



Cost assessment of the movement restriction policy in France during the 2006 bluetongue virus episode (BTV-8)



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ABSTRACT

This study aims at evaluating the costs of the movement restriction policy (MRP) during the 2006 BTV-8 epidemic in France for the producers of 6–9 month old Charolais beef weaned calves (BWC), an important sector that was severely affected by the restrictions imposed. This study estimates the change in the number of BWC sold that was due to the movement restrictions, and evaluates the economic effect of the MRP. The change in BWC sold by producers located inside the restriction zone (RZ) was analyzed for 2006 by using a multivariate matching approach to control for any internal validity threat. The economic evaluation of the MRP was based on several scenarios that describe farms' capacity constraints, feeding prices, and the animal's selling price. Results show that the average farmer experienced a 21% decrease in animals sold due to the MRP. The economic evaluation of the MRP shows a potential gain during the movement standstill period in the case of no capacity constraint faced by the farm and food self-sufficiency. This gain remains limited and close to zero in case of a low selling price and when animals are held until they no longer fit the BWC market so that they cannot be sold as an intermediate product. Capacity constraints represent a tremendous challenge to farmers facing movement restrictions and the fattening profit becomes negative under such conditions. The timing and length of the movement standstill period significantly affect the profitability of the strategy employed by the farmer: for a 5.5 month-long standstill period with 3.5 months of cold weather, farmers with capacity constraints have stronger incentives to leave their animals outside during the whole period and face higher mortality and morbidity rates than paying for a boarding facility for the cold months. This is not necessarily true for a shorter standstill period. Strategies are also sensitive to the feed costs and to the food self-sufficiency of the farm. Altogether, the present work shows the farmer's vulnerability to animal movement restrictions and quantifies the costs of the standstill. These results should assist decision-makers who seek to calculate adequate subsidies/aid or to efficiently allocate resources to prevent future outbreaks.

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1. Introduction

Bluetongue is a vector borne disease transmitted by *Culicoides* biting midges, with 26 serotypes recognized worldwide and 9 in Europe (Maan et al., 2012). High genetic

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diversity of the virus, high variability of its pathogenicity and few cross reactions plus low cross protection among different serotypes are described (Saegerman et al., 2007). Unlike other bluetongue virus (BTV) outbreaks, the serotype 8 epizootic was characterized by being detected initially in the north of Europe, starting in the Netherlands. In 2006 the BTV-8 was detected in five countries: Germany, Belgium, the Netherlands, France and Luxemburg. The expansion of the virus continued during 2007, reaching other countries such as the United Kingdom, Spain, and Italy.

Clinical signs of the BTV-8 are much more frequent in sheep flocks than in cattle herds. BTV-8 infection leads to extra morbidity, mortality and abortions, and to a decrease in the performance of dairy units (Elbers et al., 2008; Dercksen and Lewis, 2007; Perrin et al., 2010; Zanella et al., 2012). Subclinical consequences of BTV-8 infection, including a decrease in the conception rate, have also been reported (Le Mezec et al., 2010) and in some cases economic effects estimated. For instance, the gross profit margin for beef farms due to the BTV-8 is estimated to have decreased between 6.1% and 17.7% (Mounaix et al., 2010).

One of the main policies implemented at the European level to prevent expansion of an animal infectious disease is the movement restriction policy (MRP). Since 2000, the basic strategy is based on strict movement controls on animals coming from infected zones (Directive 2000/75/EC). Three zones are delimited: the infected zone (IZ), defined by a 20 km radius around the infected holding; the protection zone (PZ), which includes the infected zone and a 100-km radius around the infected holding; and the surveillance zone (SZ), with a radius of 50 km beyond the PZ. Animal movements from or to the IZ are forbidden. Animals are banned from leaving the PZ during periods of vector activity and vaccination may be applied under certain conditions. Restrictions in the SZ are similar to those imposed in the PZ (except that vaccination is forbidden because it interferes with the surveillance program). The rest of the territory is classified as the unscathed zone (UZ), where no movement restrictions exist.

In 2003, with Commission Decision 2003/828/EC some exemptions to the exit ban for animals leaving the restriction zones were established. However, for France one of the requirements was that the animal must be vaccinated or originated from a vaccinated herd. This remained with slight changes (Commission Decision 2004/550/EC) until 2005 when the requirements for moving animals outside a restriction zone were homogenized among all Member States (Commission Decision 2005/393/EC). Since then, besides the movement of vaccinated animals or movements during periods of vector inactivity, derogations to the MRP could be granted to farmers protecting their animals from culicoides attacks through the use of insecticides (before and during their transportation) and presenting negative results on serological or PCR tests conducted twice (not less than 7 days apart).

The major economic impact on the trade of ruminants due to the restrictions on international movements has been recognized (Dal Pozzo et al., 2009; MacLachlan and

Osburn, 2006; Tabachnick et al., 2011). However, no formal cost assessment has been done regarding the MRP and the only published estimate (5% of the market value of the animal) comes from expert opinion (Fofana et al., 2009; Carrasco et al., 2010). In order to avoid the costs associated with movement restrictions at the national level, countries such as Switzerland and the Netherlands decided to homogenize the zoning. Swiss authorities declared the whole country a single restriction zone at an early stage of the epidemic (Häsler et al., 2012). In the Netherlands, one month after the epidemic started the country was divided into an infected perimeter and a protection zone, with no unscathed zone (Velthuis et al., 2010). In contrast, France maintained the zoning during the 2006 and 2007 BTV-8 epidemics.

The French cattle industry accounts for 20% and 33% of the European dairy and suckling cows, respectively. Most of the 4 million suckling calves are born in winter and spring, and 1.4 million animals (mainly males) are sold yearly as beef weaned calves (BWC) around 6–9 months old (more than 1000 million euros of value). Most (66%) are sent abroad (Loirette-Baldit, 2008), with others sold to fattening units in France. Exports are defined here as BWC sold and sent out of France, either within or outside the EU. For these calving systems, MRP has a huge impact: timing for selling is crucial to fulfill contracts with fattening barns abroad, and farms have some limited stocking capacity, in particular during winter. The vulnerability of this sector to movement restrictions was clearly recognized by policy makers who granted millions of euros of specific aid to the sector (NS-DGPEI/SDEPA/N2008-4019), and made it the objective of the earliest derogations regarding the MRP (NS-DGAL/SDSPA/N2006-8244). Movements between zones of equivalent status of different Member States were not subjected to the ban so farmers in the RZ could move their animals to countries such as Belgium, Netherlands, and some parts of Germany. However, the absence of specialized fattening units on these countries translates to a very low demand for French BWC there. Moreover, although in theory this derogation allowed the movement of animals from the French RZ to Italy (the main destination of French BWC), Italian authorities imposed a ban on animals coming from any RZ, which was not lifted before February 2007.

French authorities have admitted they did not expect the disease spreading to evolve as it did, leading to an underestimation of the financial requirements to fight the BTV spreading for the following year (Bricq, 2008). The increasing occurrence of epidemics and the integration of multinational markets (Ihle et al., 2009) raise an urgent need to evaluate the costs and benefits of the control strategies, including MRP. Authorities need more tools and data to shape the most efficient controls and to determine the size of the aid that would compensate the producers for losses. The goal of this study is to assess the economic costs associated with the MRP for BWC farmers during the 2006 BTV-8 epidemic. First the impact of the MRP on the sales for 2006 is estimated, and second an economical evaluation of the cattle affected by the MRP is conducted.

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