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# Strengthening Market Linkages of Smallholder Pig Producers through Informal Contracts in Northern Viet Nam

A. Costales , N.T. Son , M.L. Lapar and M. Tiongco

## Abstract

Formal contracts with integrator companies are limited to large-scale pig producers in Viet Nam. There are, however, forms of informal contracts where smaller-scale pig producers establish stable links with their input suppliers or/and output buyers. Traders screen farmers with whom they could potentially engage into contracts. As relations become more established and stable, farmer reputation / reliability, rather than scale of production, becomes the more important consideration. Human and social capital factors of pig producers are found to be significant determinants of participation in contracts. Farmers engaged in informal contracts with cooperatives benefit from contract participation through higher average net returns per unit of output in the case they use 'mixed breeds' of pigs. The benefit is not clear cut with respect to the use of exotic breeds.

## 1. Introduction

Pig production is an integral component of rural smallholder farming systems in Viet Nam, with around 66 percent of rural households keeping pigs (GSO, VHLSS 2004). The rapid growth in demand for pig meat in Viet Nam presents an opportunity for rural households, particularly the poor, to earn more income. This could happen by obtaining greater market value per unit of their produce, getting lower prices for their purchased inputs (e.g., feed), realizing higher productivity through technology that translates to lower cost per unit of output, and in increasing the scale of production. Asset-poor smallholders, as individuals, have a relatively weak bargaining position in the market. Contract farming is seen to be one of the ways to directly link the smallholder and

the market, and cut transaction costs (Glover, 1994; Gulati, *et al*., 2005; Costales *et al*., 2006; Delgado *et al*., forthcoming). Formal contracts in pigs with company integrators in Viet Nam, however, are a closed door to small-scale farmers. This paper examines alternative market institutions, the benefits such arrangements provide to pig producers, and their potentials for inclusion of smallholders.

## 2. Material Studied, Area Descriptions, Methods and Techniques

The study identifies the main forms of informal contracts between pig producers and market intermediaries. The study examines the benefits that farmers derive from engaging into informal contracts. The study also looks at the conditions used by traders before engaging into, and maintaining, informal contracts with farmers.

The study was undertaken in four provinces in northern Viet Nam – Bac Giang, Ha Tay, Thai Binh, and Thanh Hoa.

Data were collected by undertaking a survey of 400 pig producing households, consisting of 200 independent producers, 166 farmers with informal contracts with cooperatives or with traders, and 34 producers with formal (written) contracts with integrator companies. From this sample, farmers were categorized according to the type of pig production activity that they engaged in. A survey of 50 traders (input suppliers and output buyers) was also conducted.

Following Green (1997), a probit model of participation is specified and estimated to identify the important determinants of participation in informal contracts by pig producing households and estimate the magnitude of their impacts.

Breeds used by farmers are identified to indicate type of technology used. The impact of participation on technology use, and on costs and returns to production activity are then assessed.

## 3. Results and Discussion

### Choice of Pig Production Activities

Without the intervention from formal or informal contracts, independent farmers tend to choose a flexible activity which combines the benefits of larger incomes per pig produced from full cycle pig production and the more rapid income turn-over from piglet production and grow-to--finish operation on the side (see Table 1). For producers with formal contracts, the integrator

companies determine the type of activity, and most of these are limited to Grow-to-finish (pig fattening). Among farmers with informal contracts with cooperatives, the concentrations are in the combined system and farrow-to-finish. Producers with informal contract with traders congregate around the smaller-scale operation of farrow-to-weaning.

**Table 1:** Relative distribution of types of pig production activities engaged in by households, by production and marketing arrangement, northern Viet Nam, 2005.

| Type of Activity | Independent (n=200) | Formal contracts (n=34) | Informal - Cooperative (n=129) | Informal-Trader (n=37) |
|---|---|---|---|---|
| Farrow-to-weaning | 16 | 21 | 12 | 62 |
| Farrow-to-finish | 23 | | 36 | 14 |
| Grow-to-finish | 23 | 79 | 7 | 5 |
| Combination | 39 | | 44 | 19 |
| Total | 100 | 100 | 100 | 100 |

**Source**: Field survey, 2005-06

## Benefits to Participation in Informal Contracts

Pig producers perceive benefits from engaging into an agreement with a regular market intermediary. In engaging into contract with input suppliers, the assurance of the supply of inputs (e.g., feeds) ranks high in importance, as does the service provided of having the inputs delivered to the farm without the farmer assuming the explicit transport costs (Table 2). Quite important, too, is the implicit guarantee that the stable relationship with the regular input supplier bestows on the quality of output that the farmer produces (i.e., 'reputation effect'). With the sustained relationship, the privilege of obtaining inputs on credit comes about, and the input supplier also becomes a source of technical advice on production matters, which farmers value in the absence of timely assistance from public extension officers.

