

The determinants of selling through a short food supply chains:
An application to the French case

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Abstract:

A Short Food Supply Chain is a marketing channel whose developments answers the emerging demand of both public policy and consumers' requirement mainly in terms of quality. Based on the exhaustive census of all French farms in 2010, the aim of the article is to understand what are the individual and structural determinants of selling through a short food supply chain for producers: are there some factors leading to adopt such marketing channel? To answer this question, the resource-based view is mobilized. This theory highlights the relationship between the diversification of marketing channels and the individual characteristics of farmers and the structural characteristics of their farm. Since the choice observed is a dichotomous one, a logit model is implemented to identify determinants of short food supply chain adoption. This analysis lets underline differences observed between farmers who never sell through a short supply chain from the others in terms of both individual and structural specificities. Econometric results highlight that selling through this marketing channel is a commercial strategy implemented by younger and more educated farmers. Moreover, these farmers are installed on smaller farms. Even smaller, the implementation of a short food supply chain requires relatively more workforce. As a matter of fact, implementing such marketing channel translates into a need of workforce that is higher than for others farms and more precisely permanent workforce.

Keywords: short food supply chain, 2010 agricultural census, France, adoption, resource-based view

Introduction

For the last twenty years, independently from the production implemented, farmers intensify the diversification of their activities. The diversification translates into different practices, including mainly the transformation and/or the marketing channel of the production. These strategies let the producer benefit from a higher valuation of his production. Spurred on the public authorities and on the consumers' requirements, a new type of selling emerges: the short food supply chain. Such type of selling is defined by, at the most, one intermediary. The physical distance between producer and consumer sometimes complements this definition to take into account the need of proximity. Hence, adopting short food supply chains reinforces the relationship between producers and consumers and overcomes mistrust associated to long food supply chains (Moinet, 2010).

The resource-based view theory highlights that the combination of resources and skills let companies to develop their activity and hence let them be able to diversify their productive activity (Penrose, 1963; Richardson, 1972; Jacobides and Winter, 2005; Richards and Buckley, 2007). This theory focuses on industrial enterprises but is also translated to the agricultural sector. Aubert and Perrier-Cornet (2012) and Capt and Wavresky (2014) highlighted that resources and skills are key determinants from the diversification of farms' activities.

At the producer level, the decision to diversify the production activity translates into higher economic performance and a higher probability of being perennial (Mundler et al., 2009; Aubert and Perrier-Cornet; 2009). However, the effect is different while considering the decision to diversify the marketing channel selling all or part of the production through short food supply chains. As a matter of fact, Capt and Wavresky (2014) process a dynamic analysis of French farms from the period 2000-2007 and they demonstrate that selling through this marketing channel has no impact on farm perennially. The apparent contradictory results, for the French case, between the implementation of diversification and the continue existence of farms can be due to the database used. Since Aubert and Perrier-Cornet (2009) mobilized the 2000 exhaustive Census, focusing more precisely on farms specializing on wine-growing, Capt and Wavresky (2014) consider all French farms, whatever their productive orientation. The database mobilized, in this last case, is a survey which stratification is based on the location, the physical size and the productive orientation. However, since this marketing

strategy is assumed to be conditioned by the physical dimension of farms and to the extent that this survey is based on the physical size, considering such database can translate into a bias. In our case, considering an exhaustive census overcomes this bias. Hence, the population considered (a specific productive orientation versus all French farms), the nature of the database (exhaustive versus survey) and the fact that stratification is based on variables supposed to influence the farmers' behaviour could explain why, depending the database used, the relationship between the implementation of diversification and the continue existence of farms can differ. One of the aims of our analysis is to understand mechanisms leading to the diversification of a productive activity, through the implementation of short food supply chains, and, at the same time, validates results obtained by these authors, since they also consider that resources and skills available on farms affect the diversification of the productive activity. Moreover, the previous analysis considered the 2000-2007 period (Capt and Wavresky, 2014) and the 2000 French exhaustive census (Aubert and Perrier-Cornet), while we consider the more recent available database. Hence, in that sense, our analysis complements and augments the previous ones.

Whatever the impact in terms of farms' perennially, the diversification of farm activities is based on resources and skills needed for its implementation. For farms which benefit from such resources and skills, selling through short food supply chains appears to be an alternative, or a complementary marketing channel, to long food supply chains (Aubert and Enjolras; 2014a; Aubert and Enjolras; 2014b).

