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The Survival of Small-scale Agricultural Producers in Asia, particularly Vietnam: General Issues Illustrated by Vietnam's Agricultural Sector, especially its Pig Production

by

Clem Tisdell

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THE UNIVERSITY OF QUEENSLAND

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ABSTRACT

Economic growth in more developed countries has resulted in farms increasing their scale of production and becoming more specialized in their production. The sizes of farms have tended to increase, agricultural production has become more capital-intensive, and the percentage of the workforce employed in agriculture has shown a falling trend. This process has been brought about by the operation of market systems and has reduced the number of small-scale agricultural producers. Asia still has a huge number of small-scale agricultural producers. As Asian countries experience economic growth and as market systems become more established in Asia, the survival of Asia's small-scale agricultural producers is likely to be threatened. Since these producers are poor, this is of concern to several international aid agencies. On the other hand, some Asian governments (such as Vietnam's) want to encourage larger scale agricultural production units. This article presents arguments for and against government strategies to promote large-scale agricultural units in emerging economies and presents an economic theory that models agricultural supply in emerging economics as being dualistic in nature. It provides information about the predominance of small-scale units in agricultural production in Vietnam, particularly in pig production, and assesses policies proposed for by Vietnam's Government for increasing the size of units producing pigs.

The Survival of Small-scale Agricultural Producers in Asia, particularly Vietnam: General Issues illustrated by Vietnam's Agricultural Sector, especially its Pig Production

1. Introduction

In developing countries, including emerging economies in Asia, farm sizes are very small compared to those in more developed countries, especially compared to those in Australia, Canada and the United States and New Zealand. The scale of farms in developed countries has tended to increase. The tendency towards larger-scale farms in developed countries is underlined by a recent case study of the growth in farm-sizes and diversifications in Washington State in the USA by Skolrud et al. (2009). They find a trend towards larger scale farms in this state in the period 1992-2002. Furthermore, economies of specialization in agricultural production rather than economies of diversification (sometimes called economies of scope) appear to be the dominant attribute on this growth. Larger farms and more specialized farms tend to be more profitable than smaller sized and diversified farms. Therefore, the trend towards consolidation of farms (evident in most developed countries for at least two centuries) continues.

Vietnam provides a useful case study of the sustainability of small-scale agricultural units in less developed nations in Asia. As a result of its economic reforms, *doi moi*, this socialist republic has given an increased role to market systems as a means to manage its economy and, like China, it has increasingly opened up to the outside world. For example, it is now a member of the World Trade Organization (WTO). Agriculture makes a major contribution to employment in Vietnam's economy and is dominated by very small-scale farming units.

Given the current market situation of Vietnam's economy and its increasing openness, Vietnamese policy-makers have several concerns. They are concerned about whether or not small-scale units are able to be economically efficient, and about whether they can withstand increased market competition, particularly from imports of agricultural produce. A related issue is whether small agricultural producing units are able to maintain 'adequate' hygiene and quality standards and satisfactorily control

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agricultural pests and diseases as well as improve their performance in these areas as economic development occurs. Hygiene and quality of agricultural products have increased as a priority as urbanisation and levels of income have increased in Asia. Some policy-makers (including some in Vietnam) are of the view that larger scale industrial commercial-type agricultural units are likely to have lower costs of production compared to small-scale household units and also are likely to display superior performance in meeting hygiene and quality standards, as well as in controlling agricultural diseases. It is, therefore, believed that by increasing the scale of production of agricultural units, this will benefit domestic consumers and help to meet potential competition from imports. The purpose of this article is to assess generally whether government strategies to promote larger-scale commercial agricultural units are likely to be economically beneficial to developing countries, particularly Vietnam.

First, arguments for and against the adoption in developing countries of government strategies that favour farm enterprises of larger scale are advanced and a relevant economic theory is developed. Secondly, the scale and nature of Vietnam's agricultural production units are outlined paying particular attention to its pig sector. Thirdly, the long-term strategies of the Government of Vietnam for the development of its livestock sector, especially its pig sector, are given attention and several relevant economic implications of this strategy (which is intended to favour larger scale producing units) are highlighted by applying the theory developed earlier in this paper.

