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Agricultural transformation and food and nutrition security in Ghana: Does farm production diversity (still) matter for household dietary diversity?

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ABSTRACT

Africa south of the Sahara experienced an acceleration of economic growth in recent years that was accompanied by structural changes in national economies. Some African countries, such as Ghana, managed to utilize rapid growth for poverty reduction and improving food and nutrition security. Transformation of agriculture appears to have played an important role in this context. However, the linkages between agricultural transformation and food and nutrition security at the household level are not well understood. This article examines the linkage between farm production diversity and household dietary diversity in rural Ghana and how that linkage changed between 2005–06 and 2012–13. The empirical analysis employs a regression model that controls for region- and time-fixed effects. The estimation results suggest that farm production diversification, as well as household income growth, continues to be strongly associated with increased household dietary diversity. The analysis further explores the mechanism that underlies this production-consumption linkage by systematically modifying the basic model specification.

1. Introduction

Africa south of the Sahara experienced an acceleration of economic growth during the first decade and a half of the 21st century (World Bank, 2017).[1] Africa's recent economic growth was accompanied by structural changes in national economies and rapid urbanization. Agriculture shrank as a share of both national gross domestic product (GDP) and the total labor force; workers moved out of agriculture and largely into a burgeoning services sector (Diao et al., 2017a; Rodrik, 2018). At the same time, rising incomes, rapidly growing 'consumption cities' (Gollin et al., 2016), and continued high population growth in rural areas have stimulated agricultural commercialization and intensification of farming systems. African farmers have gained new market opportunities from a growing demand for food and other agricultural products. But these developments have also put traditional farming systems under mounting stress (Binswanger-Mkhize and Savastano, 2017). This is reflected in declining (or stagnant) per capita farm sizes (Jayne et al., 2014), shrinking fallow land areas and shorter fallow periods (Headey and Jayne, 2014), and increasing soil degradation (Drechsel et al., 2001; Muchena et al., 2005).

At the farm household level, increased commercialization is typically accompanied by specialization in the production of a few profitable crops or livestock products. Specialization leads to reduced farm production diversity and declining levels of household food self-sufficiency (Fafchamps, 1992; Pingali and Rosegrant, 1995). With advancing agricultural transformation, farm production diversity gradually becomes less important for household dietary diversity until farm households' food consumption is largely decoupled from on-farm production in a well-integrated rural market economy.

However, African farmers, especially in remote areas, continue to face severe market failures that may not allow them to separate farm production decisions from household consumption decisions. This non-separability rationalizes maintaining high farm production diversity at the (potentially high) cost of sacrificing profits to mitigate consumption risks (Dillon and Barrett, 2017; Morduch, 1995). To increase household incomes and reduce consumption risks, African farm households often diversify their income sources into non-farm employment, including jobs in agro-processing (Barrett et al., 2001; Tschirley et al., 2015).

The ongoing agricultural transformation is likely to have important implications for food and nutrition security in Africa. Food shortages and malnutrition remain mainly rural phenomena across the region. Agricultural transformation could help improve food and nutrition security in rural areas by increasing farm income from growing (urban) demand for agricultural products and off-farm income from employment along the value chain and by improving market access, thereby enabling rural consumers to smooth seasonal food shortages and

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[1] The specification 'south of the Sahara' is omitted in the remainder of the article.

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diversify their diets. On the other hand, agricultural commercialization and farm production specialization, especially into non-food 'cash crops,' may be accompanied by reduced dietary diversity if the sacrificed diversity of foods from own-production is not compensated for with market purchases. The lack of diversity in the foods people eat—in particular, the variety of vegetables, fruits, pulses, and animal-source foods—often leads to micronutrient deficiencies (Ramakrishnan, 2002; Ruel, 2001) that can cause child stunting (Branca and Ferrari, 2002; Walker et al., 2007).

There has been a revival of household-level analysis of the links between farm production choices and food security and nutritional outcomes in the context of Africa's recent agricultural transformation. Examples include studies by Ritzema et al. (2017), using data from seven East and West African countries; Carletto et al. (2017), using data from Malawi, Tanzania, and Uganda; Sibhatu et al. (2015), using data from Ethiopia, Kenya, and Malawi (and Indonesia); Hirvonen and Hoddinott (2017), using data from Ethiopia; Romeo et al. (2016), using data from Kenya; and Jones et al. (2014), Radchenko and Corral (2018), and Koppmair et al. (2017), using data from Malawi.

This article contributes to that literature. The primary objective of the empirical analysis is to examine the linkage between farm production diversity and household dietary diversity in rural Ghana and how that linkage has changed with agricultural transformation in recent years. To estimate the dietary diversity effects of farm production diversity, household income, and other farm household characteristics indicative of agricultural transformation, this analysis employs a regression model that controls for region- and time-fixed effects. The fixed-effects model addresses potential endogeneity problems due to unobserved, time-constant heterogeneity across regions and time-varying factors that affect all Ghanaian farm households similarly, such as agricultural seasonality. The secondary objective is to explore the mechanism underlying the linkage between farm production diversity and household dietary diversity by systematically modifying the basic model specification.

