Ecological Economics 70 (2011) 1406–1414

Contents lists available at ScienceDirect

Ecological Economics

journal homepage: www.elsevier.com/locate/ecolecon

Analysis

Adoption of organic farming: Are there differences between early and late adoption?

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ARTICLE INFO

Article history:
Received 14 September 2010
Received in revised form 21 February 2011
Accepted 1 March 2011
Available online 30 March 2011

Keywords:
Organic farming
Early and late adoption
Multinomial logit analysis
Farmer attitudes

ABSTRACT

Based on the fact that not all farmers adopt a technology at the same time, it is argued in this paper that the distinction between groups is important because early, medium and late adopters respond differently to economic and non-economic factors when they consider whether to take up organic farming or not. The individual effects on adoption between the groups are identified by the use of multinomial logit analysis. The results provide evidence that there are significant differences in the characteristics between the adopter groups. The findings also reveal that the factors that affect adoption play a different role for early, medium and late adopters, particularly with regard to farming intensity, age, information gathering as well as attitudes of the farmer. More specifically, early adopters were the youngest to adopt organic farming and their decisions were found to be less profit related compared to other groups. Late adoption is constrained by risk considerations, while environmental attitudes and social learning were identified to be important determinants for all adopter groups. Overall, the findings strongly suggest, that for policy measures to be effective, the current state of diffusion has to be taken into account.

1. Introduction

Organic farming is considered by some to offer solutions to the problems associated with conventional agriculture such as biodiversity loss, nitrate pollution, animal welfare concerns, surplus production or food safety (Häring et al., 2004; Lampkin, 1994; Lynggaard, 2006; Rigby et al., 2001; Van Mansvelt and Mulder, 1993). Thus, the promotion of organic farming has become an essential element of the Common Agricultural Policy (CAP) and several European Member States are eager to increase the size of their organic sectors. This began with the MacSharry reform[1] in 1992, which first introduced payments for environmentally friendly farming (including organic farming). Next, the Mid Term review of Agenda 2000 concluded in 2003 with a fundamental reform that involved decoupling of payments from production (CEC, 2002). This encourages extensive farming, therefore further supporting the switch to organic farming. However, regardless of substantial policy support, the organic sector still represents only a small portion of the total utilizable agricultural area (UAA) in most European countries, averaging 4% at the end of 2007 (Willer et al., 2009). Nevertheless, organic farming has been available to the farmer long before it received policy support. Thus, it is crucial that the current diffusion of the sector is accounted for when attempting to explain uptake decisions.

For organic farming to be effective, policy makers require an understanding of what persuades conventional farmers to switch to organic farming. Organic farming shares similarities with other agricultural technologies in terms of the adoption and diffusion process. The uptake of new technologies or farming practices has attracted considerable interest over the years. Hence, there is a vast literature on the adoption and diffusion of technologies in agriculture (Feder et al., 1985). Nevertheless, the majority of these studies tend to focus on the classic comparison between adopters and non-adopters of a technology (e.g. Burton et al., 2003; Dadi et al., 2004; DeSouza Filho et al., 1999), with very few empirical studies investigating differences between early and late adoption of new technologies in general and organic farming in particular.

Initially, rural sociologists studied the diffusion of technologies. Cumulative adoption was described with an S-shaped curve which results from the fact that only few farmers adopt the new technology in the early stage of the diffusion process (Rogers, 1962). At this stage, only a minority of farmers have acquired full information about the potential advantages of the technology, hence the pace of adoption is slow. Moreover, fear of possible risks associated with the new technology enhances farmers' reluctance to adopt. However, the degree of risk reduces as more farmers adopt, so that the rate of adoption increases. Adoption increases gradually and begins to level off, ultimately reaching an upper ceiling. Obviously, not all individuals in a social system adopt a technology at the same time and based on that, Rogers (1962) divided adopters into five adopter groups: innovators, early adopters, early majority, late majority and laggards. In describing the characteristics of these groups, he suggested that differences exist between adopters at different stages of the distribution curve.

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[1] The MacSharry reform was the first major reform of the CAP. The main implication of this reform was the reduction of the level of price support for a number of commodities, while farmers were compensated for the resulting loss in income through increased direct payments (Bromley and Hodge, 1990).

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doi:10.1016/j.ecolecon.2011.03.002

Against this background, this study investigates differences between early, medium and late adopters of organic farming and more importantly, whether the factors affecting uptake changed with ongoing diffusion influenced by policy support. The identification of these determinants aims to contribute to an improved understanding of the adoption process and the findings can thereby help to promote the adoption of organic farming.

Section 2 gives a brief overview of the organic sector in Ireland; Section 3 provides a review of relevant literature. Section 4 outlines the underlying research hypotheses, while Section 5 explains the use of a multinomial logit model in the context of early, medium or late adoption of organic farming. Section 6 describes the data set, followed by the presentation and discussion of the results in Section 7. Finally, Section 8 provides some concluding remarks.

