# Working Paper No. 44/07

# Explaining off-farm labour supply: The importance of income

**by**

**Espen Bratberg,**
**Lars Petter Holgersen and Erling Vårdal**

SNF Project No. 2496
Modellutvikling og analyser av norsk matvarepolitikk

The project is financed by the Research Council of Norway

INSTITUTE FOR RESEARCH IN ECONOMICS AND BUSINESS ADMINISTRATION
BERGEN, January 2008
ISSN 1503-2140

## Abstract

We have collected a panel of 4,723 farm holders as of 1994. In 1995 these farmers face the choice either to continue or to quit farming, for example by working full time in an another industry. Presumable, when individuals take this choice, income possibilities in and out of farming will count. By using a multinomial logit model we investigate the empirical importance of income considerations. According to our econometric results, incomes enter significantly into the decision process.

## 1. Introduction

Most industrialised countries try to sustain a high national production in agricultural commodities. For this aim they give large subsidies to the agricultural sector. According to OECD (1998), 35 % of total production costs in agriculture is covered by subsidies, as an OECD average. For Norway the figure is as large as 70 %. Agriculture is unprofitable not only for the society. The return for a farmer working in agriculture is well below the return obtained in other industries. For example, in Norway the return from farm employment is 50 NOK (=$ 6.70) per hour, which is rather low compared to the return from working outside of the farm which is 150 NOK (=$ 20) (NILF,1998).

Since many farmers want to stay at the farm, off-farm employment has been a strategy to provide sufficient income. This kind of employment has increased all over the world. Before the World War II about six per cent of US farm operators worked 200 or more days of the year off the farm. In 1994 this percentage had increased to thirty per cent (Huffman, 1997). We have seen the same development in Norway, as the off- farm participation of farm household members has increased substantially the last 50 years (NILF, 1998).

The last years there has been a tendency for the level of subsidies to the agricultural sector to decline. Since future trade-rounds in WTO are expected to result in substantial reductions in trade barriers, declines in subsidies are expected to continue. Many less developed countries also have a large potential for agricultural production. As trade barriers are built down this potential may be taken out, which means a decrease in the agricultural production in industrialised countries. This may force many farmers in these countries to close or step down agricultural production. This raise the question of how this group of farmers can be absorbed in the labour market outside the farm.

There exists a rich literature on explaining farmers' participation in the off-farm labour market. In Table 1 we have reviewed a representative sample of articles. Typically, the analyses utilised are based on neo-classical labour supply theory. The decision unit is a farm household which is supposed to maximise utility over total household consumption and leisure subject to constraints on total household time, income and farm production. Farm households have the possibility of holding multiple jobs, one of which is self-employment. In most of the studies, an off-farm labour supply relationship is also estimated. The results from these estimations are reported in Table 2.

We can distinguish between analyses which deal only with the farm operator's time allocation and those for the aggregate farm household. In Table 1, Huffman (1980) and Woldehanna et. al. (2000) study the behaviour of the farm household while in Sumner (1982) and Weersink (1992) the farm operator is the object. Since we try to explain the behaviour of Norwegian farm operators, the last two articles are the most relevant for our research.

In the second column of Tables 1-2 we have written in the signs derived from the theoretical model of Sumner (1982). Sumner examines the off-farm labour decisions of Illinois farmers who allocate their time between non-work activities, farm work and off-farm work. He estimates the off-farm participation decision by a maximum likelihood estimation of a probit function and the off-farm labour supply by a log-linear form using ordinary least squares methods. The empirical results of Sumner are written into column four of table one.

