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Financing the Energy and Ecological Transition

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The energy and ecological transition (EET) is inevitable, desirable, and now accepted worldwide. But how this transition will be financed remains highly uncertain.
This Policy Paper analyzes the financing needs and reviews the different possible financial channels. Some avenues have already been launched, and procedures and instruments are being put in place, but all of this remains insufficient. Many solutions will have to be combined, and these will require financial innovations, the broader application of environmental, social, and governance (ESG) criteria, an adaptation of certain banking and financial regulations, and more international cooperation. This paper proposes several recommendations to facilitate the financing of EET.

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The Policy Center for the New South (PCNS) is a Moroccan think tank aiming to contribute to the improvement of economic and social public policies that challenge Morocco and the rest of Africa as integral parts of the global South.

The PCNS pleads for an open, accountable and enterprising "new South" that defines its own narratives and mental maps around the Mediterranean and South Atlantic basins, as part of a forward-looking relationship with the rest of the world. Through its analytical endeavours, the think tank aims to support the development of public policies in Africa and to give the floor to experts from the South. This stance is focused on dialogue and partnership, and aims to cultivate African expertise and excellence needed for the accurate analysis of African and global challenges and the suggestion of appropriate solutions.

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INTRODUCTION

The objectives set in Paris in 2015 at the COP21 climate summit remain the reference for subsequent COPs and the works of the Intergovernmental Panel on Climate Change (IPCC). The goal is to keep the increase in the average temperature of the planet below 2°C compared to pre-industrial levels by the end of this century, and to do everything possible to keep the increase to 1.5°C. The 6th IPCC Report, published in March 2023, shows that achieving such objectives is now a challenge. Due to greenhouse gas (GHG) emissions, 70% of which are carbon emissions, the global temperature has already risen by 1.1°C since the period 1850-1900. There is a risk of reaching 2°C by 2030, i.e. well before the end of the century, with all the negative consequences expected:

- Accelerated warming accompanied by increasingly marked climatic episodes; rising sea levels; retreat of glaciers; drastic reduction of biodiversity; accelerated migration flows ... The IPCC, in a pessimistic but not impossible scenario, even states that the temperature increase could reach 3.2°C in 2100. Is this an alarm signal that could trigger the necessary action?

To contain GHG emissions and achieve carbon neutrality, a situation in which production and destruction/capture of CO2 are roughly balanced, the energy and ecological transition (EET) needs to be accelerated throughout the world. This will involve implementation of public policies for less carbon-intensive transport and housing, for greener agriculture, for a less GHG-producing energy mix thanks to renewable energies, and, in some countries, thanks to nuclear energy, and by introducing 'green' incentives and taxation. The interaction between policies and behaviors is essential. The 6th IPCC Report illustrated this perfectly, emphasizing the essential role that public policies and individual behavior must play in favor of sobriety in many areas. Green technologies will also be essential to improve energy efficiency, and to reduce the cost of carbon capture and sequestration techniques. Between now and 2050, a certain number of technological breakthroughs will be necessary, and on their own insufficient, to get closer to the shared objectives.

The fact that EET has become one of the stakes of a 'green' reindustrialization, of competition between countries and of industrial competitiveness, is evident with the adoption of the U.S. Inflation Reduction Act (IRA), the EU's response to it, and similar Chinese initiatives. Ecology, which should bring together countries and areas of influence since the climate and the planet are common goods, is being activated as a channel for commercial and geopolitical confrontations, with the risk of a rise in protectionism, in a context in which the World Trade Organization is once again showing its powerlessness, and in which emerging and developing countries, too often reduced to the role of spectators, are presented with a fait accompli by the most advanced countries.

