

The Potential Impact of EU's Carbon Border Adjustment Mechanism (CBAM): An Australia-China Relationship Perspective

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Abstract:

The Carbon Border Adjustment Mechanism (CBAM) serves as a sophisticated policy tool at the nexus of environmental sustainability and global trade, necessitating a thorough exploration of its multifaceted aspects and consequences. This paper leverages the SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis to examine both the internal and external factors that affect Australia and China in the context of the CBAM. In addition, we employ the PEST (Political, Economic, Social, and Technological) framework to identify effective strategies for Australia-China cooperation following the implementation of the CBAM. Our analysis reveals numerous mutual interests and opportunities for bilateral collaboration, despite challenges and threats, positioning the CBAM as a potentially significant catalyst for joint initiatives. The study outlines 10 potential areas for cooperation between Australia and China, spanning the political, economic, social, and technological dimensions.

Key Words: Carbon Border Adjustment Mechanism (CBAM), International Trade, Climate Policy, Australia-China Relations, SWOT Analysis, PEST Analysis.

JEL Classification: F18, Q56, Q58, F13

Acknowledgements

This research was funded by the ASSA-CASS Joint Action Program under the auspices of the Academy of the Social Sciences in Australia.

1 Introduction

The Carbon Border Adjustment Mechanism (CBAM) designed to minimise the carbon footprint of imports and create an equitable environment for European producers represents a complex policy instrument at the intersection of environmental sustainability and global trade dynamics, warranting a comprehensive analysis of its various aspects and implications. Officially launched on October 1, 2023, the CBAM,

colloquially known as a "carbon tariff", initially targets sectors including cement, iron, steel, aluminium, and electricity, but will expand to other significant products (Zhong & Pei, 2023). This pioneering approach extends EU's internal carbon pricing to the carbon embedded in imported carbon-intensive goods, representing a novel stride in "carbon diplomacy" (Hancock et al., 2021a; Durán, 2021). The CBAM will likely lead to a redistribution of competitiveness among countries and regions, with a pronounced effect in emission-intensive and trade-intensive sectors (Zhong & Pei, 2023). The CBAM's potential impact on international trade, especially in energy intensive sectors, is notable, as it could affect countries without a price on carbon and push emissions reduction laggards (Hancock et al., 2021a).

Science trade in energy-intensive products will be subject to additional tariffs, further studies from the perspective of countries along the energy-intensive product supply chains, such as Australia and China, are necessary but notably missing. Australia and China are two of the world's largest economies and major players in global trade, particularly in carbon-intensive industries. Australia and China face similar economic pressures from the implementation of the CBAM, since the high carbon footprint in key sectors in both nations' economies are likely to result in an increase in the prices of some of their most valuable commodities, such as aluminium, coal, Liquified Nature Gas and steel. By understanding how the CBAM will affect trade between Australia and China, policymakers in both countries can develop effective strategies to mitigate negative consequences and capitalize on new opportunities for cooperation in areas such as clean energy technology development and emissions reduction (Feng, 2022; Zhou & Satherley, 2022). Nevertheless, despite extensive literature review (Zhong & Pei, 2023), and the CBAM widely expected to profoundly influence international trade and climate diplomacy (Kardish et al., 2021), the impact on China and Australia --two nations are deeply intertwined with carbon-intensive industries and pivotal players in the global energy market--has not previously been studied. Given the controversies surrounding the CBAM in trade and emissions reduction, further examination from various national perspectives has the potential to shape an inclusive and just future for the CBAM and other similar policies.

This paper seeks to remedy this by providing a comprehensive and systematic exploration of the CBAM and its multifaceted implications for Australia and China, offering insights into how these two nations can navigate the CBAM's implications.

This paper makes a pioneering attempt to explore potential strategies, both individually, and together, that Australia and China can adopt to manage the impact and consequence of CBAM. The incorporation of the SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis is instrumental in dissecting both internal and external factors influencing Australia and China in the context of CBAM. Alongside the SWOT analysis, we integrate the PEST ((Political, Economic, Social, and Technological)) framework to explore effective cooperation strategies between Australia and China in the wake of CBAM's implementation. These analytical approaches allow for a nuanced exploration of the complex interplay between environmental policy, international trade, and diplomatic relations, providing valuable insights into global response to the climate initiatives. By examining the potential for collaborative strategies between Australia and China, the paper not only addresses the

specific challenges faced by energy-intensive economies but also enhances understanding of international cooperation in climate policy. This pioneering work serves as a critical reference for countries navigating the complexities of global trade and environmental sustainability, marking a significant addition to the discourse on global trade regime and environmental governance in the face of climate change regulations.

