

How climate protection adds to inflation

Dr Jörg Krämer

Tel: +49 69 136 23650

Dr Ralph Solveen

Tel: +49 69 136 22322

Climate policy wants to make fossil fuels significantly more expensive and thus set in motion a climate-friendly restructuring of the German economy. We analyze the associated costs to get a sense of how climate policy could affect inflation. Accordingly, the German inflation rate could increase by half a percentage point per year during a transition phase, although this estimate is associated with a high degree of uncertainty.

Households and businesses emit far too much CO₂ because they do not have to pay anything for these emissions. If politicians put a price on CO₂ emissions, economic agents would take the social costs of pollution into account and the cause of the climate problem would be solved. But how much do people have to pay for climate protection and how does that increase inflation, regardless of the fact that unchecked climate change would likely cause much higher costs and thus even more inflation?

Climate protection absorbs resources ...

To estimate the costs of climate policy and thus its potential effect on inflation, one needs to understand what climate policy does in an economy. Climate policy puts a price on the emission of greenhouse gases. Compared to a situation without a CO₂ price, the production processes change. Here is an example: Pricing emissions could make the capture and storage of CO₂ emissions from power plants economically attractive. Part of the labour and capital would now be needed to produce and maintain the corresponding facilities and infrastructure. Fewer resources would be available for the production of consumer goods, so that correspondingly fewer consumer goods could be produced. Consumer goods would become scarcer. In a model world without money, workers would be paid with fewer consumer goods; the real wage would fall and the price of consumer goods would rise relative to the wage.

... and makes consumer goods more expensive

Whether this increase in relative goods prices also leads to an increase in goods prices expressed in euros depends on monetary policy. If it responds to a reduction in the supply of consumer goods with a corresponding reduction in money supply, the prices of goods expressed in euros would not rise, while wages would fall. In order to conceal the inevitably worse position of workers, it would be politically opportune not to react to the reduction in the goods supply with a lower money supply. Therefore, central banks would provide so much money that prices would rise to such degree that the inevitable fall in real wages would occur without a fall in nominal wages. All this suggests that climate policy will lead to higher inflation, at least for a transitional period.

Two cost waves

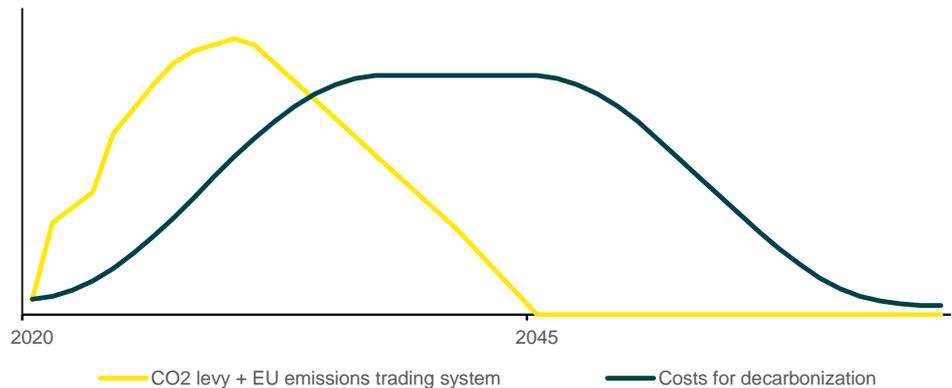
Climate policy increases inflation by triggering two waves of costs (chart 1). First, companies have to pay more for CO₂ emissions. They incur further costs because the higher CO₂ price leads them to reorganise their production in a climate-friendly way.

- 1. Increasing the cost of CO₂:** The cost of CO₂ emissions is likely to increase steadily in Germany in the coming years. The CO₂ levy, for example, will rise from the current 25 euros per tonne of CO₂ emitted to 55 euros by 2025. For the time after that, it is planned to integrate fossil fuels and heating energy into a certificate trading system, whereby the CO₂ price formed on the market should tend to rise. Because the price for the use of fossil fuels will increase, companies and consumers are likely to demand less of them; the quantities consumed will decrease. As a result, the total financial burden on businesses and households (and government revenues, vice versa) from the CO₂ levy and emissions trading will decrease after a certain point; by 2045 at the latest, when no more CO₂ is to be emitted, it will fall to zero.
- 2. Costs of decarbonising the economy:** The higher CO₂ prices as well as extensive regulations will induce companies to make a climate-friendly conversion. For one, this requires investments that would otherwise not have been made at all, or at least later. For another, many production processes are likely to become temporarily more expensive. How these costs will develop over time can hardly be estimated at present. However, they will probably initially increase from year to year, as the simpler (and less cost-intensive) measures are taken first. In particular, avoiding the last CO₂ emissions is likely to become very expensive. From 2045 at the latest, however, expenditure by companies and private

households is likely to decline, as the conversion investments will have been made. In addition, operating costs will probably fall again due to technical progress. Whether costs will be higher or lower than at present is hard to say. It is true that there will be fewer input costs for energy production, for example, since the wind and the sun, unlike natural gas or hard coal, are for free. However, due to the strong fluctuations in energy production from wind and sun, significantly larger reserve capacities will probably have to be maintained, which also cause costs.