2. Arguments For and Against Government Strategies in Emerging Economies intended to Promote Large-scale Agricultural Units and a Relevant Economic Theory

As countries experience economic growth, it is normal for the level of employment in their agricultural sector to decline as rural to urban drift of their population occurs and a greater population of the workforce is employed in secondary and tertiary industry (Clark, 1957). Nevertheless, there is a limited speed at which labour which would otherwise be employed in primary industry can be absorbed into other sectors of the economy. If technological and structural change occurs at a rate greater than the rate at which displaced agricultural labour can be employed elsewhere, this is likely to result in growing unemployment, or under employment of the displaced population.

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Such underemployment or unemployment is a risk if governments in emerging economies promote larger-sized agricultural production units that replace smaller-scale ones. Government policies may directly or indirectly drive small-scale agricultural units out of business.

Larger-scale units are usually more capital-intrusive and less labour-intensive than small-scale economic units. In developing countries where labour is relatively abundant, labour-intensive technologies are usually preferable to capital-intensive ones from an economic efficiency point of view (Eckhaus, 1955; Tisdell, 1972, pp 312-319). This needs to be kept in mind by policy-makers.

As more labour is absorbed in sectors outside of primary industry and labour becomes scarcer in agriculture, less labour-intensive technologies can be expected to become more economic in agriculture. However, the optimal pace at which this occurs may be slow. Certainly, in the early stages of the economic growth of developing economies, it is unlikely that capital-intensive agricultural technologies will be appropriate. Technologies that are appropriate in developed countries are unlikely to be economically appropriate for emerging economies in their early stages of development. This is because for some time to come, labour in agriculture is likely to be comparatively more abundant in emerging economies than in more developed ones.

A further consideration in developing economies is that agricultural households provide some economic security for family members who have migrated to the urban sector to find employment. These migrants are usually younger family members of agricultural households. In difficult economic times (such as that now being experienced by many Asian developing countries as a result of the global recession), family members can return to their agricultural household if they become unemployed in their urban setting. These rural households provide a security blanket for many rural to urban migrants in emerging Asian economies when macroeconomic conditions are unfavourable to their employment. This is important because few government schemes exist to assist such migrants in emerging Asian economies. By sustaining rural households, governments in developing countries provide an economic security back-up that otherwise would not exist or be of limited help. The problem is that development of the urban sector in less developed countries can be

subject to major macroeconomic fluctuations which change the economic fortunes of rural-to-urban migrants.

An argument sometimes put forward for favouring an increase in the scale of production by individual productive units in agriculture is that this will improve hygiene in agricultural production and the quality of agricultural products. Furthermore, traceability is less costly when there are large-scale producers and products become more standardised. Most supermarkets consider this to be an advantage. The development of supermarkets as retailers, therefore, tends to favour large-scale agricultural producers. Furthermore, market exchange with large-scale producers tends to reduce market transaction costs in the whole production chain. Apart from reduced market transaction costs for buyers of agricultural produce (for example, supermarkets and processors), suppliers of agricultural inputs may also incur lower transaction costs in supplying these inputs to large agricultural units. This applies, for example, to suppliers of agricultural fertilizers, chemicals, and sellers of commercial food for livestock.

Despite this, standardisation of products, improvement in their quality and extra safeguards to ensure their purity, usually involve extra costs. When incomes are low (as they still are in many emerging Asian economies), a significant proportion of the population may not wish to pay for these product improvements. Therefore, a conflict of interest can emerge when a portion of a country's population is urbanised and has a high income but this is not so for the bulk of its population.

A further argument sometimes advanced by officials in favour of large-scale agricultural units is that they are likely to be more effective in reducing the occurrence of diseases in agricultural crops and livestock. For example, there seems to be a view in some circles that large-scale agricultural units would be more effective in preventing the occurrence of bird flu, various diseases of pigs and the spread of these. The extent to which this is so needs further study. Considerable economic costs are experienced as a result of the occurrence of such diseases in developing countries.

Another relevant issue is the control of pollution associated with agricultural production. Excrement and odours from livestock in and near urban areas can be a

major pollution problem. The problem is usually greater for livestock units of a large size, such as piggeries. In rural areas, much of the manure and the wastes generated by livestock are used to fertilize crops. Relatively scattered livestock in rural areas probably creates fewer pollution problems than livestock concentrated in or close to urban areas.

