

# PUBLIC DEBT AND MONEY FOR A POLITICAL ECOLOGY IN THE EUROPEAN UNION

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The pandemic crisis has displayed the lack of precautionary measures and health infrastructure in most advanced countries, not forgetting how little help has been granted to poor countries. In the face of a worldwide ecological crisis, there has been no global cooperation. In addition, in 2020, catastrophic events due to climate change have accelerated. Public finances have been called upon to support the economy and to engineer a much hoped-for short-term recovery on the one hand, and to put financial systems in order to deal with climate change in the coming crucial decade on the other.

Our work tries to address this dual challenge. First, it handles the crucial problem of debt sustainability in a theoretical framework that emphasizes the discounted ratio of future primary balances rather than the level of debt. Simulations of the theoretical model used are provided for the four largest countries of the euro zone to show the conditions in which public debt could be sustainable during the crisis and the subsequent recovery.

Moving to the longer-term challenge of handling climate change, societies must confront the irruption of climate-related risks that are plagued with radical uncertainty. To deal with this new financial landscape, the institutional structure of finance must be reformed. Furthermore, macroeconomic disequilibria are no longer symmetrical. The threat of a deflationary depression is far higher than inflationary risks. Consequently, central banks need to integrate macro-prudential and monetary policies and to collaborate with fiscal policy. The financial regulatory authorities are developing precautionary macroeconomic scenarios to induce private agents to report the ecological costs of their economic activity and then to reduce those costs under their monitoring.

Strategic planning is indispensable for the financing of long-term infrastructure investments that receive insufficient finance from the markets. Three categories of actors stand out for the long-term restructuring of Europe's financial systems: first, the public development banks networked under a

reformed EIB; second, responsible long-term financial investors, who understand that economic damage from climate change negatively influences their long-run financial returns; and third, the European system of central banks that can account for the differentiated impact of climate change within the euro zone.

*Keywords:* debt sustainability; Climate change; political ecology; public investment.

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“Climate change is the greatest market failure of all time”  
**Nicholas Stern**

## Introduction: A decisive bifurcation?

The scale and speed of the depression caused by the pandemic crisis revealed a surprising lack of preparedness of governments. This crisis was, however, heralded by the concern of the scientists on the Intergovernmental panel on climate change (IPCC) and explained in depth by the Dasgupta review on the destruction of biodiversity.<sup>1</sup> However, what surprised scientists in 2020 was the rapidity of the effects of accelerating climate change.

Planet Earth has already warmed by an average of 1°C over the past century, compared to pre-industrial times. In 2020, the scale and intensity of fires in Australia, the Amazon forest and California, the frequency and violence of hurricanes and tropical storms, and the extent of drought brought about by high temperatures have surprised environmental experts. Temperatures on the order of 38°C were not expected above the Arctic Circle, resulting in a massive melting of ice, the lack of which prevents the reflection of the sun's rays and raises the soil temperature. As for the fires in Australia, California and the Amazon, they are destroying carbon sinks and increasing the density of greenhouse gases (GHG) in the atmosphere. Is it widely known that the California fires have propelled 110 million tons of CO<sub>2</sub> into the atmosphere and that the smoke has been a nuisance as far away as the US East Coast?

Taking full stock of this situation means, first of all, understanding that the pandemic crisis, known as the COVID-19 crisis, is an ecological

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1. The economics of biodiversity: the Dasgupta Review, February 2021.

crisis of the greatest magnitude, which is closely linked to climate change. It is necessary to start from the knowledge accumulated over more than thirty years. Ecological processes are expressed in biogeochemical cycles that concern the most fundamental elements of life on Earth. These cycles have the common characteristic of being global, profoundly affected by human activity, and interdependent. It follows that the propagation of disturbances, from one cycle to another, can cross thresholds of bifurcation toward divergent dynamics, which in turn can jeopardize the organization of societies.

The question is the following: how will societies react in the short and long term? We will focus more particularly on Europe, especially since the European Commission seems to have become aware of the nature of the problem. We will first deal with the short run from the point of view of public debt, since the States have been in the front line in the management of the pandemic crisis. What are the conditions for public debts to remain sustainable? More specifically, what is the trajectory of public debt in Europe under the constraint of the immediate management of the pandemic crisis and the recovery envisaged from the Commission's perspective? The first section presents a theoretical understanding of the sustainability. The institutional consequences of the persistence of a high but sustainable level of public debt in relation to monetary sovereignty will be examined, with an emphasis on the requirement of a new framework for the relationship between fiscal and monetary policy. We provide a simulation for the evolution of public debt in the Eurozone's four main countries.

It is then key to tackle the transition to a new growth regime that is regulated by political ecology, from the short to the long term. How do we break out of "yesterday's world" to set in motion, with some chance of success, the ecological transition to make climate change livable in the next decade and beyond? Section 2 will explain how climate-related financial risks under radical uncertainty will lead to the transformation of the financial system and to change in central bank strategies, with a requirement of coordination between the different domains of economic policy.

Finally, we will return to Europe in Section 3 to interpret the Commission's plan for the next European budget and analyse the conditions for its success: implementing the Green Deal, investing in the digital economy to boost innovation, protecting biodiversity, and promoting financial players over the long term.

## 1. Fiscal and monetary doctrine from a perspective of sustainable growth

How could a persistent deflationary depression be avoided? What direction should be given to the investments required for a return to sustainable growth? How could the emergence of very high public debt be sustainable? All these questions make sense, because they are and will be at the forefront of the fight against climate change.

### 1.1. Public debt: Theoretical foundations and prospective consequences

There was a vigorous debate about the sustainability of public debt during the financial crisis of 2008, which saw governments bail out private finance at the cost of taking on public debt. The debate took a sharp turn because of controversy over the conclusion that C. Reinhart and K. Rogoff drew from their historical investigation: above a gross public debt/GDP ratio of 90%, a country becomes financially weakened, regardless of what happens in the private sector, to such an extent that growth is hampered.<sup>2</sup>

This position is in fact exaggerated because it has no sound theoretical basis. Indeed, there is no optimal level of gross public debt on which to judge whether or not debt induces vulnerabilities, whether it is 60% as decreed by the European Stability Pact or 90% as Reinhart and Rogoff suggest. Gross debt is only one item in the consolidated balance sheet of the public sector. It depends on the size of public investment, on the existence of negotiable financial assets on the assets side of the public sector's balance sheet, and on the financial regime for pensions, i.e. whether a pay-as-you-go or capitalization system. The components of the public sector's future liabilities and assets must come into play to define the balance sheet item that characterizes public sector sustainability: its net worth (Table 1). A public debt is sustainable if its net worth is positive, just as a corporate debt is solvent if the net worth of the corporation is positive.

Of course, what counts is the future development of the balance sheet. But, if the State is not deficient in its political organization, which is the case in all advanced countries, then it has an existence of infinite duration on the time scale of economic actors and financial markets.

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2. Reinhart C. and Rogoff K. (2009), "This time is different. Eight centuries of financial folly", Princeton University Press.

This is the time dimension of sovereignty. It is therefore over an infinite time horizon that the sustainability of public debt must be assessed.

Table 1. General government balance sheet

	Assets	Liabilities
<b>Budgetary assets and liabilities</b>	Net present value of future tax revenues	Net present value of future primary expenditures
<b>Financial assets and liabilities</b>	Investment in public sector enterprises Other financial assets	Government gross debt
<b>Capital of the nation</b>	Real estate assets Common goods for which the government is responsible	Public sector net worth
<b>Public wealth</b>	Total	Total

Let us construct a theoretical model of public finance accounting to define rigorously the conditions for debt sustainability.

The expenditure and revenue account for the annual financial year shall be analyzed as follows:

$$H - T + iD - 1 = \Delta D + \Delta M$$

$H$  is the amount of public expenditure,  $T$  the amount of tax revenue,  $D$  the stock of sovereign bonds,  $\Delta D$  the annual net flow and  $\Delta M$  the monetization of the public deficit by the central bank. The left-hand side is therefore the budget deficit, while the right-hand side is the financing, including the monetization of the debt;  $i$  is the average nominal interest rate paid on the debt.

This accounting equation can be expressed as a percentage of nominal GDP:

$$h - \tau + (i - \pi - g)d - 1 = \Delta d + \Delta m + (\pi + g)m - 1$$

The primary deficit as a percentage of GDP does not depend on the capital market, but on money creation:

$$b = h - \tau - \Delta m - (\pi + g)m - 1, \text{ where } ((\pi + g)m - 1) \text{ is seigniorage.}$$

The growth-adjusted real interest rate can be defined as:

$\rho - i - \pi - g$ , or  $r - g$  if  $r$  is the real interest rate.  $\rho$  is the discount rate. Note that the government debt discount rate is equal to the difference between the average real interest rate paid on outstanding debt (a function of the debt structure) and the growth rate of the economy.