Chart 1 - Two kinds of costs on the way to climate neutrality

Stylised trajectory of costs incurred by companies and private households in the transition to a climate-neutral economy



Source: Commerzbank Research

The first wave of costs: the CO₂ levy

To start with we analyze the first wave of costs triggered by the CO₂ levy, which companies are likely to pass on to their customers through higher prices, at least in the long run. According to calculations by the German Council of Economic Experts, the levy of 25 euros per tonne of CO₂, which has been imposed since the beginning of this year, has increased consumer prices by a good 0.6% this year via more expensive fuel and heating oil (front page chart). In the coming years, the inflationary effect will be smaller, as the levy will then be raised in smaller steps according to the current legal framework.[1]

There may be further effects from the fact that higher energy costs make the production of other goods and services more expensive (e.g. higher petrol costs for taxi rides) and the companies pass this on to their customers as well. If this were to happen in full, it would once again have a similarly large effect on consumer prices as the direct effect via higher energy costs. All in all, the CO₂ levy is likely to increase consumer prices by almost 3% overall in the coming years via direct and indirect effects.

It is assumed in the front page chart that the higher costs for both energy and other goods and services will be passed on to consumers without delay. In the case of energy, this can be assumed on the strength of experience with previous tax increases. In the case of other goods and services, however, this is likely to occur with a certain delay, so that the effect of the CO₂ levy on the consumer price index is probably significantly smaller, especially this year, and will tend to be somewhat larger in the following years.[2]

In addition to the costs of the CO₂ levy, companies have to bear further burdens from the European Emissions Trading Scheme. For a long time, these were low because the companies not only received the certificates for free, but in the meantime a large amount of surplus emission allowances had accumulated, which was due to less ambitious reduction targets, crisis-related declines in production and emissions, and the extensive use of international project credits. This had put a strong downward pressure on the certificate price. But since 2017, the prices and thus the costs for the companies that need additional certificates have risen noticeably (chart 2). This is particularly noticeable in exchange-traded electricity prices, but also in the prices of intra-European air travel.

Chart 2 - Strong price increase of CO₂ emission rightsEuros per tonne of CO₂ emitted

Source: Bloomberg, Commerzbank Research

The second cost wave: The climate-friendly restructuring of the economy

Having examined the impact of higher CO₂ prices on inflation (first wave of costs), we now turn to the costs of the climate-friendly transformation of businesses triggered by higher CO₂ prices and regulatory requirements. The size of this second cost wave and thus its impact on inflation depends on many factors that can hardly be predicted at present:

- **Price signals or regulations?** If climate policy relies primarily on CO₂ prices or certificate trading, this will have a direct and thus rapid impact on consumer prices. But overall, such a climate policy is cheaper because market-based incentive mechanisms induce companies to reduce greenhouse gas emissions where it is cheapest. In contrast, rules and regulations do not have a rapid impact on consumer prices, but cause higher costs and consumer prices in the long run because politicians cannot know where CO₂ emissions can be reduced most efficiently.
- **How strong is the technical progress?** For example, rapid and tangible efficiency improvements in the production of synthetic fuels or green hydrogen could require less investment in infrastructure and thus reduce the costs of the transition to a CO₂-neutral economy.
- **How much are government subsidies?** Subsidies do not reduce the economic costs of the transition, but rather increase them because of greater inefficiencies. But subsidies relieve the financial burden on companies, so that they will raise their prices less. This would be different if these subsidies were financed through higher consumption taxes, which would also increase consumer prices.

Conversion costs can only be roughly estimated

Because of all these open questions, the few studies that estimate the costs of decarbonising the economy can only provide an indication of the magnitude of the costs to be expected. In November 2017, for example, **the German science academies** estimated that a 90% reduction in greenhouse gas emissions by 2050 would incur additional costs of €3,000bn compared to a reference scenario without active climate policy. This would be just under 100 billion euros per year, or a good 2½% of current GDP.

A study commissioned by the Federation of German Industries (BDI) arrives at much lower figures. According to this study, the additional expenditure for a 95% reduction would amount to about 1,420 billion euros.[3] This would be "only" just under 50 billion euros per year, or about 1¼% of GDP. The authors even point out that they have rather underestimated the positive effect of technical progress. However, it is precisely the saving of the last 5%, which is excluded in this study, that is likely to be particularly expensive. In addition, the target date for climate neutrality has been moved forward by 5 years since the study was prepared, which is likely to increase the costs. Finally, it is assumed that the most cost-efficient path to (extensive) climate neutrality will be taken. In view of the current tendency of German policy to rely on regulation rather than price signals, there is a big question mark behind this assumption, so that the costs are likely to be significantly higher.

