



Working Paper No. 369

January 2011

## Determinants of Vegetarianism and Partial Vegetarianism in Ireland

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*Abstract.* Vegetarianism is increasing in the western world. Anecdotally, this trend can be attributed to heightened health, environmental and animal welfare concerns. In this paper we investigate the factors associated with vegetarianism among adults in Ireland. Using the 2007 Survey of Lifestyles, Attitudes and Nutrition, we use a logit model to assess the relationship between vegetarianism and the socioeconomic and personal characteristics of the respondents. We also analyse the factors associated with varying levels of meat consumption using an ordered logit model. This paper adds to the existing literature as it is the first paper to estimate the determinants of vegetarianism and partial vegetarianism in Ireland.

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# Determinants of Vegetarianism and Partial Vegetarianism in Ireland

## 1. Introduction

Meat production is set to double by 2050 due to an increase in the world population and increased wealth in developing countries (FAO, 2010). At present, in less developed countries, low income levels force many people to follow vegetarian diets. In developed countries, where people are vegetarians by choice, vegetarianism is increasing (Leahy, Lyons and Tol, 2010a). The notion of partial vegetarianism is also becoming increasingly popular in developed nations. Catholics have long been urged to abstain from meat consumption on Fridays. However, the heightened interest in partial vegetarianism has been driven mainly by celebrity endorsed movements such as the Meatless Monday campaign which began in 2003. Concern for animal welfare and the environment are among the factors driving this trend. The relationship between meat consumption, especially red meat, and global environmental change has been acknowledged (FAO, 2006). Ruminant livestock are major emitters of methane, the second-most important anthropogenic greenhouse gas.

Meat consumption also has implications for an individual's health. In developed countries, excessive meat consumption can be a health concern (Giovannucci *et al.*, 2004, Drewnowski and Specter, 2004, Hu *et al.*, 2000, Rose, Boyar, and Wynder, 1986, James *et al.*, 1997). Barnard, Nicholson and Howard (1995) studied the medical costs associated with meat consumption in the USA. The authors estimate that costs of between \$30-60 billion per year result due to the higher prevalence of hypertension, heart disease, cancer, diabetes, gallstones, obesity and food-borne illness among omnivores compared with vegetarians.

Leahy, Lyons and Tol, (2010c) examined the determinants of vegetarianism at an aggregate level. They find that there is a Kuznets-like relationship between income and meat expenditure. For the poor, an increase in income results in higher meat expenditure. However, at the global average income, meat consumption levels off and at very high levels of per capita income vegetarianism increases. Higher levels of education are also associated with increased vegetarianism and, in poor countries, vegetarianism is negatively associated with the per capita level of meat production.

Previous papers which aim to establish the motivations of vegetarians have usually been carried out on small or unrepresentative samples (Beardsworth and Bryman, 1999, Fox and Ward, 2008, Jabs, Devine and Sobal, 1998). To our knowledge, the most comprehensive study of the determinants of vegetarianism and partial vegetarianism was carried by Leahy

Lyons and Tol (2010b). The analysis is carried out using the 2008 Health Survey for England which is a large representative sample of adults and children in England. Results show that gender, ethnic origin, the region in which a person lives and their level of education are all significantly associated with vegetarianism. Consistent across both the adult and child analyses are the findings that both vegetarians and partial vegetarians are more likely to be female as opposed to male and Asian as opposed to White. Results also show that the larger the household, the more often meat is consumed.

While research on the determinants of vegetarianism is scarce, research into meat consumption has been extensive. The factors affecting meat demand have been studied at a micro level for example in Ireland by Newman, Henchion and Matthews (2001), in the USA by Nayga (1995), in the UK by Burton et al. (1994), in Japan by Chern et al. (2002) and in Mexico by Gould et al. (2002). Results suggest that the demand for meat is affected by factors such as income, household size, education level and professional status. Changing socio economic patterns have also resulted in changing the pattern of meat demand (Newman et al., 2002, Meat and Livestock Commission, 1996).