The paper is organized into several key sections. The next section sets the stage by examining the trade and climate impact of the CBAM with a focus on Australia and China. Section three explains the analytical framework to be used. Section 4 presents the strengths, weaknesses, opportunities, and threats (SWOT) that the CBAM presents to both countries and their cooperation. Further, the paper synthesizes political, economic, social, and technological (PEST) factors to articulate clear policy directions and collaborative strategies for Australia and China in response to the CBAM's challenges and opportunities. The last section concludes the paper.

2 The CBAM's Impact on Australia and China

This section embarks on an in-depth exploration of the CBAM through the lens of Australia and China, setting the stage for a comprehensive analysis of its multifaceted impacts. Employing a systematic review of both official reports and newspaper articles, the analysis is structured around three critical dimensions to ensure a holistic understanding of each country's stance on the CBAM: impact, official response, and potential countermeasures. By reviews these official responses, the paper seeks to understand the diplomatic and policy implications of the CBAM for bilateral and international relations. The examination of strategic responses is crucial for understanding how each country can navigate the challenges posed by the CBAM. In this section, we first discuss the general impact of the CBAM on trade and climate regimes, applicable to both Australia and China, followed by a focused discussion from the perspectives of China and Australia, respectively.

2.1 CBAM's general impact on international trade and climate regime

The CBAM has sparked intense debate due to its potential ramifications on international trade and climate policies, which are likely applicable to both Australia and China. CBAM's compatibility with the multilateral climate and trade regimes, particularly the principle of Common But Differentiated Responsibilities and Respective Capabilities (CBDRRC), has been questioned (Lim et al., 2021). CBAM's implementation raises concerns about ineffectiveness in climate action and could lead to geopolitical tensions (Eicke et al., 2021). Critics argue that it needs adjustment to provide differential treatment for least-developed and Small Island Developing States (Marín Durán, 2023).

This perceived misalignment with international trade rules could lead to trade retaliation and distortion (Lim et al., 2021; Perdana & Vielle, 2022). Based on a comprehensive CBAM Opposition Index that considers multiple dimensions, (Overland & Sabyrbekov, 2022) reveals that the countries most inclined to oppose CBAM are Iran, Ukraine, the United States, the United Arab Emirates, Egypt, China, India, Kazakhstan, Russia, and Belarus. Based on GTAP analysis, (Sun et al., 2023)

finds that the likely trade retaliation will result in increased welfare losses, predominantly affecting poorer countries .

In contrast, other studies suggest that the CBAM proposal complies with World Trade Organization (WTO) rules, particularly the principle of non-discrimination, and can work as a complementary tool to attain climate neutrality (Galiffa & Bercero, 2022). Similarly, the former leader of the World Trade Organization has characterized trade rules as a guide to adhere to, rather than a hindrance, when creating a carbon border adjustment (Muller et al., 2021).

2.2 China's perspective of CBAM

The CBAM presents complex challenges for China, affecting its trade, economy, emission strategies, and competitiveness of key industries. Therefore, the Chinese office response to the CBAM is negative. However, cooperation and engagement are the primary potential countermeasures.

2.2.1 Impacts

Numerous scholarly studies examining the influence of the CBAM on China reveal a mix of advantageous and disadvantageous consequences of the CBAM on trade between China and the EU, as well as the strategies that Chinese businesses might have to adopt in response to this policy (Yan & Yuan, 2023). The full implementation of the CBAM is expected to directly weaken the competitiveness of China's exports to the EU, which will have a negative impact on China's overall economy and employment (He & Li, 2022). Some studies suggest that the CBAM will have a negative impact on the social welfare and exports of non-EU countries, particularly those heavily reliant on carbon-intensive industries, like China (Siy et al., 2023). This negatively impact to China's social welfare and exports is expected to more significant when more industries are covered by the CBAM (Siy et al., 2023). Concerns also exist that the CBAM might strain the relationship between China and the EU, possibly resulting in a trade conflict (Duong et al., 2023).

However, some studies suggest that the immediate effect (before 2030 as argued by (Feng, 2022)) is limited due to the small portion of China-EU trade it covers. Less than 2% of China's total exports to the European Union, valued at approximately €6.5 billion (US\$7.18 billion), are products affected by the CBAM. The reason for the low percentage is that most products subject to the EU's CBAM are in the upstream of the industrial value chain and require significant energy, a practice not favoured by Chinese policies in light of concerns about domestic supply security and environmental impact (Wu, 2023). However, the long-term impact could be significant due to increasing coverage and new regulations that restrict China's advantageous industries (Feng, 2022).

The adverse impact on China exporters, however, could be significant in specific sectors, especially given the current volatile international political and trading market conditions (Yan & Yuan, 2023). The China Iron and Steel Association argues that this initiative is likely to elevate the export costs of Chinese steel products by approximately 4% to 6% and has raised objections, asserting that the EU's autonomous implementation of the CBAM represents a new trade barrier introduced under the guise of promoting low carbon (Amy Lv & Dominique Patton, 2023).