The aim of our article is to understand the mechanism of food supply chain diversification, by considering resources and skills available on farms. To take into account both individual and structural characteristics, we consider the French agricultural census. The 2010's census is exhaustive of all French farms. Hence, results obtained will be independent from any stratification from which are based almost all surveys. Moreover, all production are considered in our study to take into account the farms' diversity and hence to have a comprehensive view of the determinants of such diversification. As a matter of fact, from a productive orientation to another, specificities exist and hence farmers may implement differently their marketing strategy (Capt and Wavresky, 2014; Aubert and Enjolras, 2014a).

The article is organized as followed. First, we describe the emergence of short food supply chains in relation with public authorities' expectations and consumers' requirements. Second, we identify the factors leading to such marketing strategy. Third, we characterize the French farms specificities and present econometric results. Fourth, we conclude on the French farms' marketing strategies.

1. The emergence of a new marketing channel: the short food supply chain

Farm activity is developing from the last twenty years. First dedicated to a productive activity, it progressively integrates off-farms activities (Traversac et al., 2007; Dufour and Lanciano, 2012). Off-farm activities are considered in terms of diversification. Hence, it takes into account the expansion of productive activity to transformation and marketing activity. More precisely, the marketing diversification translates into "*the growth of sales of agricultural products in short food supply chains*" (Dufour and Lanciano, 2012, translated by authors).

Short food supply chain is defined as "*a marketing channel of agricultural products processed by direct selling to consumers, or by indirect selling provided that there is at most one intermediary.*" (French Ministry of Agriculture and Fishing, translated by authors). It is important to mention that several definitions of short food supply chains exist. While some consider the number of intermediary, others also consider the physical distance between a producer and a consumer (Martinez et al., 2010; Aubry and Chiffolleau; 2010). In our case, because the study considers a database which unit is the farm, the definition chosen is the number of intermediary. Such definition lets us differentiate direct selling from indirect selling, depending there is no intermediary or one.

The development of short food supply chains comes as an answer to internal and external constraints (Capt and Wavresky, 2014). More precisely, it answers, in the one hand, to public authorities intervention and, in the other hand, to consumers' requirements.

First, short food supply chain emergence is due to the public authorities intervention. As part of the second pillar of the Common Agricultural Policy (CAP), one measure aims at the "*economic diversification and life quality*". At the national level, in 2009, the Ministry of Agriculture and Fisheries launched an "*action plan to promote the development of short food supply chains for agricultural production*".

Second, short food supply chains meet consumers' requirement. One main attribute of a product bought through long food supply chain is the “*anonymity*” (Benezech, 2012). Short food supply chain let “forge a link with client” (Langhade, 2010). Hence, the proximity between producers and consumers is an attribute put forward. Short food supply chain also answers to “*the recent emergence of an engaged consumption that defend ethical values (...) in opposition with a standard and anonymous commercial system*” (Chessel and Cochoy, 2004).

For producers, implementing such marketing strategy is a way to explore new alternative ways to sell their production (Esnouf et al., 2011) that “seems to be an efficient way of development” (Mundler et al., 2009). However, the impact of the diversification is controversy since for some authors farms that diversify their activities through marketing channels such as short food supply chains, are more likely to be perennial than others farms (Aubert and Perrier-Cornet, 2009), while they are not more likely for others (Capt and Wavresky, 2014).

In France, in 2010, the exhaustive Census of farms estimates that around 20% of farms sell all or part of their production through short food supply chains. Short food supply chains take into account all direct sales and indirect sales. In this last case, there is one intermediary between the producer and the consumer. Short food supply chain corresponds mainly to direct sales since more than 81% of producers selling through short food supply chain channels declare as main channel direct selling. More precisely, farm sales and local market sales represents respectively 60% and 23% of direct sales while indirect sales are mainly (77%) destined to retailers (Table 1).

Table 1 – Main short food supply chain channels

The definition of short food supply chains has been widening since 2010. Before this date, the focus was done on direct selling and considered only the indirect selling through collective catering. Nowadays, indirect selling also takes into account commercial catering, retailers, supermarkets and hypermarkets. Hence, this wideness leads to take into account near 18% of farms selling through short food supply chains.