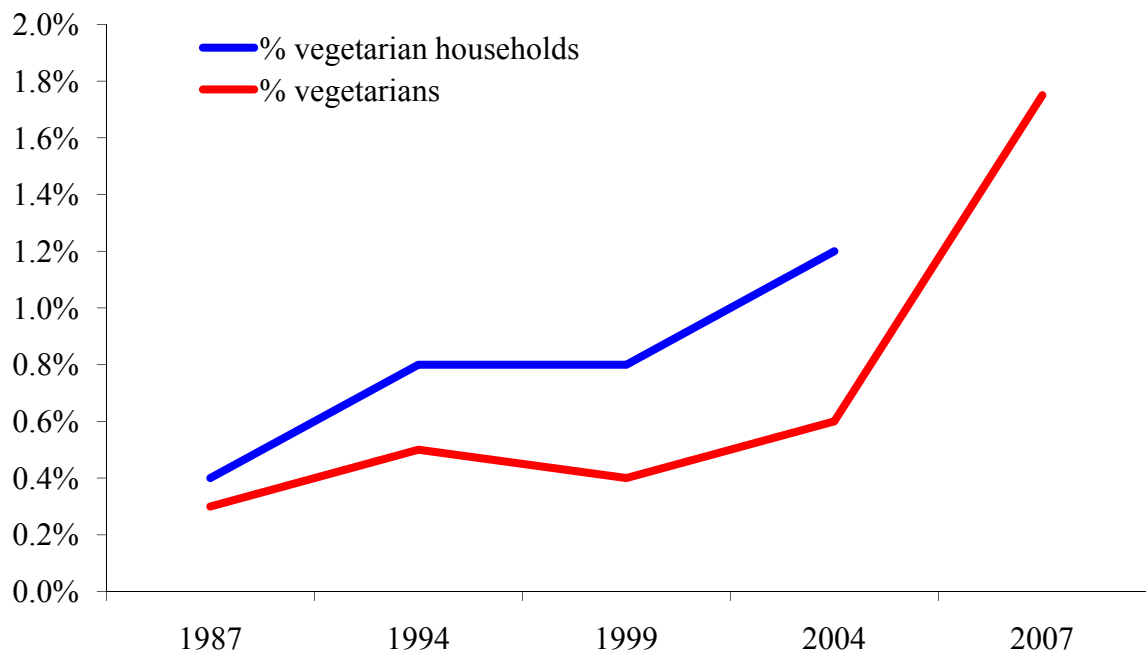
The majority of meat demand studies to date have used household expenditure surveys with which it is difficult to predict individual consumption patterns because data is collected at the household level. Also, such surveys do not usually contain detailed information about eating out. Expenditure does not necessarily equal consumption (e.g., someone may buy meat for her dog). Expenditure surveys cannot distinguish between people who eat a lot of cheap meat and people who eat a little bit of expensive meat. There can also be problems with the accuracy of purchase recall and the frequency of purchase. All this makes expenditure surveys less suitable for studying the patterns of vegetarianism. While the paper by Newman, Henchion and Matthews (2001) provides useful information about the role of socio-economic characteristics in a household's meat expenditure pattern, it fails to provide any information about those households that abstain from buying meat. In this paper, we focus our attention on the group of respondents that does not consume meat. Like Newman, Henchion and Matthews (2001), we also analyse the factors associated with varying levels of meat consumption. The advantage of this paper, however, is that the data we use is collected at the individual rather than at the household level and respondents are asked about general eating patterns as opposed to expenditure at a point in time.

Leahy, Lyons and Tol (2010a) find that the proportion of vegetarians in Ireland is increasing (see Figure 1). To our knowledge, this is the first empirical analysis of the determinants of vegetarianism and partial vegetarianism using Irish data. This should be of benefit to those

forecasting future numbers of vegetarians and the associated environmental or health benefits. Because partial vegetarianism can lead to important environmental and health benefits, we also assess the personal and household characteristics associated with varying levels of meat consumption.

The paper continues as follows. Section 2 describes the data and methods used and section 3 discusses the results. Section 4 provides a discussion and conclusion.

**Figure 1. Vegetarianism in Ireland\***



\* 1987-2004 results are taken from Leahy, Lyons and Tol (2010a) and are based on data from the Household Budget Survey. The result for 2007 is estimated using SLÁN data.

## **2. Data and Methods**

We follow the method of Leahy, Lyons and Tol (2010b). We used the anonymised data file of the 2007 Survey of Lifestyles, Attitudes and Nutrition (SLÁN) in Ireland (Health Promotion Unit of UCD, 2008). This is a nationally representative sample of 10,364 adults aged 18 and over. A response rate of 62% was achieved. Participants were asked a range of questions about general health, fruit and vegetable consumption, alcohol consumption, smoking, and physical activity. The survey includes additional anthropometric and other physical examination data from two sub-samples: 967 adults aged 18-44 years and 1,207 adults aged 45 years and over. SLÁN also contains information on income and other socio-economic variables which we use as explanatory variables in our models. Morgan et al., 2008 provide a detailed description of the SLÁN survey and findings.

9,223 adults (89% of sample) completed a food frequency questionnaire. Respondents are asked about average food consumption over the past year. Respondents are asked how often they consume medium sized portions<sup>1</sup> of 21 meat items; less than once a month or never, one–three times per month, once a week, two–four times per week, 5–6 times per week, once a day, 2–3 times per day, 4–5 times per day or 6 or more times per day. We classify those who identify themselves as consuming any of the 21 meat items “less than once a month or never” as vegetarians. While this is not perfect, it is the best measure available to identify vegetarians.

We construct a variable which represents the number of portions of different foods consumed each day, i.e. a total food consumption variable. It appears from this variable that some respondents report consuming incredibly high or low amounts of food. Based on this variable, we omit observations that are greater than the standard deviation above the mean and less than the standard deviation below the mean. We also assess respondents’ daily calorie intake. Even in the restricted sample, the daily calorie intake is impossibly high for some respondents and too low for others. Thus, we further restrict the sample based on the daily calorie intake variable. Again, we omit observations that are greater than the standard deviation above the mean and less than the standard deviation below the mean. We do this separately for male and female respondents. The sample is reduced to 6,893.

