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Determinants of Fast-Food Consumption in Kano Metropolis

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Abstract

Given the changes in consumption behavior which can be attributed to the proliferation of fast food outlets all over Kano metropolis, there is need to identify the determinants of fast food consumption in the study area. The study employed qualitative response econometric tool to examine the effects and significance of some of the factors responsible for determining the consumption of fast food in Kano metropolis. The research is premised upon the theory of consumer behavior. Four hundred and eight (408) residents were selected randomly across the eight (8) local government areas that constitute Kano metropolis. Ordered logistic regression was used to analyze the data. The study provides more insight into the trend of fast food consumption in Kano metropolis where gender, geographical location, type of occupation, price of fast food, amount of money and time spent on home-made food turned out to be significant in determining the likelihood of fast food consumption the study area. It is recommended that food pricing policy should be implemented to regulate fast food consumption. This is in addition to intensifying awareness campaign on the dangers of fast food consumption which should be targeted at male residents and inhabitants of the core urban centers of Kano Metropolis.

Keywords: Consumer Behavior, Fast food, Kano Metropolis, Food consumption, Nigeria

1. Introduction

Fast food has become a global phenomenon as more and more people are lured by it day in and day out irrespective of their demographic characteristics (Narayan; 2015). Fast food refers to all kinds of food that is prepared and served within a very short period of time usually in restaurants and food outlets. For example, pizza, burgers, chips, juices, ice cream, etc. Fast-food restaurants are those in which one can order, purchase, and receive the food in about ten (10) minutes (Spears & Gregoire; 2003). This includes traditional fast-food restaurants where customers order and receive food at counters and drive-in locations as well as fast/casual restaurants where customers order at counters and their food is delivered to the table. Farzana et al (2011) operationally defined fast food as quickly prepared, reasonably priced, and readily available alternatives to home cooked food. Broadly speaking, any meal with low preparation time can be considered as fast food. Nevertheless, it typically refers to the foods sold in a restaurant with low preparation time and served to the customer in a packaged form for take-away (Atinkut et al;2018). Fast food is therefore any food consumed away from home or out of home.

Research has shown that fast food consumption reveals a lot of secrets about an economy (Chris, 2017). This is because economies where majority of the populace are fully employed and engaged tend to prefer and consume fast food to home cooked meal. There is increasing appetite for fast food and that, has led to more providers springing up to meet these needs. Such high demands have not only been noted in developed countries such as the United States and South Korea but also in developing countries, Nigeria inclusive (Bakare and Olumakaiye, 2016; Hwam et al 2004 in Mukoru 2023). Fast food contains high amounts of harmful ingredients, such as refined carbohydrates, sugar, trans fats and preservatives. These substances improve food's taste, texture and longevity but possess adverse impacts on human health (Chai &Cheah; 2024).

Studies on consumption and demand revolve around analyzing the influence of certain variables like price, consumers' income and preferences on the demand for a commodity. Knowing how these factors can significantly determine the likelihood of consumers' demand for a commodity is of particular importance to existing and potential fast food producers especially looking at the increasing trend of individual and household expenditure on fast food.

Dunn et al (2011) used structural equations model to examine those variables believed to be influencing fast food consumption in Australia while relying on the theory of planned behavior. Their findings suggested that fast food consumption is influenced by specific referent groups as well as general demand for meals that are tasty, satisfying and convenient. These factors reflect immediate needs and appeared to override concerns about long term health risks associated with fast foods. Most of the factors identified to influence fast food consumption include lack of time for meal preparation, change in living condition, lack of cooking skills and utensils, fun and cravings, gender, socializing, convenience, availability of and density of food outlets, age group, ethnicity and so on. According to such studies, fast food is mostly consumed during lunch time. Data from the National Health and Nutrition Examination Survey during 2013-2016 indicated that 36.6% of adults consumed fast food on a given day. However, the percentage of adults who consumed fast food decreased with age where 44.9% are between 20-39; 37.7% range between 40-59 and 24.1% are 60 and above. Fast food consumption has increasing trend due to convenience, cost, menu choice, flavor and taste. In one of the most recent studies conducted in Nigeria by Mukoru et al (2023), about three out of five participants of their research consumed fast food, which was usually flour-based. The commonest pattern of fast-food consumption was lunch, with the commonest frequencies of once a day and thrice a week. The strongest reasons for consumption include being considered nutritious, being readily available, claiming it provides value for money, and being accessible.

