



Store or export? An economic evaluation of financial compensation to forest sector after windstorm. The case of Hurricane Klaus



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ABSTRACT

We assess the economic impacts of the compensation plan implemented in the forest sector after Klaus hurricane in the south-west of France in 2009. We model this plan within the French Forest Sector Model (bio-economic partial equilibrium model), and we compare it with alternative plans assuming alternative distributions between transport and storage subsidies. Our results show that the plan as it was formulated was globally beneficial to the forest sector compared with a scenario without a plan. In addition, we show that, compared with the formulated plan, a storage-oriented alternative plan reduces the fall in price observed after the hurricane, increases storage volume, increases the total gains in surplus of the overall sector but postpones the price rebound after the shock. This is a policy-relevant result in such a context where one major risk is that windfall wood prices drop to zero.

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1. Introduction

Western European countries have been hit by several extreme windstorms during the last 15 years. In 2013 alone, four major windstorm events affected these countries, namely Christian, Cleopatra, Xaver and Dirk. Many of these extratropical windstorms had a major impact on forests and created huge windfalls. In 1999, Lothar and Martin wound their way across France, Switzerland and Germany, leaving 30 million m³ of windfall and/or tree damages in Germany alone, amounting to a financial loss of €1.4 billion. In France, about 140 million m³ were destroyed, resulting in a loss of €4.57 billion. Germany provided €15.3 million for windfall hauling, transportation, storage and replanting (Holec and Hanewinkel, 2006), while the French government provided €920 million over a 10-year period in order to remove windfall timber from destroyed stands, to clear and replant stands and to create storage areas for harvested timber (CGAAER, 2010). In 2005, Denmark was hit by Hurricane Gudrun, leaving 2 million m³ of felled forests in its wake, mostly in coniferous stands. The Danish government also provided compensation to forest owners but only for those who were covered by a minimum of a basic forest insurance policy. A public assistance of €20 million was provided, which covered about half of the estimated losses and costs (Brunette and Couture, 2008).

More recently, Hurricane Klaus hit southwestern France on 24 January 2009. Damages were concentrated in the Aquitaine region (95%) and

most of the damaged trees were maritime pine [*Pinus pinaster*]: 37.1 Mm³ over approximately 42 Mm³ of total windfall (Bavard et al., 2013). Lecocq et al. (2009) estimated a total financial loss of €1.34–1.77 billion for maritime pine stands. In 2011, i.e., two years later, a bark beetle attack increased the total wood loss by approximately 7 Mm³, of which 4 Mm³ was greenwood (wood from standing trees, non-windfall) (Bavard et al., 2013). A compensation plan of €138.5 M was provided by the French government in the form of subsidized rate loans (€12.5 M), storage area subsidies (€25 M), transport subsidies (€56 M) and transshipment subsidies (€46 M) (Bavard et al., 2013). This compensation plan was formulated within 6 weeks after the storm, before being approved by the European Commission on 3 June 2009. Much criticism was voiced by some stakeholders regarding the relative weight of subsidies allocated to transport and to storage (Bavard et al., 2013). In particular, some of these criticisms accused the plan of being too transport-friendly and leading to subsidy leakages for the benefit of foreign processing industries.

So far, public compensation programs have been extensively studied from the perspective of their impacts on forest owner risk management decisions. Holec and Hanewinkel (2006) advanced the idea that public compensations could have a negative impact on forest owners' insurance coverage decisions. More generally, many have argued that the expectation of liberal disaster assistance following a catastrophic event can deter homeowners from purchasing insurance (Kaplow, 1991; Harrington, 2000; Gollier, 2001; Kunreuther and Pauly, 2006; Brunette and Couture, 2008). Brunette and Couture (2008) examined the effects of public financial assistance programs on forest owners' optimal risk management decisions and showed that providing public financial

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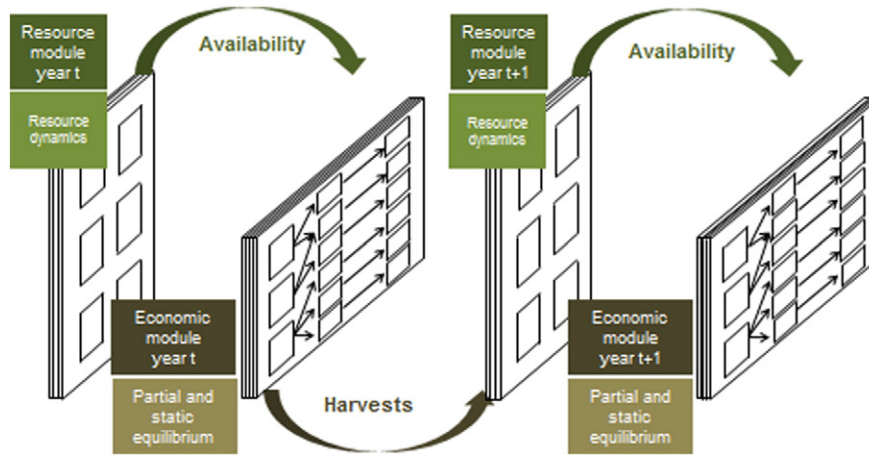


