De Økonomiske Råd
Formandskabet

ECONOMY AND ENVIRONMENT, 2023
SUMMARY AND RECOMMENDATIONS

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Chapter I comments on a number of current environmental and economic issues, including the possibilities for Denmark to pursue an independent climate policy in light of the new and tighter regulations for the entire EU in the EU's climate package, *Fit for 55*. The chapter also contains a discussion of the regulation of agricultural emissions of greenhouse gases and nitrogen to the water environment.

Chapter II finds that, in the future, damage from storm surges will increase fivefold in line with climate change. Therefore, it is important that there are incentives for ongoing climate adaptation. The storm surge insurance scheme, to which everyone contributes the same premium regardless of their storm surge risk, does not provide incentives to avoid settlement in high-risk areas.

Chapter III investigates whether taxes on agricultural emissions encourage consumers to buy fewer climate-damaging products. The analysis shows that Danish consumers reduce their meat consumption when meat prices rise. Using Danish data, it is shown that a fundamental mechanism underlying the effect of a greenhouse gas tax works.

SUMMARY AND RECOMMENDATIONS

The Report by the Chairmanship of the Environmental Economic Council contains three chapters:

- Current environmental economic issues
- Climate adaptation in coastal zones
- Meat consumption and greenhouse gas taxes

Assessments and recommendations in the Report are solely those of the Chairmanship. Notes to accompany the report, which elaborate and document the analyses, are available at www.dors.dk (in Danish only).

CHAPTER I, CURRENT ENVIRONMENTAL ECONOMIC ISSUES

Current environmental economic policy

Municipal climate targets can increase cost of achieving national climate targets

The Danish Climate Act sets targets for the total emissions of greenhouse gases from Denmark. Many municipalities have their own reduction targets, which vary significantly. This can increase the costs of achieving the national targets, partly because the municipalities' targets vary, and partly because they do not have access to cost-effective tools, such as uniform greenhouse gas taxes.

Regulations that ensure the 2030 target is met should be implemented now

Implementing regulations at short notice can significantly increase costs, as is now necessary in order to meet the 2025 target, and this situation should be avoided for meeting the Climate Act's 2030 target. In order to meet the 70 percent reduction target by 2030, the Government can implement a tax on greenhouse gases that is appropriately high, so that the target is met with reasonable certainty, and thus avoiding the need to adopt additional regulations later. This reduces overall costs because there is no need to implement regulations at short notice.

The EU's climate package, *Fit for 55*

The EU's climate policy

The EU's *Fit for 55* climate package was adopted in the spring of 2023. The package contains new and stricter regulations to ensure that the

EU's climate goals are met. Broadly speaking, cost-effective measures are used: The existing quota system has expanded, and a new quota system has been created that includes, among other things, the transport sector. Following the introduction of the new quota system, agriculture will be the most important emitter that is not regulated via a quota system, but must instead be regulated by the individual country. Overall, the climate package will contribute significant reductions in European emissions compared to the previous regulations.

Danish and EU climate targets overlap after 2030

The EU's and Denmark's own targets for reducing greenhouse gas emissions after 2030 have approximately the same level of ambition. There is a risk that the overlapping objectives will lead to inappropriate double regulation and make the transition unnecessarily expensive. In light of this, consideration should be given to either tightening the Danish climate targets so that Danish climate policy is unambiguously governed by Denmark, or abolishing them so that Denmark follows the EU's targets. Tightened Danish climate targets after 2030 will increase the costs of the transition. Furthermore, leakage through the EU's quota systems means that Denmark's possibility of pursuing an independent climate policy that leads to real reductions in greenhouse gas emissions are reduced after 2030.

Emissions from agriculture

Agriculture is central to achieving climate and water environment goals

Agriculture is responsible for such large shares of the emissions of greenhouse gases and nitrogen that it is not possible to achieve the political objectives for the climate and the water environment in inner Danish waters without reductions in agricultural emissions of both greenhouse gases and nitrogen. Measures aimed at reducing emissions of greenhouse gases often have the added benefit that they will also reduce emissions of nitrogen. To ensure that this added benefit is reaped, it is important that nitrogen regulations are in place when climate regulations are introduced.

