

ASSESSING SERBIAN IRON AND STEEL EXPORTS TO THE EU UNDER CBAM

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Abstract: Iron and steel products in Serbia is mostly oriented towards export to the EU market. The aim of the paper is to assess Serbian exports to the EU of various products from the iron and steel sector that will be covered by Carbon Border Adjustment Mechanism (CBAM) and conduct a comparative analysis of greenhouse gas (GHG) emissions of these products to the EU. The findings of this paper suggest that 60% of total value of Serbian iron and steel exports will be effected by the CBAM. Additionally, it is observed that five specific iron and steel products dominate Serbian exports to the EU and are significantly exposed to CBAM regulations. Furthermore, the analysis reveals that the direct emissions associated with these products are, on average, 25% higher than the emissions within the EU, while indirect emissions are, on average, more than three times higher than those in the EU.

Keywords: Carbon Border Adjustment Mechanism, European Union Emissions Trading System, iron and steel, Serbia, Green Deal

1. INTRODUCTION

In order to address the challenges posed by climate change and mitigate GHG emissions, numerous states and regional governments have implemented ambitious strategies (Hainsch et al., 2022). Many countries have adapted carbon pricing mechanisms to incentivize companies to lower their CO₂ and other GHG emissions. In April 2022, a total of 73 emissions trading systems (ETS) and carbon taxes were implemented, collectively covering more than 23% of GHG emissions. One of the first and largest carbon pricing mechanism is European wide system called European Union Emissions Trading System (EU ETS). EU ETS is a mechanism that started in 2005 and has since significantly contributed to GHG emissions reduction. In 2022, the EU ETS covers 11,000 enterprises within the 27 EU states and three non-EU states (Norway, Iceland and Lichtenstein), which accounts for 45% of the total GHG emissions in these countries (Vićentijević et al., 2023).

From the beginning of implementation of EU ETS, EU policy makers were conscious of potential issues of carbon leakage. Carbon leakage occurs when EU companies relocate their carbon-intensive production to countries with lower or without carbon pricing policies. In order to deal with these problem EU introduced new mechanism called Carbon Border Adjustment Mechanism (CBAM). CBAM is an import tariff on products from carbon-intensive sectors such as iron and steel to reduce carbon leakage and aims to provide incentive to companies outside EU ETS to reduce their GHG emissions. Six sectors are included in first phase of implementing CBAM. Together with products under the sectors of hydrogen, cement, fertilizers, electricity and aluminum, one of the sectors covered by CBAM is iron and steel (European Parliament, 2023b), which is a sector with one of the highest emissions globally. In 2019, iron and steel companies produced around 2.6 Gt CO₂e or 7% of total emission world wide. (International Energy Agency, 2020).

The EU is the biggest trading partner of Serbia. In 2022, Serbia's exports to the EU were €17.7 billion (64.1% of total Serbian exports), while imports from the EU amounted to €21.4 billion (54% of total Serbian imports). Furthermore, the iron and steel sector is traditionally one of the most important export sectors of the Serbian economy. Between 2019 and 2023, on average, iron and steel accounted for 7.2% of the total value of Serbian exports to the EU (European Statistical Office, 2024). Moreover, as a candidate country for EU membership, Serbia is obliged to harmonize its legislative framework with EU regulations, including those related to energy and industrial policy. Due to the fact that Serbia is neither part of the EU ETS nor does it have its own carbon pricing system, Serbian iron and steel exports will be under CBAM scope.

The primary objectives of the paper are: 1) to determine the amount of the Serbian exports of iron and steel to EU and to which extent it will be covered by CBAM. 2) to analysis structure of Serbian export of iron and steel

products and to identify the main export products from these industries 3) to asset both indirect and direct emissions intensity of main export products from iron and steel sector in Serbia and to compare to the EU average.

