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Climate adaptation in the Danish Municipalities: Is the current Order adequate?

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In the thesis we want to present new and improved applications to the current Order on determination of the service level for handling roof and surface water from 2020[1]. We will propose improvements and inclusion on three aspects, namely:

- Cloudbursts effect on house prices
- Damage costs
- Added recreational values

We use different methods in each of the three parts of the thesis, which we will go through in the following.

The house price effect analysis is based on a quasi-experimental difference-in-difference (DiD) design, in which we have data for cloudburst events, insurance claims related to damages caused by cloudbursts and data for houses sold in the same time period together with the attributes of the houses. In our model, we correct for many confounding factors with a rich dataset on house prices, housing characteristics and insurance claims. The dataset contains information on 506.844 single-family houses and apartments, together with insurance data on 43.386 insurance claims related to damages caused by cloudbursts. At this stage of the analysis, we can't conclude on the DiD results yet, but the conclusion and results of the analysis are ready to be presented at the conference.

[1] Miljøministeriet (2020): *Bekendtgørelse om fastsættelse af serviceniveau m.v. for håndtering af tag- og overfladevand.* Bekendtgørelse nr 2276 af 29/12/2020, Miljøministeriet, København. Available at: https://www.retsinformation.dk/eli/lta/2020/2276

Damage costs are a big part of the benefits when performing the socio-economically analysis. The current and used values are estimated by COWI (2014[2]). After thoroughly investigation, it seems unlikely that the current values aren't estimated by best practice. In our research we will propose a new and improved model to estimate both an 'easy to implement' national value and a differentiable value across the municipalities to achieve more precise socio-economically calculations. This improved national damage cost model is an OLS regression where the response variable is damage per m^2. The differentiable model is a more detailed model with several house/apartment characteristics as explanatory variables. The results of the different models will be presented at the conference.

The recreational value is the last thing that we impose to include in the improved socio-economically analysis. The recreational value that a 'green' surface project will add to the society, should be considered. For the part of the thesis regarding the recreational value, we have performed a benefit transfer. Through the benefit transfer we have come up with a unit price that can be used by the municipalities when performing the socio-economically analysis.

[2] COWI (2014): *Enhedsomkostninger ved oversvømmelsesskader fra skybrud* [Prepared for Forsikring & Pension]