On the environmental front, the CBAM is expected to compel Chinese exporters to use higher quality green and low-carbon energy and manufacturing materials, accelerating the low-carbon, green transformation of the entire production process to reduce greenhouse gas emissions at the source (Yan & Yuan, 2023). The literature, however, is not uniformly positive. Using a CGE model with an evolutionary game approach, (Chen, 2023) demonstrates that the CBAM has only a limited impact on China's GDP and carbon emissions. This finding supports the argument that the CBAM functions more as a protectionist policy than as an effective tool for reducing emissions.

2.2.2 China's official response

The Chinese government views the CBAM as a new green barrier, unilateral measure and discriminatory practice which could result in trade protectionism and potentially hinder collective global initiatives to address climate change (Duong et al., 2023). China had raised objections to the EU CBAM, criticising its lack of efficiency, perceived unfairness, and the EU's inconsistent approach to trade matters (Voituriez & Wang, 2011). On March 15 2023, China proposed initiating multilateral discussions about environmental policies at the WTO, starting with the CBAM (Duong et al., 2023). China's suggestion was based on the assertion that the Carbon Border Tax (CBT) is not in line with international trade regulations (Dimana Doneva, 2021). China's dissatisfaction also stems from the disregard of its other emissions reduction initiatives, such as green electricity, the surge in renewables, and energy efficiency policies (Duong et al., 2023).

The perception of the CBAM as a potential trade barrier could have prompted the Chinese government to challenge the CBAM. China's perspective on the European Union's CBAM holds critical significance, particularly in light of China's prominent role as one of the EU's key trading partners and its ambitious commitment to achieving carbon neutrality. This is especially true considering the interconnectivity of international trade and the pivotal role China plays in global supply chains. China's reaction could set a precedent for other nations, potentially influencing the global approach towards carbon reduction strategies and trade policies (Kardish et al., 2021). China's response to the CBAM is a key aspect of its trade and diplomatic relations, particularly with the EU and Australia (T. Huang et al., 2022).

2.2.3 Proposed countermeasures

In the context of the European Union's CBAM and its potential implications, many studies highlight the urgency for China to conduct a thorough impact assessment and develop strategies to counteract any adverse effects on its economy and EU trade relations (He & Li, 2022). Additionally, there is a growing consensus that active cooperation and engagement with the CBAM through measures such as proactive emission reduction strategies, could be beneficial for China (Gu et al., 2023). Such measures, according to Gu et al. (Gu et al., 2023), would likely have a minimal impact on global social welfare loss while aiding in global GDP growth.

However, it is not feasible to align China's carbon price with Europe's, which is currently 11 times higher, before 2026 (Duong et al., 2023). Furthermore, (Tang et al., 2015) suggest that China could mitigate the adverse effects of carbon-based

border tax adjustments by increasing its influence on global pricing and enhancing its energy technology efficiency.

Another strategic approach involves accelerating the development of carbon reduction capabilities, with a focus on reducing embodied carbon. Li et al. (Li et al., 2023) emphasise this strategy, proposing specific countermeasures such as the promotion of tradable green certificates to offset carbon tariffs. This proposal takes into account the evolving green certificate system and the contentious standing of CBAM within the WTO framework. Their scenario-based calculations suggest that, in the most favourable circumstances, the rate of cost increase due to the CBAM could be as low as 1.1% (Li et al., 2023a). This indicates a tangible pathway for China to adapt to the CBAM while minimising economic disruption.

2.3 Australia's perspective of CBAM

While the EU's CBAM poses challenges for Australia, it also opens avenues for innovation and adaptation in environmental practices and international trade relations. While the immediate effects on the Australian economy are anticipated to be relatively minor, the CBAM's long-term influence on Australia's economic competitiveness, particularly in light of its trade relations with key partners like China, warrants careful consideration. The Australian government's approach, ranging from critiques of the CBAM as protectionist to initiating reviews for a potential Australian CBAM, reflects a strategy of cautious evaluation and proactive engagement in the evolving landscape of global climate and trade policies.

2.3.1 *Impacts*

Our literature search returned few studies on the CBAM from an Australian perspective. Therefore, the impact analysis is referred to other studies indirectly. While the CBAM may necessitate alignment with EU emission standards, potentially incurring higher costs and affecting competitiveness in the European market, the overall effect on the Australian economy is expected to be relatively minor. This is due to the limited direct competition between Australian exports and industries included in the EU ETS. Overall, Australia's exports of emissions-intensive products, including primary metal products, bulk chemical products, paper products, and basic metal products, amounted to \$23.4 billion, representing 5% of the total export value in the 2019-20 period (Muller et al., 2021). Notably, the CBAM appears to have negligible impact on Australia's largest export to Europe, metallurgical coal, as the EU's plan does not encompass "fugitive" methane emissions and accounts for coal emissions at the point of burning rather than mining (Adept Economics, 2023). However, the introduction of the CBAM may impose a price on carbon for fossil fuel-generated hydrogen imports, affecting Australia's economy and trade in the energy sector (Hancock et al., 2021a).

