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The Happy Farmer: The Effect Of Non-Pecuniary Benefits On Farmers' Behavior

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Abstract: I test empirically the relationship between farmers' perceptions of the non-pecuniary benefits from farming with a variety of field behaviors such as disinvestment, production, diversification and off-farm labor market participation. Results suggest that non-pecuniary benefits have an important influence on a wide range of farmer activities. While costs and returns are clearly important, I suggest that non-pecuniary benefits may make some choices more attractive than others which may be more rewarding financially.

Keywords: disinvestment; diversification; farmer behavior; non-pecuniary benefits; off-farm labor; production

JEL Classifications: Q1 and Q12

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The Happy Farmer: The Effect Of Non-Pecuniary Benefits On Farmers' Behavior

A central assumption underpinning most economic models is that agents maximize simple objective functions; consumers maximize expected utility and firms maximize expected profits. The argument for this assumption is not that it leads to perfect descriptions of behavior, but that it leads to reasonably good approximations in most instances (Romer 2006). Given that utility is a difficult concept to measure, agricultural economists have often made the simplifying assumption that money can act as a substitute for utility. This has led to the assumption in many mathematically based economic models that all farmers are profit-maximizers (Edwards-Jones 2006). The idea that farmers always make decisions that maximizes their profits does not marry with actual observed choices by farm operators. Examples abound in the literature of instances where farmers' exhibit behavior that would be against their financial self-interest. For example, it has been widely observed that farmers often engage in loss-making production strategies (O Donoghue and Howley 2012), exhibit disinvestment reluctance even when land prices are significantly higher than the annualized returns (Musshoff et al. 2013) and allocate more time to on-farm labor even in the face of greater returns in the off-farm labor market (Key and Roberts 2009).

One explanation for these sub-optimal financial behaviors is that while business related motivations such as maximizing profits will be important to farmers, it may not in many instances be their sole motivation for farming. For example, there is a rich literature supporting the importance of social and psychological influences in farmer decision-making. This research suggests that farmers seek to balance economic, social and lifestyle goals (Gasson 1973; Darnhofer, Schneeberger, and Freyer 2005; Karali et al. 2014). Some farmers may place profit maximization low on their list of priorities and for many, farming is a vocation that is valued in itself (Ackerman, Jenson, and Bailey 1989; Herrmann and Uttitz 1990; Willock et al. 1999a; 1999b; Maybery, Crase, and Gullifer 2005). In other words, farmer's farm for reasons other than just maximizing profit and a myopic view of the profit maximization goal as driving farm decisions may misrepresent farmers' behavior.

Ruth Gasson's classic study in 1973 identified four broad 'value orientations' that were important for farmers. These were 'instrumental' (make money, expanding the business), 'social' (maintaining a tradition), 'expressive' (creativity) and 'intrinsic' (enjoyment of work tasks, lifestyle preference) (Gasson 1973). Following on from this work, much recent

research suggests that there are distinct behavioral categories or typologies of farmers with some driven more by economic motives, while others are driven more by social, lifestyle or family objectives, with varying degrees of interaction between them (Willock et al. 1999a; 1999b; Maybery, Crase, and Gullifer 2005). While this research, which is essentially descriptive or qualitative in nature, suggests that farmers are partly influenced by both non-pecuniary as well as pecuniary factors, there is very little insight available on the relative contribution of perceptions relating to the non-pecuniary benefits on specific farmer behaviors.

The precise assessment of the role of non-pecuniary benefits on farmer decision-making has been problematic because it is faced with the problem of dealing with unobservable variables. While often recognized as being important, economic models of farm behavior rarely include explicit recognition of non-pecuniary benefits that might accrue to farmers, as they are not considered tractable. In this study, I derive variables representing farmers' perceptions of the non-pecuniary benefits from farming, by presenting them with a number of attitudinal statements reflecting a wide range of non-pecuniary, as well as pecuniary benefits from farming. I then use factor analysis to reduce this dataset to a number of latent constructs, reflecting the degree to which farmers in our sample are likely to receive different types of benefits from farming, both pecuniary and non-pecuniary. Logistic regression is then employed to examine the association between these latent constructs on a range of important real world farmer behaviors.

Thus, this study makes a number of new contributions to the existing literature. First, while much previous research has identified that non-pecuniary benefits of farming are important to farmers, there has been little empirical work in testing the effect of perceptions relating to non-pecuniary benefits on real world farmer behaviors. Second I derive constructs that reflect farmers' perceptions towards different types of non-pecuniary benefits from farming. This is used to ascertain not just whether non-pecuniary benefits have an effect, but also which types of non-pecuniary benefits are relevant for explaining specific types of farmer behavior. Findings suggest that perceptions relating to non-pecuniary benefits have a multidimensional structure, and that non-pecuniary benefits have an important role to play in understanding farmers' behavior across a wide range of activities.

Non-Pecuniary Benefits from Being Self-Employed

Economists have long been interested in measuring the value that workers place on various non-pecuniary attributes associated with their job. A wide range of studies have shown that the self-employed are, on average, more satisfied with their jobs than the organizationally employed (Weaver and Franz 1992; Blanchflower and Oswald 1998; Hundley 2001; Finnie, Laporte, and Rivard 2003; Benz and Frey 2008a). Hamilton (2000), for example, examined differences in the earnings distributions of self-employed workers and paid employees. They find that most self-employed workers enter and persist in business despite both lower initial earnings and lower earnings growth. Their findings support the idea that self-employment offers substantial non-pecuniary benefits such as "being your own boss", for many workers.