**Table 2**: Benefits to engaging in contracts with regular input suppliers and output buyers by farmers with informal contracts, northern Viet Nam, 2005. *(In percent; with multiple responses)*

| Intermediary / Benefit | Percent within group |
|---|---|
| **With input suppliers** | |
| Assured supply of input | 96.1 |
| Free delivery to farm | 96.1 |
| Guarantee of output quality to buyers | 77.5 |
| Free technical advice | 70.9 |
| Input purchase on credit | 69.0 |
| Complementary inputs available | 63.1 |
| Provide information on output buyers | 38.5 |
| Provide information on output price | 33.9 |
| Assist in negotiation with output buyers | 20.1 |
| Price premium on volume purchase | 19.9 |
| **With output buyers** | |
| Assured buyers of outputs | 98.6 |
| Payment in cash | 85.9 |
| Free pick up output on farm | 84.5 |
| Minimum quality requirements demanded | 26.8 |
| Price premium on volume output sale | 14.1 |

**Source**: Field survey, 2005-06

In the selling of outputs, prominent is the benefit of having an assured buyer of the output. Next is being paid in cash and the transport cost savings from the pigs being picked up at the farm rather than being brought by the farmer to a buying centre. Quality considerations and price premiums for larger volume of sale do not yet stand out.

## Trader Conditions for Entry into, and Renewal of Contracts

Traders use screening mechanisms before engaging into contracts with prospective pig producers, and renewing them on a more sustained basis. In entry to contracts with pig producers, input traders give importance to the potentials for larger volume of transactions (Table 3). A significant proportion also considers the reputation of the farmers, particularly in their payments behaviour, as contracts often involve provision of supplies on credit. The breed used is also considered as the use of exotic or near-exotic breeds are associated with the more intensive use of commercial mixed feeds than home-mixed ones. For output buyers, majority do not put any conditions, but a sizable proportion pay attention to the reputation of the farmers in their delivery of pigs or piglets agreed upon.

In the renewal of contracts, for both the input traders and the output buyers, the reputation of the farmers is the prime consideration. The volume of transaction considerations becomes secondary. Thus, for more sustained relations between the pig producer, enhancing the level of trust is key.

**Table 3:** Distribution of responses of traders on factors considered for entry into, and renewal of contracts with pig producers, northern Viet Nam, 2005. (In percent of group with regular market intermediaries)

| Considerations / Conditions | Entry into contracts | | Renewal of contracts | |
|---|---|---|---|---|
| | Input trader (n=34) | Output (+Input) Traders (n=16) | Input trader (n=34) | Output (+Input) Traders (n=16) |
| Size of pig inventory | 67.6 | 12.5 | 23.5 | 18.8 |
| Volume of feeds use | 50.0 | 0.0 | 32.4 | 12.5 |
| Good reputation (payment/supply) | 44.1 | 31.3 | 35.3 | 56.3 |
| Breed of stock | 44.1 | 0.0 | | |
| Farmer experience | 17.6 | 12.5 | | |
| Size of landholding | 8.8 | 0.0 | | |
| Properties of the farmer | 8.8 | 0.0 | | |
| No conditions | 0.0 | 68.8 | | |
| Risk | | | 17.6 | 6.3 |

**Source**: Field survey, 2005-06

## Determinants of Participation in Informal Contracts

Participation in contract arrangements constitutes a choice. Choice implies the possibilities that farmers can attain, given their resources, but also embodies the barriers that they are confronted with that constrain their ability to participate. Some farmers may already have the resources and linkages they need, and may choose to retain their independence in market transactions. The participation model hypothesizes that household characteristics, assets, social capital, and conditions of access to markets and services, embody factors that facilitate (or restrict) the overcoming of barriers to participation.

Among the demographic characteristics, the results suggests that as pig production becomes an important generator of income for the household, the likelihood that the pig producer establishes a more stable linkage with an intermediary in the obtaining of inputs, or in the selling of livestock, is enhanced (Table 4). So, too, does higher levels of schooling, suggesting that a higher capacity to process information is vital to assessing the implications of engaging into contracts.

