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Analysis of the determinants of international seafood trade using a gravity model

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ABSTRACT

Given the high share of fisheries and aquaculture production entering international trade the analysis of seafood trade is of key importance for any policy measure in the aquaculture and fisheries sectors. In this study a gravity model is developed to explore the influence on seafood trade of primary production, food consumption, population, income, GDP, trade agreements and geographical distance. The model is applied to the entire seafood aggregate, in comparison with meat, over time, and at different levels of aggregation of commodities: by main commercial species, processing and preservation stage and aquaculture versus fisheries origin. From the methodological perspective the model formulation addresses two main issues in gravity models which are the incorporation of a multilateral resistance term and the treatment of zero trade flows. The results of the model indicate the peculiarities of seafood trade in respect of meat and, within the seafood aggregate, the extreme diversification of trade determinants linked to the commercial characteristics of the products. Seafood trade is attracted either by countries with well-established seafood preferences or by countries with low labour costs for further processing, while meat exports are favoured by high per capita income and high primary production of the exporting country. Seafood trade is expanding under the influence of two key forces: one is the growth of aquaculture production and the other is the trade for re-processing. These two phenomena are clearly emerging from the differences in the model coefficients when considering disaggregated seafood trade.

1. Introduction

Seafood has a share of around 37% of production value entering international trade. This share is the highest among food commodities comparing for example to 9.8% for meat and 6.7% for milk and dairy products. Considering the ratio between seafood trade and domestic availability it was estimated that 77% of world seafood production is exposed to trade competition [35].

Given the high exposure to trade competition of primary production, the analysis of trade determinants is particularly important for the aquaculture and fisheries sectors. This is true both for developed countries, which are main importers, and for developing countries, which are increasingly relying on seafood trade as a source of income.

The analysis of seafood trade and, in particular, of the south to north trade is central in the debate on food security. In this debate, on one side, there are pro-trade advocates, including many international organisations like FAO and OECD, which indicate that the remarkable expansion of seafood trade and the great amount of earnings generated at the aggregate level are clear signs of the positive welfare effects of seafood trade. On the other side, there are opponents who argue that the selling of fishing rights and the exports of fish from developing countries, in particular sub-Saharan and West African countries, are causing an exploitation of local natural resources and damaging small scale fisheries without a re-distribution of wealth through trickle down effects. Under such conditions seafood exports are blamed to affect negatively the food security of the poor and local coastal communities that depend heavily on fish resources for their subsistence [11,15,2,7].

World fish exports have increased almost continuously in last decades, going from an average of US$20.5 billion in the 80 s to almost US$77 billion in the 00 s, with an average annual growth rate of almost 7%. International seafood trade has expanded not only in volume and value, but also in terms of number of traded species, products and trading partners. Currently there are more than 800 species in different commercial products traded internationally among 197 countries [14].

Forecasts on seafood supply and demand indicate that the expansion of the world's trade of fish and fisheries products will continue in the coming decade, although at a slower pace (from 3.1% for 2010–2012 to 1.8% in 2022) ([27]; [37]). Aquaculture will be mainly responsible for this expansion, as its production is

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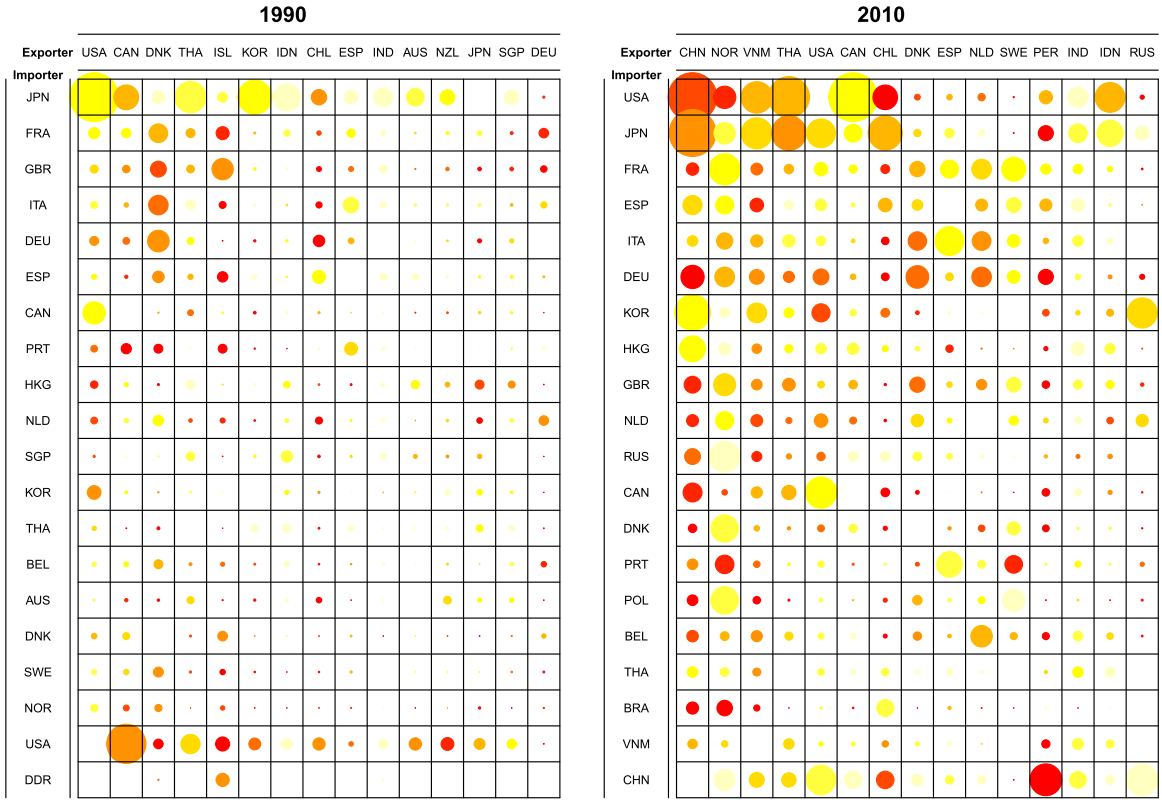