Jasper (2002) investigated the socio-economic determinants of the likelihood of consuming fast food and house hold expenditure on the fast-food using USDA country survey of food intake by individuals for 1994-1998. It has been observed that 30% of children to over 50% of college students use fast food daily in the US. A study by Oadimeji et al (2017) indicated that 52% of students' expenditure per semester is dedicated to fast food consumption on ABU Zaria campuses. Significant determinants were age, gender, time spent away from hostel and amount of students' allowance. Similar studies were conducted by Mukoru et al (2023) in southwestern Nigeria where about 60% of the youth that responded to the study questions consume fast food regularly on the basis of accessibility, affordability and nutritional value. However fast-food consumption has its negative effect both health wise and income wise but are people ready to give up the habit of consuming fast foods? What factors significantly determine the likelihood of fast-food consumption in Kano metropolis? The specific aim of the study is therefore to empirically examine the influence of these factors on the likelihood of consuming fast food in the study area.

2. Literature Review

2.1. Theoretical Framework

Theory of Consumer's Demand

The traditional demand theory has its basis in the neoclassical utility analysis which assumes cardinal measurement of utility. The satisfaction which a consumer derives from a commodity can be measured quantitatively. This makes it easy for consumers to choose among different commodities by simply comparing the amount of utility of various commodities. Since they are assumed to be rational, we expect them to choose the commodity with the highest amount of utility. Lancaster (1966) in his working paper "A New Approach to Consumer Theory" states that consumers derive utility not from the actual contents of the basket but from the characteristics of the goods in it. And thus, goods should be defined not in terms of their physical properties but in terms of their characteristics or attributes that are demanded by the consumers, not the goods themselves. For example, consumers do not demand food in itself, but rather the nutrients and flavors in the food. Therefore, consumers' preferences can determine their demand for goods and services (Lancaster; 1990). These, imply that each consumer's demand is independent of others. However, individual demand is not independent of the demand of others in all situations. The bandwagon, snob and Veblen effects as identified by Leibenstein (1950) determine consumers' demand. The bandwagon effect represents a case of positive net externality in which a consumer increases his/her demand for a commodity in response to the growth in purchases of other individuals (Jhingan; 2004). While the snob effect takes place when a consumer reduces his demand for a commodity at a point when others are demanding more of it. This happens in situations where the consumer desires to be distinct from the 'crowd'. The Veblen effect on the other hand showcases a situation where a consumer demands for commodities due to their high prices. The Veblen effect is somewhat similar to the snob effect in the sense that in both, the consumer demands a commodity in order to be exclusive but the difference is that in the case of Veblen effect, price of the commodity is the determinant. All these effects could possibly apply in analyzing the demand for fast food because while some demand for fast food due to the satisfaction inherent in them, others patronize fast food joints in order to follow the crowd. Yet others may prefer to demand for fast food in order to distinguish themselves from the crowd.

3. Research Methodology

3.1. The Study Area

The chosen area of study is Kano Metropolis. Kano is a state in northwestern part of Nigeria and is the second largest industrial and commercial center in the country. Its metropolis comprises of eight (8) local government areas namely: Tarauni, Fagge, Dala, Municipal, Gwale Nassarawa, Ungogo and Kumbotso. The former six (6) are core urban while the latter two (2) are the peri- urban local government areas (Metro Kano; 2024). The rationale for choosing the study area lies in the concentration of fast-food outlets especially in the core urban areas of the state. This could largely be due to the commercial activities abound in these areas.

3.2. Population, Sample Size and Sampling Technique

According to the 2006 population census, the total population of Kano metropolis amounts to 2,828,861 while using the Yamane's precision formula as follows: n= N/1+N(e) 2; where e, the error margin was assumed to be 0.05. A value of 399.9 was arrived at after substituting in the formula which indicates the minimum required sample size must be at least 399.99. As such a sample size of 408 residents of Kano metropolis was used for the study. A stratified sampling technique was used so that each local government area is represented in the sample. Below is a summary of the sample:

Table 1: Sample Size by Local Government Area

Local government area	Sample size
Tarauni	45
Ungogo	61
Dala	50
Kano Municipal Council	51
Kumbotso	50
Nassarawa	51
Gwale	50
Fagge	50
Total	408

Source: Researchers' field survey (2025)

3.3. Model Specification

The ordered logistic regression was used to achieve the research objectives and facilitate testing of the hypotheses. The model follows the traditional demand function which assumes linear relationship between the demand for a commodity and the factors responsible for determining such demand. An ordered logistic regression is used to predict an ordinal dependent variable using one or more predictors (McCullagh; 1980). It is a form of regression analysis which models a discrete and ordinal dependent variable having more than two outcomes. The ordered logistic regression is stated as follows:

$$\mathbf{Y_{ij}= \alpha_{ij}+\beta_1 X_{ij}+e_{ij} \equiv Logit\ [p(Y \leq j)]=\alpha_j-\sum \beta_i X_i}$$

