10](#)). These models thus confirm that pre-committed expenditure is less sensitive to variations in income than non-discretionary spending, which in turn is less sensitive than discretionary spending.

### 7 - Breakdown of consumption expenditure by type of expense and by standard of living in 2011



Scope: ordinary households

Note: Q1 (resp. Q5) corresponds to the 20% of the poorest (wealthiest) households

Source: INSEE, national accounts

### Box 2: modelling household consumption

#### The econometrics of forecasting consumption

Traditional economic models of household consumption are based on the theories of life cycle and permanent income (Bonnet & Dubois, 1995). In particular, they require the unit-linking of consumption to income in the long-term component, which is to say that consumption is held to adjust itself perfectly to income in the long term. This ensures that the models reflect the stability of household consumption over the long term, or to put it differently, the stationary nature of the savings ratio. While the ratio is not actually entirely stationary in the long term, modelling it as such allows us to avoid any unjustified leaps in the savings ratio when forecasting.

When modelling for different types of consumption, this approach is no longer valid, because the structure of household consumption is not stable in the long term: the proportion spent on food has followed a long-term downward trend, while spending on leisure activities has gone the other way. Therefore, imposing unitary elasticity for all types of consumption in the long-term component would be equivalent to suggesting that households always allocate the same proportion of their income to expenditure in the long term. The equations we use do not retain this unit-linking of consumption to income

Modelling expenditure by type serves to explicitly take account of the particular behaviours associated with each type. For example, the spike in precautionary saving following the crisis of 2008 was counterbalanced by a reduction in discretionary spending (Gateaud et al, 2015); each type of expenditure has its own income and price elasticities; exogenous shocks with an impact on specific forms of expenditure can be measured individually: scrappage bonuses, mad cow disease, anti-smoking initiatives, etc. These models also serve to define the springback effects specific to each type of expenditure, i.e. the average time it takes to return to the long-term trend level (Table 5). Finally, we also tested sequential modelling. We began by estimating pre-committed expenditure and non-discretionary spending. We then calculated the “residual” household income left after these expenses have been deducted. Finally, we used that income to predict discretionary spending. The forecasts yielded by these two models proved to be fairly similar.

#### Comparing the models

It is possible to compare consumption as simulated by aggregating the various models described in this Special Analysis, and a more classical model of the sort proposed by Faure et al. (2011). It appears that our new model more effectively reflects the variations in household consumption. Furthermore, outside the estimation period (1990-2016 or 1995-2016 depending on the models; 1990-2016 for the old model), the average absolute error for 2017-2018 is 0.17 percentage points with the new model, compared with 0.22 when using the old model. The RMSE (root mean square error) is 10% smaller than with the old model. A similar margin is found across the whole estimation period, including error from outside the period. ■

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	Type	Spring-back effect	Explanatory Variables				
			Purchasing power	Relative prices	Trend	Indicative	Others
Pre-committed	Housing	-0.1	*	*	Trend increase in the share of this expenditure	Yes post-crisis 2008	No
	Water, gas, electricity and other fuels	-0.2	*	**	No	No	Temperatures
	Communications	-0.2	**	***	Since 2005, the increase in the share of communications spending has slowed down	No	No
	Financial services	-0.1	*	*	No	No	Logged endogenous
Non-discretionary	Food products and non-alcoholic beverages	-0.2	*	**	No	No	Unemployment rate
	Health	-0.1	*	*	No	No	No
	Fuels	-0.2	***	*	Since 2000. Trend increase in fuel consumption Increase in oil prices.	In 2008. Temporary drop in fuel expenses due to the economic crisis.	Logged endogenous
	Transport services	-0.3	*	**	Trend increase in transport services spending since 1960.	No	No
	Education	<-0.1	*	*	No	No	Logged endogenous
Discretionary	Alcoholic beverages, tobacco, narcotics	-0.2	**	***	No	From 2003 onwards, public health measures.	No
	Clothing and footwear	-0.6	*	***	Trend decline since 1960	Reduced household spending after the 2008 crisis	No
	Furniture, household items and routine household maintenance	-0.1	**	***	No	From 2008: crisis effect.	Logged endogenous
	Vehicle Purchase	-0.5	***	***	No	In 1995, 1996, 2004 and 2011: scrapping premiums.	Unemployment rate
	Vehicle operating expenses, excluding fuel	-0.2	*	***	No	Between 2008 and 2016: crisis effect.	Delayed endogenous, vehicle purchase expenses
	Leisure and culture	-0.3	**	*	Trend increase in the share of spending on culture and recreation: rising standard of living. Broke up in 1998. Breakdown in 2008: crisis effect.	In 2016: attacks and football Euro	Unemployment rate
	Restaurants and hotels	-0.2	*	*	No	From 2008: crisis effect.	Unemployment rate e
	Miscellaneous goods and services, excluding financial services	-0.2	**	*	Trend with disruption in 2007 related to the crisis	No	No

