

# **How transaction costs shape market power: conceptualization and policy implications**

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## **Abstract**

This paper conceptualizes how market imperfections and transaction costs influence farmers' strategies addressing changing external conditions. Such an integrated understanding is necessary for a new appraisal of the public policy role in order to develop robust solutions. We list the current changes affecting the agricultural sector and discuss how market power and adjustment costs may affect the spectrum of actions a farmer could take. Then we analyze the resulting new organizational forms emerging in agriculture. In particular, we focus on horizontal cooperation and vertical coordination. Finally, we question the changing role of government and how public and private mechanisms may reinforce each other or instead counteract.

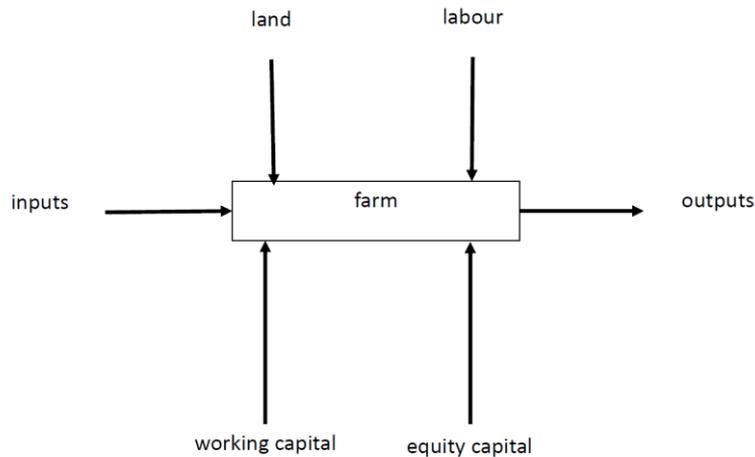
## **1. Introduction**

Primary production, that is agriculture, fisheries and aquaculture, forms the foundation of the food system. This key role induces a strong influence on the society's welfare. That's why, the study of the agricultural sector efficiency should be of the highest importance for scientific research. Theory of market efficiency has evolved and the prevalence of market imperfections is nowadays fully acknowledged. In particular for farmers, the existence of transaction costs highly shape its structure and performance. Indeed, as economic agents, primary producers aim at generating a sufficient amount of income, but their financial conditions are highly dependent on public and private actors they are interacting with. Because of the existence of transaction costs, business interactions lead to market power inducing an unequal distribution of the cost of market imperfections.

In this paper, we conceptualize how market imperfections and in particular transaction costs influence the strategies of farmers will have following changes in conditions. Such an integrated understanding is necessary for a new appraisal of the public policy role in order to develop robust solutions. To do so, we first describe the nature of the farm and the market imperfections affecting it. Section 3 we list the current changes affecting the agricultural sector and discuss how market power and adjustment costs may affect the spectrum of actions a farmer could take. Then the next section analyses the resulting new organizational forms emerging. In particular, we focus on horizontal cooperation and vertical integration. Finally, we question the changing role of government and how public and private mechanisms may reinforce each other or instead counteract. The very last section concludes.

## **2. The nature of the farm and the farmer's web of transactions**

A farmer converts a set of inputs into a set of outputs using a set of production factors (land, labour and assets) and a set of technologies. What the farmer does not produce himself needs to be bought from other actors through market based-transactions. Decisions are made based on the relative prices of outputs and factors of production that reflect their opportunity costs.



*Figure 1 : The nature of the farm*

Overall, neo-classical economic theory posits that the resulting market-based equilibrium will efficiently allocate scarce resources, thus creating the highest welfare for society. However, this credo is based on four critical assumptions:

1. There is perfect information, that is, knowledge about all relevant issues exists and is distributed equally among economic actors. This ensures that the price formation is perfect in such a way that it includes all costs induced by production. Given that all actors are perfectly informed about prices which are themselves perfect, decisions are optimal.
2. There are no adjustment costs, that is, consumers can change supplier without cost, producers can change buyer at no cost or producers can change their production orientation freely. Hence, farmers can perfectly adapt to changes in the conditions and move to the newly optimal resource allocation.
3. There is no uncertainty on production, prices, and all necessary information to take optimal decisions in the long run. Hence, farmers take decision in a non-probabilistic setting and optimize based on certain output. There is no risk associated to their decision.
4. Economic actors behave rationally, that is not opportunistically.