Table 1: Participation in off-farm work

| Variable | Theory | Earlier empirical studies | | | |
|---|---|---|---|---|---|
| | | Huffman, 1980 | Sumner, 1982 | Weersink, 1992 | Woldehanna, 2000 |
| **Wage rate, operator** | | + | | | + |
| **Wage rate, spouse** | | - | | | |
| **Farm output** | - | - | | | -[3] |
| **Age, operator** | + | + | + | +[2] | |
| **(Age, operator)$^2$** | - | - | - | | |
| **Children <5 years of age** | ? | - | +[1] | | |
| **Education, operator** | ? | + | + | + | + |
| **Education, spouse** | ? | + | - | | |
| **Agricultural education** | - | | + | + | |

+ indicates a positive relationship.
- indicates a negative relationship.
Dark shaded cells indicate 1 % significance level.
Brighter shaded cells indicate 5 % significance level.
No shading indicates statistical insignificance.
1) number of children irrespective of age.
2) measured by categorical variables.
3) farm profit in stead of output

We see that he finds the age profile to be concave: For young farmers off-farm work participation increases with age. For old farmers the opposite is true. Children give a tendency for the operator to work outside the farm. The length of the operator's education leads to an

increase in his participation in off-farm work. The opposite is true for the spouse. Unexpectedly, agricultural training leads to an increase in off-farm work participation.

Weersink (1992) examines the off-farm labour decisions of Ontario swine producers using a theoretical household production model. To estimate the participation decision rule, Weersink specifies a multivariate logit model. We see that his results accords with those of Sumner.

Huffman (1980) is the standard reference in the literature. Using a logit participation model, he examines how changes in the level of education and agricultural extension affect farmers' allocation of time between farm and off-farm work. His research is based on county averages per farm for Iowa, North Carolina and Oklahoma. The labour supply decisions are being treated as part of a set of joint decisions made by multiple-person farm households on inputs for household consumption and for farm production. We see that an increase in the wage rate gives a significant increase in the off-farm work participation, i.e. the substitution effect dominates the income effect. An increase in the wage rate of the wife has the opposite effect. In two cases the results differ from those in Sumner. First, Huffman finds (expectedly) that children tends to reduce off-farm work participation. However, in Huffman's study the children are under five years of age, while Sumner counts children irrespective of age. Second, in Huffman (1980) the length of the education of the spouse contributes positively to the operator's off-farm work participation.

Woldehanna & al. (2000) estimate a double hurdle model of off-farm work participation and off-farm work labour supply. They find that rationing and unexpected transaction costs inhibit farm households from participation in off-farm work. The empirical results of Woldehanna & al. written in Table 1 accord with the other studies.

Table 2 reports the results from off-farm labour supply estimation. The results in the table are somewhat mixed. Both Huffman and Sumner find that an increased wage rate increases the labour supply. Unexpectedly, Woldehanna & al. report the opposite. Farm output is in all studies found to reduce the labour supply. In the case of children, the empirical results are also unambiguous. The signs of the age variables of Huffman and Sumner are as expected. Again Woldehanna & al. come out with the opposite conclusion. The results from the length of the general education are rather mixed. However, as for agricultural education the sign in the various studies is unambiguous and accords with theory.

Table 2: Off-farm labour supply

| Variable | Theory | Empirical studies | | |
|---|---|---|---|---|
| | | Huffman, 1980 | Sumner, 1982 | Woldehanna,[2] 2000 |
| **Wage rate, operator** | + | + | + | - |
| **Wage rate, spouse** | | - | | |
| **Farm output** | | - | | - |
| **Age, operator** | + | + | + | - |
| **(Age, operator)$^2$** | - | - | - | + |
| **Children <5 years of age** | ? | + | +[1] | |
| **Education, operator** | - | + | + | - |
| **Education, spouse** | ? | + | - | |
| **Agricultural education** | - | | - | - |

+ indicates a positive relationship.
- indicates a negative relationship.
Dark shaded cells indicate 5 % significance level.
Brighter shaded cells indicate 10 % significance level.
No shading indicates statistical insignificance.
1) Number of children irrespective of age
2) Woldehanna estimates off-farm wage income

Our study will follow the reviewed articles by estimating an off-farm work participating and off-farm labour supply function. We will depart from earlier work in important ways. Most importantly, we focus on wage considerations in the decision of whether and how much to work off the farm. In the models we have reviewed, the farmer compares the gain from a marginal hour spent in agriculture with the gain from off-farm work and the gain from leisure. The gain in off-farm work is measured by an off-farm wage rate. The gain from agricultural work is measured either indirectly through a production function (Huffman, Sumner and Weersink) or through a profit function (Woldhanna & al.). However, our data allows us to estimate the gain from agricultural work directly.