The analysis is made up of two parts. In the first part we use logit regression models to analyse the factors associated with vegetarianism. The dependent variable is a binary variable, equalling 1 if the respondent eats meat “rarely or never” and 0 if he/she eats any type of meat more often.<sup>2</sup>

The independent variables are mostly individual and some household characteristics. The household income level is included as an explanatory variable and enables us to establish whether vegetarians are more likely to be found in higher income or lower income households. The income variable is not continuous; rather it is divided into 6 binary categories. A graph of the relationship between household income and the percentage of vegetarians is shown in Figure 2. Leahy, Lyons and Tol (2010c) found that at the aggregate (national) level there is a Kuznets-like relationship between income and vegetarianism. It appears that in Ireland, the level of vegetarianism is quite stable across income levels. The standard deviations, however, are quite large. We would be interested to know the

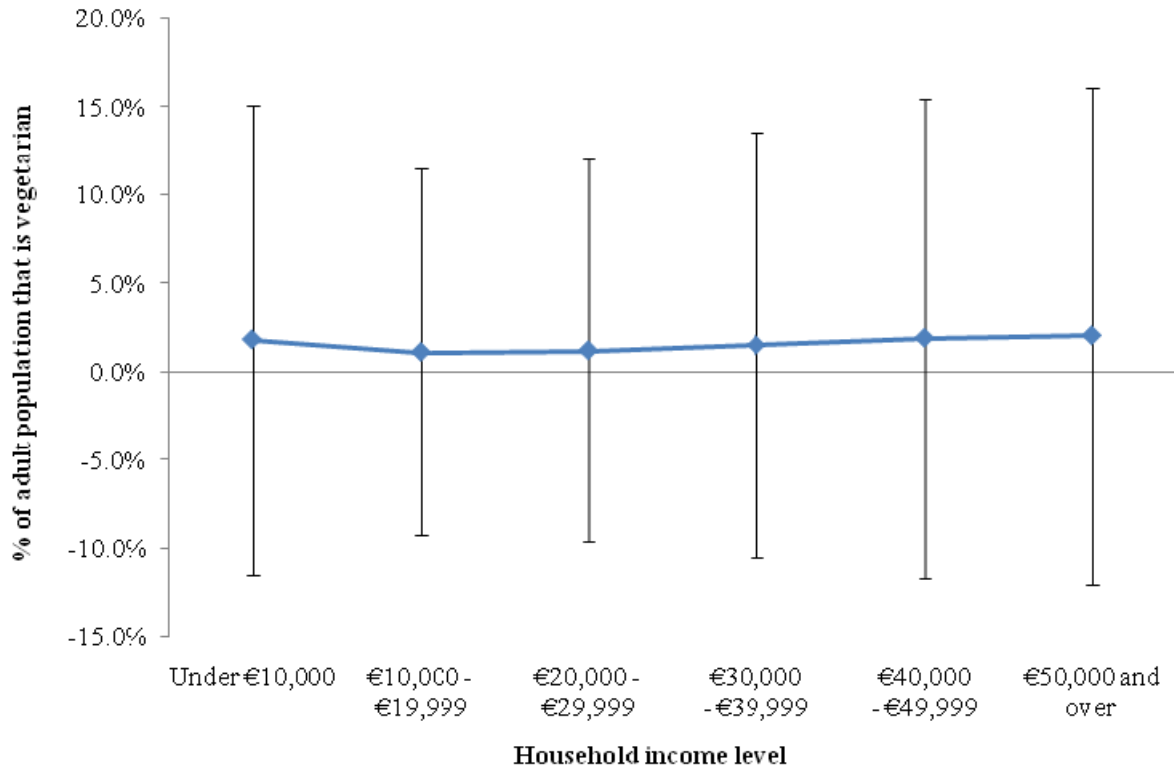
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<sup>1</sup> A medium sized portion of meat is taken to be about the size of a deck of cards.

<sup>2</sup> The consumption of fish is not included in this analysis.

relationship between vegetarianism and relatively high levels of household income. Unfortunately, however, SLÁN does not specify income levels above €50,000.<sup>3</sup>

**Figure 2. Vegetarianism and income**



We also control for the location of the household because the characteristics and eating patterns of Dublin residents may be very different to those of rural dwellers. We expect to find that vegetarians are more prevalent in urban areas (and in particular big cities) than in rural areas or small towns. We also control for household tenure because we are interested to see whether the dietary patterns of renters are different to those of home owners, for example. Also included is the age and gender of the respondent. Anecdotally, vegetarianism is becoming more prevalent among young adults in Ireland and females in particular. Leahy Lyons and Tol (2010b) found that in England females were two and a half times more likely to be vegetarians than males and the relationship between age and vegetarianism was negative. We wish to ascertain whether there is a link between vegetarians and the health conscious. The respondent's body mass index (bmi) is measured and the number of portions

<sup>3</sup> The 2004/05 Household Budget Survey for Ireland (CSO, 2007) shows that the average annual gross household income in Ireland is over €53,000 while the average annual disposable household income is over €42,000.

of fruit and vegetables consumed daily are counted. Respondents are also asked if they are physically active on a regular basis and whether they watch their weight or not. We expect to find a positive relationship between being weight conscious, having a relatively low bmi, and being physically active and vegetarianism. Other control variables include having any medical problems, because this may mean respondents are obliged to follow restricted diets. We also control for the respondents own assessments of their health status and quality of life. The explanatory variables also include smoking and alcohol intake. We expect to find that vegetarians are more health conscious, so alcohol intake might be lower than that of non vegetarians. Similarly, we expect to find that non smokers are more likely to be vegetarians than smokers.