N.B.: The number of stars in the “purchasing power” and “relative prices” columns reflect the amplitude of the short-term elasticity of consumption following variation in one of the two variables: \* not sensitive \*\* sensitive and \*\*\* highly sensitive. When elasticity is close to 0, the box is marked \*. For elasticity of around 0.5 in absolute value terms, the score is \*\*. Finally, when elasticity is close to 1 in absolute value terms, the score is \*\*\*.

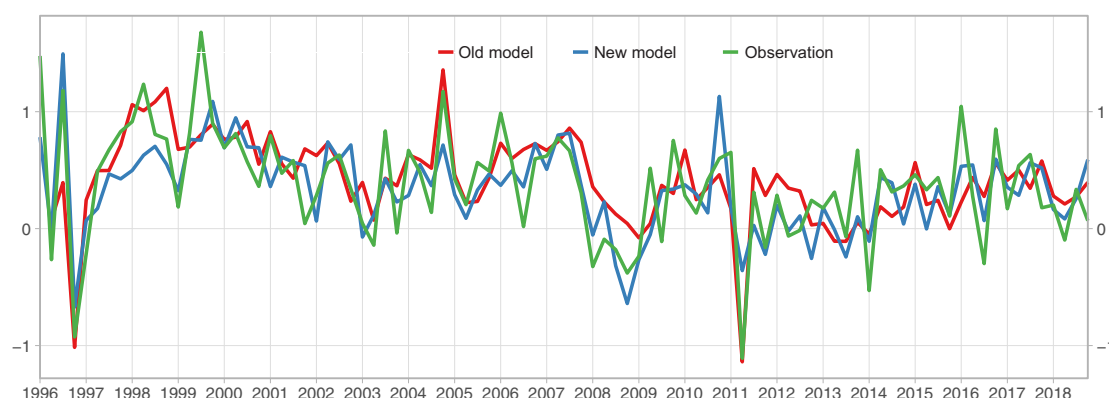
## How are purchasing power and household consumption linked in France in 2019 ?

*Some types of expenditure take twice as long as others to feel the effects of changes in income*

Since consumption does not adjust immediately to positive or negative shocks affecting purchasing power, there must be a transmission period. One of the advantages of estimating the consumption equations for each type of expenditure is that it enables us to calculate the time that each type and broad category of expenditure takes to return to a state of equilibrium in the aftermath of such shocks. For pre-committed expenditure, it takes an average of six quarters. The period is just three quarters for discretionary spending. Finally, it takes on average five quarters for non-discretionary spending to return to equilibrium, placing it between pre-committed expenditure and discretionary spending. As such, a purchasing power shock which leads to a temporary departure of the savings ratio from its long-term level will be fully reabsorbed after four quarters, on average.