Although the immediate effects may be minimal, the CBAM and comparable initiatives by other nations could pose a long-term challenge to Australia's economic competitiveness (Adept Economics, 2023). The CBAM's effect on countries like China, significant trading partners of Australia, could indirectly impact Australia's exports to these countries. The CBAM's introduction could lead to a redistribution of competitiveness among countries and regions, with more pronounced effects in

emission-intensive and trade-intensive sectors (Zhong & Pei, 2023). This may have long-term implications for Australia's economic competitiveness, especially as similar initiatives are adopted by other nations. Moreover, there is a possibility of increased retaliatory or comparable tariffs that could hinder global trade and affect Australia's export-driven economy (Adept Economics, 2023).

2.3.2 Australia's official response

Australia's stance on the EU's CBAM is complex, influenced by its alignment with global climate policies and intricate trade relations with both the EU and China. Australia's involvement in the power dynamics between the United States and China further complicates its stance on international policies (WALTON, 2021). The former coalition government criticised the CBAM as protectionist without providing analytical support for this claim (Adept Economics, 2023). The current Australian government is more positive to the CBAM. The current Australian Climate Minister, Chris Bowen, has expressed interest in setting up an Australian CBAM in Australia to address carbon leakage and ensure a level playing field for domestic producers subject to carbon pricing (EY - Global, 2023). One key reason behind the official stance change is a change in government. The current Albanese Labor government has set more ambitious emission reduction targets, aligning with global climate policies, than the previous Coalition government led by Scott Morrison (EY - Global, 2023).

2.3.3 Potential countermeasures

Given the potential impacts of the CBAM, there are calls for Australia to engage proactively in shaping the mechanism. The Australian Institute suggests that the government should collaborate with the EU and other trade partners to develop a multilateral strategy for carbon border adjustments (Muller et al., 2021).

The current Australian government is assessing the possible effects of the CBAM on its exports and exploring policy alternatives to mitigate carbon leakage, particularly focusing on the steel and cement industries (DCCEEW, 2023). The review aims to balance Australia's trade relationships, adhere to international trade regulations, and potentially align with other CBAM frameworks (EY - Global, 2023).

3 Analytical frameworks

Here we employ a comprehensive strategic planning tool, aiming to dissect the strengths, weaknesses, opportunities, and threats (SWOT) faced by both nations in this context. The SWOT model helps in identifying internal strengths and weaknesses, as well as external opportunities and threats, providing a comprehensive framework for strategic planning. This comprehensive approach to strategic analysis ensures that organizations can navigate their internal capabilities and market conditions effectively, aligning their strategies with both current and future environmental factors. A state-of-the-art review of SWOT analysis, tracing its historical development and methodological advancements, concludes that it is continuously relevant in strategic planning (Ghazinoory et al., 2011). A more recent comprehensive review highlights the model's utility across various sectors, showing how it supports managers in making more informed strategic decisions by integrating SWOT analysis into the broader context of strategic planning (Benzaghta et al., 2021).

Applying SWOT analysis to the implications of the EU's CBAM on the bilateral relationship between Australia and China is particularly appropriate due to its comprehensive and balanced approach. The SWOT analysis serves as a critical tool in developing informed, strategic, and proactive policies in response to international regulatory changes like the CBAM. This approach fosters an in-depth understanding of their potential collaborative strategies and individual responses (Shi, 2016). This framework enables a nuanced understanding of the current capabilities and challenges like resources, experience, and capabilities (strengths and weaknesses) of both countries, while also considering the external environment that could impact their bilateral relations such as market trends, economic conditions, and policy shifts (opportunities and threats).

Basing on the SWOT assessment, the PEST framework facilitates a detailed exploration of how political decisions, economic collaborations, social influences, and technological advancements can be harmonised to foster a robust partnership between Australia and China in addressing the challenges posed by the CBAM. Originating from Francis Aguilar's ETPS scanning approach (Aguilar, 1967), the PEST model analyzes Political, Economic, Social, and Technological factors, offering a comprehensive framework to understand the broad external forces that influence policy outcomes across different sectors. It allows policymakers to methodically assess how political dynamics, economic conditions, societal shifts, and technological progress affect policy creation and execution. Its utility in unraveling multifaceted and interdependent factors makes PEST an invaluable asset in decision-making and strategic planning (Helmold et al., 2020). By conducting a detailed evaluation of these essential elements, policymakers can formulate precise and impactful policy recommendations based on a thorough understanding of the external context.

The PEST model has been widely adopted in policy analysis for its ability to dissect complex external environments into four manageable categories (Helmold et al., 2020).