Greenhouse gas tax on emissions is most cost-effective

The cheapest way to reduce greenhouse gas emissions from agriculture is to impose a uniform tax on agricultural emissions. Such a greenhouse gas tax provides an incentive to change all production processes in a climate-friendly direction, and it will increase the price of all foods where this is not possible, so that consumers are encouraged to substitute these with less-expensive, more climate friendly food options. Imposing a consumption tax on food is an alternative, however, such a tax would not be imposed on approximately 2/3 of agricultural production, as this is exported. For the final third, a consumption tax would only provide an incentive to change consumption but not to change to more climate-friendly production processes. Such a tax is

not cost-effective in terms of reducing agriculture's climate emissions and, even if it were very high, it would not ensure that the reduction targets for agriculture would be reached.

Climate accounting important for the tax to work

A fair and detailed climate account for the individual farm is essential for the cost-effectiveness of a greenhouse gas tax. On the basis of current knowledge, it is largely possible to draw up such accounts, see *Economy and Environment, 2022*. Determining the parameters for the accounts and how they will be updated is an important task that should be initiated as soon as possible.

Possible to provide compensation without distorting reduction incentives

Whether farmers should be compensated or not for the introduction of a greenhouse gas tax on agriculture is a political decision. If they are to be compensated, the design of the compensation scheme is important for economic efficiency. It is essential that compensation is given in such a way that the tax's incentive effect is preserved. This can be achieved if compensation to the individual farmer is solely based on historical information that cannot be influenced. If, on the other hand, the compensation is conditional on the choice of technology or other current production conditions, incentives will be distorted, and the costs will increase.

CHAPTER II, CLIMATE ADAPTATION IN COASTAL ZONES

Climate change increases the risk of storm surges, ...

In line with climate change, seawater levels are rising along the Danish coasts, and the risk of flooding in coastal zones is increasing. The increased risk of storm-induced flooding includes more frequent and more violent events, which will lead to more and greater damage from storm surges.

... and the cost of damage increases fivefold

In a scenario that projects temperatures to rise by 2.7 degrees by 2100, the expected annual cost of damage from storm surges would increase fivefold. Thus, the expected damage costs (which in 2023 are DKK 2 billion) would instead be DKK 10 billion if Denmark currently had the climate of the future, see Figure A.

FIGURE A **EXPECTED ANNUAL COST OF DAMAGE**

The cost of expected damage from storm surges is increasing in line with climate change

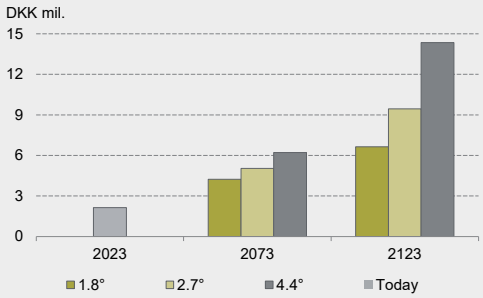
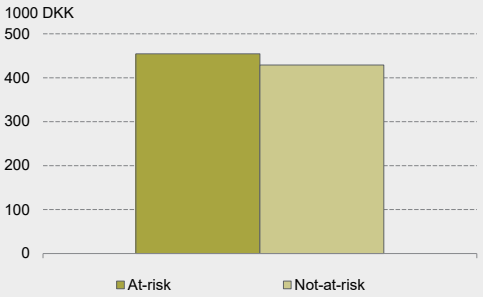


FIGURE B **INCOME IN RISK AREAS**

Average income is slightly higher in the at-risk areas than in the not-at-risk areas



Notes: Figure B shows the average equivalised disposable income for residents and home owners in at-risk and not-at-risk areas. Risk areas are defined as parishes with positive expected annual damage in 2023.

Source: Own calculations based on data from the Danish Coastal Authority and register data from Statistics Denmark.

Climate adaptation reduces damage costs

The costs of multiple floods can be reduced by implementing adaptation measures, such as increased coastal protection and changed settlement patterns. International studies show that climate adaptation measures can considerably reduce the expected costs of flood damage. Therefore, incentives to undertake appropriate climate adaptation are essential.