The debt dynamic is described by the discrete-time differential equation:  $b + \rho d - 1 = \Delta d$ . Note that if  $\rho < 0$ , i.e. the nominal growth

of the economy is higher than the nominal interest rate paid on the debt,  $\Delta d$  can be  $< 0$  when  $b + \rho d - 1 < 0$ ; this makes it possible to maintain a primary deficit ( $b > 0$ ) to finance social expenditure and/or public investment.

The equation describing debt dynamic is solved iteratively for debt maturing in  $n$  future periods:

$$d_t = E_t \delta_{t,n} d_{t+n} - E_t \sum_{j=1}^{j=n} \delta_{t,j} b_{t+j}$$

The present value of the debt in  $t$  is therefore equal to the expected present value of the debt in  $t + n$  minus the present value of primary deficits between  $t$  and  $t + n$ .

The discount factor in  $n$  periods in the future is:

$$\delta_{t,n} = \prod_{s=1}^{s=n} (1 + \rho_{t+s})^{-1}.$$

If  $\rho < 0$ , the weight of discounting increases over time, allowing monetization to erase the debt over time.

The sustainability condition is obtained when  $n \rightarrow \infty$ .

Government debt is sustainable if its present value tends towards zero, as the debt horizon tends towards infinity. The condition is as follows:  $\lim_{n \rightarrow \infty} E_t \delta_{t,n} d_{t+n} = 0$ .

This is the cross-sectional requirement,  $\delta$ , which means that, if public finances are to be sustainable, the debt-to-GDP ratio must follow a stationary trend in the very long run. It need not converge towards any predetermined maximum. Its value depends on the profile of future primary deficits/surpluses according to the sign of the discount rate:

$$d^* = -\lim_{n \rightarrow \infty} E_t \sum_{j=1}^{j=n} \delta_{t,j} b_{t+j}$$

This means that the sustainability of public debt has nothing to do with its level in  $t$ , but everything to do with its discounted cost, which depends on future growth and inflation.

## 1.2. Lessons for the consolidation of high public debts

There is a golden rule when the discount rate is zero, i.e.  $r = g$ , meaning that all future primary surpluses are equivalent. The government has an infinite amount of time to rebalance its finances. Recall that, if  $r < g$ , the government can run moderate primary deficits, because future tax revenues grow faster than the cost of servicing the debt.

If a government wishes to establish a medium-term consolidation plan, it must set a  $d^*t+n$  target for the sustainable level of its debt over the horizon  $(t+n)$ , since there is no optimal level on which to base it. This is where the debt level in  $t$  comes in. The programmed decline  $dt - d^*t+n$  must not be incompatible with the ability to generate the required primary surpluses on  $t+n$ . Once the target has been set, the sustainability condition applies as follows:

$$d_t - E_t \delta_{t+n} d_{t+n}^* = -E_t \sum_{j=1}^{j=n} \delta_{t,j} b_{t+j}$$

The left-hand side is the desired change in the current value of government debt. The right-hand side is the discounted flow of the primary surpluses that will have to be generated to finance it. As long as the equation is satisfied, sustainability is respected for the target. As a consequence, there are as many sustainable debt trajectories as there are targets, i.e. potentially a continuum.

For each objective, one can infer the fiscal effort required to satisfy the intertemporal budget constraint. This is the difference between two budget revenue/GDP ratios: the required budgetary pressure minus the current budgetary pressure ( $\tau^* - \tau$ ). This is determined by the following equation:

$$\tau^* - \tau = [E_t \sum_{j=1}^{j=n} \delta_{t,j}]^{-1} [d_t - E_t d_{t+n}^* + E_t \sum_{j=1}^{j=n} \delta_{t,j} b_{t+j}]$$

This works out such that the present value of income surpluses due to the fiscal effort in  $(t, t+n)$  is equal to the difference between the present value of the desired change in debt and the present value of future primary surpluses that would have been recorded if past policy had been extended. Because the tax system and current spending are not malleable at the will of the government, the target level in  $t+n$  should not be arbitrary. It must result from a trade-off between the requirement of sustainability and the feasibility of the policy change. The longer the adjustment period, and thus the lower the discount rate, the more room at the government's disposal to implement a credible program.

Following the financial crisis of 2008-2009, the governments in the United States and the euro zone cut public spending by between 3 and 5% of GDP, and the United Kingdom by 6%! Taxation increased by more than 2% of GDP. The United States revived its economy at the cost of the massive indebtedness of non-financial companies, with vulnerabilities transferred to the private sector in ratings of BBB and

speculative grade. The euro zone plunged into secular stagnation. Given the characteristics of the current crisis, repeating such a policy would lead to an economic depression reminiscent of the 1930s.

The model shows that what is critical is the sign of the discount rate  $r - g$ , not the level of debt.

If  $r - g > 0$ , there is a debt limit  $d^*$  that depends on the speed of adjustment in the primary balance  $b$ . Any debt can be sustainable on the proviso that the primary balance reacts to debt:  $b = b_0 + a d (-1)$ . The dynamic of the debt  $t$  becomes:

$$d - d(-1) = [(r - g) / (1 + g) - a] d(-1) - b_0$$

If there is a political limit  $b^*$  on the primary balance, the sustainable debt limit is:  $d^* = b^*[(1 + g) / (r - g)]$

If  $r - g < 0$  across the whole yield curve, debt can converge to a finite value, even with  $b < 0$  and constant.  $b > 0$  would lead to a steady decline of debt that converges to an  $a < 0$  value!

However, debt can have an impact on interest rates under conditions of sovereign risk and uncertainty, i.e. raising the rate. This is why monetary policy must enter the picture in flattening the yield curve. In that case the debt limit is finite but can be very high.

Therefore, the problem that might occur is a shift from  $r - g < 0$  to  $r - g > 0$  because of the uncertainty about any variable of the model. An event like this can arise in countries with weak financial systems and a large portion of debt in foreign currencies, e.g. some middle-income and developing countries. If the debt could default, the probability of default raises the risk premium. The rise in  $r$  makes it more likely to exceed the debt limit. Multiple equilibria can occur. However, in case of two scenarios, the central bank can eliminate the worse one by buying bonds at the lower interest rate. This is why some central banks in emerging market economies (EME) have relied successfully on asset purchase programs.

There is no such problem in the euro zone, but there is a political problem of exceeding the limits of the Stability Pact.

It should be recalled that the stabilizing primary balance for debt sustainability is:

$$(\text{Stabilizing primary fiscal balance} / \text{GDP}) = (r - g) (\text{public debt} / \text{GDP})$$

If  $r - g < 0$ , the stabilizing primary balance is a deficit. Paradoxically, it may be all the higher, the higher the weight of debt/GDP. Of course, it all depends on the nature of public expenditure. Spending must be directed towards growth-generating investments that involve the private sector, while monetary policy keeps the interest rate close to 0.<sup>3</sup> The transformation of the growth regime would increase future tax revenues. In that case, public debt would be self-financing in the long run, in line with the sustainability condition.

The eruption of the Covid-19 crisis and its economic impact have exacerbated all the vulnerabilities of the euro zone, whose Member States have so far proved unable to promote a cooperative policy in the face of common challenges. This had already been observed in the aftermath of the 2008 financial crisis, which increased budgetary constraints without any agreement on a common strategy to advance European integration.

The fall into a deep recession caused by the consequences of the health crisis poses problems of appalling complexity for the euro zone countries. On 26 May 2020, the European Central Bank (ECB) published its semi-annual financial stability report.<sup>4</sup> The report identifies four vulnerabilities that pose crucial challenges for the financial stability of the euro zone: more restrictive financial conditions and the fragile functioning of some markets; the rapidly increasing burden of public and private debt; the weakened intermediation capacity and profitability of banks; and the amplification of divergent market dynamics by non-bank financial actors.

Could commercial banks come to the rescue? A Cepii study addresses this question.<sup>5</sup> The paper points out that banks are in better shape since the prudential reform, following the 2010 Basel III accords. These reforms introduced enhanced capital and liquidity requirements as well as a simple (non-risk-weighted) capital ratio. A more dynamic management of these tools, which are both counter-cyclical and directed towards the prevention of systemic risk, is part of macroprudential regulation.

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3. Aussiloux V., Ecalte F. and Mavridis D. (2020), "Taux bas: quelles implications pour la politique budgétaire", *Note d'analyse de France Stratégie*, no. 86, March.

4. European Central Bank (2020), "Financial Stability Report", May 26<sup>th</sup>.

5. Couppey-Soubeyran J., Peregó E. and Tripier F. (2020), "Les banques européennes à l'épreuve du Covid-19", *Cepii Policy Brief*, no. 32 FR.

For this reason, the ECB has allowed banks to make full use of their capital and liquidity cushions to accommodate the cash needs of their customers. This has led the ECB to extend its medium-term refinancing at negative rates (TLTRO) for banks that maintain credit to their borrowers.