2. METHODS

Academic interest in the CBAM has increased, resulting in a growing body of literature. Academic research on CBAM has primarily concentrated on three key areas. Firstly, scholars have examined its legal implications and combability with World Trade Organization (WTO) regulations, as explored by Gehring (2023) and Lim et al. (2021). Secondly, there is a focus on evaluating CBAM's potential effectiveness in combating carbon leakage, with papers by Khourdajie and Finus (2020) and Sun et al. (2023) contributing to this aspect. Lastly, researchers have investigated CBAM's ramifications on the European Union's external trade relations with other nations, as studied by Øverland and Sabyrbekov (2022) and Smith et al. (2023).

Moreover, an expanding number of papers are examining topics that assess the effects of CBAM on specific sectors or individual states, taking into account the emissions of companies operating within CBAM-covered sectors. For instance, Tastan (2022) explored the effects of CBAM on the Turkish economy, Takeda and Arimura (2024) focused on its effects on Japan, while Magacho et al. (2024) examined its impact on developing countries. Additionally, Li et al. (2023) and Zhao et al. (2024) analyzed the implications of CBAM on the Chinese iron and steel industries, with a focus on potential policy adjustments by the Chinese government.

The primary methodological approach employed in this paper involves conducting a comparative analysis between emission levels in Serbia and the average emission intensities observed within the EU. This analysis encompasses both direct emissions, which are directly released into the atmosphere from production of iron and steel, and indirect emissions, which result from upstream activities associated with production processes, mostly electricity generation.

For the purpose of the research, data for Serbian export of iron and steel was used from both European Statistical Office and UN Comtrade databases under Combined Nomenclature (CN) commodity code for the period between 2019 and 2023. Data on emission intensity for the individual iron and steel products for both Serbia and EU was obtained from the publication of Vidovic et al. (2023), produced for the European Commission's Joint Research Center.

3. CARBON BORDER ADJUSTMENT MECHANISM

The EU has been a pioneer in carbon pricing, establishing the first ETS in 2005. When creating the ETS, the EU recognized the need for specific regulations for sectors such as iron and steel production, which are at risk of carbon leakage i.e., the risk that production capacities might relocate to countries with no carbon pricing or lower rates of carbon taxes. To address this, the EU provides free emission permits, known as free allocations, to these vulnerable sectors to protect EU domestic production capacities. The free allocation in the EU ETS is calculated based on historical emissions data and benchmarks, which represent the average emissions intensity of the most efficient installations within each sector and serve as a reference point for allocating emission allowances. While this measure has protected industries at risk of carbon leakage (Koch & Basse Mama, 2019), it has not sufficiently incentivized the reduction of GHG emissions in these sectors (Jakob, 2021). In addition to free allocations, the EU ETS employs a mechanism called indirect cost compensation which allows individual member states to provide subsidies to sectors at risk of carbon leakage due to significant indirect costs from the carbon pricing of electricity sector emissions. Similar to free allocations, indirect cost compensation is determined using efficiency benchmarks for electricity consumption (European Parliament, 2023a).

In 2020, the EU adopted the European Green Deal, ambitious plan in which EU committed to a 55% reduction in GHG emissions by 2030 compared to 1990 levels (Hafner & Raimondi, 2020). A key instrument of this initiative is the CBAM, a tariff on imports of products from high-emission sectors like iron and steel, designed to reduce carbon leakage. The CBAM aims to level the playing field by ensuring that the carbon price for products produced inside and outside the EU is the same, while also creating incentives for companies to invest in cleaner technologies. If importers can prove that a carbon price has already been paid during the production of the imported goods, the corresponding amount can be deducted. (European Parliament, 2023b). According to the plan, by 2034, the free allocation permits and indirect cost compensation will be completely phased out, with the affected sectors then subject to the CBAM tariff (European Parliament, 2023b).

Starting from October 2023, the transition period for the CBAM began, during which importers are only required to report both direct and indirect emissions from imported products. From 2026, the CBAM will be fully implemented, requiring imported products to pay a carbon price equivalent to what EU companies would pay

under the EU ETS. Initially, only direct emissions will be included in the CBAM system for most iron and steel products.

