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Policies to Support Biofuels in Europe: The Changing Landscape of Instruments

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Until 2008/2009, biofuels were considered among the best alternatives to oil consumption in a captive market such as transport fuels. Improvement of security of supply through partial substitution of imported oil, reduction of GHG emissions, improvement of income, and employment in the agricultural and rural sectors were quoted as the main drivers of the promotion of biofuels in Europe, as well as in the United States and Brazil. In the European Union, biofuels policy was supported mainly through Directive 2003/30. This article deals with the biofuel experience in Europe, providing a general analysis of the 2003/30 Directive. It includes an evaluation of the difficulties experienced in satisfying the requested targets, plus an assessment of the member states’ policies to support biofuels. Social and political consensus about biofuels decreased sharply when their ability to strongly decrease overall GHG emissions was questioned, and mainly when they were blamed of being responsible for the 2007-2008 food-price increase. Finally, a new Directive was approved on April 23rd, 2009, including the request for various certifications to prove the environmental sustainability of biofuels.

Key words: greenhouse gas emissions, land-use changes, biofuels, EU policy.

Introduction

In the EU-27, national policies supporting biofuels seem to be continuously changing. The first reason for this wave of changes stems from efficiency concerns. In previous years—say, up to 2007—the main objective of biofuel policies was to trigger both domestic production and consumption in the member countries through measures of fiscal stimulus and incentives (Directive 2003/30, shown in the next section). These policies occurred when the biofuel option seemed not to face heavy obstacles; with the exception of land (and therefore output availability), the policies were aimed both at increasing domestic surface suitable for producing biofuels and at providing them with outlets for consumption. With these policies, a new specific biofuel industry came into operation, usually coming from already existing branches of the agro-industry. However, in 2006/2007, some doubts about the environmental sustainability and climatic advantages of biofuels began to spread (Crutzen, Mosier, Smith, & Winiwarter, 2007), which opened the door for the criticisms of Kutas, Lindberg, and Steenblick (2007). Kutas et al. emphasized the role of cost inefficiency; according to their evaluations, biofuel policies were too expensive for the national budgets of the member states if we take into account the scarce gains that biofuels could grant in terms of sustainability and the reduced amount of overall energy they could provide. This cost inefficiency brought about profound changes in the policies adopted by member states (discussed in the third section of this article), going from tax exemptions to mandates to blend, which had no direct cost for the national budgets. The majority of this article consists of an in-depth assessment of such measures.

In 2008-2009, the European biofuel policy lost an even larger share of consensus in Europe. In my opinion, this was due mainly to the presumed responsibility of biofuels to boost world food prices; according to the well-known World Bank economist Mitchell (2008), biofuels were supposed to be responsible for 75% of the increase in food prices. Statistic assessments have only recently paved the way for an explanation, by emphasizing the role of financial speculation (Robles, Torero, & von Braun, 2009).

At present it is unclear if first generation biofuels will continue for a long time to represent the major share of the supply—even in the presence of certifications that they meet the required environmental and biodiversity criteria—or if they will be supplanted as soon as possible by second- or third-generation biofuels (algae). Even before such a substitution occurs, the supply of first-generation biofuels should disappear. It is possible that, as firms differ if they operate in the first- or second-generation value chain (Lanzini & Ninni, 2009), this could cause a sort of Schumpeterian "cre-

Table 1. Arable land with energy crops: Areas involved (mio ha) and percentage shares.

	2005	%	2006	%	2007	%
Set-aside	0.9	29.0	1.0	27.0	1.0	30.3
Energy crop aid	0.6	19.4	1.3	35.1	2.8	63.6
Areas with no support	1.3	51.6	1.4	37.9	0.2	6.1
Total	**3.1**	**100**	**3.7**	**100**	**4.0**	**100**

Source: Directorate General for Agriculture and Rural Development (DG AGRI; European Commission, n.d.)
Some caveat in the comparisons, as 2005 and 2006 refer to EU-25, while 2007 figures refer to EU-27. The trend, however, is not affected by these changes.

ative destruction" or, more plainly, a new mixture within the biofuel industry.

It should be noted that an improvement in the economic competitiveness of biofuels with respect to oil products was for many years claimed attainable given the higher oil prices.[1] The experience of 2007-2008, when both oil prices and agricultural products (including feedstock prices) rocketed, radically changed this perspective; the competitiveness of biofuels with respect to oil products will increase when production costs of biofuels decrease strongly and not when the oil price increases. There is an asymmetry: the former trend has only a weak effect on oil prices, while the latter affects feedstock prices in a substantial way.

In any case, as long as their production costs remain higher than those of oil products, biofuels of each generation will need policies to support them. This article shows how these policies have been changing in recent years, mainly because of their cost to the public budget.

