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Damned if you do, damned if you do not—Reduced Climate Impact vs. Sustainable Forests in Sweden

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ABSTRACT

The main objective of this paper is to analyze the potential goal conflict between two of Sweden's environmental objectives: *Sustainable Forests* and *Reduced Climate Impact* – or, more precisely, the conflict between forest conservation and the supply of wood fuel. To accomplish this, we use a forest sector model that includes the suppliers and major users of roundwood. The econometric results, based on a data set that spans 40 years, show that all the own price elasticities have the expected signs. Among the three forestry products, the supply and (long-term) demand of forest fuel seems to be most sensitive to a price change. In a second step, the estimated model is used to simulate the effect of increased forest conservation – the *Sustainable Forest* objective – on the supply of wood fuel. If oil is used as a substitute, Swedish emissions of greenhouse gases will increase by almost 0.92 percent, which indicates a clear conflict with the *Reduced Climate Impact* objective.

1. Introduction

Goal conflicts exist in all policy areas and environmental policy is no exception. Certain goal conflicts are more obvious than others, e.g. the trade-off between conserving and using a natural resource. One example is that a Swedish domestic policy objective in the biofuel area, can conflict with forest conservation ambitions. It is, to put it simply, not possible to burn a forest and at the same time conserve it for future generations. This is an example of how two different – eachworthwhile –

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environmental objectives may conflict. The basic reason for such conflicts is that the underlying resource – in this case, the forest – is limited.

Swedish environmental policy is in large part informed by the 16 environmental objectives established by the Swedish Parliament (the Riksdag) in 1998 (Swedish Parliament, 1998). Several directly or indirectly affect the management of the forest and the use of primary forest products. This should come as no surprise given that 23 million of Sweden's 43 million hectares are covered by forest.[1] The forest sector is a very important part of the Swedish economy. In 2007 the value of all Swedish exports was 1200 billion million SEK. Of this value 127 billion SEK, or 11 percent of total exports, originated from the forestry and forest industry sector of the economy.

Two of Sweden's environmental objectives are *Sustainable Forests* and *Reduced Climate Impact*. These environmental objectives are specified in a number of concrete sub-goals making it possible to analyze and present a number of different scenarios. The *Sustainable Forests* objective states that an additional 900,000 ha of forestland of high conservation value[2] should be excluded from forest production by the year 2010. Furthermore, by 2010 the amount of hard dead wood on all forestlands should increase by at least 40 percent, the area of mature forest with a large deciduous element should increase by at least 10 percent, and the area of old forest should be increased by at least 5 percent. Measures to reach this environmental objective will imply that the area of forest land available for timber production will decrease. As a result, the total volume of primary products from the forest will be reduced, *ceteris paribus*.[3]

The environmental objective *Reduced Climate Impact* states that, as an average for the period 2008–2012, Swedish emissions of greenhouse gases should be at least 4 percent lower than in 1990. Emissions are to be calculated as carbon dioxide equivalents and include the six greenhouse gases listed in the Kyoto Protocol and defined by the IPCC (Intergovernmental Panel on Climate Change). In assessing progress towards the target, no allowance is to be made for uptake by carbon sinks or for flexible mechanisms (Miljömålsportalen, 2004). This environmental objective is to be achieved by economic policy measures such as increased taxes on fossil fuel energy sources, and/or quota systems for electricity and fuels which mandate a certain share of renewable energy supplies. This implies that energy intensive sectors that can substitute away from non-renewable fuels will likely do so. Power and district heating plants in Sweden, which tend to have good fuel substitution possibilities, have largely switched to renewable energy sources.

A historical overview clearly shows that biofuels have had an increasing role in the Swedish energy system in the last 25 years, especially within the heating sector. In 1980, the use of biofuels, waste, peat, etc., accounted for less than 7 percent of the primary energy input for district heating. Twenty-seven years later, the corresponding share has increased by almost ten times, to approximately 69 percent. A large part of this shift can be traced to the increased use of wood fuels. In 1980, the use of wood fuels only amounted to 0.3 TWh, or less than 1 percent of total input, rising to 21 TWh, or almost 40 percent of the total input by 2007 (Swedish Energy Agency, 2008). Based on available forecasts and scenarios (Swedish Energy Agency, 2007), this positive trend for the use of biofuels, especially wood fuels, is likely to continue. Part of the explanation lies in the expected continued expansion of district heating – largely based on wood fuels – as well as general increases in other sectors. A driving force in the latter is both domestic and European climate policy, which aims to increase biofuel use in the transport sector.[4]

[1] Sweden has 23 million hectares of forestland according to the domestic definition by the Swedish National Forest Inventory, but almost 28 million hectares according to the international definition by the FOA (Food and Agriculture Organization).

[2] Conservation value is determined by the area's cultural, social (e.g., recreation) and environmental features. The environmental concerns are mainly in line with the Swedish obligations in accordance with the UN Convention on Biological Diversity and the Sixth Environment Action Programme of the European Community, "Environment 2010: Our future, Our choice".

[3] This is certainly true in the short run. In the long run we cannot rule out that the decrease in supply is at least partially compensated for by an increase in productivity on the remaining forest land.

[4] Further reading about the driving forces behind the development of forest energy in Sweden can be found in Björkheden (2006).