Both empirical evidence and new theoretical advances have contested these conditions. Williamson (2000) introduced the more realistic “science of contract” instead of the too theoretic “science of choice”. To understand the motivation of this shift, one needs to clearly identify how real transactions differ from the neo-classical assumptions. Differences can be grouped under five classes of market imperfections: imperfect information, externalities, uncertainty, bounded rationality and the existence of transaction costs. Because the structural changes in the conditions of the agricultural sector and food production have led to a new appraisal of the latter of these five market imperfections, we will shortly describe the first four and focus on the fifth one. Yet, it bears emphasis that market imperfections are intrinsically interacting such that the study of one cannot be completely disentangle from the appreciation of others.

A first market imperfection is that **information is often imperfect** and distributed unequally between actors so that some parties have informational advantage. Asymmetric information induces some cost of monitoring in order to incentivize agents to behave according to one’s interest and to prevent moral hazard. In the same vein, imperfect information also affects consumers who are often blinded about the intrinsic quality of products. That is why often a producer needs to signal the type of products he sells in order to attract the consumer valuing his product the best and to capture the highest share of the surplus. Finally, society’s welfare is affected by missing information about resource scarcity. Indeed, as

water, land, pollution, etc. are difficult to measure, they are not integrated into the price formation mechanism and hence environmental externalities are often not considered into the choice of resource allocation. Second, there is **uncertainty** about production and prices. This is particularly the case in agriculture, as nature, which is often unpredictable, is one of the main determinants. Moreover, when products are commercialized, the literature identifies three types of risk: primary, competitive and supplier-based (Sutcliffe and Zaheer, 1998). Third, an agent's **rationality is bounded**. Indeed, human beings are limited in their capacity to foresee all possible states of the world and the associated set of probabilities and output. That is why they tend to behave opportunistically, making relationships unstable.

The fourth and most important market imperfection is that the simple fact of selling production induces costs, so-called **transaction costs** (Coase, 1937). Indeed, transactions in markets are not frictionless and hence inflate opportunity costs by other costs associated simply with the fact of entering the market. Transaction costs can take two forms: they can be proportional or fixed transaction costs (Key et al., 2000). The former increase proportionally with the number of units exchanged and are associated with transportation and imperfect information. The latter act as a lump-sum tax and include the costs of search for customer or salesperson, the negotiation and bargaining costs and the cost associated to monitoring that is screening, enforcing and supervising (Key et al., 2000). If they do not induce subsidies or higher prices, the key point here is that usually these costs are borne by actors upstream, i.e. farmers (reference). Hence, to save on transaction costs, farmers may engage in long-lasting relationships with suppliers and buyers.

Transactions costs coexist with another type of costs: **adjustment costs**. Indeed, when farmers decide to alter their input mix and/or output mix in order to answer adequately to changes in conditions, new transactions may have to be organized. These potentially lead to new relationships and hence new transaction costs. The resulting adjustment costs act as barriers preventing exit of a given type of production and hence reduce the potential of the market to readjust to the new optimum. Farmers' adaptation to the new conditions might induce two types of adjustment costs: short term versus long term change in the cost structure:

- First, we define short run adjustment costs as those that only relate to the amount of inputs, with given levels of quasi-fixed and fixed inputs. Operational decisions are made in the short run within the framework of strategic choices and relate to the amount of inputs and outputs. These decisions are determined by the relative opportunity costs of all inputs and outputs and are facilitated by **working capital markets** (including supplier credit and buyer advance payments).
- Second, adjustment costs can result from changes in the long run. These are linked to strategic decisions which are decisions in the long run related to the technology set used and to whether to make or buy certain inputs or factors. These decisions are facilitated by **equity capital markets** in case not enough own financial resources are available. Hence, they also affect the level of debt of the farmer.

