

Is the Environment the Key to Tax Reform?

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An ambitious environmental tax policy must be part of a broader reform that addresses several problems simultaneously: the equity and progressivity of the tax system, reducing social security withholdings, pension finance, and paying down the debt.

Among the challenges currently before us, one of the most important is unquestionably the pressure that human activities place on the environment, of which climate change is among the most conspicuous manifestations. Despite the economic crisis—or perhaps because of it—it is essential to respond to this challenge as soon as possible. Indeed, the Stern Report (2006)¹ has demonstrated that the costs of intervention will continue to increase the longer it takes for adequate measures to be adopted.

What, then, are the most suitable economic tools for effectively fighting climate change? The creation at the European level of a market for tradable emission permits has met with much criticism, notably the charge that large companies in the most affected sectors (energy, automobiles, cement making, etc.) successfully lobbied to increase the number of freely distributed quotas. Because too many quotas were made available during the initial stage,² gas prices were too low to create the long-term incentives required to meet the Kyoto Protocol's goals (see the **sidebar**). The failure of this market-based approach provides new arguments to the proponents of environmental taxation, even in the United States, which is known for its aversion to tax increases. For instance, in an open letter to Barack Obama on the eve of his inauguration, James Hansen,³ noting the failure of market-based attempts to restrict CO₂ emissions, recommended the creation of a universal carbon tax, the revenue of which would be redistributed on a **lump-sum basis**, while taking into account each household's income and ecological

¹ N. Stern, *The Economics of Climate Change – The Stern Review*, Cambridge University Press, 2006.

² The European market for emissions permits consisted of an initial, exploratory phase from 2005 to 2008, followed by a second phase for the period covered under the Kyoto Protocol (2008-2012).

³ James Hansen, a professor at Columbia University's Earth Institute and director of NASA's Goddard Institute for Space Studies, is one of the world's most eminent climatologists.

footprint. Following the Scandinavian example, France in 2010 also attempted to establish a carbon tax of 17€ per ton of carbon dioxide. Ultimately, faced with the hostility of public opinion as well as practical and legislative difficulties, the government chose to postpone the measure in anticipation of a policy decision at the European level. While the debate remains open, the issue has now been passed onto the European Union.⁴

All pollution (including greenhouse gas emissions) is a negative externality, in the sense that it admits a distinction between an activity's private costs and its social costs, since polluters may not spontaneously consider the damages—or external costs—they inflict on pollution's victims. The internalization of these externalities consists in compelling polluters to take these damages into account by changing the behavior that causes these externalities, while at the same time giving economic actors maximum leeway in finding their own strategies for reducing pollution at the lowest possible cost. The economic tools that allow such internalization to occur generally fall into two major categories: price regulations (i.e., taxes or subsidies) and quantity regulations (notably emission quotas).⁵

The creation of a market for tradable emission permits requires setting an overall pollution cap, that is, the total number of emission permits to be used and exchanged over a year, which is typically defined with reference to a base year. Permits (for example, a permit to emit a ton of carbon dioxide) might initially be distributed through an auction or gratis, usually on the basis of prior emissions (a system known in English-speaking countries as “grandfathering”).

Faced with emissions restraints (through the implementation of a policy seeking to reduce overall emissions), polluters must compare the cost of reducing each additional unit of pollution (the marginal cost of pollution reduction) with the cost of purchasing additional emission permits (the permit's price). As long as the marginal reduction cost is less than the permit's price, polluters will choose to reduce emissions (for instance, by using clean technology) rather than buy a permit. In a polluter's economic calculations, a permit's market price is thus the equivalent of a tax rate. The greater the number of quotas distributed, the greater the supply of permits on the market, which automatically brings down their price (in this way, to each production technology there corresponds a particular demand for permits), consistent with the law of supply and demand. The weaker the market price, however, the less incentive companies have to invest in the development of new and less polluting technologies.

The system for the initial distribution of the permits has no effect on their market prices, but only on company profits: their profits are lesser when they must buy them at an auction than when they are distributed for free.

⁴ The political challenges raised by a European project of this kind may be very great indeed. Consider, for instance, the European Parliament's negative assessment (of April 19, 2012) of a proposal by the European Commission to tax energy products and electricity on the basis of their energy content and carbon dioxide emissions. This plan would have notably increased the price of gas in France and Germany. The parliament's opinion is, of course, non-binding; but it does not bode well, given that, in tax matters, the unanimous agreement of the EU's 27 members states is required.

⁵ O. Beaumais and M. Chiroleu-Assouline [2002], *Économie de l'environnement*, Bréal, Paris.