It seems likely that the supply of agricultural products by small-scale agricultural units is relatively inelastic compared to large units engaged in industrial-type commercial agriculture. This is assuming that small-scale agricultural units utilize traditional techniques and rely heavily on inputs supplied by the household and its farming area. Larger-scale agricultural units rely heavily on inputs produced in the market, many of which may be imported. This means that the supply curve of agricultural products supplied by large commercial agricultural units is comparatively elastic. This implies that large-scale units have a greater capacity to meet increased demand for agricultural products in economies where that demand is growing considerably. Hence, in many developing economies experiencing significant economic growth, a **dual** agricultural structure can be expected to develop. Agricultural supplies are likely to be obtained from suppliers that mainly use traditional methods of agricultural production to produce their product **and** a second set of producers that supply this product by adopting industrial-type commercial methods. The former are usually small-scale household suppliers whereas the latter consist of larger commercial units that are normally not based on households.

The theory of such a dual structure and its consequences can be illustrated by Figure 1. There the curve ABC represents the long-run supply curve of an agricultural product (e.g. pigs) by small-scale household units. Costs are relatively low when each householder has a low-level of production of the product because the household can use household and farm 'wastes', family labour (with low opportunity costs) and so forth to produce low levels of output. But as demand expands and the level of production by households increases, their marginal costs of greater supply rises sharply as they become more dependent on purchased inputs and their opportunity cost of labour rises. For commercial-type units, their long-run supply curve might be as represented by curve FGJ. This supply curve is relatively elastic. However,

households can supply the product more cheaply than commercial producers if there is limited demand for the product.
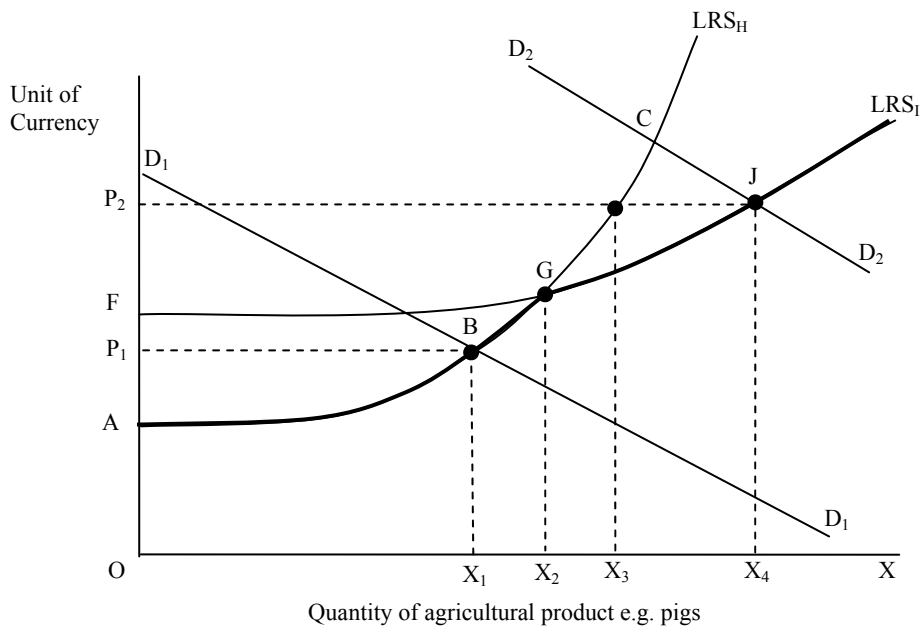

Figure 1: **An illustration of the theory outlined in the text that at an intermediate stage of economic development of a country, a dual structure of suppliers of agricultural products is likely to be economically efficient.**

For example, if in Figure 1, the demand for the agricultural product X, is as represented by the line D_1D_1, market equilibrium would be established at B. Supply of the agricultural product is then obtained at minimum cost of it is supplied only by households. X_1 of the product is produced and sold at a price per cost of P_1. However, if the demand for the agricultural product rises to D_2D_2, there is scope for **both** larger-sized industrial-type agricultural and households to contribute to its supplier. The new market equilibrium would be established at J with X_3 of the agricultural product being supplied and sold at a market equilibrium price of P_2. Small-scale producers would supply X_2 of the product and $X_3 - X_2$ of it would be supplied by larger-scale commercial units. This dual system of supply is efficient from an economic point of view. The industry supply curve is the kinked one, AGJ, in Figure 1 and is identified by the heavy line.