We control for the social class and work status of the respondent. We expect to find that the rate of vegetarianism is higher among those who are employed compared to those who are out of work and, for those who are working, we expect that those in higher social class positions are more likely to be vegetarians than lower social class individuals. We include the education level of the individual in addition. Higher education was positively associated with vegetarianism at the aggregate level (Leahy, Lyons and Tol, 2010c) and also at the individual level in the UK (Leahy, Lyons and Tol, 2010b).

We control for the marital status of the individual. Pribis, Sabate and Fraser (1999) find no differences in marital status between vegetarians and non vegetarians. However, the sample used was small (158 adults) and unrepresentative of the population. Leahy, Lyons and Tol (2010b) found that respondents who are divorced and cohabiting are more likely to be vegetarians than respondents that are married.

Finally, we include a variable which specifies whether respondents were born in Ireland, Northern Ireland, Great Britain or “other”. We would like to control for ethnic origin because this may influence meat eating patterns, particularly those of red meat, but unfortunately we are forced to lump together those of Polish, Indian and other extractions. We would also like to control for the number of other vegetarians in the household but this information is not provided in the dataset. Leahy, Lyons and Tol (2010b) found that household size was an important variable in both the vegetarian and partial vegetarian models. However, this information is not gathered in SLÁN. Also, questions regarding environmental or animal welfare concern or religious orientation would be useful in explaining the vegetarian decision but SLÁN does not include any such questions.

The second part of the analysis examines the factors associated with partial vegetarianism. We use an ordered logit model in which the dependent variable is the level of meat

consumption. We create a variable which specifies the equivalent daily servings of each of the 21 meat items. 0 indicates that the item is consumed less than once a month or never, 0.067 indicates that the item is consumed one–three times a month, 0.143 indicates that the item is consumed once a week, 0.429 indicates a consumption pattern of 2-4 times a week, and 0.786 reflects a consumption pattern of 5-6 times a week. 1 indicates that the meat item is consumed once a day, 2.5 indicates an item is consumed 2-3 times a day and 4.5 indicates a consumption pattern of 4-5 times a day. The maximum value per item is 6, indicating that the item is consumed at least 6 times per day. We then combine the daily serving equivalents for each type of meat for each respondent so that we have a composite meat consumption scale. In theory, the values could range between 0 and 126, however, no respondents report consuming all meat items 6 times per day. Having restricted the sample, the maximum meat consumption value is 8.6. The weighted mean is 1.59. 1.7% of the sample is vegetarian. We use the same explanatory variables as we do in part 1.

A list of the variables used in the model and some descriptive statistics on them can be found in Table 1. A list of the 21 meat items included in SLÁN can be found in Table A1 of the appendix.

[Table 1 about here]

### **3. Results**

For both the logit and ordered logit models, we include all of the explanatory variables we believe may influence meat consumption. We then remove insignificant variables, testing for both individual and joint significance. Due to the large number of explanatory variables in our models, only the results of the more parsimonious models are presented. Full regression results are available on request from the authors.

#### **3.1 Vegetarianism**

The dependent variable equals 1 if the respondent is a vegetarian, 0 otherwise. For each categorical explanatory variable there is a reference category which acts as a baseline against which the characteristics of respondents, or their households, are compared. The results are presented in terms of odds ratios which reflect the probabilities that a respondent with a given characteristic will be a vegetarian, relative to the probability of those in the reference category. An odds ratio of 1 indicates that a respondent with that characteristic is equally likely to be a vegetarian as those in the reference category. An odds ratio greater than 1



indicates a higher probability that the respondent will be a vegetarian, while a ratio below 1 indicates that the probability is lower.

Table 2 displays the results of the parsimonious model which investigates the factors associated with vegetarianism among adults in Ireland.

[Table 2 about here]

The odds ratio for female indicates that females are 55% more likely to be vegetarians than males in Ireland. This is consistent with anecdotal evidence. The relationship is not as strong as it is in England, however (Leahy, Lyons and Tol, 2010b). Also as expected is the finding that single people are 73% more likely to be vegetarians compared to people who are married. There are many reasons why this is the case. It could be that vegetarians like to live on their own or are hard to match, but it could also be that potential or one-time vegetarians are encouraged to eat meat when they live with meat eaters. Unfortunately, we do not have an instrumental variable with which we can solve this problem of simultaneity. The same problem arises with the “bmi” and “fruitveg” variables. The lower a person’s bmi, the more likely it is that he/she will be a vegetarian. However, we cannot decipher whether vegetarians have a lower bmi because meat contains a higher fat content than many of its alternatives or if respondents with a low bmi choose to abstain from meat. Similarly, as the number of portions of fruit and vegetables that are consumed on a daily basis increases, so too does the probability that the respondent is a vegetarian. Perhaps vegetarians are more health conscious than their meat eating counterparts or it could be that vegetarians just consume more fruit and vegetables as part of their daily calorie intake.

The argument that many Irish people become vegetarian for health reasons is supported by the fact that those who consume alcohol rarely or never are significantly more likely to be vegetarians than those who consume alcohol 2-3 times a week. However, smoking was not significant.

