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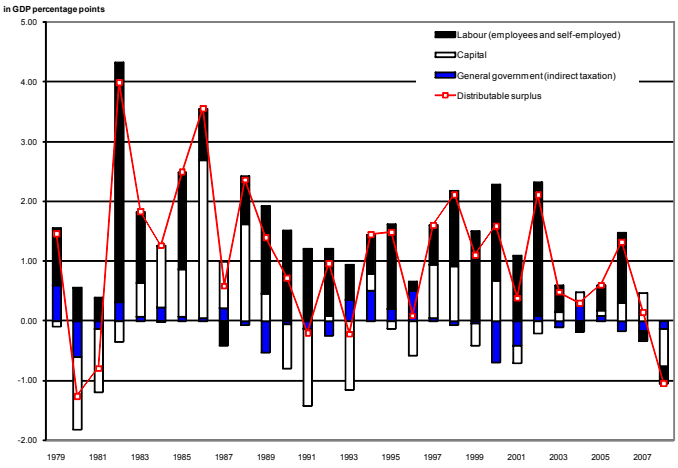
Distributable surplus and share-out of value added in France

- The distributable surplus is the share of GDP growth available to improve the remuneration of factors of production. It stems from two sources, namely productivity gains and changes in the amount appropriated by the rest of the world through variations in the terms of trade. Consequently it is the share of growth not allocated to the remuneration of additional factors of production as measured by the price of utilisation in the domestic market.
- The distributable surplus is apportioned among general government departments via changes in indirect taxation, employees and non-employees via changes in hourly wages, and holders of capital via changes in the return on capital.
- The distributable surplus has declined sharply, on average, since the 1980s, largely due to slower productivity growth, which has fallen by more than 0.5 percentage points of GDP. The annual distributable surplus has been less than one percentage point of GDP, on average, since the beginning of the 1990s.
- Since the 1990s, most of the distributable surplus has been used to increase the remuneration of labour, which is consistent with the theoretical allocation when growth is balanced. The remuneration of capital, on the other hand, has fluctuated between the beginning of the 1990s and the 2000s, serving to absorb the changes in indirect taxation.
- The decline in the remuneration of labour in value added (VA) in the 1980s resulted more from the substitution of capital for labour than from a decline in the remuneration of labour relative to capital. This is not incompatible with a redistribution of the surplus in favour of workers. The stability in the apportionment of VA since the beginning of the 1990s reflects a combination of capital/labour substitution and allocation of the distributable surplus to labour.
- The year-to-year volatility of the distributable surplus is chiefly due to that of energy prices. These cyclical shocks are absorbed mainly by the remuneration of capital.

Allocation of distributable surplus since 1979, in percentage points of GDP



Sources: Insee, DGTPE calculations

DGTPE
DIRECTION GÉNÉRALE DU TRÉSOR
ET DE LA POLITIQUE ÉCONOMIQUE

1. The distributable surplus is the share of GDP growth available to improve the remuneration of the different factors of production

1.1 The distributable surplus is calculated using data supplied by the annual National Accounts

The distributable surplus is the share of GDP growth available to improve the remuneration of production factors. It stems from two sources, namely productivity gains and the levy performed by the rest of the world via variations in the terms of trade. Therefore it is that share of growth that is not allocated to the remuneration of additional production factors as measured by the price of utilisation in the domestic market.

The distributable surplus is calculated using data supplied by the annual National Accounts, e.g. the sum of global factor productivity gains and of domestic terms of trade. Productivity gains are calculated as in an accounting calculation, by subtracting from the change in real GDP (Y) the change in the different factors of production measured at the previous year's prices. Productivity gains are valued at factor cost, which is why they are corrected for changes in indirect taxation and subsidies[1] (T). We distinguish as factors of production the net stock of capital[2] (K), the number of hours worked by employees (Ls), and those worked by non-employees (Ln).

Box 1: **Valuation at "factor cost"**

Value added in volume terms (Y) can be calculated by deflating the value added at current prices by the market price or by the "factor cost". Factor cost (CF) is the market price (P) corrected for taxes (T) and subsidies (S) on production.

$$CF = \frac{PY - T + S}{Y} = P - \frac{T - S}{PY}$$

When factor cost is used, we implicitly assume that taxes and subsidies on production affect capital and labour uniformly: they are not assigned to any production factor in particular.