Benz and Frey (2008b) compare how satisfied both self-employed and employed persons were with their work across 23 countries. They find that the self-employed are substantially more satisfied than employed persons not only for Western European, North American and former communist Eastern European countries, but largely also for countries with a non-western cultural background. Their analysis indicates that individuals attach a substantial value to self-employment, not because it is associated with greater earnings. Rather it is preferred because self-employment provides greater autonomy of choice. Similarly in a US study, Hundley (2001) find that a substantial portion of the difference in job satisfaction levels is due to the independence of the self-employed from the routines and constraints of organisational life. Using the Panel Study of Entrepreneurial Dynamics, Hurst and Pugsley (2010) show that a majority of small business owners report that non-pecuniary benefits such as being one's own boss and flexibility over when one works were the principal reason that they started their business.

Being a farm operator also offers greater autonomy of choice, but there are likely to be a number of other non-pecuniary benefits that are of relevance to farming that may not be observable, at least to the same degree, in other types of self-employment. These include benefits such as working outdoors and more generally perceived lifestyle benefits from living in a rural area. There exists some, albeit limited, empirical support for the existence of significant non-pecuniary benefits from farming. One influential study by Key and Roberts (2009) compared returns for on-farm and off-farm work for the same households. Using data from three farm household surveys, the authors found a large differential between the on farm and off-farm hourly wage rate which as the authors outline, suggests the possibility of

substantial non-pecuniary benefits from farming. Key (2005) used data from a U.S. national survey of hog producers to estimate the premium a farmer would pay for the non-pecuniary benefits associated with independent production as opposed to under a production contract. They find that farmers place a significant premia on the attributes of independent production, and that the benefits to farmers from contracting may be overestimated if the non-pecuniary benefits enjoyed by independent producers are not accounted for.

Survey Design

The data used in this study comes from a cross sectional survey of 364 principal farm operators in County Offaly in Ireland, conducted over 12 weeks between January and April 2013. A quota controlled sampling procedure was followed to ensure that the survey was broadly representative of the farming population in Ireland along key dimensions such as farm size and farm type. In the survey questionnaire, respondents were read out a list of 20 statements and asked to state how much they agreed or disagreed with these on a scale from 1 (completely disagree) to 7 (completely agree). The statements drew on a variety of previous work (see Helbling 1996; Willock et al. 1999a; 1999b, Maybery, Crase, and Gullifer 2005; Howley, Dillon, and Hennessy 2014) and are designed to cover a wide range of both non-pecuniary as well as pecuniary benefits from farming that are encountered by farmers in Ireland (see table 1). Sample items were as follows: *I enjoy farming much more than other potential sources of employment, I believe being your own boss is the best thing about farming, Growing up on a farm is great for children* and *I make a good living from farming*. Using exploratory factor analysis, this data was reduced to a number of latent constructs reflecting farmers' perceptions towards distinct categories of non-pecuniary as well as pecuniary benefits from farming.

Logistic regression was employed to examine the association between these latent constructs (factor variables) with disinvestment, production, diversification and labor allocation decisions. The rationale for choosing these activities is that they are all areas where it has been widely reported that farmers' behavior depart quite significantly from what can be regarded as profit or income maximizing, and one potential explanation is due to non-pecuniary returns. When it comes to disinvestment and production behavior, farmers often persist in farming for far longer than what would be predicted by examining farm returns and often engage in loss-making production (Moss and Katchova 2005; Howley et al. 2012; Musshoff et al. 2013). Similarly, studies into off-farm labor allocation choices have revealed

that many farmers allocate additional labor on farm, even in the face of greater returns in the off-farm labor market (Key and Roberts 2009).

I ran 4 separate logistic regression models each with the same set of control variables. The dependent variable in each logistic regression model took a value of one if the farmer reported that they engaged in that specific activity, i.e. 1.) intend to increase output over the next 3 years or 2) intend to still be farming in 10 years time, 3) participate in off-farm employment or 4) have diversified their farm business over the last 7 years (see table 2). As such, I analyze the relationship between non-pecuniary benefits with reported past behavior as well as farmers' future intended behavior. The control variables included in each regression model reflect differences in farm structural characteristics (e.g. farm size, farming system and farm income) and also personal background variables such as age, education, number of full-time farm workers on the farm and whether the principal farm operator has an identified farm successor. These are all variables which have been shown to be significantly associated with a range of farmer activities.

Results

Table 1 presents the overall mean scores associated with each of the attitudinal statements, designed to assess farmers' perceptions relating to the benefits from farming. The two statements that drew the highest mean score refer to the benefits of either raising children on a farm or in a rural environment. Other statements that attracted a strong level of agreement from farmers relate to the peace and quiet associated with farming and benefits from working outdoors and owning their own land. The statements that attracted the lowest mean scores were those that reflected the pecuniary benefits from farming.

Insert table 1 here

Insert table 2 here

Factor Analysis

A number of tests were applied to determine the suitability of respondents' answers to these attitudinal statements for factor analysis. The Kaiser-Meyer-Olkin measure of sampling adequacy was 0.907 indicating that the data matrix has sufficient correlation to justify the application of factor analysis (Kaiser 1974). Additionally, using Bartlett's measure of Sphericity we can reject the null hypothesis that the correlation matrix is an identity matrix and accept the alternative hypothesis that there is a significant relationship between the variables ($p < .0001$). Next I conducted an exploratory factor analysis on the 20 attitudinal

statements, to identify the number of latent constructs and underlying factor structure of responses to these statements. The factor analysis of the 20 attitudinal statements resulted in three factors with an eigenvalue greater than one and therefore I retained three factors for further analysis. The three factors combined explained 51 percent of the variation in respondents' response patterns to these statements. Some statements were strongly correlated with more than one factor, but generally speaking we can see a clear division of attitudinal statements with high loadings across the three factors (see table 3). These three derived latent constructs reflect farmers' perceptions of the various benefits from farming.

