

Evaluation of animal welfare outcomes of RDP-Measures for Dairy Cows

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Abstract – We use German cattle register data to analyse the effect of animal welfare measures for dairy farms in the federal state of North-Rhine Westphalia for the period 2007–2013. To establish causality, we applied a flexible conditional difference-in-differences approach, which has not yet been employed in the context of agricultural policy assessments. While participation in farm investment support did not have substantial effects on mortality as well as longevity, participation in grazing reduced mortality by 0.5 percentage points, corresponding to an effect of -12%. Participation in the measure litter led to a substantial increase in longevity by 142 days, which is equivalent to an increase of about 12%. We conclude, that the use cattle register data offers new possibilities for impact evaluations, but its application is time consuming and restricted to mortality and longevity.

BACKGROUND

In §13 of the Lisbon Treaty, the European Union (EU) recognises that animals are sentient beings and requires the Member States (MS) to “pay full regard to the welfare requirements of animals”. A specific animal welfare measure was included into the Rural Development Programmes (RDP) of the Common Agricultural Policy (CAP) in the programming period 2007–2013. While it was not taken up by many MS at first, it gained impetus in the 2014–2020 programming period and the expenditures increased from 55 m Euro in 2014 to over 450 m in 2019 (European Commission, 2019). Moreover, animal welfare issues also gained importance in measures, which were originally oriented towards increasing competitiveness such as farm investment support (FIS) or farm advisory measures.

AIM OF OUR STUDY

According to Fraser (2008) animal welfare comprises the dimensions of health, behaviour (ability to perform normal behaviour) and emotions (e.g. fear, pain, pleasure). Animal welfare is assessed using indicators and a comprehensive animal welfare measurement usually involves a substantial number of indicators. The survey of such indicator sets on farms is very time-consuming (e.g. 6 hours for a Welfare Quality® protocol) and for this reason such approaches have rarely been used for evaluation purposes. In addition, a comparison with non-supported farms, which is necessary for measuring causality, is not feasible with this approach.

In consequence, the evaluation of RDP animal welfare measures has up to now been based on the comparison of the regulations with scientific literature (e.g. BAB 2019), surveys which assess changes in management at the farm level (e.g. Gröner 2019) or the measurement of animal welfare on supported farms (Bergschmidt et al. 2014).

Another possibility for the assessment of animal welfare outcomes is the use of secondary data such as national cattle register data. The HI-Tier (HIT) (www.hi-tier.de) is the German register and we used it to analyse the effect of animal welfare measures for dairy farms in the federal state of North-Rhine Westphalia for the period 2007–2013. We applied a flexible conditional difference-in-differences approach (Dettmann et al. 2020), which has not yet been employed in the context of agricultural policy assessments.

MATERIALS AND METHODS

The HIT-Data contains information for every cattle in Germany concerning (among others) date of birth and death, sex, breed, calving status, date of entering and exiting the farm as well as the cause of death. In a first step, we identified the milking cows based on sex, breed and calving status. We then aggregated the data on farm level and calculated the animal welfare indicators mortality (The Welfare Quality Consortium® 2009) and longevity (European Food Safety Authority 2009).

North-Rhine Westphalia implemented the following measures in the programming period 2007–2013 to improve animal welfare on dairy farms:

1. The animal welfare measure *Grazing* which requires daily access to pasture for all dairy cows (payment: 30–35 € per cow and year).
2. The animal welfare measure *Litter*, which has requirements for space allowance and litter (30–37 € per cow and year); and
3. *Farm investment support (FIS)* which covered up to 40 % of the building costs for stables through grants.

Farms participating in measures 1, 2 and 3, respectively, form the treatment groups, while all other farms are in the control group. In Table 1, the numbers of participants for the measures are listed.

To establish causality between participation in animal welfare measures and changes in mortality and longevity we applied a flexible conditional difference-in-differences approach (Dettmann et al. 2020). It combines matching with a difference-in-differences approach and further allows for variations in treatment timing and durations.

Table 1. treatment group, supported farms

Measure	number of supported farms
1 Grazing	2,043
2 Litter	784
3 FIS	737

RESULTS

While participation in *FIS* did not have substantial effects on the observed indicators (see Fig. 1 and 2),

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the measure *Grazing* resulted in a reduction in mortality by 0.5 percentage points, corresponding to an effect of -12%. The measure *Litter* led to a substantial increase in longevity by 142 days, which is equivalent to an increase of about 12%.

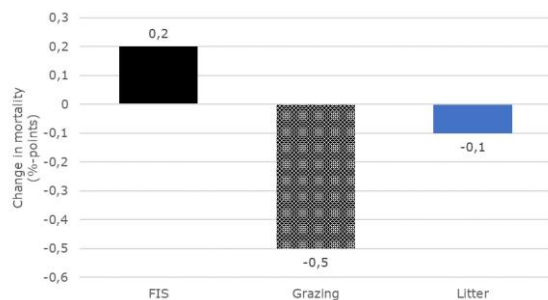


Figure 1. Effects of the support measures on cow mortality

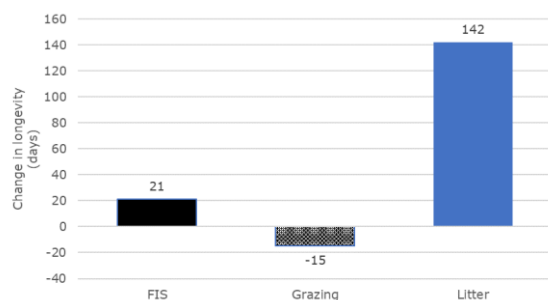


Figure 2. Effects of the support measures on cow longevity

DISCUSSION

Due to the low animal welfare requirements of *FIS* in the 2007-2013 programming period, it is no surprise that no substantial effects were found. While the effects of grazing on mortality have already been documented in other studies (Burow et al. 2011), comparable studies for the effects of litter are lacking. One explanation could be that the softer lying conditions lead to a reduction in lameness and joint damage (European Food Safety Authority 2009), which hence increases longevity.

The use of HIT-Data has the advantage of allowing the application of "state of the art" evaluation methodologies, but it also has some disadvantages: Due to different interpretations of the legal framework, the access to HIT-Data was only granted for a few federal states, making a national analysis impossible. Moreover, due to the fact that the information in HIT has to be aggregated to the farm level, data handling is time consuming and complex. And, as a final issue, HIT only contains two indicators, which limits the analysis.

CONCLUSIONS & OUTLOOK

Due to these limitations we will use data from milk recording schemes instead of HIT for the evaluation of the programming period 2014-2020. This data has the advantage of containing additional indicators on mastitis and metabolic health, which should facilitate the interpretation of the results and will enable us to provide more concise recommendations for the design of animal welfare support measures. Moreover, its use is much easier, because it is already aggregated at farm level.

Despite its usefulness, German administrative data is yet hardly used for research and evaluation purposes

because access is very restricted. Administrative bodies and managing authorities should hence take measures to facilitate access. Furthermore, it should be made possible to combine different administrative datasets (HIT, IACS, FADN etc.) allowing for more comprehensive evaluations.

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