Conversely, when it is valued at market prices, we implicitly assume that the burden of taxes and subsidies on production falls entirely on the remuneration of capital.

As a result, an increase in taxes on production has no impact on the share-out of VA measured at factor cost, which it reduces, or on the share of wages in VA when this is valued at market prices.

Further, the share of wages in VA valued at factor cost is systematically greater than the share of wages in VA valued at market prices as long as taxation on production exceeds subsidies. Writing MS for the wage bill and EBE for Earnings before interest, taxes, depreciation and amortisation (EBITDA), we thus obtain:

$$\left(\frac{MS}{VA}\right)_{PM} = \frac{MS}{MS + EBE + T - S} < \frac{MS}{MS + EBE} = \left(\frac{MS}{VA}\right)_{CF}$$

The change in the terms of trade is equal to the difference between the rate of growth of the GDP deflator p and the rate of growth in domestic demand prices, Pdi.

Measurement of the distributable surplus thus results from an accounting calculation, making no assumption regarding any production function or the determinants of technical progress (e.g. the quality of labour or of capital). On the contrary, this calculation depends on the indicators chosen to measure the factors of production, labour in particular. Hours worked for employees is a matter of consensus. Apportioning individual entrepreneurs' income between capital and labour is not easy. The use of hours worked for individual entrepreneurs provides us with a coherent measurement of the labour factor over time. But this approach underestimates the remuneration of capital[3].

By writing the share of the production factor [4] i in the value added in the previous year α_{i-1}, the expression of the distributable surplus is given by the following formula, with $\dot{x}$ being the growth rate of x:

$$SDa = \dot{Y} - \alpha_{ls-1}\dot{L}s - \alpha_{ln-1}\dot{L}n - \alpha_{K-1}\dot{K} - \alpha_{T-1}\dot{T} + \dot{p} - \dot{p}_{di}$$

Where: $\dot{Y} - \alpha_{ls-1}\dot{L}s - \alpha_{ln-1}\dot{L}_n - \alpha_{K-1}\dot{K} - \alpha_{T-1}\dot{T}$ are the productivity gains;

and where: $\dot{p} - \dot{p}_{di}$ are the terms of trade.

1.2 The distributable surplus is distributed among general government, workers and owners of capital

The distributable surplus is distributed among general government, via changes in indirect taxation, employees and the self-employed, via changes in hourly remunerations, and

(1) Indirect taxation consists of taxes on goods (of which VAT accounts for 64%, the TIPP or domestic duty on petroleum products for 12%, and excise taxes) and taxes on production (of which the "taxe professionnelle" or local business tax for 30%, real property taxes for 27%, and sundry taxes on labour for 28%).

(2) For the sake of simplicity, we use the stock of capital of non-financial companies and individual entrepreneurs, but we could refine this analysis by introducing the stock of capital of financial companies and general government.

(3) By assumption, all mixed income excluding fixed capital consumption is allocated to labour.

(4) α_{i-1} is the share of the remuneration of the production factor i in GDP: EBE excluding mixed income, remuneration of employees, mixed income adjusted for fixed capital consumption or indirect taxes. By construction, the sum of the α_{i-1} equals unity.

the owners of capital via changes in the return on capital. When growth is balanced[5], the return on capital, taxation and the terms of trade are stable and the entire distributable surplus serves to increase the hourly remuneration of labour.

2. Change in distributable surplus in France

2.1 The distributable surplus has declined with the slowdown in productivity gains

The distributable surplus has declined sharply, on average, since the 1980s, largely due to slowing productivity growth, which has fallen by more 0.5 percentage points of GDP since that period (see table 1). The distributable surplus has been less than one percentage point of GDP, on average, since the beginning of the 1990s.

