

Beyond Tariffs: Assessing the Global Trade Impact of Fisheries Production Limits

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Introduction

The evolving landscape of international trade has increasingly highlighted the significance of non-tariff factors. As global economic growth has been driven by inter-country supply chain linkages, the impact of domestic policies of one nation on international trade has become more pronounced. This is equally true for the agriculture and fisheries sectors. The introduction of policies in these sectors has amplified their impact through supply chains, affecting other nations.

Free trade agreements have played an active role in strengthening bilateral supply chains. While the impact of bilateral trade agreements on supply chain enhancement is notable, recent multilateral trade agreements like RCEP and CPTPP have further intensified these interconnections. However, quantitatively analyzing these effects is not straightforward. The GTAP model, a computable general equilibrium model, is highly effective in analyzing the impact of a country's policy implementation on others, but it has limitations, particularly in the fisheries sector, where it does not address specific items and lacks a separate model to analyze the effects of production constraints such as Total Allowable Catch (TAC).

The purpose of this study is to analyze the economic ripple effects of domestic policies in the fisheries sector. It aims to supplement existing CGE models by analyzing the impact of production constraints. To achieve this, a module capable of applying production quotas will be incorporated into the GTAP-HS based model. Specifically, by comparing the economic impacts before and after the application of TAC, this study will provide a more detailed prediction of the effects of domestic policies in addition to the impact of free trade agreements.

This research is expected to assist policymakers in formulating more effective economic policies. Understanding the impact of trade liberalization, such as trade agreements, and the economic impact of domestic policies on the fisheries sector is essential for developing strategies for the advancement of the fisheries industry. Additionally, this study is anticipated to make a significant contribution to academia, enhancing understanding in the fields of economic modeling and policy analysis.

Literature review

This study builds upon a comprehensive body of research that examines the interplay between international trade, domestic policies, and their impacts on the global economy, with a specific focus on the agriculture and fisheries sectors.

Arguello (2009) provided an in-depth analysis of trade liberalization in Colombia, particularly in the agricultural sector, highlighting the complex effects of trade agreements. Beach and Cai (2013) explored the implications of climate change on global agricultural production and trade, offering insights into the environmental aspects of trade. Blake (1998) focused on the European Union's Common Agricultural Policy, assessing its impact on global trade dynamics.

Das, Akgul, and Narayanan (2023) evaluated the effects of trade and investment reforms on global

production and trade patterns, emphasizing the broader economic impacts. Fusacchia, Balié, and Salvatici (2022) analyzed the African Continental Free Trade Area's impact on agriculture and food trade, shedding light on regional trade liberalization. Ganesh-Kumar, Panda, and Burfisher (2006) examined policy reforms in India's agro-processing and agriculture sectors, linking domestic policy changes to international trade.

Gurgel (2007) assessed the impact of trade agreements on Brazilian family agriculture, providing a unique perspective on trade policies in developing countries. Hubbard et al. (2018) explored the potential effects of Brexit on UK agriculture, a study that underscores the significance of political changes on trade. Itakura and Lee (2019) estimated the impacts of the CPTPP and RCEP on Asian economies, highlighting the role of multilateral trade agreements.

Jonga, Delin, Belford, and Ahmed (2021) evaluated the win-win situation for Zimbabwe in diversifying agricultural exports to the Chinese market, focusing on bilateral trade benefits. Kuiper and Tongeren (2005) analyzed trade liberalization scenarios for Morocco and Tunisia, providing insights into Mediterranean trade dynamics. Shinyekwa and Mawejje (2013) examined the East African Community's regional integration effects on Uganda's economy, emphasizing the importance of regional economic cooperation.

Zongo and Oyelami (2021) investigated the impact of non-tariff barriers in services on intra-African trade, contributing to the understanding of service sector trade barriers. Zahra, Seyed Nematollah, and Bahaeddin (2019) focused on the economic evaluation of green tax effects on bioenvironmental pollutants, linking environmental policies to economic outcomes. Calzadilla, Rehdanz, and Tol (2011) assessed climate change impacts on global agriculture, integrating environmental changes with trade. Bachmann (2016) presented a framework for analyzing the infrastructure impacts of Free Trade Agreements, highlighting the intersection of trade policy and transportation systems.

