

Measuring the quality of growth: which indicators?

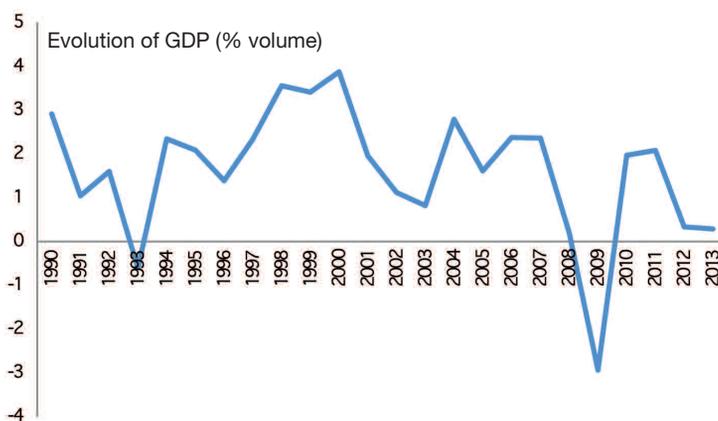
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In order to target 'sustainable' or 'quality' growth, we need to measure not only GDP growth but also the social, environmental and productive legacy that we are leaving to future generations.

In line with the conclusions of the Stiglitz-Sen-Fitoussi Commission on measuring social progress, this paper proposes seven indicators that can complement GDP in a scoreboard on the quality of French growth: change over time in stocks of productive physical and intangible assets in relation to GDP; the percentage of adults aged 25-64 that have earned the equivalent of a high-school degree; the percentage of artificial land cover; the annual French carbon footprint, imports included; the ratio between income held by the wealthiest fifth of the population and income held by the poorest fifth; net public debt in relation to GDP; and net external debt in relation to GDP.

Because they represent real societal choices, these seven indicators must be submitted to public discussion.

INDICATORS OF THE QUALITY OF GROWTH IN 2014



Productive assets in relation to GDP	140 %	↗
Percentage of high school graduates in the active population	72 %	↗
Percentage of artificial land cover	9 %	↗
French carbon footprint, imports included	733 Mt	↗
Inequalities (S80/S20 ratio)	4,6	↗
Net public debt in relation to GDP	82,4 %	↗
Net foreign debt in relation to CDP	35 %	↗
	*	**

* Most recent level

** Evolution over the last 10 years

Source: France Stratégie.

THE STAKES

The notion of 'sustainable growth' refers to the definition of sustainable development put forward by the Brundtland Commission (1987): the path of an economy - and more broadly of a social model - is called sustainable when it is capable of responding to the needs of a population and of transmitting to future generations the resources necessary for satisfying their needs as well¹.

This concern for ensuring the well-being of generations to come reflects a 'holistic' vision of systems, since well-being should be understood in the broad sense, encompassing economic, social and environmental dimensions. We shall also speak of quality of growth to refer to the intertemporal and multidimensional aspect of well-being.

Measuring the quality of growth or the sustainability of an economy is a complex business. It is nonetheless essential for guiding decisions for public action.

Quality of growth indicators have the advantage of assembling and prioritising pertinent information on the state of scientific knowledge in order to reduce the uncertainty that predominates on the determinants of sustainability.

Gross domestic product (GDP) alone is not a pertinent measure in this regard: this standard, often interpreted as an indication of economic and social progress, remains an accounting-based measure of the value added of a region's production. Its incompatibility with an evaluation of sustainability has been demonstrated: it measures flows, thus failing to describe the state of resource stocks and omitting social and environmental sustainability (GDP is notably 'blind' to socio-economic inequalities), as well as the qualitative aspects of economic activity.

1. HOW TO MEASURE SUSTAINABILITY?

The advantages and limits of an approach via capital

If sustainability consists in ensuring the transmission of sufficient resources to future generations, it can be measured by reference to the 'stocks' of these resources, which the economic literature, notably the work of Robert Solow², perceives as 'capital' expressed in monetary or physical measurements. In 2009, the report of the Stiglitz-Sen-Fitoussi Commission³ considered three types of 'capital': economic and financial (aspects relating to the production system); human and social (education, the functioning of institutions, social cohesion, etc.); and environmental (renewable and nonrenewable resources).