Table 1: Average allocation of distributable surplus by sub-period since 1979

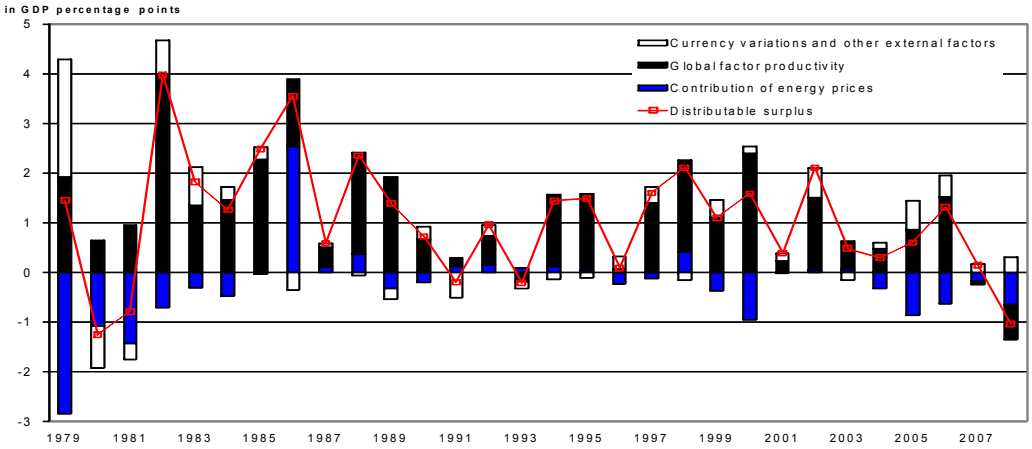
Period	Distribuable surplus	Productivity gains	Variations in terms of trade
1979 - 1988	1.6	1.7	−0.1
1989 - 1998	0.9	1.0	−0.0
1999 - 2008[a]	0.7	0.8	−0.1

a. The calculation for 2008 uses the provisional annual accounts.
Interpretation: During the period 1979-1988, the distributable surplus represented 1.6 percentage points of GDP per year on average, of which 1.7 percentage points attributable to growth in global factor productivity, and -0.1 percentage points due to the variation in the terms of trade.

Sources: Insee, DGTPE calculations, annual averages, in GDP percentage points

Since the terms of trade and growth in factor productivity are highly volatile variables, the distributable surplus tends to vary substantially from year to year. It is consequently sensitive to the state of the economy, and to energy price variations in particular. Energy price effects can be isolated by performing an accounting calculation of the contribution of energy prices to variations in the terms of trade (see chart 1).

Chart 1: Breakdown of the distributable surplus since 1979, in GDP percentage points



Sources: Insee, DGTPE calculations

Phases of rapidly rising oil prices are thus associated with falling surpluses, whereas the 1986 counter oil shock had a beneficial impact.

2.2 The bulk of the distributable surplus has been distributed to labour since the 1990s

The distributable surplus is apportioned among workers, owners of capital and general government. General government captures a portion of the distributable surplus thanks to changes in the relative prices of indirect taxation and subsidies. Variations in indirect taxation prices may stem from changes in tax rates or from composition effects.

$$S_{APU} = \alpha_T(\dot{P}_T - \dot{P}_{di})$$

The share of distributable surplus remaining after changes in taxation is called the distributed surplus. Part of the distributed surplus goes to employees and non-employees via increases in hourly remuneration. The remainder of the distributed surplus serves to increase the remuneration of capital.

(5) In a balanced growth situation, all of the nominal variables grow at the same rate, this rate being equal to the sum of the growth rates in labour efficiency and the rate of inflation of value added prices. Exogenous quantities (taxation and public expenditure) are stationary. Consequently, the distribution of value added among the various production factors is stable.

To calculate S_i the share of the distributed surplus that goes to factor i, we multiply the share of this factor in VA by the increase in its marginal remuneration relative to the domestic demand price:

$$S_i = \alpha_{i,\ t-1}(\dot{R}m_{i,\ t} - \dot{P}_{di,t})$$

Since the 1990s, the bulk of the distributable surplus has served to increase the remuneration of labour (see table 2), which is consistent with the theoretical distribution when growth is balanced (see box 2). However, the remuneration of capital has fluctuated between the beginning of the 1990s and the 2000s, which has served to absorb the changes in indirect taxation.

Box 2: **A balanced growth regime**

In a balanced growth regime, all quantities grow at a constant rate. By definition, employment (both salaried and self-employed) grows at the same pace as the working population, n. We can show that if X_t, Y_t and Z_t are three variables that grow at constant rates and such that, for every *t*, $X_t = Y_t + Z_t$, then these three variables grow at the same rate.