The statements that had high loadings for factor 1 were mainly associated with the social and lifestyle benefits from farming. Examples of such statements include those which outline the benefits of farms for raising children and the benefits from social interaction with other farmers, and within the wider rural community. Also important were statements reflecting the benefits from owning their own land and being their own boss. As such, I label this factor variable as '*social and lifestyle*'. The statements that had high loadings on factor 2 were related with the non-pecuniary benefits derived from farm work. Example statements include*: Farm work is more enjoyable that other employment* and *I love working outdoors*. This factor variable was labelled as '*farm labor*'. Farmers appear, therefore, to make a distinction between two categories of non-pecuniary benefits; one that relates to the wider social and lifestyle benefits from farming and another that relates more specifically to the enjoyment of farm labor per se.

The final factor variable reflects farmers' perceptions of the pecuniary benefits from farming and consequently this variable was labelled as '*pecuniary benefits*'. The survey asked farmers to report what capital return they made from their farm business.[1] Farmers were also asked to indicate to what extent they thought farming provided them with a good living over the last 3 years.[2] I tested the association between the construct *'pecuniary benefits'* with both of these variables and found a significant and substantive positive relationship (spearman's rho = 0.46 and 0.49 respectively). This positive relationship provides a good indication that the derived variable '*pecuniary benefits'* accurately represents farmers' perceptions relating to the pecuniary benefits from farming. There is a high degree of consistency in responses to the attitudinal statements used to derive the measures of perceptions relating to pecuniary and non-pecuniary benefits as indicated by a Cronbach's Alpha of 0.867 (social and lifestyle), 0.878 (farm labor), and finally 0.814 (pecuniary benefits). The higher a farm operator's score

on each of these factor variables, then the higher their overall level of agreement with the statements that make up that factor.

Insert table 3 here

Model Results

Using logistic regression, I examined the association between the latent constructs reflecting farmers' perceptions of the pecuniary and non-pecuniary benefits from farming on a range of real world farmer behaviors. Logistic regression models imply a non-linear relationship between the explanatory variables and the dichotomous dependent variable. Under this specification, the coefficients cannot be directly interpreted with any substantive meaning. Effects for the logit model can, however, be interpreted in terms of changes in the odds by taking the exponential of both sides of our equation (see Long and Freese (2006) for a more detailed explanation). We can interpret the exponential of the coefficient as follows: for a unit change in the independent variable, the odds of engaging in the specific behavior (e.g. increasing farm output or participate in off-farm employment) are expected to change by a factor of exp (β_n), holding all other variables constant.

The odds ratios for both a unit and standard deviation change of the independent variables are presented in the regression models. Examining the effect of a standard deviation change is particularly useful when variables have heterogeneous scales as in this study. For ease of interpretation, instead of the multiplicative or factor change I describe the percentage change in the odds of engaging in the specific activity being examined. In what follows, I discuss the results of each of the 4 analytical models in turn. A tolerance test and associated variance inflation factors (VIF) showed no evidence for multicollinearity between any of the model variables (tolerance ranged between 0.51 and 0.94, mean VIF 1.40). Overall the models predict the individual farmer behaviors quite well, as the overall rate of correct classification ranged from 77 to 86 percent in each.

Future Planned Behavior: Intentions to Increase Output

Table 4 presents the results of the logistic regression model of farmers' future production intentions. Approximately 23 per cent of farm operators report that they intend to increase output over the next 3 years. Older farm operators are less likely to report that they intend to increase their agricultural output over the next 3 years. This is in keeping with the life-cycle earnings hypothesis which suggests that younger farmers are more likely to seek to increase agricultural activity, as they would be less financially secure than their older counterparts

(Howley, Dillon, and Hennessey 2014). There is also likely to be a greater desire on the part of older farm operators to 'wind down' as opposed to increase output. Farm income was negatively associated with intentions to increase output. It could be that farms with relatively higher farm incomes could be closer to operating at full capacity, or that farms with higher incomes have less need to consider increasing output in the future.

Moving on to our measures of non-pecuniary benefits, there is a significant and positive association between *'farm labor'* and the probability of farmers reporting that they intend to increase output over the next 3 years. The variable '*social and lifestyle*' was not found to have a statistically significant effect. The difference in the significance of these two variables could be attributable to differences in the effect that increasing output will have on the enjoyment of the specific non-pecuniary aspects reflected by each factor variable. The intuition is as follows: Farmers will to a large extent enjoy the same level of '*social and lifestyle*' benefits irrespective of whether they increase output. They will still be able to talk with other farmers, still be their own boss and enjoy the lifestyle benefits from living in a rural area. On the other hand, increasing output will likely increase the utility of those farmers who enjoy '*farm labor*' per se, irrespective of any financial benefits. Thus farmers who enjoy farming have an extra incentive to increase output in order to receive additional non-pecuniary benefits associated with farm work. Finally farmers who perceive substantial pecuniary benefits from farming are more likely to report that they intend to increase output over the next 3 years.