The approach 'via capital' allows for analysis of the links between different types of investment or depreciation, as well as their effect on the different types of capital upon which sustainability depends. That is why this approach was chosen by France Stratégie in the elaboration of its

report *France Ten Years From Now*. However, this approach requires a major evolution of the statistical system, both in terms of data collection, notably for social and environmental aspects, and in terms of logistics, a certain number of investments in tangible and intangible capital having so far been viewed as intermediary input (research and development, environmental repair).

Scoreboard or aggregate indicator?

Indicators can be presented as a scoreboard grouping several distinct indicators, each of them relating to one of the various dimensions of sustainability, or as an aggregate indicator - synthetic or composite - that assembles all of the chosen dimensions, weighted or not, monetarised or not, into one statistic (for example, an index of sustainable economic well-being).

By contrast with the use of a single statistic, scoreboards provide more extensive information, and allow for more direct visualisation of the state of assets against critical thresholds. They also support several readings, according

1. Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs': Report of the UN World Commission on Environment and Development, Brundtland (1987), *Our Common Future*.

2. Robert Solow defines sustainability as the ability to give future generations everything necessary to live as well as we do and to be able to do the same for the next generation; Solow R.M. (1993), 'An almost practical step toward sustainability', *Resources Policy*, vol. 19(3), September, p. 162-172. See also Solow R.M. (1974), 'Intergenerational equity and exhaustible resources', *Review of Economic Studies*, Symposium, vol. 41(5), December, p. 29-45.

3. Stiglitz E., Sen A., Fitoussi J.-P. (2009), Report of the Commission on the Measurement of Economic Performance and Social Progress, Paris, La Documentation française. Please note that this commission came out in favour of integrating two types of indicators: a measurement of current well-being (current consumption, equivalent income, etc.) and a small number of indicators reflecting the state of the different types of capital. Taking account of these two dimensions makes it possible to transcribe the dynamic of the notion of sustainability. In addition, it avoids confusion between a situation of substantial but unsustainable well-being and of low but sustainable well-being.



to whether the approach to sustainability is strong or weak. But the global message is harder to interpret, especially if the scoreboard presents a large number of indicators.

The choice of format should be guided by aims

If the aim is to increase awareness on sustainability, aggregate indicators have definite educational qualities. But if the aim is to guide public action, to determine its objectives, evaluate their achievement or monitor the progress of stocks in relation to alert thresholds, the choice of a scoreboard will be more relevant.

The report *France Ten Years From Now*, carried out by France Stratégie in 2013-2014, is clearly intended to provide strategic guidance. This implies identifying and evaluating government choices before making decisions.

2. WHAT KIND OF SCOREBOARD?

A limited number of legible and coherent indicators that take account of sustainability thresholds

The choice of a small number of priority indicators (we recommend seven) allows the scoreboard to be a legible and efficient tool of communication, two essential characteristics if it is to figure among key statistics.

In order to preserve the scoreboard's consistency, and in line with the recommendations of the Stiglitz-Sen-Fitoussi Commission, we shall use monetary indicators for dimensions that can be expressed directly in those terms (public finance) and 'physical' measurements for dimensions where monetary valuation is complex or controversial (notably social and environmental capital).

Furthermore, skipping those fields where there is strong uncertainty as to the state of assets - for lack of available data or because of insufficient understanding of the dynamics of deterioration and improvement - would amount to denying their importance. It is therefore preferable to deal with the uncertainty and to present the available indicators as imperfect.

Finally, to present a true vision of sustainability, the scoreboard should situate each of the chosen measurements in relation to a 'sustainability threshold'.

Some fields lend themselves well to this approach. For example, concerning pressure on the environment, it is scientifically possible to measure irreversibility thresholds for a number of aspects, notably regarding climate issues (a 'global warming' threshold above which the consequences of climate change will be irreversible, situated by the Intergovernmental Panel on Climate Change at 2°C) or for 'remarkable' biodiversity⁴ (with the 'number of identified individuals' determining the vulnerability of a species). However, finding thresholds that make it possible to distinguish sustainable from unsustainable situations is a more complex exercise, or one that is even impossible to conduct on the basis of observation for subjects relating to social inequalities, education, etc. A solution would be to choose indicators according to public policy objectives and the paths determined by these objectives: performance indicators would thus be used in place of sustainability indicators.