Main Features of Recent EU Policy to Promote Biofuels

Until April 2009, the biofuel strategy in the European Union (EU) was set out in Directive 2003/30,[2] which was on the promotion of the use of biofuels or other renewable fuels for transport. This directive posed indicative, not mandatory, targets for all member states (MS), of 2% and 5.75% to be reached by December 31, 2005, and December 31, 2010, respectively, "calculated on the basis of energy content, of all petrol and diesel for transport purposes placed on their markets" (European Parliament, Article 3, p. 45).

However the shares achieved for the EU as a whole turned out to be far lower: only 1.02% in 2005 and 2.58% in 2007, so it is generally agreed that the 2010 target is very unlikely to be met.

Furthermore, only three countries—Germany, Austria, and Sweden—met the targets in 2005 and, according to the latest figures, in 2007 only five countries went beyond the 3% share in 2007: Germany,[3] Austria, France, Lithuania, and Sweden. Only very few countries adopted real policies to meet the targets.

Furthermore, the growth in EU consumption involved a reduction in EU self-sufficiency, as it was caused by an increase in imports far higher than the increase in production. This was due to two known weak points in the European context, namely

- the small quantity of arable land and
- the difficulties in finding areas without competing with food.

The expansion in EU domestic biofuel production was in fact due mainly to two factors: the set-aside areas (a heritage of the Common Agricultural Policy [CAP]) and the energy crop aid, an instrument which was devised at the time of the directive (EU Member States, 2003). These two instruments were the basic devices for the expansion in the production of feedstocks (Table 1).

It should be noted that these instruments cannot go on working in the future; on the basis of the health check of the CAP as of November 2008, instruments

1. *Past literature on biofuels was full of assertions such as: these kinds of biofuels will become competitive when the oil price reaches $120 a barrel.*
2. *A link to the directive, provided in multiple languages, can be found at http://ec.europa.eu/energy/renewables/biofuels/ms_reports_dir_2003_30_en.htm.*
3. *The German case is straightforward. In 2007, the German share was 7.35%, and it consumed roughly half of all biofuels consumed in the EU. However, in the absence of current, official figures for the whole EU consumption of biofuels in 2008, it is unfortunate that in Germany the domestic consumption decreased in 2008 by 16 % from the previous year. Nevertheless, according to the estimates of the European Biodiesel Board, the whole EU production of biodiesel increased by 35% from the previous year due to a strong increase in production in France and other EU states.*

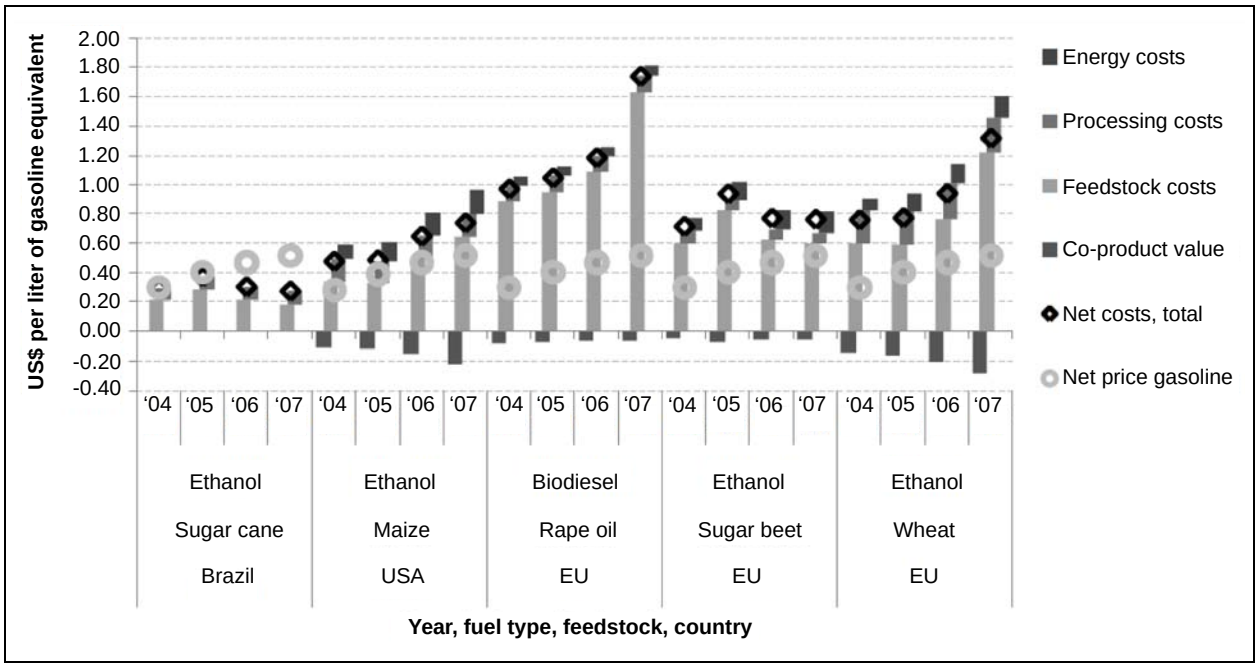

Figure 1. Costs of various biofuels, according to their feedstocks.
Source: OECD (2008). Data from Aglink-Cosimo Database, compiled using data from LMC International, Ltd. and other sources.

like the set-aside areas and the energy crops have been frozen and should be abolished.