2. Development of Organic Farming in the Republic of Ireland[2]

Most of the Directives that followed Ireland's entry into the EEC in 1973 concentrated on stimulating agricultural output and supporting farm incomes (Emerson and Gillmor, 1999). The rural economic and social benefits brought about by the modernisation of Irish agriculture were substantial but there have also been detrimental impacts on the rural environment (Bleasdale and Sheehy-Skeffington, 1995). However, from the early 1980s the CAP has been under increasing public pressure to reform its protectionist policies due to huge budgetary costs, negative welfare measures, distortionary effects on international trade and high environmental costs (European Commission, 1997). This has lead to a process of agricultural reforms which has introduced measures to curb surplus production and protectionist policies, initiated measures to fully decouple income support to farmers from price support to direct income support and the CAP now includes a number of agri-environmental measures (Brouwer and Lowe, 2000; Buller, 2000; Buller et al., 2000; Lowe and Brouwer, 2000).

Agri-environment schemes were developed in order to encourage farmers to farm in an environmentally-friendly way in exchange for financial compensation for environmental practices. The main scheme in Ireland is known as the Rural Environment Protection Scheme (REPS) which was introduced in response to the MacSharry reform (Regulation 2078/92). The financial support of organic farming is included as a supplementary measure, which implies that it was compulsory for a farmer to join REPS in order to receive organic subsidy payments.

The Irish organic sector was very small during the 1980s and early 1990s, and up until recently the sector has developed without a significant contribution from advisory or educational services. Two policy interventions played an important part in enhancing the development of organic farming in Ireland. First, the sector experienced a significant growth after the introduction of organic support payments for conversion and ongoing organic production in June 1994 by way of the REPS scheme. Second, the decoupling of payments from production which was introduced in Ireland in January 2005 encouraged extensive farming, thus further supporting the switch to organic farming. Recent figures indicate that growth is still ongoing. For example, organic farm numbers increased from 1102 in 2007 to 1315 organic farms in 2009 (DAFF, 2009). Further, the Irish government set a target of 5% of the UAA dedicated to organic farming by 2012; but while currently there is 1.2% of the UAA in organic farming, only about a quarter of the target diffusion rate has been reached.

The small scale of the Irish organic sector is somewhat surprising considering the low intensity of Irish conventional farming in comparison with elsewhere in Europe. Moreover, the typical conventional systems of beef, sheep and dairy production in Ireland are most often extensive and mainly grass-based. Therefore, many beef and sheep farmers in particular could easily adjust to organic production with relatively little entry costs and alterations in farm management or agronomic practices (Reidy, 2006). Hence, it is not surprising that the majority of organic farms in Ireland are engaged in cattle and/or sheep (drystock) farming. Therefore this analysis focuses on drystock farmers since significant numbers, necessary for an empirical analysis, can be found in this sector. However, the combination of low uptake rates and expected easy adjustment to organic practices underlines that the adoption of organic farming is not well understood, which further highlights the need to conduct a study such as this one.

[2] This study focuses on the Republic of Ireland only, thereafter referred to as Ireland.

3. Development of Relevant Literature

Early research of technology uptake focused on the diffusion process and was undertaken initially by rural sociologists. Ryan and Gross (1943) and Rogers (1962) conducted studies on the diffusion of hybrid corn in Iowa. They observed the S-shaped adoption curve and identified networks of information exchanges between adopters and non-adopters as critical for the diffusion process. The results were used by extension agents to promote new technologies and Ruttan (1996, p.56) claims that "one of the remarkable aspects of the technology diffusion studies by rural-sociologists was how rapidly the results were utilized by practitioners." Successful agricultural extension can help to overcome the gap between newly invented technologies and changes in the farmer's field. That is, extension specialists supply farmers with the required knowledge, thus assisting in a shift to more efficient production techniques and thereby enhancing the diffusion process of technologies (Birkhaeuser et al., 1991). This process is particularly important in the early stages of the diffusion process. For example, Wozniak (1987) found in his study of early adoption of the cattle feed additive monensin sodium (a feed additive to improve feed efficiency) that education and information on the new technology are very important factors for early adoption. Further, Valente (1996) stresses the effect of social networks in the diffusion of technologies. More specifically, a person's time of adoption is thought to be associated with the proportion of adopters in the social system, and therefore connected to the proportion of adopters in the person's individual network.

Due to the observation that not all farmers adopt a new technology at the same time, the diffusion of an innovation follows an S-shaped curve of cumulative adopters and essential differences among farmers can explain this phenomenon (Rogers, 1962). Initially few innovators start using the technology. They are characterized as venturesome, have strong social ties with other innovators but may not be respected by other members in the social system. In addition, they must have the capacity to cope with a high level of risk. The innovators are followed by the early adopters, who are more integrated in the social community and represent a model to follow, which is based on intensive contact with information. The next category, the early majority, comprises of individuals who carefully consider adopting a new idea and, unlike early adopters, rarely have a leadership position. The late majority tends to remain sceptical about the new technology and will wait until the technology is more widely diffused. The last category, the laggards, has traditional values and tends to be the slowest to adopt.

This highlights the need to incorporate changes in characteristics of adopters when attempting to explain the uptake of a technology. In order to understand what causes or constrains the adoption of new technologies, several researchers have examined the influence of various determinants on adoption decisions. Hence, there is a vast literature on technology adoption in agriculture. However this is mainly based on the classic comparison between adopters and non-adopters (e.g. Dadi et al., 2004; D'Emden et al., 2006; Feder and Slade, 1984; Sheikh et al., 2003). Compared to the large amount of literature on technology adoption, few empirical studies distinguish between early and late adopters, despite differences among adopter groups over time being well acknowledged in the literature (e.g. Feder et al., 1985; Rogers, 1995). One of the few examples is a study by Barham et