CARBON BORDER ADJUSTMENT MECHANISMS AND THEIR ECONOMIC IMPACT ON THE CZECH REPUBLIC

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Report summary

In this report, we evaluate the impact of the introduction of Carbon Border Adjustment Mechanisms (hereinafter CBAM or CBAMs) in selected industries on the market in the Czech Republic and attempt to identify the strong sides of the Commission Proposal with the highest impact on climate change, which might be on the top agenda during the Czech Presidency of the European Union (EU). This study assesses the issue of future CBAM implementation in Czechia taking into consideration legal and administrative obstacles as well as economic implications. It is important to underline that our study analyses a hypothetical CBAM imposed as an import carbon tax, which is very similar to the first option of the European Commission (2021a).

Implementation issues

The EU would like to be climate-neutral by 2050. However, the transition of EU industry and its decarbonisation and the zero-pollution ambition is associated with massive structural changes, increased costs of production and the risk of carbon leakage. The main objective of a future CBAM at EU level is to decrease carbon leakage by decreasing the carbon emissions embodied in goods and services imported from non-EU trading partners. The carbon intensive goods imported include cement, electricity, fertilisers, iron and steel, aluminium as well as other goods that result from highly pollutant materials used in upstream of production process. The EU CBAM presents significant challenges for the EU economy, countries of trading partners and developing countries (low-income and lower-middle income countries). Moreover, countries would be affected very differently depending on the importance of trade with the EU for the national economy, on the inability to adapt to the EU CBAM by changing export structures, decarbonising and/or certifying the carbon content of products. Many of the EU's trading partners have voiced concerns against the CBAM, such as the US, China, Russia and India. The EU should not miss the opportunity to address those concerns, otherwise there is a high risk of conflict, namely with the powerful trading partners, and risk of retaliation to the introduction of CBAMs from trading partners or reduction of the efficiency of CBAMs. Moreover, they could reduce the willingness to further cooperate internationally on reaching higher levels of global climate ambition.

On the one hand, commentators are also afraid that the EU will become a “low carbon island” where trade would be split between trade partners (countries) that are able to produce low-carbon products and those that are not able to do so. Therefore, the CBAMs will affect the trade options of trading partners by increasing the trade costs which will reflect carbon intensity and incentivize carbon emissions reduction. Trade partners declare and insist that although they understand the need for decarbonisation, they do not have sufficient financial and technical resources required for the decarbonisation. On the other hand, EU producers are afraid that they would lose their competitiveness.

However, as regards the implementation issue, the determination of the actual volume of CO_2 emissions embedded in a product is the key of the CBAM's application. Therefore, in determination of CBAMs, the carbon intensity (emissions embedded in the imported product) is a major technical issue of this study,

as carbon intensity is not straightforward and is the subject of methodological choices, such as selection of emission components, the setting of system boundaries (which processes from upstream/downstream are included), choosing allocation rules and application of representative data.

Economic analysis

Firstly, we have aimed to investigate the sensitivity of total imports of Czechia from among the top 20 non-EU trading partners as regards the price, income and trade costs. We have estimated the import demand elasticity to price and income and we have found out that the demand for foreign goods is inelastic and negatively affected by price increases. Secondly, we have estimated a gravity model where the main objective was to estimate the impact of trade costs on the total value of imports. We have established that tariffs have a statistically significant and negative impact on the total imports from non-EU countries. Therefore, we consider that a future CBAM implementation in Czechia will have a negative impact on the imports of goods from non-EU countries.

Furthermore, we have found out that Czechia imports rely more on finite products and less on raw materials. There are three main categories of energy-intensive goods that dominate total imports, namely machinery and tools of base metals, electrical equipment and mineral fuels. We also found that the main non-EU supplier of mineral fuels as well as other semi-finished goods is Russia, while the main source of machinery and electrical equipment is China.