The indicators should be debated

An indicator, or a group of indicators, is never neutral: it is based on conventions that reflect a way of representing the world and the choices of society. This is why the definition of priorities and the selection of sustainability indicators must imperatively be debated.

Proposition: seven quality of growth indicators to be put forward for debate

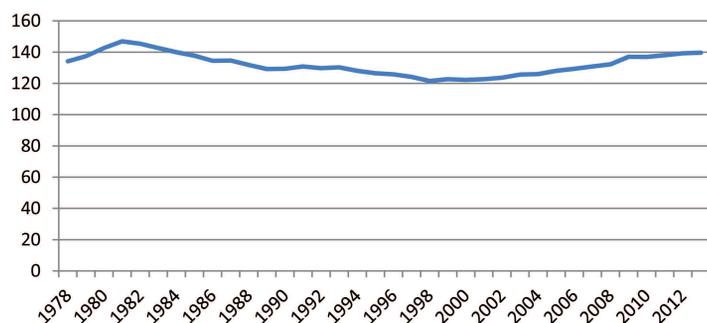
Human and productive capital

INSEE, the French national statistics institute, defines productive capital as 'all productive assets possessed by enterprises that allow them to produce goods and services'. This includes physical assets (machinery, equipment, infrastructure, etc.) and intangible assets (ITC, research and development, intellectual property, marketing, organisational capital, etc.).

4. 'Remarkable' biodiversity refer to entities (genes, species, habitats, landscapes) whose intrinsic value, even if hard to quantify, is recognised by society, justifying the shared commitment to their preservation. It differs from 'general' or 'ordinary' biodiversity, which has no intrinsic identified value per se but which, through the abundance of interactions among these entities, contributes in varying degrees, in a way that at times is essential but unseen, to the functioning of ecosystems and the production of ecosystem services.

To facilitate comparison with indicators of liabilities (cf. indicators 6 and 7), the value of these assets (in current prices) is shown in relation to GDP (in current prices).

INDICATOR 1: PRODUCTIVE PHYSICAL AND INTANGIBLE ASSETS IN RELATION TO GDP (%)



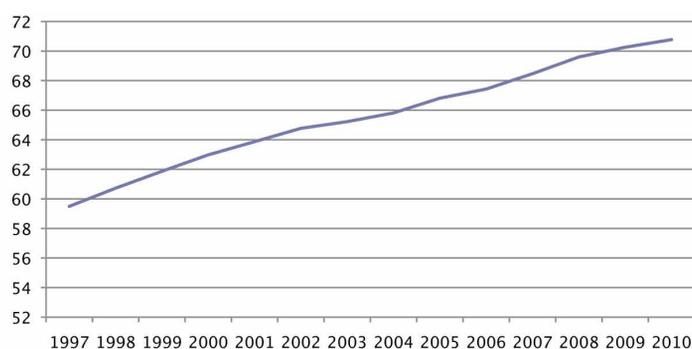
Source: INSEE data, France Stratégie calculations, nonfinancial fixed-product assets, excluding housing.

In view of its effect on income and productivity, the level of the population's education can also be an indicator of human and productive capital⁵. However, this is hard to measure: the valuation of educational capital via 'input' in monetary units, i.e. via investment in this domain, runs the risk of omitting the gains in productivity or depreciation of the capital involved. The same problem arises with innovation when it is evaluated via research and development spending.

To reflect both the skills of young people who have reached the secondary level (as defined by the OECD), whose employability remains high in many European countries, notably in Germany, and the increased level of education in the OECD countries over the last 30 years, we have chosen to focus on people aged 25-64 who have at the very least completed their secondary education, i.e. bearers of a diploma higher than a middle-school certificate.

A complementary indicator, the distribution of educative capital - in other words, inequalities of access to education - can be estimated by examining the relation between the level reached by pupils and the income or socio-professional category of their households. The composite variable worked out in the OECD's PISA survey is a possible reference in this regard.