Under CBAM regulations, the iron and steel sector is defined as products under CN commodity codes 72 – Iron and Steel, and 73 – Articles of Iron and Steel, with few exceptions (European Parliament, 2023b). The regulation also includes products under CN code 2601 12 00 – Agglomerated Iron Ores and Concentrates, other than roasted iron pyrites. However, since the annual Serbian export of these products to the EU amounts to less than a thousand euros, they were not included in the analysis.

Although introduction of carbon pricing has been under consideration by the Serbian government, Serbia has not yet implemented its own system (Vićentijević et al., 2023). Therefore, the majority of the Serbian iron and steel sector will be subject to CBAM tariffs. Furthermore, as a candidate country, Serbia is obliged to harmonize its legislation with the EU as a condition for becoming a full member.

4. SERBIAN EXPORT OF IRON AND STEEL

In 2022, Serbia was the 47th largest producer of iron and steel, with a production of 1.7 million metric tons. (World Steel Association, 2023). The largest production facility in Serbia for iron and steel is the Smederevo Steel Plant, which has been operating since 1913 under the name SARTID. Following the Second World War, the company was nationalized and operated by the government. However, due to sanctions in the 1990s and the loss of markets and suppliers, the company faced bankruptcy. In 2003, Serbia's steel producer was sold to U.S. Steel. Nevertheless, after the financial crisis in 2012, U.S. Steel sold the company back to the Republic of Serbia, leading to a significant reduction in production, as shown in Figure 1. In 2016, the Republic of Serbia privatized the Smederevo Steel Plant to the Chinese company Hesteel. (Stojanović-Višić et al., 2023) This privatization enhanced the company's international competitiveness and increased steel production, making it one of the top Serbian export companies, as can be seen in Figure 1.

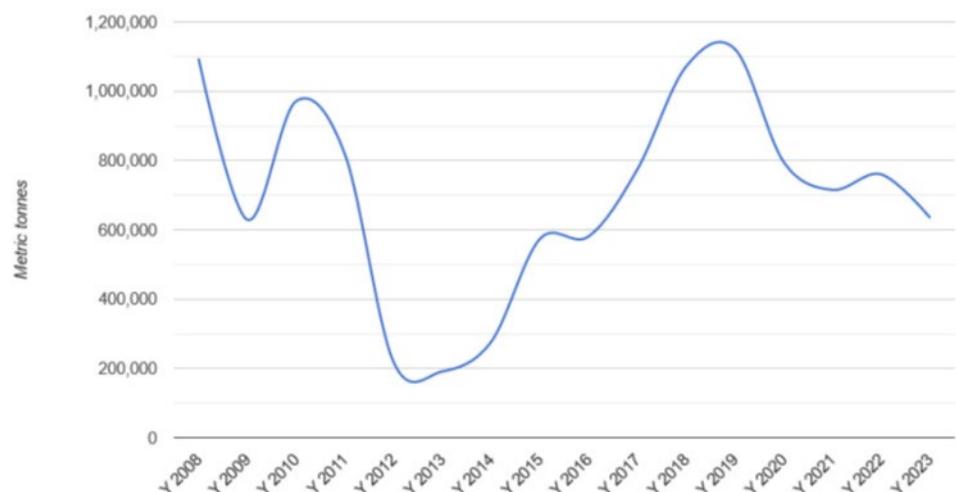


Figure 1: Export of steel in EU from Serbia
Source: European Steel Association, 2024

As depicted in Figure 2., the primary export market for the Serbian iron and steel industry is the EU. From 2019 to 2023, on average, 70% of value of Serbian iron and steel exports were directed towards the EU, with the annual amount of exports from this sector averaging around one billion euros. Furthermore, a majority of Serbian products from the iron and steel sector exported to the EU are subject to CBAM regulations. On average, from 2019 to 2023, approximately 90% of value of Serbian iron and steel exports to the EU fell under the scope of CBAM regulations. Based on the data presented, it can be inferred that around 60% of the total value of Serbian iron and steel exports will be affected by CBAM. The value of total iron and steel exports of CBAM-regulated products to the EU in 2023 was 925 million euros. Furthermore, CBAM regulated iron and steel products comprised on average 6.3% of Serbia's total exports to the EU during this period, representing a significant segment of Serbian export (European Steel Association, 2024).