Fig. 1. The FFSM is based on a recursive and modular framework.

assistance to non-industrial private forest owners after damage-causing events may reduce their incentive to purchase insurance or invest in protective forest management activities.

Meanwhile, the question of the impacts of these compensation programs over the whole forest sector economy has barely been addressed in the literature. In particular, the impacts on economic agents' surpluses, on trade balance deficits and on wood price dynamics are absent from the economic literature. One notable exception is that of [Costa and Ibanez \(2005\)](#) who carried out an economic analysis to assess the profitability of storage after the Lothar and Martin hurricanes in France in 1999. They estimated the impacts of storage on wood prices and its dynamics and concluded that, from an individual point of view, storage was not profitable and wood prices did not return to their pre-1999 levels. However, this study does not assess the impacts of the compensation plan on trade-offs between storage and export and on the dynamics of economic agents' surpluses. More generally, not enough studies have included meaningful economic evaluations of public policies and, to our knowledge, no study has yet to be carried out within a partial equilibrium framework.

Yet, given the amount of money invested in such plans, their policy relevance must be questioned for the entire forest sector. In particular, the impacts of the distribution of the plan among the different activities (storage, transport, transshipment) and on economic variables

(wood production, consumption and prices) over the forest sector economy remain unclear since it is actually difficult to estimate what would have happened without a plan or with an alternative plan.

This paper aims at filling this gap by analyzing the impacts of the compensation plan after Hurricane Klaus within a partial equilibrium economic model framework. To do this, we modeled both the physical impact of Hurricane Klaus on French forests and the economic impacts of the compensation plan within the French Forest Sector Model (FFSM), a bio-economic partial equilibrium model of the French forest sector ([Caurla et al., 2010; Caurla, 2012b](#)). We then explored the impacts of the plan as it was negotiated compared with a scenario without a plan, and we provided insights into the relative importance of transport and storage assistance by comparing the outputs of a transport-oriented assistance scenario with those of a storage-oriented scenario and with those from the plan as it was negotiated (referred to as the "observed" plan below). Impacts on economic agents' surpluses and on wood prices are analyzed in detail.

The paper is organized as follows. [Section 2](#) presents the FFSM bio-economic model used for the analysis and the methodology, making it possible to represent the impacts of Hurricane Klaus. [Section 3](#) gives the simulation results relative to the impacts of the compensation plan on windfall supply and wood prices, as well as a surplus analysis. [Section 4](#) is devoted to the conclusion.

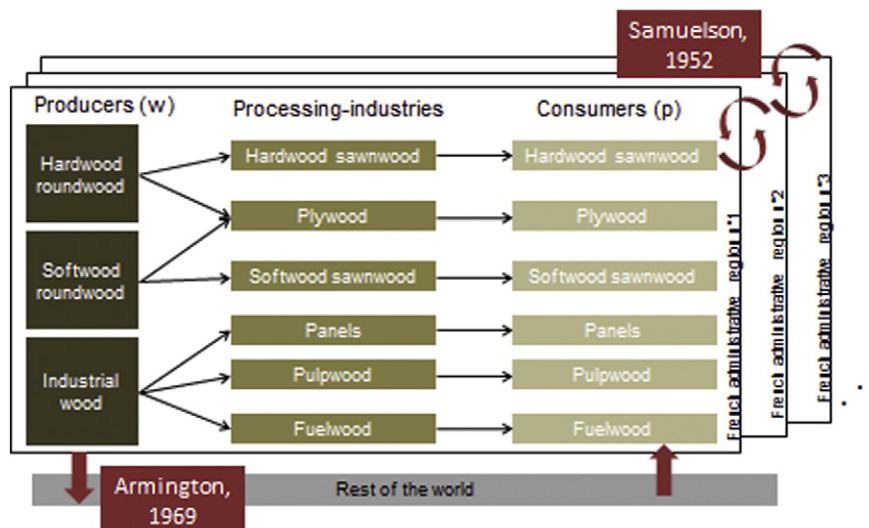


Fig. 2. Description of the economic module E.

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