But that will not be enough. The sustainability of private and public debt must be addressed in close cooperation between the ECB and the governments of the euro zone. We now address this point.

### **1.3. The post-pandemic crisis growth regime and public debt in the euro zone: Fiscal implications and the ECB's room for maneuver vis-à-vis euro zone Member States**

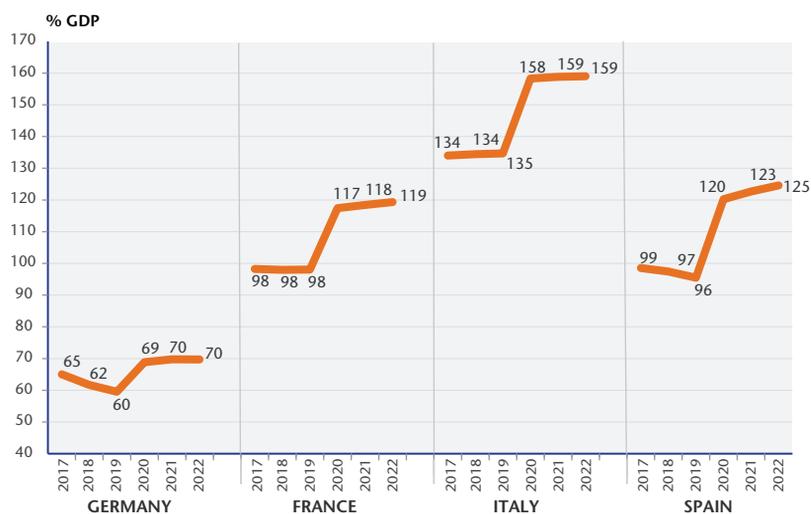
The pandemic crisis revealed the lack of preparedness and preventive measures in the face of the threat of such a disaster. By March, the European and national authorities had basic information for a month and a half. The absence of solidarity between the Member States in the face of a common menace was apparent. Selfish behavior won the day in the initial panic. The lack of medical equipment and masks manifested itself from mid-March onwards in a differentiated manner. Germany closed its borders on March 15th. France and Germany banned the export of medical equipment and masks, depriving Italy of these vital supplies.

Fortunately, the ECB, the only truly operational federal body, announced its €750 billion rescue plan on March 19th, the Pandemic emergency purchase program (PEPP), affirming that its support would be unlimited if necessary. This meant that the ECB was ready to act as if it were the national central bank of each Member State. The size of the PEPP was extended to €1350 billion in June and €1850 billion in December. It was essential to create the needed fiscal space because the budgetary responses to the health crisis have mainly been national. To prevent the very high public debt from becoming unsustainable, close coordination between fiscal and monetary policy is necessary. The PEPP signaling effect was credible in containing sovereign stress.

The sharp contraction in output and the ensuing fall in revenues along with the sizable discretionary support has pushed government debt to unusually high levels (Figure 1). These public debt projections are based on European Commission forecasts. In its baseline scenario, the Commission<sup>6</sup> considered that the containment measures in the last quarter of 2020 prevented the economy from expanding. The strin-

gency of the restrictions is set to gradually ease in 2021 and 2022. The cost of restrictions will continue to decline as economies better adapt to the Covid-19 environment. The emergency fiscal measures that have been taken are expected to be steadily reversed in 2021. The accommodative monetary policy should keep real interest rates negative. While the economic shock was severe in all the countries, its effects on the public debt in the four largest euro zone countries were highly differentiated, as the pre-pandemic levels differed greatly. The impact varied from 60% of GDP in Germany to 135% in Italy.

Graph 1. Public debt evolution in the main four euro zone countries



Source:

The temporary abandonment of the balanced budget rule in Germany has made it possible to rapidly implement a package of budgetary measures amounting to €156 billion (4.5% of GDP). The effectiveness of the support for the economy stems from the strategic nature of the German support plan, which is considered as a shield to protect businesses and employees, and incorporates a relaxation of the usual provisions so as to preserve jobs as far as possible. Germany's public debt to GDP ratio should reach a peak in 2021 of 70% (Table 2) before stabilizing, while the primary budget continues to improve (-2% in 2022).

6. European Commission (2020), "European Economic Forecast", Institutional Paper 136, November.

In France, the measures implemented to deal with the crisis have resulted in a roughly 10-ppt increase in the public debt ratio (Table 2). Despite the downward trend in both the primary and total budget deficits, the fiscal balance is not compatible with the Maastricht criteria, but allows for the sustainability of public debt, provided that the ECB continues to keep the dominant deflationary forces under control. The latent handicap in France in a context still marked by great uncertainty concerns the debt of non-financial corporations, which in the second quarter of 2020 reached 187% of GDP (from 152% in Q4 2019). Public guarantees were provided to the corporate sector. The contingent liabilities may increase the fiscal risk.

Italy's public debt was 135% of GDP in 2019, a level that had been stable since 2014. When considering the level of debt excluding the ECB's holdings, that number falls from 131% before the start of the QE program in 2015 to 114%. However, the weakening of Italy's growth potential during and after the European crisis was greater than in the other major euro zone countries. Net fixed capital formation was negative in Italy from 2012 to 2017. This low growth potential means that the absorption of the pandemic crisis by the build-up of public debt has been particularly high in Italy, where debt rose by 23% of GDP in 2020 (Table 3). To prevent the stock of debt held outside the ECB from rising to the 2014 level, the ECB has had to buy up large amounts of debt. Italy's public debt held by the ECB accounts for 22%, so it is acting as if it were the Bank of Italy in monetizing Italian debt. This prevents the spread vis-à-vis the German Bund from widening significantly, so that the budget deficit can be rapidly reduced from 2021 onwards (-6% in 2022).

Spain's public debt ratio accounted for 97% of GDP in 2018, close to the French level. However, the health crisis has hit harder than in France, leading to a larger increase in the fiscal deficit (-12.2% vs -10.6%). The public debt-to-GDP ratio should reach 125% in 2022. Here too, public guarantees provided to the corporate sector represent a risk to the fiscal outlook. The corporate sector was indeed already highly leveraged at the onset of the crisis (92% of GDP in Q4 2019). Firms' loan debt increased to 122% of GDP in Q2 2020.

Table 2. Trends in German and French public debt

Baseline scenario: tighter measures in Q4, gradual easing from 2021

	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022
	Germany					France				
Nominal GDP	3,7	2,7	-5,1	4,9	3,9	2,8	2,7	-8,2	6,7	4,6
Fiscal balance (%GDP)	1,8	1,5	-6,1	-4,1	-2,6	-2,3	-3,0	-10,6	-8,4	-6,1
Primary fiscal balance (%GDP)	2,8	2,3	-5,4	-3,5	-2,0	-0,6	-1,6	-9,2	-7,8	-6,7
Debt (%GDP)	62	60	69	70	70	98	98	117	118	119

Table 3. Trends in Italian and Spanish public debt

Baseline scenario: tighter measures in Q4, gradual easing from 2021

	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022
	Italy					Spain				
Nominal GDP	1,9	1,1	-8,7	4,8	3,8	3,6	3,4	-11,6	6,3	5,8
Fiscal balance (%GDP)	-2,2	-1,6	-10,8	-7,8	-6,0	-2,5	-2,9	-12,2	-9,6	-8,6
Primary fiscal balance (%GDP)	1,4	1,8	-7,2	-4,4	-2,9	-0,1	-0,6	-9,8	-7,4	-6,7
Debt (%GDP)	134	135	158	159	159	97	96	120	123	125

Source:

## 2. Macroeconomic regulation as the basis of political ecology

### 2.1. Principles of political ecology in the face of climate change

The theoretical hypothesis of a strong complementarity between the post-crisis growth regime and the ecological transition, mentioned in the introduction, should provide an opportunity to put the Paris Agreement into practice, as countries' aspirations have risen strongly in the face of the climate emergency.<sup>7</sup> Mobilizing the private sector requires strong environmental public investment policies. Indeed, health disasters and environmental deterioration are closely linked to the degradation of common goods: biodiversity, the destruction of natural habitats, soil artificialization, water pollution and air poisoning. Restoring common goods, that are neither strictly public nor market commodities, requires cooperation between the private and the public sectors under the leadership of local governments.

In France, the National Low Carbon Strategy has set out an investment policy covering several areas: the renovation of public and private buildings, urban and rail transport infrastructure, electric cars, and renewable electricity production.<sup>8</sup> This policy involves increasing public spending in key sectors by the State, local authorities, and public development banks. Such a strategy must be linked to the European Commission's Green Deal for Europe plan. We will look at the European objectives and the difficulties involved in achieving them, in view of the long-run challenge of European integration in the area of public finances.

As governments try to revive their economies in line with the dynamics simulated above, the UN Sustainable Development Goals emphasize the global limits of the biogeochemical cycles discussed in the introduction.