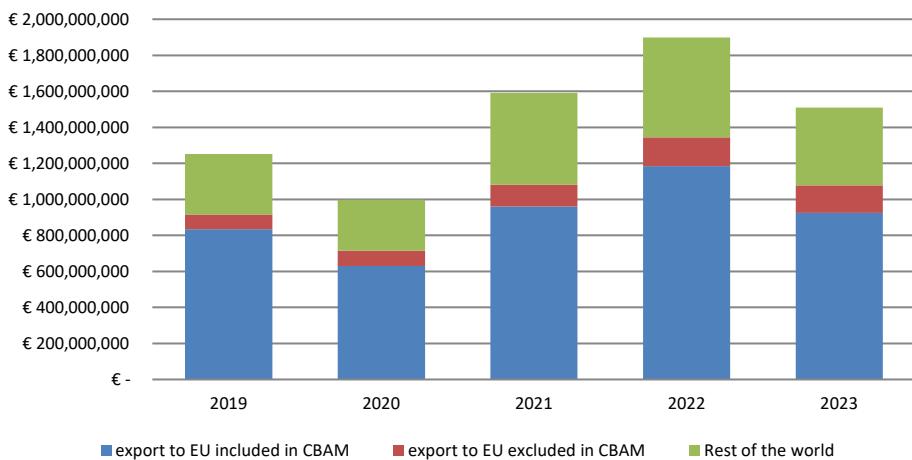


Figure 2. Serbian export of iron and steel (CN code 72 and 73)

Source: calculated by authors based on data from UN Comtrade and European Statistical Office, 2024.

Furthermore, the study discovered that five products from the iron and steel sector, categorized according to the four-digit CN trade code, dominates Serbian exports to the EU, as depicted in Figure 3 and Table 1. The individual annual export value of these products exceeded 50 million euros during the observed period. The analysis excluded iron and steel products falling outside the scope of CBAM regulations.

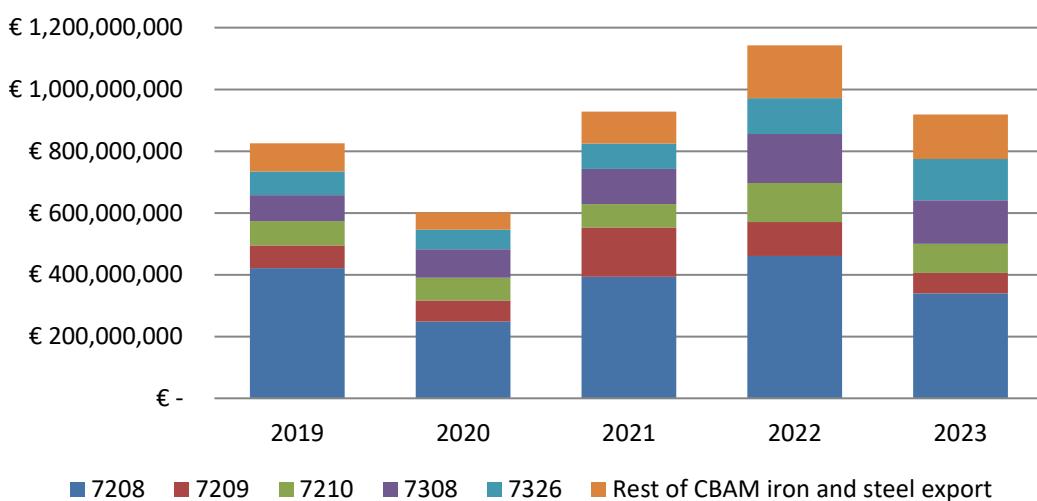


Figure 3. Serbian export of iron and steel included in CBAM

Source: calculated by authors based on data from European Statistical Office, 2024.