More has been built in high-risk areas

However, over the period 2009 to 2021, more has been built in areas that are at risk of flooding than in areas without this risk. This can, of course, be attributed to the fact that it is attractive to live close to the coast, but *the storm surge scheme* (in Danish: stormflodsordningen), which today subsidises those located in areas with a high risk of future flooding, is likely to be a contributing factor.

Subsidised storm surge damage insurance scheme distorts settlement incentives

This is due to the design of the storm surge scheme, which insures against damage in the event of flooding from storm surges. All property owners pay the same insurance premium via their fire insurance policy regardless of their flood risk. This means that property owners in at-risk areas are subsidised by property owners in areas without the risk of floods. This distorts the incentives to locate in areas with a high risk of flooding.

Subsidy for property owners in risky areas

The income of people who live in at-risk areas is, on average, slightly higher than people who live in areas without the risk of flooding, see Figure B. The storm surge insurance scheme will, on average, have a small redistribution effect from areas with low incomes to areas with high incomes. Furthermore, the insurance premium in the storm surge scheme is independent of the property's value, which further redistributes to owners with high property values in risky areas.

Introduce risk-based premiums

The chapter describes principles for improving the current storm surge insurance scheme to increase economic efficiency. This is achieved by making the premiums risk-based so that they reflect the costs of the damage. As a result, premiums in at-risk areas would increase, while premiums in not-at-risk areas would decrease. Furthermore, premiums and payouts should be made dependent on the observable storm surge prevention measures undertaken by the owner. To this end, the level of coverage and the coinsurance should be designed to incentivise private individuals to carry out preventative measures.

Slow phasing in for existing buildings

Such changes would increase the effectiveness of climate adaptation, but they may involve large increases in premiums and consequent falls in the prices of properties located in areas with the highest risk. Therefore, it is necessary to balance the increased efficiency in climate adaptation against the large losses for a section of the population. One possibility is to phase in the risk-based premiums gradually, thereby reducing the immediate redistributive effects on house prices while at the same time achieving the efficiency gains in the longer term. However, fully risk-based premiums should be introduced for all new construction immediately. This will already help to ensure that not too many new buildings are built in high-risk areas.

A committee of experts will have to determine the restructuring and transitional arrangements

In order to redesign the storm surge scheme, further analyses of the details of the proposed changes are necessary. It may be relevant to introduce a transitional arrangement as well as to delegate some of the market for storm surge insurance to private companies. Therefore, it is recommended that a committee of experts be set up to carry out this task.

Better decisions about publicly funded coastal protection via cost-benefit analyses

The costs of damage from storm surges can be reduced by effective coastal protection measures undertaken by the public sector or by private property owners. As a starting point, public sector coastal protection projects should follow the cost-benefit criterion that dictates that projects with net economic benefits are carried out, while other projects are rejected. Cost-benefit analyses should, therefore, always be carried out for proposed major coastal protection projects, and measures

should only be implemented when the benefits are greater than the costs.

Allocation of costs should follow a principle of utility

Today, municipalities decide whether affected property owners have to make financial contributions to coastal protection projects and they determine each party's share of the costs. Negotiations about the financing of projects can mean that projects with net benefits are postponed or abandoned, while projects with lower benefits are progressed. In order to avoid this, it is recommended that the distribution of contributions follows a principle of utility proportionally so that those who benefit from the project contribute in proportion to their gain. It is also recommended that utility values are calculated and allocated in a standardised way. If all the gains from a project accrue to the property owners, they have an incentive to support projects with positive net benefits and to oppose projects with negative net benefits.

Proposed climate adaptation plan

In October 2023, the Government released its proposal for the first part of a national climate adaptation plan. Among other things, the proposal includes an increase in the Coastal Protection Fund of DKK 150 million. The municipalities would be able to apply for money from this fund to finance local coastal protection projects. However, as a basic principle, coastal protection projects that protect local assets should be financed by those who benefit from the projects. The Government's proposal also aims to simplify the rules governing the allocation of costs. This basically accords with the Chairmanship's recommendations to standardise the method for calculating the allocation of costs.