The method for estimating the gain from agricultural work is explained in section 3. In section 2 our econometric method, which is a multinominal logit model, is set out. Our data set consists of 4,723 individuals who worked as farmers in 1994. In 1995 they face the following choice: To continue farming, either full or part-time, or to quit farming. These choices will depend on in- and off-farm wages, characteristics as age, education, income of the spouse, number of children, etc. In section 4 we present the results of the econometric analysis.

## 2. Econometric method

We follow a standard route and use the multinomial logit model to consider farmers who make a one-shot choice of labor force status in 1995, conditional on their characteristics in 1994. Assume that farmer *i*'s utility of choosing labor force status *j* among alternatives 0, 1, …, *J*, is

$$U_{ij} = \boldsymbol{\beta}_j' \mathbf{X}_i + u_{ij}, \tag{1}$$

where $\mathbf{X}_i$ denotes individual characteristics, $\boldsymbol{\beta}_j$ denotes a vector of coefficients specific to state *j*, and $u_{ij}$ is a random term. Let $P_{ij}$ denote the probability that state *j* is chosen. If the $u_{ij}$ terms are independently and identically distributed with the type I extreme-value distribution, utility maximization leads to the well-known multinomial logit model,

$$P_{ij} = \frac{\exp(\boldsymbol{\beta}_j' \mathbf{X}_i)}{\sum_{k=0}^{J} \exp(\boldsymbol{\beta}_k' \mathbf{X}_i)}, j = 0,...,J. \tag{2}$$

Some normalization is necessary to estimate the model. The standard approach, also taken in this paper, is to let $\boldsymbol{\beta}_0 = \mathbf{0}$.

The explanatory variables in the $\mathbf{X}$ vector consist of the income opportunities associated with the different labor force states, variables that are assumed to affect the marginal utility of leisure, and other socio-economic characteristics. More details are provided in the next section.

For interpretation of the results, it is straightforward to show that the marginal effect of a change in some variable $X_{ik}$ on the probability of choosing state *j*, $P_{ij}$, is

$$\frac{\partial P_{ij}}{\partial X_{ik}} = P_{ij}(\beta_{jk} - \sum_{m=0}^{J} P_{im}\beta_{jm}). \tag{3}$$

This expression may be evaluated by averaging over individuals or by inserting the mean values of the explanatory variables in equation (2).

## 3. Data Sources

The analysis draws on data from the KIRUT database. The base contains detailed information on socio-economic background, labour market anticipation and social insurance payments for a random 10 % sample of the Norwegian population between the ages 16-67. The information is merged from different public registers, with the consent and supervision of the Norwegian Data Protection Agency. The large size of the sample leads to a certain time lag in the processing of the data. This means that the most recent data go somewhat back in time, in our case to 1995.

We have identified the farmers by merging the KIRUT database with the public register for agricultural subsidies. The first year with information is 1989. We restrict our sample to contain only stable farmers, i.e. which have received subsidies all the years 1989-1994. A total of 5,489 stable farmers were identified. For various reasons we further reduced the sample to 4,723[1]. Occasionally we need to compare farmers with non-farmers. For this aim we selected randomly a control group which consists of 5,000 non-farm individuals.