Products falling under codes 7208, 7209, and 7210 are characterized by their composition solely of iron and steel, devoid of any added metal elements. Such products undergo further processing in order to adopt to the requirements of various other industries. In contrast, products classified under code 7308 include a diverse range of structures and parts of structures from iron and steel for the construction sector. Additionally, code 7326 comprises all iron and steel articles not classified under more specific codes.

Table 1. Top five iron and steel export products from Serbia to EU by value

CN Code	Description
7208	Iron or non-alloy steel; flat-rolled products of a width of 600mm or more, hot-rolled, not clad, plated or coated
7209	Iron or non-alloy steel; flat-rolled products, width 600mm or more, cold-rolled (cold-reduced), not clad, plated or coated
7210	Iron or non-alloy steel; flat-rolled products, width 600mm or more, clad, plated or coated

7308	Structures (excluding prefabricated buildings of heading 9406) and parts of structures (for example, bridges and bridge-sections, lock- gates, towers, lattice masts, roofs, roofing frameworks, doors and windows and their frames and thresholds for doors, shutters, balustrades, pillars and columns), of iron or steel; plates, rods, angles, shapes, sections, tubes and the like, prepared for use in structures, of iron or steel
7326	Other articles of iron or steel

Source: UN Comtrade, 2024.

5. EMISSION INTENSITY OF SERBIAN IRON AND STEEL EXPORT

Emission data for the iron and steel industry is used in the calculations in the publication by Vidovic et al. (2023). In this publication, GHG emissions are divided between direct and indirect emissions. The direct GHG emission intensities are calculated according to the CN product codes covered by the CBAM regulation for 2019 based on total production of these products in Serbia and EU, expressed in tones of CO₂e per tone of goods. Indirect emissions were calculated based on country-specific carbon emission factors for electricity, relying on data from the International Energy Agency and calculated as a five-year average for the period 2015-2019. Since emission data for CN code 7326 is given for subproducts, emission levels for the product under code 7326 90 98 - Other articles of iron or steel were used, which account for two-thirds of the total Serbian exports to the EU under the code 7326.