Where j=1,.....j-1 and i=1,....M
Y=0 if $y^* \leq \mu_i$
Y=1 if $\mu_1 < y^* \leq \mu_2$
Y=2 if $\mu_2 < y^* \leq \mu_3$
Y=n if $\mu_n < y^*$

$$Freq=\alpha+\beta_1 age+\beta_2 age^2+\beta_3 geoloc+\beta_4 gen+\beta_5 educ+\beta_6 occ+\beta_7 hmnt+\beta_8 ffmnt+\beta_9 hmtime+\beta_{10} health+e_i \quad \ldots\ldots(1)$$

Where, freq is an ordered categorical variable and captures the frequency of fast-food consumption by individual respondents.
Y=4 if respondent consumes fast food every day
Y=3 if respondent consumes fast food 3-5 times in a week
Y=2 if respondent consumes fast food once in a week
Y=1 if respondent does not consume fast food at all.
X represents the set of explanatory variables including:
Age: continuous variable measured on an interval scale
Geographical location: binary variable such that; core urban =2; peri urban =1
Gender: binary variable such that; male =1; female =0

Occupation: Multi categorical unordered variable such that; unemployed =0, self-employed=2, wage employed =3, wage and self-employed=4
Level of formal education: number of years spent in receiving formal education.
Time of fast-food consumption: multi categorical unordered variable such that; breakfast=1; lunch=2 and supper=3
Amount spent on home-made food: continuous variable measured on an interval scale
Amount spent on fast food: continuous variable measured on an interval scale
Time spent on preparation of home-made food: continuous variable measured on an interval scale
Health status: binary variable such that; being on diet=1; not on diet=0
Reasons for choosing fast food over home -made: multi categorical unordered variable such that:
Don't consume fast food=0
Convenience=1
Cheapness=2
Influence=3
Taste=4
Distance of workplace from home=5
Others (not having any other alternative but fast food) =6
β is the coefficient of the explanatory variables
α is the intercept of the regression
e is the random error term

4. Findings: Data Presentation and Analysis

4.1. Categorical Variables' Summanry

From table 2 below, about 73% of the respondents reside in the core urban areas of Kano metropolis. Majority of them are male (71%) while almost 41% of them have received formal education up to secondary level. In terms of employment, 38% of them are self-employed. While 27% of them are unemployed. Healthwise, only 32% of them have some dietary restrictions while 22% of the respondents do not consume fast food at all.

Table 2: Summary of Categorical Variables

S/N	Variables	Frequency	Percentage
1	Geographical location:		
	Peri-Urban (1)	112	27.45
	Core Urban (2)	296	72.55
	Total	408	100.00
2	Educational level:		
	Informal (0)	44	10.78
	Primary (6)	67	16.42
	Secondary (12)	167	40.93
	Tertiary (16)	130	31.86
	Total	*408*	100.00
3	Gender:		
	Female (0)	120	29.41
	Male (1)	288	70.59
	Total	408	100.00
4	Occupation:		
	Unemployed (0)	110	26.96
	Self-employed (1)	156	38.24
	Wage employed (2)	85	20.83
	Both self and wage employed (3)	57	13.97
	Total	408	100.00
5	Health status:		
	Not on diet (0)	256	62.75
	On diet (1)	152	37.25
	Total	408	100.00
6	Time of fast food consumption:		
	Don't consume at all (0)	*88*	21.57
	Breakfast (1)	*69*	16.91
	Lunch (2)	*182*	44.61
	Supper (3)	*69*	16.91
	Total	*408*	100.00

7	Reasons for fast food consumption:		
	Don't consume at all	88	21.57
	Convenience	0	0.00
	Cheapness	106	25.98
	Influence of friends/colleagues	41	10.05
	Taste	35	8.58
	Distance	132	32.35
	Others	6	1.47
	Total	408	100.00
8	Frequency of fast-food consumption:		
	Don't consume at all (1)	88	21.57
	Once in a week (2)	80	19.61
	3-5 times in a week (3)	113	27.70
	Every day (4)	127	31.13
	Total	408	100.00
9	Opinion on fast food:		
	Fast food is harmful (1)	171	41.91
	Some categories of fast food are healthy while some are not (2)	162	39.71
	Fast food is healthy (3)	75	18.38
	Total	408	100.00

Source: Researchers' field survey (2025)

4.2. Reasons for Fast Food Consumption

Figure I show the reasons why the respondents consume fast food. Majority of them consume fast food due to proximity of where they find themselves from home. Another large portion of them patronize fast food because they believe it to be cheap compared to home-made food.

