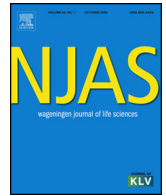




Contents lists available at ScienceDirect

NJAS - Wageningen Journal of Life Sciences

journal homepage: [www.elsevier.com/locate/njas](http://www.elsevier.com/locate/njas)



Research paper

## Price risk perceptions and management strategies in selected European food supply chains: An exploratory approach

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### ARTICLE INFO

#### Article history:

Received 1 June 2015

Received in revised form 2 November 2016

Accepted 17 November 2016

Available online xxx

#### Keywords:

Price risk

Perceptions

Management strategies

European union

Exploratory

Interviews

Food supply chains

### ABSTRACT

Agricultural prices in European food markets have become more volatile over the past decade exposing agribusinesses to risk and uncertainty. This study goes beyond the farm stage and explores through interviews the price risk perceptions and management strategies in multiple stages of the food supply chain. Respondents were farmers, wholesalers, processors, and retailers in six European food supply chains. Results show that price risk management strategies in EU food chains are diverse and well beyond traditional instruments such as futures and forward contracts. We further find that deviations of prices by more than 10–15% from expected levels were perceived as price volatility by a majority of the chain actors. This study provides new insights on price risk management, a deeper understanding of price risk perceptions and highlights the interrelation of price risk management decisions with other business decisions.

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### 1. Introduction

Prices in European agricultural markets have become increasingly volatile in the past decade [1]. The decoupling of farm income supports through successive reforms of the Common Agricultural Policy has led to a market oriented EU (European Union) farm sector that is increasingly exposed to market price volatility [2]. Price volatility implies uncertainty which may in turn lead to reduced investment in productive inputs and reduced supply by farmers [3–5]. The negative effects of price volatility also extend to actors in the downstream stages of food supply chains. According to a report by Rabobank [6], the downstream stages of the food supply chain are increasingly faced with price and supply uncertainty and are obliged to alter their sourcing strategies to mitigate the negative effects. Food security of consumers spending a large share of their income on food is also threatened by price volatility (Hernandez et al.) [7]. The above assertions suggest that managing the risk from price volatility should be done at all levels of the food supply chains.

Risk perception and management among farmers has been extensively investigated within the current literature (see for instance Martin [8], Meuwissen [9], Hall et al. [10], Bergfjord [11]). Although the literature found that farmers perceive price risk as an important source of agricultural risk, it failed to explore the price risk management strategies farmers adopt in practise. This is because the studies relied on structured questionnaires that pre-specified strategies instead of asking farmers which strategies they use in practise. The pre-specified strategies are in general limited to traditional instruments such as hedging in derivative markets, forward contracts, and diversification. To our knowledge, the studies by Heyder et al. [12] and of von Davier [13] were the only ones that addressed price risk and its management in downstream stages of the food supply chain. Similar to the farm level studies, these two studies also failed to explore actual price risk management practises as they also relied on structured questionnaires. Furthermore, the structured questionnaires generally ascribe a particular strategy to a particular source of risk (e.g. futures contracts for volatile prices) [14]. This undermines the discovery of other strategies that would not normally be considered solutions to that particular source of risk while they could in fact be solutions. A more open-ended exploratory approach to data collection could uncover price risk management strategies previously unexplored in previous quantitative studies.

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<http://dx.doi.org/10.1016/j.njas.2016.11.002>

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Although assessing farmers' risk perception in a categorical and quantitative manner is analytically convenient, it is unnatural for farmers to think about risk in this manner [14]. Price risk perception can be better understood with more open-ended approaches to data collection. Although it is generally agreed that price volatility implies risk, it is not clear whether it is perceived as such by food chain actors. This paper will explore through forty-two semi-structured interviews the price volatility perceptions and management strategies of farmers, wholesalers, processors and retailers in six EU food supply chains. The six chains are the Bulgarian wheat, French wheat, German pork, Dutch cheese, Dutch tomato, and Spanish tomato supply chains. Actors' price risk perception is explored with respect to two elements. The first is the percentage price deviation from expected values which actors perceive as price volatility. The second element concerns the factors that determine whether perceived price volatility is perceived as risky. Exploring actors' perceptions of price risk helps to better understand actors' choices of price risk management strategies.

The benefits of qualitative exploratory research for the field of agricultural risk management are demonstrated in this study. By qualitatively exploring food chain actors' price risk management strategies, this study informs quantitative risk management research on previously unexplored and non-traditional price risk management practises. Future studies can then investigate the adoption level of the explored strategies through large scale surveys that use an up-to-date list of price risk management strategies in their questionnaires. The usefulness of comparative methodological approaches in risk management studies are further demonstrated in this study. The comparison of perceptions and strategies across different food chains and different stages of the chains highlights the context specific nature of price risk management. Findings of this research are also informative to policy makers. Chain actors' price risk perceptions can help define 'excessive' level of price volatility needed for policy intervention. On the other hand, gaps in the identified strategies inform policy makers of where in chain policy intervention is needed.

