

The political economy of biodiesel in an era of low oil prices



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ABSTRACT

Global biodiesel production grew by 23% per annum between 2005 and 2015, leading to a seven-fold expansion of the sector in a single decade. Rapid development in the biodiesel sector corresponded to high crude oil prices, but since mid-2014, oil prices have fallen dramatically. This paper assesses the economic and policy factors that underpinned the expansion of biodiesel, and examines the near-term prospects for biodiesel growth under conditions of low fossil fuel prices. We show that the dramatic increase in biodiesel output would not have occurred without strong policy directives, subsidies, and trade policies designed to support agricultural interests, rural economic development, energy security, and climate targets. Given the important role of policy—and the political context within each country that shapes policy objectives, instruments, and priorities—case studies of major biodiesel producing countries are presented as a key element of our analysis. Although the narrative of biodiesel policies in most countries conveys win-win outcomes across multiple objectives, the case studies show that support of particular constituents, such as farm lobbies or energy interests, often dominates policy action and generates large social costs. Looking out to 2020, the paper highlights risks to the biodiesel industry associated with ongoing regulatory and market uncertainties.

1. Introduction

Global biodiesel production grew at a phenomenal rate of ~23% per annum between 2005 and 2015, leading to a seven-fold expansion of the sector during a single decade. This growth coincided with a sharp increase in crude oil and diesel prices on trend, which bolstered the competitiveness of the biodiesel industry. High oil prices also justified policies supporting biodiesel use in several countries. Energy market trends have reversed since 2014, however, creating an interesting paradox shown in Fig. 1—that global biodiesel production has continued to rise despite a precipitous drop in crude oil prices. If sustained, a new era of low oil prices presents challenges for both the industry and policymakers in major biodiesel producing countries as they grapple with their investment and incentive strategies. This paper examines the political economy of the global biodiesel sector and asks: What policies have been implemented to induce investments and expansion in the biodiesel sector since the mid-2000s, and what objectives have motivated these policies? Looking out to 2020, how might biodiesel policies in key producing countries respond to current low oil prices?¹

Crude oil prices influence investment decisions in the entire

renewable transportation fuel sector, which includes both biodiesel and ethanol. There are several reasons why we focus on biodiesel specifically in this paper, despite the fact that global ethanol production is almost three times that of biodiesel by volume [1]. First, diesel is gaining market share over gasoline in transportation fuels, especially in developing countries where truck fleets have been expanding rapidly. In line with this trend, biodiesel production growth has been significantly higher than that of ethanol since 2005, albeit from a lower base level. The share of diesel in transportation demand is expected to increase at various rates in all countries, and at a global scale, biodiesel is expected to account for 70% of transport fuel demand growth out to 2040 [2].

In addition, international trade in biodiesel has been substantially higher than trade in ethanol. Although biodiesel trade is only 10–15% of global production, it has been instrumental in the establishment of biodiesel sectors in certain developing economies [3]. Policies introduced to expand biodiesel use in the EU and USA have served as a strong motivating force for countries with large oil crop sectors to develop their biodiesel industries for export, particularly in the cases of Argentina (soy-based biodiesel) and Indonesia (palm-based biodiesel). The dynamics of the global biodiesel industry thus revolves around a

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¹ Longer run projections of biodiesel production and feedstock use can be found in [7]. This paper builds on work presented in that volume.