A positive purchasing power shock which affects lower-income households will lead to an increase in consumption, all the more so since their marginal propensity to consume (MPC) is greater than that of other categories of households. Nevertheless, they may take longer to adjust their consumption habits than households in the wealthier categories. This is because the former have a greater proportion of pre-committed expenditure and non-discretionary spending than the latter. As such, if the structure of consumption is presumed to remain stable, a positive and uniform purchasing power shock should be reflected in an increase in the consumption of the least well-off households which is proportionally bigger but less rapid than the corresponding increase in the consumption of those households with the highest standard of living. However, this is based on the assumption that the

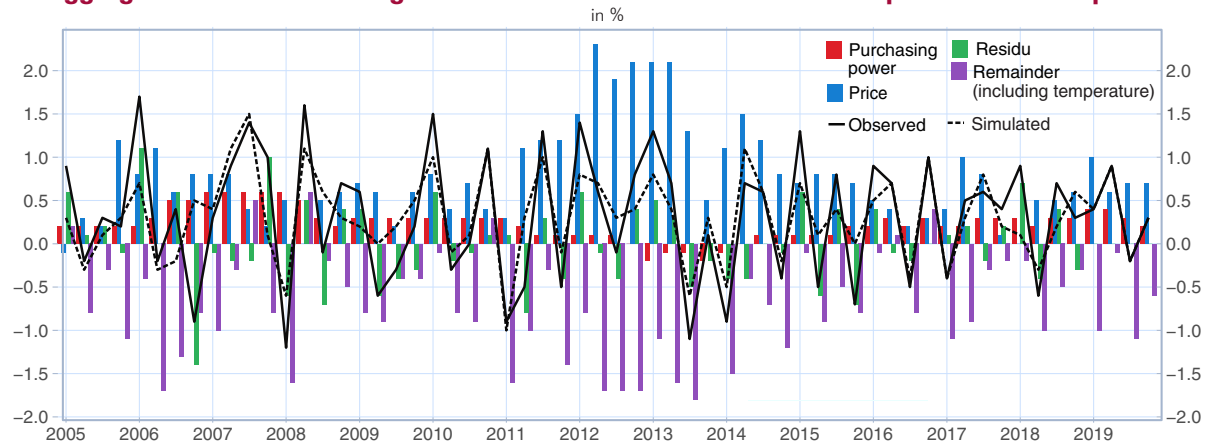
### 8 - Variations in household consumption simulated using the old and new models



N.B.: The former model is the model historically used to forecast consumption, i.e. a classical consumption equation. The new model contains 17 consumption equations corresponding to different types of expenditure. The forecasts are made using the error correction models explained above.

Source: INSEE, calculations performed by the authors. Estimation period of the old model 1990-2016.

### 9 - Aggregation of the forecasting models and contributions to variation in pre-committed expenditure



Source: INSEE

## How are purchasing power and household consumption linked in France in 2019 ?

MPC of the different types of household is identical for all of the types of consumption which make up the three main categories. This hypothesis is difficult to verify, due to the absence of quarterly data for each category of households. This also makes it impossible to calculate consumption equations for each category of households. Finally, households may respond asymmetrically to an increase or decrease in their purchasing power. This asymmetry, which is certainly more significant for pre-committed expenditure, is not covered by this analysis.

It is nonetheless possible to estimate the effect of a homogeneous purchasing power shock over different time scales (for example a jump of 1.0%) on the three categories of consumption and on total consumption by all households (Table 3). Firstly, the springback effect and elasticity of purchasing power are weaker for pre-committed expenditure, meaning that the reaction in the immediate short term is relatively modest, and the speed at which it converges is relatively slow. On the other hand, discretionary spending converges much more rapidly due to its strong springback effect, and increases more sharply in the immediate short term. At the aggregate level, consumption would see a 0.2% increase in the quarter in which the shock occurred, and a +0.5% rise within the year, rising to +0.8% over the long term. The absence of a unitary response of consumption to income in the long term – which may be problematic from the perspective of macroeconomic theory – can be attributed to the fact that the savings ratio is non-stationary. Moreover, the ultimate goal of the approach adopted in this Special Analysis is to analyse and predict household consumption in the short term, rather than in the distant future.