In this paper, I take the goals of the Paris Agreement and the work of successive COPs since the Agreement as data. Discussing them, and possibly challenging them, is an exercise that has generated a lot of work since 2015. After the excesses of some parties, on the side of ecologists and anti-ecologists alike, we can now discern a certain appeasement and some convergence, particularly on the question addressed here: will green finance, one of the main components of sustainable finance, live up to the stated ambitions of the EET? The convergence is less about the answers given, which are necessarily imprecise when it comes to anticipating and quantifying financial flows over the next thirty years, than about the relevance of the question, which is now widely accepted.

The fact that financing conditions are crucial for the EET was already apparent from the 2015 Paris Agreement. This Agreement seeks, among other objectives, to improve the United Nations Framework Convention on Climate Change, by "making financial flows consistent with a pathway to low-GHG emissions and climate-resilient development." Will financing be the major stumbling block for the EET? This contribution, without claiming to settle all the issues involved, explores the subject in greater depth.

I. ABOUT FINANCING NEEDS

1) Increased Competition for Finance

The necessary financing of EET will take place in a context in which, in many countries, public and private debts have reached levels where the question of their sustainability arises. With the increase, not yet completed, of the whole range of interest rates (short and long-term rates), states must face the increase in public debt rates, the inevitable extension of defense and security expenditures given the geopolitical context (the war in Ukraine, but not only that), the required coverage of education and health expenditures, and the financing of the EET. Facing such a public spending program, while reducing public deficits, lowering the ratio between public debt and GDP, or at least stabilizing it, while avoiding increasing the tax burden ratios. For many countries, regardless of their level of development, this will be extremely difficult, if not impossible.

It is true that global savings should remain abundant. But beyond the global adjustment between savings and investment, what also counts is the geographical distribution of possible tensions in this balance. For example, given that for long-term rates the causality runs from U.S. rates to non-U.S. rates, because of the weight of U.S. capital markets, an ex-ante excess of investment over savings in the United States would have global financial consequences from U.S. long-term rates.

Olivier Blanchard postulates that for some years, the U.S. economy will have to adapt to the new economic environment. This is a central question if we are talking about the EET. Nominal and real interest rates (excluding inflation) should remain moderate thanks to the volume of savings that ex ante would exceed investment needs. The criterion of debt sustainability, whether public or private, would be even more verified if GDP growth rates were to remain higher than average interest rates.

For the reasons given above, and the fact that the increased crowding-out of public and private borrowers on the financial markets is likely to generate crowding-out effects that are synonymous with tensions, particularly on long-term rates, I am more cautious than Blanchard about the path of interest rates over the next ten years, and whether the conditions for debt sustainability will be met.

2) Global Figures, Figures Per Country

How much money should be mobilized to finance an EET that is compatible with the objectives of the COP21, validated by subsequent COPs? At this stage, given the many uncertainties, we can only talk about orders of magnitude. The figures put forward also have a strong normative dimension, since they are associated with the most ambitious scenarios of the COPs and the IPCC.

It is therefore a question of estimating the desired contours of green finance, with the probable gaps between the objectives and reality, between the commitments made by countries and their effectiveness.

The United Nations Report on Climate Change Financing speaks of $4,500 billion to be mobilized per year over the next thirty years. Most estimates from independent institutes converge on this estimate, ranging from 4,000 to 5,000 dollars per year. Taking as a reference world GDP of 2022 and neglecting, for simplicity's sake, the inflation of the next few years and its differentiated effects on the GDP and on the green finance bill, this would represent between 4% and 5% of global GDP. This gives an idea of the additional investments and financing to be mobilized. For the EU, the

corresponding figures would be $400 billion per year and about 3% of GDP. The COP28 in Dubai should, in principle in December 2023, refine these quantifications of the financial effort required for the EET.

The World Bank provides more granular data based on countries' levels of development. In a Synthesis Report[1], it groups 24 emerging or developing countries according to their per-capita incomes. The less developed the country and the more limited its access to financial markets and private capital, the greater the additional investment and financing effort targeted at EET as a proportion of GDP. The figures range from 1.1% of GDP for upper-middle-income countries, to 8% of GDP for low-income countries, and 5.1% of GDP for lower-middle-income countries.