On asset holdings, the size of agricultural landholding as such does not come into play in the participation informal contract arrangements. There may be other assets that matter more.

Among factors relating to access to markets and services, the distance to the market centre has the unexpected positive sign of the coefficient. Shorter distances from the town centre should facilitate participation in informal contractual agreements, all other things equal. The result seems to imply, however, that the farther is the market, the greater is the likelihood of reliance on informal contracts to bridge the distance with the market.

Under production characteristics, the scale variable is not significant. This implies that size is not necessarily a barrier to participation in informal contracts. The activity type dummy variables provide an indication on which type of producers would more likely engage into informal contracts as compared to those engaged in the full-cycle farrow-to-finish. Those engaged in Grow-to-finish would less likely be engaged in informal contracts than those in farrow-to-finish. Noteworthy is that this is in contrast with formal contract growing where the farmers are predominantly in grow-to-finish.

Among the locational variables, farmers in the other provinces, compared to Bac Giang, have lesser likelihood to engage in informal contracts, all other things equal.

**Table 4:** Marginal effects of determinants of participation in informal contracts

| Variable | Marginal effects | S.E. | Level of significance |
|---|---|---|---|
| **Demographic characteristics** | | | |
| Gender (dummy=1 if male) | 0.071 | 0.083 | |
| Age | 0.005 | 0.004 | |
| Education | 0.080 | 0.021 | *** |
| Main occupation is pig raising | 0.213 | 0.084 | ** |
| Proportion of time spent in pig production | -0.002 | 0.002 | |
| **Assets** | | | |
| Area of agricultural land owned | -3.62E-06 | 0.00002 | |
| **Social capital** | | | |
| Member of coop (dummy=1 if yes) | 0.692 | 0.058 | *** |
| **Access to services** | | | |
| Received gov't loan (dummy=1 if yes) | 0.116 | 0.075 | |
| No. of vet visits | -0.006 | 0.005 | |
| Distance to VBARD | 0.033 | 0.014 | |
| Distance to commercial input supplies | 0.040 | 0.015 | ** |
| Distance to vet shops | 0.009 | 0.010 | |
| **Scale and type of production system** | | | |
| Total weight sold | 5.90E-07 | 1.94E-06 | |
| Grow to finish (dummy=1 if yes) | -0.511 | 0.059 | *** |
| Piglet prod & fattening combined (dummy=1 if yes) | -0.436 | 0.106 | *** |
| **Location** | | | |
| Hatay (dummy=1 if yes) | -0.420 | 0.08 | *** |
| Thai Binh (dummy=1 if yes) | -0.466 | 0.078 | *** |
| Thanh Hoa (dummy=1 if yes) | -0.360 | 0.094 | *** |
| Constant | -2.702 | 0.080 | *** |

No. of obs. = 319
Wald chi2(18) = 110.38
Prob > chi2 = 0.0000
Log pseudolikelihood = -128.76929
Pseudo R2 = 0.4146
Proportion correctly predicted of informal contracts = 82%
Source of basic data: Field survey, 2005-06
***, ** - coefficient estimate is statistically significant at 1% and 5% levels, respectively

## Influences on Technology Adoption

In this study, the indication of technology used by the farmer is represented by the type of breed used, generically distinguished by the use of exotic breeds in contrast to the use of a mixture of breeds (local and crosses) within the herd. The use of exotic breeds presumes the more intensive use of complementary inputs and services.

The engagement in informal contracts with market intermediaries appears to positively influence the use of exotic breeds, as seen in Table 5. There is a clear distinction, however, between

having a contract with cooperatives and simply linking with traders. On average, there is very little difference between the rate of adoption of exotic breeds between farmers with informal agreements with traders and independent producers, with the adoption rates of the two groups hovering at a low 15 to 16 percent.

The rate of adoption of exotic breeds is also associated with the type of production activity engaged in, where for all three groups, higher rates of adoption are exhibited in farrow-to-finish and the combination of activities. In the farrow-to-weaning activity, the export market for suckling pigs demands a particular type of breed, where the local Mon Cai, or crosses with Mon Cai, is preferred.