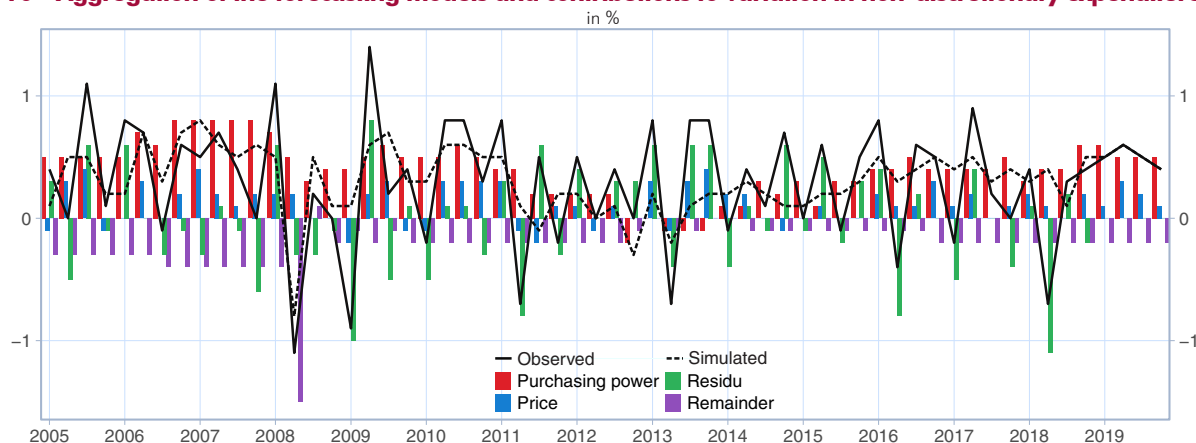
**Table 3 - Estimated cumulative effect of a 1.0% increase in purchasing power on household consumption**

	Q (choc)	Q+1	Q+2	Q+3	A+1	A+2	A+5	Long term
Pre-committed	0,1	0,1	0,2	0,2	0,3	0,4	0,4	0,5
Non-discretionary	0,2	0,3	0,4	0,5	0,6	0,7	0,9	0,9
Discretionary	0,3	0,4	0,5	0,5	0,6	0,7	0,8	0,8
<b>Total</b>	<b>0,2</b>	0,3	0,4	0,4	0,5	0,6	0,7	<b>0,8</b>

Key: a 1.0% increase in purchasing power in quarter Q leads to an 0.04% increase in pre-committed expenditure in the same quarter, rising to +0.3% a year on and +0.5% in the long term.

Can this analysis explain the unusual trajectory followed by the savings ratio recently? There are three potential causes of this unusual behaviour. Firstly, a purchasing power shock may be passed on more or less slowly to consumption depending on the type of spending in question. Secondly, exogenous factors may also affect consumption