Many of the work status variables are significant in the model. Self employed people are 2.25 times more likely to be vegetarians than employees. This supports the argument that being a vegetarian is not just a dietary but also a lifestyle choice. Those who cannot work because they are sick or disabled are almost 2.6 times more likely to be vegetarians than those who are employed. These people may be following specific diets of which meat does not play a role. We had also included a dummy variable which equals 1 if the respondent suffers from one or more medical conditions and 0 if not, but it was not significant. Interestingly, respondents who are involved in home duties are 76% more likely to be vegetarians than those in the

“employees” category. Again, this may be to do with certain lifestyle choices made by vegetarians but we would need more detailed data to tease out exactly why this is the case.

As expected, vegetarians are more likely to live in Dublin than those in the reference category; “open country”. In fact, 2.6% of Dublin’s residents are vegetarian while only 1.5% of those living in the reference category are vegetarian. This may be because Dublin’s population is more culturally diverse than that of rural Ireland. Thus, some of Dublin’s residents may be vegetarians on religious or cultural grounds. Leahy Lyons and Tol (2010b) also showed that living in a capital city (London) is positively associated with vegetarianism. Leahy Lyons and Tol (2010c) found that at the aggregate level, in relatively rich countries, higher education is positively associated with vegetarianism, probably because people are more aware of the environmental, health or animal welfare benefits of following a meat free diet. We find that this is also the case at the individual level. Respondents who have completed certificates, diplomas, degrees or higher degrees are all significantly more likely to be vegetarians than respondents who left full time education after completing the Leaving Certificate. Respondents who left education after the Junior Certificate, on the other hand, are significantly less likely to be vegetarians.

We were not surprised by the fact that income does not play a significant role in explaining the vegetarian decision among adults in Ireland. Leahy Lyons and Tol (2010c) found that in very poor countries, the rate of vegetarianism can be high because people simply cannot afford meat. However, in developed countries such as Ireland, most people can afford to buy meat if they so wish. We were surprised, however, that none of the age variables were significant. It thus appears, that younger adults are not more likely to be vegetarians than their older counterparts in Ireland, as we had previously thought.

### **3.2 Partial Vegetarianism**

Table 3 shows the results of the ordered logit model in which we investigate the factors associated with varying levels of meat consumption among adults in Ireland. The dependent variable represents the level of meat consumption on an average day and varies between 0 and 8.6. Again, we test for individual and joint significance of the insignificant variables and only the results of the parsimonious model are presented.

[Table 3 about here]

As expected, females eat meat on fewer occasions than males. If we assume that portion sizes are the same in each sitting, we can conclude that females eat less meat.

Many of the health related variables are significant in this model. It is intuitive that respondents who take exercise and who are weight conscious eat less meat than those who do not because meat has a relatively high fat content. Similarly, the higher a person's bmi and the less fruit and vegetables he/she consumes, the more meat he/she eats. As was the case in the previous model, however, we cannot ascertain the direction of causation. Consistent with the health hypothesis is the finding that respondents who drink alcohol less than once a month or 3-4 times a month eat significantly less meat than those who consume alcohol 2-3 times a week. Furthermore, the more alcoholic drinks a person consumes each time he/she is drinking alcohol, the more meat he/she consumes. The odds ratio on smoker also supports the hypothesis that partial vegetarianism may be a health related decision. Smokers eat meat significantly more often than non smokers in our sample.

Respondents who were born in Great Britain eat 23% less meat than respondents who were born in Ireland. This is an interesting finding but we would need more information on their ethnic, religious, cultural, and class background to ascertain why this is the case. While the quality of life variables were not significant in the previous model, respondents who consider their quality of life to be very poor eat 34% less meat than those who have a good quality of life. It does not appear that this can be explained by a loss of appetite in general, however. The SLÁN data shows that the total food consumption variable is not lower for these respondents. The causation may be reversed, of course: Those that cannot afford to eat as much meat as they would want report a low quality of life.