We will use the following variables to explain the transition from one year (1994) to another (1995): On-farm (wage) income, off-farm (wage) income, age, the income of the spouse, number of children less than 18 years of age, educational level, agricultural education, male and married. In addition, four regional dummies are included.[2]

We expect that the decisions of an individual are based on a comparison of the (yearly) income he will receive if he works full time outside the farm with that he will receive if he works fully on the farm. KIRUT contains information on the individuals' income provided by the tax authorities. Among the various income measures in KIRUT, we have utilized the *computed wage income*[3]. For wage earners this measure is simply gross wage income. For self-employed, the tax authorities compute this wage income in the following way: Profit from the self-employed activity (in our case farming) is the point of departure. From this,

[1] Some farmers were dropped out because of lack of registrations (63). We dropped people older than 66 years, since these farmers most likely retired in 1995 (287). Farmers with higher income than NOK 600.000 (29) or who worked more than 60 hours per week in off-farm work were dropped because we judge them as untypical (36). Farmers with taxable income equal to zero were also dropped (351).

[2] The province of Rogaland, Western Norway, Middle Norway and Northern Norway. Eastern Norway is the reference region.

[3] In Norwegian: Pensjonsgivende inntekt.

capital income is subtracted. The most important item here is the return on the invested capital[4]. Capital expenses, of which interest expenses on loans are the most important, are added.

In the next section we explain how we derive the wage income that the farmer will receive in off-farm work. The section thereafter explains how the (yearly) wage income from agricultural work is derived.

### 3.1 Off-farm yearly wage income

KIRUT contains detailed information on work relationships, including a 4-digit industry code. For farmers that work off-farm their incomes are a mixture between incomes from agricultural and non-agricultural activities. Unfortunately, we have only information on the total income, not on its composition.

We have computed the yearly income from off-farm work indirectly by using information based on the 5,000 individuals from the control group. I.e. we have computed the income of full time workers in the same industries as the farmers' off-farm work took place.

The computation of the (potential) non-farm yearly income for farmers that have no off-farm work was done as follows: From the control group (5000 individuals) we chose full-time employed individuals in 1994. These were categorized according to type of education and a mean income was found for all types of education, a total number of 18 types. The potential income for full-time farmers was then set according to the education they had.

### 3.2 Wage income from farming

For farmers working on-farm only their yearly income are set equal to the computed wage income as found in KIRUT.

The wage income of farmers that also work off-farm comes from farm and non-farm activities. As mentioned earlier we have information on total income, not on its composition. We therefore try to estimate the farm part. Our procedure here is to first estimate the non-farm part and then subtract that part from total wage income. This is done in the following way: In

[4] The rate of return used by the authorities is 13.5 %.

KIRUT we have information on whether an individual works 4-19 hours per week, 20-29 hours or more than 30 hours. We have translated these categories into 12, 25 and 37,5 hours per week respectively, weighted with the fraction of a year the job lasted. The non-farm part of the income is computed in the following way:

$$\text{Wage income off-farm} = \frac{hours\ \ off\ \ farm\ \ work}{37,5} * (\text{ yearly wage in the industry the farmer works})$$

Wage income from farm work, $Y_i^F$ , is estimated as

$$Y_i^F = \text{total wage income - wage income off-farm.}$$

This estimate is for the income from part-time work on the farm. If he works less off-farm, he can work more on farm. Naturally, we do not know the return from this switch. We have here estimated the marginal wage rate from working in agriculture by regressing $Y_i^F$ on (yearly) hours in off-farm work. The resulting estimate on the hourly on-farm wage rate was NOK 55.60. Based on this estimate we compute the part-time farmer's potential yearly income in agriculture as:

Yearly farm income = estimated on-farm wage income + 55.60*hours worked off-farm* 48 weeks

### 3.3 Descriptive statistics

The descriptive statistics of the explanatory variables are given in Table 4. Observe that if a farmer works off-farm he will in average earn NOK 75.000 more per year compared to work as a farmer. As for the effect the various variables have on the different outcomes we make the following predictions:

We expect to find that “Wage per year, as farmer” has a positive influence on the probability of becoming a fulltime farmer and a negative effect on the probability to quit as a farmer and start up in an off-farm job. We expect to find the opposite effect from the variable “ Wage per year, as non-farmer”.