CHAPTER III, MEAT CONSUMPTION AND GREENHOUSE GAS TAXES

Greenhouse gas taxes lead to price increases

A uniform tax on agricultural emissions of greenhouse gases provides an incentive for the most cost-effective green transition of the Danish agricultural sector, *see Economy and Environment, 2020*. This is partly because a uniform greenhouse gas tax leads to higher prices for the segments of agriculture that cannot be converted to less climate-damaging technologies. This is important because prices that reflect the climate impact of products encourage consumers to reduce their demand for climate-damaging products. This leads agriculture to transition towards more climate-friendly production.

The chapter examines consumer responses to meat price increases

The chapter empirically examines whether and how Danish consumers respond to meat price increases. This sheds light on whether one of the central mechanisms underlying the effect of a greenhouse gas tax works. The analyses use data on the food purchases of households in 2021-22, when food prices rose unexpectedly and to varying degrees for different types of meat and for meat from different countries of origin. In addition, the price increases were of an order of magnitude that corresponds to the expected increase in prices that follows from the introduction of a uniform greenhouse gas tax. The chapter analyses Danish consumers' demand for different types of meat and examines, among other things, the effects of increased Danish meat prices on the demand for foreign meat.

Mechanism underlying greenhouse gas tax works

The analyses examine increased prices for four types of meat: beef, pork, poultry and other meat and show that, when one type of meat increases in price, consumers respond by purchasing less of this meat, see Figure C. Thus, one of the fundamental mechanisms underlying the effect of a greenhouse gas tax works, as consumption falls for the foods that increase in price.

FIGURE C CONSUMER RESPONSES

Consumption of beef, pork and poultry falls when the price of the type of meat in question increases.

Notes: The figure shows own price elasticities for a price increase of 1 percent for beef, pork, poultry and other meat, and 95 percent confidence intervals are indicated by the black lines.

Source: Own calculations using data from GfK Panel Services Denmark.

Limited substitution between meat types

In addition, the analyses suggest that when one type of meat increases in price, consumption of other types of meat only increases to a limited extent. Total meat consumption thus falls regardless of which type of meat rises in price. The limited substitution that takes place is primarily towards other foods.

Consumption of imported meat is more price-sensitive than that of Danish meat

The chapter also contributes new knowledge about how Danish consumers respond to increases in the price of Danish and imported meat. The analyses show that the consumption of Danish meat is less sensitive to price increases than the consumption of imported meat. This is in line with Danish and international studies that have previously found that domestic consumers are more sensitive to increases in prices of imported products compared to domestically produced goods.