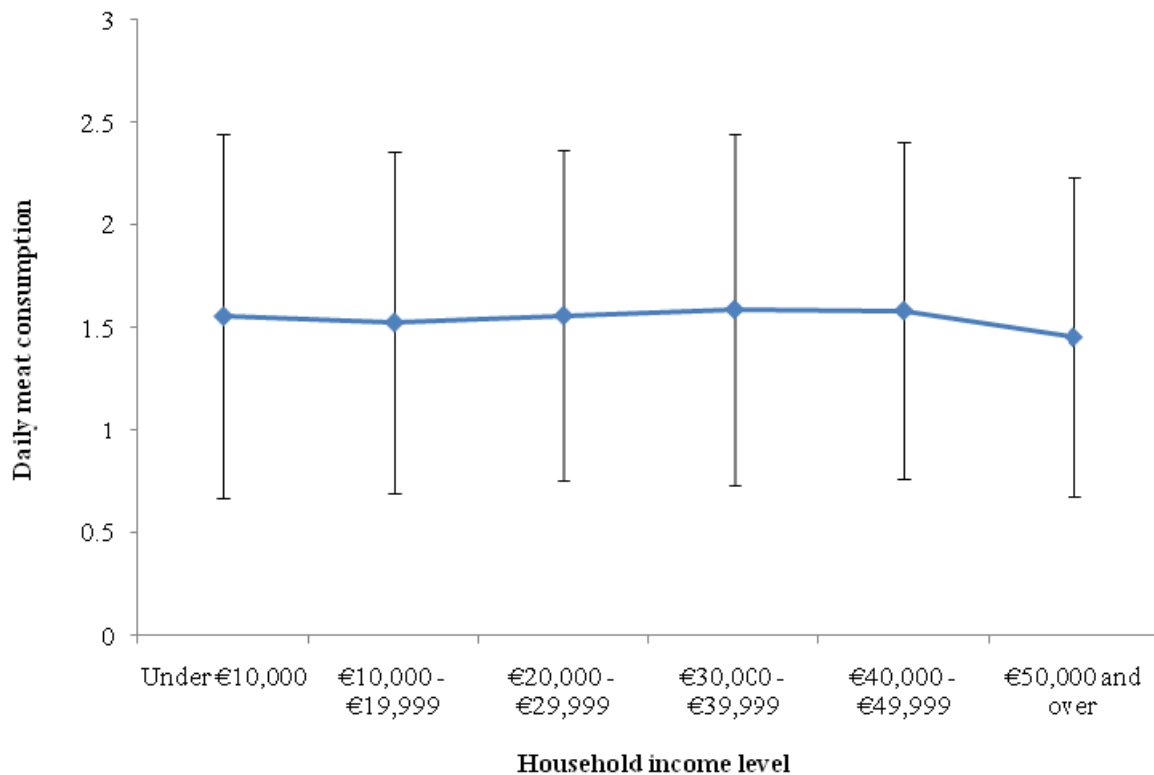
As was the case in the vegetarian model, higher levels of education are associated with lower levels of meat consumption, probably because respondents who are relatively well educated are aware of health and environmental benefits of reducing the amount of meat they consume. However, the odds ratio on the "educatio~2" variable contradicts this hypothesis. These respondents left full time education after completing the Junior Certificate but we find that they eat significantly less meat than those who completed the Leaving Certificate. As we have also controlled for income, we cannot presume that these people eat less meat because of income constraints. In any case, cheap, but poor quality, meat items are available in Ireland.

Two of the work status variables are significant in the model. Farmers eat meat 62% more often than respondents in the reference category (employees) while those in the "other" category eat meat significantly less often. Consistent with our hypothesis that respondents in the higher social classes would consume less meat was the finding that professional or managerial workers eat significantly less meat than non manual and skilled manual workers.

The results for the age variables are interesting. We had expected to find that young people are more likely to be both vegetarians and partial vegetarians. However, respondents in the youngest age group eat 30% more meat than 30-44 year olds. Respondents in the third (45-64) and fourth (over 65) age groups eat significantly less meat, however. This may be a habituation effect. Older adults may consume less meat because of income constraints at some time in their past.

The income variables are again not significant. Figure 3 shows the relationship between meat consumption levels and household income. The standard deviations are also shown. The average person consumes meat 1.5 times a day and this does not vary much across income levels. Respondents in the highest income group eat meat on fewer occasions than any other income group. However, we do not know how meat consumption varies for levels of income higher than €50,000.

**Figure 3. Meat consumption and income**



#### 4. Discussion and Conclusion

In this paper, we investigate the factors associated with vegetarianism at the individual level. We find that sex, marital status, living in Dublin, level of education and work status are all significantly associated with vegetarianism. Some of the health related variables also prove

statistically significant in our model; bmi, daily fruit and vegetable consumption, and the frequency of alcohol consumption. The identification of causal relationships between some of the variables and vegetarianism is constrained by the data. We are unable to correct for problems of simultaneity due to the lack of suitable instrumental variables and because the data are cross sectional. Also, due to data limitations, we cannot test the hypotheses that people become vegetarians for health, environmental or animal welfare reasons.

We also investigate the factors driving the frequency of meat consumption. Being female, being born in Great Britain, having a poor quality of life, being in the professional or managerial social class, or having an education level higher than the Leaving Certificate are all negatively associated with meat consumption frequency. The health related variables are also significantly associated with the level of meat consumption. Having a relatively high bmi, being a smoker and consuming many units of alcohol in one sitting are all positively associated with meat consumption levels. On the other hand, eating a lot of fruit and vegetables, watching one's weight, taking exercise and rarely or occasionally consuming alcohol are negatively related to a respondent's meat consumption level.

Leahy Lyons and Tol (2010b) found that the larger the household, the more often meat is consumed. It thus appears that there are economies of scale in food consumption and small households may be deterred from consuming meat as often because of the associated cost, limited life span of meat, or the effort required in preparation. We were unable to include this variable in the models in this paper. Nor were we able to control for ethnicity, culture, religion or the number of other vegetarians living in the household, both of which could prove to be important factors in explaining vegetarianism and meat consumption frequency.

Vegetarianism is quite stable across relatively low levels of income. The level of vegetarianism is lowest among respondents belonging to the second lowest income group. Interestingly, however, these respondents eat meat on fewer occasions than respondents in most of the other income groups. We do not know how vegetarianism or meat consumption varies for income levels above €50,000. As expected, vegetarianism increases with education. Almost 2.9% of respondents with a higher degree are vegetarian while the figure is less than 1.0% for respondents with primary education or for those who are educated to Junior Certificate level.

This is probably because the well educated are aware of the health and environmental benefits that are associated with a low meat, if not a meat free, diet.