We nevertheless defend the idea that the creation of a carbon tax is indispensable to shaping behavior and encouraging more sober energy consumption habits,⁶ and that it could, moreover, be a useful tool for comprehensively reforming the French tax system. Far from constituting an additional expense for all taxpayers, which for some might even be unbearable, a carbon tax could, paradoxically, through the targeted recycling of tax revenue (in other words, the use of revenue thus generated to reduce other tax rates and to finance specific expenses) create the flexibility required to bring about greater fiscal equality.

“Greening” Taxation and the Double Dividend

In theory, the carbon tax, like the market in tradable emission permits, should make it possible to improve environmental quality while minimizing economic costs. Furthermore, it should be able to generate public revenue that can be redistributed. This is one reason why the carbon tax is preferable to subsidies or the distribution of free emissions quotas. It has been argued that if the state used this revenue to reduce other distorting taxes,⁷ an environmental tax could improve environmental quality (the environmental dividend) and reduce existing tax distortion (the tax efficiency dividend). This is the so-called “double dividend,”⁸ as Goulder (1995) has defined it.⁹ It provides a compelling argument for the “greening” of taxation, that is, increasing the share of tax revenue generated through environmental taxes, even if the double dividend alone is not a sufficient basis for a policy of reducing greenhouse gas emissions.

The double dividend is the subject of an abundant literature and the question it raises remains, given the economic crisis, highly relevant to our times: can one establish an environmentally-oriented tax reform without threatening economic wellbeing (beyond improvements resulting from greater environmental quality)?

A necessary condition for reaping the double dividend is that the initial tax system be Laffer efficient,¹⁰ so that an increase in environmental taxes can be offset by a decrease in tax rates on work, an outcome that is not always guaranteed. Such efficiency depends on the elasticity of each tax base to its tax rate, and specifically to the relative strength of tax base effects and rate

⁶ K. Schubert, *Pour une taxe carbone!*, Editions ENS, 2009.

⁷ *Tax distortion* occurs when the revenue that a tax generates for the state is inferior to its cost to taxpayers. Only **flat-rate taxes** create no distortion.

⁸ In very general terms, the *double dividend* can be defined as the possibility of having, in addition to an improved environment (the first dividend), an improved economy (the second dividend), measured, for example, in terms of a return to growth or improvement in employment rates. From a theoretical point of view, the most fitting definition is given by Goulder, as it encompasses all the others: social wellbeing is diminished by the existence of tax distortions and its improvement can take the form of stronger growth, lower unemployment, etc.

⁹ L. H. Goulder, “Environmental Taxation and the ‘Double Dividend’: A Reader’s Guide,” *International Tax and Public Finance*, 2, 1995, pp. 157-183.

¹⁰ A tax is Laffer-efficient if an increase in its rate leads to an increase in revenue (in other words, if the resulting contraction of its base does not overcompensate a rate increase’s revenue effects).

effects.¹¹ If one of these taxes (i.e., on work or carbon) is not Laffer-efficient, the double dividend cannot be reaped as, rather than reducing existing tax distortion, tax reform will exacerbate it. In France, taxes at their current rates are all Laffer-efficient. The necessary conditions for reform thus obtain.

Chart 1: Structure of Obligatory Withholdings Related to Work and to the Environment in European Countries (EU15) in 2006¹²

[Chart]

Source: OECD (2008), *Revenue Statistics 1965-2007*.

How much flexibility do European countries have? The revenue they receive from existing environmental taxes is slight compared to social welfare contributions (from employees and employers) and income taxes (see chart 1). In Europe (except for the United Kingdom), taxes on work are recognized as a major source of distortion. We define a tax system's change potential ratio as the ratio between environmental tax revenue and revenue from work-related withholdings (i.e., income tax and social security withholdings). For the EU-15 countries, this ratio is on average 13.5%. By this standard, the Netherlands, Ireland, and Denmark have the "greenest" tax systems in Europe (see chart 2), as they have already replaced a significant share of their tax revenue with revenue from environmental taxation. In contrast, Belgium, France, and, surprisingly, Sweden have tax systems that are the least green. Consequently, they have better opportunities than other countries to use environmental taxes to lighten the fiscal burden on work and to curtail the loss of wellbeing resulting from the current tax system's inefficiencies.

Chart 2: Change Potential Ratio

[Chart]

Source: OECD (2008), *Revenue Statistics 1965-2007*.