The 2010 French census lets appreciate precisely individual characteristics, structural ones and the marketing channel adopted by farmers. The unit of this database is the farm. Hence, the marketing strategy is measured in terms of global behaviour and not in terms of transactions. As a matter of fact, selling through short food supply chains can be implemented for a part of, or all, the production. The French census let apprehend this element considering both the marketing channel and the contribution, according to the total turnover, from the short food supply chain activity.

We can observe that selling through short food supply chains translates differently, for a producer to another, in terms of turnover. For farmers who gave this information, and that represent more than 80% of farmers selling through short food supply chains, we observe a dual behaviour. As a matter of fact, for more than 40%, these sales represents more than 75% of the turnover; while it represents less than 10% for 30% of producers (Table 2). Hence, the relative importance of such marketing channel differs from a farmer to another since it appears to be an important activity for the first ones and a complementary marginal activity for the seconds ones. Since the database does not indicate if the short food supply chain is the only marketing channel, we will discuss about a complementary activity to the long supply chain.

Table 2 – Marketing channel and short food supply chain intensity

2. Selling through short food supply chain: a strategy conditioned by resources and skills available on farms

Extending the productive activity to a commercial one depends from internal constraints. More precisely, implementing a complementary marketing channel in addition to the traditional one is based on both farms' characteristics and farmers' own individual characteristics. Hence, the resource-based view is the most appropriated theory to understand the adoption of this marketing strategy (Aubert and Perrier-Cornet, 2009; Jacobides and Winter, 2005). This theory highlights that the importance of resources and skills available in a company affects its development (Penrose, 1963; Richardson, 1972). A company, which benefits from resources and skills, can reinforce its productive activity or decide to diversify.

The combination of resources and skills, and more precisely an efficient management of these factors let a farmer to diversify his activity and hence selling his production through short food supply chains.

2.1.Resources as a key to understand the marketing strategy implemented

The main resource available on a farm is its physical dimension. In the literature, the relationship between the physical size and the fact to sell through a short food supply chain is controversial. Some authors highlight that the biggest farms are more likely to diversify their activity (Aubert and Perrier-Cornet, 2009); while for others, the relationship is reverse: they show that smallest farms are more likely to sell through this marketing channel because it let compensate the inability to explore long food supply chains (Dufour and Lanciano, 2012).

For the first authors, the biggest farms have a higher growth potential. Moreover, they are more likely to face financial constraints due to the implementation of another activity since they appear to be relatively less expensive than the smallest ones. Hence, they are more likely to diversify their activity, adopting in particular a short food supply chain marketing strategy. However, this relationship can be non-significant since farmers face many alternative strategies that also need resources. As a matter of fact, even if the biggest farms are able to implement short food supply chains, they can decide to diversify their productive strategy rather than their commercial one.

For the second authors, the physical size is not a key factor leading to more sells realized through short food supply chains. They highlight that “*the agricultural diversification is not dedicated to the smallest farms*” (Langhade, 2010). Selling through short food supply chains represents “*new opportunities to sustain the activity and increase farmers’ revenues for some farms facing difficulties, or which have not a sufficient dimension to explore long food supply chain*” (Dufour and Lanciano, 2012). These marketing channels are considered as a growth factor of the revenue and hence a relevant marketing strategy to sustain a farm (Langhade, 2010).

In terms of kind of short food supply chains implemented, Moiret (2010) highlights that depending the size of the farm, different channels are more likely adopted. Small farms are more involved on direct sales *via* farm sales or local market sales, while big farms are more involved on collective point of sales or indirect sales *via* retailers, restaurants or supermarkets and hypermarkets (Moiret, 2010).

The hypothesis made is that there is a positive link between the physical size and the short food supply chain-marketing channel. As a matter of fact, we assume that selling through short food supply chains induces incompressible costs that are relatively bearable by biggest farms.

Hypothesis 1: the biggest farms are more likely to sell through short food supply chains

Selling through short food supply chains translates into an “*additional workload*” (Langhade, 2010). To face it, the farmer has to anticipate and recruit beforehand workforce to answer such workload. Farmers with higher workforce are more likely to answer the additional activity and hence more likely to extend this activity (Capt and Dussol, 2014). Moreover, selling through short food supply chains is “*time gourmet*” (Moinet, 2010). Hence, this additional workload has to be considered in relation with other activities. As a matter of fact, this need of workforce can be in conflict with the need of workforce linked to others activities, depending on the period of the season. Selling through short food supply chains translates into a division of labour with an assignment of “dedicated work to some production, transformation and marketing tasks” (Lanciano and Saleilles, 2010). This marketing channel involves a new organization of the activity and a definition of coordination rules (Lanciano and Salailles, 2010; Hernandez, 2008).