The proposed approach is somewhat paradoxical since it amounts to asking the least-developed countries to make the most intensive efforts relative to GDP. Since in these countries the financial market is not even emerging and private capital is insufficient, this amounts to shifting the bulk of the green financing to the government budget, a budget already often burdened by other essential expenditures and by the interest charges of the public debt overhang. Using the same methodology, the World Bank estimates the total investments to be made by Morocco by 2050 in a "resilient and low carbon"[2] strategy at $78 billion in present value.

3) The Required North-South Transfers

As early as COP15 in Copenhagen (2009), the advanced countries committed to transferring $100 billion per year by 2020 to the countries of the South to help them finance their EETs. The commitment was so underfunded that it had to be renewed and reprogrammed by the 2015 Paris Agreement. After another slow start, the process has finally accelerated. Thus, for 2020, according to a detailed analysis by the OECD (Organization for Economic Cooperation and Development)[3] , North-South transfers for climate finance had reached $83 billion (compared to $52 billion in 2013), the bulk of which came from bilateral public aid and from multilateral development banks. The information available suggests that the symbolic, but not only symbolic, threshold of $100 billion was reached in 2022 and will probably also be reached in 2023.

Other channels, convergent with or complementing the previous one, have been put in place. They support EET investments in the countries of the South, for modest amounts. The Green Climate Fund (GCF) became fully operational in 2015; it helps developing countries to reduce their GHG emissions, being one of the channels through which the $100 billion commitment is delivered. For the period 2020-2023, the GCF has been allocated nearly $10 billion to finance 32 projects and programs. The 2022 COP27 in Sharm-el-Sheikh, Egypt, announced the creation of a 'loss and damage' fund to help the most vulnerable countries. We can therefore see that financial initiatives are multiplying, often for modest amounts in relation to the financial flows required, and sometimes in a scattered manner. In terms of the North-South transfers required by the EET, it would undoubtedly be more efficient to take advantage of economies of scale by focusing on two or three major distribution channels, rather than multiplying the number of aid windows required.

1. The World Bank, 'What you need to know about how CCDRs estimate climate finance needs', CCDR Explainer Series, March 2023.

2. World Bank, Climate and Development Report. Morocco, October 2022.

3. OECD, Aggregate Trends of Climate Finance Provided and Mobilised by Developed Countries in 2013-2020, 2022.

4) The Link Between Micro and Macroeconomics

At the microeconomic level, the rise of environment, social, governance (ESG) criteria, especially the E criterion, throughout the world and whatever the degree of development of the country in question, is both irresistible and irrepressible. The signs of the rise of extra-financial reporting are multiform:

- Extra-financial reporting by companies, banks, all issuers;
- Ratings of issuers increasingly dependent on extra-financial criteria in addition to the usual financial criteria;
- On the investor side, increasing weight given to ESG criteria, SRI, CSR, with portfolio allocations in full evolution as can be seen, for example, for large asset managers including Blackrock, Pimco, and Amundi.

The role of shareholders' meetings in approving companies' climate strategies is also increasing, and the variable part of corporate executives' remuneration is being indexed to compliance with ESG criteria. We are moving towards a generalization of integrated reporting by companies that combines financial and extra-financial information, towards integrated ratings by rating agencies that master both types of information (the takeover of the extra-financial rating agency Vigeo-Eiris by Moody's heralds other operations of this type).

The rise of ESG criteria is generating both supply and demand for green finance. To illustrate the supply side, we need only take the example of asset managers who are already devoting, directly or indirectly, a growing share of their asset allocation to green funds and sustainable finance. But this offer is the direct counterpart of the financing needs arising from the EET. There is a gap here, which is difficult to quantify ex ante and even ex post: the undeniable global success of ESG issues seems to exceed, by far, the green financing required for EET. Is it a problem of time for the macroeconomy to translate the revolution underway at the microeconomic level? Or is there a structural difficulty that goes beyond the mere time lag? At this stage, and despite the uncertainties, I tend to favor the (optimistic!) time-lag hypothesis.