This study aims to extend these diverse perspectives by focusing on the underexplored area of production constraints in the fisheries sector, particularly the Total Allowable Catch (TAC) policy, and its implications for global trade. By utilizing an enhanced GTAP-HS model, this research seeks to provide a more detailed analysis of the combined effects of domestic fisheries policies and international trade agreements, filling a gap in the existing literature.

This study extends the existing GTAP model by developing and applying a new module that can include detailed items and production quotas in the fisheries sector. This overcomes the limitations of existing research and allows for more detailed analysis. This study analyzes the combined effects of free trade agreements and domestic policies on international trade. It contributes to a deeper understanding of the interactions between international trade policies and domestic policies. Through these differences, this study distinguishes itself from existing research and offers new opportunities to explore the impact of policy changes in the fisheries sector on international trade in greater depth.

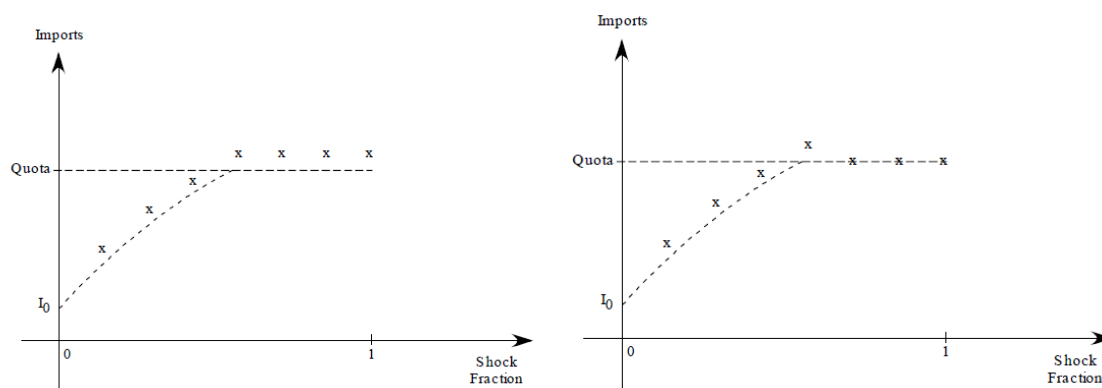
Methodology

Production quota systems are economic policies that limit the amount of a particular product that can be produced, thereby adjusting the balance of supply and demand in the market. These quotas are implemented to prevent overproduction and maintain price stability. The introduction of production quotas can ensure stable income for producers and contribute to reducing market price volatility. However, such limitations may restrict consumer choices and sometimes lead to higher prices. Additionally, production quotas can create barriers to market entry, making it difficult for new competitors to enter the market, potentially hindering innovation and efficiency in the long term.

The concept of complementarity plays a pivotal role in this research. Complementarity in economic modeling signifies situations where either a specific condition holds true or its complementary variable reaches a boundary value. For instance, in the context of policy implementation such as import quotas within the model, complementarity conditions define whether a policy is active or inactive. This allows the model to accurately reflect the impact of policy changes on specific sectors of the economy. Complementarity is crucial for solving nonlinear problems and is particularly used to define the effects of policy changes on economic variables.

In this research, the concept of complementarity is utilized to analyze the impact of production quotas. In the fisheries sector, production quotas can be applied in the form of Total Allowable Catch (TAC) for certain fish species. Such quotas impose supply limitations, influencing market prices, which in turn affect the equilibrium of demand and supply. Through complementarity, the model can quantitatively analyze the diverse impacts of quota policies on the market, thereby assisting policymakers in formulating more effective economic strategies. This approach enables a detailed examination of how production constraints in the fisheries sector influence broader market dynamics and economic outcomes.

Figure 1. Production restriction system in TAC module of CGE model



Source: Harrison and Pearson (1996, p.170)

This study's analytical scenario focuses on assessing the economic ripple effects of the multilateral trade agreement RCEP, particularly examining how tariff reductions in the fisheries sector, based on HS codes, are applied. Additionally, it explores the economic impacts when the Total Allowable Catch (TAC) module is implemented. The aim is to evaluate the effects of RCEP's tariff reductions on the fisheries industry and analyze the complex impacts of combining international trade agreements with domestic policies like TAC. This analysis is expected to provide critical insights for international trade policy decisions, enhancing understanding of the interplay between international trade agreements and domestic policies, and contributing significantly to the development of more nuanced international trade strategies.