These global limits are ecological ceilings beyond which bifurcations leading to divergent dynamics can occur in the biogeochemical cycles (tipping points). Because of the complexity and connectivity of the phenomena involved, not all of these limits are measurable. They are uncertain, as are the local implications of the global limits. This is why climate and biodiversity scientists propose precautionary limits.

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7. Grandjean A. (2020), "Une opportunité pour une vraie transition écologique", *Alternatives Économiques*, no. 400, April.

8. Stratégie Nationale Bas Carbone (2020), "La transition écologique et solidaire vers la neutralité carbone", *Ministère de la Transition Écologique et Solidaire*, March.

Nine ecological ceilings have been identified:

Climate change	Nitrogen and phosphorus loading	Air pollution
Ocean acidification	Freshwater withdrawals	Loss of biodiversity
Chemical pollution	Artificialization of soils	Depletion of the ozone layer

Respecting ecological ceilings is not enough. Engaging societies in the ecological transition implies a collective orientation of societies, and thus a moderation of their inequalities, so that a society can recognize its unity. According to Rawls, social belonging depends on the provision of primary goods, i.e., common goods that no one must be deprived of in order to enjoy real freedom. The extreme concentration of capital and the social fragmentation induced in today's neo-liberal Western societies are undermining the material basis of the principle of equity. As for the second principle concerning social inequalities, it means that acceptable inequalities are only those that improve the well-being of the most disadvantaged members of society.

This principle of equity required for the pursuit of a common project leads to the recognition of social floors as pillars of social belonging. It follows that political ecology in search of environmental sustainability cannot be detached from the restoration of an acceptable level of social justice. In order to do this, States must rediscover a sense of strategic planning that takes into account global limits and social floors.

Global resilience, according to Johan Rockström and Ottmar Edenhofer, the proponents of global limits, requires a three-tiered policy strategy.<sup>9</sup> First, governments must develop multi-trillion dollar plans over the next decade to set the course for all economic agents, on the basis of carbon prices that are high enough to direct public and private investment towards renewable energy, low-carbon infrastructure, and territorial renewal. Second, the G20 should establish an investment fund fuelled by 50-year bond issues to finance low-carbon transition infrastructure in the developing countries that are most at risk and lack the resources to initiate and sustain the transition. Third, UN institutions must be strengthened to protect the global commons from damage by governments that are deliberately destroying it. An Environmental Security Council will become indispensable to oversee collective action to respect the global limits.

9. Rockström J. and Edenhofer O. (2020), "The Global Resilience Imperative", *Project Syndicate*, May 7<sup>th</sup>.

## 2.2. The difficulties of future choices: The price of carbon

A necessary change in budgetary and monetary doctrine is in order. The importance of monetizing high public debt to keep it sustainable has been shown above in theory, hence the prominent role of central banks both in the pandemic crisis and in future growth strategy. However, this monetization must be balanced to control the resumption of inflation that might occur. As seen above, the lower the discount rate applied to the future path of public debt, the greater governments' room for maneuver. Since the discount rate depends crucially on monetary policy, cooperation between governments and central banks, while respecting the institutional independence of the latter, is decisive. Indeed, it is wrong to confuse two logically different levels: the institutional status of the central bank on the one hand, and the operational stance of monetary policy on the other hand. Neoliberal monetary doctrine has done this since the 1980s under the dogma of the efficiency of finance and the uniform rational expectations of economic actors, independently of any social context, which has led to the absurd notion of a representative agent.

Central bank independence refers to the institutional status of the central bank, as established and guaranteed by the constitution of any sovereign country that ensures this status. Since money is not neutral with respect to the evolution of public debt, its monetization is part of its sustainability in the choice of a growth regime. Now, as Olivier Blanchard reminds us, in accordance with the theoretical logic outlined above, the axis of an exit policy from the crisis is that nominal growth should be higher than the interest rate paid on the debt.<sup>10</sup> Blanchard has pointed out that this strategy was the norm in the advanced countries after World War II and was very effective.

At the end of the war, US public debt was 112% of GDP, while British debt was 259%. By 1980, these had fallen to levels of 26% and 43%, respectively. Inflationary slippage did not occur until the late 1960s, and for reasons other than the level of public debt at that time. The main cause of success was the strategy adopted in the first fifteen years after the war. This strategy combined financial regulation, monetization of the public debt, and growth to maintain public debt discount rates ranging from -1.9% in the United States to -7.2% in

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10. Blanchard O. (2019), "Public debt and low interest rates", *American Economic Review*, 109 (4), pp. 1197-1229.

Japan.<sup>11</sup> Let's summarize the post-war tools: capital controls, fixed exchange rates, credit regulation, and interest rate ceilings; in short, the opposite of the neo-liberal political doctrine.

We have shown that high public debt can be sustainable in a macroeconomic situation of low inflation and low interest rates. But this requires close coordination of fiscal and monetary policy. As for the persistence of low real interest rates on sovereign debt and the possibility of maintaining  $r - g < 0$  over very long periods of time, it is interesting to observe the extraordinary study by Paul Schmelzing, which shows the trend decline in real interest rates and inflation over seven centuries in a set of European countries.<sup>12</sup> However, this very long-run trend has been reversed temporarily many times in history.

The transition to a low-carbon economy implies a much more drastic change in the production system. Pricing carbon is critical for providing incentives for decarbonization. It is essential to incorporate the cost of GHG emissions into the price of goods and services.

Present debates center on \$100 a ton of CO<sup>2</sup>eq in 2030 to be in accordance with the Paris agreement objectives and drive a sustained fall in carbon emissions. This would be four times higher than the average level used internally by companies that are using carbon pricing to manage climate-related risks and reduce emissions.

A \$100 price level would trigger Schumpeterian investments in low carbon technologies but would cripple businesses that would not or could not adapt without government support. After making numerous simulations, the 2017 commission backed by the World Bank, chaired by Stern and Stiglitz, recommended \$100 a ton by 2030.

What is crucial is the net present value of the impact of an extra ton of carbon expelled into the atmosphere. A low discount rate would increase this social cost of carbon.

What ways could be used to implement carbon pricing? Methods include carbon taxes as well as cap-and-trade schemes. China and the EU use the latter. Businesses also prefer trading schemes, because they can influence governments over the issuance of permits to reduce the impact of the scheme. This is why the carbon price collapsed in Europe

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11. Reinhart C. and Brancia B. (2015), "The liquidation of government debt", *IMF Working Paper*, 15/7, January.

12. Schmelzing P. (2020), "Eight centuries of global real interest rates,  $r-g$ , and the supra secular decline, 1311-2018", *BoE Staff Working Paper*, no. 845, January.

following the 2008 great financial crisis. It then recovered to €33 a ton in January 2021. Conversely, carbon taxes directly impose a price on carbon, but do not guarantee the level of emissions.

The IMF has estimated that household electric bills would rise by 43% on average over the decade to 2030 for a carbon tax rising to \$100 a ton. The way to alleviate the likely social contest is to recycle at least part of the revenue from the carbon tax or the sale of emission permits into benefits or tax cuts for low and middle-income households.

Another acute problem concerns the geopolitical impossibility of setting a single world price for a universal common good. To handle this problem, the EU is pushing the idea of a border adjustment mechanism, like a frontier tax, to create a “green level playing field”. However, some members of the WTO suspect that the EU has protectionist motives in blocking carbon-intensive sectors in developing countries. To alleviate this unfair treatment of the low emission poorer countries, it has been suggested that a group of willing advanced countries, including China, be created. This group would issue guarantees for low-carbon projects in developing countries and credits to multilateral development banks and would finance the Green Fund for climate change to induce governments of poor developing countries to modernize their infrastructures, so that they will not be trapped with carbon-emitting infrastructures for decades to come.

What would be the impact of carbon pricing on corporate valuations? This would depend on how much companies can pass on the extra cost of carbon pricing to their customers. What matters is the price elasticity of demand for their products and the availability of low-carbon technologies on the supply side. The fossil fuel energy sectors would be the worst hit, but competitive renewable alternatives already exist. Moreover, the cost of carbon capture schemes that remove carbon from the atmosphere could fall below \$100 per ton of CO<sup>2</sup>eq before 2030. Low-carbon alternatives also exist or can be developed in railway and road transport.

All in all, the climate challenge cannot be handled without effective carbon pricing. The early days of this decade are the last opportunity to engineer an orderly transition. If governments continue to delay, a higher carbon price will be necessary in the future, which will make for a chaotic transition.

### 2.3. Climate-related financial risks: A precautionary principle under radical uncertainty

In January 2020, a study on the “Green Swan” was published under the aegis of the Bank for International Settlements (BIS)<sup>13</sup>. The Green Swan refers to Nassim Nicholas Taleb's *Black Swan* interpretation of the Great Financial Crisis.<sup>14</sup>

The two logics have the common feature of proceeding from radical uncertainty. Such phenomena cannot be anticipated by private actors, who postulate that the past provides a good approximation of the future. They proceed from non-linear dynamics with tipping points, resulting from the interaction of multiple mutually reinforcing destructive forces. They have a large amplitude and extreme intensity, as they propagate across economic sectors and countries. But the Green Swan is specific in the sense that climate risks will occur with certainty through the vulnerabilities of biogeochemical cycles. But in what form? And when? The pandemic crisis we are currently experiencing is one element in this surprise.