Two final remarks are worth stressing in order to completely grasp the nature of the farm and how its structural form determines the set of strategies available to the farmer following changes in market conditions. First, if consumers and producers were to be a single integrated entity, market imperfections in general and transaction costs in particular would not exist. As the overall agricultural economy evolved from auto-consumption to market-based production, transaction costs appeared and have tended to increase. Transaction costs explain why some farmers still do not find it profitable to enter the market in developing countries and prefer consuming all what they produce (Eswaran and Kotwal, 1986; Sadoulet, et al., 1998; Goetz, 1992; de Janvry and Sadoulet, 1994). The second relevant observation is that during the last decades, there has been a shift from family farming to bigger but more specialized farms. This is mainly explained by the gains from labour specialization and economies of scale. However, this new

structural form required gradually more trade with external actors so that the decrease in family farming has changed the type and distribution of business costs. In particular, farmers now have to interact with external actors downstream, whereby they could lose part of their freedom and take the risk of bearing a higher share of transaction costs. Indeed, the division of tasks between different entities leads to power games inducing that additional costs caused by changing market conditions might be shared unequally within the chain of actors. Yet the potential concentration at the farm level is limited. This is explained by the seasonal constraints placed by nature, inducing the trade-off between gains from specialization and the subsequent increase in monitoring costs due to moral hazards problems (Allen and Lueck, 1998). Because it depends on nature and its rather unpredictable events, the organizational configuration of the farm is more restricted than its closest structural identity, the firm.

### **3. Changes in external conditions**

The structure of the farm greatly shapes how farmers will suffer from changes in external conditions and the potential answer they will be able to develop to cope with these changes. A change in conditions can affect either inputs, outputs, factors or technology (Porter, 1998). According to the market imperfections prevailing on each of these, the conditions' change on one of them will have a relatively small or bigger effect on the situation of the producer and the set of strategies he will have in order to cope with the new conditions. Hence, the proportion of the farm's functioning that is market-based will greatly determine the intensity at which it will be affected by external conditions.

The spectrum of actions a farmer could take following changing conditions depends on two characteristics of his current business: market power and adjustment costs. First, the degree of market power is reflected in the ability of an actor to raise prices above marginal costs. It is inversely correlated with the competition the actors faces on a given market. That is, the lower the competition, the higher the power of an agent to rule the market toward its profits. Second, adjustment costs, as defined supra, are the costs of changing the trajectory of the farm. Hence, it is proportional to exit and entry costs of a new activity. In this measure, sunk costs play a big role as they are unlikely to be reallocated to an alternative activity and weight the level of indebtedness of the farmer. Hence, adjustment costs depend on the level of specialization of the farm: the stronger the farm is specialized, the bigger the adjustment costs. Figure 2 shows at which level of the farmer's decision-making process both market power and adjustment costs may play. Market power is linked to the number and distance of potential inputs/outputs. It is negatively correlated with the number of potential competitors and positively correlated with their distance in terms of product and business characteristics.

Imagine that an actor in the farmer's web changes his behaviour, to reinforce his competitiveness or simply to answer to new regulations, in such a way that costs are transferred upon the farmer. These would be externalities or spillover costs. These spillover costs alter the opportunity costs the farmer faces, such that he may want to take action either to avoid the spillover cost by changing supplier or buyer, or by adjusting his farm plan according to the new relative prices. How much of the new costs will be transferred to the farmer depends on his market power and adjustment costs because it is intrinsically linked to the possibility of both actors in the relationship to switch to an alternative contract. Hence, the adaptation capacity of the farmer depends on the existence of an oligopsony or even a monopsony downstream and the number of similar farmers he is competing with. How much a farmer can distinguish himself from the rest of the sector and what distance he holds to his competitors in term of the quality of their products, crucially determine the bargaining power he will have towards a buyer who needs the type of products he sells. Then how much the farmer is dependent on the actor he is dealing with will also shape the share of the burden he will not be able to escape from because of unevenly distributed power.

