



Small Farmers in High-Value Chains: Binding or Relaxing Constraints to Inclusive Growth?

ROEHLANO M. BRIONES*

Philippine Institute for Development Studies, Makati City, Philippines

Summary. — Considerable empirical work relates participation in contract farming with farm profitability. However causation is far from settled as few studies control for endogeneity of participation. Moreover the link between contract farming and equity is ambiguous as the association between contract farming and farmer endowments is mixed. This case study of smallholders in the tobacco industry addresses these issues, and seems to be the first such econometric application in the Philippines. Based on a treatment effects regression, contract farming increases profitability, with participation biased toward smaller farm sizes, supporting the positive role of contract farming toward inclusive growth in rural areas.

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Key words — supply chain, contract farming, smallholders, treatment effect, instrumental variable

1. INTRODUCTION

(a) *Issues*

The development of agriculture continues to play a key role in the transformation of economies in Asia Pacific. Often such transformation is accompanied by diversification of smallholder farming toward high-value activities linked to modern markets (ADB, 2013). Linking small farmers to modern markets, whether domestically or for export, increasingly entails participation in organized value chains, here referred to as *supply chains*.

In supply chains, traditional arms-length transactions are replaced by coordinated buyer–supplier networks. A common coordination scheme is contract farming, in which agricultural production is carried out based on an agreement between buyers and farmers, which establishes conditions for the production and marketing of farm products.

Much research has been conducted on contract farming in developing countries. A cursory review of the literature supports the claim that contract farming is favorable to smallholders. For example, empirical work tends to show that incomes of smallholders who produce under contract are larger than those who do not (Reardon, Barret, Berdegue, & Swinnen, 2009). However a deeper survey uncovers ambiguities in the evidence; for instance, contract growers of a supermarket chain in Nicaragua pay significantly lower prices compared to traditional markets (Michelson, Reardon, & Perez, 2012).

Moreover, the correlation between contract participation and farm income cannot be equated with causation, owing to the endogeneity problem: “Few studies, however, have credible controls for the nonrandom pattern of geographic placement of firm contracting and of firm selection of individual suppliers into specific commodity value chains, raising serious questions as to whether the observed associations between farmer income and participation, for example, reflect the welfare effects actually *caused* by the value chain transformation or merely placement and selection effects (Barrett *et al.*, 2012, pp. 13–14).” Those that do control for endogeneity are not unanimous in establishing a positive effect for contract farming (see Section 2).

Even if beneficial, contract farming may serve to perpetuate or aggravate rural inequalities; buyers may prefer farmers with greater landholdings or asset endowments, excluding the smallest and poorest farmers from high-value chains (Minot, 2007). If so then contract farming may be inconsistent with a growth process that is broad-based and inclusive.

Clearly, more rigorous research is warranted on the impact of contract farming, based on evidence from a variety of areas, commodities, and farming systems.

(b) *Aims, scope, and significance of the study*

The aims of the study are: first, to characterize contract farming for a major value chain in Philippine agriculture; second, to determine the impact of contract farming on the farm incomes of smallholders; third, to assess the degree to which participation in contract farming is biased toward farmers with larger endowments. A corollary aim of the study is to draw implications for policy.

Assessment is applied to the case of the tobacco industry in the Philippines. This is a useful test case as tobacco is a cash crop serving a high-value chain, with supplies intended for export or as raw material for domestic manufacturers. Tobacco farming is done mostly by small farmers, either for sale under contract schemes with either exporters or manufacturers, or for sale to traditional tobacco traders; the latter in turn supply (directly or through intermediaries) the same exporters and manufacturers. Assessment will incorporate a combination of methods, from simple comparison of means, to econometric analysis with correction for endogeneity of

*The study was funded entirely by the Philippine Institute for Development Studies (PIDS). The author acknowledges assistance in the field from the following: Universal Leaf Philippines Inc., headed by Winston Uy; the National Tobacco Administration, headed by Edgardo Zaragoza; Mariano Marcos State University (MMSU), headed by Miriam Pascua, the Directorate of Extension, MMSU, then headed by Marivic Alimbuyugen; and Melanie Aldeon. He is likewise grateful for outstanding research assistance of Ivory Myka Galang. He alone is responsible for errors, omissions, and views expressed in this paper. Final revision accepted: January 21, 2015.

participation in supply chains. This study appears to be the first application of endogeneity-corrected impact assessment, with analysis of the role of farm size, to contract farming in the Philippines.

The application is of great policy relevance to the Philippines and other developing economies. The Philippine Development Plan 2011–16 Midterm Update aims for inclusive growth of the economy, defined as economic expansion with poverty reduction in multiple dimensions and massive creation of quality employment (NEDA, 2014, p. 6). Performance of the production sectors, namely agriculture, industry, and services, is a critical determinant of the economy's potential for growth and job generation. For the agricultural sector, a key strategy is to “expand existing markets, explore new markets, and link farmers and fisherfolk to these value chains and commodity/industry clusters” so as to reinforce forward linkages with the industry and services sectors (p. 93).