It can therefore be argued that the Green Swan is a new type of systemic risk, generated by complex reaction chains between degraded ecological conditions and unpredictable economic policy responses (e.g. generalized containment).

Due to the irreversibility of their consequences for ecosystems, the effects of the Green Swan pose an existential challenge for future generations. They directly threaten their well-being. The issue at stake is therefore the deployment of decisive political action for the common good based on global coordination. The approach to climate-related financial risk therefore leads to a generalized precautionary principle in financial policy in order to face radical uncertainty by transforming finance.<sup>15</sup>

A precautionary approach to global limits is required in financial policies to oversee financial markets and provide preventive incentives for financial actors, in order to raise the resilience of the financial system to unpredictable events. In this regard, the distinction between risk and uncertainty is crucial. Uncertainty refers to situations where

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13. Bolton P., Despres H., Pereira da Silva L.A., Samama F. and Svartzman R. (2020), “The Green Swan. Central banking and Financial Stability in the age of climate change”, BIS, January.

14. Taleb N. (2007), “The Black Swan: The impact of the highly improbable”, Random House, NY.

15. Chenet H., Ryan-Collins J. and Van Larsen F. (2019), “Climate-related financial policy in a world of radical uncertainty; Towards a precautionary approach”, *UCL Working Paper*, 2019-13.

there is no rational basis for estimating probability distributions of future events. This is the case of financial risks of climatic origin through biogeochemical cycles. These are the impacts of what Mark Carney has called “physical risks”. Furthermore, the transition towards sustainable development will lead to policies whose non-linear interactions with financial systems will create “transition risks” on achievements (compared to intentions).

Financial policies inspired by a precautionary principle in the face of radical uncertainty about climate-induced financial risks are macroprudential policies aimed at strengthening the resilience of financial systems, since the unilateral pursuit of efficiency is illusory and dangerous.

The Great Financial Crisis of 2008 showed that systemic risk is not an exogenous shock. It is produced endogenously by *momentum*, which is the logic of the financial cycle. The role of macroprudential policy is to give central banks and financial regulators the power to reduce losses, regardless of the scenarios that may arise, without having a specific assessment of the probability of the occurrence of this or that scenario.

Applied to climate-related financial risks, the challenge of precautionary financial policies is to change the incentives of financial institutions by penalizing financial investments in carbon-intensive sectors, so that the restructuring of asset portfolios takes into account the necessary devaluation of carbon assets (stranded assets). To avoid a delay in the pricing of high-carbon assets that would lead, at some point in the future, to their abrupt loss of value and to a subsequent chaotic transition, progressively pricing carbon to reach \$100 by 2030 would help guide non-financial firms and financial investors. The guidance of market values must be complemented by that of bank credit. This should increase the cost of financing carbon-intensive activities and place quantitative limits on the credit of companies that exceed a carbon threshold that should evolve according to a planned rate of decarbonation, induced by an industrial policy. Finally, climate risk should be incorporated into monetary policy, in order to reduce the weight of carbon assets that is presently more than 60% of the ECB's asset purchases, as well as the acceptance of collateral for bank refinancing. A precautionary approach to monetary policy should therefore modify its credit ratings by incorporating transition risk.

In conclusion, the preponderance of the precautionary principle should make financial stability an intrinsic dimension of the central banks' mandate to deal with climate-related risks. It should guide credit in a way that gives a clear direction to the financial system, particularly on the need to strengthen its resilience to climate change.

#### **2.4. The indispensable coordination of economic policy and the change in central bank strategy**

The IMF was very slow in undertaking in-depth analysis of how climate change would interfere with its mandate of monitoring the macroeconomic policies of member countries and their impact at the world level. It was only in 2019 that a seminal paper set up a permanent study group to develop policies aiming at climate change mitigation<sup>16</sup>. The IMF's climate panel is very critical of the financial community's attitude toward climate risks. The highly non-linear impacts of physical risks from rising average temperatures are grossly underestimated, while the damage is boundless when global limits are crossed, thus leading to infinite costs. This is Martin Weitzman's dismal theorem.<sup>17</sup>

The entire scientific community recognizes that market prices do not reflect the social cost of carbon and that, consequently, the market is unable to internalize carbon externalities. The transition to a low carbon economy is handicapped by a huge lack of investment. Climate risks need to be incorporated into financial risks. All levers for action must be mobilized and coordinated.

Fiscal policy is central. A wide range of actions are required, going well beyond the Pigouvian tax, including subsidies for low-carbon investments and very low interest loans from development banks under public guarantees. All these instruments must be combined to push public investment in infrastructure and R&D.

The integration of monetary policy and macro-prudential policy must transform monetary policy doctrine, not on separate national bases, but in a coordinated manner. This is the role of the creation of the Network for Greening the Financial System (NGFS).<sup>18</sup> Its recommendations, centered on the action of central banks, have

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16. Krostrup S. and Oman W. (2019), "Macroeconomics and financial policies for climate change mitigation", IMF working Paper, September.

17. Weitzman M. (2009), "On modeling and interpreting the economics of catastrophic climate change", *Review of Economics and Statistics*, 91, pp.1-19.

complemented the scenario method proposed by the Task Force on Climate-related Financial Disclosures (TCFD) since 2016.

### ***a) Scenario method according to the TCFD***

The scenario method is the concrete elaboration of the precautionary principle to overcome the pitfalls of the Green Swan. It is the only operational method for the public disclosure of climate-related risks that is compatible with the search for resilience to mobilize all economic and social actors.

The scenario method is based on the identification of direct risks related to economic activities. These risks can be partly assessed in terms of the carbon footprint, relative to global limits, or at least those that can be quantified. In the current state of scientific knowledge, the indirect influence due to the interdependencies of the indicators in the feedback loops cannot be quantitatively assessed by any model. The method proposed by the TCFD is to establish the qualitative influence of these indirect risks by rating them on a four-point scale – nil/weak/moderate/strong – to arrive at an impact matrix. By summing the rows and columns, the most sensitive indicators of the spread of physical and transition risks are shown.

Long-term scenarios are built from the indicators most sensitive to transition risk. The recommendations for companies are to connect to the macroeconomic scenarios, structuring their governance to meet the purpose of the environmental, social and governance (ESG) criteria: participative governance, strategy, risk management, implementation of metrics when available, and targets derived from the TCFD recommendations.

The aim is to create a coherent framework for the widest and most consistent disclosure possible by companies and financial institutions, within a legal and regulatory framework aimed at achieving acceptable consistency and completeness in the disclosure of information. To do this, reports must comply with seven requirements: use present relevant information; be specific and complete; be clear and

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18. The NFGS was created in December 2017 at the “One Planet Summit” in Paris by eight central banks and supervisors. As of September 2020, it had 72 members. Its mission is to strengthen financial systems with respect to managing climate risks and mobilizing capital for low-carbon investments in accordance with the objectives of the Paris agreement. The NGFS undertakes extensive studies to promote financial best practices under the aegis of central banks and financial regulators.

understandable; be consistent over time; be comparable between companies in the same sector; be verifiable; and be made available at appropriate intervals.

***b) NGFS recommendations for central bank action***

As early as its first report in 2018, the NGFS recognized that weather-related financial risks were not adequately reflected in asset valuations by financial markets. There is a need for collective central bank leadership and global coordinated action. In October 2019 in its second report, the NGFS stated that central banks should lead by example in introducing environmental sustainability considerations into the management of their securities portfolios, without prejudice to their mandate, in order to demonstrate the sustainable and responsible investment approach to other investors.

In its 2020 technical papers, the NGFS observes that central banks need to strengthen their range of analytical tools to incorporate climate risks into their macroeconomic models and forecasting instruments, as climate change is likely to alter the transmission channels for monetary policy. They must therefore revise the operational framework and the guidelines for their monetary strategy.

This concern meets that of the Fed, which conducted a broad review of its monetary policy objectives and the macroeconomic assumptions underpinning them. Inflation targeting, as the basis for anchoring the expectations of economic actors, is justified by the independence between the steering of monetary policy to cushion fluctuations in the business cycle and the determinants of potential growth; this guarantees a stable (well-behaved) Phillips curve. However, since the Great Financial Crisis, the so-called “Great Moderation” macroeconomic framework has eroded, making the hypothesis of separating long-term growth and monetary policy untenable.