4 A SWOT Analysis of Australia-China Cooperation in Response to the CBAM

Here we discuss how the CBAM could act as a catalyst for transnational collaboration and policy adaptation. It considers the potential for collaboration between Australia and China within this new regulatory landscape. Through a SWOT analysis, this section aims to provide a nuanced understanding of the interests and potential of the two countries in the face of the CBAM. For instance, recognising the strengths such as China's technological advancement in renewable energy and Australia's rich natural resources can lead to policies fostering joint ventures in green technologies. Similarly, understanding the threats like potential trade dynamics shifts due to the CBAM can guide the development of strategies to diversify trade and enhance supply chain resilience. We present our SWOT analysis results from the perspective of individual countries, initially China and then Australia, when a single-country perspective exists, followed by an Australia-China relations perspective.

4.1 *Strengths:*

China's significant advancements in renewable energy technologies, such as solar and wind power, present a strong foundation for collaboration with Australia. For over a decade, China has held the position as the world's largest and most rapidly expanding producer of renewable energy products. The declaration made by China in 2020 to achieve carbon neutrality by 2060 sent a strong political message in support of investments in renewable energy. In 2023, China is on track to add an amount of new solar energy capacity that equals the entire current installed capacity in the United States (Howe, 2023). China also holds the leading position globally in supplying renewable energy technologies. Forecasts suggest that by 2026, China will possess over 80% of the global solar manufacturing capacity and by 2032, China will have the ability to manufacture and supply enough solar modules to satisfy the entire world's yearly demand (Wood Mackenzie, 2023). This immense production capacity of China is contributing to a significant reduction in the prices of solar components, driving them to record lows (Howe, 2023). The Chinese renewable capacity can help Australia achieve its energy transition goals.

Australia is well-placed to develop new zero-emission export industries, bolstered by its significant reserves of critical minerals and promising green hydrogen production capabilities, which align with China's demand for these essential resources in its energy transition (Hancock et al., 2021b). Australia's wealth of affordable solar and wind resources, substantial mineral reserves, extensive land availability, scientific and technological prowess, and expertise in the National Greenhouse and Energy Reporting Scheme, give it a distinct advantage over many other countries in transitioning to net-zero emissions (Muller et al., 2021). Cooperation between the two countries could lead to closer integration of critical mineral supply chains, expanded green hydrogen markets, and faster development of Australia's renewable energy potential.

CBAM could lead to favourable market signals for clean exports, especially under the framework of the CBAM (Muller et al., 2021). Carbon border adjustments in target markets can support the development of Australia's resource advantages by equalising competition with high-emission rivals that do not price carbon. Under a carbon pricing scheme, Australia's green hydrogen and green steel will become more competitive compared to alternatives in overseas markets, including China. Additionally, these adjustments can facilitate the transition of current carbon-intensive export industries, such as aluminium and steel, towards a zero-emission future (Muller et al., 2021). Similarly, CBAM can boost the demand for cost-competitive, low-carbon technologies and products in Australia, thereby making China's advancements in renewable energy beneficial for Australia.

Another strength comes from the emission reduction effects of the Australia-China trade. The bilateral trade of carbon-intensive goods between Australia and China has played a notable role in reducing carbon emissions not only in the two countries but globally, thanks to the relatively lower carbon intensity factors in their exports. Research has shown that the rapid growth of carbon-intensive goods from Australia to China has helped reduce global emissions (Tan et al., 2013). Furthermore, technology spillover between the two nations can significantly reduce CO₂ emissions,

particularly in sectors like electricity, transportation, and cement by 2030 (R. Huang et al., 2020).

Finally, Australia and China have enjoyed fruitful cooperation in the fields of energy and environmental research. A prime example is the China-Australia Geological Storage of CO₂ Project (CAGS), which has been instrumental in fostering knowledge exchange and networking between researchers from both countries. This project has significantly enhanced the assessment of potential geological storage sites in China (Feitz et al., 2017; Kalinowski et al., 2013). Despite a challenging political climate, cooperation in these less sensitive areas of energy and environment is likely to continue. This pragmatism is also apparent in the US-China relationship, despite relations between Beijing and Washington being even more politically charged than Beijing and Canberra (USCC, 2022; Xu et al., 2022).

4.2 Weaknesses:

While China has made significant strides in renewable energy, its continued heavy dependence on fossil fuels could become a liability. Approximately 70% of its electricity production still relies on fossil fuels, predominantly coal (Howe, 2023). The continued heavy dependence on fossil fuels by China could potentially create trade and economic vulnerabilities for both China and its fossil fuel trading partners, including Australia. Under a CBAM, China's export of energy-intensive products, such as steel and alumina, may face challenges from Australia's low-carbon alumina and steel, which are produced in smelters powered by renewable energy.

Much like China, Australia predominantly satisfies its energy requirements through fossil fuels, with coal playing a central role. Coal is responsible for producing about three-quarters of Australia's domestic electricity (Geoscience Australia, 2023). Australia is one of the few high-income advanced economies where emissions from fossil fuel combustion have risen since 2005, significantly lagging behind its peers in terms of commitments made under the Paris Agreement to cut emissions. Additionally, it is now among the rare high-income nations without any form of carbon pricing (Muller et al., 2021). The dominance of fossil fuels in electricity generation will undermine the competitiveness of Australia's exports to China, such as iron ore, coal, and LNG.