### 10 - Aggregation of the forecasting models and contributions to variation in non-discretionary expenditure



Source: INSEE



## How are purchasing power and household consumption linked in France in 2019 ?

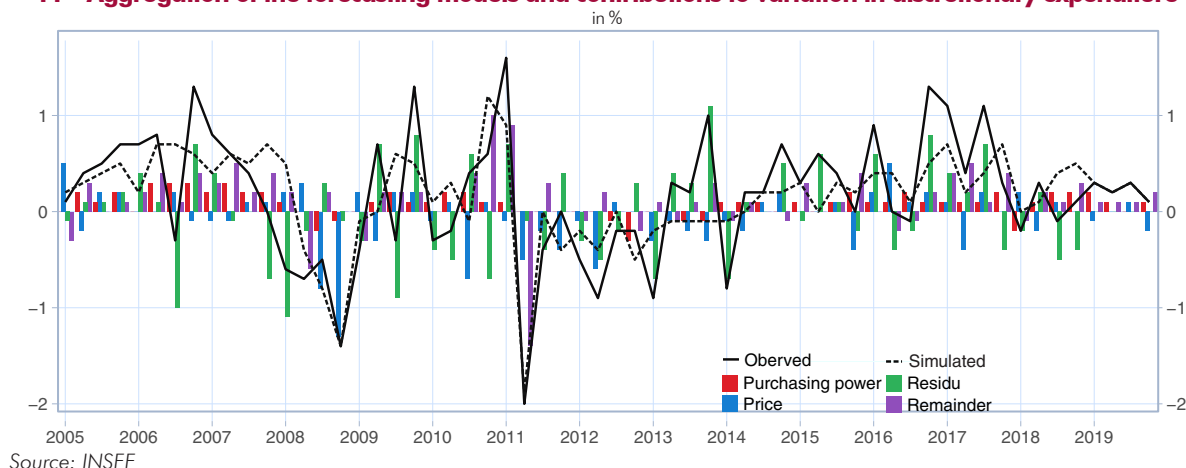
independently of variations in purchasing power. Finally, consumption responds differently depending on the distribution of variations in purchasing power between categories of households.

On the consumption side, only discretionary spending declined in Q1 2018. This explains the resilience of overall consumption (*Figure 11*), which grew by 0.3% despite the decline in purchasing power, and also the 0.8 percentage-point decrease in the savings ratio. In Q2, while discretionary spending again mirrored the fluctuations in purchasing power, one-off shocks led to a fall in household consumption: relatively mild temperatures in the spring and strikes on the public transport network led to a drop in the consumption of energy and transport services, unrelated to variations in income. Consumption grew only moderately in Q4 2018, despite the fairly robust growth of purchasing power. While pre-committed and non-discretionary expenditures again remained relatively impervious to variations in income, as they did in Q1, discretionary consumption and energy consumption both fell. This can be partly attributed to the effects of the “yellow vest” protest movement, as well as the drop-off in vehicle purchases in anticipation of the expansion of the scrappage bonus in January 2019 and the relatively mild temperatures recorded in late 2018. Once again, in 2018 the fact that pre-committed and non-discretionary expenditures are relatively impervious to variations in purchasing power in the short term (unlike discretionary spending) was reflected in the fact that aggregate consumption was more stable than purchasing power. As such, the strong positive income shock in the final quarter of the year led to an increase of around 0.7 percentage points in the savings ratio. Our analysis of fluctuations in consumption thus leads us to make two main observations: that the influence of exogenous factors must not be underestimated when studying quarter-to-quarter variation, and that pre-committed and non-discretionary expenditures are relatively stable compared to discretionary spending, which more rapidly mirrors (one-off external factors notwithstanding) the fluctuations of purchasing power.

*The variations in household purchasing power for different standard of living brackets also reveals much about consumption habits in 2018.*

In terms of income, the unusual quarter-to-quarter trajectory of purchasing power in 2018 is primarily a result of reforms to the system of taxes and social contributions, affecting both gross disposable income and consumer prices, with consequences which varied depending on the standard of living of households. Combined with our estimates for the short-term elasticity of different types of expenditure to purchasing power and relative prices, the MPC figures allow us to quantify the effect of a given fiscal policy on consumption behaviours. On the standard assumption that MPC will be higher for lower-income households, the