As regards the impacts of the CBAM implementation on the Czech market and energy-intensive industry, we have adopted a second level of dis-aggregation, following the EXIOBASE data regarding carbon intensities, and simulated a rather inclusive range of carbon prices expressed in EUR per tonne (i.e. 10, 25, 50, 66 and 100 EUR/tonne of emissions) applied to two scenarios (a Feasible Scenario and an Ideal Scenario). We run our simulations in both scenarios assuming that the non-EU trading partners of Czechia have no climate policies implemented.

The first scenario, entitled the Feasible Scenario, assesses the implications of a future CBAM imposed on imports of selected categories of energy-intensive goods. We simulated four different levels of CBAMs imposed as EUR per tonne of CO_2 emissions for a) short list of carbon intensive goods based on the Commission's legislative proposal, namely: cement, fertilizers, iron and steel, and aluminium; b) 19 categories of energy-intensive goods imported from main non-EU countries. We simulated a lower level of 10 EUR/tonne, a mid-level of 25 EUR/tonne, two higher levels of 50 and 66 EUR/tonne and a maximum level of 100 EUR/tonne of CO_2 emissions. The level of 66 EUR/tonne of CO_2 is also included in order to simulate the implications of such CBAM that match the current price of carbon emissions (November 2021) at EU level, although it is expected that the EU ETS price will hit 100 EUR/tonne of CO_2 emissions this year. The objective of these simulations was to calculate the potential implications of import demand, on GDP and on CO_2 emissions, from different levels of charges, offering a comparative insight for policy-makers.

The second scenario, entitled the Ideal Scenario, assesses the implications of a future global CBAM imposed on all imports to Czechia from its non-EU countries. The second scenario does not discriminate between different categories of goods imported by Czechia. We consider necessary to stress that the Ideal Scenario is less feasible to be implemented due to its high requirement regarding CO_2 intensities for all products imported and high administrative costs. The expression "Ideal" used for the second scenario is directly connected with the environmental objectives of a future CBAM implementation in the EU. The implementation of a "global" CBAM would have a significant impact on carbon emissions in non-EU trading partners. However, the Ideal Scenario is highly unlikely to be adopted due to its near insurmountable challenges related to administrative, legal and economic costs. Moreover, the Ideal Scenario under the rigid WTO rules could lead to significant retaliatory trade countermeasures by non-EU trading partners producing unwanted trade distortions. We have included the Ideal Scenario in our analysis solely for comparative reasons, in order to offer additional insights regarding the implications of global CBAMs.

The scope of this study is to estimate potential economic impacts of a future CBAM implementation in Czechia. In comparison with the European Commission Report (2021b), we select a wider range of pollutant products imported by Czechia from its main non-EU trading partners. We consider that a future CBAM implementation, regardless of what form it will take (i.e., as an import tax or surrendering of certificates) it will lead to significant economic implications triggered by distortions of import demand. Unequivocally, future CBAMs will lead to higher prices and production costs that will affect both upstream and downstream production chains. Therefore, it is necessary to estimate the potential adverse effects and their impact on economic growth, taking into consideration a wide range of imported products and different levels of CBAMs. The empirical analysis and the results obtained above are based on empirical analysis of macroeconomic data between 2000-2020 (i.e., trade, import demand, price and GDP), simulations of different levels of CBAMs as well as carbon intensity for each category of goods assumed to fall in the event of future CBAMs.

Results

The results obtained regarding a future CBAM implementation in Czechia are presented in three different tables as follows. In Table 1 we present the results for the Feasible Scenario, only for EU short list of carbon intensive goods, namely: cement, fertilizers, iron and steel, and aluminium.

Table 1. The impact estimation of future CBAM implementation for EU proposed categories of goods imported from non-EU countries (Feasible Scenario)

Category of goods	CO_2 intensity	**CBAM 10 EUR/tonne CO_2**	**CBAM 25 EUR/tonne CO_2**	**CBAM 50 EUR/tonne CO_2**	**CBAM 66 EUR/tonne CO_2**	**CBAM 100 EUR/tonne CO_2**
	Gg/mil. EUR	Price increase in %				
EU proposed categories of carbon intensive goods	5.05	5.05	12.62	25.23	33.31	50.47
	Price elasticity coefficient	Impact on import demand in %				
	-1.16	-5.90	-14.76	-29.52	-38.96	-59.04
	GDP coefficient	Impact on GDP in %				
	0.04	0.09	0.24	0.47	0.62	0.94
	CO2 coefficient	Impact on total CO_2 emissions in %				
	0.02	-0.10	-0.24	-0.48	-0.63	-0.95

*Source: Own calculations. Note: the values presented represent the mean values.