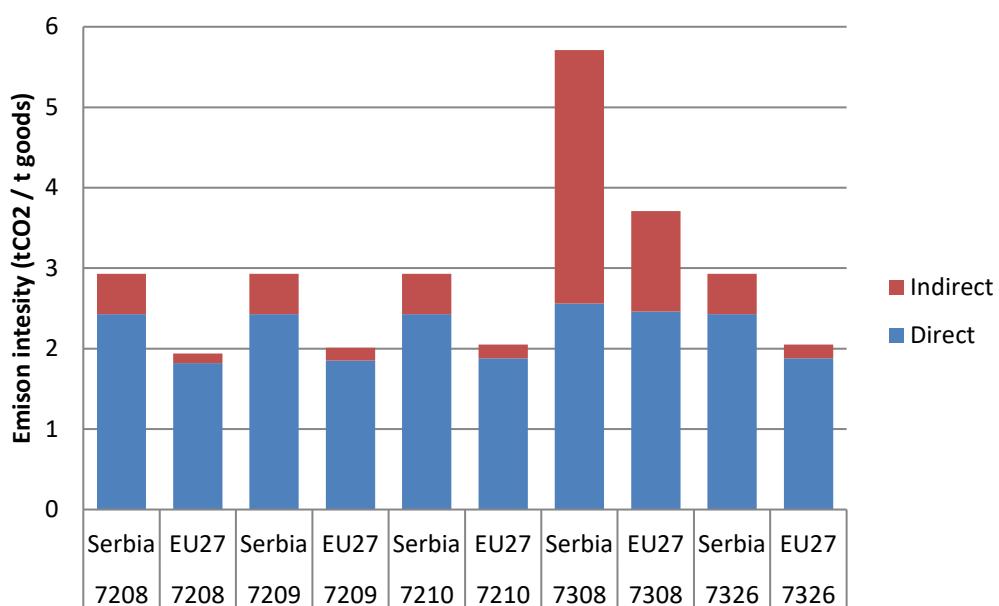


Figure 4. Emission intensity for Serbia and EU for top 5 Serbian iron and steel export to EU
Source: Vidovic et al. (2023).

In Figure 4., both direct and indirect emission intensity levels for Serbia and the EU27 are depicted for the top 5 Serbian iron and steel exports to the EU. On average, direct emissions in Serbia are approximately 25% higher than in the EU27. However, this disparity varies across products. Specifically, products under CN code 7308, which includes structures and parts of structure made of iron and steel, exhibit a similar level of GHG emission intensity as in the EU. Emission intensity in the EU is 2.46 tCO₂e per ton of product, while in Serbia it is 2.56 tCO₂e per ton of product, only 4% higher. However, other sectors in Serbia demonstrate higher emissions, ranging between 30% and 35% compared to the EU average.

In contrast, indirect emissions in Serbia surpass the EU27 average by a significant margin, approximately three times higher, primarily because the predominant component of indirect emissions is electricity generation. Although, according to EU regulation (European Parliament, 2023b) indirect emissions for iron and steel products will not fall under the scope of the CBAM in first period, the EU has retained the option to incorporate them in the future. If CBAM eventually starts to include indirect emissions, it could drastically lower the competitiveness of Serbian iron and steel products in the EU market.

The total emission intensity of GHG (direct and indirect emissions of GHG) for products under CN codes 7208, 7209, 7210, and 7326 shows that the EU emission intensity for these products is an average of 2 tCO₂ per ton of goods, while in Serbia it is 2.93 tCO₂ per ton of goods, 46.5% higher than in the EU. Moreover, the total

emission intensity for products under 7308 in the EU is 3.71 tCO2 per ton of goods, while in Serbia, it is 5.71 tCO2 per ton of goods, 54% higher than in the EU.

6. CONCLUSION

The EU's Carbon Border Adjustment Mechanism (CBAM) is poised to significantly impact Serbia's iron and steel industry, given the substantial portion of exports subject to CBAM regulations. Around 60% of Serbian iron and steel exports to the EU could be affected, potentially reshaping trade dynamics and competitiveness in these sectors. This underscores the importance for Serbian stakeholders to adapt to the evolving carbon pricing landscape, ensuring continued resilience and competitiveness in the EU market.

The research has examined the export structure of iron and steel from Serbia to the EU, with a specific focus on products exhibiting a significant export value exceeding 50 million euros between 2019 and 2023. The analysis revealed that five distinct products, categorized by the CN trade code, dominate Serbia's exports to the EU and are included within the scope of the CBAM.

The comparison of direct and indirect emissions between Serbia and the EU27 highlights significant disparities in the iron and steel sector. Firstly, direct emissions in Serbia are generally higher, especially in products of solely of iron and steel. Secondly, indirect emissions are considerably greater, primarily resulting from the utilization of fossil fuels in electricity generation. Although current EU regulations do not include majority of iron and steel sub-sectors indirect emissions in CBAM, the potential for future inclusion underscores the importance of Serbia's efforts to reduce indirect emissions. Serbia should consider exploring policy options for adaptation to CBAM. One potential measure is the introduction of carbon pricing aligned with EU ETS to avoid paying CBAM tariffs while also generating additional revenue for financing the green transition. The other policy measure is enhancing electricity generated from renewable energy sources, which would lower indirect emission.

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