For this purpose we write the growth rates g_x, g_y, g_z. Thus for each $t > 0$, we obtain:

$X_0 e^{g_x t} = Y_0 e^{g_y t} + Z_0 e^{g_z t}$ the value of X at the initial instant is written $X_0 = Y_0 e^{(g_y - g_x)t} + Z_0 e^{(g_z - g_x)t}$. Since this value is independent of t, we necessarily obtain $g_x = g_y = g_z$.

Consequently, in a balanced growth situation, all GDP components must grow at the same rate. The investment growth rate, and consequently the capital growth rate, are thus equal to the GDP growth rate.

$$Y = C + I + G + X - M \Rightarrow \dot{Y} = \dot{I} = \dot{K} = \dot{C} \ldots$$

The same reasoning applied to the balance between sources and uses of funds, at current prices, implies that all prices rise at the same rate.

$$\dot{P} = \dot{P}_c = \dot{P}_i = \dot{P}_k = \dot{P}_{di}$$

The change in the terms of trade is therefore nil in a balanced growth regime.

Since income distribution is always described by the following accounting equation, we obtain:

$$PY = rP_K K + WL + T - S \Rightarrow \dot{P} + \dot{Y} = \dot{r} + \dot{P}_K + \dot{K} = \dot{W} + \dot{L} = \dot{T} = \dot{S}$$

In a balanced growth regime, taxation, subsidies, the wage bill and income from capital grow at the same rate, i.e. the nominal GDP growth rate.

Combining the above equations, we deduce that the rate of return on capital is constant in a balanced growth regime.

$$\dot{r} = \dot{Y} - \dot{K} + \dot{P} - \dot{P}_K = 0$$

Moreover, the share of wages in value added is also constant.

$$\left(\frac{\dot{WL}}{P\dot{Y}}\right) = 0 \Rightarrow \left(\frac{\dot{W}}{P}\right) = \left(\frac{\dot{Y}}{L}\right)$$

Therefore real wages grow in line with apparent labour productivity.

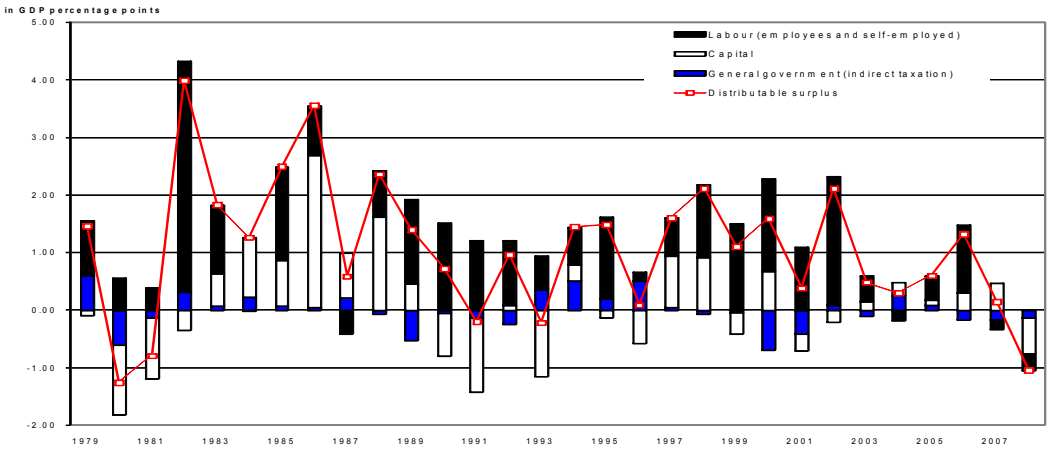
Using the foregoing results and the fact that $\sum_i a_i = 1$, the distributable surplus is now:

$$Sda = (\dot{Y} - \dot{L})(\alpha_{ls} + \alpha_{ls})$$

The distributable surplus is thus equal to the labour productivity growth rate multiplied by the share of wages in VA, which precisely corresponds to wage increases. Consequently, the entire distributable surplus is distributed to workers. Another way of looking at this result is to note that, since the return to capital is constant, income from capital serves entirely to increase the factors of production.