Fig. 1. Trade flows for the main exporters and importers by year and processing. The size of the circles is proportional to the value of the exports and the shading is based on the percentage of the value of whole fresh and whole frozen products in the flow (10 equal intervals between 0% and 100%; trade for USA is relative to 1991).

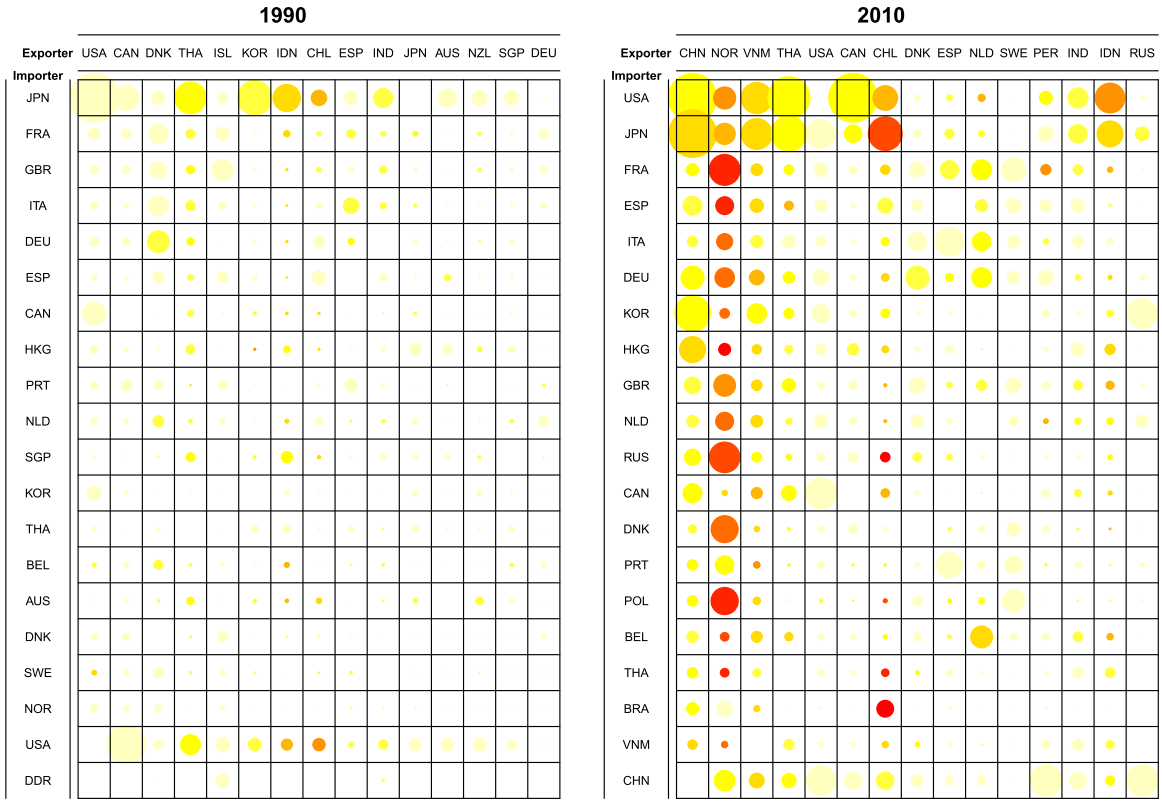

Fig. 2. Trade flows for the main exporters and importers by year and origin of production (aquaculture vs. fisheries). The size of the circles is proportional to the value of the exports and the shading is based on the percentage between aquaculture and total fish production in the exporting country (10 equal intervals between 0% and 100%; trade for USA is relative to 1991).