Abandoning the two main practical instruments used to provide feedstocks domestically is among the most relevant signs of the deep change in European policy for (first-generation) biofuels. The most important proof of this change was the new framework of Directive 2009/82/EC of April 29, 2009, which was on the promotion of the use of energy from renewable sources.

One of the main factors that most jeopardized the EU biofuels strategy (causing a profound change) was the statement that the EU biofuels policy was expensive, especially considering its (questionable) benefits. The first and most important assessment of the cost of the EU policy was the one by Kutas et al. (2007), followed by the Organisation for Economic Cooperation and Development (OECD, 2008). I will come back to the assessment of the cost of biofuels in the last part of the article.

EU Policies to Support Biofuels

A short—but very recent—image of the varying costs of different biofuels in different periods in various parts of the world can be appraised in Figure 1, which was taken from an OECD report (2008).

This figure gives us a lot of information.

- Brazilian ethanol from sugar cane remains the most competitive biofuel. The main reasons for its competitiveness and its status stem from its low feedstock cost and from the fact that sugar was not affected by the food price rise of 2007-2008. Another reason for the competitiveness of Brazilian ethanol is that its raw material covers all the expenses of the whole production cycle of the ethanol, including transport.
- As the figures are in US dollars, it is not correct to make comparisons between the US- and Euro-evaluated fuels (also because, except in 2007, there has been no trade in biofuels between the US and Europe).
- Within the EU, the growth in feedstock costs involves a continuous growth in biofuel prices at higher and higher levels compared with gasoline. This increasing trend does not affect EU ethanol from sugar beet, due to stagnation of the sugar price on the international markets.
- The absolute value of co-products—which can be considered a negative item for the price of biofuels as they can be sold in other, non-energy markets—increased because of the feedstock price increase; however, it decreased in relative terms with respect to the whole price of the single biofuel.

- EU biodiesel (from rapeseed oil) proves itself again to be the most expensive biofuel.

Figure 1 confirms that, in the absence of policies to support biofuels, the industry cannot develop in a spontaneous way, as the costs of production of the various kinds of biofuels are higher than those of the fossil fuels they are replacing, with Brazilian ethanol made from sugarcane being the only exception.

The recent crisis has taught us that this remains true even when oil prices soar to more than $130/bbl, as prices of feedstocks also increase; this is one of the most important truths learned after the 2007/08 crisis.

Of course not every non-competitive production in the market should be stimulated by government intervention. Only one kind of production should be promoted: outstanding industries providing remarkable externalities.[4]

In the case of the EU, three recognized external economies stemming from biofuels were known:

- reduction of external emissions of GHGs in order to limit climate change;
- security of supply in order to reduce and differentiate EU energy supply channels from abroad; and
- improvement in rural income and conditions in order to reduce existing gaps within the EU and to create new outlets for farm production.

Of course, the 2003/30 Directive, officially proposing "reference targets" for the diffusion of biofuels does not pinpoint the way in which these targets can be achieved at the national level.

General Measures: Tax Exemptions vs. Obligations to Blend

The most common instruments[5] used by European countries to promote biofuels are tax relief and obligations to blend.

Tax exemptions were the most commonly used measure until 2006. All European countries except Finland adopted during the period prior to 2006.[6] Several countries adopt a full exemption approach: Cyprus, Estonia, Germany (for biodiesel only up to the first half of 2006), Greece (only biodiesel), Ireland, Italy (only biodiesel and only in 2006), Malta, Poland (practically a full exemption), Spain, and Sweden.

This measure has allowed many countries to find an appropriate outlet for the domestic production of biofuels, so it has been fairly successful in developing the new biofuel industry in some countries. It seems that this measure has been successful above all when implemented in countries with high fossil fuel excise levels, so that the room for developing the new industry was larger.

Some countries utilize the quota mechanism for production (Belgium, France, Italy, Ireland, and Portugal): the amount of biofuels is shared among different suppliers from different European countries through calls for bids. Of course, this mechanism allows governments to decide the amount of biofuels that has to be supplied each year, thus creating some regulation on the market. No country decided to modify this approach in the period.

However, this measure has a cost for the public budget, caused by the reduction in fiscal revenues. This cost pushed some countries in 2007 to adopt a classic "command and control" policy package measure—obligations to blend, usually describing an increasing path towards the shares to be reached in 2010.