Even so, one of the arguments frequently leveled against environmental taxes is that they are regressive and hit poorest budgets the hardest. Consequently, this makes it necessary, when

¹¹ Any increase in tax rates has two effects: all other things being equal, it increases tax revenue (the tax rate effect); however, by increasing the value of taxed goods, it triggers substitution effects with other goods and reduces the tax's base (the tax base effect). If the tax base is highly sensitive (or elastic) to the tax rate, and if the tax base effect is greater than the tax rate effect, a tax rate increase will ultimately result in declining revenue (i.e., inefficiency in Laffer's sense).

¹² In this chart, the sum of all obligatory withholdings considered is not equal to 100% because we have chosen, in the interest of simplification, to not include VAT, corporate taxes, and other taxes the bases of which are not strictly related to work and the environment.

analyzing opportunities for establishing a carbon tax, to adopt a more suitable method than the straightforward holistic approach that is typically used.

The Unequal Distribution of Environmental Policy's Costs and Benefits

While the net macroeconomic benefits resulting from the implementation of an environmental policy suggest that the overall gains for society exceed the losses, the same does not hold true for each member of society considered individually. Some sectors of society may bear higher costs resulting from environmental measures than others and may even be harmed by them, even in instances where, at the macroeconomic level, a double dividend clearly exists. Attention to environmental justice is important for at least two reasons. The first is ethical, the second pragmatic. The ethical dimension involves the compatibility of norms for cost distribution with the benefits of social justice. The political goal of social justice is an appropriate complement to economic efficiency. The pragmatic dimension arises from the relationship between the unequal effects of distributing a policy's costs and the likelihood that environmental reform will be adopted through a democratic process. Indeed, when the public considers a planned policy to be unjust, it has little chance of being accepted, even if it is likely to result in greater efficiency and sustainability.

Norms of social justice are neither sufficiently well-defined nor agreed upon to withstand criticism. Even so, there exist mechanisms that allow us to approach *a* conception of social justice when evaluating public policy: in particular, the concepts of horizontal and vertical equity.

Horizontal equity exists when two agents with the identical resources incur the same costs for a policy. In environmental policy, the criterion of horizontal equity is satisfied if individuals with identical incomes obtain the same net benefits. Vertical equity is concerned with inequality and thus with situations in which individuals with different resources are simultaneously affected by the same policy. Evaluating the distribution of net benefits makes it possible to classify policies into three groups: progressive, regressive, and proportional. A regressive policy exists when the ratio of net benefits to income increases with an individual's income. A regressive policy does not obey the criteria of vertical equity.

The equity argument merits attentive study as a way of measuring the carbon tax's unequal consequences and devising proposals for offsetting its negative effects, thus ensuring that fighting climate change does not create more inequality.

Indeed, Goulder (1995)¹³ and Lighthart (1998)¹⁴ have demonstrated that the double dividend depends fundamentally on shifting the overall tax burden from salaried work to other fixed

¹³ See above.

production factors, such as capital, or to different kinds of households (like the unemployed and retirees). Their work already emphasized the importance of a diversity of economic actors.

Yet, rather surprisingly, while the literature has thoroughly examined the question of the double dividend's feasibility, it has until now neglected the issue of the distribution of its benefits, despite the fact that gains in overall wellbeing can only occur at the expense of particular groups. It is well known that the costs and benefits of environmental policy are unequally distributed. The rich and the poor do not give the same priority to protecting the environment, whatever the specific threats it faces might be (Baumol and Oates, 1988)¹⁵. The rich are generally willing to pay more for environmental quality.

Moreover, the costs of any tax policy aimed at environmental protection are likely to be unequally distributed across income levels. Based on existing studies of indirect taxation's regressive character, it can be inferred that any environmental tax policy is likely to be regressive. In France, taxes on energy and gas purchases hit the lowest income decile three times as hard as the top decile (Ruiz Trannoy, 2008).¹⁶ Bureau's study (2011),¹⁷ which measures the regressivity of French gas taxes before revenue is recycled, confirms this finding.

Similarly, in the case of Denmark, which created a major CO₂ tax that corresponds to 10% of its total tax revenue, Wier et al (2008)¹⁸ have demonstrated that this tax does indeed have regressive effects. These are even greater if one considers the costs that companies pass onto households. Furthermore, the ways in which revenue from environmental taxes is typically recycled can exacerbate their regressive properties (Metcalf, 1999).¹⁹ This question is obviously critical, as tax policies designed to reduce greenhouse gases and other forms of pollution would be opposed if it could be proved that they only increase inequality.

Ekins and Dresner (2004)²⁰ show how in Britain it would be impossible to completely counterbalance the carbon tax's regressive effects through various redistributive mechanisms (the common denominator of which is that they occur **at a flat rate**): notably, the diversity of energy consumption within a particular income decile is such that even if a comprehensive

¹⁴ J.E. Ligthart, "The Macroeconomic Effects of Environmental Taxes: A Closer Look at the Feasibility of Win-Win Outcomes," *Working Paper of the International Monetary Fund, Washington*, 1998.

