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The Impact of the EU Biofuel Policy Reform on Agricultural and Energy Commodity Prices

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We will build a tractable partial equilibrium model that captures the most important features of the EU biofuel, energy, and biofuel feedstock markets. We consider two representative crops: wheat and rapeseed. Wheat is used for both human consumption and ethanol production (where it yields DDGS as a co-product). Rapeseed is crushed first, yielding joint products: rapeseed oil and meal. Oil is then consumed by humans and is also used in biodiesel production; rapeseed meal is used as animal feed. Waste oil is used for second-generation biodiesel. Because the European Union imports a lot of biofuels and biofuel feedstocks, we allow for trade in these commodities. We explicitly model the multiple counting toward the overall mandate for second-generation biofuels produced from non-food crops.

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A historical overview of the EU biofuel policies

The policies governing the production and consumption of biofuels in the European Union are complex. The complexity has three main dimensions. First, the biofuels production and consumption are regulated by the Renewable Energy Directive (RED) and by the Fuel Quality Directive (FQD). Second, three EU institutions shape the EU biofuel policies: the Commission, the Parliament, and the Council. In addition, a number of pro- and anti-biofuel lobby groups are active in (re)designing biofuel policies. For example, many EU biodiesel producers are associated in the European Biodiesel Board (EBB); ePURE represents the European renewable ethanol industry; and Copa-Cogeca, representing European farmers and their cooperatives, is also supports the production of first-generation biofuels. On the other hand, non-governmental organizations such as Transport and Environment or Greenpeace are against land-based (i.e., first-generation) biofuels. Third, although the EU directives state general objectives to be achieved and principles to be followed at the EU level, the actual implementation of the biofuel legislation differs across the 28 EU Member States.

Large-scale biofuels production in the European Union started only after the EU Parliament and the Council passed in May 2003 the Directive 2003/30 on the promotion of the use of biofuels for transport. The objectives of this Directive were to replace diesel and gasoline in the transportation sector to contribute to (*i*) meeting the EU climate change commitments, (*ii*) achieving environmentally friendly security of energy supply, and (*iii*) promoting renewable energy sources. The Directive 2003/30 set an indicative target of 2 percent by 2005 for each Member State for the share of energy coming from biofuels and other renewable fuels in the total energy of fuels used in the transportation sector; the Directive also stipulated a target of 5.75 percent by 2010.

It is important to notice that the targets in the Directive 2003/30 were (and to this date are) expressed as an energy share, as opposed to a volumetric share used in other countries (e.g., the United States or Brazil). Most importantly, however, the targets were not binding. Article 4 of the Directive is very informative in this respect: "Where appropriate, Member States shall report on any exceptional conditions in the supply of crude oil or oil products that have affected the marketing of biofuels and other renewable fuels." This implies that as long as a Member State was able to explain why a lower energy share of biofuels had been achieved, no consequences followed. To illustrate the non-binding character of the target, note that the share of biofuels in total transportation fuels in the European Union reached 1.65 percent in 2006 and 4.05 percent in 2010 (USDA 2010), and 22 out of 27 EU Member States failed to achieve their target for 2010 (European Commission 2013).

Another big milestone in the development of the EU biofuel policies was the year 2009 when the RED[1] and the FQD became EU laws. The RED requires (among other things) that by 2020 at least 10 percent of the total energy consumed in the EU transportation sector comes from renewable sources. Although it is expected that the lion's share of the target will be met by biofuels, other renewable sources of energy (such as renewable electricity) can also be counted.

[1] http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32009L0028&from=EN

Unlike Directive 2003/30, the RED explicitly uses the term "mandatory target," albeit it does not specify the enforcement mechanisms.

Although the RED specifies an overall blend target (i.e., ethanol and biodiesel combined, bar the tiny share of other renewable energy sources), each Member State specifies its own trajectory to achieve the overall 10 percent goal by 2020 and can set ethanol- and biodiesel-specific sub-mandates. For illustration, in 2010 the European Union as a whole managed to blend 5.1 percent of biofuels in volumetric terms as compared to 5.75 percent in energy terms (USDA 2013).