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4. There is room here for the Odagiri approach, where the State acts traditionally as a social planner. Let us suppose a case where the domestic market for i-goods does exist, but is satisfied only by imports. A private domestic supplier will not enter the market because it would bear huge sunk costs. The credit market (or the finance center of a multinational firm) will not finance its entry: even if the new production becomes profitable after production starts, because of the triggering off of scale economies, its discounted profits would turn out to be lower than the costs charged on entry (the Negishi condition). If, however, the production of the new industry is able to generate relevant positive externalities for the rest of the system, thus reversing the above-mentioned welfare losses, the State could finance the entry. This occurs because the State is expected to maximize the collective welfare, while private entities maximize their own individual welfare (Ninni & Silva, 1997; Odagiri, 1986).

5. Surveys of policies aimed at the developing biofuel industry and consumption are common. The most comprehensive are the reports by PREMIA, Ecn, Kutas et al. (2007), OECD, and three from the EU Intelligent Energy Europe program, i.e., Refuel, Biodiesel Chains (BC), and Elobio, plus notifications of State Aid to the Commission. Kutas et al. and BC (albeit only referring to biodiesel) reports are very detailed. These sources, containing useful information about policies and instruments sometimes not available in the MS reports, have been exploited to integrate the information of the MS reports, which remain, however, the most important source of information.

6. Finland grants partial relief from excise duty only for biofuels involved in R&D projects.

Table 2. General measures for promoting biofuels in the EU countries in 2006 and in 2007.

	2006	2007
Tax relief (partial or full)	Belgium, Denmark, Estonia, Germany Hungary, Ireland, Italy (only biodiesel), Latvia, Luxembourg, Malta, Poland, Portugal, Spain, Netherlands, United Kingdom	Belgium Denmark, Estonia, Greece, Hungary, Ireland, Latvia, Malta, Poland, Spain, United Kingdom
Obligations to blend (often increasing yearly)		Czech Rep. (only biodiesel), Germany, Luxembourg, Netherlands
Both: tax relief and obligations to blend (often increasing yearly)	Austria, France, Lithuania, Slovakia, Slovenia, Sweden	Austria, Cyprus, (Finland from 2008), France, Italy, Lithuania, Portugal, Slovakia, Slovenia, (Spain from 2008), Sweden, (United Kingdom from 2008)

Source: EU Member States (2003)

If in 2006 the majority of European countries utilized tax reduction as a policy instrument, in 2007 some of them—including Germany, which alone accounts for about half of the European market for biofuels—adopted the obligation to blend as policy in substitution of the too-expensive measures of reduction (or abolition) of excise rates, while other countries adopted obligations to blend in addition to tax relief.

Finally, other countries kept on adopting the same policy measures as before (among them, Austria, France, and Sweden—three countries where the biofuel supply increased the most).

Not surprisingly, the combination of tax relief/obligations to blend seems now to be the most successful policy, and the most likely instrument to reach the required 2010 target. Maybe for this reason the main changes foreseen for 2008 (Finland, Spain, United Kingdom) adopt this combination (Table 2).

It is hard to assess which general instrument is more operative in increasing demand for biofuels, as a lot of factors other than policy measures influence the dynamics of consumption. It is possible, however, to offer some suggestions stemming from the experience of the EU countries in terms of dynamics of consumption between 2005 and 2007.

- Continuing with tax exemptions (maybe reducing them) together with bringing in obligations to blend seems to be the most successful measure (in terms of higher growth in consumption).
- Continuing with tax relief is a successful measure. It creates a sort of path dependency; continued tax relief eventually brings about a habit for customers, who are led to go on purchasing biofuels if they are not obliged to pay higher prices.

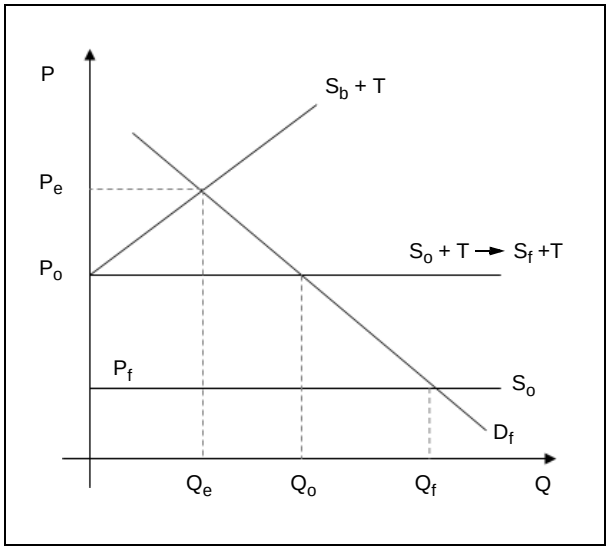

Figure 2. Supply and demand of fuels in the de Gorter-Just model.