We can compare the effect of all our explanatory variables with heterogenous scales by looking at the column headed %StdX[3] in table 4, which represents the impact of a one standard deviation change in our explanatory variable on the probability of farmers' reporting that they intend to increase output over the next 3 years. The derived construct *'farm labor'* has the most substantive relationship with future planned behavior. A one standard deviation increase in this variable is associated with an 113 percent increase in the odds of a farmer reporting that they intend to increase farm output over the next 3 years. Perhaps a better illustration of the effect of this variable can be ascertained by comparing the predicted probability of reporting that they will increase output for the farmer with the highest and lowest scores on this attitudinal construct, holding all other variables at their means. The farmer with the lowest score for the variable *'farm labor'* (i.e. least likely to derive non-pecuniary benefits from farm work) had a mean predicted probability of reporting that they

will increase output of 0.009; i.e. all things being equal, it would be expected that 0.9 percent of farmers with these characteristics would report that they plan to increase output over the next 3 years. On the other hand, the farmer with the highest score for the variable *'farm labor'* had a mean predicted probability 0.62. That is, we would expect that 62 percent of farmers with these characteristics would report that they intend to increase output over the next 3 years.

The variable '*pecuniary benefits*' also has quite a substantial relationship with future intentions, as a one standard deviation increase corresponds to a 43 percent increase in the odds of expecting to increase output over the next 3 years. Also significant was age, as farmers who were sixty five years of age or older and farmers who were between 55 and 64 were 65 and 42 percent less likely respectively to report that they will increase output over the next 3 years than farmers under the age of 55.

Insert table 4 here

Future Planned Behavior: Intentions to Stay in Farming

Table 5 presents the results of our analysis of the factors affecting the probability of farmers reporting that they plan to still be farming in 10 years time. Seventy per cent of farmers report that they intend to still be farming in 10 years. As one would expect, age was negatively related with intentions to remain in farming. Farmers who were 65 years of age or over or between the ages of 55 and 64 were 95 and 88 percent less likely respectively to report that they will still be farming in 10 years, as compared to farmers who are under 55. Having a third level education was positively related with the probability of farmers remaining in farming. Similar to the previous analysis of farmers' short-run production intentions, farmers relatively more likely to perceive significant non-pecuniary benefits from '*farm labor'* were more likely to report that they will remain in farming for longer. The farmer with the lowest and highest scores on this attitudinal construct had mean predicted probabilities of 0.53 and 0.90 respectively of reporting that they will still be farming in 10 years time (53 versus 90%). The variable '*social and lifestyle*' was not found to have a statistically significant effect.

The reasoning I used to explain the effect of the variables '*social and lifestyle*' and '*farm labor*' in the previous model of short-run production plans could also be applied to explain these findings. Farmers can enjoy something close to the same level of '*social and lifestyle'*

benefits if they choose to disinvest from farming. For instance, it would be expected that if farmers retire from farming they can still talk and interact with other farmers. The majority can still be regarded as being their own boss, unless instead of retiring they plan on switching from farming to another type of employment. This is unlikely for this sample of farmers given their age profile. Furthermore, when farmers do retire from farming in Ireland, they often retain ownership of the land even if they have a farm heir which takes over the running of the agricultural enterprise. On the other hand, farmers who derive significant utility from '*farm labor*' will experience a welfare loss associated with working on the farm if they exit the farm sector. These potentially rational considerations of the non-pecuniary benefits from working on the farm may lead farmers to exhibit disinvestment reluctance, as they fear losing the non-pecuniary benefits associated with farm work.

Farmers with more positive perceptions relating to the *pecuniary benefits* from farming are less likely to report that they will still be farming in 10 years time. This could reflect farmers' ability to be able to 'afford' to retire. Age has the most substantive relationship with the probability of farmers remaining in farming. A one standard deviation increase in the variables representing farmers 65 years of age or older and those between the ages of 55 and 64 was associated with a 73 and 61 percent decrease respectively in the odds of reporting that they will still be farming in 10 years time. A one standard deviation increase in the variable *'farm labor'* is associated with a 36 percent increase in the odds of remaining in farming.

Insert table 5 here

Past Reported Behavior: Participation in Off-Farm Employment

Table 6 presents the results of the logistic regression model of farmers' labor allocation choices. A quarter of farmers have an off-farm job.[4] The coefficient values on the control variables are all along expected lines with age negatively related and education positively related with the probability of having an off-farm job. Much research, for instance, has documented the impact of personal characteristics of the farm operator such as both age and education on off-farm labor allocation decisions (Lass and Gempesaw 1992; Howard and Swidinsky 2000; Howley, Dillon, and Hennessey 2014) and these findings are in line with this existing research. Having an identified farm successor was found to be positively related with the probability of farmers working off farm. It could be that this variable acts as a proxy for available labor supply which in turn is related to farmers' choices in relation to off-farm labor market participation. Another potential explanation is due to income constraints in that

farms with an identified farm successor could be under more pressure to generate additional non-farm income to support both the principal farm operator as well as their successor. Dairy farmers were less likely to have an off-farm job than other farm types. Dairy farming requires the presence of a farmer at certain times of the day and is also much more labor intensive than other farm types, and as such, dairy farmers do not have a lot of flexibility with their time (Hennessy and Rehman, 2008). In addition, the marginal productivity of dairy farmers in Ireland is generally higher than that observed on other farm types and therefore working off-farm is likely to hold relatively less attraction for this group of famers (Connolly et al. 2010). Farm income was not found to be significantly related to off-farm labor market choices.