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With the passage of time the supply curve of the agricultural product of households may move upwards as the economy become more integrated and household members find superior economic employment opportunities outside of agriculture, and the supply curve of commercial producers may fall as technological change occurs. Eventually, this process could result in the replacement of households by commercial enterprises as suppliers of the product. The speed at which this process occurs depends on the rate of economic growth of the economy and in most cases, is probably a slow process. In any case, the above theory implies that at an **intermediate** stage of economic development, a dual structure for supply of agricultural products can be expected to be efficient from an economic point of view. Taking into account transport costs, dual structures (combinations of commercial and household suppliers) are more likely to be observed near large urban centres than in remote rural regions in emerging economies, and the proportion of commercial units in relation to household units is likely to be higher near large urban centres than further away. There is supporting evidence for this in the case of Vietnam's pig industry (Tisdell, 2008, 2009).

Table 1 summarises the comparative socioeconomic attributes of large-scale and small-scale productive units in agriculture and indicates whether or not, they are likely to be an advantage or disadvantage in developing countries experiencing significant economic growth. The list is not necessarily exhaustive.

Table 1:   A comparison of the socioeconomic attributes of large-scale and small-scale agricultural units and their likely advantages and disadvantages in developing economies.

Attributes	Large-scale Units	Small-scale Units
Capital intensity	High (−)	Low (+)
Labour intensity	Low (−)	High (+)
Import dependence	Usually high (−)	Low (+)
Traceability of product	Easier (+)	More difficult (−)
Environmental pollution	Often major (−)	Usually minor (+)
Disease control	Possibly easier (+)	More difficult (−)
Control of quality of product	Easier (+)	Difficult (−)
Ability to meet increasing demand	Easier to do (+)	Limited (−)
Costs per unit of production	Lower for large volumes of supply	Lower for small volumes of supply
Long-term prognosis	Increase in relative importance with development	Decrease as a source of supply with economic development
Alienation	Can occur (−)	Not a problem (−)

Note: + Likely to be an advantage in a developing country
        − Likely to be a disadvantage in a developing country

From Table 1, it can be seen that large-scale agricultural production units are not superior in developing countries to smaller ones in terms of several socioeconomic attributes. The fact that large-scale commercial units are characteristic of more developed economies and appear to be modern does not mean that they are an optimal choice for less developed countries. It is highly unlikely that the skew in favour of large-scale commercial units observed in more developed countries is likely to be economically optimal in less developed nations. Nevertheless, as Figure 1 demonstrates a mixture of a small household units and large commercial ones is likely to be appropriate for nations at an intermediate stage of economic development.

3. The Predominance of Small-scale Units in Agricultural Production in Vietnam, Particularly in Pig Production.

The number of persons employed in agriculture in Vietnam continues to decline but in 2006, 21.26 million persons were still employed in agriculture in Vietnam, and agriculture employs a greater portion of Vietnam's workforce than any other sector of its economy. In 2006, agricultural units were dominated by households (9.74 million, 99.92% of all agricultural units) followed by co-operatives (6,971,0.07%), registered enterprises (608, less than 0.01%) and agricultural subsidiary organizations (343, less than 0.01%) according to General Statistics Office of Vietnam (2007, Vol.3. p.41). Between 2001 and 2006, the numbers within all categories of agricultural units declined except for the number of enterprises which showed a slight increase. The largest percentage reduction was in the number of cooperatives. Nearly a million Vietnamese households abandoned agriculture between 2001 and 2006. One expects that the rate of exodus would now be slower due to the global recession which is reducing employment opportunities in the urban sector in Vietnam and all Asian economies.

Table 2 provides a summary of the amount of land used by individual agricultural production units in Vietnam in 2006. It shows that the majority of agricultural households had less than half a hectare of agricultural land and that only 5.87% of agricultural households had 2 hectares or more of land.