**Table 5:** Rate of adoption of exotic breeds technology by pig producers, by type activity and contract arrangement, northern Viet Nam, 2005.

| Activity type | Informal-Cooperative | Informal-Trader | Independent producer |
|---|---|---|---|
| Farrow-to-weaning | 19 | 0 | 9 |
| Farrow-to-finish | 89 | 60 | 27 |
| Grow-to-finish | 22 | 0 | 0 |
| Combination | 63 | 43 | 21 |
| All Activities | 64.3 | 16.2 | 15.5 |

**Source**: Field survey, 2005-06

## Cost and Returns Performance

The benefits derived from informal contracts have economic significance if these benefits are reflected on incomes earned by pig producing households with such contracts. Table 6 compares the costs and returns from pig production by the farmers with informal contracts to those from independent producers, differentiated type of production activity and technology (breed).

The first observation is that farmers engaged in informal contracts are not a homogenous group. Producers participating in contracts with cooperatives exhibited superior performance in terms of net returns per kg of output over farmers engaging into contract with traders, in all types of production activity, and in any technology used. In general, this comes about from farmers engaged with cooperatives obtaining uniformly higher revenue per unit of output (i.e., prices) in each type of activity.

In the use of mixed breeds, between farmers engaged with cooperatives and independent producers, the former generated much higher net returns per unit of output than did the latter in three out of the four activities, with the advantage of those with cooperatives consistently receiving higher prices for output than independent farmers. The exception is in the combination of activities, where those in cooperatives exhibited a slight disadvantage, with the higher cost of production overpowering their advantage in higher prices for output. Among the three groups, the producers with informal agreements with traders appear to be in the worst position, receiving the lowest output prices (except in farrow-to-weaning), and realizing the lowest net returns (except in farrow-to-finish).

In the use of exotic breeds, the advantage is exhibited by the independent producers in the two activities of farrow-to-weaning and farrow-to-finish. In the combination of activities, they are about even with farmers linked with cooperatives. The advantage of the independents lay in their consistently incurring lower costs per unit of output. On the other hand, the advantage of those linked with cooperatives was the higher prices of output received, except in one activity – farrow-to-weaning. Between the two groups, the farmers with contracts with cooperatives consistently incurred higher costs per unit of output.

**Table 6:** Comparative costs and returns in pig production by farmers with informal contracts and independent producers, by type of activity and technology, northern Viet Nam, 2005. (In '000 VND/kg of output)

| | Mixed breeds | | | Exotic breed | | |
|---|---|---|---|---|---|---|
| **Activity type / Item** | **Informal-Cooperative** | **Informal-Trader** | **Independent** | **Informal-Cooperative** | **Informal-Trader** | **Independent** |
| **Farrow-to-weaning** | | | | | | |
| Revenue/kg | 18.26 | 17.58 | 17.17 | 23.26 | | 24.26 |
| Cost/kg | 12.47 | 12.00 | 11.75 | 14.03 | | 12.84 |
| Net returns/kg | 5.79 | 5.58 | 5.42 | 9.23 | | 11.42 |
| **Farrow-to-finish** | | | | | | |
| Revenue/kg | 14.79 | 13.54 | 13.80 | 17.78 | 17.10 | 17.04 |
| Cost/kg | 8.06 | 8.06 | 8.53 | 12.13 | 12.22 | 10.24 |
| Net returns/kg | 6.73 | 5.48 | 5.27 | 5.65 | 4.88 | 6.80 |
| **Grow-to-finish** | | | | | | |
| Revenue/kg | 14.96 | 13.69 | 13.74 | 16.57 | | |
| Cost/kg | 10.91 | 10.72 | 10.18 | 13.33 | | |
| Net returns/kg | 4.05 | 2.97 | 3.56 | 3.24 | | |
| **Combination** | | | | | | |
| Revenue/kg | 15.48 | 14.80 | 14.91 | 19.39 | 17.50 | 17.93 |
| Cost/kg | 12.47 | 12.47 | 11.75 | 14.52 | 13.55 | 13.04 |
| Net returns/kg | 3.01 | 2.33 | 3.16 | 4.87 | 3.95 | 4.89 |

**Source**: Field survey, 2005-06

In the two activities where the farmers with informal contracts with traders used exotic breeds, they had the lowest net returns per unit of output.

Comparing performance between mixed and exotic breeds, within activity type, the definite pattern is that cost per unit of output using exotic breeds is higher than using mixed breeds, but the output prices received for exotic breeds were also higher than those using mixed breeds.

In terms of net returns, the consistent results lie only with independent producers, where for the three comparable activities, net returns with exotic breeds were higher than those generated using mixed breeds. The output price advantages tended to outweigh the input costs disadvantages.