Hypothesis 2: farms with higher level of workforce are more likely to sell through short food supply chains

More precisely, to take into account the relative implication of waged workers on this marketing channel, we have to consider the weight of permanent workers among these waged workers. “*The implication and the mobilization of employees’ skills differ considering they are permanent or seasonal*” (Aubert and Perrier-Cornet, 2012). The marketing activity has another rationale than the productive one. While the production activity can be

concentrated on a precise period of the season, the marketing activity is an annual one. Hence, workforce dedicated to this activity refers to annual workforce, more than seasonal one. Furthermore, the marketing relation is based on stable relationships. The loyalty is a “*company's wealth*” (Moinet, 2010) that necessitates permanent waged workers if the farmer does not himself perform the marketing activity.

Hypothesis 3: the more farmers recruit permanent waged workers and the more he is likely to sell through short food supply chains

Selling through short food supply chains requires the implementation of a diversification strategy. Diversification may be defined in terms of productions, quality and services (Allaire and Boyer, 1995; Lanciano and Saleilles, 2010; Dufour and Lanciano, 2012). The production's differentiation answers consumers' requirements and contributes to “*a quite revenue stability*” (Dufour and Lanciano, 2012). Furthermore, it reduces risks associated to poor harvest or loss production.

Hypothesis 4: the more the farmer diversifies his production and the more he is likely to sell it through short food supply chains

2.2. Skills as a key factor to understand the marketing strategy implemented

To sell through short food supply chains, farmers need non-agricultural employment (Allaire and Boyer, 1995). The only production activity is based on agricultural skills. The marketing activity requires other skills.

Hypothesis 5: the more the farmer has an agricultural training and the more he is likely to sell his production through short food supply chains

Combining the productive activity to a marketing activity requires more than agricultural skills (Lanciano and Saleilles, 2010; Benezech, 2012; Aubert and Perrier-Corner, 2012). These skills are apprehended through the education level. This level can refer to several capabilities and hence to a large range of skills that are difficult to appreciate precisely (Aubert and Enjolras, 2013).

Hypothesis 6: the more the farmer has a general education and the more he is likely to sell his production through short food supply chains

Newly installed farmers are more likely to sell their production through short food supply chains. As a matter of fact, sell through short food supply chains can translates into consumers' commitment that let encourage the cash flow of the farm. While almost cash flow for new installed is based on families' network, sell through short food supply chains let enlarge it thanks this network. Hence, this marketing strategy let them raise a financial constraint since it offers opportunities (Benezech, 2012). Furthermore, these newly installed farmers are more likely young.

Hypothesis 7: the more the farmer is young and the more he is likely to sell his production through short food supply chains

Selling through short food supply chain requires “a greater availability of the farmer” (Langhade, 2010) since the marketing activity is time-consuming (Moinet, 2010). The time spent on the farm is crucial for the farmer that let him extent his activity from productive to marketing. Full-time farmers are more likely to be involved in the marketing strategy than other farmers.

Hypothesis 8: the more the farmer's work time is important, the more he is likely to sell through short food supply chains

Beyond resources and skills available on farm, the environment on which it evolves “conditions the organizational mode adopted” (Aubert and Perrier-Cornet, 2012). The productive specialization lets appreciate this environment effect. As a matter of fact, even if short food supply chains are implemented for all agricultural productions, it is more implemented in the fruit and wine-growing sectors (Moinet, 2010).

Hypothesis 9: the productive specialization of a farm conditions its probability to sell through short food supply chains

Hypotheses formulated are tested using the exhaustive French Census of farms performed in 2010. More precisely, a logit model is performed to appreciate to what extent farmers' and farms' characteristics differ depending on the commercial strategy implemented.

3. Methodology and results

3.1. Database

Farmers decide to sell their production through short food supply chains only when resources and skills available are sufficient to. To take into account both individual and structural characteristics, we mobilize the 2010 French exhaustive census of farms.

This census details areas farmed and productions implemented. Beyond these structural characteristics, the census itemises also workforce. Workforce considers both permanent and seasonal wageworkers and family workers. Moreover, the diversification lets appreciate all activities implemented by farmers.