Table 2:   The distribution of agricultural households in Vietnam in 2006 by the size of their holding of land.

Size of Holding	Number of households	Percentage of Agricultural Households
Less than 0.2 ha	3,753,454	32.21
0.2 ha but < 0.5 ha	4,259,744	36.55
0.5 ha but < 2 ha	2,956,742	25.37
2 ha and over	683,538	5.88
	11,653,478	100.00[a]

(a)   Does not add exactly to 100 due to rounding
Source: Based on General Statistics Office (2007) Vol 3, Table 6, p.51.

An examination of the distribution of land used for annual crops, paddy and even perennial crops in Vietnam in 2006 reveals that most households involved used less than a half hectare of land for these individual crops (General Statistics Office, 2007, Vol.3). Again agricultural households having livestock operated on a very small scale. In 2006, 80.11% of Vietnamese agricultural households had chickens, 65% had pigs and 27.8% held cattle. The majority of Vietnamese agricultural households keep chickens and pigs. The size distribution of their holdings of chickens, pigs and cattle are shown in Table 3. For all these types of livestock, small holdings predominate.

Table 3:   The percentage distribution of agricultural households in Vietnam by size of their holdings of cattle, chickens and pigs in 2006.

CATTLE					
Size of Holding					
No of Head	1-2	3-6	6-10	11 and over	TOTAL
% of total	71.42	22.39	5.06	1.14	100
CHICKENS					
Size of Holding					
No of Head	1-19	20-99	900-999	1000 and over	TOTAL
% of total	66.4	32.06	1.24	0.06	100
PIGS					
Size of Holding					
No of Head	1-2	3-5	6-20	21 and over	TOTAL
% of total	56.73	27.64	12.09	1.78	100

Source: Based on General Statistics Office (2007). Tables 90, 92 and 94, Volume 3.

Between 2001 and 2006, the number of agricultural households keeping pigs in Vietnam declined by just over 1 million, that is by slightly more than the total decrease in the number of agricultural households in this period. Although most rural households keeping pigs in 2006 still had 1 or 2 pigs, holdings with 1-2 pigs and with 3-5 pigs declined in number whereas those households with a greater number of pigs rose in number (see Table 2). Consequently, the scale of pig holdings by households increased, even though their scale still remained low by comparison with the size of piggeries in more developed countries.

Table 4:   The distribution of households raising pigs in Vietnam in 2001 and 2006 by the size of their pig holding.

Size	Number of Households		Percentage	
No of head	**2001**	**2006**	**2001**	**2006**
1-2	4,937,352	3,528,297	66.8	56.73
3-5	1,887,448	1,749,844	25.54	27.64
6-20	443,597	942,000	7.35	14.89
21 and over	22,518	111,000	0.3	1.75
TOTAL	7,290,875	6,331,941	100[(a)]	100[(a)]

(a) May not add to 100 due to rounding
Source: Based on result of the rural agricultural and fishery census of 2001 and 2006 as reprinted by the General Statistics Office, Vietnam

From Table 4, it is seen that the scale of pig production by pig producing units in Vietnam shows an upward trend and that very small production units are becoming less common, even though they still predominate in Vietnam's pig industry. This is a trend favoured by the Government of Vietnam. For example, the General Statistics Office (2007, Vol 3, p.26) states that household production scale has expanded and that this is positive for economic development. The General Statistics Office (2007, Vol 3, p.26) continues "in 1994, there were only 17.4% households with more than 3 pigs, in 2001, it was 33.4% and is 44.3% in 2006. Especially in 2006, there were 17,844 households with more than 50 pigs, more than 5.5 times in comparison with the year 2001. There is also the same trend in cattle and poultry rearing [and it claims that] large-scale animal husbandry, together with processing and consumptions, should be encouraged." The Vietnamese Government intends to adopt strategies to increase the scale of production by units producing livestock, including those supplying pigs.

4. Policies Proposed by Vietnam's Government to Increase the Scale of Units Producing Pigs and other Livestock

As pointed out in Section 2, a normal pattern in the economic development of nations is for small-scale agricultural units to decline in relative importance and for larger scale production units to increase in relative importance. This trend has been observed

in Vietnam's case. However, the Government of Vietnam wants to accelerate this trend as far as livestock production is concerned to an even greater extent than in the past. (Ministry of Agriculture and Rural Development, MARD, 2007).