Where:

Q = quantity of fuel;

P = price of fuel;

D_f = demand curve for fuel;

S_o = supply curve for conventional fuel (where supply is assumed constant for each price level);

T = indirect tax

$S_o + T$ = curve of domestic supply of conventional fuel, when indirect tax is added;

$S_b + T$ = curve of domestic supply of biofuels, when indirect tax is added

- A mere shift to obligations to blend—completely substituting these for tax relief—involves some difficulties in achieving the required target.

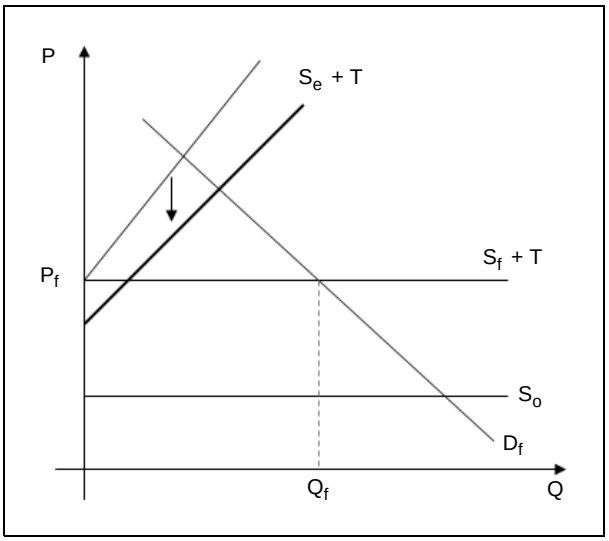

Figure 3. The effects of an excise exemption.

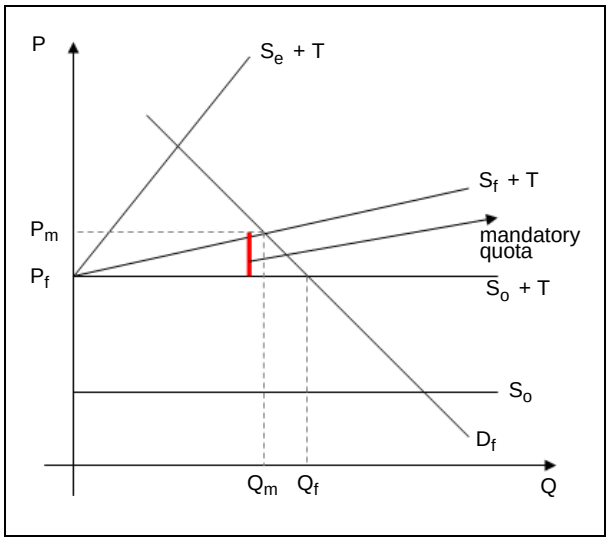

Figure 4. The effects of the introduction of a mandatory quota.

Economic Differences Between the Two Approaches: The de Gorter-Just Model

It is now interesting to assess the differences between the two main instruments—tax exemptions and obligations to blend—through the model developed by de Gorter and Just (2007).[7]

Figure 2 describes the impact that the splitting of consumption between conventional fuel and biofuel has on costs of production and prices, independent of the policy measures introduced.

The quantity of fuel consumed before any policy intervention is equal to Q_f , and the price paid by consumers is P_f. Of course, when indirect taxes are added, the quantity of fuel consumed becomes $Q_o < Q_f$.

Suppose now that the policymakers want to introduce biofuel, given the quantity consumed Q_o. However, as the cost of one liter of biofuel is higher than the cost of one liter of conventional fuel, consumers are not interested in buying biofuels. Then the policymakers set a target for the penetration of biofuels: they establish that a quantity, such as Q_o, has to be made up of 90% conventional fuel and 10% biofuel. Therefore, $S_o + T$ now becomes $S_f + T$.

The target can be obtained by either reducing the indirect tax only on the part of the fuel that has to be blended or directly imposing mandatory obligations to blend. Figure 3 describes the effects of achieving the percentage of blending through the introduction of a total or partial excise exemption on the share of biofuel. The excise exemption for the share of biofuel brings about a downwards shifting of the supply curve of biofuel. The excise exemption is assumed here to offset the extra costs of biofuels.

From the graph, it can be seen that a total or partial excise exemption—that is able to fully offset the extra cost of production—for the bio component of the fuel does not modify the price (P_f) of the end product and, as a consequence, it does not modify the quantity consumed (Q_f). The result depends entirely on the ability to find an exemption level to fully compensate for the additional costs of biofuels.[8]

The most important variations would concern the increase in the agricultural output—which increases as the excise exemption increases—and the reduction in fiscal revenues—which shrink as the exemption (i.e., the subsidy cost) increases, unless they are not balanced by an equivalent increase in the excise on oil, as in Belgium.