When it comes to age, we expect this variable to have a non-linear effect. Up to a certain age we find it reasonable that age increases the chance of being a full-time farmer and as the farmer becomes older we anticipate that age increases the probability to quit and find another job. The reason for this expectation is that young people might be in a phase where they are waiting for the moment to inherit the farm. When they get older they focus more of their energy on the farm, and when they pass a certain age they prepare to hand over the farm to one of the children by working more off-farm.

Table 4: Descriptive statistics

| Variable | Mean | Std. Dev | Min | Max |
|---|---|---|---|---|
| Wage per year, as farmer | 125980 | 78479.97 | 100 | 564900 |
| Wage per year, as non farmer | 202836.3 | 39960.85 | 41100 | 463115 |
| Age | 48.0506 | 9.427681 | 23 | 66 |
| $(Age)^2$ | 2397.723 | 907.131 | 529 | 4356 |
| Spouse Income | 90472.79 | 85270.17 | 0 | 943700 |
| Number of Children<18 | .9493966 | 1.193916 | 0 | 8 |
| Educational Level | 10.32818 | 2.239254 | 7 | 20 |
| Agricultural Education | .2614863 | .4394908 | 0 | 1 |
| Male | .9415626 | .2345936 | 0 | 1 |
| Married | .7762016 | .4168327 | 0 | 1 |
| Rogaland County | .0942198 | .2921652 | 0 | 1 |
| Western Norway | .2799068 | .4490008 | 0 | 1 |
| Middle Norway | .1526572 | .3596948 | 0 | 1 |
| North Norway | .1009951 | .3013542 | 0 | 1 |

The income of the spouse is of importance. We expect that the higher the income of the spouse is, the less money is needed from the farm operator to support the family, and the more likely is it that he works full time as a farmer.

If the individuals have children, number of children will most likely have influence on the farmer's adjustment process. Farms are often considered to be a good place for children to

grow up. Ceteris paribus, we expect that children increase the probability for the farm operator to work at the farm on a full-time basis.

We expect people with long education to search for jobs according to the education they have. Moreover, farmers with agricultural education are expected to have a higher probability to become full time farmers then those without.

The regional variables are organized as dummies with Eastern Norway as reference group. These variables will hopefully reveal differences among the regions.

## 4. Results

The results from the multinomial logit model, reported as coefficients and marginal-effects, are given in Table 5. We focus on how the wages affect the transition into one of the following outcomes: *Farm work only, Part time farmer* and *Quit, new full time job.* We don't comment on the outcome *Quit.* This group contains people quitting for various reasons, other than starting up in another job. The group is rather heterogenous and therefore not of particular interest.

Our main finding is that a higher *WAGE PER YEAR AS FARMER* has a positive effect on the probability of being a full-time farmer. An increase in the on-farm wage also has a negative influence on the farmers' chances of becoming a part time farmer and to quit and start up in another occupation. The marginal effect is in all three cases significant on at least a 5 % level.

*WAGE PER YEAR AS NON-FARMER* pulls in the other direction. A higher off-farm wage has a positive effect on the probability of leaving agriculture to find a new job outside the farm. A higher wage off the farm increases the probability to work more in other industries. The marginal effect is significant in both *Farm work only* (negative) and *Part time farmer* (positive), but not for *Quit, another job*.

*AGE* and $(AGE)^2$ are included as variables. The interpretation of the results in Table 5 is that middle-age farmers has a higher probability to end up in *Farm work only* group compared to older and younger farmers.

*SPOUSE INCOME* seems to be important in explaining the adjustment process. The higher the income of the spouse the easier it is for the farmer to work on-farm only, presumably

because they as a couple is less dependent on the income from the farm. The results also show that higher *SPOUSE INCOME* has a significant negative influence on the *Part time farmer* category. Surprisingly it also has a positive effect on *Quit, another job*. One would anticipate that higher *SPOUSE INCOME* should result in lower risk of quitting and higher probability of only being a farmer.

The positive marginal effect of number of children below 18 indicates that farmers look upon a farm as a good place to bring up children. And by choosing to be full time farmers they indicate a strong will to spend time together with their children. To support this conclusion we see from Table 5 that number of children has a significant negative effect on ending up in the *Part time farmer* group.