## Acknowledgements

The Energy Policy Research Centre of the Economic and Social Research Institute provided financial support.

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**Table 1. Descriptive statistics**

<b>Variable</b>	<b>Description</b>	<b>Obs</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
<b>Dependent variables</b>						
vegetarian	1 if respondent is a vegetarian, 0 if not	6893	1.61%	12.59%	0%	100%
meatfreq	Times per week respondent consumes meat	6893	1.54	0.82	0	8.57
<b>Explanatory variables</b>						
bmi	Body Mass Index	6504	25.66	4.49	11.24	60.28
fruitveg	Daily portions of fruit and vegetables	6893	6.95	3.39	0	30.08
alcohol	Typical number of drinks when drinking alcohol	5298	4.45	3.48	1	20
smoker	1 if respondent is a smoker, 0 if not	6893	0.26	0.44	0	1
female	1 if respondent is a female 0 if not	6893	0.59	0.49	0	1
active	1 if respondent is physically active regularly, 0 if not	6893	0.54	0.50	0	1
medicalprob	1 if respondent has medical problems, 0 if not	6893	0.09	0.29	0	1
watchweight	1 if respondent watches his/her weight, 0 if not	6893	0.45	0.50	0	1
<b>Frequency of alcohol consumption</b>						
daysdrin~1	Never	6865	0.20	0.40	0	1
daysdrin~2	Monthly or less	6865	0.17	0.38	0	1
daysdrin~3	3-4 times a month	6865	0.25	0.43	0	1
daysdrin~4	Reference category: 2-3 times a week	6865	0.29	0.46	0	1
daysdrin~5	At least 4 times a week	6865	0.08	0.28	0	1
<b>Health Status</b>						
healthst~1	Excellent	6874	0.22	0.41	0	1
healthst~2	Reference category: Very good	6893	0.36	0.48	0	1
healthst~3	Good	6874	0.29	0.45	0	1
healthst~4	Fair	6874	0.11	0.31	0	1
healthst~5	Poor	6874	0.03	0.16	0	1
<b>Education level</b>						
educatio~1	Primary not completed	6893	0.03	0.16	0	1
educatio~2	Primary	6893	0.13	0.34	0	1
educatio~3	Junior Certificate	6893	0.20	0.40	0	1
educatio~4	Reference category: Leaving Certificate	6893	0.25	0.43	0	1
educatio~5	Diploma/Certificate	6893	0.19	0.39	0	1
educatio~6	Degree	6893	0.11	0.31	0	1
educatio~7	Higher degree	6893	0.10	0.30	0	1
<b>Social status</b>						
socialcl~1	Professional and managerial	6893	0.35	0.48	0	1
socialcl~2	Reference category: Non manual and skilled manual	6893	0.39	0.49	0	1
socialcl~3	Semi-skilled and unskilled	6893	0.15	0.36	0	1
socialcl~4	Unclassified	6893	0.11	0.31	0	1
<b>Work status</b>						
workstat~1	Reference category: employee	6893	0.45	0.50	0	1
workstat~2	Self Employed	6865	0.08	0.28	0	1
workstat~3	Farmer	6865	0.03	0.18	0	1
workstat~4	Student	6865	0.04	0.19	0	1



<b>Variable</b>	<b>Description</b>	<b>Obs</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
workstat~5	Training Scheme	6865	0.01	0.08	0	1
workstat~6	Unemployed	6865	0.02	0.16	0	1
workstat~7	Sick/Disabled	6865	0.03	0.18	0	1
workstat~8	Home duties	6865	0.15	0.35	0	1
workstat~9	Retired	6865	0.17	0.38	0	1
worksta~10	Other work status	6865	0.01	0.10	0	1
<b>Household tenure</b>						
tenure_1	Mortgage holder	6846	0.39	0.49	0	1
tenure_2	Renting from local authority	6846	0.08	0.27	0	1
tenure_3	Renting privately	6846	0.12	0.33	0	1
tenure_4	Reference category: Owned outright	6893	0.40	0.49	0	1
tenure_5	Other tenure	6846	0.01	0.10	0	1
<b>Location of household</b>						
location_1	Reference category: Open country	6893	0.32	0.47	0	1
location_2	Village	6812	0.12	0.32	0	1
location_3	Town	6812	0.25	0.43	0	1
location_4	City	6812	0.11	0.32	0	1
location_5	Dublin city or county	6812	0.20	0.40	0	1
<b>Location born</b>						
born1	Reference category: Ireland	6893	0.86	0.34	0	1
born2	Northern Ireland	6869	0.01	0.11	0	1
born3	Great Britain	6869	0.07	0.25	0	1
born4	Other location	6869	0.05	0.23	0	1
<b>Quality of life</b>						
lifequal_1	Very Poor	6850	0.01	0.12	0	1
lifequal_2	Poor	6850	0.02	0.15	0	1
lifequal_3	Ok	6850	0.07	0.25	0	1
lifequal_4	Reference category: Good	6893	0.49	0.50	0	1
lifequal_5	Very good	6850	0.41	0.49	0	1
<b>Household income</b>						
income_1	Under €10,000	6241	0.04	0.21	0	1
income_2	€10,000-€19,999	6241	0.19	0.39	0	1
income_3	€20,000 -€20,999	6241	0.18	0.38	0	1
income_4	€30,000 -€39,999	6241	0.16	0.37	0	1
income_5	€40,000 - €40,999	6241	0.15	0.36	0	1
income_6	Reference category: Over €50,000	6893	0.25	0.43	0	1
<b>Age</b>						
age_1	18-29	6893	0.17	0.38	0	1
age_2	Reference category: 30-44	6893	0.32	0.47	0	1
age_3	45-64	6893	0.32	0.47	0	1
age_4	65 or over	6893	0.19	0.40	0	1
<b>Marital status</b>						
maritals~1	Single	6883	0.27	0.44	0	1
maritals~2	Cohabiting	6883	0.06	0.24	0	1
maritals~3	Reference category: Married	6893	0.52	0.50	0	1
maritals~4	Separated	6883	0.04	0.20	0	1
maritals~5	Divorced	6883	0.02	0.13	0	1
maritals~6	Widowed	6883	0.09	0.28	0	1