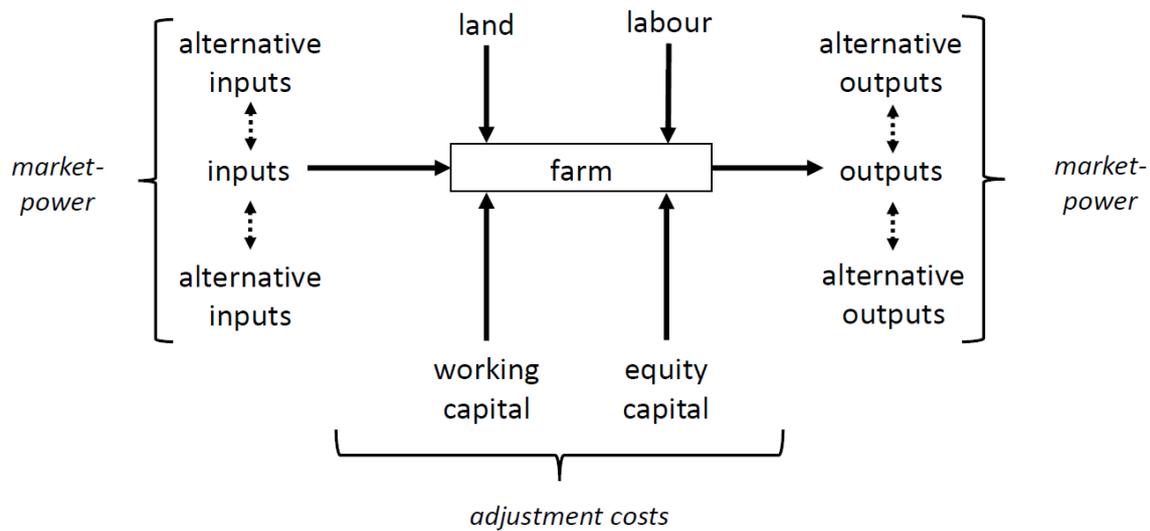


Figure 2: Market power and adjustment costs

During recent years, changes in conditions affecting the entire food market have required tremendous adaptations from farmers. The list of changing conditions is extensive, so that it is hard to provide an exhaustive description of it. At the top of these conditions, changing society's expectations towards farmers is the most prevalent one. While during decades, the focus was on increasing farmers' income and welfare through agricultural extension and the resulted production increases, nowadays, farmers are called to respect a set of "best management practices". The latter is designed by external actors whose main objective is food safety, resource conservation and environmental sustainability. In line with this, consumers' preferences are changing: not only consumers want enough food, but they also require food to be of high quality, diverse, healthy and sustainably produced. In general, given the strengthening environmental pressure, farmers are asked for more sustainable management. This leads to increasing costs due to new regulations. Products must respect tight guidelines and high quality requirements which induce high transaction costs (Hobbs and Young, 2000). In addition, climate change has increased output uncertainty and hence risk associated with farming activities. Farmers, while being unsure about nature, not only need to cope with the risk of current choices but also need to undertake new investments in order to adapt their practices. Moreover, on the list of major changes in conditions, stands the reduction of global trade barriers. On the one hand, it enables price reduction through stronger competition and hence improves society's welfare. On the other hand, while farmers have to compete with an increasing set of competitors, national regulations are not always necessarily harmonized at a global level, leading to unfair, unstable and unpredictable competition. The growing role of financial markets also affects the scope of farmer's decision-making process, complexifying it enormously and bringing tremendous uncertainty about price determinants. Finally, the decrease in the share of land still available increases the difficulty to start a new activity and the level of farm's indebtedness due to high land cost. This observation reinforces barriers to entry, hampering young farmers to start a new activity. It prevents new blood from entering the agricultural sectors and thus limits the potential for new ideas and reforms of the system as a whole.

#### 4. Emergence of new organisational forms

To cope with the threat of increasing transaction costs following changes in conditions, farmers are engaged into two types of strategies. First, horizontal cooperation entails a collaboration among farmers

to capture economies of scale or increase market power. Here, farmers take the initiative. Second, vertical cooperation entails a collaboration between farmers and other supply chain actors. Usually, farmers are not in the lead here.

#### 4.1. Horizontal cooperation

A first action small producers have found to be successful is the formation of associations to bargain collectively with sellers of inputs or buyers of produce. The mechanism behind this strategy is a reduction in the number of parties: as the buyer tends to a monopsonistic power, sellers act collectively to reduce the number of their voices and hence increase their bargaining power. One necessary condition for the success of this strategy is that none of the cooperative members deviate from the ex-ante agreement. Ensuring the latter commitment relies on two characteristics: (1) none of the producers should be big enough to undertake the contract alone and (2) a large cost of deviating should be credibly announced or informally known and believed ex-ante.