However the contribution of contract farming to inclusive growth remains controversial. A Bill in the country's legislature alleges that “most of the time”, contract buyers are able to manipulate the price such that contract farmers “end up at the losing end of the venture” (Congress of the Philippines, 2010, p. 3). Evidence provided in this study will be invaluable in illuminating the policy debate.

The rest of the paper is organized as follows: the background of the study is elaborated further in Section 2. The study methods are presented in Section 3, while results are presented in Section 4. Section 5 concludes and draws some policy implications.

2. BACKGROUND

(a) *Impact of contract farming: past research*

Polemics against modern agro-industrial chains is best typified by the “political economy of agrarian change”, a school of thought influential in the 1970s and 1980s (Prowse, 2012). Contract farming is seen as an instrument of exploitation of capital against the peasant class. Even in the 2000s this school of thought remains vocal: Singh (2002) claims that contract farming shifts risks onto farmers, reduces them into pauperised land laborers, and undermines food security by reducing food crop production. These concerns are shared by the former UN Special Rapporteur on the Right to Food (De Schutter, 2011). Borras and Franco (2010) deny that contract farming leads to win–win situations in many diverse settings, contending rather that resulting processes and outcomes mainly favor transnational companies.

Denial of the benefits of contract farming however appears too pessimistic against the mass of related literature. Numerous studies reviewed in Minot (2007) confirm the positive correlation between farm earnings and contract farming. In the Philippines, most of the work on contract farming is unpublished, though a few published studies have compared net farm income between contract and non-contract farmers. Among these is Costales *et al.* (2007), which covered smallholder hog farming in Southern Luzon. Based on purposive sample of survey sites (and random sampling within a site), they collected data from 123 respondents, of whom 50 (41%) were contract farmers. They find that profit per kg of output was higher for contract farmers, by around 44%, with the difference being statistically significant.

The aforementioned studies however do not necessarily address the problem of endogeneity. As mentioned earlier, Barrett *et al.* (2012) note the sparseness of studies that control

for selection effects. They do cite some of these earlier studies (some in their working paper versions), including Ashraf, Giné, and Karlan (2009), as well as Bellemare (2012) and Michelson (2013). The first applies randomized trial to examine the impact of a program that offers to link Kenyan vegetable farmers to the export market via production contracts. The program did succeed in motivating farmers to switch crops; farmers who switched from non-export to export production received a significant increase in household income.

Bellemare (2012) takes a novel approach to control for endogeneity by deriving willingness to pay for contract participation. The approach assumes that the key benefit of contracting is a guaranteed output price; the farmer's decision to participate is determined by his or her degree of risk aversion. A contingent valuation experiment is implemented among the sample farmers to arrive at a proxy for the degree of risk aversion, which is then used as an instrument for the first stage binary regression. The method is applied to a sample of farmers in Madagascar. The study finds that contract farming leads to a 10.4% increase in household income.

Aside from these experimental approaches, earlier quasi-experimental techniques had already been applied to address endogeneity. Michelson (2013) uses a difference-in-difference based on panel data of small farmers in Nicaragua. Other factors constant, being in the Walmart supply chain exerts a strong positive effect on a supplier's asset portfolio, suggesting that the supermarket relationship may have lasting effects on productivity and incomes of farmers.

Cross-sectional approaches have also been applied. A Heckman selection model was used for growers of poultry, maize seed, and rice seed in Bali and Lombok, Indonesia (Simmons, Winters, & Patrick, 2005). The study finds that contract farming results in improved returns to capital for poultry and maize seed, but not for rice seed. Another Heckman selection model was also used to address the endogeneity problem in the case of organic coffee in Uganda (Bolwig, Gibbon, & Jones, 2009). Based on a sample of 160 farmers, participation in contract organic farming is associated with an increase in net coffee income of around 75% on average. The increase is due to the price premium commanded by organic coffee.

Setboonsarng, Leung, and Cai (2006) used a treatment effects regression on a sample of rice farmers in Thailand. They found that, other factors constant, in the counterfactual case that contract farmers became non-contract farmers, farm income will be lower by 31%; in the counterfactual case that non-contract farmers became contract farmers, farm income will be higher by 47%. Ramaswamy, BIRTHAL, and Joshi (2009) also applied a treatment effects model for Indian poultry growers; the instrumental variable for contract participation is distance from the rural bank. They found that contract participation (other factors constant) increased poultry-growing income by 50% through realizing a premium price.

A more recent review of the contract farming literature (Wang, Wang, & Delgado, 2014) identified a several other studies as performing the endogeneity correction, namely Key and McBride (2008), Miyata, Minot, and Hu (2009), Freguin-Gresh, d'Haese, and Anseeuw (2012), and Ito, Bao, and Su (2012). Key and McBride (2008) examine hog farmers in the US using a two-stage least-squares approach with the contract participation dummy instrumented by a location variable (share of production contracts in hog-finishing operations at the county level). They find that participation

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