Educational information is included in the analysis to access the effect of human capital. We find that the longer education they have, the less is the probability that the individual can be classified as a full time farmer. Farmers with high education are more likely to be a *Part time farmer* or quit as a farmer and start up in another industry. Higher education implies a higher earning potential outside the farm. People with long education are also influenced by the educational environment they have attended, and thereby they are more aware about the opportunities that exists. We have also used a variable indicating if the individual had *AGRICULTURAL EDUCATION* or not. This variable shows that farmers with *AGRICULTURAL EDUCATION* are more likely to become *Full time farmer* then others, and this type of education have negative influence on all other groups.

According to the results from the multinomial logit model, it seems that gender doesn't affect the adjustment process particularly. We only find that *MALE* has negative effect on the inhomogeneous *Quit* group.

As expected *MARRIED* individuals adjust differently from singles. *MARRIED* increases the probability of being a *Part time farmer*, and it reduces the chances of ending up in the *Full time farmer* category. A simple explanation for this result is that farm work is heavy and time-consuming. Single persons will therefore often not be able to handle more than one job. Married couples on the other hand have the opportunity to share the farm work between them and have a job outside the farm.

Table 5: Estimation results

| Explanatory variables | Quit | Farm work only | | Part-time farmer | | Quit, new full-time job | |
|---|---|---|---|---|---|---|---|
| | Marginal effect | Coefficient | Marginal effect | Coefficient | Marginal effect | Coefficient | Marginal Effect |
| | (Std. dev.) | (Std. dev.) | (Std. dev.) | (Std. dev.) | (Std. Dev.) | (Std. dev.) | (Std. Dev.) |
| Wage per year, as farmer | 5.15e-08* (4.34e-08) | -2,93e-06*** (3,43e-06) | 6,66e-07* (1,03e-07) | -6,04e-06* (1,36e-06) | -6,91e-07* (1,02e-07) | -5,77e-06* (2,03e-06) | -2,69e-08** (2,31e-08) |
| Wage per year, as non farmer | -4.30e-08 (4.37e-08) | -2,12e-06 (1,32e-06) | -2,25e-06* (2,18e-07) | 9,85e-06* (3,47e-06) | 1,18e-06* (2,13e-07) | ,00001** (4,43e-06) | 1,08e-07 (4,27e-08) |
| Age | -.0043* (.0014) | ,2916* (,1084) | -,0273* (,0077) | ,4297* (,1110) | ,0318* (,0076) | ,3233** (,1582) | -,0001 (,0017) |
| $(Age)^2$ | .0001* (.00001) | -,0036* (,0011) | ,0003* (,0001) | -,0053* (,0011) | -,0004* (,0001) | -,0038** (,0016) | 5,13e-06 (,00002) |
| Spouse income | 1.75e-08 (1.75e-08) | -9,98e-07 (1,38e-06) | 2,25e-07** (1,03e-07) | -2,23e-06 (1,41e-06) | -2,94e-07* (1,02e-07) | 2,06e-06 (1,73e-06) | 5,11e-08* (1,77e-08) |
| Number of kids <18 | -.0003 (.0019) | ,0602 (,1462) | ,0232* (,0080) | -,0366 (,1480) | -,0202* (,0078) | -,1589 (,1950) | -,0027 (,0019) |
| Educational Level | -.0010 (.0008) | ,0205 (,0668) | -,0361* (,0040) | ,1847* (,0674) | ,0360* (,0039) | ,1534*** (,0834) | ,0011 (,0008) |
| Agricultural Education | -.0027 (.0038) | ,5397*** (,3012) | ,2122* (,0189) | -,3881 (,3079) | -,1990* (,0187) | -,4951 (,4473) | -,0105** (,0048) |
| Male | -.0095*** (.0052) | ,8804** (,4036) | ,0951* (,0382) | ,5081 (,4131) | -,0746** (,0323) | -,00006 (,5398) | -,0110** (,0056) |
| Married⊕ | -,0044 (,0037) | ,1663 (,2871) | -,1101* (,0230) | ,6694** (,2971) | ,1105* (,0228) | ,6068 (,4459) | ,0040 (,0051) |
| Rogaland County | -,0071 (,0058) | ,6033 (,4530) | ,0331 (,0281) | ,4753 (,4620) | -,0255 (,0277) | ,5184 (,6676) | -,0005 (,0073) |
| Western Norway | -,0084** (,0039) | ,5784*** (,3098) | -,0446** (,0184) | ,7938** (,3140) | ,0487* (,0180) | ,9366** (,4216) | ,0043 (,0043) |
| Middle Norway | ,0050 (,0037) | -,2660 (,2860) | ,0788* (,0236) | -,6642** (,2689) | -,0919* (,0235) | ,1488 (,4336) | ,0081*** (,0049) |
| North Norway | ,0019 (,0044) | -,1001 (,3431) | ,0274 (,0270) | -,2702 (,3537) | -,0425 (,0268) | ,7406 (,4745) | ,0132* (,0049) |
| Constant | ,0590*** (,0352) | -2,417 (2,734) | 1,3599* (,1824) | -8,548*** (2,792) | -1,3372* (,1797) | -10,004** (3,913) | -,0817*** (,0423) |
| N (%) | 92 (1,9) | 2881 (61,0) | | 1666 (35,3) | | 84 (1,8) | |