Figure 3 gives a simple representation of this evolution of transactions, within a very simplified supply chain involving sellers and buyers. All production steps are assumed to be confined within the same enterprise. Letters distinguish sellers according to the set of products they sell. The same applies to buyers. Hence both  $S_A$  are two different farms which produce the same set of crops.

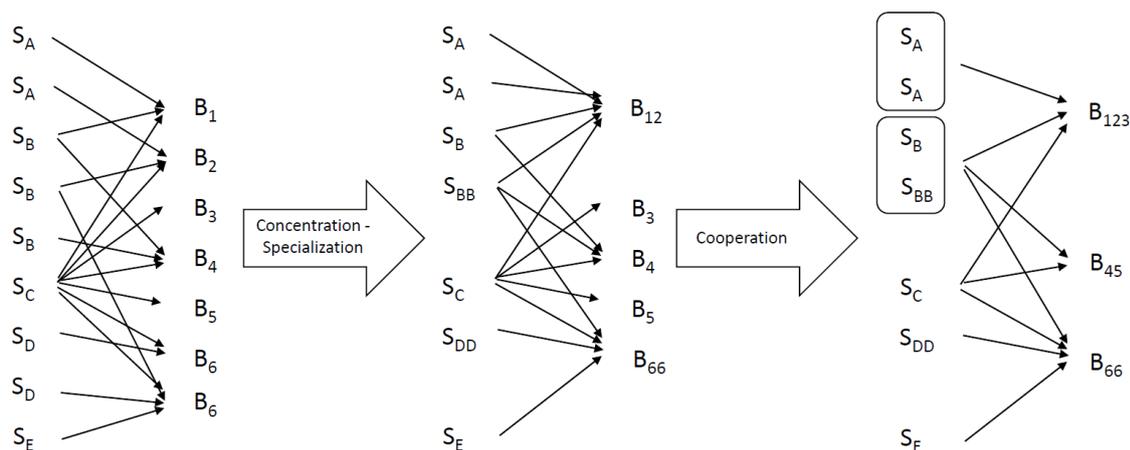


Figure 3 : Evolution of transactions

In the first branch, many transactions take place between a high number of sellers and buyers. Then, sellers and buyers concentrate and specialize: some sellers merge with other ones of the same type while the same appear on the buyer side. Hence, in the second phase, the number of transactions is relatively reduced. Finally, in the last branch, some sellers decide to cooperate : they bargain collectively with buyers. On the other hand, the fusion of buyers exacerbates. The number of transactions appears to be even more reduced.

What can be observed in general is that buyers' market-power has increased through the mergers leading to an oligopsony. However, the same appears on the sellers' side, even though their merging potential is intrinsically more limited. Moreover, within the cooperative, adjustment costs are reduced thanks to the possibility of shared investments. This limits the risk of hold-up from buyers. The main risk for the cooperative to collapse is that one member takes over the other ones. However, according to Allen and Lueck (1998), this phenomenon would be rather limited because of the moral hazard costs associated with nature. Hence, in our setting, it is more likely that  $S_A$  eats up  $S_C$  than  $S_A$  because merging with  $S_A$  would increase risk (because of the idiosyncrasy of shocks) and monitoring costs.

## 4.2. Vertical cooperation

Another tool is the development of new contractual forms. That is, actors write down bilateral commitments in order to avoid moral hazard problems and reduce transaction costs. Production and marketing contracts have been set in all subsets of the supply chain, from producers, to processors and then retailers, so that actions are gradually more predictable and decided ex-ante. Hence, actors tend to coordinate. Vertical coordination is the means by which products move through the supply chain from producer to consumer (Mighell and Jones, 1963). To optimize production processes and costs, actors also specialize gradually more. Tasks tend to be harmonized or outsourced. This leads to very specific types of contracts in order to organize strategic alliances, joint ventures or franchising practices, among others (Young and Hobbs, 2002). Actors in the supply chain recognize each other to be complementary and take complex bilateral or multilateral well-written commitments in order to prevent agency issues.