The success of green finance in the lives of all companies, whether SMEs or large corporations, has as its counterpart the temptation to 'greenwash', i.e. to claim to be greener than reality indicates. This is why a demanding work of normalization and standardization is necessary. Taxonomy is essential to improve the transparency of issuers and the correct assessment of the risk/return trade-off by investors. It is a complicated exercise, which will take time to stabilize because it is based on conventions and choices that cannot be purely scientific.

Given the current weakness of global governance, I do not believe in the emergence of a universal green taxonomy. Even in the European integration zone, it has taken many debates and summits to arbitrate differences between France and Germany over the treatment of nuclear and gas in the taxonomy. In the end, a fragile agreement was reached by including, under specific conditions, nuclear and gas in the European green taxonomy. On all these energy and environmental issues, competition between states is coupled with the effective intervention of the lobbies concerned.

II. POSSIBLE FINANCING FOR EET

1) Abundance of private savings?

For at least ten years, global savings have been abundant in relation to investment projects, and this ex-ante imbalance, necessarily corrected ex post, has pushed nominal and real rates to levels close to zero and often negative for real rates. The rise in risks has fueled this configuration, by

encouraging the accumulation of precautionary savings and by discouraging a proportion of investments through a rise in the risk premiums associated with them. It should be added that the implementation of unconventional monetary policies—QE ('quantitative easing')—has accentuated the abundance of liquidity, a significant part of which has swelled household savings and sometimes also those of companies.

In 2023, we are still in this type of configuration. Will it last? Everything will depend on the occurrence of possible systemic shocks, be they health, geopolitical, financial, or other, and on the evolution of macroeconomic aggregates (growth, employment, inflation, etc.). It is impossible to make serious forecasts on all these subjects for the next ten years, or even the next five. While the horizon of the EET is very long term, we are obliged, given the many uncertainties, to navigate by sight and to sketch out scenarios at best. I assume that private savings will remain abundant worldwide over the next five years. As indicated above, this will not prevent interest rates from rising as a result of the return of crowding-out effects and increased competition between different borrowers (public and private), and between different financing needs.

Under this hypothesis, an essential dimension of EET financing lies in this question: how can we attract an increased share of available private savings to green and sustainable finance? Thus posed, the problem seems to be the establishment of the right financing and intermediation channels, of a good 'piping system'. In fact, it is the entire "economic policy system" (an expression borrowed from Jan Tinbergen) that must be mobilized: there is nothing mechanical, nothing taken for granted, and financing channels must be reoriented to be not completely dependent on energy and ecological objectives alone, but compatible with these objectives.

2) The State and the Financing of EET

The State can and must commit itself and its public finances to the financing of EET. This can be done in several ways.

Public expenditure (the State and sub-state authorities) must take charge of green investments with the most uncertain profitability and/or very distant in time. The level of risk and the presence of externalities represent market failures that justify public intervention. It is also a question of favoring public investments in budgetary trade-offs, such as infrastructure spending in the energy sector, with a high leverage effect to mobilize complementary private financing. In a very classical way, the value of the Keynesian multiplier attached to these additional investments will depend on their mode of financing (tax or borrowing). A priori, the greater the share of EET financing directly borne by public budgets, the less developed the country: this is a way of compensating for the weakness of private financing, discouraged by an unattractive risk/return ratio, and of compensating for the almost general absence of sufficiently active and liquid financial markets in the countries of the South. To finance the required infrastructure, public/private partnerships (PPPs) are a tempting option. Experiences with PPPs have produced contrasting results.