¹⁵ W. J. Baumol and W. E. Oates, *The Theory of Environmental Policy*, Cambridge University Press, 2nd edition, 1988.

¹⁶ N. Ruiz and A. Trannoy, "Le caractère régressif des taxes indirectes: les enseignements d'un modèle de microsimulation," *Economie et Statistique* 413, 2008, pp. 21-46.

¹⁷ B. Bureau, "Distributional Effects of a Carbon Tax on Car Fuels in France," *Energy Economics*, vol. 33, 2011, pp. 121-130.

¹⁸ M. Wier, K. Birr-Pedersen, H. K. Jacobsen, and J. Klok, "Are CO₂ Taxes Regressive? Evidence from the Danish Experience," *Ecological Economics* 52:2, 2005, pp. 239-251.

¹⁹ G. E. Metcalf, "A Distributional Analysis of Green Tax Reforms," *National Tax Journal* 52:4, 1999, pp. 655-682.

²⁰ P. Ekins and S. Dresner, *Green Taxes and Charges – Reducing their Impact on Low-Income Households*, Joseph Rowntree Foundation, 2004.

reform, including a carbon tax and compensatory mechanisms, saved most of the lowest income decile from energy insecurity, around 20% of this decile would nonetheless find itself in a worse situation. The authors conclude, consequently, that a carbon tax is at best politically problematic and, at worse—and most likely—politically impossible.

Meanwhile, a number of empirical studies from a range of disciplines (the life sciences, medicine, etc.) have, in recent years, brought to light the close connection between increasing pollution and declining personal health. Among environmental policy's benefits, it now seems established that we must include worker productivity. Specifically, we need to study the social inequalities arising from environmental degradation and their macroeconomic consequences. Though empirical studies of the distribution of the benefits of environmental policy across economic actors are old and imprecise (Christiansen and Titienberg, 1985²¹; Harrison, 1994²²; Peskins, 1978²³), this issue is becoming a major political and environmental concern. For instance, the primary goal of the second national health-and-environment plan (2009-2012) is the reduction of environmental inequality, particularly inequalities in the **ability to act** (i.e., social inequality). This plan was inspired by the National Strategy for Sustainable Development adopted in June 2003, while also incorporating some of the commitments made within the framework of the French environment summits.²⁴ Yet while work of this kind has already been undertaken, the influence of environmental exposure on social inequality remains a domain that is largely unexplored. The results of such studies should make it easier to identify the net gains from environmental policies and would most likely refute the argument that environmental taxes are unequal.

So is it possible to create an environmental tax policy that would not undermine the wellbeing of any population segment? Having considered the standard literature on the double dividend, which examines the simultaneous pursuit of two goals—the improvement of environmental quality by creating or raising environmental taxes (i.e., the first dividend) and the increase in social wellbeing resulting from less distortion in the tax system as a whole (i.e., the second dividend)—we must now consider a third goal: the non-exacerbation of inequalities, and even the struggle against inequality.

A Definition of Non-Regressive Fiscal “Greening”

²¹ G. B. Christiansen and T.H. Titienberg, “Distributional and Macroeconomic Aspects of Environmental Policy,” in A. Kneese and J. Sweeney, eds., *Handbook of Natural Resource and Energy Economics*, Amsterdam, 1985.

²² D. Jr. Harrison, *The Distributive Effects of Economic Instruments for Environmental Policy*, Paris, OECD, 1994.

²³ H. Peskins, “Environmental Policy and the Distribution of Benefits and Costs,” in R. Portney, ed., *Current Issues in U.S. Environmental Policy*, Johns Hopkins University Press for Resources for the Future, 1978.

²⁴ These summits, or “Grenelle de l’environnement,” were organized by the French government in 2007 to set long-term goal for improving the environment and sustainable development.

Several recent contributions incorporate these viewpoints. An empirical study by CIRED (Hourcade et al, 2010)²⁵ evaluated, with the help of a static computable general equilibrium model (Imaclim-S), the macroeconomic consequences for France of establishing a carbon tax (in which the rate varied between 40€ and 200€/tCO₂), offset by various forms of revenue recycling, including lower payroll taxes and uniform redistribution to households. The primary conclusions pertain to the evolution of environmental quality and its redistributive effects. The kind of recycling has only a weak impact on environmental quality (the first dividend). Compensation through cutting payroll taxes and a system of uniform redistribution to households has, however, opposite macroeconomic and income distribution effects. The greatest gains are achieved through cutting payroll taxes, but this approach is highly regressive. On the contrary, the impact of a uniform, **flat-rate** distribution of tax products is highly progressive. These results are consistent with the double dividend: no efficiency benefit can be expected from a **flat-rate** distribution, unlike the recycling of tax revenue through a reduction in distorting tax rates. This situation reminds us of the unavoidable choice that must be made between equity (by controlling distributive consequences) and efficiency (i.e., macroeconomic gains).

