

## Extended Abstract

Paper  
Title

### Impact of Membership of Dairy Participatory Extension Group on Farm Income: An Application of a Difference-in-Differences Coarsened Exact Matching Approach

Abstract prepared for presentation at the 96<sup>th</sup> Annual Conference of the Agricultural Economics Society, K U Leuven, Belgium

4<sup>th</sup> – 6<sup>th</sup> April 2022

<b>Abstract</b>	<i>200 words max</i>
<p>This paper evaluates the impact of membership of the dairy Business Development Groups (BDG), a participatory extension programme in Northern Ireland on the gross margin performance of participating farmers relative to non-participants. The study employs a difference-in-differences exact coarsened matching approach, which is a novel application of the conditional difference-in-differences analytical techniques and also contributes to the literature on the impact of participatory extension programmes on farm income. The results of the study have practical implications for the design of participatory extension programmes as it provides robust evidence to inform policy development around the area of participatory extension programmes. It also supports the design of efficient agricultural education and extension systems that incorporates the ideas of the farmers themselves through peer-to-peer learning thereby maximising the economic and social benefits accruable from such programmes.</p>	
<b>Keywords</b>	Impact assessment; Participatory extension; Conditional difference-in-differences; Matching; Business Development Groups; Northern Ireland
<b>JEL Code</b>	Agricultural R&D; Agricultural Technology; Biofuels; Agricultural Extension Services-Q16
<b>Introduction</b>	<i>100 – 250 words</i>
<p>Northern Ireland as a country has historically delivered extension services on an advisor to farm, one-to-one basis using a top down approach. However, this approach has limitations in terms of the extent of its coverage to farmers and its inability to account for the current, more complex agricultural production environment which requires more responsive and innovative approaches. In a bid to improve economic performance at farm-level through fostering competitiveness of agriculture and ensuring the sustainable management of resources in March 2016, the Northern Ireland College of Agriculture, Food and Rural Enterprise (CAFRE) adopted a new approach to advisory service provision for farmers namely; Business Development Groups (BDG's). The BDG is a knowledge transfer scheme which forms part of a wider programme, the Farm Business Improvement Scheme (FBIS), part funded by the EU through Pillar II of the Northern Ireland Rural Development Programme 2014–2020. The</p>	

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objective of this study is to evaluate the impact of membership of the dairy BDG's on the gross margin performance group members using a difference-in-differences coarsened exact matching approach.

**Methodology**

*100 – 250 words*

The study employs the conditional difference-in-differences coarsened exact matching approach. The methodology combines a non-parametric matching estimator with a difference-in-differences analytical technique to obtain a robust and valid estimate of the causal effect of BDG membership on dairy farmers' gross margin performance. The approach is attractive because it is able to control for unobserved time invariant factors and at the same time reduce selection bias that arise with simple comparisons. Selection bias is alleviated when a treatment unit is matched with control units that are as similar as possible in observable characteristics that are critical to programme participation and to the subsequent outcome. In addition, the use of the Coarsened Exact Matching (CEM) approach, which is a monotonic imbalance-reducing matching method, means that the balance between the treated and the control groups is chosen by ex-ante user choice and eliminates the need for a separate procedure to restrict data to common empirical support, meets the congruence principle and is robust to measurement error.

**Results**

*100 – 250 words*

The results of the descriptive analysis stratified by treatment status showed statistically significant differences in socio-economic and farm characteristics between farmers participating in the BDG programme and non-participants. In terms of the impact of the BDG programme on farm gross margin performance, the results of the analysis shows that membership of the dairy BDG group has a positive and statistically significant impact on farm gross margin performance.

**Discussion and Conclusion**

*100 – 250 words*

In this study, we analysed the impact of membership of the dairy Business Development Groups on farm income by employing the conditional difference-in-differences coarsened exact matching approach. This study provides a novel application of the conditional difference-in-differences analytical techniques and also contributes to the literature on the impact of participatory extension programmes on farm income. The results have practical implications for the design of participatory extension programmes as it provides robust evidence to inform policy development around the area of participatory extension programmes. It also supports the design of efficient agricultural education and extension systems that incorporates the ideas of the farmers themselves through peer-to-peer learning thereby maximising the economic and social benefits accruable from such programmes.