INDICATOR 2: PROPORTION OF PEOPLE AGED 25-64 HOLDING A DIPLOMA HIGHER THAN A MIDDLE-SCHOOL CERTIFICATE (%)



Source: OECD, Education at a Glance 2013. In OECD terminology, upper secondary education corresponds to the level that begins after completion of middle school in France: 'Students typically expected to have completed 9 years of education or lower secondary schooling before entry and are generally 15 or 16 years old'.

Finally, other secondary indicators could document the evolution of human capital, notably based on the characteristics of the active population.

Environmental capital

In line with the opinion of the Stiglitz-Sen-Fitoussi Commission, which concluded that aggregation and monetarisation of environmental indicators are neither possible nor useful - the priority being to define the state of natural resources according to danger thresholds - we have chosen one-dimensional indicators of a 'physical' type⁶.

Difficulties persist, in environmental matters, in moving from measurements of flows (energy intensity, ecological intensity, carbon, etc.) to measurements of stocks (consumption of materials, greenhouse gas emissions, loss of biodiversity, etc.). To the degree possible, we shall avoid the former, which are more useful for international comparisons than for the evaluation of the state of assets.

Irreversibility thresholds are particularly important in the environmental domain. The most viable method would no doubt involve calculating the distance between the concerned asset to the irreversibility threshold, which is set according to scientific consensus.

5. This definition of education is restrictive because it omits the links between education, democracy and quality of life.

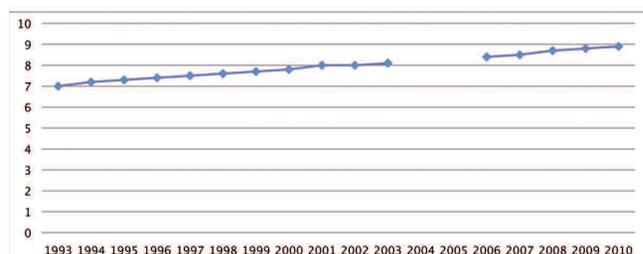
6. For a complete summary of the literature on environmental sustainability in an international perspective, see UNU-IHDP and UNEP (2012), *Inclusive Wealth Report 2012, Measuring progress toward sustainability*, Cambridge, Cambridge University Press.



The scoreboard will make no secret of the fact that scientific uncertainty limits the pertinence of numerous environmental indicators, which are for the most part 'proxy' indicators - observable data that provide indexes on a phenomenon that is not directly measurable.

The multiplicity of aspects covered by the concept of environmental capital - and the fact that they are intrinsically linked⁷ - make choices necessary concerning indicators. We opt here to follow two major components, biodiversity and the climate system. Keeping them in balance is urgent, and failure to do so could lead to global consequences of unmatched gravity (with repercussions on food security, health, settlements and conflict zones, to mention only those that concern humans). There is, moreover, an increasing amount of documentation on these two dimensions, even if numerous characteristics remain unknown.

INDICATOR 3: PERCENTAGE OF ARTIFICIAL LAND COVER IN FRANCE (%)



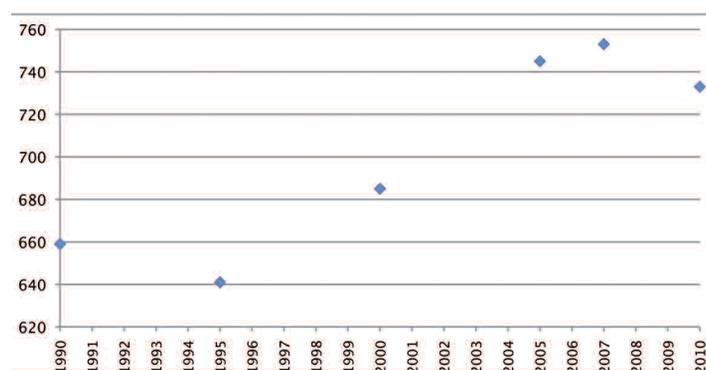
Sources: SOeS data, General Commissariat for Sustainable Development (CGDD).
Converted surfaces: built land, paved or stabilised land and other converted spaces. The absence of data for 2004 and 2005 corresponds to a change in methodology.