Drucker et al.(2006) argue that the Government of Vietnam has in recent years adopted policies that effectively have encouraged larger-scale pig-producing units and the substitution of imported breeds of pigs for local ones. The increased presence of imported breeds and their crosses in Vietnam favours larger-scales of pig production based on the use of commercially processed food, much of which is imported to Vietnam, as are many other products used in intensive pig-production. Drucker et al. (2006) estimate that government subsidies paid to pig producers for the adoption of imported breeds to be substantial. Be that as it may be, livestock development policy in Vietnam is expected to begin a new phase in which explicit subsidies are to be given to units of larger scale. The government believes that this will accelerate Vietnam's economic development, reduce the cost of pork production, and improve the quality of pork. Indirectly, this discriminatory policy is likely to reduce the number of household suppliers of pigs operating on a small scale. There are, however, some reasons for being wary of such an approach.

First, the fact that industrial-type commercial pig units experience economies of scale whereas household units may not, does not mean that industrial units have the lowest costs for pig production. Households may have the lowest costs for production on a low-scale, and even when industrial units fully realize their economics of scale, their per-unit cost of production may be higher than for small-scale households. This possibility is illustrated in Figure 2 where diagram A represents the assumed per unit cost of producing pigs of a typical household producer and diagram B represents that of a typical industrial-type producer. For a level of small-scale production (possibly production involving 3 pigs or less) per unit costs of production by the household is low and shown by the line AF. It is low because household and farm wastes can be fed to the pigs and the opportunity costs of labour is also likely to be low. However, once the scale of household production exceeds a low threshold (x_1 in the case illustrated) per unit cots rise rapidly, as shown by line marked MC_H.
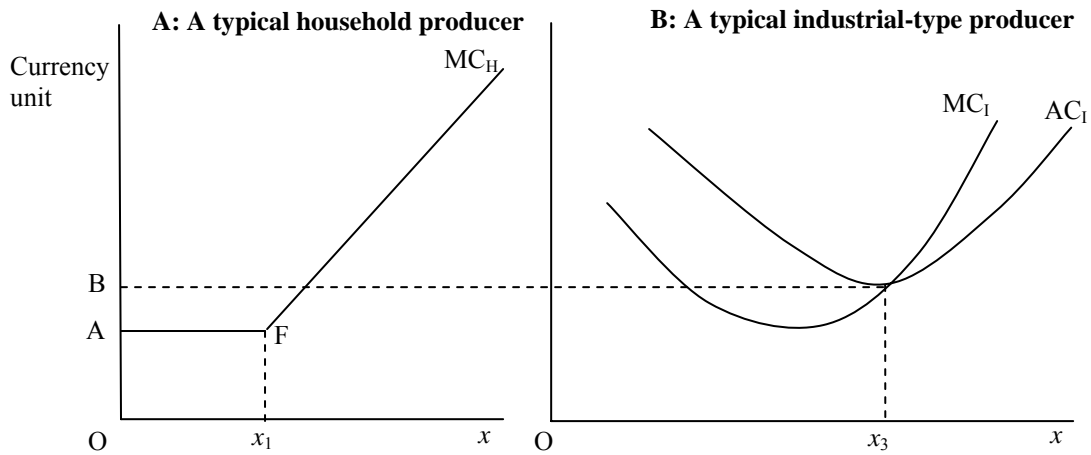
A: A typical household producer

B: A typical industrial-type producer

Currency unit

MC_H

MC_I AC_I

B

A   F

O x_1 x O x_3 x

Figure 2: **Theoretical differences in the type of per unit cost of production relationships facing household producers of pigs and those confronting industrial-type producers of pigs.**

The exact nature of the per unit cost of industrial pig production in Vietnam does not seem to have been specified empirically by the Government. In Figure 2, it is assumed to be U-shaped. Increased economies of scale occur until a scale of production of x_3 is obtained and after that diseconomies begin to emerge. The curve identified by AC_I represents the average cost of production of the industrial unit and the curve market MC_I indicates its marginal cost of production. It can be noted that minimum per unit cost of production of the industrial unit is OB and is higher than that of the household unit, OA. In this static case, even when industrial units all operate at maximum efficient scale (minimum per unit cost), some contribution to production by household units is less costly. However, as pointed out in Section 2, household units can only make a limited contribution to aggregate production because they are constrained in their available resources. Therefore, the type of kinked aggregate supply curve shown in Figure 1 applies. The type of relationship illustrated in Figure 1 can be developed further to explore the potential economic consequences of policies that favour large-scale agricultural producers.