Contrary to our expectation, the impact of CBAM on GDP in Czechia is a positive one. These estimates are driven by the fact that a decrease of cement and fertilisers imports from non-EU trading partners has a positive impact on economic growth in Czechia. On the other hand, the decrease of iron and steel imports, as well as the decrease in aluminium imports has a negative impact on GDP. However, the negative impact is offset by the positive impact of cement and fertilisers import demand, which in average has a positive impact on GDP.

In Table 2, we present the results regarding the future CBAM implementation in Czechia for 19 categories of goods imported from non-EU countries.

Table 2. The impact estimation of future CBAM implementation for 19 categories of goods imported from non-EU countries (Feasible Scenario)

Category of goods	CO_2 intensity	**CBAM 10 EUR/tonne CO_2**	**CBAM 25 EUR/tonne CO_2**	**CBAM 50 EUR/tonne CO_2**	**CBAM 66 EUR/tonne CO_2**	**CBAM 100 EUR/tonne CO_2**
	Gg/mil. EUR	Price increase in %				
19 categories of carbon intensive goods imported from non-EU countries	2.36	**2.18**	**5.44**	**10.88**	**14.36**	**21.76**
	Price elasticity coefficient	Impact on import demand in %				
	-1.02	**-2.26**	**-5.66**	**-11.31**	**-14.93**	**-22.63**
	GDP coefficient	Impact on GDP in %				
	0.05	-0.02	-0.05	-0.09	-0.12	-0.18
	CO2 coefficient	Impact on total CO_2 emissions in %				
	0.02	**-0.03**	**-0.08**	**-0.15**	**-0.20**	**-0.30**

*Source: Own calculations. Note: the values presented represent the mean values[6].

We have found out that the import demand for all 19 categories of energy-intensive goods imported is negatively influenced by a price increase, confirming our expectations. The decrease in import demand creates a difficult task to further estimate the propagation of negative effects. The reaction of importers depends on a wide range of exogenous factors that could lead to reduction of production or increase demand for carbon intensive goods from EU trading partners. In the context of business as usual, with

[6] It is important to mention the rather interesting difference between results obtained in Table 1 versus Table 2 with respect to the price increase, impact on import demand and GDP. The mainstream expectation would be that CBAM imposed on the short-list of EU goods would have a smaller impact than on 19 categories of carbon-intensive goods. One pertinent explanation of this "decreased" impact is that the short list of goods has an overall negative impact on price, demand and GDP, while in the case of 19 categories of goods there are some carbon-intensive goods that have a positive impact on price, demand and GDP. Consequently the offsetting effect (i.e., "lessening" effect) on the mean values regarding the effect of future CBAM implementation on price, import demand, impact on GDP and impact on total CO2.

no carbon price applied, the economics implications of a future CBAM implementation in the Czech Republic, would be translated into 0.02% decrease of GDP if a 10 EUR/tonne of CO_2 CBAM is imposed, while the maximum level of CBAM simulated, namely 100 EUR/tonne of CO_2, will lead to an average GDP decrease of 0.18%. However, we have found out that a CBAM implementation in Czechia would have a rather small impact on total CO_2 emitted by its main non-EU trading partners. We estimate that a low-level of CBAM, 10 EUR/tonne of CO_2 would produce only a -0.03% decrease in total CO_2 emissions, while a 100 EUR/tonne CO_2 CBAM would lead to a -0.3% decrease in the total volume of emissions. It is important to note that the results presented in Table 2 represent averages for selected categories of carbon-intensive goods and not total values. Moreover, these estimates are based on a "ceteris paribus" context, which could be affected significantly by future redistribution of exports from CBAM adopters to other world countries that do not impose carbon border charges.

