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MEAT CONSUMPTION PATTERNS IN VIETNAM: EFFECTS OF HOUSEHOLD CHARACTERISTICS ON PORK AND POULTRY CONSUMPTION

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Introduction

Vietnam is one of the developing countries with considerable changes in meat consumption patterns. Annual GDP has achieved a comparatively high growth rate of approximate 6% over the last years. Income per capita has increased rapidly over the last two decades (GSO, 2013). There are nearly 87 million people in Vietnam who make up about 26 million households (GSO, 2013). In terms of expenditure, meat is one of the most important food groups consumed when families spent 20.9% their food expenditure for meat. And pork is the most popular meat consumed by Vietnamese households, followed by poultry. Furthermore, meat demand, especially pork and poultry, have been rapidly increasing (Tisdell, 2009, Lapar and Toan, 2010) and Vietnam's demand for meat has grown more rapidly than domestic production. In effect, the real price of pork has risen fast over the last years because of Vietnamese's strong and persistent preference for fresh pork. Hence, pork imports are difficult (Lapar et al, 2009; Tisdell, 2010). In addition, the meat and poultry industry is positioned as one of Vietnam's most important manufacturing industries. In 2010, livestock husbandry has contributed about 23% of total agricultural products (GSO, 2011). So understanding meat demand is important for Vietnamese producer, trader and agricultural policy makers and meat consumption provides an important case study for demand analysis. The major objective of this study is to analyze the consumption patterns of pork and poultry in Vietnam based on data of the Vietnamese Household Living Standard Survey (VHLSS) 2010.

Data and methodology

The data analyzed in this study is from the Vietnamese Household Living Standard Survey (VHLSS), which was conducted by the Vietnam General Statistical Office (GSO). The VHLSS 2010 was conducted nationwide with a sample size of 69,360 households in 3,133 communes/wards which were representative at national, regional, urban, rural and provincial levels. VHLSS 2010 recorded the expenditure behavior of households for certain products and product groups, e.g. daily consumption of foods and drinks, daily consumption product etc., as well as regional and socio-demographic characteristics such as income, region, size and composition of the household, age of household members. The demand equation can be written as:

$$\ln(Y_i) = \beta_0 + \beta_{i1} \text{Hsize} + \beta_{i2} \text{Urban} + \beta_{i3} \text{Female} + \beta_{i4} \text{Ethnic} + \beta_{i5} \text{Age} + \beta_{i6} \text{Edu} + \beta_{i7} \text{Income} + \sum_{j=2}^6 \beta_{ij8} \text{Reg}_{ij}$$

Where Y is the meat quantity consumed by households. Urban, Female and Ethnic are binary variables indicating the location of household in an urban area, female-headed household and

ethnic minority. Hsize denotes the number of members in the household. Age denotes the age of household head and Edu represents the number of school years of the household head. Income denotes income per capita per year of households, while Reg represents the geographic location of household is included as zero-one dummy variables for the 6 regions of Vietnam

Quantity of pork and poultry consumption per person per year by income quintiles in 2010 is shown in table 1. The difference between income quintiles in consuming meat is pronounced: the quantity of pork and poultry consumption increases with income quintiles. Per capita pork consumption in the richest quintile is more than twice as much as in the poorest quintile. While, in average a person in the richest quintile ate 3 times more poultry than persons in the poorest quintile (table 1). These results give a first indication that income growth is a major driver of increasing meat consumption in Vietnam.

Table 1: Quantity of meat consumption per capita per year by quintile income 2010

Income groups	Pork consumption		Poultry consumption	
	Mean (Kg per capita)	SD	Mean (Kg per capita)	SD
Total	13.53	10.62	7.93	8.66
Quintile 1	8.71	7.34	4.31	5.94
Quintile 2	11.87	8.93	5.98	6.65
Quintile 3	13.59	9.76	7.77	7.68
Quintile 4	15.69	11.17	9.51	9.68
Quintile 5	17.78	12.70	12.08	10.32

Source: Based on VHLSS 2010 (GSO)

Results

To identify the factors affecting pork and poultry consumption, two demand functions were estimated. Table 2 summarizes the parameter estimates of the Tobit model for household's pork and poultry consumption. The results are consistent with prior expectations concerning household's characteristics. Almost all coefficients of the equations are statistically significant at 0.01 and 0.05 level.

There are several clear results from the pork and poultry analysis. Table 2 clearly indicates that pork and poultry demand is positively influenced by per capita income of households. The coefficients of income variable (unit 100 million VND/year) are significant at the level of 1%. In particular, the coefficient of pork demand model is 0.109. It means that if income per capita per year increases by 1 million VND, the quantity of pork consumption will raise by 0.109 % (mean per capita annual income is 16.68 million VND). This is less than in the poultry demand equation, when income per capita per year increases by 1 million VND, the quantity of poultry increases by 0.3444%. So if continued income growth is assumed for the future the meat consumption can expect further growth induced by income growth.