Figure 4 describes the effects of achieving the desired percentage of blending through the introduction of a mandatory quota. From Figure 4 it emerges that the obligation of a binding percentage of blending triggers

7. *de Gorter and Just have developed their model in various papers. For the sake of simplicity, I make reference only to the first of these papers. They discuss the biofuel issue in a broader way in their more recent contribution (de Gorter & Just, 2010).*

8. *See the texts of notification of State Aids sent by the MS to DG Competition:http://ec.europa.eu/competition/state_aid/overview/index_en.html.*

Table 3. Costs and benefits of tax exemptions and obligations to blend.

Policy measures	Strengths	Weaknesses
Tax exemptions (agricultural production increases, according to variations in relative prices)	Easy to implement; Few market risks; Incentive to innovation; Suitable for the early stages of development	Loss of fiscal revenues; Risks of overcompensation (proposal of high tax reduction); Strongly dependent on the initial levels of the excise: it is effective where these levels are significantly high
Blending obligations (agricultural production increases, independently of variations in relative prices)	It injects certainty in the agricultural sector; (unless the subsequent increase in prices significantly penalize the agricultural supply) It does not involve additional costs for the public budget; Suitable for the more advanced stages of development	Higher prices for taxpayers; Less incentive to innovate; Higher price variability; Difficult to implement and monitor

Source: European Commission (2009)

increases in the supply price of the end product (the supply curve of blended fuel rotates upwards, as one liter of more expensive biofuel must substitute for one liter of cheaper conventional fuel), hence leading to a higher equilibrium price and reduced levels of consumption (with lower GHG emissions). The price increases from P_f to P_m and the quantity drops from Q_f to Q_m.

All the variations are circumscribed by the increase in the agricultural product—which increases as the required share of blending increases—and the deterioration of the "classic" rent of consumers. Under this scenario, fiscal revenues do not shrink.

Then, according to de Gorter and Just, the adoption of (partial or total) tax exemption as a measure to support biofuels does not modify the supply curve of biofuels at the market prices, but modifies the composition of the whole fuel supply curve (comprehensive of fossil fuels and biofuels). Taking into account the heavy burden of taxation (excise plus V.A.T.) on the total market price of oil fuels in Europe, the difference between the before-tax price of oil products and the before-tax price of biofuel has to be filled through taxation. While the oil product is charged through the usual excise rate, biofuel benefits through a reduced rate, and the difference between the two excise rates should offset the gap in before-tax prices. It should be noted that in Europe the amount of the excise reduction is notified to DG Competition, which evaluates the adequacy of the required reduction in excise.

The advantage of excise reduction lies in the fact that it does not change price and quantity of the fuel, so that it does not modify the behavior of consumers. However, the damage falls on the State—its fiscal revenues diminish. That is the real economic cost.

On the contrary, the imposition of obligations to blend has the advantage that it is not a charge on the government budget. However, as long as the price of biofuels is higher than that of fossil fuels, the price of the final fuel (fossil fuel blended with biofuel) tends to be higher than the fossil fuel alone. It is difficult to foresee what the reactions of the consumers will be. If fuel demand goes on being rather rigid in the long run, it could allow an increasing and a considerable outlet for biofuels; if fuel demand becomes more elastic, the slackening of the demand should have positive results in less GHG emissions.

The results described through these graphs are summarized in Table 3, where a further description of the pros and cons is added for both kinds of policy measures, according to the main literature.

Specific Measures

Finally, support for biofuels occurs also through specific measures.

It is common to distinguish biofuel policy instruments, including subsidies, by the phase of the biofuel chain to which they refer. Two large, main phases may be identified: production and consumption, each of which fall into different sub-items. The production phase includes measures applied to agriculture (for the production of feedstocks) and to industry (where the operations necessary to get the intermediate and finished product are carried out). The consumption phase includes measures referring to the distribution of biofuels, the purchase and maintenance of cars and vehicles utilizing biofuels, attempts to increase the demand side of the market for biofuels through "green" public pro-

curement, and campaigns to increase consumer awareness.

Agriculture. In the most recent years, the domestic production of feedstocks relevant for biofuels was mainly obtained in EU-25 by set-aside areas and areas with energy crop aid.

The set-aside instrument was launched in 1992—at the time of the CAP reform—in order to limit rising production and stabilize decreasing prices of food products. Set-aside accounts for nearly one third of the possible supply of domestic feedstocks for biofuels (in terms of involved areas); however, its absolute contribution to the supply of feedstocks remained stable from 2005 to 2007. Since the 2003 CAP reform, payments are within the Single Farm Payment Scheme, keeping set-aside obligations; farmers receive payments independently of what kind of non-food products are produced on set-aside lands. On the contrary, since its 2003 introduction, the Energy Crop Scheme has been explicitly linked to the creation and deployment of the biofuel industry. Based on this, producers are paid €45/ha if they utilize land for crops for energy use (including biomass for heat and electricity outlets).

