



# Does trade openness contribute to food security? A dynamic panel analysis



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## ABSTRACT

Despite significant progress in the fight against hunger during the last decades, food insecurity remains a major problem in many countries, especially developing ones. In this study, we use a large cross-country data to investigate the impact of trade openness and other factors on food security, measured by dietary energy consumption. We employ a system GMM approach to account for unobserved heterogeneity, correlated individual effects and potential endogeneity of the explanatory variables. The empirical results reveal that trade openness and economic growth exert positive and significant impacts on dietary energy consumption, and also contribute to improvements in dietary diversity. The results are robust to the inclusion of additional variables capturing specific agro-climatic constraints (e.g. weather-related) and regional/country characteristics and to the sample composition. Most geographical regions are found to have significantly higher food security levels compared to Sub-Saharan Africa. Additional results indicate that besides calorie consumption, trade openness also improves dietary diversity and diet quality-related aspects of food security.

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## 1. Introduction

Despite significant progress in world agriculture and economic development during the last decades, food insecurity persists in many countries. As indicated by the FAO, with more than 800 million people still suffering from chronic undernourishment and additional population pressure, the eradication of hunger continues to be a major global challenge (FAO, 2012). Food insecurity and malnutrition have direct consequences for health and human development and more general for learning, individual productivity and economic development (World Bank, 2006; Upton et al., 2016). Consequently, the FAO (2014) emphasizes the need to place food security issues at the top of the political and international research agenda and to create an enabling environment for improving food security through adequate investments and better policies.

Many countries, developed as well as underdeveloped ones, have undertaken substantial policy reforms in the last three decades, including trade policy reforms aimed at reducing tariff and non-tariff barriers. These trade policy reforms have contributed to growth in international trade worldwide (Anderson, 2010). Trade reforms have been justified by expected increases in effi-

ciency, particularly in resource allocation, and output growth by improving transparency in incentives, thereby promoting economic growth and poverty alleviation and improving food availability for local consumption (FAO, 2003a; Dorosh et al., 2016; Alessandri et al., 2017).

A considerable body of empirical research has focused on the impact of globalization and trade liberalization on specific dimensions of economic development, such as economic growth and poverty, yielding inconclusive results.<sup>1</sup> Given that poverty is a broad indicator of the well-being of a country's population, the issue of food insecurity, which is more about basic needs, has attracted the attention of researchers over the past decade (Traub and Jayne, 2008). The importance of trade policies for food security was recognized by the World Food Summit in 1996, speaking in favor of a fair and market-oriented world trade system (Rome Declaration, 1996). At the global level, international trade can link production and consumption of food and may thus play an important role in securing enhanced food security, as it permits global production to take place in those regions most suited to it and enables food to flow from countries with abundant food supplies to ones with insufficient supplies (Runge et al., 2003). A country's increasing openness to trade may then lead to an increase in the total amount of food available

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<sup>1</sup> For a survey of the openness-growth nexus, see Rodríguez (2007), and for a review of the evidence on the impacts of trade liberalization on poverty, see Winters et al. (2004).

to the national population and make available a greater variety of foods, contributing to increased food security. However, food security both- in terms of research and policy- has received much less attention than poverty, with only few studies explicitly exploring the impact of trade liberalization on food security (Guha-Khasnobis et al., 2007; World Bank, 2006).

FAO (2006) summarizes the findings of 15 country case studies regarding the impact of trade reforms on food security. The majority of the studies, however, perform only descriptive analysis. Furthermore, they generally focus on only one aspect of the relationship between trade reforms and food security, for example, the impact on income and prices, such that the overall effect on food security levels are not quantified. An additional problem comes from the fact that these studies largely use poverty indicators instead of direct food security indicators, which are seldom available at the household level (FAO, 2006). The few available case studies on the issue (e.g., Seshamani, 1998; del Ninno et al., 2003; Feleke et al., 2005; Dorosh et al., 2009; Pyakuryal et al., 2010) find either no significant effects of trade liberalization policies on aggregate food security indicators, or positive effects, working mainly through resulting employment and income increases, and by enabling a rapid increase in food supplies following domestic production shortfalls.