This guarantee must be granted under very specific conditions: whether the investments have strong positive externalities and if the social return exceeds the private return, and if the profitability is uncertain but there is a sufficient probability of success, etc. Experience shows that, if properly calibrated, government guarantee schemes can provide new private financing without putting too much pressure on public finances.

Another way to finance the EET is through environmental taxation. The carbon tax, one of the pillars of this taxation, varies as the price of carbon changes. As of August 2022, the price of CO2

ranged from $0.01 in some U.S. states to $125 per metric ton in Sweden and $134 in Uruguay. In practice, there are two types of revenue from the carbon price: the carbon tax and the revenue from the emission trading systems (ETS). For 2021 as a whole and globally, carbon pricing raised $100 billion, of which 70% came from the allowance markets (of this 70%, two-thirds came from the EU ETS), and only 30% from carbon taxes. Compared to the financing required for the ETS, these are modest amounts, especially since, under the widespread budgetary principle of not allocating tax revenues to public spending, not all these sums are targeted to green finance. In order to step up the pace of environmental taxation, there are four key areas of focus: 1). generalize the allowance markets. As of August 2022, only 48 jurisdictions, representing 70% of the world's GDP, had a carbon price (tax or ETS market). 2). Accelerate the upward trend in the price of carbon, to quickly reach $100 per ton in as many jurisdictions as possible. 3). Gradually increase carbon tax rates so that environmental taxation is no longer the poor relation of global taxation. 4). Abandon the principle of not allocating revenues to public expenditure for environmental taxation.

3) The Role of Banks

Most of the investment and financing of EET is long-term. In today's world, are banks long-term investors? The answer mixes factual arguments and regulatory considerations.

First, given the associated risk/return trade-off and their management of liquidity risk, banks may be reluctant to commit to the long term. The Basel III framework, insofar as it is fully applied, does not make banks natural long-term investors because they are required to respect both the short-term liquidity ratio (liquidity coverage ratio) and the long-term liquidity ratio (net stable funding ratio). These prudential rules, introduced in the wake of the financial crisis that began in 2007-2008, basically mean that banks can only finance the long term from long resources, and that their capacity to carry out 'maturity transformation' is now closely supervised. This capacity is not zero, but strictly limited.

To go further and put this regulatory constraint into perspective (a little), I borrow from Jean Boissinot (Banque de France) the distinction to be made, when building infrastructure—more specifically EET infrastructure—between two very distinct phases:

- The infrastructure construction phase, often between five and seven years. At this point, many banks can participate in the financing without contravening the Basel III liquidity rules.

- The infrastructure management phase, which follows the first phase and can extend into the very distant future (as in the case of nuclear power plants, but also of certain renewable energy equipment). Banks are not essentially concerned by this second period.

The problem is therefore to organize a system in which the banks involved in the first phase can withdraw after five to seven years by selling the loans concerned. This implies the existence of mechanisms for refinancing and securitizing the loans. This requirement is easily met in advanced countries, where such mechanisms are in place, even though securitization declined sharply since 2007-2008 and is taking time to recover, even in the most financially sophisticated countries.

However, in emerging or developing countries that have roughly transposed Basel III, the involvement of banks in the financing of EET is complicated by the poverty of bank refinancing mechanisms and the absence of securitization procedures. Will it then be necessary to relax the liquidity rules of Basel III for environmental reasons? The failure of the Californian bank SVB, and then of First Republic Bank, another Californian bank, and the fragility of many American regional banks, precisely for this reason of liquidity, should lead to great caution in this case. As is often

the case, a trade-off will have to be made between financial stability considerations and long-term financing objectives. The preceding reasoning suggests that the terms of this trade-off are not and will not be the same, depending on the level of financial development of the country in question.