Both labor productivity growth and the so-called “natural” interest rate, i.e. the long-term estimate of the evolution of the marginal return on capital, are on declining trends. The so-called natural unemployment rate  $U^*$  can no longer be evaluated, because it is too uncertain. It ensures that the risks between which monetary policy arbitrates are no longer symmetrical. The risk of a deflationary depression has become much greater than that of an acceleration of inflation, forcing the key rate of monetary policy to fall close to zero. The euro zone economy is on the verge of deflation, which makes imperative close coordination

between fiscal policy and monetary policy, with the former preponderant. The express condition is that the budget must be oriented towards a vast area of productive investments for sustainable development.

The NGFS therefore recommends that central banks use the analysis of the scenarios recommended by the TCFD to extend their domains in taking account of the balance sheet constraints of private actors, in a stock-flow approach to capture the hysteresis of supply constraints on macroeconomic situations.

This means that the impact of climate change on growth affects the protocol of monetary policy: the choice of targets, the horizon for reaching them, and the degrees of flexibility incorporated in monetary strategies.

The links remain between macroeconomics and financial stability under the impact of climate change. How can they be considered in the relationship between monetary policy and macro prudential policy?

Physical risks associated with extreme weather events create damage in terms of loss of life and the destruction of real assets, with financial consequences for insurance and defaults. Then a transition, if it is abrupt, will cause sudden changes in the valuation of assets, including failed real assets.

Only scenario analysis can provide a method to acknowledge non-linearities, spatial heterogeneities and multifaceted imbalances in relation to the preservation of financial stability. The resilience of the financial system in general will depend on the ability of financial investors to handle transition risks in the valuation of financial assets, based on macroeconomic scenarios provided by central banks. Stress testing should be connected to the range of gradual or abrupt transition scenarios, incorporating different variations in the intensity of physical risks. This can lead to an understanding of tipping points due to global boundary crossings.

The contagion effects between the public and private sectors under the impact of large-scale shocks, such as the health crisis of 2020, reveal sovereign risks, such as those simulated above. This question brings us back to Europe between the overcoming of the pandemic crisis and the entry into the climate transition, which is the unknown that lies ahead.

### 3. Time to transform Europe

For Europe, the post-pandemic future means further integration so as to become a leader in the promotion of a political economy that undertakes practically the intentions claimed in the Paris agreement but never operationalized.<sup>19</sup>

#### 3.1. The moment of political truth

The occurrence of the breaks in the growth regime inherited from neoliberalism raises an opportunity to give birth to Europe's priorities for the next generation. Strengthening Europe's position as a global political actor to promote the objectives of sustainable development is a looming challenge. Solidarity, cohesion, and convergence must inspire the renewal of Europe.

In this perspective, the European Commission presented a communication to the other European institutions on May 27<sup>th</sup>, 2020. Because the pandemic has had very different effects in different countries, there is a risk of an unbalanced recovery and a further widening of disparities. To meet this challenge, the European Plan for the Next Generation must support a reinforced multilateralism. The Commission has therefore proposed to link a new recovery model called Next Generation EU to a long-term strategy supported by the European budget.

This would involve raising €750 billion on the financial markets in two or three years, to set up a fund backed by the European budget, pertaining to the Multiannual Financial Framework (MFF) 2021-2027. The European Commission would raise the funds on behalf of the European Union on the capital markets. Part of the funds would be spent on grants and would therefore not have to be repaid by the beneficiary countries. These transfers would be directed to the countries most affected by the virus. The remainder would be earmarked for investment credits, seeking a leverage effect on private investors.

This proposal, which was validated by the European Council after bitter debate and some adjustments extracted by the so-called frugal countries, has an historical importance for the future of European integration. Indeed, it signals a significant change in the political stance of German authorities towards the political future of the European Union.

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19. Aglietta M. and Leron N. (2017), *La double démocratie*, Le Seuil.

The political breakthrough is significant for three related reasons: the European Commission can raise funds for a much higher amount than before; the funds raised can be distributed as grants to Member States; and the repayment of the borrowed funds will be made from the European budget. It is up to the Commission's plan, unveiled on May 27<sup>th</sup>, to specify the modalities of the implementation of this Plan, while the MFF 2021-2027 is approved.

### **3.2. The project of the European Commission submitted to the European Council and the European Parliament for approval**

The Commission's communication of May 27<sup>th</sup> 2020 to the European Parliament and the political authorities of the Member States is impressive for two reasons. First, it deals with the urgency of an economic recovery that avoids worsening and, even strives to abate, the disparities between Member States, in incorporating and specifying the Franco-German political proposal of May 18<sup>th</sup>. Second and above all, it proposes a long-term view, based on the ecological transition and the digital economy, which breaks definitively with "yesterday's world", i.e. neo-liberal capitalism, to promote a strategy led by a European public power for the well-being of future generations (Next Generation EU).<sup>20</sup>

The detail of the Commission's communication shows that expectations regarding mutualization have not been disappointed. In concrete terms, this Fund would be financed by a joint debt, issued by the European Commission on behalf of the EU. This is made possible by an increased contribution from the Member States (temporarily from 1.2% to 2% of gross national income and permanently 1.4%). As the European Commission's debt is rated AAA, this guarantees a minimum cost for borrowing on the financial markets. However, the European Commission's debt issuance is not expected to start before 2021. These bonds would be jointly repaid between 2028 and 2058 via future EU budgets, which will undoubtedly be enriched by own resources linked to the deepening of European integration.

To this end, the European Commission is proposing a series of new EU taxes. These own resources are designed to allow for sharing equitably the debt repayment. Possible candidates are a carbon tax, a

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20. European Commission (2020), "Europe's moment: Repair and prepare for the next generation", Communication to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions, May.

digital tax, and an extension of the EU Emissions Trading Scheme. The money raised would be redistributed through grants of €500 billion and loans of €200 billion according to three pillars. This sounds like a compromise between the Franco-German proposal and the wishes of the “frugals”. The first pillar aims at supporting investment and reforms. This is made possible thanks to a €560 billion recovery and resilience mechanism, distributed in the form of grants and loans to Member States, according to the investment and reform priorities identified in the framework of the European Semester. This mechanism would be complemented by greater support for the cohesion of the Member States, dear to the countries of Eastern Europe, as well as for the ecological transition. The other two pillars aim at stimulating private investment and modernizing the health system.

On July 10th, a new proposal was made by the EU Council President, Charles Michel, to break the deadlock on the Recovery Fund and MFF negotiations.<sup>21</sup> It proposes to cut the MFF by €26 billion (to €1.07 trillion). The allocation of the €750 billion across grants and loans to Member States is maintained. What has been modified is the debt repayment, which is set to start in 2026 instead of 2028. Also, the funds would be allocated in line with recommended national reforms. The EU council would approve the national Recovery and Resilience Plans to unlock the funds needed at qualified majority (no unanimity as wanted by the Netherlands) instead of the European Commission, weakening therefore its position. The so-called “frugal four” would continue to benefit from budget rebates. The new proposal is better for the climate, as 30% of the EU budget would be dedicated to the climate (instead of 25%), but weaker for long-run investment.

On July 21<sup>st</sup>, European leaders finally struck a deal<sup>22</sup> on the EU recovery fund and the MFF after four days of negotiations, paving the way for deeper fiscal integration. This agreement is a sign of cooperation and collaboration in the face of the crisis. The initial €750 billion (5.4% of 2019 EU GDP) envelope has been maintained. What differs is its distribution. The size of grants was cut from €500 billion to €390 billion (2.8% of 2019 EU GDP) while loans were raised from €250 billion to €360 billion (2.6% of 2019 EU GDP). The reduction of grants diminishes the benefit of the program for highly indebted countries.

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21. European Council (2020), “President Charles Michel presents his proposal for the MFF and the recovery package”, July.

22. European Council (2020), “European Council conclusions July 17-21<sup>st</sup>”, July.

The core element is the Recovery and Resilience Facility (RRF) to support climate change and digitalization. The size has been increased to €672.5 billion (+€112.5 billion), with €312.5 billion in grants (+€2.5 billion) and €360 billion in loans (+€110 billion). 70% of all grants will be provided in 2021-2022, and the remaining 30% in 2023, financed by jointly issued debt. The recovery fund will provide a cyclical boost given the front-loading of the grant disbursement. The increase in the RRF came at the expense of the rest of the programs but all are heavily skewed towards countries with lower per capita GDP. More precisely, React EU, which aims to bolster and frontload cohesion, has been cut to €47.5 billion; Invest EU, the former Juncker Plan, will benefit from €5.6 billion, the Just Transition Fund to fight climate change from €10 billion, and Rural Development from €7.5 billion. Horizon EU for research and innovation will be granted €5 billion.

The EU budget envelope is €1.07 trillion, as proposed on July 10<sup>th</sup> by Charles Michel. The EU will be granted own resources to offset the UK contribution and the higher budget (from €1 trillion in 2014-2020). The plastic tax will be introduced on January 2021, while the carbon border mechanism and the digital levy from 2023. The Green agenda is a major priority, with 30% of the EU budget dedicated to climate change (revised up from 25%).