In 2010, the census enumerates 516.152 farms. Farmers who decide to sell all or part of their production through short food supply chains hold 102.040 of these farms (around 20%). For these farmers, 80% declared a turnover from this activity. The level of this turnover varies from a farm to another. Around 40% declare that more than 75% of their turnover comes from sales sell through short food supply chains; while 30% estimate to less than 10% the contribution of this activity on the total turnover (Table 2). Hence, short food supply chains can be considered as an alternative or complementary strategy to long food supply chains (Benezech, 2012; Dubuisson-Quellier and Le Velly, 2009).

3.2.Descriptive statistics

3.2.1. Characteristics of farmers who sell through short food supply chains

Statistics analyses highlight the importance of individual characteristics of farmers to differentiate those who sell through short food supply chains from the others (Table 3).

Table 3 – Short food supply chains – Individual and structural characteristics

Farmers who sell all or part of their production through short food supply chains are younger than others. While the first are on average 49 years old, the second ones are 51,5 years. This seems to confirm that younger farmers are more likely to implement such marketing strategy.

Selling through short food supply chains appears to be more likely implemented by younger farmers, independently from their level of education. As a matter of fact, considering the level of education, results do not highlight any difference between farmers who sell through short food supply chains than others (Table 4). The only element is that the first ones are overrepresented for lower or higher education levels.

Table 4 – Short food supply chains: Individual and structural characteristics

The working time is another characteristic that seems to differentiate farmers according to the marketing strategy implemented. More than 80% of farmers who sell through short food supply chains declare to work more than half time on their farm, 66.83% declare full-time. For other farmers, these rates are respectively 59.14% and 55.80%. The implementation of such marketing strategy seems to require the presence of the farmer. This highlights also that such activity is based on an important working time, and more precisely a farm working time.

3.2.2. Structural characteristics depending on the marketing strategy implemented

The first statistical results confirm that resources available on farms are needed to the implementation of the marketing strategy. The relative importance of workforce and the production diversification seem to confirm this point.

While farmers who sell through short food supply chains employ on average 0.75 AWU (Agricultural Work Unit) per hectare¹, other farmers employ 0.26 AWU per hectare. Hence, this marketing channel appears more workforce-consumers. More precisely, such channel requires more permanent waged workers. As a matter, farmers involved on short food supply

¹ 1 hectare = 2.47 acres

chains have on average 19.68% of their waged workers that are permanent; while it is 10.74% for other farmers. This result confirms that this marketing channel requires not only more waged workers but also more permanent waged workers to answer both productive and marketing activities. Moreover, because this marketing activity is a perennial one, it reinforces the need of permanent waged workers. This result confirms that such activity “perpetuates and creates more jobs, whatever their productive orientation” and that it “uses more waged labour” (Capt and Wavresky, 2014).

The diversification is another indicator considered in our analysis. This indicator is defined as the number of different productions implemented. More precisely, seven main ETO (Economic and Technical Orientation) are defined by the Service de la Statistique et de la Prospective (SSP) whose aim is to perform the census considered². These ETO are: Cereals, market gardening, wine growing, fruits, cattle, sheep and other orientations. This indicator refers to the technical orientation’s diversity. It is a counter of all main orientations implemented on farms. More precisely, a farmer specialized on market gardening that produces vegetables on open field and greenhouse vegetables has a diversification indicator equal to 1. If another farmer produces vegetables on open field and breeds cattle, his diversification indicator is equal to 2. Farms for which all or part of the production is sold through short food supply chains have on average an indicator equal to 2; while it is 1.75 for other farms. Diversifying the production seem to foster the implementation of short food supply chains. Since this marketing channel answers consumers’ requirement, developing several productions lets the producer to offer a more adapted supply. In that sense, the diversification is one of the necessary conditions that let the farmer selling through short food supply chain channels.

These statistics results seem to confirm the importance of both resources and skills to understand the marketing strategy implemented by farmers. Hence, the farms’ potential is key for such implementation. An econometric analysis let appreciate these statistical intuitions and hence evaluate quantitatively each of the relationships described above, all other things remaining equal.

² The SSP is linked to the French Ministry of Agriculture, Agrifood and Forest. It is the observatory of the French rural world.