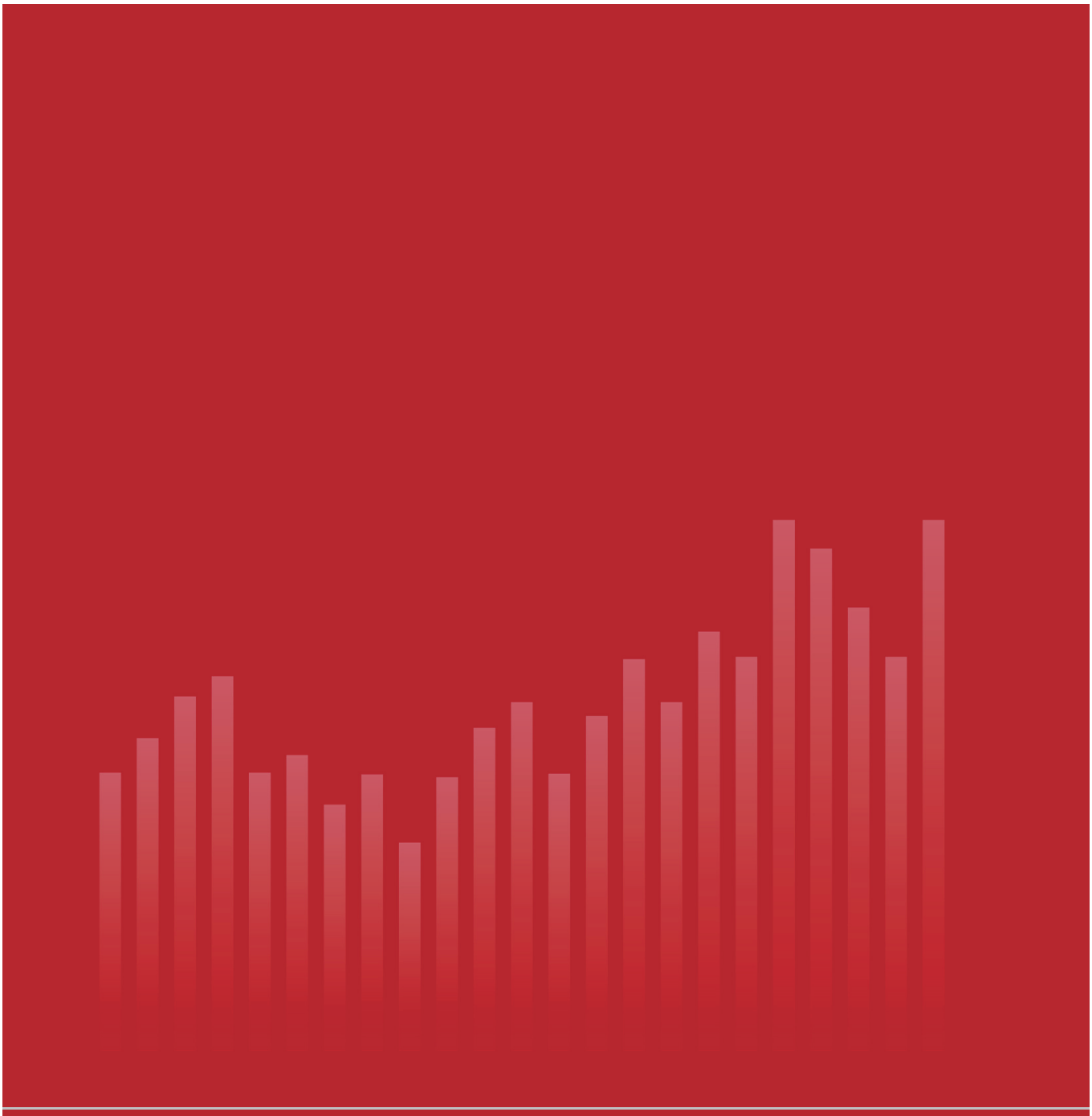
The analyses indicate limited carbon leakage in the domestic meat market

In response to a meat price increase, the consumption of Danish meat decreases by approximately the same proportion as the price increase so that overall spending on Danish meat remains approximately unchanged. Therefore, the need for substitution towards foreign-produced meat is limited, which is exactly what the chapter's analyses

show. The limited substitution that takes place is primarily towards other foods. The results in the chapter thus indicate that the changes in Danish consumers' meat purchases, which a greenhouse gas tax would lead to, only give rise to limited carbon leakage. A greenhouse gas tax on agriculture would, however, lead to price increases on goods other than meat, e.g., dairy products, and the analyses do not rule out that Danish consumers' responses to this may lead to significant carbon leakage effects.

Low costs for Danish consumers from meat price increases

The introduction of a greenhouse gas tax will lead to relative price increases for different types of meat. According to previous estimates by the Economic Councils' Chairmanship in *Economy and Environment, 2020* a tax of around DKK 1,200 per tonne CO_2e would lead to the following price increases: 17 percent for beef, 5 percent for pork and 1 percent for chicken. Estimates in the chapter show that the costs to Danish consumers that would result from such price increases are relatively limited. They make up around 0.5 percent of households' average annual expenditure on food, or around DKK 100 per household. Furthermore, the costs that result from the meat price increases are almost the same across three broadly defined income groups of households for which comparison was possible in the analyses. It should be noted that the analyses only represent the costs linked to the consumption of meat. However, a greenhouse gas tax would also lead to price increases on a number of other foods, for example, dairy products. The total costs to Danish consumers of a greenhouse gas tax on agriculture would, therefore, be greater.



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