Sources: Insee, DGTPE calculations

Chart 2: Allocation of distributable surplus since 1979, in GDP percentage points



Sources: Insee, DGTPE calculations

Table 2: Average annual distribution of distributable surplus by sub-period since 1979

Period	Distributable surplus	Shate of surplus captured by...		
	In GDP percentage points	...labour	... capital	... indirect taxation
1979 - 1988	1,6	65%	31%	5%
1989 - 1998	0,9	107%	−13%	6%
1999 - 2008	0,7	113%	6%	−19%
Balanced growth[a]	**–**	**100%**	**0%**	**0%**

a. Theoretical calculation based on average characteristics of the French economy over the long period.
Interpretation: During the period 1999-2008, the average annual distributable surplus represented 0.7 percentage points of GDP per year on average, of which 6% served to increase the remuneration of capital. Over the same period, the increase in the remuneration of labour exceeded the surplus, representing 113% of its value, which was offset by the decline in indirect taxation equivalent to 19% of the surplus.

Sources: Insee, DGTPE calculations

2.3 Changes in the distribution of VA cannot be explained by changes in the distributable surplus

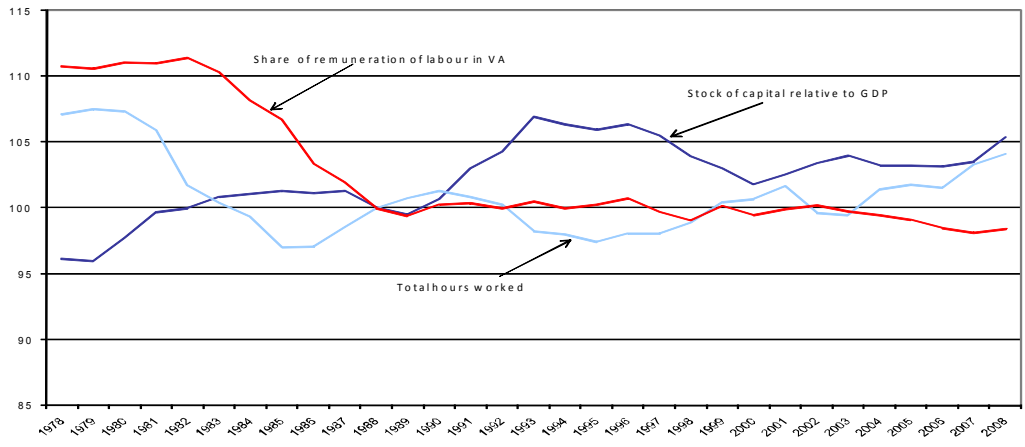
Changes in the distribution of VA reflect the substitution of capital for labour more than they do the change in the distributable surplus and in its distribution.

The distribution of value added was significantly distorted in the wake of the 1970s oil shocks. The index-linking of wages to consumer prices, just when these were rising as a result of soaring oil prices, pushed up the share of wages in value added from 67% to 75% in a handful of years.

The 1980s brought a return to equilibrium. Disinflation led to falling employment and a drop in the share of wages in value added. This period of disinflation went hand in hand with a decline in the share of the surplus distributed to workers, who received only two-thirds of the surplus (see table 2). But this decline accompanied the trend towards substitution of capital for labour. The number of hours worked fell by around 10% between 1978 and 1986, mainly due to the decline in non-wage labour in the agricultural sector. Conversely, the stock of capital relative to GDP grew by 5% over the same period, with the opening up of the financial markets.

Since the end of the 1980s, however, the share of wages in value added has remained stable, due to the de-linking of wages and prices, while the number of hours worked and the stock of capital have grown steadily. Since the 1990s, practically the entire distributable surplus has been distributed to workers.

Chart 3: Change in the distribution of VA and factors of production in France, (1988 = base 100)



Source: Insee

3. The link between distributable surplus and the state of the economy

3.1 The volatility of the surplus stems chiefly from that of energy prices

The changes in distributable surplus shown in chart 1 show that the distributable surplus is volatile. On first view the state of the economy can operate on two levels, via productivity gains on the one hand, and via the terms of trade on the other.