In this study, we take a broader perspective and focus on the overall level of food security of the population as indicated by average dietary energy consumption. This approach enables us to rigorously assess the impact of trade openness and other factors on food security. In particular, we adopt a dynamic modeling approach that is better suited for the analysis of policy reforms that have long-term effects that persist into the future. Specifically, we use a two-step Generalized Method of Moments (GMM) estimator to account for unobserved heterogeneity and potential endogeneity of the explanatory variables.

The rest of the study is structured as follows. The next section outlines the potential impacts of trade reforms and food security. Section 3 explains the empirical specification and estimation methodology employed in the empirical analysis. Section 4 describes the data, while Section 5 presents the empirical results and sensitivity analysis. Finally, Section 6 offers some concluding remarks and policy implications.

## 2. How trade openness contributes to food security

The FAO defines food security as a situation in which all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. This definition emphasizes the multidimensional nature of food security, which include availability, stability, and access. Adequate food availability means that, on average, sufficient food supplies should be available to meet consumption needs. Stability refers to the issue of ensuring adequate food supplies in years of severe food shortages. Food security in the access dimension is about ensuring that all people at all times have economic access to the basic food they need (FAO, 2003a).

With respect to the issue of ensuring national availability of food, the world market can function as an essential source of food supplies, especially for those countries where domestic food production is constrained by agro-climatic and other factors (Runge et al., 2003). Trade openness allows access to larger markets, opens up opportunities for specialization in production as well as the realization of dynamic efficiency gains from factors such as economies of scale, technology transfers and knowledge spillovers and thus enhances the possibilities for generating export revenues (Wacziarg and Welch, 2008). The economic choice of importing a

commodity generally implies that it can be procured from abroad more cheaply than can be produced domestically and as such is no *a priori* reason for concern (FAO, 2000). For countries with heavily distorted production and trade, greater market liberalization reduces price distortions and brings about improved incentives for market participants. Trade may then lead to an increase in the total amount of goods, e.g. food, available to the national population and make available a greater variety of goods (FAO, 2000). Moreover, export revenues can be used for the import of production inputs, such as machinery, fertilizers and pesticides. However, debt service obligations and deteriorating terms of trade between agricultural commodities and manufactured products, may limit the possibilities to finance food imports for those countries for which agricultural commodities are the major source of foreign exchange (FAO, 2005).

With regards to stabilizing food supplies, trade may serve to smooth out excess demand or excess supply situations in domestic markets, thereby stabilizing national food supplies and reducing price fluctuations. A more open trade regime may thus reduce the supply variability of (staple) foods, as countries have more options to enhance food availability compared to the case of a self-sufficiency policy. It also relieves countries of part of the burden from costly stock holding interventions (FAO, 2000). Deeper world markets for food products, availability of foreign exchange from increased export earnings, accompanied by an open trade policy can then help to stabilize domestic food availability and allow global production to take place in those regions most suited to it. On the other hand, a problem resulting from this process may be the reliance on exports of a small number of agricultural commodities for a large share of export revenues. High dependence on just a few export commodities may leave some countries, in which export earnings are critical for ensuring staple food imports, extremely vulnerable to changing market conditions, such as international price fluctuations (FAO, 2003b).

International trade impacts on the access dimension of food security via its effect on prices, the availability of production factors, economic growth, household incomes and employment. Many farmers may, for example, sell some of their production surpluses on local or export markets to acquire other food products. The amount of food they can acquire will be influenced by trade policies that affect the prices for food relative to what households are able to exchange as well as the access to export markets. Besides that, producers may indirectly benefit from increased demand for their goods from those who benefit from trade liberalization (Winters et al., 2004; Alesandro et al., 2017).

Furthermore, trade openness promotes exports of products that are produced with the relatively abundant factor, in most developing countries presumably (low-skilled) labor, thereby creating employment opportunities (also for non-farm income) and raising workers' incomes (Stolper-Samuelson theorem). This induced process could play an important role in reducing poverty and improving food security (Jaffe et al., 2011). Lastly, the openness of a country may positively affect the possibility to receive food aid (FAO, 2003a). For example, Alesina and Dollar (2000) show that the direction of foreign aid is influenced by political and strategic considerations and find that certain donors, most notably the Nordic countries, dedicate more aid to those countries that are more open and have better institutions in place.

## 3. Empirical specification and estimation

As indicated previously, we adopt a dynamic modeling approach to analyze the impact of trade openness on food security for a cross-section of countries. The use of a dynamic panel regression framework allows us to account for some of the dynamic

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