3.3.Econometric modelling

To understand and appreciate more precisely the determinants of selling through short food supply chains, a logit model is implemented (Table 5). As a matter of fact, the aim is to identify individual and structural factors leading farmers to implement a complementary marketing channel: short food supply chain. More precisely, it lets apprehend to what extend resources and skills available by farmers condition their marketing strategy

Because all farmers sell part of their production through the traditional market, the differentiation is based on the fact that these farmers sell part of their production through another channel. Since near 20% of producers selling through short food supply chains did not indicated the economic importance of this activity on the total turnover, all these farmers are aggregated. The model lets differentiate farmers who sell only their production through traditional market from farmers who sell through short food supply chains, whatever the weight of this activity on the farm's turnover.

Table 5 – The determinants of short food supply chain strategy

Formally, this model can be developed as below:

$$SFSC_i = 1 \text{ if } SFSC_i^* > 0; 0 \text{ otherwise}$$

The decision made by the producer, in terms of marketing channel, is conditioned by a continuous variable, notated $SFSC_i^*$, where:

$$SFSC_i^* = \alpha + \beta Resources_i + \delta Skills_i + \gamma ETO_i + \varepsilon_i$$

With i the individual index that relates to farms.

α is the constant of the model

β, δ are coefficients respectively associated to the item resources and skills

γ is the coefficient associated to ETO to control from all productive orientation effect

ε is the residual term.

The first lessons gained from the econometric model is that more than three fourth of the farmers' behaviour can be apprehended by individual and structural characteristics. The concordant rate highlights that these are the main factors that condition the implementation of a short food supply chain channel. This translates also that external factors, independent from the farms and farmers' specificities, impact this behaviour, but to a lesser extend.

3.3.1. Individual characteristics that condition the marketing strategy

Farmers who sell all or part of their production through short food supply chains are the most invested in their agricultural activity, in terms of working time (Hypothesis 8 validated). A farmer who declares full-time working is four times more likely to sell through this channel, compared to another farmer who declares working less than 25% of his working time. Selling through short food supply chains is based on a need of farmer's investment, whatever the workforce needed to answer the new activity constraint. The presence of the farmer appears to be a key element to implement such marketing strategy, added to the productive one.

Another key element is the farmer's age (Hypothesis 7 validated). Younger farmers are more likely to sell through short food supply chains than older. For younger ones, such marketing strategy appears to be an opportunity. This opportunity is all the more important that this strategy is a long term on based in particular on consumers' loyalty. Furthermore, such marketing strategy is reinforced by the fact that farmer declares working full time on farm.

The level of education, either general or agricultural, has little impact on the marketing strategy implemented by farmer (Hypothesis 6 invalidated). Whatever the level of education, all farmers have quite the same probability to sell through short food supply chains. The only difference observed translates that the more a farmer is educated and the less likely he is to sell through short food supply chains. Implementing such strategy appears to be more likely for less educated farmers. A farmer with a superior agricultural level is 1.5 times less likely to sell through short food supply chains than a farmer who has no agricultural education. Similarly, a farmer with a superior general level of education is 1.2 times less likely to adopt such marketing strategy than a farmer who has no general education.

The main individual characteristics that lead to diversify the marketing channel is the age of the farmer and the time he spends on his farm.

3.3.2. Structural characteristics that condition the marketing strategy

As assumed, structural characteristics condition the marketing strategy implemented by farmers. More precisely, results highlight that farmers who sell through short food supply chains have smallest farms (Hypothesis 1 invalidated). Such marketing strategy can appear to be a long food supply chain alternative since it is more difficult to explore for the smallest ones. In such a case, short food supply chain appears to be a complementary marketing strategy to traditional channels.

Moinet (2010) highlights that *“farms (that sell through short food supply chains) are little area gourmet (and) create employment”*. The econometric model confirms this relationship since the more a farmer has employees per hectare and the more he is likely to sell through short food supply chains (Hypothesis 2 and 3 validated). Similarly, the more the waged workers are permanent and the more such marketing channel is implemented. This result confirms that short food supply chain channels need more workforce and more precisely more permanent workforce. As a matter of fact, to implement it, farmers have to be involved on their farm and to employ permanent workforce to answer productive and marketing activity constraints.