As part of the compromise, Germany, Austria, the Netherlands, Sweden and Denmark will enjoy budget rebates (scaled up for the frugal fours by around €6 billion). Also, the share of custom duties retained by Member States is raised to 25% (from 15%), benefitting countries with well-located seaports like the Netherlands.

The recovery deal was approved by national parliaments and the European Parliament before year-end 2020.

### **3.3. The public debt of Member States, ECB's quantitative easing and the shackle of EU fiscal rules**

It has been shown in section 2 that public debts are sustainable in the main euro zone countries, provided that the monetary conditions set up by the ECB Council prevail in the foreseeable future, since sustainability depends essentially on  $r-g$  remaining negative. Why not a monetary policy framework driven by control of the yield curve? The monetary doctrine adopted by the Bank of Japan is telling. Japan has the highest debt/GDP ratio in the world (around 250%), and the most sustainable, since investors have bought long-term bonds at a zero

interest rate since 2016. The experience shows that the debt can rise while its interest cost declines, giving the public sector an opportunity to invest productively since the multiplier can reach 1.5 at the zero lower bound.

The same is happening in Germany and France, because the ECB uses asset purchases to stabilize interest rate spreads implicitly between Member States. This is an implicit yield curve policy driven by the ECB's Treasury bond purchases on the secondary market since 2015. This policy framework is stable, as long as inflation does not reawaken. Might a rebound in inflation arise? It is unlikely, given the extreme concentration of wealth and a highly unequal income structure. Indeed, inflation has trended downwards in the last 40 years.

The Fed's review reached similar conclusions in 2020. This has led to more flexibility in the inflation target as an average ex post result of policy actions in a deflationary environment. The ECB is pursuing the same strategy without officially changing its monetary doctrine for the time being, e.g. in trying to achieve a monetary target that can never be attained.

On the fiscal side, the public debt of euro zone Member States is supposed to be encapsulated in the arbitrary quantitative limit of 60% of GDP, which is to be monitored by the European Semester. Hence the vehement calls to reimburse the extra debt in the wake of the fiscal expenditures arising from the pandemic crisis. A fiscal doctrine like this that rests on rigid rules is incompatible with an economic environment marked by radical uncertainty. This is why Olivier Blanchard and his coauthors have proposed a fiscal reform based on standards instead of rigid rules.<sup>23</sup>

According to the authors, a standard is a norm in which all legal content is defined ex post, allowing standards to guide a case-by-case approach. For example, "Member States shall avoid excessive government deficits" is a standard approach. What is deemed excessive is related to sustainability, which has been checked in the simulations presented in section 2 for the four main euro zone countries. More generally, models for assessing whether fiscal standards are satisfied proceed from scenario analysis, based on the drivers of debt dynamics. The relevant variables are those appearing in the theoretical model of

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23. Blanchard O., Leandro A. and Zettlmeier J. (2020), "Redesigning the EU fiscal rules: From rules to standards", *Petterson Institute for International Economics*. 72<sup>nd</sup> economic fiscal meeting.

section 1:  $r - g$  (discount ratio),  $b$  (primary balance), and the debt's maturity structure. Will the future primary deficit be higher than the present deficit, taking account of the flexibility of monetary policy?

To enforce fiscal standards, the EC Commission can be empowered to conduct fiscal surveillance according to the protocol adapted to the standards. If a country disagrees with the Commission's assessment of a future budget, the country could appeal to the Council, which could overrule the Commission with a qualified majority. The decision would be limited to requesting a different fiscal balance.

### 3.4. The strategies for a new growth regime

#### *a) Priority on the Green Deal*

The ecological transformation is at the heart of the growth strategy for the next generation. Lifting long-term uncertainty so as to mobilize private investment will be achieved through a Climate Law and by proposals for greater ambitions that the Member States will have to provide at COP26. The European taxonomy of sustainable finance will guide the compatibility between investments for economic recovery and long-term targets. To keep business strategies in line with the EU's social and environmental priorities, in 2021 the Commission will introduce an initiative on sustainable corporate governance to ensure that the European Green Deal creates new types of jobs, supported by European training and retraining policies. The European Green Deal should create one million "green" jobs by 2030.

The territorial dimension will be given priority through investment in the circular economy, with the aim of creating more than 700 000 new jobs of this type by 2030 while reducing dependence on external suppliers. The renovation of buildings at the local level will promote labor-intensive activities.

Two other areas of industrial transformation are energy and transport. In energy, priority is given to hydrogen batteries, carbon capture, and the intelligent interconnection of electricity distribution systems (smart grids). In transport, priority is on electric vehicles, for which the Commission plans to install one million recharging points. Other changes include discouraging air transport for distances of less than 1000 km, developing trans-European high-speed trains, and encouraging the development of urban public transport.

The Commission also attaches great importance to the protection and restoration of biodiversity and natural environments. It will mobilize the European Fund for Agriculture and Rural Development, drawing lessons from the pandemic, including by support for organic farming to provide healthy food through a reform of the Common Agricultural Policy (CAP) and a strategy to rehabilitate forests against soil artificialization.

### ***b) Digital economy for the single market***

The Commission wants to bridge Europe's digital technology gap to bring about structural changes in social life, based on an electronic public identity that would open access to transnational public services in Europe. The Commission sees four complementary types of innovation.

First, investing in better connectivity through the deployment of 5G to increase Europe's strategic autonomy in the development of common goods across Europe: health, education, transport, logistics, and media infrastructures.

Second, strengthening the European industrial presence in digital value chains. The aim is to concentrate investment in the formation of digital "capabilities": artificial intelligence, cybersecurity, data and cloud infrastructure, the 5G network, and quantum and blockchain computing.

Third, designing a common European data economy in the priority areas to launch the European Green Deal. To this end, the Commission will present legislation on the governance of data sharing between Member States.

Fourth, establishing a level playing field to break the GAFAM monopoly on digital platforms by creating public Internet platforms under the auspices of a Digital Services Act to facilitate access for SMEs in the context of cybersecurity.

### ***c) Protection of biodiversity***

The biodiversity crisis and the climate crisis are intrinsically linked, because climate change increases the physical risks of destruction of the natural world (droughts, fires, floods, hurricanes, etc.), which reduce carbon sinks, thus increasing GHGs in the atmosphere and aggravating climate change.

The Green Pact for Europe must contribute to a global framework on biological diversity (COP15), while being part of the Union's recovery plan. Transforming the CAP to develop organic agriculture and increase the area of forests and improve their resilience is a crucial priority for restoring natural habitats and freshwater ecosystems.

This implies a new governance framework for investments, pricing, and taxation. Biodiversity will be introduced into the EU taxonomy to guide funding. 25% of the 2021-27 share of the EU climate budget should be invested in biodiversity. The aim would be to attract national public and private funding for biodiversity with guarantees from the European budget.

#### ***d) Promotion of European financial players for the long term***

The financing of long-term infrastructure projects presents risks that market finance does not assume. These risks stem from capital injections tied up for long periods of time (upfront costs), linking successive phases of investment implementation. These risks are very difficult both to estimate (danger of gross underestimation) and to insure. They are investments whose purpose is to create positive externalities on the economy. Their social return is therefore higher than the financial return. Accordingly, these investments are by-products in the logic of market finance.

Public action is thus crucial here. Where pure public goods are concerned, financing would be the direct responsibility of the European budgetary authority. In terms of activities with positive externalities, the public development banks are the predominant financial actors. Their long-term mandate enables them to support large-scale projects, generating such externalities. Their capital is held by sovereign entities (national or international) with high financial credibility. This results in an ability to borrow long-term at low costs on the international bond markets.

Public development banks can provide governance of investment projects, because they have the expertise to undertake selection, appraisal, and monitoring. They are direct partners when it comes to choosing the right technologies, the amounts allocated, and locations. These banks can attract other lenders and provide leverage in mobilizing their resources. Europe is fortunate to have a rich array of public development banks and public financial investors following the same logic. The European Investment Bank (EIB) should be the pivot of the

new architecture. Backed by a budget guarantee, it can emerge from its legendary prudence and finally take risks. If these different bodies acted in coordination, they would have a considerable financial strike force, which could be amplified by responsible private investors.

A responsible investor is a financial intermediary that collects large amounts of savings (insurance companies, pension funds, sovereign wealth funds) and develops strategies for allocating these savings, recognizing the interdependencies between financial and non-financial evaluations that contribute to a broader conception of the wealth of nations.<sup>24</sup> Indeed, these investors understand that major trends that degrade the life of societies have harmful long-term consequences on the financial return on capital, on which their ability to honor their commitments to their constituents depends. Responsible investors are led to become involved in the governance of the companies in which they invest, in order to influence management models in the direction of sensitivity to social and environmental criteria. They must also acquire instruments to assess the impact of positive and negative externalities on the internal returns of companies' investment projects. Governance by investors as shareholders must be exercised in such a way as to encourage the use within the companies concerned of expertise in understanding risks, in considering reference indicators, and in developing scenarios about their future.