The derived variable *'farm labor'* was found to have a statistically significant and negative relationship with the probability of farmers working off-farm, which supports the idea that perceptions relating to non-pecuniary benefits affect labor allocation choices. Farmers with the lowest score on this attitudinal construct (i.e. least likely to derive non-pecuniary benefits from farm work) had a mean predicted probability of 0.42 of having an off-farm job, or in other words we would expect 42 percent of farmers with these characteristics to participate in the off-farm labor market. On the other hand, the farmer with the highest score had a mean predicted probability of 0.060 (6%) of having an off-farm job.

Due to the non-pecuniary benefits associated with the on farm work experience, many farmers may be reluctant to allocate their time to off-farm work, even if the marginal returns to off-farm income are higher. That is, these non-pecuniary benefits may act as a compensatory mechanism to farmers even if they could obtain higher incomes in other endeavors. This finding supports previous research by Key and Roberts (2009) which compared returns to labor for on-farm and off-farm work and found that the off-farm wage rate was much higher. This they attributed to the existence of substantial non-pecuniary benefits from farming. The other factor variables '*social and lifestyle*' and '*pecuniary benefits*' were not found to be significantly related with off-farm labor market participation. In terms of effect sizes, the presence of a successor and age were found to have the most substantive relationship with the probability of farmers having an off-farm job.

Insert table 6 here

Past Reported Behavior: Diversified their Farm Business over the Last Seven Years

Table 7 presents the results of the logistic regression model of diversification behavior. Twenty four percent of farm operators report that they had diversified their farming operation over the last 7 years. Decoupled payments which broke the link between payments and production were introduced in Ireland roughly 7 years prior to the distribution of this survey to farm operators. I chose this as a useful time frame to examine diversification behavior, as the introduction of decoupled payments allowed farmers greater freedom to diversify than ever before, without the fear that they would lose out on subsidies as a result. There is a significant and negative relationship between being a dairy farmer as opposed to other farming types on the probability of farmers having diversified their farming enterprise. Dairy farming would be significantly more intensive and profitable than other farm types in Ireland (Connolly et al. 2010) and so it would be expected that these farmers would have both less time and need to diversify their farm business. Farms with relatively more full time workers and older farmers were also relatively less likely to have diversified their farming operation. On the other hand, both education and farm income had a positive relationship with the probability of diversification.

Both our variables '*farm labor'* and *'social and lifestyle'* were statistically significant predictors, but affect the probability of farm diversification in opposite directions. That is, '*farm labor'* is positively associated with the probability of diversification whereas '*social and lifestyle'* has a negative relationship with diversification. The mean predicted probability of having diversified their farm business for the farmers with the lowest and highest score for the variable *'farm labor'* was 3 and 56 percent respectively. For farmers with the lowest and highest scores for the variable *'social and lifestyle'*, the mean predicted probabilities were 71 and 11 percent respectively. On the one hand, it is easy to imagine why '*farm labor'* could be positively associated with diversification. Farmers who derive additional utility from working on the farm may be relatively more likely to consider diversifying their farming business into more profitable endeavors in order to remain farming. It is more difficult to explain why the variable '*social and lifestyle'* has a negative and statistically significant relationship. One potential explanation is that farm diversification may not be in keeping with a farmer's idealized image of farming, in that it could be associated with a non-traditional way of life (e.g. the addition of a non-traditional enterprise). The variable *'social and lifestyle'* is likely to, at least partly, capture farmers' views toward a traditional way of

farming/life, given its emphasis on benefits derived from working with nature, owning their own land and social interaction with other farmers.

There was a statistically significant and positive association between farmers' perceptions in relation to the pecuniary benefits from farming on the probability of farmers diversifying their farming operation. It would be expected that farmers who are more optimistic about the pecuniary benefits from farming could have more confidence in diversifying, or perhaps are more likely to have the necessary access to capital resources to start their diversification activity. '*Pecuniary benefits'* and *'farm labor'* were found to have the most substantive relationship with farmers diversification choices as a one standard deviation increase in these variables was associated with an 103 and 71 per cent increase respectively in the probability of a farmer having diversified their farming operation.

Insert table 7 here

Study Limitations

One important point to note is that the reported relationships are associative rather than causal. Endogeneity bias could be affecting these estimates as the presence of confounding factors cannot be ruled out. Furthermore, in some instances, particularly in the case of off-farm labor allocation, farmers may ex-post rationalize their decision by expressing a higher degree of agreement with statements that reflect the non-pecuniary benefits from farm work. Future longitudinal work would be needed to establish further insights regarding the relationship between perceptions of the benefits from farming (both non-pecuniary and pecuniary) on farmer behavior. That being said, it should be comforting to note that our derived measures had predictive power across a variety of both reported past behaviors as well as future planned behavior. This should help to demonstrate that the derived measures of farmers' perceptions of non-pecuniary benefits have strong construct validity. In other words, while the association between our measures of non-pecuniary benefits and the outcome variable are open to subjective interpretation, the fact that the measures of non-pecuniary benefits were statistically related with a variety of both farmers reported past behavior (off-farm employment and diversification) and future intended behavior (increase in production and staying in farming) should add reliability to our key argument that non-pecuniary benefits have a significant influence on important farm household business decisions.