For producers linked with cooperatives, the results were mixed in that only in the two activities of farrow-to-weaning and combination of activities did the output price advantages outweigh input cost disadvantages. In the two other activities, performances under exotic breeds were inferior.

For farmers with informal agreements with traders, the results were also mixed, with no definite advantage in net returns in using exotic breeds.

## 4. Conclusions

Benefits from engaging in contracts with market intermediaries that farmers identify more dominantly relate to the greater assurance that production inputs will be supplied, and/or that produced pigs and piglets will have a buyer. Having stable informal contracts with known input suppliers have the positive external 'reputation effect', conveying information that the farmer's pigs and/or piglets are of higher quality than average. Also, the benefits of engaging in informal contracts are seen not so much in lower prices for inputs, or higher prices for outputs, but in the valuable services that farmers obtain, for which they are not explicitly charged (transport of inputs and/or outputs, technical advice, credit).

Traders, particularly input suppliers, have higher preference for larger-scale farmers in the initial stage of engaging into informal contracts. In the renewal of contracts, however, the farmer's reputation in the ability to pay on schedule, and the ability to deliver the volume of output contracted, takes precedence over simple scale of operation.

The analytical results confirm that scale of production as such is not a decisive determinant of participation in informal contracts by pig producers. Rather, the development of social and human capital is important. Thus, smallholder producers are not automatically excluded from participating in informal contracts by virtue of them being smallholders. Measures, however,

have to be taken to motivate and organize them, and enhance their capacities to process information vital to pig production and marketing, and engaging in contracts. The physical and institutional infrastructure should be developed to support these measures.

Engagement in informal contracts, specifically with cooperatives, tends to promote the adoption of production technology associated with the use of exotic breeds.

In general, engagement in informal contracts with cooperatives has a positive impact on obtaining higher prices for outputs, in any activity, using either mixed breeds or exotic breeds. In the use of mixed breeds, the above advantage, in general, translates to higher net incomes for the pig producer, in any activity. This is not generally the case, however, with the use of exotic breeds.

Pigs produced from exotic breeds fetch higher output prices than those from mixed breeds, but cost per unit of output of producing them are also uniformly higher. Thus, higher prices of output do not necessarily translate to higher net returns.

## 5. References

Costales, A., C. Delgado, M.A. Catelo, M.L. Lapar, M. Tiongco, S. Ehui, and A.Z. Bautista (2006). Scale and Access Issues Affecting Smallholder Hog Producers in an Expanding Peri-Urban Market, Southern Luzon, Philippines. IFPRI Research Report No. 151. International Food Policy Research Institute. Washington, D.C., U.S.A.

Delgado, C., C. Narrod, and M. Tiongco, in collaboration with G.S. de Camargo Barros, M.A.O. Catelo, A. Costales, R. Mehta, V. Naranong, N. Poapongsakorn and V.P. Sharma. Forthcoming. Determinants and Implications of the Growing Scale of Livestock Farms in Four Fast-Growing Developing Countries. IFPRI Research Report. International Food Policy Research Institute. Washington, D.C., U.S.A.

Glover, D. (1994). Contract farming and commercialization of agriculture in developing countries. In: Von Braun, J. and E. Kennedy. (Eds.), Agricultural Commercialization, Economic Development and Nutrition. Baltimore, MD: The John Hopkins University Press.

Government Statistics Office (2006). Viet Nam Household Living Standards Survey (VHLSS) 2004. Statistical Publisher, Hanoi, Viet Nam.

Greene, W. (1997). Econometric analysis, 3rd ed. Upper Saddle River, N.J., U.S.A.: Prentice Hall.

Gulati, A., N. Minot, C. Delgado, and S. Bora (2005). Growth in High-Value Agriculture in Asia and the Emergence of Vertical Links with Farmers. Paper presented at the Symposium "Towards High-Value Agriculture and Vertical Coordination: Implications for Agribusiness and Smallholders". National Agricultural Science Centre, Pusa, New Delhi, 7 March 2005.

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**Achilles C. Costales**
Livestock Economist
Pro-Poor Livestock Policy Initiative (PPLPI)
Livestock Information, Sector Analysis and Policy Branch (AGAL)
FAO of the United Nations
Viale delle Terme di Caracalla, 00153 Rome, Italy
Room C513
Tel. No.: +39 06 57054521
Fax: +39 06 57055749
e-mail: Achilles.Costales@fao.org

Or visit the PPLPI website at: www.fao.org/ag/pplpi.html