This instrument has been successful: the amount of area utilized under this scheme has grown impressively, and in 2007 it accounted for more than 60% of the domestic supply of feedstocks. The 2007 utilization of this measure has been large enough to overcome the upper limit imposed by the Commission (2 million hectares), so that the premium for each hectare has been reduced by the coefficient of 0.703.

Although both instruments are widely used for the creation and deployment of the biofuel industry, they are different. The Energy Crop Scheme was planned and utilized for this purpose (together with providing biomass for heat and electricity). The set-aside scheme was planned for other purposes and utilized also for other goals.[9] Above all, farmers are paid independently of what they are producing, so incentives for direct yields towards different outlets depend on the prices that the farmers are able to obtain on the market through contracts (rather than from upstream support to the farmers) by restricting the direction of their products.

Currently there are (few) national subsidies aimed especially at farmers: the countries involved are Belgium, Greece, Ireland,[10] Lithuania,[11] and Poland[12] (biodiesel chains).

Industry. As we exclude R&D policies, measures for industry refer above all to the current transformation localized in the agro-industry: they occur in Cyprus,[13] Czech Republic,[14] Latvia,[15] Lithuania,[16] and Poland.[17] Among these, the Polish policy seems the most interesting one, as it tries to deal with the biofuel industry through a supply-chain approach.

Setting aside the contributions many governments make to small and medium enterprises operating in poor regions or in rural countries, some aid is provided through regional bodies. For example, in the United Kingdom the Scottish Executive and the Regional Development Agencies continue to offer support to operators in the sector.

Measures for the *distribution* sector are provided in a few cases, such as Sweden[18] and the United Kingdom.[19]

Interventions to help to *purchase and maintain specific cars* able to utilize biofuels at a content that is higher than the one accepted by car manufacturers are adopted in different countries, like Cyprus[20] and Ireland.[21] Maybe the most successful policies have been adopted in Sweden, where private individuals who want buy a new eco-friendly car can receive a subsidy of nearly €10,000 (this program was launched in 2007).

9. *There are no statistics on the outlets of the production on set-aside areas.*

10. *Irish farmers receive incentives in addition to the EU energy crop premium (a €6 million bioenergy scheme). Furthermore, grants are provided to cover 50% of the costs to produce energy crops.*

11. *An extra premium is paid to non-food rapeseed growers; a similar aid scheme exists for cereals (granted up to 2011). Furthermore, in 2007 the Lithuanian Government paid €6.84 million to producers of rape methyl ester (RME) and producers of dehydrated ethanol.*

12. *According to a 2007 provision, 75% of biofuels produced in Poland should rely on special long-term contracts (usually 5 years) with local farmers, providing for fixed raw material prices. Furthermore, from the start of 2007 farmers can produce biofuels for their own use without paying value-added tax, provided that they do not sell them on the market.*

13. *A grant scheme finances investments for the production of biofuels for transport. The grant can reach 40% under specific criteria, with the maximum eligible around €680,000.*

14. *In 2006 the Czech Republic provided a direct, non-reimbursable grant to the producers of RME (which comes from rapeseed oil) to be mixed at 31% in the final biodiesel blend, set at roughly €260 per 1,000 liters of RME, provided that plants were in Czech territory. The grant, approved by the Commission, was provided only through the end of 2006.*

For this very reason, the proportion of eco-friendly cars among new car sales increased from 5% in 2005 to 22% in 2007.

Finally, programs for *public procurement*, as well as programs for creating public awareness, are common in many countries. However, they refer to very small quantities of "clean" vehicles, and often no room is left for purchasing biofuels through continuative long-term contracts. Of course, they occur only for demonstrative reasons, as the size of the market involved in these purchases is too small to provide a substantial outlet for the production of biofuels, and it is too small also to trigger economies of scale in the industry.

However, more active policies are pursued by Sweden and Poland. In the case of Sweden, the envisaged scenario is that, beginning in 2007 at least 85% of passenger cars purchased or leased by the State shall be eco-friendly. In Poland, the already-mentioned "Long Term Biofuel Promotion Project 2008-2014" provides the requirement that government departments gradually replace their vehicle fleets with vehicles able to use liquid biofuels.

To conclude, specific measures are used by some countries, although not systematically, according to the country's specific conditions. Two countries have had experiences that seem to be more unusual, with respect to specific measures. One is Sweden, which relies above all upon the downstream parts of the chain (role of the distributors and of the purchase and acquisition of eco-friendly cars). The other is Poland, which is quite considerably involved with the full biofuel chain.

Among specific measures, public procurement seems particularly neglected, although it is claimed and invoked by many policymakers.

Conclusions: Uncertainty and the New Directive

In April 2009, the difficulties and troubles regarding the biofuel option in the European context were made formal in the adoption of the new 2009/28/EC Directive of the European Parliament and Council, which was on the promotion of the use of energy from renewable sources. This new directive repealed Directives 2001/77/EC and 2003/30/EC.