The fossil fuel dependency in Australia and China and trade interdependence between them create an urgent need for decarbonisation of their economies, which are exacerbated by the CBAM. The CBAM might force both countries to diversify their trade partners and markets. While this could open new opportunities, it also presents the challenge of developing new trade relationships and complying with varying environmental standards. China's low carbon energy transition, in line with the CBAM, will reduce their demand of Australia's fossil fuels. A disruption in their trade relationship could lead to increased emissions and economic losses for both nations and the global community (Shi et al., 2021).

The potential impact of the CBAM on Australia's exports, particularly those to China, could be substantial. Australia's economy is heavily exposed to the export of coal and liquefied natural gas (LNG), with China being a major trading partner in this regard. Moreover, if the EU implements tariffs on carbon-intensive imports like coal and

LNG, it could lead to pressure on their global demand and prices. This shift might prompt exporting countries, including Australia, to reevaluate their energy portfolios and trade strategies.

4.3 Opportunities:

The CBAM may serve as a significant catalyst for transformative public policy change in both Australia and China. The CBAM has potential to significantly influence public opinion regarding climate change and international trade policies in both countries. This shift in societal perspective could drive a demand for more robust environmental policies and sustainable trade practices. For Australia, it presents an opportunity to strengthen climate policies and reduce carbon emissions, aligning with the Paris Agreement goals. In China, the CBAM might prompt the adoption of more rigorous environmental policies and practices, contributing to international climate change mitigation efforts.

The CBAM offers a unique opportunity for Australia and China to work together in developing and deploying green technologies. The CBAM could drive both Australia and China towards more sustainable production practices and cleaner technologies, providing boost to bilateral trade opportunities, as well as those with the EU (Hancock et al., 2021a). Both nations will be motivated by the CBAM to increase investments in clean energy technologies and renewable energy industries, which could lead to joint projects and partnerships in green technology, enhancing bilateral trade and investment in sustainable energy infrastructure. The increasing dependence on critical minerals for the low carbon transition, such as lithium and rare earth elements, provides new opportunities for economic development and collaboration between Australia and China (Perdana & Vielle, 2021). This collaboration can capitalise on China's manufacturing prowess and Australia's abundant resources.

Business with robust environmental practices might gain an advantage from CBAM. Companies that have proactively reduced their carbon footprint could use their sustainability achievements to appeal to European consumers, gaining a competitive edge. This shift may also spur innovation in environmentally friendly technologies, such as wind and solar power, potentially accelerating the growth of green industries in Australia. Investing in and developing low-carbon technologies and renewable energy in Australia potentially enhances technological collaboration with China.

Lastly, the CBAM presents a chance for both Australia and China to jointly influence global climate policies. By presenting a united front, they might be better positioned to advocate for their interests and contribute more effectively to shaping global climate policies. Such enhanced negotiating power could play a crucial role in steering discussions towards more equitable climate governance, ensuring that policies and agreements reflect a wider range of perspectives and needs.

4.4 Threats:

The European Union's CBAM presents significant challenges for Australia and China as major exporters of carbon-intensive goods. The introduction of the CBAM, viewed as a move towards EU's climate leadership (Buissing, 2022), also brings about a need for Australia and China to reconsider their roles in global climate governance

(Hancock et al., 2021a). It necessitates adjustments in trade practices, legal frameworks, and international relations.

The evolving geopolitical landscape and escalating tensions between China and the US present a precarious situation for Australia, challenging its diplomatic strategies and trade decisions (Dittmer, 2012). This overall political environment makes a collective response between Australia and China to the CBAM's challenges more difficult and complicated. Additionally, the CBAM represents a political challenge for China, balancing its role as a major global exporter with the need to meet international environmental standards.

Economically, both Australia and China could face increased production costs and therefore reduced competitiveness. Since the mechanism imposes an additional financial burden on exporters, affecting industries like chemicals, metals, machinery, and oil refining (Lee & Yoo, 2022), China is likely to experience an economic impact in these industries. This could necessitate a restructuring of China's export economy and impact its trade with Australia (Siy et al., 2023). Furthermore, the CBAM could significantly affect business, who might need to align their products with the EU's emission standards or else incur higher costs, potentially affecting their competitive edge in the European market. Compliance with CBAM standards could increase production costs, prompting Australia and China to invest in energy efficiency, cleaner technologies or purchase carbon credits (Gu et al., 2023; Tang et al., 2015) (Leonelli, 2022). Australia and China will also face the challenge of harmonizing their carbon market regulations and data reporting with EU norms, a task particularly challenging for China due to its weak and incompatible carbon system (Duong et al., 2023).