Conclusion

Studies into farmers' behavior increasingly show that farmers do not always seek to maximize farm profits above all other factors. Choices that farmers make (like most people) between different types of behaviors are rarely based on a single category of reasons. While it is possible to calculate the financial loss or gains accrued by farmers for land-use or management changes, farmers may experience more than changes to their finances when changing their farming activities. Policy stimuli such as changes in financial incentives may encourage farmers to change activities, but unless there is a corresponding compensation for any losses in non-pecuniary benefits, then there may be a significant reluctance to change certain types of behavior. In other words, while costs and returns are clearly important for farmers' decision-making, non-pecuniary benefits may make some choices more attractive than others which may be more rewarding financially. The presence of substantial non-pecuniary benefits may, in turn, be one reason why farmers do things which others (policymakers for example) might see as economically irrational.

Although essentially descriptive in nature, much previous research suggests that farmers are partly influenced by social and lifestyle factors as well as pecuniary goals. This study added a new element to this literature by quantifying farmers' perceptions in relation to the non-pecuniary benefits from farming and testing the relationship between these perceptions on a variety of real world farmer behaviors. Findings indicate that perceptions in relation to the non-pecuniary benefits from farming are significantly related with farmers' behavior across a wide range of activities. The specific field behaviors examined were those where it has been widely observed that farmers often do not act in a fashion that would be consistent with just purely profit-maximization goals (of course there are many more). The observed relationship between perceptions relating to non-pecuniary benefits with the various field behaviors examined was often as strong, if not more so, than the observed relationship between structural farm characteristics and personal background variables with the same reported field behaviors. Consequently, it seems reasonable to suggest that the behavior of farm operators cannot be adequately understood by an approach which ignores the farm family's non-pecuniary returns from farming.

The analysis also suggests that non-pecuniary benefits from farming have a multidimensional structure and different dimensions can be used to better understand farmers' behavior. Specifically, I identified two types of non-pecuniary benefits of importance to farm operators.

One of these types is reflective of the additional utility that farmers get from farm work, i.e. independently of the outcome people enjoy doing the required labor per se. The other derives from the wider social and lifestyle benefits from farming and as such can be seen as a by-product from farming. A potentially useful way of thinking about these benefits is to consider them as intrinsic and extrinsic benefits. That is, farmers often enjoy non-pecuniary benefits from actual farm labor (intrinsic) but they also enjoy a number of social and lifestyle benefits that that are a by-product of the farming lifestyle (extrinsic). These extrinsic benefits include greater autonomy of choice from being self-employed, lifestyle benefits living in a rural area and social interaction with other farmers.

Given that perceptions in relation to the non-pecuniary benefits from farming are inherently multidimensional, incorporating a unidimensional measure in economic models of farm behavior may not lead to accurate assessments of farmers' response to policy changes. For example, results presented in this paper suggest that for some field behaviors the effect of these two different categories of non-pecuniary benefits could have very different impacts on farmers' behavior. It would be useful for future work to aim at providing a better understanding of the multidimensional nature of perceptions relating to non-pecuniary benefits and their effect on different types of farmer behavior.

To conclude, as in other enterprises objectives relating to maximizing profits are likely to be important determinants of individual behavior. Nonetheless, farming can affect welfare not just through providing income, but also by providing a range of non-pecuniary benefits. Farmers may keep up production at sub-optimal levels because they do not want to lose the non-pecuniary benefits which they derive from their farming activities. This decision can be seen as one in favor of the non-pecuniary benefits which they would lose if they changed their production activity, and against the additional consumption that would be possible if they sought to strictly maximize profits. Accordingly, measuring the benefits from farming in monetary terms alone may not give full consideration to the benefits perceived by farmers from working on the farm. For policymakers, the omission of non-pecuniary considerations may be an important limitation of existing economic models of farmer behavior.

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Table 1: The Benefits from Farming

	N	mean	mode
I believe a rural environment is a great place to raise children	355	6.36	7
Growing up on a farm is great for children	358	6.31	7
Owning my own land is important to me	363	6.29	7
I enjoy the peace and quiet that comes with farming	352	6.24	7
I love working outdoors	360	6.24	7
I think farming communities are a great place to live	360	6.22	7
Its great being able to work with nature	356	6.12	7
I believe being your own boss is the best thing about farming	361	6.11	7
Farming is a more rewarding job in terms of quality of life, independence, lifestyle, than it is in terms of money	362	5.80	7
I feel that farmers look out for each other	358	5.80	7
I talk regularly with other farmers about farming	356	5.79	7
I do not make a fortune from farming but the lifestyle is great	360	5.76	7
I think people living in rural areas are generally nicer than those living in urban areas	347	5.69	7
I enjoy farming much more than I would other potential sources of employment	359	5.58	7
Farm work is more enjoyable than other employment	348	5.53	7
Being able to talk with other farmers is the best thing about farming	355	5.25	5
I could make more money in other employment but I would miss farming too much to give it up	345	5.10	7
I make a good living from farming	348	3.84	4
Farming is hard work but the financial rewards make it worthwhile	359	3.68	4
There are substantial monetary rewards from my farm work	362	3.67	4

Note: Respondents were read out these 20 statements and asked to state how much they agreed or disagreed with each one on a scale from 1 (completely disagree) to 7 (completely agree)