Moreover, results highlight that even if all-agricultural sector implement short food supply chains, some are more likely than others to implement it (Hypothesis 5 validated). Hence, farmers specialized on marketing gardening, wine-growing and fruits are respectively 2.17, 1.97 and 3.3 times more likely to sell through short food supply chains than farmers specialized on cereals. This result confirms that the marketing diversification depends on the nature of the production and the proximity with consumers (Capt and Wavresky, 2014). As a matter of fact, productive orientations that are mainly concerned by such marketing channels correspond to seasonal productions. Their intrinsic characteristics are suitable to this kind of channel since these productions are highly perishable and not storable. Moreover, these productions are located in touristic area that encourages also this kind of marketing channel, reducing the distance between producers and consumers (Capt and Wavresky, 2014). Hence, whatever individual and structural characteristics, the production implemented by producers and their location condition their ability to sell through short food supply chains.

Conclusion

Short food supply chain is an emergent marketing channel due to mainly consumers' increased demand and public authority intervention. This marketing strategy translates into a need for farmers to adapt their management.

Since the 2010 Census of all French farms, results highlight that near 20% of these farms, whatever the production implemented, sell part or all their production through short food supply chains. An important point highlighted by our analysis is the complementary nature of such marketing channel. As a matter of fact, all farmers who sell through this channel also sell a part of their production through the traditional market. Deciding to sell through short food supply chain coincides with a global marketing strategy of diversification.

The analysis performed demonstrates that both individual characteristics of the farmer and structural ones of his farm condition the implementation of such marketing strategy. More precisely, farmers who sell through short food supply chains are younger, even if they are no more educated. The adoption of such marketing channel appears to be independent from any education level, meaning there is no education gap between farmers who sell through short food supply chain and the others.

Moreover, result show that farmers who decide to implement short food supply chains are also more present on their farm. This translates the need for the farmer to involve in this activity. Contrary to enlarging the production implemented, diversifying the marketing channel is based on the physical presence of the farmer on his farm.

Beyond these individual characteristics, the diversification of marketing channel requires the diversification of the production to answer consumers' requirement. As a matter of fact, one of the key factors of the development of such channel is the need to answer consumers' requirement, and one of these requirements is the need to propose them a basket of product that is diversified.

While farmers who sell through short food supply chains have smaller farms, they mobilize more workforce and more precisely more permanent waged workforce. Since this commercial activity differs from the production activity, it requires more workforces. Moreover, because

the implementation of short food supply chains is a perennial activity, it is based on permanent workforce. Hence, such strategy translates into a need to employ more work units, and more precisely permanent work units.

All these results confirm the importance of both resources and skills to understand the implementation of such marketing strategy by producers.

Since short food supply chain can be either a marketing activity alternative and hence a complementary to the productive activity, it would be relevant to appreciate the importance of such activity on the total turnover of the farm. Database let appreciate such rate because around 20 % of farmers who sell through short food supply chain have indicated it. This selection bias prevents us from implementing such delicate analyse. A preliminary analyse would be necessary to characterize farmers who have answered the question and consider to what extend some of the characteristics can explain the relative importance of short food supply chain activity on the total turnover. A transposition of characteristics identified as relevant could let us reconstruct the missing information.

Furthermore, this study could be considered deeper thanks to the farms' evolution. Knowing their trajectories in terms of perennially or economic growth, considering the marketing strategy implemented, could let us appreciate more precisely the impact of such marketing strategy on the farms' dynamics.

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Table 1 – Main short food supply chain channels

		Main marketing channel	
		Repartition	
Direct sales	Farm sales	58,34%	
	Collective point of sales	5,77%	
	Local market sales	22,63%	
	Door-to-door sales	10,36%	
	Mail-order sales	0,48%	
	Basket sales	1,72%	
	Fair and shows sales	0,70%	
	<i>Total of direct sales</i>		<i>81,40%</i>
Indirect sales with one intermediary	Commercial catering	4,18%	
	Collective catering	1,46%	
	Retailers	77,01%	
	Supermarkets and hypermarkets	17,35%	
	<i>Total of indirect sales</i>		<i>18,60%</i>
Total of short food supply chain sales			<i>100,00%</i>

Source: Agreste –2010 Census

Table 2 – Marketing channel and short food supply chain intensity

Rate of short food supply chain activity on the total turnover of the farm					
inf 10%	10% - 50%	50% - 75%	sup 75%	missing information	All
<i>Counter</i>					
24795	17998	8087	32831	18329	102040
<i>Repartition when information is available</i>					
29,62%	21,50%	9,66%	39,22%		100,00%