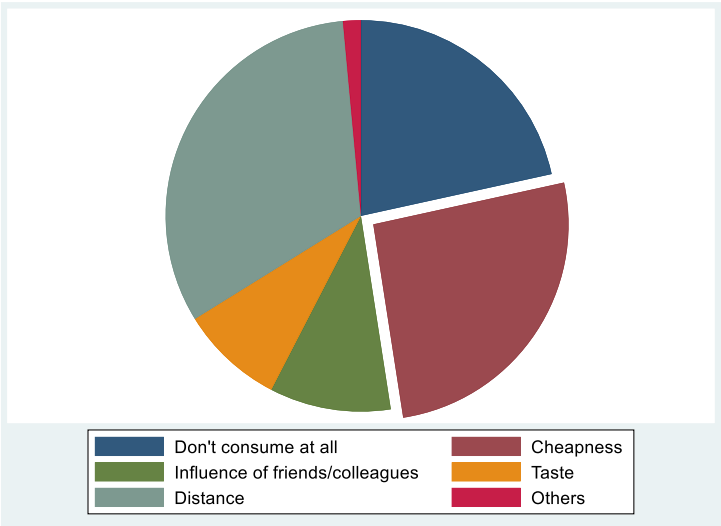

Figure I: Reasons for Fast Food Consumption

4.3. Descriptive Statistics

A further summary of the respondents' characteristics is shown on table 3 where the mean age of the respondents is 35 years. The average number of years spent by the respondents in receiving formal education is 11years. The respondents spend an average of N1500 on a single serving of fast food while the average amount spent on home-made food is a little less i.e. N 1200. While the average time spent in cooking at home is around 60minutes.

Table 3: Summary of Continuous Variables

S/N	Variables	Mean	Minimum value	Maximum value
1	Age	35	18	65
2	Educational level (Years of formal education)	11	0	16
3	Amount spent on fast food (₦)	1,490	1,000	2,000
4	Amount spent on home-made food(₦)	1,194	0	2,000
5	Time spent on home-made food (Minutes)	57	30	90

Source: Researchers' field survey (2025)

4.4. Ordered Logistic Regression

Table 4 shows the coefficients of the ordered logistic regression which indicates how well the socio-economic characteristics of the respondents determine their likelihood of fast-food consumption. Those variables that turn out to be statistically significant in determining the chances of fast-food consumption include geographical location of the respondents, their gender, engagement in paid employment, amount spent on homemade food, amount spent on fast food as well as the time spent in cooking at home. The likelihood of consuming fast food tends to increase for those respondents who reside in the core urban areas of kano metropolis. Likewise, the chances that male will consume fast food is higher than those of female. While for wage employed respondents, their odds of consuming fast-food decreases. Whereas the higher the amount and time spent on home-made food, the greater the tendency of consuming fast food and vice versa. While the amount spent of fast food which is synonymous to the price is inversely related to the tendency of consuming fast food such that the higher this amounts the less the likelihood of fast-food consumption. The marginal effect shows a 0.008% chance of not consuming fast food if its price is raised by N1. Coefficient of other variables namely: age, education and health status of the respondents turned out to be statistically insignificant. The respondents' age is inversely related to their likelihood to consume fast food likewise their educational level. While their health status is directly related to their likelihood of fast-food consumption meaning those with dietary restrictions are more likely to consume fast food. The pseudo R2 was almost 0.5. however, the Wald chi2 shows joint significance of the explanatory variables.

Table 4: Estimates of Ordered Logistic Regression I
Dependent variable: Frequency of Fast-Food Consumption

S/N	Variable	Coefficient (VCEs)/Standard Errors	Marginal Effects (Freq=1)
1	Age	-.0315841	.0014119
		(.0699848)	(.0031238)
2	Geographical location		
	2	.9458912***	-.0402735***
		(.2775588)	(.0119892)
3	Gender		
	1	.7481118***	-.036453***
		(.2965774)	(.0156648)
4	Educational level	-.0134369	.0006006
		(.0264013)	(.0011927)
5	Occupation		
	1	-.3975221	.0177277
		(.3580808)	(.0157895)
	2	-.8845747**	.040372**
		(.436561)	(.0201566)
	3	-.8792586	.0401145
		(.6482131)	(.030452)
6	Amount spent on home-made food	.0030808***	-.0001377***
		(.0002274)	(6.98e-06)
7	Amount spent on fast food	-.0017174***	.0000768***
		(.0004437)	(.0000189)
8	Time spent in preparing home-made food	.0867104***	-.0038761***
		(.0081834)	(.0004729)
9	Health status		
	1	.3591242	-.0158921
		(.2503564)	(.0111177)

Source: Researchers' field data analyzed with Stata 17 software

Standard errors in parentheses
***Coefficients significant at 99% confidence level**coefficient significant at 95% confidence level
Wald chi2(12) = 294.91
Prob > chi2 = 0.0000
Pseudo R2 = 0.4516

5. Discussion and Recommendations

5.1. Discussion of Findings

Findings from this research show a significant influence of geographical location on the likelihood of fast food

consumption by the respondents where those residing in the core urban areas have more tendency to consume fast food compared to their counterparts in the peri urban areas. This finding is consistent with Sukhwal and Varma (2020) whose research outcome showed that urban respondents eat more outside weekly than semi urban respondents of Jaipur and Bhunas. Similar findings were arrived at by Arya and Dubey (2024) where Indian families in the greater metropolitan areas consumed more fast food than those in smaller non-metro-urban areas. This could be attributed to more availability and or accessibility of fast-food outlets in the core urban areas compared to the peri urban centers.