A complementary approach would be to create a green savings account for the general public, accessible to all through financial intermediaries (banks, savings banks, insurance companies, post office or postal banks, etc.), benefiting from tax advantages (e.g. tax-free interest), and subject to a ceiling on the amount per person. The decision to set up such a financial instrument is a matter for each country to decide, except perhaps in the EU where there are plans to launch a green financial product at the community level. The sums collected on such a passbook would be entirely recycled into the financing of the EET. Insofar as this would involve long-term financing from short-term savings, it would be necessary to look closely at the extent to which banks and this new financial instrument could accept an exception to the Basel III liquidity rules.

The green savings passbook has the advantage of being open to all, whether wealthy or modest. It may be of interest to developing countries as well as the most advanced countries, since it does not prejudge the existence or not of an active financial market. For many African countries, it would also be a way to mobilize and activate a significant portion of informal savings.

4) Other Financial Operators

In addition to banks, all financial actors are concerned by the financing of the EET, whether they are asset managers, insurance companies, or fintechs.

Asset managers, including the already mentioned meg-operators such as BlackRock, Pimco, and Amundi, are playing a growing role. Of the $9, trillion under management at BlackRock, a growing proportion is invested according to ESG criteria, as is the case with its main competitors. This trend has given rise to a controversy in the United States that sums up the debates that have arisen just about everywhere. Some elected Republicans criticize BlackRock for doing too much in terms of ESG, at the risk of sacrificing returns for investors. Some twenty American states (including Louisiana, Florida, Texas, and Missouri) have reduced their exposure to BlackRock, some for several billion dollars. Conversely, an activist fund such as the British Bluebell Capital denounces the shortcomings of BlackRock (of which it is a very small shareholder) in terms of ESG, its excessive use of ‘green washing’, and its continued direct or indirect investments in fossil fuels.

This American controversy underlines the urgent need for more transparency and standardization of all these extra-financial criteria, since from the same reality—the investment strategy and the performance of BlackRock's SRI funds—totally opposite conclusions are drawn. It raises the broader question of the performance of green and sustainable finance. Should performance be sacrificed for ethics, and is there a trade-off between them? Several empirical studies lead to a nuanced answer: in the short term, funds managed according to ESG criteria have lower returns than traditional funds, but the returns of the two types of management become comparable as soon as one adopts a medium- to long-term horizon. To refine the comparison, we should consider the management fees paid by investors, which are often higher for green funds than for traditional funds, all other things being equal. It would also be necessary to reason about the risk/return relationship at the heart of portfolio theory and to broaden it by working in a three-dimensional space—return/risk/ESG compliance indicator—to better establish this debate on the relationship between return and ethics.

Beyond asset managers, the investment funds at the heart of private equity are already involved in financing the EET, and the trend is expected to accelerate. This is obvious when it comes to

infrastructure funds and impact funds. But alongside these highly focused financial vehicles, traditional investment funds often include an ESG pocket. In the Financial Stability Board's definition, private equity funds are part of shadow banking because they are much less regulated than the banks they compete with in terms of financing. In the EU, these funds belong to the category of alternative investment funds (AIF), regulated by the AIFM Directive. This European directive was conceived in the early 2010s, at a time when the issue of EET was already present but less significant than today. The AIFM Directive will have to be amended fairly quickly to encourage private equity funds to invest in EET.

Insurance companies are by nature long-term investors, like pension funds and other institutional investors. They are therefore destined to play a major role in the financing of the EET. However, it is important that prudential regulations do not discourage them, through excessive capital requirements, from investing in the EET. For EU countries and for those outside the EU that have replicated the European regulation, the Solvency II Directive will have to be corrected on several points. A new weighting system that not only encourages insurance companies to finance the real economy, but more specifically the EET, is the preferred direction and should be the subject of a broad consensus to accelerate the required revision.

As for fintechs, many of them are already directly or indirectly involved in financing the EET. Given their size, which is generally modest, they can only finance well-targeted projects, start-ups immersed in the EET, or participate in the co-financing of larger financial operations. In most countries, specific regulations applicable to fintechs are being put in place. These regulations need to be evaluated and, in some cases, modified to meet the financing objectives of the EET.