Producers also rely on market segmentation in order to catch the biggest share of the consumer surplus. They do so by very differentiated products and the signaling of their quality to well-targeted consumers. It can also take the form of niche markets for new types of goods, facilitated by raising consumer demand for specific food products and by progress in agricultural biotechnology (Young and Hobbs, 2002). Signaling product quality is the key action to ensure good price reward of new sustainable practices. In this respect, labels are widely used nowadays. However, labels are very expensive and constitute a lump-sum cost. Hence, labelling needs not only to be well compensated by a much higher consumer willingness to pay but also by a catch of a non-negligible share of the market.

Vertical coordination may also have some disadvantages. *First*, because it induces thinner and hence more volatile spot markets, it increases risk for farmers not benefiting from contracts, and hence in particular smaller farmers and those from the developing world. Moreover, it increases the share of the market were the price is unknown and hence induces less transparent price formation and information (Young and Hobbs, 2002). Vertical coordination may thus rise information and negotiation costs for the farmer. Indeed, because long-term contractual obligations tremendously constrain farmer's future choices, engaging in one of these relationships means seriously comparing it with other potential alternatives. *Second*, the resulting increase in adjustment costs strengthens the positions of some actors at the cost of others. In particular, because contracts usually lock farmers in a relationship with retailers, the bargaining power of the latter is usually reinforced at the expense of the former (Hurt, 1994). An implication might be that retailers decide to change conditions and report the induced costs onto farmers because they do not have outside options. *Third*, another increase in adjustment costs comes from the investment in very specific assets following specialization choice. Hence, not only adjustment costs are raised by the one-shot transaction cost of changing relationships but also by the dis-investment and re-investment costs associated with a very specific production process. Another additional cost, which might be considered as non-rational, lies in the emotional costs for farmers of adopting a more systematized and blinded way of producing, where he does not necessarily see the final output of the chain he is part of. Finally, the requirement for sophisticated production skills and capital constitutes a barrier to entry for some producers. It is then likely that retailers will concentrate their contracts on a small group of producers in order to limit transaction costs (Boehlje, 1999). *Fourth*, when actors are organized in supply chains, additional costs will fall on each of them given that specific practices must be applied in every step of the production process. Hence, if competition is high in one stage of the supply chain and induce aggressive strategies, this might oblige upstream producers to change their practices and hence bear new costs. The probability that farmers will not be compensated for these new costs is inversely correlated with the level of their outside options. Hence, farmers with low market power might find it more secure to invest in additional transaction costs in order to safeguard their economic interests and to decrease the risk of being subject to opportunistic behavior. *Fifth*, the organization in supply chains may strengthen vulnerable situations due to the existence of squeezed actors. Indeed, market imperfections for inputs and outputs may reinforce each other leading to a price-cost squeeze when the input is essential. In the same vein, spillover costs on a factor (e.g. land) means that the farmer wants to change his plan so as to obtain a higher return to that factor. This can be hindered by the fact that there is also an spillover effect on inputs (e.g., fertilizer)

## **5. Changing role of government: how public and private mechanisms may reinforce or counteract each other**

The kind of changes affecting the farming system is likely to call for a rethinking of agricultural policy as a whole. Economic theory states that without market imperfections, the role of governments would be nil because prices would integrate all types of costs, assuming that consumers are able to determine what is good for themselves. However, as markets are not perfect, the traditional role of government has been to correct market failures and information asymmetries. That is why the main aim of political intervention is to remove the aforementioned distortions which affects not only producer welfare but also consumer welfare. This used to be done through the provision of public price reporting, publicly funded research and development activities, education and extension activities.

Yet, the role of government is complex and double, having to balance between societal welfare and protection of producers (as food providers and individuals). One striking observation is the translation of increased requirements from society with respect to sustainability into public regulations, at farmers' cost. To counterbalance the resulting loss, institutional mechanisms that aim to reduce these new costs have emerged, such as the direct payments from the EU's Common Agricultural Policy (CAP). However, as support from the state increased, requirements in term of farming practices have also tremendously raised so that it is hard to conclude on the net welfare improvement for farmers. Moreover, as government keeps on providing subsidies, they also accentuate price distortion and thus unfair competition, so that it incentivizes farmers to look for solutions outside of the free market. In this respect, one meaningful observation is that the agri-food sector as a whole is experimenting with new tools to cope with the raising costs, reflecting a partial failure of the state.