In a theoretical article, we have tried (Chiroleu-Assouline and Fodha, 2011)²⁶ to reconcile the double dividend's goals with equitable criteria. This makes it possible to go beyond the literature's usual results, in which the second dividend is achieved only at the expense of particular groups, which must bear the brunt of the tax's burden. Our work, by considering the economic actors' properties of longitudinal and transverse heterogeneity, proposes a criterion of unanimity for this tax measure (Pareto-improvement). In this way, governments will pursue three goals: environmental quality, economic efficiency (i.e., macroeconomic gains), and Pareto-improvement. This threefold goal requires three tools: an environmental tax, a tax on salaries, and an index of fiscal progressivity.

Specifically, we have demonstrated, first, that an increase in the environmental tax rate undermines general wellbeing and is regressive, but most importantly that, for workers with the lowest incomes, the best option is environmental tax reform offset by **across-the-board** cuts in the income tax rate (i.e., a cut in the lowest marginal rate), while for higher income groups, a decrease in the progressivity index is more beneficial.

Next, we show that the redistributive properties of income taxes can correct the social distortion resulting from environmental tax policies. Non-regressive tax reform thus consists in establishing a carbon tax the revenue of which would be recycled through a non-linear income tax cut. This recycling depends on a careful combination of variations in the rate of the lowest income tax

²⁵ J.C. Hourcade, F. Gherzi, and E. Combet, "Taxe carbone, une mesure socialement régressive ? Vrais problèmes et faux débats," *Revue française d'économie*, 25:2, 2010, pp. 59-91.

²⁶ M. Chiroleu-Assouline and M. Fodha, "Environmental Tax and the Distribution of Income among Heterogeneous Workers," *Annales d'Economie et de Statistique* 103-104, 2011, pp. 71-92.

bracket (which will benefit all economic actors²⁷) and an increase in the rate of upper brackets (the cost of which will be paid by higher income groups). This mechanism makes it possible to compensate for the carbon tax's regressive character.

Chart 3: Progressivity of Social and Fiscal Systems

[Chart]

Source: OECD (2008), *Revenue Statistics 1965-2007*.

Using the tax system's progressivity as a way of gaining more flexibility and making such reforms painless for all income deciles is, however, no guarantee that the kind of diversity that Ekin and Dresner (2004) have brought to light will be eliminated, particularly within the first decile. Doing so would require further specific measures (such as targeted, income-based assistance for replacing coal-fired boilers in northern households).

Our work also calls attention to the difference between economic efficiency and vertical equity and illustrates the problem of aggregating gains and losses in wellbeing by economic category: the usual aggregation methods gives greater weight to wealthier categories in calculating aggregate gains and losses in wellbeing and is biased in its assessment of whether environmental tax reforms are desirable or acceptable.

As our results are dependent on the extent to which taxes on work are initially progressive, the efficiency of such policies will be inversely proportional to the initial system's progressivity. As chart 3 shows, Germany, France, and Denmark typically have the least progressive tax systems, meaning that these countries have the most to gain from tax reform mixing a significant increase in progressivity and major cuts in the lowest marginal rates.

Conclusion

In France, the debate on environmental taxation appears to have ended with the demise of the Fillon government's plan. As a result of pressures arising from the economic crisis, the debate has extended to the entire fiscal system, from the public debt to the financing of retirement pensions. If, however, one considers the long-term costs of the aging of the French population in conjunction with the potential benefits of more demanding environmental regulation, it would seem particularly appropriate to pursue an ambitious tax reform encompassing environmental taxation as well as income taxes, social security withholdings, and pension financing.

This kind of flexibility is found in almost all European countries, but reform at the European level cannot be contemplated, as consensus would be required for any fiscal decision. A

²⁷ For households not subject to the income tax, a rate cut is in effect a subsidy.

pronounced “greening” of tax policy would, however, facilitate far more comprehensive tax reform in France by creating an opportunity to address simultaneously the problems with which political decision-makers repeatedly grapple: the equity and progressivity of the tax system, reducing social security withholdings, pension finance, and paying down the debt.

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