5) Financial Markets, Green Bonds, Sustainable Bonds

When asked about the financing of the EET, the president of a major French bank recently replied "capital markets union". If the EU were to move forward with its capital markets union (CMU) project—which unfortunately is not the case—the financial markets of continental Europe would gain in depth and liquidity, and thus in competitiveness relative to U.S. and UK financial markets.

This may be necessary, but it is not sufficient to involve the financial markets in the financing of the EET. It is not enough, because this financing is tied to large, long-term programs, and projects with long time horizons and high degrees of uncertainty about their profitability. The risk premiums associated with such financing are likely to be exorbitant. In the absence of forward markets with such long time horizons and capable of covering such risks for both borrowers and investors, this is a market failure that justifies government intervention to achieve the common good of combating climate change. Through tax incentives, subsidies, and the guarantee schemes mentioned above, governments can broaden the involvement of capital markets in financing the EET. However, the exercise is limited everywhere by the budgetary constraints of governments and the need to rely on market mechanisms even in the long term.

This is hardly an issue for countries with barely emerging financial markets. It is not by considerably extending the horizon of these markets via EET financing that the emergence of such markets will be facilitated; quite the contrary. There are sequences to be respected, and a financial market can only really emerge if it relies on a solid bond compartment (especially on the sovereign-bond side) and on institutional investors able to improve the liquidity of securities on the secondary market.

These prerequisites are far from being met in many countries of the South. In these countries, it will therefore be necessary to rely on public financing, on banking intermediation and on investment funds to implement the EET, not to mention the North/South transfers mentioned at the beginning of this brief.

Green bonds have recently accelerated. In the first quarter of 2023 and globally, issuance of such bonds reached $164 billion, 30% more than during the same period in 2022. For the whole of 2023, issuance could approach $600 billion. This is a groundswell of activity that goes beyond the post-COVID-19 catch-up effect. The green bond (GB) market attracts both private and sovereign issuers. Since the beginning of 2023, there has been a rise in euro-denominated issues, and a decline in dollar-denominated GB issues in the wake of the outcry from certain U.S. states against ESG management. The maturity of UK bonds varies greatly from one issuer to another. Since the beginning of this year, the EU has issued 25-year GBs, Italy 8 years, the U.S. firm Comcast 10 years, etc. The success of the GB calls for more transparency for investors. Here we find the demand for reliable regulation and standardization of financial instruments.

The same requirement for transparency and standardization applies to sustainability-linked bonds (SLBs). The purpose of SLBs is related to ESG criteria; it is therefore broader than that of GBs, but the two categories of security are complementary. The innovation of SLBs is to introduce indicators of achievement of one or other of the ESG criteria, with a coupon paid by the issuer indexed to the degree to which these indicators are achieved.

As we can see, financial innovation is once again limitless. This is as true for EET financing as for anything else. At this point, this rapidly growing finance sector needs transparency and standardization. Given the current weakness of global governance, I do not believe that there will be a global standardization of green finance within the next five years (or beyond that, we will see).

Even if the fight against green washing concerns all countries, whatever their level of development, it is better at this stage, to favor a regional approach to standardized green finance, by seeking convergence in, for example, the African Union, and in the EU. Pragmatism must prevail in this case over ideology. Easy to say, difficult to make prevail, if we refer for example to the debate raised by the publication by seven NGOs of the Banking on Climate Chaos Report in May 2023. This report denounced the persistent involvement of the major banks in financing fossil fuels. The banks themselves are critical of the methodology used in the report and the conclusions put forward. As is often the case, the truth lies halfway between the two opposing theses.