In practice, variations in productivity gains have a limited impact on the change in the distributable surplus (table 4), since in the event of a downturn in activity much of the shock is absorbed by falls in production factors, employment and investment.

Conversely, variations in the terms of domestic trade have a major influence on changes in the distributable surplus, via currency variations on the one hand and energy price swings on the other.

The appreciation of the euro versus the dollar[6] improves the terms of trade in the short run since this depresses the price of imports in euros, and this decline ought to be transmitted in part to domestic demand prices. In practice, the direct effects of a euro appreciation against the dollar on distributable surplus prove to be negligible, even when currencies are swinging sharply, as in 2007 and 2008.

The impact of energy prices is substantial, on the other hand. There are two reasons for this. For one thing exchange rates vary far less widely than energy prices. Secondly, the price elasticity of domestic demand to the euro/dollar parity is weaker than the elasticity of the same price to oil prices[7].

Recent economic trends clearly illustrate these findings. Oil prices have fluctuated sharply since 2005, rising by around 18% in 2006, then by 40% in 2008. The euro also rose by 8.7% against the dollar in 2007, and then by 7.3% in 2008 (table 3).

Using the elasticities of the terms of trade to the oil price and the exchange rate estimated by econometric models, we can calculate the contributions of these cyclical shocks to changes in the distributable surplus (box 3).

In both 2006 and 2008, the rise in the price of oil had a pronounced negative impact on the domestic terms of trade. The contribution of other factors, excluding energy and the exchange rate, was structurally positive, as import prices remained weak due to opening up to the emerging economies (and to possible measurement errors).

Box 3: **Domestic terms of trade**

Domestic terms of trade are defined as the ratio of GDP price, P (or value added price) to domestic demand price, P_{di}.

$$TEI = \frac{P}{P_{di}}$$

Consequently this is the relative price of goods and services that provide utility to residents and value added. The higher this ratio, the larger the quantity of goods and services available on the domestic market residents can buy, thanks to the sale of the same quantity of domestic value added.

Generally, this ratio is different from unity, since a sizeable share of goods and services available on the domestic market and used for consumption or investment is imported. The domestic demand price, therefore, is a function of the domestic price *P* and of the import price P^*. We can then link marginal variations in the domestic demand price to those in the domestic VA price and in the import price, with *a* and *b* comprised between 0 and 1:

$$\dot{P}_{di} = a\dot{P} + b\dot{P}^*$$

By further assuming that prices are dynamically homogeneous, which is verified empirically in the long run, we obtain $a + b = 1$. The variation in the terms of trade can thus be written as a function of domestic VA and import price variations as:

$$\dot{TEI} = \dot{P} - \dot{P}_{di} = \dot{P} - (a\dot{P} + (1-a)\dot{P}^*) = (1-a)(\dot{P} - \dot{P}^*)$$

The contribution of the variation in the domestic terms of trade to distributable surplus is structurally positive since the end of the 1990s. This can be explained by the fact that a growing share of goods and services on the domestic market is imported from emerging countries where productivity gains are greater than in France. This strong productivity growth has been reflected in import prices, which have risen less rapidly than value added prices in France.

We may evaluate the effects of oil price variations on changes in the domestic terms of trade by breaking down domestic demand prices as above. In the first order, the variation in the domestic trade price is equal to the share of energy in domestic demand *e* multiplied by the variation in the price of energy, $\dot{P}_e$, to which should be added the contributions of the other factors P_x.

$$\dot{P}_{di} = e\dot{P}_e + (1-e)\dot{P}_x$$

The contributions of other factors, such as the exchange rate or prices of non-energy imports, are calculated as in an accounting calculation, reversing the previous equation.

To deduce the change in energy prices from variations in the price of oil, P_o, we use the autoregressive equation derived from the following Mésange model[a]:

$$\dot{P}_{e,t} = 0{,}78\dot{P}_{o,t} + (0{,}91 - 0{,}78)\dot{P}_{o,t-1} + (0{,}95 - 0{,}91)\dot{P}_{o,t-2}$$

After three years, oil price variations no longer have any significant impact on energy price variations.

a. C. Klein and O. Simon "Le modèle mésange, une réestimation" (The Mésange model, a re-estimation), Document de travail de la DGTPE (DGTPE working paper), 2009, to be published.

