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The influences of contract farming on smallholder performance in developing countries: a modelling approach

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Abstract

Contract farming is generally associated with opportunities for farmers in rural areas of developing and emerging countries to overcome market barriers and improve farming efficiency. Whether this is also true for the contract farming scheme introduced in the year 2002 in Vietnam has never been examined before. This study addresses the influence of contract farming on farm performance within the export rice sector in Vietnam, a developing country with more than 70 percent of the population working in the agricultural production. Quantitative cross-sectional data from 250 export-oriented rice farmers were collected in the Mekong River Delta of Vietnam, where 90 percent of the national export rice is produced, using a structured questionnaire. Results from a binary probit model and ordinary least squared (OLS) regression in combination with the propensity score matching (PSM) method confirm the positive effects of contract farming for the case of the Vietnamese export rice farmers. Based on these results policy implications are derived.

Keywords: Developing countries, contract farming, farm performance, Vietnam, export rice sector.

Introduction

Contract farming has become popular as a marketing strategy for agricultural production worldwide. Especially, in many developing countries, contract farming offers opportunities for small-scale farmers to gain market access and improve income (Jia and Bijman, 2013). Since the late 1990s, Vietnam has developed from being a larger importer of rice to the second largest rice exporter from Southest Asia, supplying about 20 percent of total global rice trade in the year 2015 (USDA, 2015; Giraud, 2013; Baldwin et al., 2012). However, the Vietnamese rice export markets are characterised by lower value added and low product

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quality leading to low prices in comparison to the major competitor, i.e. Thailand (Baldwin et al., 2012; Nielsen, 2003). Due to the numerous types of potential trading partners involved in export rice value chains, the linkages between the farmers and processing/exporting companies are loose (Saigenji, 2010). Only 4.2 percent of the rice quantity produced is directly sold to export processing companies limiting their control opportunities for raw product quality (Loc and Son, 2011). Since the export rice production sector does not only provide an important staple food and employment opportunities for the Vietnamese population but also export earnings for the national economy, the government has reformed and implemented various economic policies in the year 2002 encouraging rice farmers to directly trade with the private export sector such as a contract farming scheme (Saigenji, 2010). However, up to now the determinants of Vietnamese export rice farmers' participation in the contract farming scheme and its influence on farm performance remain uncertain. To close this research gap, these uncertainties are explored by analyzing primary farm level data collected in Vietnam in early 2016 using binary probit model and OLS regression combined with PSM in this study.

Material and Analyzing Methods

The primary data collection process in Vietnam about one year of export rice production was conducted in early 2016 in the three main export rice production regions of the area, namely the Kien Giang, Can Tho and An Giang provinces. Using a structured questionnaire 250 households from the aforementioned provinces were chosen. To thereby ensure the comparability of contract and non-contract farmers, 134 contract farmers from contractor lists and 116 non-contract farmers from village official lists of 12 villages were randomly selected based on two criteria: firstly, they had to be located in the same area as the contract participants were and secondly, they also had to produce export rice.

By following Warning and Key (2002), Kersting and Wollni (2012), and Holzapfel and Wollni (2014), the probit model is applied to explain the dichotomous dependent variable "contract farming decision" influenced by the observed factors (farm and household characteristics) and unobserved factors (motivation and management skills) of smallholder rice farmers which may lead to different probabilities of their contract participation. Additionally, OLS-regression is applied for identifying the income differences between the groups. Thereby, the PSM method is used to control for selection bias (Imbens and Rubin, 2015; Caliendo and Kopeinig, 2005; Rao, Brümmer and Qaim, 2012).

Results and Discussion

The probit model estimation shows an R^2-value of 0.11 for the variables employed in the model which is acceptable for a cross-sectional data analysis (Greene, 2002). Additionally,

the following values for quality criteria proof the correct prediction of the model: Log likelihood of -153.05083, LR Chi^2 of 39.17, Prob> Chi^2 of 0.0000 and 64.80 percentage of correct classification. The coefficients and their significance levels[2] indicate the particular importance of the variables "age of the household head" (β=0.026**), "extension service access" (β=0.520**), "membership in farmer association" (β=0.479**) and "access to world market price information" (β=0.66***) as the most important factors influencing the contract farming participation among other control variables. Surprisingly, the "educational level of the household head" (β=-0.011) and "rice farming experience" (β=-0.030**) have negative effects on farmers' contracting decision.

Based on the results of the OLS regression, we find that contract participation has significant influence on household income as well as rice profit. In particular, the contract farming scheme helps to increase the farm average household income by 1.274 euro/1000m^2/year and to contribute with 1.748 euro/1000m^2/year to the average rice profit. It becomes evident that contract farmers achieve a 13.80 percent/1000m^2/year higher household income and 25.83 percent/1000m^2/year higher profit than non-contract farmers. Using the nearest neighbor matching algorithm in PSM to control for sample selection bias, the average treatment effects and average treatment effect on the treated results confirm that these differences in household income and rice profit among contract participants and non-contract participants are significant on a 5 percent level even though they have the same socio-demographic characteristics. In addition, the results illustrate that export-oriented rice smallholders' income (I) and profit (P) are affected by major important indicators, however, to different extents among the two groups, contractors and non-contractors: "rice farming area" (I: β=0.43*** and P: β= 0.45***), "extension service" (I: β=6.25*** and P: β=6.04***) and "price information access" (I: β=3.70** and P: β=2.38**).

Conclusions and Outlook

Overall the results of this study confirm the particular importance of contract farming for improving household income and rice profit of smallholders in Vietnam. Thereby the relative influence on rice profit stemming from higher prices achieved is higher than on household income which confirms our initial hypotheses on the positive economic effect of contract farming most likely stemming from higher prices achieved for better product qualities. Additionally, the results highlight the particular importance of memberships in farmer associations and access to extension service as main motivators for contracting decisions. Consequently, the Vietnamese government should strengthen its attempts in further developing the national contract farming scheme simultaneously to farmer associations and

[2] * p< 0.10, **p< 0.05, *** p< 0.01

extension services for improving the export rice sector in the long term, for enhancing its competitive position in relation to other major rice exporters in the world market and for improving household income as well as rice profit of smallholder farmers.

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