Assume that the relationships illustrated in Figure 2 are long run ones and that, for simplicity, all household suppliers have the same cost relationship as shown in inset A in Figure 2 and that all industrial producers have the same U-shaped cost curves as shown in inset B in Figure 2. Then the industry supply curve for households is like

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that shown in Figure 3 by ACS_H. This indicates that the maximum quantity of pigs per unit of time that can be supplied by households at minimum cost is X_0. For a greater quantity of supplies, their extra cost of supply rises sharply. On the other hand, the supply curve of industrial units is an elastic straight line shown by BG. Supply is elastic because greater production can be obtained by replicating industrial units operating at minimum efficient scale (x_3 in Figure 2) and consequently, the cost of supply can be kept constant at OB per unit, assuming that the scale of industrial units is relatively low relative to the size of the market. Unlike household units, commercial units do not have significant supply constraints – they can import pig food and draw on a large labour pool. The supply curve for the whole industry is then as specified by the kinked relationship ACEFG. Given that DD is the demand for pigs, market equilibrium is established at F. This results is X_2 pigs being supplied by households and $X_3 − X_2$ being supplied by industrial units with the price per pig being P_2.
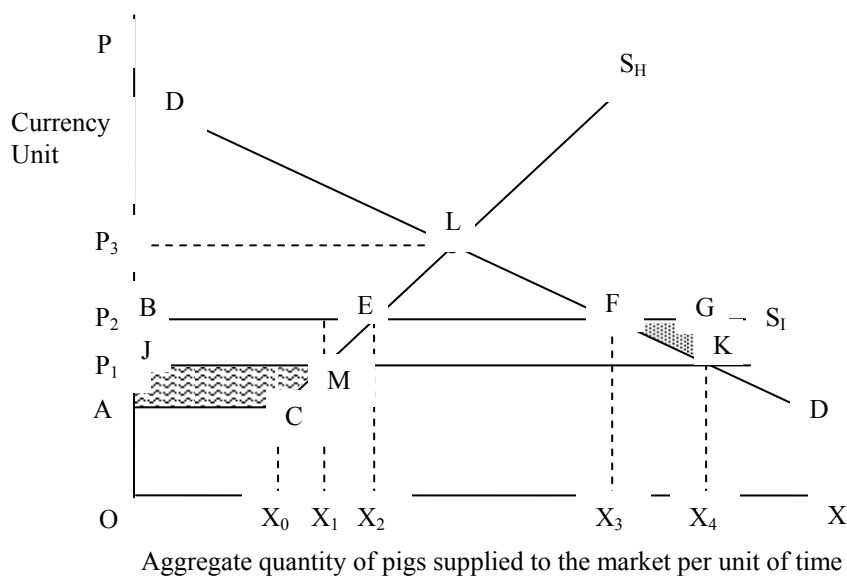

Figure 3: An illustration designed to highlight some of the economic consequences of subsidies that favour units that produce pigs on a large rather than on a smaller scale.

Suppose that the government provides a subsidy of BJ per pig exclusively to large-scale producers of pigs which in this dualistic model are industrial-type producers of pigs. In Figure 3, this reduces the supply curve of industrial-type producers of pigs from BG to JK because their marginal cot of production falls by the full amount of the

subsidy, unless suppliers of industrial inputs, such as produce (feed) merchants, have enough market power to raise the price of their supplies to piggeries and therefore, capture some of the economic gains from the subsidy. For the time being, let us assume that produce merchants lack market power. Then the following economic impacts can be observed:

1. After the subsidy, the market supply curve becomes the kinked one ACMK and the market equilibrium shifts to F from K. The supply of pigs from (small-scale) households declines from X_2 to X_1 and the supply from industrial type units rises by $X_2 - X_1$ plus $X_4 - X_3$. The former term is the displacement effect of the subsidy and the latter term is its impact on expanding the quantity of pigs traded.