Male residents as shown by the study have more tendency to consume fast food than their female counter parts. This finding conforms to Kobayashi (2010), Onyinriuka et al (2013) as well as Chai and Cheah (2024). It however conflicts with Bakare and Olumkaiye (2016). However, males are more likely to consume fast food due to peer influence and the fact that they spend more time outside the home than the females. The influence of employment on the likelihood of fast-food consumption indicates that those in paid employment are less likely to consume fast food. This finding contradicts that of Jasper et al (2002) whose study showed that those who work 40 hours or less in a week are the most likely to consume fast food.

Other factors that proved to be significant determinants of fast-food consumption in the study area are the price of fast food, the cost of preparing meals at home and also the time spent in preparing home-made food. The latter two positively influence the likelihood of fast-food consumption which conforms to priori as, the higher the amount of money and or time expended in preparing meals at home, the greater the chance of opting for fast food. This contradicts Monsivais et al (2014) whose finding showed that the less time spent on home-made meals, the higher the amount and frequency of fast-food consumption. As for the price of fast food, about 25% of the respondents prefer fast food due to its cheapness. Likewise, the coefficient of the amount spent on fast food inversely influences the likelihood of fast-food consumption indicating that there is tendency for the residents to consume patronize fast food when its price is cheaper and vice versa. It is expected of consumers to increase their consumption of fast food when its price is on the low side unless they have some other incentives to do otherwise. In other words, fast food must be relatively cheap with respect to price, time and or taste for it to be demanded (Jekanowski et al; 2001). This contradicts Saghaian and Mohammadi (2018) whose finding shows that price does not have any significant effect on frequency of fast-food consumption as fast food is available in different prices and quality.

The study also shows a positive relationship between health status of the respondents and likelihood of fast-food consumption (even though insignificant). Only 41% of the respondents believe that fast food is harmful. This creates concern as it is an indication that being on dietary restrictions will not likely stop the respondents from consuming fast food. As Dunn et al (2011) stated in their study, consumers demand fast food due to taste, satisfaction and convenience as opposed to considering long term health risks associated with them.

5.2. Recommendations

The government should implement food pricing policies in order to regulate fast food consumption in the study area. With increasing number of fast-food outlets, there is the tendency of competition and price war to ensue between fast food restaurants thereby making fast food more affordable and accessible to the residents of the metropolis. Prices and food quality thus need to be monitored to ensure that the residents obtain nutritious and healthy food for their money.

Secondly, from result of the study it is evident that health status of the respondents does not influence their eating habit. This should be a fair warning and a cause for concern to public health experts/professionals because it is a sign that, either the residents are unaware of the possible health implications of consuming fast food or, they are aware but do not prioritize their health while making food choices.

On the whole, awareness should be promoted on the risks associated with fast food consumption especially among male residents and those who live in the core urban areas of Kano metropolis.

Conflict of Interest

The authors declare that they have no conflicting interests

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Data Availability statement

The data used to support the findings of this study are available from the corresponding author upon request.

Ethical considerations

The article followed all ethical standards appropriate for this kind of research.

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APPENDIX I

```
. *(15 variables, 408 observations pasted into data editor)

. tab ffoutlet
```

ffoutlet	Freq.	Percent	Cum.
0	88	21.57	21.57
1	167	40.93	62.50
2	114	27.94	90.44
3	39	9.56	100.00
Total	408	100.00	

```
. tab freq
```

freq	Freq.	Percent	Cum.
1	88	21.57	21.57
2	80	19.61	41.18
3	113	27.70	68.87
4	127	31.13	100.00
Total	408	100.00	

```
. tab constime
```

constime	Freq.	Percent	Cum.
0	88	21.57	21.57
1	69	16.91	38.48
2	182	44.61	83.09
3	69	16.91	100.00
Total	408	100.00	

```
. tab reas
```

reas	Freq.	Percent	Cum.
0	88	21.57	21.57
2	106	25.98	47.55
3	41	10.05	57.60
4	35	8.58	66.18
5	132	32.35	98.53
6	6	1.47	100.00
Total	408	100.00	

```
. tab health
```

health	Freq.	Percent	Cum.
0	256	62.75	62.75
1	152	37.25	100.00
Total	408	100.00	

```
. tab gen
```