Because the artificial land cover is at the root of several factors of erosion of biodiversity (deteriorating quality of air and water caused by transport, pollution caused by runoff onto sealed surfaces, deterioration and disappearance of natural resources), it would appear to be an interesting indicator. It is, however, imperfect. Its restrictive aspect pleads in favour of using, in complement, secondary indicators measuring the evolution of certain species or ecosystems: the evolution of common bird populations in agricultural habitats⁸; the evolution of the average

Community Thermal Index (which measures movements of birds in response to climate change); study of the quantity of DNA in the soil⁹; the risk of disappearance of certain species that are on the Red List of the International Union for Nature Conservation in France.

The contribution to climate change should be evaluated bearing in mind its international dimension for the relative determination of critical thresholds. Ideally, we will choose a carbon footprint¹⁰ indicator that takes into account the emissions induced by French consumption, 'imported' emissions included¹¹. To the degree allowed by available data, this footprint should integrate emissions linked to agriculture and forestry.

INDICATOR 4: EVOLUTION OF THE FRENCH CARBON FOOTPRINT, IMPORTS INCLUDED (MTCO2E)



Source: Emissions of CO₂, CH₄, N₂O, SO_x data, Commissariat General for Sustainable Development.

Beyond aspects linked to biodiversity and climate change, we can use secondary indicators relating to different types of environmental damage. An interesting dimension concerns net water consumption: the 'water footprint' calculated by the French Commissariat general for sustainable development (CGDD) is a quantitative measurement that can supplement qualitative measurements based on the evolution of pollution.

Social capital

Social sustainability involves the legacy to future generations of an egalitarian society with an egalitarian growth

7. To cite one example, deforestation feeds both climate change and the erosion of biodiversity.

8. This measurement, based on the STOC programme, establishes a special link between the pressure of human activities and the evolution of biodiversity: the important contribution of common bird populations to the balance of ecosystems and their relatively high position in the food chain guarantee the sensitivity of the indicator to the state of ecosystems, in the short term (from one year to another).

9. See the web site of the French Ecology Ministry: www.statistiques.developpement-durable.gouv.fr/indicateurs-indices/f/1964/1115/microflore-sol.html.

10. We have chosen to measure the carbon footprint instead of the ecological footprint because of the predominance of carbon emissions in this indicator.

11. Emissions that are 're-exported' (after conversion or not) are not included.

model¹². Revenue sharing, including social transfers, is the central aspect. Here the indicators in current use are imperfect. For example, when used to measure income dispersion, the Gini coefficient¹³ provides a synthetic measurement but does not indicate in which specific categories the inequality takes place.

Another recurring measurement, the 'D1/D9' decile ratio, which gives the relation between the income of people in the top decile and those in the bottom decile, has the disadvantage of being calculated either on threshold incomes of the deciles (INSEE) or on the intradecile average (OECD).

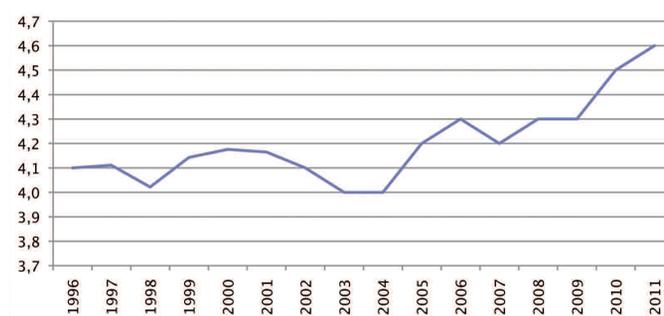
The interdecile ratio, as computed by INSEE, does not provide a precise idea of extreme incomes, notably in the wealthiest decile (D9), for which the threshold is not at all representative of the level of the highest incomes. It thus seems more appropriate to compare income masses held by the wealthiest and poorest instead of income thresholds or the average incomes of each group. We have therefore chosen a measurement called 'S80/S20' that relates the income mass held by the wealthiest 20% to that held by the poorest 20%. If this indicator is equal to 4, it means that the share of total income held by the wealthiest 20% of households is 4 times greater than the share held by the poorest 20%. This indicator is produced by INSEE, the OECD and Eurostat. It also presents variations that are more visible than the other indicators over the long term.