China's accelerated adopt of low carbon energies will negatively impact Australia's exports of carbon-intensive goods, like coal and LNG, to China. Australian industries heavily reliant on exports to the EU could also be significantly impacted by the CBAM's influence on the redistribution of competitiveness (Zhong & Pei, 2023). The CBAM might also influence Australia's future international energy trade, affecting hydrogen export/import projects, which are indirectly related to China's trade dynamics (Hancock et al., 2021a). The restructured trade relationship could undermine global emission reduction efforts as Australia-China trade has contributed to global emission reductions (R. Huang et al., 2020; Tan et al., 2013).

The CBAM is expected to negatively impact China's social welfare and exports, particularly in the energy sector, and have broader global economic implications, especially for Australia (Siy et al., 2023). From a legal perspective, Australia and China may need to assess the CBAM's implications on existing trade agreements and domestic environmental laws, ensuring compliance with new emission standards (T. Huang et al., 2022). This could lead to significant alterations in trade dynamics between these countries and the EU, potentially requiring revisions in bilateral trade agreements to maintain economic stability (Zhong & Pei, 2023).

5 Implications for Australia-China Collaboration: A PEST Analytical Perspective

Based on findings from the previous SWOT analysis, we assess the prospects for joint initiatives and strategic partnerships that could enable both countries to navigate the complexities of the CBAM more effectively, transforming potential obstacles into opportunities for sustainable development and enhanced cooperation on climate action. Following the PEST model, we propose how political decisions, economic strategies, social influences, and technological innovations can be leveraged to foster a robust and dynamic partnership between Australia and China in light of the CBAM's impacts. Such a joint effort has the potential to foster a resilient economic partnership, aimed at not only meeting CBAM requirements but also advancing sustainable practices.

5.1 Political implications

The introduction of the CBAM presents both Australia and China with a unique set of political challenges and opportunities, necessitating a strategic recalibration of their diplomatic and trade tactics. This recalibration is essential to align with the evolving landscape of international environmental regulations and to adeptly manage their interactions with key global economic entities, such as the EU and the US (Hancock et al., 2021a).

A critical aspect of this strategic response involves **(1) enhancing cooperation on carbon pricing mechanisms**. This implies that Australia needs to establish a carbon market, while China needs to expand its existing carbon market and increase carbon prices. At the initial step, both countries can explore the potential of integrating their carbon markets or aligning their carbon pricing mechanisms, to create a more unified and efficient approach to carbon emissions trading. Australia and China could cooperate to mutually recognize carbon credits and reduction volumes, thus reducing the costs of verifying carbon emissions during trade. The potential benefits of technology spillover could significantly decrease embodied CO₂ emissions in China's exports to Australia and vice versa (R. Huang et al., 2020).

Moreover, Australia and China could leverage their influence in climate diplomacy to advocate for balanced and fair global climate policies, thereby representing the interests of both developed and developing nations. An example of such collaboration is their potential **(2) joint efforts in the Pacific on climate change and development aid** (Disruptive Asia, 2023). This collaborative stance in climate diplomacy not only strengthens the bilateral relationship, reducing political tensions in the region, but also could greatly impact global climate governance and facilitate the transition to a low-carbon future.

Furthermore, the CBAM offers Australia and China a political opportunity to **(3) deepen partnerships and engage with other middle powers**, including the EU and the UK. The EU's interest in mitigating the US-China rivalry and promoting multilateralism (Emerald Expert Briefings, 2021) and leading the global climate change efforts (Buissing, 2022) underline the importance of this cooperative

approach. Joint CBAM implementation among the EU, US, and China could not only reduce carbon leakage and enhance production in energy-intensive industries but also increase overall welfare compared to non-CBAM or unilateral implementations (Perdana & Vielle, 2021).

5.2 Economic implications

Australia and China can enhance their economic ties by (4) **jointly expanding and exploring trade and investment in clean energy sectors such as** renewable energy and critical minerals. Collaborative trade in these areas, which are less affected by the CBAM, can mitigate risks associated with trade disruptions and policy changes. For example, joint hydrogen export/import projects between Australia and China could significantly benefit both countries. China's trade and investment in Australia's critical minerals can deliver similar benefits to those of renewable energy sector. Bilateral collaboration on large-scale renewable energy infrastructure, such as solar farms and wind energy facilities, is another potential area. These projects not only enhance energy security but also support transitions to low-carbon economies, positioning both nations as leaders in sustainable energy solutions (Hancock et al., 2021a). Additionally, it can lead to optimised trade structures and stronger cooperation with the EU, potentially yielding increased profits and cost reductions (Tan et al., 2013) .

