World Development 107 (2018) 264–276

Contents lists available at ScienceDirect

World Development

journal homepage: www.elsevier.com/locate/worlddev

Beyond dualism: Agricultural productivity, small towns, and structural change in Bangladesh

M. Shahe Emran [a], Forhad Shilpi [b,*]

[a] IPD, Columbia University, United States
[b] World Bank, MSN MC3-305, 1818 H Street, N.W., Washington, DC 20433, United States

ARTICLE INFO

Article history:
Accepted 4 February 2018
Available online 5 April 2018

JEL classification:
O13
O14
O17
O18

Keywords:
Agricultural productivity
Small town economy
Dualism
Employment in large firms
Employment growth
Structural transformation

ABSTRACT

This paper uses a framework that goes beyond rural-urban dualism and highlights the role of small-town economy in understanding structural change in a developing country. It provides a theoretical and empirical analysis of the role of agricultural productivity in structural transformation in the labor market in small towns and the surrounding rural areas. The empirical work is based on a general equilibrium model that formalizes the demand and labor market linkages: the small-town draws labor away from the rural areas to produce goods and services whose demand may depend largely on rural income. The theory clarifies the role played by the income elasticity of demand and the elasticity of wage with respect to productivity increase in agriculture. For productivity growth to lead to a demand effect, the wage elasticity has to be lower than a threshold. When the demand for goods and services produced in small towns comes mainly from the adjacent rural areas, the demand effect can outweigh the negative wage effect and lead to higher employment in the town-goods sector. The empirical analysis finds a significant positive effect of higher rainfall on rice yield and wages. Using rainfall shocks as a source of exogenous variation, we provide instrumental variables estimates of the effects of agricultural productivity on agricultural wages. The increase in wages is larger in the rural sample compared with the small town economy sample, but structural change in employment is more pronounced in the small town economy. In the rural sample, the positive employment effect is observed only in small-scale manufacturing and services. In contrast, a positive productivity shock in small towns sample has large and positive effect on employment in large scale manufacturing and services (construction, transport, education, and health). Agricultural productivity growth induces structural transformation within the services sector in small towns, with employment in skilled services growing at a faster pace than that in low skilled services.

1. Introduction

A substantial literature in development economics focuses on structural change where economic development is characterized by labor reallocation from a contracting agricultural sector to the expanding manufacturing and services sectors. In much of the literature, agriculture is equated with the rural economy, and manufacturing and services with urbanization. Although such dualistic perspectives have been at the center of a large body of literature starting from Lewis (1954) and Kuznets (1973), the more recent work emphasizes the need for a broader framework, beyond the binary conceptualization of dualistic models, to capture the richness of structural change in a developing economy.

In the context of rural-urban dualism, a growing literature underscores the fact that the "rural" and "urban" are two polar cases in a broader spectrum, and many geographic and administrative units are better characterized as partially urbanized. A simple yet useful framework that goes beyond the canonical rural-urban dualism is where the focus is on areas that contain a small town surrounded by significant rural population and agricultural activities. Contrary to popular impression of most urban people being crammed into mega-cities, recent evidence shows that a large share of urban population and rural-migrants live in the smaller cities and towns (Christiaensen, De Weerdt, Kanbur & Ravi, 2017; Ferre, Celine, Ferreira, & Lanjouw, 2010). In the spatial spectrum from metropolitan cities to villages, the small towns occupy a space in the middle in terms of population and employment density. As suppliers of goods and services and destinations of rural workers, the small towns have ties with both metropolitan cities

* Corresponding author.
E-mail address: fshilpi@worldbank.org (F. Shilpi).

https://doi.org/10.1016/j.worlddev.2018.02.004
0305-750X/

and rural areas (Haggblade, Hazell, & Reardon, 2006). This paper analyzes structural change in employment in a 'small town economy' with a focus on the role played by higher agricultural productivity in the villages surrounding the town.

The focus on agricultural productivity change as a driver of employment specialization and structural change is primarily motivated by a longstanding debate about the role of agricultural productivity in industrialization and structural change.[1] The earliest view in development literature identified a trade-off between poverty reduction through agricultural development and long-run structural change, because higher agricultural productivity is likely to increase the wages faced by the nonfarm sectors (Lewis, 1954; Foster & Rosenzweig, 2004). A second view emphasizes possible adverse effects of green revolution in Asia on employment, wages and inequality (especially land concentration) because of mechanization and unequal access to credit (Griffin, 1974; Rogaly et al., 1999), which would facilitate structural change in favor of manufacturing by lowering wages and relaxing wage-goods constraint (Sah & Stiglitz, 1987). Both of these opposing views, however, share a common feature: they focus on the supply side mechanism of structural change that works through the labor market.[2] The competing view emphasizes the Engel curve effect in consumer demand reflecting inelastic demand for food, and higher income elasticity of manufacturing goods and services. Since much of the rural population are engaged in agricultural activities, a rise in agricultural productivity can increase rural income and thus have a positive demand effect on non-farm activities, including those located in small towns (Haggblade et al., 2006; Mellor, 1976; Ranis & Stewart, 1973). Recent empirical studies suggest a bigger role of labor market linkages. Foster and Rosenzweig (2004) find a negative relationship between manufacturing employment and agricultural productivity growth providing support to the contention that there is a trade-off between agricultural growth and manufacturing growth. Bustos, Caprettini, and Ponticelli (2016) on the other hand find that labor saving technical change in soybean production in Brazil led to industrial growth. In this paper, we provide evidence on the impacts of agricultural productivity shock on employment growth and specialization in a more general context where both labor market and demand linkages interact with each other, and may lead to contrasting outcomes across different areas within the same country.