The main changes contained in Directive 2009/28/EC (European Parliament, 2009) are the following.

- Mandatory (and not indicative) targets are placed for each EU country—at least 10% of final energy consumption in all forms of transport (not only in road transport) has to be met by renewable sources in 2020 (Article 3.4.b).
- Biofuels can be taken into account for the required targets only if they fill the following sustainability criteria (Article 5.1).
    - Environment: the GHG emission saving should be at least 35% up to January 1, 2017, 50% up to January 1, 2018, and 60% afterwards for biofuels produced in installa-

15. *In 2007 the Latvian authorities notified support of about €271 per 1,000 liters to the producers of biodiesel. The measure should last until 2010.*
16. *An aid scheme entitled "Aid for the Development of Production of Biodiesel" promotes the use of biodiesel for six years. Manufacturers of rapeseed oil for the production of RME may benefit from direct aid, especially given that the overall budget is around €34 million.*
17. *The "Long Term Biofuel Promotion Project 2008-2014" aims to improve the competitiveness of the entire biofuel supply chain, starting from the cultivation of crops, right up to creating easier outlets for biofuels. In the industry segment of the chain, the measure chosen is relief from corporation tax.*
18. *As the Swedish Government relies upon the role of larger filling stations to respect the obligation to blend, "a State aid has also been introduced for measures to promote the distribution of renewable fuels. This aid means that persons who make investments in order to provide renewable fuels, under Act (2005: 1248) concerning the obligation to provide renewable fuels, can receive a subsidy of up to 30% of the total cost of the measure (the investment cost). The subsidy may not, however, exceed the investment cost minus the lowest cost needed to fulfil the requirement standard cost" (Government of Sweden, 2006, p. 2).*
19. *The Refuelling Infrastructure Grant Program, managed by the Energy Saving Trust, provides grants for installing alternative refuelling points, including biofuels (but not exclusively). According to a recent report (July 1, 2008), the program has assisted in funding 18 E85 and one E95 bioethanol stations.*
20. *The government proposed a tax relief of €1,200 towards the cost of purchasing a new flexible fuel vehicle, including electric and hybrid vehicles. The measure aimed to encourage the owners of captive fleets to use biofuels, especially those who can produce biofuels from their own resources, such as restaurants, hotels, and so on.*
21. *The Irish Government proposes the Vehicle Registration Tax (VRT) Relief for hybrid, flexible fuel, and electric cars. This relief—an addition to the existing one, which provides for lower rates of VRT for cars with lower emissions—will last until December 31, 2010. At the end of April 2008 there were 2,836 flexible fuel vehicles sold on the market.*

tions in which production started after January 1, 2017 (Article 17.2).
  - Biodiversity: biofuels and bioliquids taken into account for the required targets "shall not be made from raw materials obtained with high biodiversity value."[22]
  - Land-use change: biofuels and bioliquids taken into account for the required targets "shall not be made from raw materials obtained from land with high carbon stock."[23]
- Issues of social sustainability and competition with food will be the object of a report that the Commission has to provide every two years to the Parliament and the Council.[24]

The EU will be the only large biofuel consumer country that will submit its provisions, either domestic or imported, to criteria of sustainability (including reports about the existence and the development of consequences on social sustainability and competition with food).

How it will be made is still unknown. It is possible that, less than a year after the approval of the directive, obtaining 10% of energy final consumption in 2020 is simply unsustainable. So the landscape of policy instruments to support conventional biofuels is simply vanishing, completely substituted by R&D policies to promote second-generation biofuels, but they also seem rather absent in the group of the current EU R&D energy policies.[25]

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22. *This includes land that had one of the following statuses on or after January 2008: (a) primary forest and other wooded land, namely forest and other wooded land of native species; (b) area designed (i) by law or the relevant competent authority for nature or protection purposes; or (ii) for the protection of rare, threatened, or endangered ecosystems or species recognised by international agreements or included in lists drawn by intergovernmental organisations or the International Union for the Conservation of nature; c) highly biodiverse grassland (Article 17.3.a, b, c, p. 37).*
23. *i.e., wetlands, continuously forested areas, "land spanning more than one hectare with trees higher than five meters." (European Parliament, Article 17.4.b, c, p. 37) or from peatland (Article 17.5, p. 37).*
24. *Also, in this case there is an embarrassing confusion. According to Article 17.7, "reports shall address the respect of land-use rights. They shall state, both for third countries and Member States that are a significant source of raw material for biofuel consumed within the Community, whether the country has ratified and implemented each of the following Conventions of the International Labour Organisation (ILO)..." (European Parliament, 2009, p. 38). References to eight different ILO Conventions are then quoted, but some of them are not signed even by the United States.*
25. *See the 2010 composition of the suggested policies for Intelligent Energy Europe at http://ec.europa.eu/energy/intelligent/.*

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Author's Notes

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