Building supply chain resilience, particularly through joint management of trade disruptions, is essential for adapting to CBAM requirements (Hancock et al., 2021a). This collaboration between Australia and China could involve production investment, infrastructure construction, and technology exchange, contributing to the carbon neutrality goals of both countries and adaptation to CBAM requirements. (5) **Joint ventures in critical supply chains** can not only enhance resilience but also ensure stability in these sectors during political turmoils.

By focusing on sustainable trade expansion, collaborative projects, and infrastructure development, as well as enhancing supply chain resilience, both countries can turn the challenges posed by CBAM into substantial economic opportunities.

5.3 Social implications

On the social aspect, these two countries can promote cultural exchange and understanding, fostering a sense of global community and shared responsibility in environmental stewardship.

One strategic approach to enhance mutual understanding and collaboration is implementing (6) **exchange programs in cultural exchange, social engagement, environmental studies and engineering between Australian and Chinese universities**. These exchange programs can facilitate knowledge exchange, innovation, and joint research initiatives, contributing to a more informed and engaged public in both countries.

The **(7) establishment of a dedicated dialogue platform** where scientists, engineers, and policymakers from both countries can exchange knowledge, discuss challenges, and share best practices is paramount. This platform would serve as a hub for the continuous flow of information and ideas, thereby nurturing a collaborative environment conducive to technological innovation. It would enable stakeholders from both nations to engage in fruitful discussions, learn from each other's experiences, and develop joint strategies for addressing environmental challenges and meeting CBAM requirements.

5.4 Technological implications

Despite the sensitive political environment surrounding technology cooperation, Australia and China may still be able to collaborate on technological innovations in clean energy and emissions reduction, which are shared interests.

Australia and China have the opportunity to invest in advanced digital technologies, including blockchain for transparent carbon tracking and AI-powered tools, to enhance carbon management. Employing these technologies will allow both countries to more accurately assess and reduce their carbon footprints in trade and manufacturing. Combining China's production and technological advantages with Australia's expertise in standards and regulations can lead to impactful **(8) technological cooperation in digital areas for carbon emission measurement, reporting and verifications (MRV)**. These digital technologies may be conducive to addressing China's capacity weaknesses in emission accounting.

Enhanced cooperation in research and development can yield innovative solutions in energy efficiency and low-carbon technologies. This collaboration can draw from China's manufacturing and technological advancements and Australia's resource abundance, leading to innovative solutions for achieving carbon neutrality. Both countries can **(9) collaborate on the development and deployment of clean energy technologies**, such as solar, wind, and hydrogen technologies. It could also be motivated by shared interests and challenges, such as dependency on fossil fuels. For example, leveraging the complementary social-political contexts and comparative advantages in Carbon Capture and Storage (CCS) technology could accelerate global deployment and compliance with CBAM standards (Liu & Hao, 2014).

The two countries could collaborate to **(10) establish joint technical standards** such as green hydrogen certificates, green steel standards, and methods for recycling and disposing of battery waste, etc. These areas are expected to become increasingly significant in the future, and both countries hold strong yet complementary positions in these industries.

6 Conclusion

The European Union's CBAM represents a pivotal shift in global environmental and trade policies, directly impacting countries like Australia and China and indirectly

through trade. Our comprehensive report has thoroughly explored the multifaceted implications of this policy shift.

Through our detailed examination using the SWOT and PEST analytical frameworks, we have uncovered the intricate dynamics of how CBAM influences the Australia-China bilateral relationship. This paper has highlighted that while CBAM poses significant challenges for both countries, it also opens avenues for innovative collaboration in environmental practices and international trade relations.

We have identified that the CBAM presents a unique set of political, economic, social, and technological opportunities and challenges. Politically, CBAM necessitates a recalibration of diplomatic and trade strategies for both nations. This approach not only addresses the immediate challenges posed by CBAM but also positions both countries as proactive and cooperative leaders in global climate governance. Economically, it emphasises the need for diversification towards clean energy sectors and strengthening of supply chain resilience. Socially, it calls for enhanced public engagement and dialogue to foster a deeper understanding of environmental policies. Technologically, it presents an opportunity for joint innovation in green technologies and sustainable practices. Our analysis has shown that despite the initial disruptive potential of CBAM on trade between the Australia-China, it can catalyse a transformative approach towards low-carbon economies and sustainable trade practices.

This paper underscores the importance of strategic cooperation between Australia and China in navigating the challenges posed by CBAM. By leveraging their unique strengths and addressing their weaknesses, both countries can jointly influence global climate policies and contribute effectively to the global effort towards carbon neutrality.

In conclusion, the CBAM, while initially posing a challenge to the current mix of trade between Australia and China, can serve as a catalyst for positive change and greater diversification in the decades ahead. It offers a platform for both nations to lead in the global transition to a sustainable future, fostering a partnership that balances economic growth with environmental stewardship. The insights provided in this paper aim to guide policymakers, industry stakeholders, and academic researchers in developing informed strategies to adapt to and leverage the changes brought about by the CBAM in the evolving landscape of global environmental policy and trade.

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