gen	Freq.	Percent	Cum.
0	120	29.41	29.41
1	288	70.59	100.00
Total	408	100.00	

```
. tab occup
```

occup	Freq.	Percent	Cum.
0	110	26.96	26.96
1	156	38.24	65.20
2	85	20.83	86.03
3	57	13.97	100.00
Total	408	100.00	

```
. tab educ
```

educ	Freq.	Percent	Cum.
0	44	10.78	10.78
6	67	16.42	27.21
12	167	40.93	68.14
16	130	31.86	100.00
Total	408	100.00	

```
. tab geoloc
```

geo loc	Freq.	Percent	Cum.
1	112	27.45	27.45
2	296	72.55	100.00
Total	408	100.00	

```
. tab opinionoff
```

opinion on ff	Freq.	Percent	Cum.
1	171	41.91	41.91
2	162	39.71	81.62
3	75	18.38	100.00
Total	408	100.00	

```
.
```

```
. su age

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
         age |        408     35.3701    13.43609        18         65

. su educ

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
        educ |        408     10.9951    5.058865         0         16

. su ffamt

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
       ffamt |        408    1490.196    339.6804      1000       2000

. su hmamt

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
       hmamt |        408    1193.627    709.1945         0       2000

. su hmtime

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
      hmtime |        408    56.58088    18.89486        30         90

.
. ologit freq age age2 i.geoloc i.gen educ i.occup hmamt ffamt hmtime i.health

Iteration 0:   log likelihood = -558.62265
Iteration 1:   log likelihood = -326.56321
Iteration 2:   log likelihood = -307.52548
Iteration 3:   log likelihood = -306.37142
Iteration 4:   log likelihood = -306.36914
Iteration 5:   log likelihood = -306.36914

Ordered logistic regression                     Number of obs =    408
                                                LR chi2(12)   = 504.51
                                                Prob > chi2   = 0.0000
Log likelihood = -306.36914                     Pseudo R2     = 0.4516

------------------------------------------------------------------------------
        freq | Coefficient  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
         age |  -.0315841   .0720874    -0.44   0.661    -.1728729    .1097047
        age2 |  -.0000555   .0008816    -0.06   0.950    -.0017835    .0016724
   2.geoloc |   .9458912   .2680457     3.53   0.000     .4205313    1.471251
      1.gen |   .7481118   .2800109     2.67   0.008     .1993006    1.296923
        educ |  -.0134369   .0273034    -0.49   0.623    -.0669506    .0400769
             |
       occup |
          1 |  -.3975221   .3414399    -1.16   0.244    -1.066732    .2716879
          2 |  -.8845747   .4171656    -2.12   0.034    -1.702204   -.0669452
          3 |  -.8792586   .5314526    -1.65   0.098    -1.920886    .1623693
             |
       hmamt |   .0030808   .0002685    11.48   0.000     .0025546    .0036069
       ffamt |  -.0017174   .0004203    -4.09   0.000    -.0025412   -.0008936
      hmtime |   .0867104   .0084506    10.26   0.000     .0701476    .1032732
   1.health |   .3591242   .2483822     1.45   0.148    -.1276959    .8459443
-------------+----------------------------------------------------------------
        /cut1 |   2.452956   1.335214                   -.1640148    5.069927
        /cut2 |   5.366927   1.351807                    2.717434     8.01642
        /cut3 |   7.707455   1.380576                    5.001575    10.41333
------------------------------------------------------------------------------
```

```
. ologit freq age age2 i.geoloc i.gen educ i.occup hmamt ffamt hmtime i.health, r

Iteration 0:   log pseudolikelihood = -558.62265
Iteration 1:   log pseudolikelihood = -326.56321
Iteration 2:   log pseudolikelihood = -307.52548
Iteration 3:   log pseudolikelihood = -306.37142
Iteration 4:   log pseudolikelihood = -306.36914
Iteration 5:   log pseudolikelihood = -306.36914

Ordered logistic regression                             Number of obs =    408
                                                        Wald chi2(12) = 294.91
                                                        Prob > chi2   = 0.0000
Log pseudolikelihood = -306.36914                       Pseudo R2     = 0.4516
```