### 11 - Aggregation of the forecasting models and contributions to variation in discretionary expenditure



## How are purchasing power and household consumption linked in France in 2019 ?

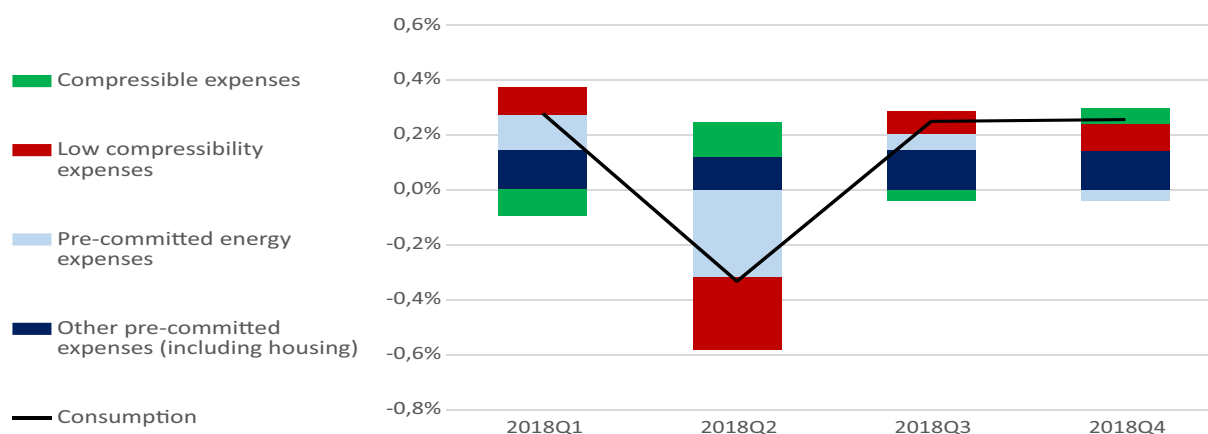
relative weakness of aggregated consumption can be explained by these disparities in the evolution of purchasing power: the combined effect of the CSG increase and rising fuel prices reduced the purchasing power of the poorest 10% of households in 2018 (Biotteau & Rioux, 2019). The measures introduced in 2018 did more to benefit households with a median standard of living, with a negative impact on households in the top income decile (with the probable exception of those at the very top of that bracket, formerly required to pay the wealth tax). On the one hand, the MPC of middle-income households is lower than that of more modest households. On the other hand, the wealthiest households have the lowest MPC so any variation in their income has a much more modest impact on consumption. As such, the decrease in discretionary spending in Q1 2018 can likely be attributed to the strong marginal propensity to consume of lower-income households and the higher proportion of discretionary spending in the total expenditure of wealthier households.

*The variation in household consumption in 2019 is expected to reflect the variation in discretionary spending.*

In 2019, the quarter-to-quarter variation in purchasing power should once again be relatively erratic: a major spike in Q1 followed by a fall-back in Q2, remaining virtually stable in Q3 then accelerating slightly toward the end of the year. These developments should be driven partly by the economic and social emergency measures introduced at the start of the year, but also by the further reduction in local residence tax and the slow growth of prices toward the end of the year (see *the Household income sheet*). Our model allows us to forecast consumption of items classed as pre-committed expenditure, non-discretionary spending and discretionary spending, while also taking into account their different degrees of sensitivity to variations in income. As such, pre-committed expenditure and non-discretionary spending should follow a relatively smooth trajectory in 2019, reflecting – after a time lag – the past and present fluctuations in purchasing power and prices. On the contrary, discretionary spending, which is most sensitive to variations in income, should follow a similar trajectory to purchasing power (*Figure 10*): dynamic at the start of the year, more subdued in H2. Furthermore, this spending should be partially impacted by the scheduled increases in tobacco prices in March and November 2019.

Overall, and much like the fluctuations in consumption in 2018, variations in 2019 will be primarily dictated by discretionary spending while other forms of spending should continue to cleave to their long-term trends. The variation in aggregated consumption should thus mirror the trajectory of discretionary spending. ■

**12 - Contributions to variation in household consumption in 2018**



Note: variation at constant volumes, excluding tourist balance.