A sufficient critical mass of responsible investors is therefore required for significant macroeconomic effects to arise. The development of this mass is underway. Investor clubs, forming coalitions dedicated to a gradual decarbonization of financial portfolios, are committing to withdrawing their investments from carbon-intensive industries in favor of those that show concern for energy efficiency.

Central bank engagement may also be essential in the face of systemic financial risks, which will be caused by policy changes, technological mutations, and any transformations that may result in valuations that differ significantly from current averages for large pools of financial assets, as the costs and benefits of the actions being taken become apparent.

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24. Stiglitz J. E., Sen A. K., and Fitoussi J. P. (2009), "Rapport de la Commission sur la mesure des performances économiques et du progrès social". CGDD (2015), "Nature et Richesse des Nations", *Numéro spécial de la Revue du Commissariat Général au Développement Durable*.

#### 4. Conclusion: A time of bifurcation

The statement of the problem is disarmingly simple, but its resolution is appallingly complex. Humanity's life depends on the Earth system, whose finitude has been scientifically defined by planetary limits. Yet, capitalism, which governs social life and has taken over the entire world, claims unlimited expansion. This has already led to the transgressing of several planetary limits, including global warming and the destruction of biodiversity. This contradiction can be resolved only by the return of respect for planetary limits, so that civilization, as we know it, can survive. But, under what conditions and through which disasters will this adaptation take place? It is not a return to the state of nature of the pre-industrial era. The inertia of geological processes is such that we will have to live with the after-effects of the destruction already inflicted on a warming planet, with more frequent and more violent catastrophic natural phenomena.

The pandemic crisis is a warning of what awaits societies. Clearly, we cannot react without radical changes in economic and social life. Collective wisdom must prevail over individual hubris, governed by the principle of "making money with money". That is why neoliberalism, which has pushed this principle to the extreme, must disappear.

In this study, we have studied only a small dimension of this problem. But this study touches on a crucial issue: the re-establishment of public authority over capitalist interests to regain a sense of the Common Good. Since capitalism can only evolve from crisis to crisis, and the domination of private interests over the collective interest leads to the principle of the privatization of gains and the socialization of losses, public debt increases from one crisis to the next, and the process can never be reversed.

However, in the year 2020, we have entered the era of ecological crises. It follows that the extent of the drift in public debt, as well as the reasons why it has risen, are following a new logic that is plunging us into an unusual uncertainty about the duration and extent of the crisis.

We have tried to show that public debt remains sustainable on the express condition that the monetary doctrine pursued by neoliberalism is completely abandoned. Central banks must have total flexibility of action; there must be full cooperation between fiscal policy and monetary policy; and private debt must be strictly controlled. The common good of articulating social stability and respect for global limits must be relentlessly pursued.

What social movement might be able to bring about the advent of a political elite capable of taking up the planetary challenge? As the European Commission claims, it is the fate of future generations that is at stake. Only a movement that reaches out to the younger generations around the world can meet the challenge.

## References

- Aglietta M. and Brand T., 2012, "Un New Deal pour l'Europe", *Odile Jacob*, Chapter 1.
- Aglietta M. and Leron N., 2017, "La double démocratie: une Europe politique pour la croissance", *Seuil*.
- Aglietta M. ed., 2019, "Capitalisme. Le temps des ruptures", *Odile Jacob*.
- Aglietta M. and Khanniche S., 2020, "La vulnérabilité du capitalisme financiarisé face au coronavirus", *Lettre du Cepii*, no. 406, April.
- Aussiloux V., Ecalle F. and Mavridis D., 2020, "Taux bas: quelles implications pour la politique budgétaire", *Note d'analyse de France Stratégie*, no. 86, March.
- Blanchard O. (2019), "Public debt and low interest rates", *American Economic Review*, 109 (4), pp.1197-1229.
- Blanchard O. and Pisani Ferry J., 2020, "Monetisation: do not panic", *voxEU.org*, April 10<sup>th</sup>.
- Blanchard O., Leandro A. and Zettelmeier J., 2020, "Redesigning the EU fiscal rules: from rules to standards", *Petterson Institute for International Economics*. 72<sup>nd</sup> economic fiscal meeting.
- Bolton P., Despres H., Pereira da Silva L.A., Samama F. and Svartzman R., 2020, "The Green Swan. Central banking and Financial Stability in the age of climate change", *BIS*, January.
- Bridonneau B. and Scialom L., 2020, "Des annulations de dette publique par la BCE: lançons le débat", *Terra Nova*, 17 April.
- CGDD, 2015, "Nature et Richesse des Nations", *Special issue of the Revue du Commissariat Général au Développement Durable*.
- Chenet H., Ryan-Collins J. and Van Larsen F., 2019, "Climate-related financial policy in a world of radical uncertainty; towards a precautionary approach", *UCL Working Paper*, 2019-13.
- Claeys G. and Wolff G., 2020, "Covid-19 fiscal response: what are the options for the EU council?", *Bruegel Blog Post*, March 26<sup>th</sup>.
- Coupey-Soubeyran J., Perego E. and Tripier F., 2020, "Les banques européennes à l'épreuve du Covid-19", *Cepii Policy Brief*, no. 32 FR.
- European Central Bank, 2020, *Financial Stability Report*, May 26<sup>th</sup>.

- European Commission, 2020, "European Economic Forecast", Institutional Paper 136, November.
- European Commission, 2020, "Europe's moment: repair and prepare for the next generation", *Communication from the Commission to the European Parliament, the European Council, the Council, the European and Social Committee and the Committees of the regions*, May 27<sup>th</sup>.
- European Council, 2020, "Le Président Charles Michel présente sa proposition du MFF et du Fonds de relance", July.
- European Council, 2020, "Les conclusions du sommet européen du 17 au 21 Juillet", July.
- Gali. J., 2019, "The Effects of a Money-Financed Fiscal Stimulus", *NBER working paper*, No. 26249, September.
- Godin R., 2020, "Union Européenne: la dette perpétuelle est-elle une solution miracle?", *Mediapart*, 24 April.
- Grandjean A., 2020, "Une opportunité pour une vraie transition écologique", *Alternatives Economiques*, no. 400, April.
- IMF, 2020, "Chapter 1: the great lockdown", *World Economic Outlook*, April.
- IMF, 2020, "Chapter 1: policies to support people during the Covid-19 pandemic", *Fiscal Monitor*.
- IMF, 2020, "Chapter 1: global financial stability overview: markets in the time of Covid-19", *Global Financial Stability Report*.
- Krostrup S. and Oman W., 2019, "Macroeconomics and financial policies for climate change mitigation", *IMF Working Paper*, n° 19/185, September.
- Meckling J. and Allan B., 2020, "The evolution of ideas in global climate policy", *Nature Climate Change*, Avril 20<sup>th</sup> (online).
- Mian A., Straub L. and Sufi A., 2020, "The saving glut of the rich and the rise of the household debt", *NBER Working Paper*, no. 26940, April.
- Pâris P. and Wyplosz C., 2014, "Politically acceptable debt restructuring in the eurozone", *ICMB, CEPR*, January.
- Rawls J., 2001, "Justice as Fairness: a restatement", Harvard University Press.
- Reinhart C. and Rogoff K., 2009, "This time is different. Eight centuries of financial folly", Princeton University Press.
- Reinhart C. and Brancia B., 2015, "The liquidation of government debt", *IMF Working Paper*, 15/7, January.
- Rockström J. and Edenhofer O., 2020, "The Global Resilience Imperative", *Project Syndicate*, May 7<sup>th</sup>.
- Stiglitz, J. E., Sen, A. K., and Fitoussi, J.-P., 2009, "Rapport de la Commission sur la mesure des performances économiques et du progrès social", *vie-public.fr*

- Stiglitz J., 2020, "Four priorities for Pandemic Relief Efforts", Roosevelt Institute, April.
- Tooze A., 2020, "The Death of the Central Bank Myth", *Foreign Policy*, May 13<sup>th</sup>.
- Schmelzig P., 2020, "Eight centuries of global real interest rates, r-g, and the suprasedecular decline, 1311-2018", *BoE Staff Working Paper*, no. 845, January.
- Stratégie Nationale Bas Carbone, 2020, "La transition écologique et solidaire vers la neutralité carbone", *Ministère de la Transition Écologique et Solidaire*, March.
- Summers L., 2015, "Have we entered an age of secular stagnation?", *IMF Economic Review*, Palgrave Macmillan, vol. 63 (1), pp.277-280.
- Taleb N., 2007, *The Black Swan: the impact of the highly improbable*, Random House, NY.
- Weitzman M., 2009, "On modeling and interpreting the economics of catastrophic climate change", *Review of Economics and Statistics*, 91, pp.1-19.
- Wolff G.B., 2020, "EU debt as insurance against catastrophic events in the euro area: the key questions and some answers", *Bruegel Blog Post*, April 22<sup>nd</sup>.