In the remainder of this paper, section 2 briefly discuss related agricultural risk management researches, section 3 details the methodological approaches used in this study, section 4 presents the results and section 5 discusses the results. Section 6 concludes the study and draws research and policy implications.

## 2. Previous research

Previous research on risk perceptions and management strategies in the agricultural sector has mainly focused on the farm stage. Wilson et al. [15] defined risk perception as "the awareness of the factors in the social and economic environment that create risk and the degree to which one factor is more critical than the other". This definition is shared by most of the studies that investigated farmers' risk perceptions. The methodological approach these studies followed is to list a set of possible sources of agricultural risks and ask farmers to rate the importance of each source of risk using Likert scales (for instance, Martin [8], Meuwissen et al. [9]; Hall et al. [10], Bergfjord [11], Wilson et al. [15], Patrick et al. [16], Knutson et al. [17], Greinier et al. [18]). A common finding of these studies is the high score that farmers assign to price risk (for instance, Meuwissen et al. [9], Bergfjord [11], Wilson [15], Patrick et al. [16], Knutson et al. [17]). The inconsistency in the terminologies the authors use to define price risk reflects, nevertheless, a lack of agreement about what price risk really is. A precise definition of price risk is not provided by the literature. Authors that use the term "price risk" also use the terms "price variability" (Knutson et al. [17]; Patrick et al. [16]) and "declining prices" (Greinier et al. [18]) and rising "input costs" (Greinier et al. [18]) interchangeably.

The above cited studies adopted a similar approach to assess farmers' risk management strategies. Farmers were presented with a list of pre-specified risk management strategies and asked to rate the importance or the relevance of each strategy using Likert scales. The main price risk management strategies these studies considered were forward contracts, futures and options, and off-farm and on-farm diversification. The scores assigned to the risk sources and those assigned to the risk management strategies were then compared. Surprisingly, many authors did not find a match between the score assigned to price risk and those assigned to the considered price risk management strategies (for instance, Martin [8], Meuwissen et al. [9], Hall et al. [10]; Bergfjord, [11]). Although price risk ranked at the top of the list of risk sources, the importance or relevance scores assigned to the listed price risk management strategies were unexpectedly low. This raises the question whether the strategies considered are indeed the strategies farmers adopt to deal with price risk. The generic categories of risk management strategies provided in the questionnaires and/or the limited knowledge on available risk management strategies restrict the identification of the possible set of strategies that farmers use in practise.

The only two studies that investigated the price risk perceptions and management strategies of actors downstream from the farm stage are those of Heyder et al. [12] and von Davier [13]. Heyder et al. [12], who surveyed German agribusiness firms, used actors' expectations of price volatility developments in the next five years as a measure of perceived price risk. Similar to farm-level studies, a set of pre-defined price risk management strategies were presented to the actors who then had to evaluate the relevance of each strategy using Likert scales. The study by von Davier [13] relied on a media content analysis to identify perceptions about causes and developments of price risk and suggested management strategies. A limitation of both studies is that they failed to explore actual management strategies adopted by firms. Another limitation is that these studies did not investigate the actual levels of price volatility that chain actors perceived as risky.

In summary, previous research provides limited evidence on actual price risk perceptions and management strategies in the chain. The downstream sector of the chain has remained overlooked in previous research, as the focus has been mainly on the farm sector. These gaps in the literature are addressed in this research by following an exploratory methodological approach and by including the downstream stages of the chain in the analyses.

## 3. Materials and methods

### 3.1. Exploration through in-depth interviews

Exploration is used as a methodological approach "when a group, process, activity or situation has received little or no systematic empirical scrutiny or has been largely examined using prediction and control rather than flexibility and open-mindedness" [19]. Previous research has given little attention to the price risk perceptions and management strategies of actors in food supply chains. At the farm stage, the structured nature of the questionnaires distributed to farmers restricts the identification of the set of strategies farmers adopt in practise. An exploratory approach was therefore deemed appropriate to investigate chain actors' price risk perceptions and management strategies.

Data was collected using in-depth interviews with semi-structured questions. Some structure was imposed on the questions to guide the interview process and keep the focus on the key topics that were the subjects of the investigation. The imposed structure also assured some consistency in the questions across respondents. The questions, nevertheless, allowed some room for probing

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