Source: Agreste –2010 Census

Table 3 – Short food supply chains – Individual and structural characteristics

	Short food supply chain		
	Yes	No	All
<i>Counter</i>			
	102040	414112	516152
<i>Total area</i>			
Average	38,62	58,88	54,94
Standard-deviation	62,78	95,09	90,09
<i>Workforce per hectare</i>			
Average	0,73	0,26	0,35
Standard-deviation	9,86	4,32	5,84
<i>Rate of permanent workforce on total employment (%)</i>			
Average	91,69	95	93,94
Standard-deviation	17,42	15,48	14,36
<i>Productions' diversification</i>			
Average	1,95	1,76	1,8
Standard-deviation	0,99	0,91	0,93
<i>Farmer's age</i>			
Average	49,08	51,48	51
Standard-deviation	11,7	12,4	12,3

Source: Agreste –2010 Census

Table 4 – Short food supply chains – Individual and structural characteristics

	Short food supply chain (counter)			Short food supply chain (Repartition)		
	Yes	No	All	Yes	No	All
<i>Counter</i>						
	102040	414112	516152			
<i>General level of education</i>						
None	25665	82923	108588	25,15%	20,02%	21,04%
Primary	41539	214815	256354	40,71%	51,87%	49,67%
Secondary	14922	4041	18963	14,62%	0,98%	3,67%
Superior	19914	69333	89247	19,52%	16,74%	17,29%
<i>Agricultural level of education</i>						
None	52900	202365	255265	51,84%	48,87%	49,46%
Primary	25011	124325	149336	24,51%	30,02%	28,93%
Secondary	13038	53183	66221	12,78%	12,84%	12,83%
Superior	11091	34239	45330	10,87%	8,27%	8,78%
<i>Farmer time working on farm</i>						
Less than 25 %	10583	103503	114086	10,37%	24,99%	22,10%
25 % – 50 %	9692	43067	52759	9,50%	10,40%	10,22%
50 % - 75 %	7753	22607	30360	7,60%	5,46%	5,88%
75 % - full time	5816	13851	19667	5,70%	3,34%	3,81%
Full time	68196	231084	299280	66,83%	55,80%	57,98%
<i>Economic and Technical Orientation (ETO)</i>						
Field crops	15394	116317	131711	15,09%	28,09%	25,52%
Market gardening	6799	9517	16316	6,66%	2,30%	3,16%
Wine-growing	19354	50608	69962	18,97%	12,22%	13,55%
Fruits	8404	13505	21909	8,24%	3,26%	4,24%
Sheet	14169	108777	122946	13,89%	26,27%	23,82%
Cattle	10544	46129	56673	10,33%	11,14%	10,98%
Others orientations	27376	69259	96635	26,83%	16,72%	18,72%

Source: Agreste –2010 Census

Table 5 – The determinants of short food supply chain strategy

		Short Food Supply Chain		
		Estimation	Odds Ratio	Pr > Khi-2
Constant		-1,9294***		<0.0001
Total area		-0,00848***		<0.0001
Rate of waged workers on total workers		0,00661***		<0.0001
Rate of permanent workers on total waged workers		0,00760***		<0.0001
Diversification		0,2886***		<0.0001
Time spent on farm	Less than 25 % time	<i>Reference</i>		
	25 % - 50 % time	0,8098***	2,25	<0.0001
	50 % - 75 % time	1,3117***	3,71	<0.0001
	75 % - full	1,5769***	4,84	<0.0001
	Full time	1,3697***	3,93	<0.0001
Agricultural level of education	None	<i>Reference</i>		
	Primary	-0,3528***	0,70	<0.0001
	Secondary	-0,1891***	0,83	<0.0001
	Superior	0,0259*	1,02	0,0753
General level of education	None	<i>Reference</i>		
	Primary	0,3937***	0,67	<0.0001
	Secondary	-0,1754***	0,83	<0.0001
	Superior	-0,1696***	0,84	<0.0001
Farmer's age		-0,0153***	0,98	<0.0001
ETO	Cereals	<i>Reference</i>		
	Market gardening	0,7760***	2,17	<0.0001
	Wine-growing	0,6756***	1,97	<0.0001
	Fruits	1,5953***	3,30	<0.0001
	Cattle	-0,3483***	0,71	<0.0001
	Sheep	0,2553***	1,29	<0.0001
	Others orientation	0,5687***	1,77	<0.0001
Number of observations		506 663		
Correctly classified		74,60%		

Significant at 1% (***), 5% (**) et 10% (*)