* = Significant: 1% level
** = Significant: 5% level
*** = Significant: 10% level

Place of residence is constructed as dummies with Eastern Norway as reference. Our analysis shows that people living in *WESTERN NORWAY* are more likely to become *Part time farmers* and less likely to become *Full time farmers*. The probabilities go in the opposite direction for farmers from *MIDDLE NORWAY* and *NORTH NORWAY*. This can be explained by the key words: topography, climate and income possibilities. Because of the topography in *WESTERN NORWAY,* farms are small compared to farms in the east. Moreover, it is quite easy to get a job outside the farm. On the other hand, farms in *MIDDLE NORWAY* are bigger than in western Norway. When it comes farmers from *NORTH NORWAY*, they will have a much harder time to find an off-farm job compared to their colleagues from the western part of the country. Besides, the farmers from the northern part of the country have to struggle with a

rough climate. It is therefore expected that they have a larger chance of leaving agriculture to start up in another industry, than farmers in the southern provinces of the country.

## 5. Conclusion

We have tried to explain labour market decisions of Norwegian farm holders as to continuing or quitting farming. The focus has been on the importance of wage income in explaining these decisions. Our main finding is that wages explain these choices significantly. The larger the return from working on the farm is, the larger is the tendency to continue as farming and the lower is the tendency to quit. Moreover, the larger the return from out of farm work, the larger is the tendency to quit farming.

## Literature:


Huffman, W.E: "Farm and Off-Farm Work Decision: The Role of Human Capital," *The Review of Economics and Statistics*, 62,1980: 14-23

Huffman, W.E and H. El-Osta (1997): Off-farm Work Participation, Off-farm Labour Supply and On-farm Labor Demand of U.S. Farm Operators". Staff Paper #290 Iowa State University.

NILF: *Driftsgranskninger i jord- og skogbruk. Regnskapsresultater,* Norsk institutt for landbruksøkonomisk forskning, Oslo 1998

OECD: Agricultural Policies, Markets and Trade in OECD countries. Monitoring and Evaluation 1996, Organisation for Economic Co-operation and Development, Paris 1996.

Sumner, D.A: "The Off-Farm Labor Supply of Farmers," *American Journal of Agricultural Economics,* 64, 1982: 499-509

Weersink, A: "Off-Farm Labor Decisions by Ontario Swine Producers," *Canadian Journal of Agricultural Economics*, 1992:235-251

Woldehanna, T., A.O. Lansink and J. Peerlings: "Off-farm work decisions on Dutch cash crop farms and the 1992 and Agenda 2000 CAP reforms," *Agricultural Economics*, 22, 2000: 163-171