Another relevant remark is that public support helps farmers start a new activity in the form of the CAP's second pillar payments, but exit support seems to be rather absent. This lack of flexibility, reinforced by specialization trends, explains why some farmers keep on producing goods in a non-optimal or even unsustainable way. Those are consequences from sunk-costs, which calls for new agricultural policy.

Overall, the sector nowadays is characterized by a mix of private and public policy. First of all, there is stronger private sector involvement and leadership. This is mainly reflected by producers associations. Economic theory predicts under-investment by farmer due to risk aversion, under-evaluation of potential return and lack of exclusivity and rivalry. This leads to a market failure whereby public investment is needed. However, due to technological advances, it is often now possible to secure investments (Young and Hobbs, 2002). Moreover, labelling is increasingly undertaken by the private sector, GlobalGAP being one meaningful example of how the number of different standards has risen sharply. However, a large increase in the number of labels increases the cost for the consumer to get the information behind each of them. This is a new potential role for the public sector: ensuring that trust of the consumer in labels is well-placed. However, the increase in contracting and vertical coordination also places the control of markets outside of the scope of government. Transactions are less transparent and hence sometimes unfair. Illegal behaviour is also less likely to be correctly monitored by government. However, monitoring could take place thanks to the existence of some informal mechanisms. Indeed, because actors are organized in well-integrated supply chains, where they often meet, they are likely to hold more information about each other than the government does. Moreover, as they are organized in supply chains, sanctions or reputational breach of one of them is likely to affect the entire chain of actors. That is why government may count on the whole chain of actors to monitor their own practices within a given supply chain. This informal mechanism would work only if threat is high, that is the probability of detection is high, and the cost of deviating is large enough as well.

Finally, a remaining remark about governance mechanisms and their interplay lies in the heterogeneity and well-adaptation of the set of tools needed. Indeed, to analyze what is the need for policy from government, one needs to understand first what already exists. This is different according to the sector

as the nature of the products determines the type of relationship that prevails and hence the extent and type of market failure. Some sectors are characterized by market failure for ages and have hence developed solutions to cope with it while some other sectors face new market failures which affects the position of certain actors who do not always have the tools to fix it. In the latter situation, there is room for new governmental policy. In any case, new governmental forms will likely be of a hybrid type, that is, a mix of elements from both markets and hierarchy (Phil, 2000).

## **6. Conclusions**

In this paper, we reflect on the structure of the farm and the farmer's web of interactions. The existence of market imperfections has now been fully acknowledged and researchers investigate their nature and how they impact farmers. We list these market imperfections and focus on the prevalence of transaction costs. Indeed, the simple fact of selling products induces these types of costs. Moreover, the change in farm's structural form has required gradually more trade with external actors so that the type and distribution of business costs has changed. However, market imperfections not only affect farmers but they also interact with each other. Hence, according to the market imperfections prevailing on each factor of the farm, the condition's change on one of them will have a relatively small or bigger effect on the situation of the producer and thus the set of strategies offered to him.

This being said, we show that market power and adjustment costs play a particularly big role on how a farmer will suffer from a change in a given condition. This will determine the share of the burden the farmer will have to bear because of unevenly distributed power. In particular, gradually more powerful retailers combined with reinforced stringent regulations, heavily affect farmers. To cope with it, farmers are engaged in two types of relationships. First, horizontal cooperation entails a collaboration among farmers to capture economies of scale and increase market power. Second, vertical cooperation entails a collaboration between farmers and other supply chain actors. In the first form of collaboration, farmers take the initiative while in the second one, they are usually not in the lead.

The new structural form of the agricultural sector as a whole calls for a rethinking of public policy. Indeed, the fact that private actors are experimenting with new tools to cope with raising costs, partially reflects a failure or inadequacy of policy intervention. Overall, the sector nowadays is characterized by a mix of private and public policy. Interestingly, the closed interactions between actors of supply chains might induce new incentive and mechanisms as sanctions and reputational breach of one of them is likely to affect the entire chain of actors. Finally, the set of tools needs to be well-adapted to the nature of a given sector, as this determines the type of market failure and the already-existing solutions actors have put in place in order to cope with them. However, not only government need to give well-targeted and heterogeneous solutions to different sectors but also they should not under-estimate the need of unlocking farmers stuck in non-optimal situations, that is help transition between the different sectors.

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