In Table 3 we present our results regarding the impact of a future CBAM implementation in Czechia in an Ideal Scenario, where all categories of imports from non-EU countries are considered.

Table 3. The impact estimation of a future CBAM implementation for all categories of goods imported from non-EU countries (Ideal Scenario)

Category of goods	CO_2 intensity	**CBAM 10 EUR/tonne CO_2**	**CBAM 25 EUR/tonne CO_2**	**CBAM 50 EUR/tonne CO_2**	**CBAM 66 EUR/tonne CO_2**	**CBAM 100 EUR/tonne CO_2**
	Gg/mil. EUR	Price increase in %				
All imports from non-EU countries	2.31	2.3	5.75	11.51	15.19	23.01
	Price elasticity coefficient	Impact on import demand in %				
	-0.969	-2.229	-5.572	-11.153	-14.719	-22.297
	GDP coefficient	Impact on GDP in %				
	0.304	-0.678	-1.694	-3.391	-4.475	-6.778
	CO2 coefficient	Impact on total CO_2 emissions in %				
	0.312	-0.695	-1.738	-3.48	-4.592	-6.957

*Source: Own calculations. Note: the values presented represent the mean values.

Comparing the Feasible Scenario versus the Ideal Scenario, we have found out that the former produces a considerably smaller decrease in import demand and thus bears a smaller negative impact on GDP than the latter scenario. However, the Ideal Scenario proved to be more efficient in decreasing the overall volume of CO_2 emissions of non-EU countries when compared with the Feasible Scenario.

The implementation of a future CBAM should consider these trade-offs. Although it is not possible to decide an optimal carbon price by policymakers, according to the current development when the ETS price may hit 100 EUR/tonne CO_2 this year, it is possible to achieve a maximum decrease of CO_2, but with negative effects on domestic economic growth. However, the CBAM should result into the fair competition of products on the internal market as imported products will reflect their carbon content and consequently fair pricing of GHG emissions. The created “fair level playing field” for the relevant sectors in the internal market will provide importers, regardless of the country of origin and port of entry or destination within the EU, uniform conditions and incentives for carbon emission reductions that are equivalent to those of domestic producers. Properly-targeted incentives for carbon emission reductions for those non-EU producers can help to reduce CO_2 globally.

The economic implications of a future CBAM implementation in Czechia and the environmental effectiveness thereof depend directly on a multidimensional spectre of challenges. The three-dimensional factors that make the difference between a costly and environmentally ineffective measure and a feasible CBAM are as follows. The first dimension relates to the type of goods selected to fall under the incidence of a future CBAM, the second dimension represents the quantity of embodied carbon emissions, and the third dimension is represented by the level (e.g., price of carbon emissions) of CBAM. While the first two dimensions could be relatively easy to adjust in future, the third dimension represents the key issue that challenges the implementation of any CBAMs in the future.

Environmental aspects

From the environmental point of view, the most important added benefit of the CBAM is its ability to reduce carbon emissions in the country of source/production outside of the EU resulting in the reduction of CO_2 worldwide. The properly-targeted motivation offered to non-EU producers/importers will motivate them to decrease their carbon emissions and help to ensure that the EU's emissions reduction efforts will not be offset by increasing emissions outside the EU through importing "cleaner" products into the EU and “the most demanding” ones to the rest of the world, or by relocation of productions. As a result, the CBAMs would be able address climate change by reducing the volume of GHG emissions in the Union and globally.

However, it is clear that without prior sufficient financial support, the transition to carbon-free or low-carbon production will be very challenging. Some producers/importers or trading partners can prefer to target other customers in countries where decarbonisation is not required, which would result in the

global CO_2 reduction target not being reached. One offsetting advantage of a future CBAM, leading to a reduced volume of carbon emissions on a global level, is that through this measure the EU will limit carbon leakage and will increase the pressure on non-abating countries to adopt climate policies in future. However, these conclusions need to be supported by a thorough study that is not a part of this report.