This article shows that farm production diversification continues to be strongly associated with increased household dietary diversity in rural Ghana, despite advancing (early-stage) agricultural transformation. Ghana is an interesting case because it has achieved rapid economic growth and remarkable progress in poverty reduction and food and nutrition security, especially since the mid-2000s. Agricultural transformation likely played a key role in these achievements (IFPRI, 2015a; McKay et al., 2016; NDPC and UNDP, 2015). The structural change in Ghana's national economy has been typical of much of Africa (Diao et al., 2018), and like many other African countries, Ghana now needs to sustain the progress of the last decade and a half. Continued agricultural transformation offers a promising avenue for achieving sustainable labor-productivity growth (McMillan et al., 2017; Rodrik, 2018). Ghana is well positioned to forge a model path of agriculture-driven, growth-enhancing economic transformation for Africa.

Apart from providing a useful case study from West Africa, where the implications of agricultural transformation for food and nutrition security have been underresearched, this article contributes to the literature by systematically analyzing the likely mechanism that translates farm production diversity into household dietary diversity. Previous studies (e.g., Jones et al., 2014; Koppmair et al., 2017; Romeo et al., 2016; Sibhatu et al., 2015) do not go beyond demonstrating the association(s) between farm production diversity or specific production activities and household dietary diversity. They also use regression model specifications that are less well suited to control for potential endogeneity problems.

This article proceeds as follows: Section 2 provides the study background; Section 3 describes data and methods of the empirical analysis; Section 4 presents and interprets the estimation results; and Section 5 offers conclusions.

2. Background

Current optimism about Africa's growth path is cautious, as a growing dependence on the (often informal) services sector does not offer a lasting path to economywide labor-productivity growth (Diao et al., 2017a; Rodrik, 2018; McMillan et al., 2017). Yet the transformation of traditional, subsistence-oriented agriculture to modern, market-oriented agriculture, along with the development of agricultural value chains, offers a promising opportunity for Ghana and other African countries (Diao et al., 2018). Unlike many other African countries, however, Ghana has already established critical 'fundamentals' for sustainable economic growth, although there is no guarantee that these will lead to economic transformation (McMillan et al., 2017).

A fundamental component of Ghana's economic development was the Economic Recovery Program (ERP), launched by Ghana's new revolutionary government in 1983, after more than a decade of economic recession. The ERP was successful in spurring growth, restoring fiscal and monetary stability, and reducing external debts (World Bank, 1989). To address the ERP's shortcomings, correct distortions and disincentives, and improve public-sector resource use, the government began to implement a series of major economic reforms under the Structural Adjustment Program (SAP) in 1986 (World Bank, 1992). Together with a return to democratically elected government in 1992, the SAP efforts helped to embed a basic market-led development strategy in which the government focused primarily on creating an enabling economic environment rather than trying to promote specific lines of economic activity (Diao et al., 2018). Unlike many other African countries that established similar structural adjustment programs and suffered from a 'lost decade' of development, Ghana has enjoyed uninterrupted per capita GDP growth since 1983. This achievement has been matched by only three other countries—China, Vietnam, and Mauritius (World Bank, 2017).

The ERP and SAP identified agriculture as a key sector for achieving sustainable economic growth, and Ghana's government began to invest considerably in the sector's rehabilitation in the late 1980s. Agricultural investments were largely directed toward—or, at least most conducive to—the production of exportable cash crops, especially cocoa (Clark, 1995). In response to popular criticism for an unbalanced agricultural policy, the government put in place the Medium-Term Agricultural Development Program 1991–2000, which aimed at achieving national food self-sufficiency and improved household food security by 2000. Nevertheless, agricultural policy continued to focus on market production (Clark, 1995). Agriculture performed reasonably well overall, with output growing by 2.4% on average between 1990 and 2015, although the sector's relative contribution to the national economy declined (Fig. 1).

Agricultural growth did not prevent workers from leaving the sector. Since 2000, the share of Ghana's total labor force employed in agriculture has declined at an even faster rate than has the share of the rural population, indicating the declining importance of farming for rural income generation (Fig. 1). Nevertheless, agriculture remains the dominant source of livelihood for rural Ghanaians, who, since 2010, account for less than half of the total population. The movement of workers out of agriculture into non-agricultural sectors with higher average labor productivity contributed to economywide labor-productivity growth in the 2000s (Diao et al., 2017a).

Ghana's agricultural sector has undergone substantial changes induced partly by national agricultural policy. The distribution of cultivated land and land productivity have changed since the early 1990s and more so since the mid-2000s. Although the vast majority of Ghanaian farmers are still smallholders, the share of all farms under five hectares (ha) dropped from 92% in 1992 to 84% in 2012 (Jayne et al., 2016). The share of farmland on holdings with less than 5 ha also fell, while the share on holdings of 5 ha or more rose. Among all farms with up to 100 ha, 49% of the total operated land area was controlled