Another important piece of legislation affecting the production and consumption of biofuels in the European Union is the Fuel Quality Directive of 2009. The FQD addresses the reduction in life cycle greenhouse gas emissions of transportation fuels by 6 percent by the year 2020 as compared to 2010. With respect to biofuels, it specifies criteria that need to be met for biofuels to count toward the mandatory consumption targets.

Perhaps the most important of these criteria is a requirement that biofuels should save at least 35 percent of greenhouse gas emissions compared to fossil fuels they are to replace. This threshold increases to 50 percent starting from January 1, 2017. Moreover, from January 1, 2018 the saving shall be at least 60 percent for biofuels produced in plants that started production on or after January 1, 2017. It is important to note, however, that the greenhouse gas emissions savings above do not take into account carbon emissions from land use change—a topic that gave rise to a heated debate on biofuels in the European Union after 2012.

In addition to emissions reduction, the FQD also specifies requirements for the origin of biofuel feedstocks. The energy from biofuels can only be counted toward a national target if the feedstock or a biofuel complies with additional sustainability criteria detailed in the FQD. For example, the feedstock cannot be obtained from land with a high biodiversity value (e.g., primary forest and other wooded land of native species); from areas designated for nature protection or for protection of rare, threatened, or endangered ecosystems; from highly biodiverse grassland that is natural or rich in species; from land with high carbon stock (e.g., wetlands) or from peat. Moreover, the FQD allows imports of biofuels or biofuel feedstocks only from countries that have ratified important international conventions such as the Convention on International Trade in Endangered species of Wild Fauna and Flora; the Cartagena Protocol on Biodiversity; or conventions of the International Labor Organization.

The food commodity price booms of 2008 and 2011 and intensifying "food versus fuel debate" have been an impetus for the reform of the EU biofuel policy. In October 2012, the European Commission proposed to reform the EU biofuel policy (represented by the RED and FQD directives).[2] The Commission has assigned indirect land use change (ILUC) factors to different biofuels but failed to account them for the climate performance of biofuels. Thus, the ILUC factors are used only for reporting purposes. In recognition of adverse inflationary effects of first-generation (i.e., land-based) biofuels on food commodity prices, the Commission proposed to cap the use of these biofuels to 5 energy percent. Environmentalists, such as Transport and

[2] http://ec.europa.eu/clima/policies/transport/fuel/docs/com_2012_595_en.pdf

Environment—a Brussels-based environmental organization—were not happy with this proposal as it did not mean complete abolition of biofuels produced from food crops.

The 2012 EU Commission proposal also specified weights for biofuels feedstocks to be used in counting the contribution of various biofuels toward the overall target. For example, biofuels from used cooking oil, animal fats, or non-food cellulosic material shall be counted twice their energy content, and biofuels from feedstock like algae, straw, or biomass fraction of industrial waste shall be counted four times their energy content. First-generation biofuels have a contribution factor of one.

The reshaping of the EU biofuel policy continued in July 2013 when the European Parliament's Environmental Committee voted for the inclusion of the ILUC factors into the RED and for capping all first-generation biofuels at 5.5 percent. Later in September 2013, the European Parliament voted to cap the first-generation biofuels at 6 percent and placed a 2.5-percent minimum requirement to be achieved by 2020 for advanced (third-generation) biofuels from, for example, seaweed or certain types of waste (European Parliament 2013). In June 2014, the Council of energy ministers decided to cap the use of land-based biofuels to 7 percent and to put a 0.5-percent floor for advanced biofuels.[3] Importantly, the Council did not propose to include ILUC estimates to sustainability criteria for biofuels.

The beginning of 2015 has seen trilogue negotiations between the Commission, the Parliament, and the Council, with the last two parties not willing to make concessions that would give an end to the long-lasting debate about biofuels in the European Union. A third trilogue meeting is scheduled for mid-April to reach an agreement.[4]

[3] http://gr2014.eu/sites/default/files/indirect%20land-use%20change_1.pdf
[4] http://www.euractiv.com/sections/sustainable-dev/meps-retaliate-against-eu-countries-biofuels-draft-law-313239