Table 2: Summary Statistics of Explanatory and Independent Variables

Dependent variables		Mean	Std. Dev.	Min	Max	N
Future production Plans	Whether the principal farm operator plans to increase output over the next 3 years ((1=Yes, 0 = No)	0.23	0.42	0	1	364
Future intentions to remain in farming	Whether the principal farm operator plans to still be farming in 10 years time (1=Yes, 0 = No)	0.70	0.46	0	1	364
Off farm labor	Whether the principal farm operator has an off-farm job (1=Yes, 0 = No)	0.25	0.44	0	1	364
Diversification	Whether the principal farm operator has diversified their farm business over the last 7 years (1=Yes, 0 = No)	0.24	0.42	0	1	364
Explanatory variables						
Age 65 plus[a]	Whether the principal farm operator is aged 65 or over (1=Yes, 0 = No)	0.23	0.42	0	1	364
Age 55-64	Whether the principal farm operator is aged between 55 and 65 or over (1=Yes, 0 = No)	0.28	0.45	0	1	364
Presence of farm successor	Have you a successor/heir that will work on the farm when you retire (Scale ranging from 1 definitely not to 6 definitely)	2.81	1.49	1	6	364
Third level education	Whether the respondent has a third level education (e.g. post second level/high school) (1= Yes, 0 = no)	0.17	0.38	0	1	364
Dairy farmer	Whether the farm operator is predominantly a dairy farmer (1= Yes, 0 = No)	0.12	0.33	0	1	364
Full time workers	Number of individuals who work full time on the farm	0.82	0.57	0	3	363
Farm size (25-49 ha)	Whether the farm operator has a farm between 25 and 50 hectares (1= Yes, 0 = No)	0.41	0.49	0	1	364
Farm size (50-74 ha)	Whether the farm operator has a farm between 50 and 74 hectares (1= Yes, 0 = No)	0.17	0.38	0	1	364
Farm size (greater than 74 ha)	Whether the farm operator has a farm between greater than 74 hectares (1= Yes, 0 = No)	0.13	0.34	0	1	364
Farm income	Annual farm income before taxes and excluding the single farm payment[b] (€)	20,959	17,099	2,000	105,000	354
Social and Lifestyle	Factor variable capturing the extent to which farmers enjoy non-pecuniary benefits from farming	0	0.89	-4.85	1.53	271

Farm Labor	Factor variable capturing the extent to which farmers enjoy non-pecuniary benefits from farming	0	0.87	-3.44	2.57	271
Pecuniary benefits	Factor variable capturing the extent to which farmers enjoy pecuniary benefits from farming	0	0.91	-1.95	2.29	271

[a] *For age I have used sets of dummy variables – those 65 and over, those between 55 and 64 and those under 55 (age was heavily skewed towards the older age categories in line with the farming population figures).*

[b] *The single farm payment is the main agricultural subsidy in the European Union. It replaced most of the crop and livestock payments from 1 January 2005. The new scheme breaks the link between production and support. Instead, farmers will have to observe certain conditions (known as Cross Compliance) in return for receipt of direct agricultural support in the form of an annual single farm payment. To ascertain farm income, respondents were given a payment card with various intervals and asked to indicate which of these best describes their annual farm income before taxes and not including subsidies such as the single farm payment. We took the midpoint in each interval as an approximation of respondents' farm income.*

Table 3: Factor Analysis of Attitudinal Statements

	Social and lifestyle	Farm labor	Pecuniary benefits
Growing up on a farm is great for children	**0.765**	0.235	-0.074
It's great being able to work with nature	**0.672**	0.350	0.132
I feel that farmers look out for each other	**0.631**	0.224	0.261
I believe a rural environment is a great place to raise children	**0.602**	0.337	-0.205
Owning my own land is important to me	**0.556**	0.212	0.023
I talk regularly with other farmers about farming	**0.532**	0.332	0.173
Being able to talk with other farmers is the best thing about farming	**0.515**	0.157	0.278
I believe being your own boss is the best thing about farming	**0.46**	0.346	-0.037
I think people living in rural areas are generally nicer than those living in urban areas	**0.409**	0.235	0.057
I think farming communities are a great place to live	**0.529**	**0.546**	-0.102
I enjoy farming much more than I would other potential sources of employment	0.293	**0.724**	0.172
Farming is a more rewarding job in terms of quality of life, independence, lifestyle, than it is in terms of money	0.332	**0.709**	0.154
Farm work is more enjoyable than other employment	0.427	**0.603**	0.293
I enjoy the peace and quiet that comes with farming	0.42	**0.594**	0.055
I could make more money in other employment but I would miss farming too much to give it up	0.167	**0.533**	0.217
I love working outdoors	**0.528**	**0.558**	0.087
I do not make a fortune from farming but the lifestyle is great	**0.43**	**0.481**	0.147
There are substantial monetary rewards from my farm work	0.138	0.149	**0.795**
I make a good living from farming	0.004	0.118	**0.759**
Farming is hard work but the financial rewards make it worthwhile	0.005	0.100	**0.757**

Table 4: Future Plans to Increase Production

	b	P>z	%	%StdX	SDofX
Age 65 plus***	-2.41	0.00	-91.10	-64.90	0.43
Age 55-64***	-1.22	0.01	-70.40	-42.40	0.45
Successor	0.12	0.31	13.30	19.90	1.46
Third level education	0.70	0.11	101.00	29.70	0.37
Farm income***	0.00	0.02	0.00	-40.20	17861.12
Full time workers	0.41	0.24	50.40	25.20	0.55
Dairy farm	0.40	0.42	49.50	14.60	0.34
Farm size (25-49 ha)	0.20	0.28	22.30	26.40	1.16
Farm size (50-74 ha)	0.30	0.26	34.60	34.10	0.99
Farm size (greater than 74 ha)	0.24	0.45	27.50	19.60	0.73
Social and lifestyle	0.03	0.90	3.20	2.80	0.87
Farm Labor***	0.87	0.00	139.80	112.70	0.86
Pecuniary benefits*	0.40	0.10	48.90	43.40	0.90
Pseudo R^2	0.26				
Correctly classified	81%				