**Table 2. Determinants of vegetarianism**

	<b>Odds Ratio</b>	<b>Std. Err.</b>	<b>z</b>	<b>P&gt; z </b>
female	1.55	0.4	1.68	0.092*
maritals~1	1.73	0.4	2.37	0.018**
workstat~2	2.25	0.74	2.49	0.013**
workstat~7	2.57	1.25	1.94	0.052*
workstat~8	1.76	0.51	1.97	0.049**
location_5	1.62	0.37	2.13	0.033**
bmi	0.94	0.02	-2.41	0.016**
fruitveg	1.17	0.03	6.66	0***
daysdrin~1	1.97	0.49	2.68	0.007***
daysdrin~2	1.71	0.47	1.94	0.052*
educatio~3	0.25	0.14	-2.56	0.01***
educatio~5	1.95	0.52	2.51	0.012**
educatio~6	1.93	0.61	2.08	0.038**
educatio~7	1.87	0.62	1.91	0.056*
Number of observations	6387			
LR $\chi^2(14)$	119.51			
Prob > $\chi^2$	0			
Pseudo R <sup>2</sup>	0.1161			
AIC	940.28			
BIC	1041.71			

**Table 3. Determinants of partial vegetarianism**

	<b>Odds Ratio</b>	<b>Std. Err.</b>	<b>z</b>	<b>P&gt; z </b>
female	0.69	0.04	-6.52	0***
smoker	1.11	0.06	1.88	0.06*
daysdrin~2	0.86	0.06	-2.23	0.026**
daysdrin~3	0.89	0.05	-1.96	0.05**
alcohol	1.03	0.01	3.81	0***
active	0.91	0.05	-1.86	0.062*
watchweight	0.84	0.05	-3.21	0.001***
bmi	1.02	0.01	3.78	0***
fruitveg	0.97	0.01	-3.36	0.001***
born3	0.77	0.07	-2.76	0.006***
lifequal_1	0.66	0.16	-1.75	0.079*
educatio~2	0.83	0.07	-2.05	0.04**
educatio~5	0.76	0.05	-4.03	0***
educatio~6	0.73	0.06	-3.71	0***
educatio~7	0.54	0.05	-6.88	0***
workstat~3	1.62	0.25	3.11	0.002***
worksta~10	0.44	0.11	-3.29	0.001***
socialcl~1	0.75	0.04	-5.2	0***
age_1	1.31	0.1	3.64	0***
age_3	0.81	0.05	-3.37	0.001***
age_4	0.74	0.06	-3.56	0***
Number of observations	4597			
LR $\chi^2(21)$	468.27			
Prob > $\chi^2$	0			
Pseudo R <sup>2</sup>	0.0076			
AIC	62830.66			
BIC	69547.49			

**Table A1. List of meat items included in SLÁN**

Beef roast  
Beef: steak  
Beef: mince  
Beef: stew  
Beef burger  
Pork: roast  
Pork: chops  
Pork: slices/escalopes  
Lamb: roast  
Lamb: chops  
Lamb: stew  
Chicken portion or other poultry e.g. turkey roast  
Breaded chicken, chicken nuggets, chicken burger  
Bacon  
Ham  
Corned beef, spam, luncheon meats  
Sausages, frankfurters  
Savoury pies (e.g. meat pie, pork pie, steak & kidney pie, sausage rolls  
Liver, heart, kidney  
Liver paté  
Meat based lasagne

<b>Year</b>	<b>Number</b>	<b>Title/Author(s) ESRI Authors/Co-authors <i>Italicised</i></b>
<b>2011</b>		
	368	Modified Ramsey Discounting for Climate Change <i>Richard S.J. Tol</i>
	367	A Cost-Benefit Analysis of the EU 20/20/2020 Package <i>Richard S.J. Tol</i>
	366	The Distributional Effects of Value Added Tax in Ireland <i>Eimear Leahy, Seán Lyons, Richard S.J. Tol</i>
<b>2010</b>		
	365	Explaining International Differences in Rates of Overeducation in Europe <i>Maria A. Davia, Seamus McGuinness and Philip, J. O'Connell</i>
	364	The Research Output of Business Schools and Business Scholars in Ireland <i>Richard S.J. Tol</i>
	363	The Effects of the Internationalisation of Firms on Innovation and Productivity <i>Iulia Siedschlag, Xiaoheng Zhang and Brian Cahill</i>
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