



Analysis

Caloric unequal exchange in Latin America and the Caribbean

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ABSTRACT

The existence of an unequal exchange between rich and poor countries has been well studied in the literature, explained by differences in labour costs that were reflected in the prices of traded goods. Research has also demonstrated that the failure to include environmental impacts in prices of traded goods concealed an ecologically unequal exchange. This paper contributes to the discussion with the newly coined concept of caloric unequal exchange that defines the deterioration of terms of trade in food in units of calories. Exports and imports to and from Latin America and the Caribbean are analysed for the period 1961 through 2011 in volume, value, and calories, for different groups of products. The study concludes that although calories exported by the region to the rest of the world are more expensive than those imported, the ratio is deteriorating over time. This trend is found to be dependent of the trading partner involved. The region is helping the rest of the world in supplying their diets at a lower cost. A side result is that globalisation is homogenising diets over time, concentrating most food consumption in a reduced number of products, and therefore increasing interdependency among countries and affecting food security.

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1. Introduction

The insertion in global markets often induces changes in production patterns that go against the goal of self-sufficiency, understood as the situation in which food needs are covered with domestic production (FAO, 2002). This is a trend found in many Latin American countries which until now have prioritised production for exports instead of internal supply (Pengue, 2009). This trend has implied a gradual loss in food self-sufficiency and an increase in vulnerability to external factors, such as international prices. This is not the case for all areas of the world, as food self-sufficiency is one of the main goals of many countries or regions. This is the case of the European Union, which has achieved that goal through the Common Agricultural Policy (Guinea, 2014). The EU actually produces more food than it consumes, thus avoiding a supply side problem in recent decades (Candel et al., 2014).

Latin America and the Caribbean (LAC) is increasingly feeding the world. As it happens with other commodities, the terms of trade in the case of food products have been deteriorating over time (Section 4). This fact, along with the dependency the region has on exports to obtain foreign currency, induces countries to engage in a race-to-the-bottom as they compete with each other to sell the same products, driving export prices even lower. This is known as unequal exchange, which

translates into the need for exporting more volume over time to be able to import the same volume.

This deterioration of the terms of trade was a concept advanced by economists in the region such as Prebisch (1950, 1959), Singer (1950), or Furtado (1964, 1970), and gained the attention of authors such as Emmanuel (1972) or Amin (1976). Soon the concept evolved and incorporated environmental concerns, giving birth to the concept of ecologically unequal exchange, according to which exports of natural resources were not accounting for environmental externalities produced in exporting countries.

Many other studies have followed and contributed to this discussion in Latin America (Eisenmenger et al., 2007; Falconí and Vallejo, 2012; Giljum, 2004; Hornborg and Jorgenson, 2010; Hornborg, 1998, 2009; Machado et al., 2001; Muradian and Giljum, 2007; Pérez-Rincón, 2006a; Samaniego et al., 2014; Vallejo, 2010), and acknowledged by studies also measuring the loss of nutrients involved in food exports (Grote et al., 2005; Pengue, 2005). Through analysing the energy balance of agriculture (Pérez-Rincón, 2007), we decided to explore the unequal exchange of food trade, with an understanding that trade is not bad in itself, but unequal exchange is, as it means that many side-effects of production and trade of food are not accounted for.

It is in this regard that the article introduces the concept of caloric unequal exchange, which could be defined in the following way. It expresses the deterioration in the terms of trade of food traded when considering the cost of exported and imported calories. If unequal exchange allowed for discussions of power relationships in international trade,

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and ecologically unequal exchange allowed us to incorporate trade-derived environmental externalities into the debate, it is our belief that caloric unequal exchange will allow for discussions of nutritional issues and diet quality when analysing food trade.

The paper explores this concept in the case of Latin America and the Caribbean with respect to the rest of the world, for the period 1961–2013, using the latest available data published by FAO.

The paper has two specific objectives:

- 1) To test the existence of caloric unequal exchange as defined above both in volume terms but also considering the cost of exported vs imported calories and their evolution over time.
- 2) To examine the loss of regional food self-sufficiency or the increase in external dependency.

2. Unequal Exchange, Ecologically Unequal Exchange, and Caloric Unequal Exchange

The concept of ecologically unequal exchange builds on the concept of 'unequal exchange' developed by Emmanuel (1972) and Amin (1976) and earlier by the work of structuralists Raúl Prebisch (1959, 1950) and Furtado (1970, 1964). At that time, the concept focused on the unequal relationship found in traded goods between countries in terms of embodied labour time, which was reflected in prices being different and therefore developing countries showing deteriorating terms of trade. Ecologically unequal exchange put the focus on embodied land, natural resources and pollution (Bunker, 1984, 1985, 2007; Dorninger and Hornborg, 2015; Hornborg, 1998, 2009, 2014; Hornborg et al., 2007; Muradian and Giljum, 2007; Röpke, 2001). Exports of developing countries would be intensive in natural resources. However, their prices would not account for the value of the environmental externalities involved, implying a de facto transfer of wealth from poor to rich countries. Externalities would not be seen then as market failures, but rather as 'cost-shifting-successes' (Muradian and Martinez-Alier, 2001).