The European experience, which is rather advanced in this field, shows the extent of the challenges to be met. As already mentioned, it took several years to reach an agreement, undoubtedly fragile, on the European taxonomy, in particular on the inclusion of nuclear and gas in green energy alongside renewable energies. Regulatory trial and error is probably inevitable. By classifying funds according to demanding but not very operational criteria, the European Sustainable Finance Disclosure Regulation (SFDR) has had the effect of turning managers away from 'super-green' funds (those covered by Article 9 of the regulation), which are considered too restrictive. Surveys show that many of these green or even super-green funds do not deserve such labels in light of their asset portfolios.

Green finance is in full bloom, which is a good thing given the amount of financing to be mobilized. It has reached a stage where it needs stabilization and standardization. Self-regulation is necessary, but it is not and will not be sufficient. Because the primary task of financial regulators is to ensure both the transparency of financial information and the protection of savers and investors, it is their duty to find, if possible, on a supranational scale, the right mix of carrot and stick, between incentives and binding standards. For green and sustainable finance, as for the rest of finance, innovation is ahead of regulation. There is no point in trying to reverse this sequence, but it is desirable to reduce the reaction time of regulation by doing so through the broadest possible international cooperation, since the climate has become our essential common good.

IN CONCLUSION, SOME RECOMMENDATIONS

The preceding analysis suggests several recommendations:

1. In the very short term, it is essential that the June 2023 summit in Paris, in preparation for the COP28 in December 2023, results in concrete proposals, and not just fine intentions, on two major subjects of EET financing: to make the IMF, the World Bank, and the other multilateral development banks evolve in a direction more favorable to this financing; to attract more private capital to make the EET a success by maximizing the leverage effects created by public capital;

2. To achieve the financing required for the EET by 2030, with a view to 2050, a wide range of financial instruments will have to be mobilized. Advanced countries must combine intermediated and market financing, while Southern countries will have to rely mainly on intermediated financing, because of the lack of sufficiently active financial markets. The various financial instruments are and will be complementary rather than competing, given the abundance of private savings in the world;

3. In all countries, whatever their level of development, it is necessary to consider, if it does not already exist, creating a 'green' passbook accessible to all households through banks, post offices, insurance companies, etc. This would be an account benefiting from tax advantages and, therefore, subject to a ceiling per saver;

4. The prudential regulations applied to banks (Basel III) and insurance companies (Solvency II in the EU and in many countries in the EU's neighborhood) will have to be updated to integrate certain objectives and constraints of EET financing. There is no regulatory revolution here, but some prudential rules have been adapted to better serve green finance without sacrificing the objective of financial stability;

5. States must continue to be involved in the financing of the EET, giving preference to formulas that are not too costly in terms of public expenditure: tax incentives rather than direct subsidies, State guarantee mechanisms (and in some cases, local authorities) rather than gross public financing, public/private co-financing, giving priority to State interventions with a strong knock-on effect and leverage on private contributions;

6. The commitment to transfer $100 billion per year from advanced countries to Southern countries, in order to help the latter finance their EETs, must be scrupulously respected;

7. Green finance and sustainable finance, at the current stage of their development, need transparency, standardization, and regulation. In the absence of international coordination on these subjects, the national framework must be accepted as second-best or even third best. Given the state of global governance, it would be naive to expect convergence soon on extra-financial issues at the G7, the G20, etc... We should rather count on regional convergences, in the EU, in the AU, in Asia, in NAFTA, or Mercosur, and not hesitate to rely on the rapid rise of extra-financial rating agencies, on the desirable integration, and moreover observed, of financial and extra-financial ratings.

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Professor de Boissieu was Chair of the Council of Economic Advisers which advises the French Prime Minister (2003-2012). He has also advised several foreign governments. For example, he has run several TACIS program missions in Russia during the transition period. Since 1984, he has worked extensively in and on North-African and Sub-Saharan countries. Moreover, Professor de Boissieu has also developed links with the corporate sector. He is currently member of the board of SUNU Holding (insurance companies in Sub-Saharan countries) and of Lloyd (Tunis). He is also chairing the Stakeholders Committee of ENEDIS (electricity distribution, France).

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