*Note: % is the percent change in the odds of planning to increase output in the next 3 years. % StdX is the percent change in odds of planning to increase output for a standard deviation change in our explanatory variable. SDofX is the standard deviation of the relevant explanatory variable. ***indicates statistically significant at 1 percent level, ** indicates statistically significant at 5 percent level, * statistically significant at 10 percent level. N= 265.*

Table 5: Future Intentions to Remain in Farming

	b	P>z	%	%StdX	SDofX
Age 65 plus***	-3.00	0.00	-95.00	-72.80	0.43
Age 55-64***	-2.10	0.00	-87.80	-61.40	0.45
Successor	0.15	0.19	16.70	25.20	1.46
Third level education*	1.33	0.07	276.90	64.00	0.37
Farm income	0.00	0.13	0.00	46.30	17861.12
Full time workers	-0.23	0.51	-20.40	-11.80	0.55
Dairy farm	0.45	0.51	56.70	16.40	0.34
Farm size (25-49 ha)	0.25	0.21	28.50	33.90	1.16
Farm size (50-74 ha)	-0.29	0.23	-25.00	-24.80	0.99
Farm size (greater than 74 ha)	-0.14	0.60	-13.20	-9.90	0.73
Social and lifestyle	0.11	0.56	11.90	10.30	0.87
Farm Labor*	0.35	0.09	42.50	35.70	0.86
Pecuniary benefits**	-0.50	0.03	-39.30	-36.30	0.90
Pseudo R^2	0.30				
Correctly classified	77%				

*Note: % is the percent change in the odds of planning to increase output in the next 3 years. % StdX is the percent change in odds of planning to increase output for a standard deviation change in our explanatory variable. SDofX is the standard deviation of the relevant explanatory variable. ***indicates statistically significant at 1 percent level, ** indicates statistically significant at 5 percent level, * statistically significant at 10 percent level. N = 265.*

Table 6: Off-Farm Labor Market Participation

	b	P>z	%	%StdX	SDofX
Age 65 plus***	-2.10	0.00	-87.70	-59.70	0.43
Age 55-64**	-0.85	0.05	-57.40	-32.10	0.45
Successor***	0.48	0.00	62.20	102.40	1.46
Third level education*	0.83	0.07	130.50	36.50	0.37
Farm income	0.00	0.65	0.00	10.40	17861.12
Full time workers***	-1.49	0.00	-77.50	-56.00	0.55
Dairy farm**	-1.91	0.02	-85.20	-47.70	0.34
Farm size (25-49 ha)	0.00	0.99	0.30	0.30	1.16
Farm size (50-74 ha)	-0.08	0.76	-7.70	-7.60	0.99
Farm size (greater than 74 ha)	-0.46	0.12	-36.70	-28.60	0.73
Social and lifestyle	0.29	0.17	33.60	28.50	0.87
Farm Labor*	-0.40	0.06	-33.10	-29.30	0.86
Pecuniary benefits	-0.19	0.41	-17.50	-16.00	0.90
Pseudo R^2	0.30				
Correctly classified	86%				

Note: % is the percent change in the odds of planning to increase output in the next 3 years. % StdX is the percent change in odds of planning to increase output for a standard deviation change in our explanatory variable. SDofX is the standard deviation of the relevant explanatory variable.
****indicates statistically significant at 1 percent level, ** indicates statistically significant at 5 percent level, * statistically significant at 10 percent level. N = 265.*

Table 7: Diversification

	b	P>z	%	%StdX	SDofX
Age 65 plus*	-0.90	0.06	-59.20	-32.20	0.43
Age 55-64	-0.27	0.51	-23.60	-11.50	0.45
Successor	0.08	0.45	8.50	12.70	1.46
Third level education*	0.78	0.07	118.70	33.90	0.37
Farm income***	0.00	0.83	0.00	-4.30	17861.12
Full time workers**	-0.70	0.03	-50.50	-32.10	0.55
Dairy farm**	-1.09	0.04	-66.30	-30.80	0.34
Farm size (25-49 ha)	0.18	0.32	19.80	23.40	1.16
Farm size (50-74 ha)	-0.14	0.52	-13.40	-13.20	0.99
Farm size (greater than 74 ha)	-0.30	0.26	-25.60	-19.50	0.73
Social and lifestyle**	-0.46	0.02	-36.80	-32.80	0.87
Farm Labor***	0.62	0.01	85.90	70.70	0.86
Pecuniary benefits***	0.78	0.00	118.30	102.70	0.90
Pseudo R^2	0.14				
Correctly classified	78%				

Note: % is the percent change in the odds of planning to increase output in the next 3 years. % StdX is the percent change in odds of planning to increase output for a standard deviation change in our explanatory variable. SDofX is the standard deviation of the relevant explanatory variable.
****indicates statistically significant at 1 percent level, ** indicates statistically significant at 5 percent level, * statistically significant at 10 percent level. N = 265.*

[1] 37 percent of farmers reported that they did not know what capital returns they made so this correlation is limited to those farmers who reported their capital returns. They were given 6 response options: 0-5%, 5-10%, 10-15%, 15-20% and finally don't know.

[2] Farmers were asked to indicate their level of agreement on a scale from 1 completely disagree to 7 completely agree with the following statement: Farming has provided me with a good living over the last 3 years.

[3] I used the Spost9 collection of Stata ado files for post-estimation interpretation (see Long and Freese, 2006)

[4] The overall mean level of hours worked on the farm for farmers in this sample was in the 50-60 hours interval.