We develop a simple model of a small-town economy that formalizes the dual roles that a town plays in such an economy: it draws labor away from the rural areas to produce goods and services whose demand may depend largely on rural income. There are three types of goods produced in this economy: food and informal good (low quality manufacturing and services) are produced in the villages, and a formal good (high quality manufacturing or services) is produced in the small town.[3] A positive productivity shock to agriculture, however, does not necessarily increase village income; given a labor endowment, the village income increases only when the response of wage (i.e, elasticity of wage with respect to productivity shock) is lower than a threshold.[4] When the elasticity of demand for the town good in the village is low so that most of the town good is sold outside the local economy, the labor market linkage predominates and a higher rural wage due to agricultural productivity increase reduces employment in small towns. In contrast, when demand for goods and services produced in small towns comes mainly from the adjacent rural areas, the demand effect can more than offset the negative wage effect, and lead to higher labor allocation to the production of town good.

We test the predictions of the model using panel data compiled from the population and enterprise censuses from Bangladesh. Our data set covers the period between 2000 and 2010. Between 2000 and 2010, Bangladesh experienced substantial reduction in the incidence of poverty, from 48.9 percent to 31.5 percent. This decade also witnessed substantial expansion in non-farm employment as a result of which its share in total employment increased from 47 percent to 52 percent. The rice yield, which is taken as a measure of agricultural productivity, has grown at an annual rate of 3.6 percent.[5] Though rice yield has been growing since 1973, this yield growth rate compares quite favorably relative to 1.28 percent annual growth during 1973–1994 period (Baffes & Gautam, 1996). Panel data evidence presented by Hossain and Bayes (2009) also suggests strong productivity growth over the period of 1988–2008. More recent analysis of crop sector also confirms higher productivity growth in agriculture during the decade of 2000 (Gautam & Faruqee, 2016).

To understand the implications of agricultural productivity, we exploit variations in rainfall across upazilas and over time, and implement an approach that focuses on the effects of rainfall shocks in reduced form regressions on the outcome variables (employment in different types of non-farm activities) and also on the measure of agricultural productivity (crop yield). Our approach relies on the fact that rainfall variations can be interpreted as shifts in the production function, because rainfall is a major determinant of crop yield in Bangladesh (Sarkar et al. (2012)).[6] We also provide an instrumental variables interpretation of our estimates, using rainfall deviations (from long term average) across upazilas and over time as an instrument for crop yield (rice yield). It is worth noting here that while rainfall shocks have been used for identification in a variety of contexts, agricultural productivity is arguably one of the most natural contexts where rainfall can provide reasonable identifying variations (Adhvaryu, Chari, & Sharma, 2013; Bruckner and Ciccone, 2011; Foster & Rosenzweig, 2004). Empirical estimation issues including relevance of instrument in the context of Bangladesh and strategies to deal with them are discussed in detail in Section 3.

The empirical results establish positive and statistically significant effects of rainfall on rice yield and agricultural wages. The positive effect of rainfall shock on agricultural productivity (as measured by rice yield) is similar across village and small town samples but its effect on wage is larger in the village sample compared with the small town sample. A positive rainfall shock increases employment in the production of informal village good (small scale manufacturing and services) but has no statistically significant effect on the labor allocated to large scale manufacturing employment in the rural sample. A positive productivity shock has large and positive impacts on employment in construction and transport, education, health and other services, and manufacturing employment in larger scale enterprises located in STEs. When interpreted as instrumental variables estimates of the effects of productivity increase, the empirical results suggest that agricultural productivity induces structural transformation within the services sector with employment in skilled services provided by larger firms growing at a much faster pace compared with services provided by smaller firms/individuals.

[1] A broader literature on agriculture examines other possible impacts of agricultural productivity growth on rural economy and livelihood. See, for example, Rogaly, Harris-White, and Bose (1999), Hossain and Bayes (2009).

[2] A related literature also analyzed the possibility that poor farmers will not able to adopt new technology either because of landlord's opposition, or a lack of credit.

[3] The assumption that the town produces only one good is for the sake of simplicity. In the empirical analysis, we consider disaggregation of the town good, some of which are of relatively lower quality with lower income elasticity. Moreover, in our model, town caters to demand from both rural areas and larger urban centers.

[4] In a more general model with a positive labor supply curve at the household level, a positive shock to agriculture is expected to increase village income in general.

[5] Rice is the predominant crop in Bangladesh. This growth rate is computed from Household Income and Expenditure Survey rounds (2000, 2005 and 2010). The average annual growth rate between 2000 and 2009 based on old district level data from Bangladesh Bureau of Statistics is 3.63 percent.

[6] This is confirmed in our first stage regression as well.