Furthermore, analysis by decile does not really allow for measurement of the inequality of extreme incomes, as characterised by the increase in very high incomes - the wealthiest 1%, or 0.5%. Income inequalities at the fringes of the category can thus be evaluated using a complementary indicator, for example the evolution of the share in national income of the income of households belonging to the wealthiest 1%. This measurement, however, will be a good indicator only on the condition of a proper accounting of assets¹⁴.

Other secondary, complementary indicators can be used to measure well-being. Regarding health, life expectancy

in good health is a necessary measurement, even if in the long run it would no doubt be useful to develop a more reliable indicator than measurements based on self-assessed data. Participation in public life¹⁵ can in turn be evaluated through the rate of voter participation, supplemented by measurements focusing on noninstitutional forms of participation and the institutional representation of minority elements of society. Regarding physical and economic insecurity, the ratio between precautionary savings and the pension system deficit (sizeable in France) can be used as a measurement of lack of confidence in the pension system.

INDICATOR 5: RELATION BETWEEN TOTAL REVENUE HELD BY THE WEALTHIEST 20% OF THE POPULATION AND TOTAL REVENUE OF THE POOREST 20% (S80/S20 RATIO)



Source: France Stratégie calculations, based on INSEE statistics.

The debt problem

The economic crisis transferred the burden of debt and solvency risk from the private sector to the public sector. If we add in the expected increase in financing needs for the pension system due to the ageing of the population, we understand the fundamental importance of public debt in the sustainability equation. The indicators here are particularly useful for evaluating to which degree the debt is likely to limit the investments needed to guarantee the well-being of future generations.

Sustainability of the debt means the state's capacity to handle the financing of its debt, in other words the capacity of the debtor to finance both its current debt and all of its future expenses by means of its future income, without radical change of public policy¹⁶.

12. See notably Wilkinson R.G. and Pickett K. (2009), *The Spirit Level: Why Equality is Better for Everyone*, London, Penguin.

13. The Gini coefficient measures the gap between the distribution of income in a given population and a situation of perfect equality. It varies between 0 (complete equality) and 1 (complete inequality).

14. See notably Piketty T. (2014), *Capital in the Twenty-First Century*, Harvard University Press.

15. See notably Putnam R. (2000), *Bowling Alone: The Collapse and Revival of American Community*, New York, Simon & Schuster.

16. Keynes J.M. (1919), *The Economic Consequences of Peace*.



The debt sustainability indicators used in the eurozone give major importance to future surpluses achievable by the state. Three measurements are used: short term (S0)¹⁷, medium term (S1)¹⁸ and long term (S2)¹⁹.

The limits of these measurements are well known: since debt is evaluated as the sum borrowed, and not the sum reimbursed, its assessment neglects the effect of inflation, particularly for bonds indexed to the level of prices.

In addition, the impact of the ageing of the population is often approximated by the ratio between the number of elderly and the active population. The ratio between the number of jobless and the number of employed is more directly linked to the balance of social accounts. Furthermore, beyond public debt, the level of private debt (among households and companies) could be interesting to follow.

Debt sustainability indicators - beyond the evolution of the government balance - should therefore integrate aspects relating to the effect of ageing, and to interest rates and inflation, as well as the characteristics of the debt (type of bonds issued) and of the country (probability of default, which mechanically devaluates the value of the debt).

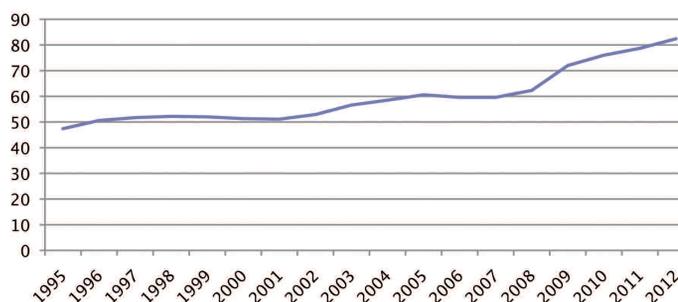
Two indicators provide an appropriate measure of public debt.