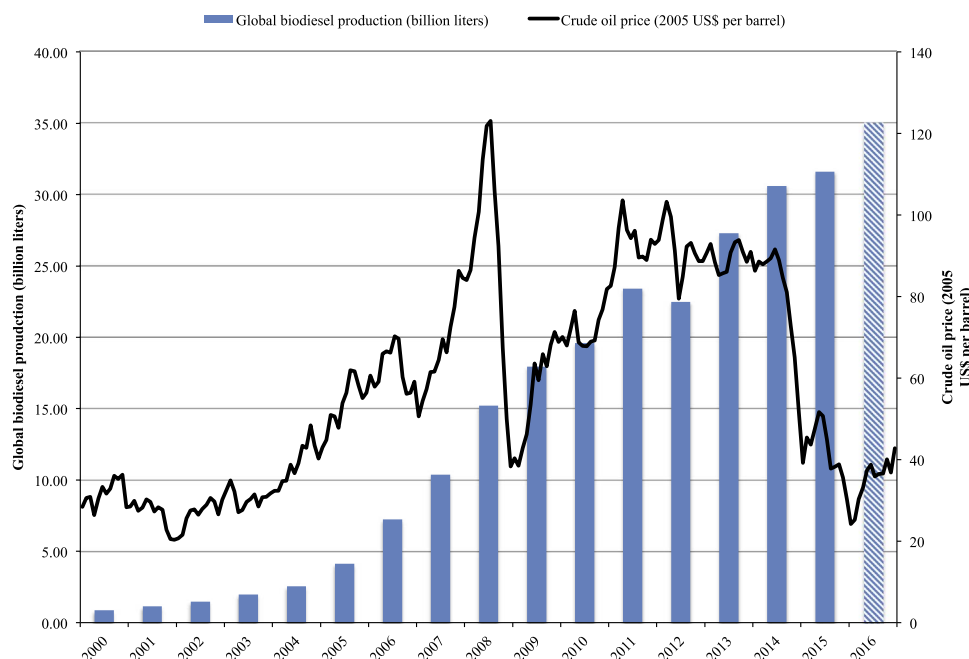


Fig. 1. Global biodiesel production and nominal crude oil prices, 2000–2016, Note: 2016 biodiesel production is estimated. Sources: [1,5,6,17,76], and [77]

complex set of policy and trade interactions.

Government policies in a diverse group of industrialized and developing countries have contributed to the expansion in the biodiesel sector since the mid-2000s. These policies have been aimed at (1) securing domestic energy supplies; (2) increasing the share of renewable (non-fossil) fuels in overall energy use; (3) reducing the net climate impact of energy use; (4) bolstering demand and prices of vegetable oils and efficient use of co-products; and (5) enhancing rural development. Although the policy narrative surrounding biodiesel often conveys win-win outcomes across these multiple objectives (as reviewed in [4]), policies are usually designed to back particular constituents, such as farm lobbies or energy groups, even when the social costs of such actions are high.² Policymakers in large agricultural economies typically have strong interests in supporting farm incomes along various parts of the agricultural supply chain. As a result, domestically produced oil crops serve as the primary feedstock for biodiesel production in most countries, and policy support for the biodiesel sector tends to be strengthened during periods of relatively low vegetable oil prices.

Biodiesel policies are also responsive to fossil fuel prices, creating a direct link between energy and agricultural markets. The nature and strength of this coupling depends on what types of policies are used to support biodiesel use (e.g., energy targets, blending volumes, price instruments) and on co-product markets for different oil crops, ranging from soybean (with its high protein meal content) to oil palm (with its high oil content). Global biodiesel feedstocks in 2015 were comprised of soybean oil (30%), rapeseed oil (25%), palm oil (18%), recycled vegetable oils (10%), animal fats (6%), and other vegetable (and unknown) oils (11%) (Author's calculations based on [5]).

We begin by describing recent trends in biodiesel production in relation to crude oil markets, and then turn to the policy context of global biodiesel use. Short case studies of the major biodiesel producing countries are presented to illustrate recent policy developments and to expose the realm of uncertainty clouding the industry today. We examine the profitability of the biodiesel sector with and without

government support and describe how policies have responded in general to fluctuations in energy and agricultural markets. The paper concludes with a discussion of short-term determinants of biodiesel demand and plausible projections for biofuel expansion out to 2020. These projections are qualitative in nature and highlight risks for the industry in the coming years.

2. The expansion of biodiesel

The global biodiesel story is largely a 21st Century phenomenon and has been fueled, literally and figuratively, by a set of countries that dominate the oil crops sector. Worldwide production of biodiesel reached 31.6 billion liters in 2015 (Fig. 1)—a small fraction (<2%) of global diesel production but still a large volume in comparison to historical biodiesel levels. The EU, which has traditionally relied on diesel road-transport fuels, is the top producer, with Germany and France in the lead. Biodiesel consumption in the EU has expanded since 2000 as more member states have been added to the Union. The USA, Brazil, Indonesia, and Argentina are also major biodiesel producers, and a suite of other countries including Thailand, Colombia, Malaysia, and Canada have significant market shares. In all cases, government policies have played a critical role in supporting biodiesel development and feedstock production. Together, the countries listed in Table 1 contributed 90% of global biodiesel production in 2015.

For both industrialized and developing countries, biodiesel policies have been implemented during a period of rising and volatile crude oil prices (Fig. 2). One can examine either crude oil or diesel in relation to biodiesel, as the correlation between crude and diesel prices was 0.989 between 2000 and 2016 [6].³ Crude oil prices (black line) rose on trend between 2000 and 2006, reaching their highest point in real terms since 1985. Oil prices then escalated to peak at a monthly average price of over \$130/barrel (nominal) in mid-2008. A short crash in oil markets corresponding to “the great recession” was subsequently reversed, and the market settled into second stretch of high real prices through mid-2014. Meanwhile, between 2011 and 2014, real prices of

² Social (versus private) costs are defined by policy distortions, environmental externalities, and other non-market costs such as land tenure conflicts and unfair labor practices. These costs are discussed at greater length in the case studies that follow.

³ Correlation is between the Europe Brent spot price F.O.B. and the LA Ultra Low Sulfur CARB Diesel spot price.

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