(6) All other things being equal, not taking into account the adverse impact of a euro appreciation on exports. These effects are included in the variations in global factor productivity.

(7) This is because oil represents a large proportion of French non-eurozone imports.

Table 3: Change in the domestic terms of trade and contribution of international shocks

Years	Cyclical shocks		of which...			
	Price of Brent per barrel (in euros)	Euro/USD	Domestic terms of trade	Euro/USD change	Energie prices	Other
2005	43.97	1.24	–			
2006	51.90	1.26	−0.19	−0.01	−0.43	0.26
2007	52.67	1.37	0.01	−0.02	−0.12	0.14
2008[a]	65.30	1.47	0.35	−0.02	−0.64	1.01

a. The calculation for 2008 uses the provisional annual accounts.
Interpretation: The average price of a barrel of Brent in 2005 was €43.90. In 2006, the domestic terms of trade fell by 0.19%, including a decline of 0.01% due to variations in the euro, a 0.43% decline resulting from the price of oil, and a 0.26% increase resulting from trends in foreign prices, all other things being equal.

Sources: Insee, DGTPE calculations based on the Mésange model's elasticities

3.2 Cyclical shocks are absorbed essentially by the remuneration of capital

The state of the economy also affects the distribution of the surplus. To form an idea of how it does so, we can chart trends in the components of the surplus since 1979 (chart 2). In keeping with theory, the largest and most stable slice of the surplus has been distributed to labour[8]. And in times of economic downturn, the effects of the shock appear to be dampened by the remuneration of capital (see table 4).

Table 4: Breakdown of the distributable surplus and economic growth, in GDP percentage points (1979-2008)

GDP growth	Number of years	Average surplus	Share of surplus captured by...		
			...indirect taxation	...labour	... capital
Below 1.1%	7	0.06	0.106	0.68	−0.68
Between 1.2 and 2.4%	16	1.29	0.03	0.88	0.39
Above 2.5%	7	1.53	−0.12	1.31	0.35
1979-2007 average[a]	**29**	**1.13**	**−0.00**	**0.93**	**0.13**

a. Interpretation: On average, in the years when GDP growth was below 1.1% the distributable surplus represented 0.06 percentage points of GDP, split between a 0.68 point increase in the remuneration of labour, offset by a fall of 0.68 points in the remuneration of capital.

Sources: Insee, DGTPE calculations

Regarding the impact of oil shocks, it would appear that the reduction in the surplus caused by a sudden and steep rise in energy prices is largely absorbed by a fall in the remuneration of capital (table 5). Until the 2000s, the share of the surplus captured by labour tended to rise in periods of rising energy prices and to fall at times of weaker energy prices. This property was less clear-cut during the latest oil price rise (in 2004-2007): labour captured a smaller share of the surplus than both the share captured during periods of stable energy prices and the theoretical share captured over the long period.

(8) Via the rise in the remuneration of employees and of individual entrepreneurs.

Table 5: Breakdown of distributable surplus according to periods of rising or falling oil prices

Period	Price of oil	Average surplus	Share of surplus captured by...		
			...indirect taxation	...labour	... capital
1979 - 1984	Rising	1.08	8%	110%	−40%
1986 - 1988	Falling	2.17	3%	19%	78%
1999 - 2000	Rising	1.34	−27%	116%	11%
Other[a]	Rising	0.57	−1%	62%	38
1979 - 2007 average	**25€**	**1.06**	**1%**	**10%**	**−6**
Balanced growth[b]	**–**	**–**	**0%**	**100%**	**0%**

a. Averages calculated for the periods 1985, 1989-1998 and 2001-2003.
b. Theoretical calculation based on average characteristics of the French economy over the long period.
Interpretation: During the period 1979-1984, when oil prices rose sharply, the surplus grew at an average annual rate of 1.08 percentage points of GDP. Indirect taxation captured 8% of this surplus, while the increase in the remuneration of labour represented 110% of the growth in the surplus. Conversely, the fall in the remuneration of capital represented 40% of the growth in the surplus over the period.

Sources: Insee, DGTPE calculations

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