Source: INSEE

## Bibliography

**Accardo J., Bellamy V., Consalès G., Fesseau M., Le Laidier S., Raynaud É.** (2017) "Inequalities between households in the national accounts, breaking down the household accounts". *L'économie française*, 2009 edition - Insee Références

**Accardo J., Billot S., Buron M-L.** (2017) « Revenu, consommation et épargnes par grande catégorie entre 2011 et 2015 ». *L'économie française*, 2017 edition - Insee Références

**Arthaud L. et Berrebi L.** (1991) « Consumption behaviour », *Conjoncture in France*, February 1991, INSEE.

**Biotteau A., Rioux L.** (2019) « In October 2018, the gains made possible by the reforms to the social contribution system were counterbalanced by the increase in fuel prices ». *Insee Focus*, 149.

**Bonnet X., Dubois E.** (1995) « How can the unexpected increase in the household savings ratio since 1990 be explained? ». *Économie & prévision*, 121(5), 39-58.

**Bournay J., Pionnier P. A.** (2007) « The French economy: continuity and interruptions from 1959 to 2006 ». *Insee Première*, (1136).

**Consales G., Fesseau M., Passeron V.** (2009) « Household consumption over the past fifty years. Five decades of consumption in France, 2019 edition – *Insee Références*.

**Faure M.-E., Soual H., Kerdrain C.** (2012) « Household consumption during the financial crisis ». *Conjoncture in France*, 23-37.

**Ferret A., Demoly E.** (2019) « Consumption behaviour in 2017 ». *Insee Première*, (1749).

**Gateaud G., Heck S., Larochette B., Morer N., Sanchez-Gonzalez J., Serre P., Veulin T.** (2015) « Since the crisis of 2008, households have been reducing their purchases of those goods and services which are easiest to cut down or postpone ». *L'économie française*, 2015 edition - Insee Références

**Lelièvre M., Rémila N.** (2018) « Pre-committed expenditure: what weight in the budget of French households? ». *Les dossiers de la Drees*, n°25. ■

### Methodological annex: calculating the average time taken for the savings ratio to return to equilibrium level.

The time taken for the savings ratio to return to its long-term level after a shock is calculated using the "half-life" (HL). HL is the time taken for the ratio to reach the halfway point in the process of returning to its long-term level (the results shown here exclude the savings ratio for the period 2009 - 2012). HL can be calculated as follows:

1. We begin by estimating the following equation:

$$\Delta X_t = \alpha + \beta X_{t-1} + \sum_{i=1}^p \beta_i \Delta X_{t-i} + \epsilon_t$$

where  $x$  represents the savings ratio. When the coefficient  $\beta$  is close to 1, the pace of convergence towards the long-term level is rapid. In this case,  $\beta = 0.63$  and this value is statistically significant at the standard threshold of 5%.

2. Thereafter, based on the estimated coefficient, HL can be calculated using the following formula:

$$HL = \frac{-\ln(2)}{\ln(1+\beta)}$$

3. We can then obtain an approximate value for the time taken to return to long-term stability by multiplying the HL by two. By construction, the model assumes that shocks are reabsorbed asymptotically. Nonetheless, doubling the half-life gives a rough idea of the reabsorption time.

Finally, for these purposes the long-term level is defined as the mean value of the savings ratio over the period in question. Formula (1) allows us to work out this result empirically. The stationary state of model (1) can thus be written as  $\Delta x = 0$  whatever the date. As such the stationary level of  $x$ , written  $x^*$ , is:  $-\alpha/\beta$ . In this case  $\alpha$  is approximately  $-0.089$ . So  $x^* = 0.14$ , which does indeed correspond closely to the empirical mean of the savings ratio over the period.

Ultimately, the time taken for the savings ratio to return to its long-term equilibrium level is estimated to be seven quarters for the period 1990-2018. If we exclude the period 2009 to 2012, during which the savings ratio persisted at a level superior to the long-term mean due to the spike in household precautionary saving, this average time falls to three quarters. ■