On the one hand, net public debt (which includes state-owned financial assets) broadens the scope of debt sustainability to the state's financial liabilities (bond issues are, however, evaluated at their nominal value), and to both forms of assets held by public administrations, financial and nonfinancial. It differs in this manner from gross public debt, which includes only the financial liabilities of the public sector. This statistic, calculated on the basis of the balance sheets of public administrations produced by INSEE, is currently listed by international institutions (IMF, OECD).

Net public debt in relation to GDP may prompt reflection on the scope of nonfinancial assets and of liabilities and

implicit debt, yet it notably allows integration into the calculation of the parameters of sustainability of public investment in financial establishments, which have taken on growing importance with the economic crisis and bank rescue operations. In the long run, the state's off-balance-sheet commitments²⁰ should enter into the calculation.

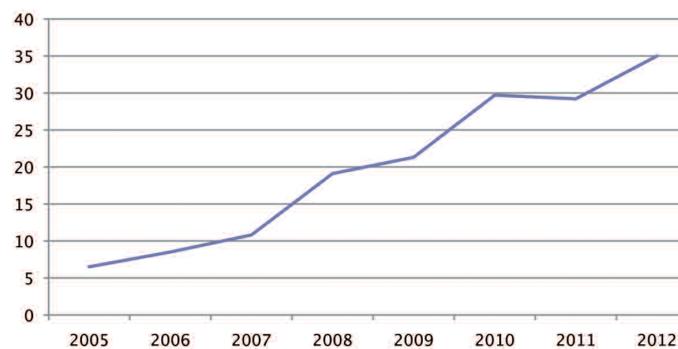
INDICATOR 6: NET PUBLIC DEBT IN RELATION TO GDP (%)



Source: INSEE.

On the other hand, net foreign debt in relation to GDP establishes the net situation of internal sectors of the French economy (public and private sectors) with regard to the rest of the world: the net commitments of residents to creditors outside the country, a necessary indicator for evaluating the position of the State because other indicators do not take account of the globalisation of exchanges.

INDICATOR 7: NET FOREIGN DEBT IN RELATION TO GDP (%)



Source: Eurostat.

17. Short-term indicator of debt sustainability, with 16 fiscal stress and financial-competitiveness variables (risk of default, inflation, pressure on the interest rates of government bonds, etc.).
18. Sustainability indicator from now until 2020, to be maintained to 2030 to bring the debt-to-GDP ratio to 60% of GDP by that time. It has three components: the budget situation, age-related expenditure and the effort needed to bring the debt to less than 60% of GDP (including projected age-related expenditure).
19. The adjustment of the structural balance required to carry the debt burden over an infinite horizon. Based on two components, the initial primary balance (without an adjustment deadline) and the effect of aging beyond 2030.
20. All potential government obligations which, without requiring balance sheet reporting, could have a significant impact on the financial situation. There are four categories: commitments made within the framework of clearly defined agreements (insurance mechanisms, protection guarantees for holders of saving), commitments stemming from the government's role as an economic and social regulator (housing aid, welfare payments), commitments stemming from government responsibilities (dismantling of military materiel, commitments of a fiscal nature), and pension commitments for state employees. In its annual public report for 2013, the French Court of Auditors estimated that, at the end of 2012, these commitments amounted to nearly 3.090 billion euros, including 1.679 billion for state pensions.

CONCLUSION

The seven indicators, as imperfect as they may be, and the different forms of 'capital' that they are meant to document, constitute an attempt to measure the quality of growth. They cannot substitute for the measure of GDP, but rather complement it in order to better guide the trajectory of a given society toward sustainable growth.

French budgetary resources for tackling the objectives linked to these seven indicators are limited, and this constraint requires choices. The necessary decisions, which we must make in all transparency and in all lucidity, will determine the trajectories that we shall follow in the years to come. This proposal, formulated in the framework of France Stratégie's *France Ten Years From Now* report, will achieve its goal only on the essential condition of public debate on both the selection of sustainability indicators and the reference thresholds in socio-economic domains. These two dimensions are basic societal choices.

Key words:
sustainability, growth, national accounting,
indicators, sustainable development, GDP.



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