freq	Coefficient	Robust std. err.	z	P>|z|	[95% conf.	interval]
age	-.0315841	.0699848	-0.45	0.652	-.1687518	.1055836
age2	-.0000555	.0008386	-0.07	0.947	-.0016993	.0015882
2.geoloc	.9458912	.2775588	3.41	0.001	.401886	1.489897
1.gen	.7481118	.2965774	2.52	0.012	.1668309	1.329393
educ	-.0134369	.0264013	-0.51	0.611	-.0651825	.0383087
occup						
1	-.3975221	.3580808	-1.11	0.267	-1.099348	.3043034
2	-.8845747	.436561	-2.03	0.043	-1.740219	-.0289308
3	-.8792586	.6482131	-1.36	0.175	-2.149733	.3912157
hmamt	.0030808	.0002274	13.55	0.000	.0026351	.0035265
ffamt	-.0017174	.0004437	-3.87	0.000	-.002587	-.0008478
hmtime	.0867104	.0081834	10.60	0.000	.0706712	.1027496
1.health	.3591242	.2503564	1.43	0.151	-.1315653	.8498137
/cut1	2.452956	1.330293			-.1543697	5.060282
/cut2	5.366927	1.360134			2.701114	8.03274
/cut3	7.707455	1.380907			5.000928	10.41398

```
. margins, dydx(age)

Average marginal effects                                Number of obs = 408
Model VCE: Robust

dy/dx wrt: age

1._predict: Pr(freq==1), predict(pr outcome(1))
2._predict: Pr(freq==2), predict(pr outcome(2))
3._predict: Pr(freq==3), predict(pr outcome(3))
4._predict: Pr(freq==4), predict(pr outcome(4))
```

	dy/dx	Delta-method std. err.	z	P>|z|	[95% conf.	interval]
age						
_predict						
1	.0014119	.0031238	0.45	0.651	-.0047107	.0075344
2	.0018612	.0041288	0.45	0.652	-.0062311	.0099535
3	.0001071	.0002921	0.37	0.714	-.0004653	.0006796
4	-.0033802	.0074684	-0.45	0.651	-.0180179	.0112576

```
. margins, dydx( geoloc )

Average marginal effects                                Number of obs = 408
Model VCE: Robust

dy/dx wrt: 2.geoloc
```

```
1._predict: Pr(freq==1), predict(pr outcome(1))
2._predict: Pr(freq==2), predict(pr outcome(2))
3._predict: Pr(freq==3), predict(pr outcome(3))
4._predict: Pr(freq==4), predict(pr outcome(4))
```

	Delta-method dy/dx	std. err.	z	P>|z|	[95% conf.	interval]
1.geoloc	(base outcome)					
2.geoloc						
_predict						
1	-.0402735	.0119892	-3.36	0.001	-.0637718	-.0167751
2	-.0624037	.0189419	-3.29	0.001	-.0995292	-.0252782
3	.0019566	.006537	0.30	0.765	-.0108557	.0147688
4	.1007206	.028091	3.59	0.000	.0456632	.155778

Note: dy/dx for factor levels is the discrete change from the base level.

```
. margins, dydx( gen )

Average marginal effects                                    Number of obs = 408
Model VCE: Robust

dy/dx wrt: 1.gen

1._predict: Pr(freq==1), predict(pr outcome(1))
2._predict: Pr(freq==2), predict(pr outcome(2))
3._predict: Pr(freq==3), predict(pr outcome(3))
4._predict: Pr(freq==4), predict(pr outcome(4))
```

	Delta-method dy/dx	std. err.	z	P>|z|	[95% conf.	interval]
0.gen	(base outcome)					
1.gen						
_predict						
1	-.036453	.0156648	-2.33	0.020	-.0671554	-.0057507
2	-.0444486	.0178797	-2.49	0.013	-.0794921	-.0094051
3	.0023898	.00532	0.45	0.653	-.0080372	.0128168
4	.0785119	.0302026	2.60	0.009	.0193159	.1377078

Note: dy/dx for factor levels is the discrete change from the base level.

```
. margins, dydx(age)

Average marginal effects                                    Number of obs = 408
Model VCE: Robust

dy/dx wrt: age

1._predict: Pr(freq==1), predict(pr outcome(1))
2._predict: Pr(freq==2), predict(pr outcome(2))
3._predict: Pr(freq==3), predict(pr outcome(3))
4._predict: Pr(freq==4), predict(pr outcome(4))
```

	Delta-method dy/dx	std. err.	z	P>|z|	[95% conf.	interval]
age						
_predict						
1	.0014119	.0031238	0.45	0.651	-.0047107	.0075344
2	.0018612	.0041288	0.45	0.652	-.0062311	.0099535
3	.0001071	.0002921	0.37	0.714	-.0004653	.0006796
4	-.0033802	.0074684	-0.45	0.651	-.0180179	.0112576

```
. margins, dydx( occup )

Average marginal effects                                    Number of obs = 408
Model VCE: Robust

dy/dx wrt: 1.occup 2.occup 3.occup

1._predict: Pr(freq==1), predict(pr outcome(1))
2._predict: Pr(freq==2), predict(pr outcome(2))
3._predict: Pr(freq==3), predict(pr outcome(3))
4._predict: Pr(freq==4), predict(pr outcome(4))
```