In fact, Hornborg (1998: 127) sees unequal exchange as emerging from an inverse relationship between productive potential and economic value. In his own words, "*production' (i.e. the dissipation of resources) will continuously be rewarded with ever more resources to dissipate, generating ecological destruction and global, core/periphery inequalities as two sides of the same coin*".

The work of Bunker helped understanding how natural resource extraction shaped the underdevelopment of the Amazon in earlier decades (Bunker, 1984, 1985), opening room for new studies in what is today called political ecology, which deals with ecological distribution conflicts (Martinez-Alier and O'Connor, 1996).

Much work showing evidence of the imbalances in international trade and the burden of the exploitation of natural resources has been conducted, particularly in Latin America. A few examples for this growing literature follow. In the case of Brazil, Machado et al. (2001) showed that exports of non-energy goods had more embedded energy than imports. Embodied pollution in exports was also analysed (Muradian et al., 2002). The authors presented environmental load displacement from developed to developing countries. They estimated embodied pollution from 18 industrialized countries belonging to OECD versus the rest of the world, with the result that more air emissions were embodied in imports than in exports by rich countries. A study using material flow accounting in Chile showed how the burden of the exploitation of natural resources was unequally distributed and remained with the exporter (Giljum, 2004). Similarly, Pérez-Rincón (2006a) found a biophysical trade balance deteriorating and worsening terms of trade in the case of Colombia.

(Jorgenson, 2009, 2012; Jorgenson et al., 2010) conducted a series of tests on the existence of ecologically unequal exchange. He first tested the hypothesis for 66 lower-income countries, finding that those countries with high levels of primary exports to high-income countries, showed, at the same time, lower consumption-based environmental demand, measured by their ecological footprint (Jorgenson, 2009).

Later he extended the analysis to deforestation (Jorgenson et al., 2010) and CO₂ emissions (Jorgenson, 2012).

Most of the analyses, though, focus on traditional extractive sectors such as mining and oil, with minor exceptions such as Austin (2010), who showed how developed economies transferred the environmental costs of their beef consumption to developing nations, the origin of their imports.

Our work contributes to this debate with the newly coined term 'caloric unequal exchange'. By this we mean the deterioration of the terms of trade when calories of foodstuff instead of volume are used. Our hypothesis is that, developing countries, and in our case, the countries of Latin America and the Caribbean, are increasingly exporting food products to the rest of the world at a lower cost to the calorie, expressing a new form of unequal exchange.

Analysing caloric unequal exchange is important as it brings together other issues regarding trade and food production globally, such as dietary diversity and malnutrition, food security and environmental concerns. Clearly, nutrition is not just about calories; however, calories can be used to bridge different scales of the analysis. Volume allows us to link the monetary value of food exports with production and therefore with land use and environmental impacts, as in ecologically unequal exchange. Calories allow us to link the former with nutrition. We are aware, though, that we are subject to simplification by using just one indicator, but we believe caloric unequal exchange may be expanded in the future to account for macro- and micro-nutrients.

3. Material and Methods

This study focuses on the region of Latin America and the Caribbean as defined by the UN Statistics Division.¹ The time window considered depends on the availability of data. For data on consumption, self-sufficiency, and variety of consumption, we use the period of 1961–2011. In the case of trade and terms of trade, we use data for the period 1986–2013 as reported by FAO.

The main source of data is FAOSTAT (FAO, 2016). We have used both data on food trade (starting in 1986) as well as food balances (starting in 1961). We present data in terms of volume, monetary values (in constant USD of 2005) and calories (kcal). Analysing LAC as a region means deducting intra-regional trade from trade statistics, as we are only interested in the relationship of the region as a block with the rest of the world. It is important to mention that, due to lack of data, Mexico is absent from the analysis for the year 1996, a fact that materialises in both tables and figures.

Several steps for processing data were followed, which are described below.

First, We use FAO's 14 major food groups: cereals (excluding beer), sugar crops, sugars and syrups, pulses, tree nuts, oil crops, vegetable oils, vegetables, fruit (excluding wine), roots and tubers, stimulants, spices, alcoholic beverages, miscellaneous. In this way, we focus our analysis on those groups that are more relevant for the region in terms of calories consumption. The study disaggregates the analysis for six major food product groups, according to their relative importance in terms of consumption: cereals (excluding beer), sugar and syrups, roots and tubers, pulses, vegetable oils and fruits (excluding wine).

Second, we used FAO's food composition tables (FAO, 2001) for calculating the energy content of traded goods. It is worth mentioning that our analysis only accounts for calorie content of food products and does

¹ Antigua and Barbuda, Argentina, Aruba, Bahamas, Barbados, Belize, Bolivia, Brazil, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Netherlands Antilles, Nicaragua, Panama, Paraguay, Peru, Saint Kitts and Nevis, St. Lucia, St Vincent and the Grenadines, Suriname, Uruguay, Venezuela. (See <http://unstats.un.org/unsd/methods/m49/m49regin.htm>)

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