

# Distribution of environmental exposures in Denmark

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## **Abstract**

Focus in the public debate on distributional issues of the environment in Denmark is often related to the distributional effects of green taxes. However, there has not been a similar focus on the distributional aspects of environmental exposures. Moreover, results from the international literature show indications of a relation between individuals with low income and a higher likelihood of being exposed to environmental pollution. Similar studies have not been conducted on a national level for Denmark. The aim of the analysis is to shed light on different aspects of environmental exposure and distribution in Denmark. The analyses focus on the environmental exposures from traffic noise and air pollution due to particulate matter (PM<sub>2,5</sub>) and nitrogen dioxide (NO<sub>2</sub>). Furthermore, analyses are conducted on the distribution of proximity to nature (forest, lakes and coast). Nationwide, register data on the environmental exposures, which can be linked to all homes in Denmark, is enriched with individual data on income and other socioeconomic characteristics, of the individuals living in the respective homes.

The results show large differences in distributional inequality across the different environmental exposures and proximity to nature. Relatively small differences are seen in the distribution of PM<sub>2,5</sub> and NO<sub>2</sub> between individuals. Compared to the distribution of income, PM<sub>2,5</sub> is more equally distributed, while NO<sub>2</sub> has more or less the same distribution as income. The larger inequality for NO<sub>2</sub> compared to PM<sub>2,5</sub> reflects that the concentration of NO<sub>2</sub> to a larger extent originates from local sources, e.g. power stations, traffic and shipping, while PM<sub>2,5</sub> is based on more regional sources mostly originating from non-domestic pollution. For both noise and proximity to nature, the distributional inequality between individuals is larger than for the two types of air pollution. This reflects that noise and proximity to nature are of a very local character.

A range of international studies investigate the relation between environmental exposure and income. These analyses often show that individuals with low income are more prone to environmental exposures than individuals with high income. The analyses based on the Danish data of the relation between environmental exposure and income reveals only a weak relation between environmental exposure and income. Moreover, the analyses show large differences in the distribution of environmental exposure between individuals within the same income group. This indicates that differences in income between individuals only explain a small part of the variation in environmental exposures. The estimated yearly cost from air pollution and noise is about DKK 4,100 higher for individuals living in housing most prone to environmental exposures compared to individuals living in an average polluted residence. This corresponds to 1.5 percentage of the average equivalent disposable income for an individual in Denmark.