	Delta-method dy/dx	std. err.	z	P>|z|	[95% conf.	interval]
0.occup	(base outcome)					
1.occup						
_predict						
1	.0177277	.0157895	1.12	0.262	-.0132192	.0486745
2	.0210314	.0180792	1.16	0.245	-.0144031	.0564659
3	.0059213	.0073184	0.81	0.418	-.0084224	.020265
4	-.0446804	.0403827	-1.11	0.269	-.123829	.0344682
2.occup						
_predict						
1	.040372	.0201566	2.00	0.045	.0008659	.0798781
2	.050574	.0242034	2.09	0.037	.0031361	.0980119
3	.0050952	.0081267	0.63	0.531	-.0108328	.0210231
4	-.0960411	.0477125	-2.01	0.044	-.1895559	-.0025263
3.occup						
_predict						
1	.0401145	.030452	1.32	0.188	-.0195703	.0997992
2	.0502389	.0376545	1.33	0.182	-.0235626	.1240404
3	.0051508	.0083605	0.62	0.538	-.0112355	.0215371
4	-.0955041	.0682731	-1.40	0.162	-.229317	.0383087

```
Note: dy/dx for factor levels is the discrete change from the base level.

. margins, dydx( hmamt )

Average marginal effects                                    Number of obs = 408
Model VCE: Robust

dy/dx wrt: hmamt

1._predict: Pr(freq==1), predict(pr outcome(1))
2._predict: Pr(freq==2), predict(pr outcome(2))
3._predict: Pr(freq==3), predict(pr outcome(3))
4._predict: Pr(freq==4), predict(pr outcome(4))
```

	Delta-method dy/dx	std. err.	z	P>|z|	[95% conf.	interval]
hmamt						
_predict						
1	-.0001377	6.98e-06	-19.73	0.000	-.0001514	-.000124
2	-.0001815	.0000227	-8.00	0.000	-.000226	-.0001371
3	-.0000104	.000019	-0.55	0.583	-.0000477	.0000268
4	.0003297	.0000264	12.47	0.000	.0002779	.0003815

```
. margins, dydx( ffamt )

Average marginal effects                                    Number of obs = 408
Model VCE: Robust

dy/dx wrt: ffamt

1._predict: Pr(freq==1), predict(pr outcome(1))
2._predict: Pr(freq==2), predict(pr outcome(2))
3._predict: Pr(freq==3), predict(pr outcome(3))
4._predict: Pr(freq==4), predict(pr outcome(4))
```

	Delta-method				
	dy/dx	std. err.	z	P>|z|	[95% conf. interval]
ffamt					
_predict					
1	.0000768	.0000189	4.06	0.000	.0000397 .0001138
2	.0001012	.0000295	3.43	0.001	.0000433 .0001591
3	5.82e-06	.0000107	0.55	0.585	-.0000151 .0000267
4	-.0001838	.0000487	-3.77	0.000	-.0002793 -.0000883

```
. margins, dydx( hmtime )

Average marginal effects                                  Number of obs = 408
Model VCE: Robust

dy/dx wrt: hmtime

1._predict: Pr(freq==1), predict(pr outcome(1))
2._predict: Pr(freq==2), predict(pr outcome(2))
3._predict: Pr(freq==3), predict(pr outcome(3))
4._predict: Pr(freq==4), predict(pr outcome(4))
```

	Delta-method				
	dy/dx	std. err.	z	P>|z|	[95% conf. interval]
hmtime					
_predict					
1	-.0038761	.0004729	-8.20	0.000	-.004803 -.0029491
2	-.0051097	.0006039	-8.46	0.000	-.0062933 -.0039261
3	-.0002941	.0005177	-0.57	0.570	-.0013089 .0007207
4	.0092798	.0005759	16.11	0.000	.0081512 .0104085

```
. margins, dydx( health )

Average marginal effects                                  Number of obs = 408
Model VCE: Robust

dy/dx wrt: 1.health

1._predict: Pr(freq==1), predict(pr outcome(1))
2._predict: Pr(freq==2), predict(pr outcome(2))
3._predict: Pr(freq==3), predict(pr outcome(3))
4._predict: Pr(freq==4), predict(pr outcome(4))
```

	Delta-method				
	dy/dx	std. err.	z	P>|z|	[95% conf. interval]
0.health	(base outcome)				
1.health					
_predict					
1	-.0158921	.0111177	-1.43	0.153	-.0376823 .0058982
2	-.0212827	.014846	-1.43	0.152	-.0503804 .007815
3	-.0017938	.0027729	-0.65	0.518	-.0072286 .003641
4	.0389686	.0273956	1.42	0.155	-.0147259 .092663

```
Note: dy/dx for factor levels is the discrete change from the base level.

.
```