2. The surplus income of households involved in raising pigs falls. Before the intervention this surplus equals the area of quadrilateral ACEB but after the intervention, it equals the area of the marbled quadrilateral ACMJ. The economic surplus of household producers falls by an amount equivalent to the area of quadrilateral JMEB. These mostly poor households are even poorer as a result of this intervention.

3. In the long-term, the surplus of industrial piggeries is unaltered because their supply curve is perfectly elastic. They only make normal profit. If their long-run supply curve were upward sloping some increase in the surplus of industrial piggeries would occur, the amount being greater the steeper their supply curve. In the short-run, industrial piggeries would most likely have an increased surplus because supply is less responsive in the short-run than it is in the long-run.

4. There is a net social loss from the subsidy if the potential Paretian improvement (also known as the Kaldor-Hicks criterion) is applied because the total economic costs of the policy outweigh its total economic benefits (see, for example, Tisdell and Hartley, 2008, Ch.2 or Tisdell, 2009c, Ch.3). The overall economic costs of this policy consists of two components. First, there is the increased cost of obtaining the displaced supplies $(X_2 - X_1)$ of

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households when these supplies are produced by industrial piggeries. This additional cost is shown in the area of the hatched triangle in Figure 3. Secondly, there is another misallocation cost corresponding to the excessive supply equal to $X_4 - X_3$ to the market. The additional value that buyers place on this extra supply is less than the extra cost of producing it. This loss is shown by the dotted area of triangle FKG in Figure 3.

5. Furthermore, the subsidy increases the tax burden on taxpayers. Extra tax revenue equivalent to $P_2 - P_1$ times $X_4 - X_1$ must be found in order to pay the subsidy.

It is possible that the main beneficiaries of the subsidy could be produce merchants if they have some market power. In Vietnam, there are few major suppliers of produce for livestock (Drucker et al. 2006), so this is a possibility. This is especially likely to be the case if in local areas there are fewer produce suppliers than exist nationally.

If it could be shown that industrial-type piggeries have reduced environmental externalities compared to small-scale household producers, this might provide an economic cases for favouring the former. However, subsidisation of large-scale piggeries might not be the best way to address this matter.

5. Concluding Comments

As economic growth proceeds, small-scale production units in agriculture tend to become uneconomic and the scale of such units increases. This process tends to occur naturally in market systems so that in the very long-term, small-scale agricultural producers fail to survive if substantial economic development occurs. Institutional factors may impede or accelerate the trend. For example, in communist countries in Asia, such as Vietnam and China, restrictions on land transfers have slowed this trend; property rights in land are still in flux in these transitional economies but land transfers are restricted. This could change, however. For example, the Central Committee of the Chinese Communist Party announced in October, 2008 that it is to develop new policies for greater property rights in agricultural land, including the right to transfer such land (World Bank, 2008, p.19). The World Bank (2008, p.19) states: "The [China's] new land policy encourages an orderly evolution of agriculture

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from household-based towards larger-scale operations, promotes the development of a rural land rental market by improving tenure security and strengthens farmers' bargaining position in land transactions and acquisitions". Whether Vietnam will follow suit eventually remains to be seen.

Vietnam has adopted a strategy for the long-term development of its livestock sector that encourages units that adopt a larger scale of production. It is not, however, apparent that this is a wise economic decision given that Vietnam is a developing economy still in economic transition. Reasons for being cautious about such a policy have been outlined in this article. There do not seem to be strong arguments for subsidising large-scale agricultural producers thereby reducing the economic sustainability of small-scale agricultural producers in Vietnam at this stage of its development. This seems to be so in many developing Asian economies. Consideration needs to be given to the removal of limitations on property rights which, amongst other things, limits the transferability of land. These limitations impede the operation of market forces likely to favour an increase in the scale of units involved in agricultural production. Reforming systems of property rights could be more efficient from an economic point of view than subsidisation to ensure that the scale of agricultural units is such as to minimize the overall costs of agricultural production. However, promoting economic efficiency is not the sole purpose of economic policy (Tisdell, 2009b)

6. Acknowledgements

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