Based on these two studies, we assume that the annual costs of a climate-friendly conversion of the economy will amount to an average of about 2 to 2½% of GDP. In the coming years,

they are likely to initially be below this average, but by the end of the current decade they will increase to a value at the upper end of this range or even above it. From 2045 at the latest, however, these costs will then fall significantly.

What all this means for inflation in the coming years

A large part of these additional costs will be passed on by the companies to their customers, i.e. to their customers abroad as well as to the domestic buyers of investment goods, consumer goods and services. This will be possible since all suppliers are affected by this – the foreign companies either through their own national measures or through an expected CO₂ border tax.

Consequently, climate policy is likely to increase consumer prices by about 2½% by the end of the decade because of the conversion costs. What has to be added to this is the effect of the CO₂ levy, which is likely to be of a similar magnitude. This results in an increase in consumer prices of about 5% for the entire period; per year this means an inflation rate that is higher by about 1/2 percentage point on average. Climate policy, like de-globalisation or the great demographic shift (declining share of the working-age population), is a structural argument for higher inflation in the coming years.

[1] In the next two years, the levy is to be increased in two steps of 5 and then in two steps of 10. However, this could change after the Bundestag elections, as the Greens, for example, are already calling for a CO₂ levy of 65 euros per tonne for 2023. ([back to text](#))

[2] The front page chart does not take into account that part of the revenue from the CO₂ levy was used to prevent a further sharp increase in the EEG levy. In fact, this has even fallen slightly compared to 2020. All in all, the subsidy of the EEG from the federal budget has pushed down the consumer price index by about 0.15% this year on its own. In the coming years, these payments from the federal government are to be increased further. ([back to text](#))

[3] Here we consider the scenario that assumes largely unchanged oil prices ("\$50 scenario"). This is because in the other scenarios the assumed increase in the oil price depresses the calculated (net) costs of the switch, as the savings increase due to the decrease in oil imports. However, this does not play a role for inflation. ([back to text](#))

Research contacts (E-Mail: firstname.surname@commerzbank.com)

Chief Economist

Dr Jörg Krämer
+49 69 136 23650

Economic Research

Dr Jörg Krämer (Head)
+49 69 136 23650

Dr Ralph Solveen (Deputy Head; Germany)
+49 69 136 22322

Dr Christoph Balz (USA, Fed)
+49 69 136 24889

Dr Michael Schubert (ECB)
+49 69 136 23700

Eckart Tuchtfield (German economic policy)
+49 69 136 23888

Dr Marco Wagner (Germany, Italy)
+49 69 136 84335

Bernd Weidensteiner (USA, Fed)
+49 69 136 24527

Christoph Weil (Euro area, France, Switzerland)
+49 69 136 24041

Hao Zhou (EM)
+65 6311 0166

Interest Rate & Credit Research

Christoph Rieger (Head)
+49 69 136 87664

Michael Leister (Head Rates)
+49 69 136 21264

Rainer Guntermann
+49 69 136 87506

Cem Keltek
+49 69 136 87685

Ted Packmohr
(Head Covered Bonds and Financials)
+49 69 136 87571

Marco Stoeckle
(Head Corporate Credit)
+49 69 136 82114

FX & EM Research

Ulrich Leuchtmann (Head)
+49 69 136 23393

Thu-Lan Nguyen (G10)
+49 69 136 82878

Antje Praefcke (G10)
+49 69 136 43834

Esther Reichelt (G10)
+49 69 136 41505

Lutz Karpowitz (EM)
+49 69 136 42152

Elisabeth Andreae (EM)
+49 69 136 24052

Alexandra Bechtel (EM)
+49 69 136 41250

Tatha Ghose (EM)
+44 20 7475 8399

Charlie Lay (EM)
+65 63 110111

You-Na Park (EM)
+49 69 136 42155

Melanie Fischinger (EM)
+496913623245

Commodity Research

Eugen Weinberg (Head)
+49 69 136 43417

Daniel Briesemann
+49 69 136 29158

Carsten Fritsch
+49 69 136 21006

Dr Michaela Kuhl
+49 69 136 29363

Barbara Lambrecht
+49 69 136 22295

Cross Asset Strategy

Alexander Krämer
+49 69 136 22982

Andreas Hürkamp (Equity Strategy)
+49 69 136 45925

Markus Wallner (Equity Strategy)
+49 69 136 21747

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60327 Frankfurt	London, EC2P 2XY	NY 10281-1050		Causeway Bay
				Hong Kong
Tel: + 49 69 136 21200	Tel: + 44 207 623 8000	Tel: + 1 212 703 4000	Tel: +65 631 10000	Tel: +852 3988 0988