With respect to household characteristics, it can be seen that a negative impact of household size is found in the models, i.e. the quantity of both pork and poultry consumed decreases by 8.9 % for pork and 4.4 % for poultry if household size increases by 1 person. The negative impact that was expected for the coefficient of household size indicates economies of scale in consumption (cf. Reynolds, 1990), i.e. when the number of people in households increase, meat consumption per capita will be reduced. According to data of VHLSS from 2002 to 2010, the average number of people in families has decreased from 4.44 persons in the year 2002 to 3.89 people in the year 2010. Therefore continued household and family restructuring could contribute to increased demand for pork and poultry as smaller household consume more meat on a per capita basis.

Table 2. Estimated Tobit model of pork and poultry consumption

Variables	Pork		Poultry	
	Parameter	Std. error	Parameter	Std. error
Intercept	2.081***	0.064	0.606***	0.100
HHsize	-0.089***	0.007	-0.044***	0.010
Urban	0.064***	0.023	0.031	0.036
Female	-0.050**	0.024	-0.065*	0.038
Ethnic minority	-0.204***	0.032	-0.238***	0.050
Age	0.006***	0.001	0.007***	0.001
Edu	0.042***	0.003	0.094***	0.005
Income	0.109***	0.028	0.344***	0.044
Northern midland and mountain area	0.197***	0.036	0.115**	0.056
North Central and Central coastal area	-0.424***	0.030	-0.937***	0.047
Central highlands	-0.368***	0.044	-0.508***	0.069
South east	-0.447***	0.036	-0.388***	0.057
Mekong river delta	-0.539***	0.032	-0.436***	0.049
Log likelihood :	-12912.43		-16872.8	
LR chi2(12) :	1411.1		1357.87	
Prob > chi2 :	0.000		0.000	
Pseudo R2 :	0.0518		0.0387	

Notes: the dependent variable is the natural logarithm of the meat consumption per capita in kg/year *** p<0.01; **p<0.05; *p<0.1. Source: Based on VHLSS 2010 (GSO)

In addition, the model results suggest that pork and poultry consumption are influenced by other socio-demographic characteristics. Factors such as household head's age, education and sex were found to have significant impacts on pork and poultry consumption. In particular, household heads' age and education are positively related to pork and poultry demand. Households with elderly heads or higher education tend to have higher meat consumption. The coefficients of Age are 0.006 and 0.007 which mean that the consumption per capita increase 0.6% and 0.7% for pork and poultry respectively when a household head is one year older.

Consumption per person increases by 4.2% for poultry and 9.4% for pork when household head's education increases by one year. These findings are contrary with results of Su and Yen (1996) and Newmann et al (2003) who found a negative relationship between education and US pork consumption and between education and Irish prepared meal expenditure respectively indicating major differences in meat consumption patterns between developed countries and an emerging country like Vietnam. Moreover, the negative coefficient of female reflects that households with female heads consume less pork and poultry than other households. Concerning the household's ethnicity, families that are Vietnamese consume more pork and poultry than ethnic minority families. We suppose that this is caused by the differences in culture (Hai, 2010).

The result also shows that urbanization has a positive impact on pork consumption. It is surprising that parameter estimations of urban in poultry equations is not significant. It means that there is no statistically significant difference between urban and rural households in

poultry consumption. This indicates that there are not significant differences in poultry consumption between rural and urban area in Vietnam and that differences that might be observable in simple comparisons can be attributed to the other factors that we included in our models.

Finally, we find significant differences between six regions of the country. With Red river delta region being the base variable, the results show that significant difference between the Red river delta region and other regions of the country. In particular, the coefficients for the dummy Northern midland and mountain areas mean that these households consume 19.7% more pork and 11.5% more poultry than households in the Red river delta. The negative signs of the other dummy regional variables are in contrast. Especially, households that live in the Mekong river delta consume 53.9% less pork compared to households in the Red river delta. Households that are located in the North Central area and the Central coastal area consume less poultry. The coefficients indicate that per capita poultry consumption of households is 93.7% less than in the Red river delta. Possible reason of this fact may be differences of culture and differences in the social-economic situation not covered by the other variables included in our models.

Conclusion

The primary focus of this study has been an attempt to better understand meat consumption patterns in Vietnam. The paper presents analyses of descriptive statistics of pork and poultry consumption by demographic groups and two Tobit models have been established for estimating pork and poultry consumption. The econometric results indicate that pork and poultry are necessity goods in Vietnam and socio-economic variables and geographic variables are important indicators of the future of Vietnamese meat consumption. Understanding meat consumption patterns will help policy makers to implement measures to ensure food security. These policies may base on food redistribution between different areas, ethnic groups, the poor and the rich. Improvement of infrastructure, especially the transportation system can support production and exchanges between regions. In addition, the food companies who wish to invest in the food market in Vietnam may need to understand meat consumption pattern and meat demand to develop suitable business strategies. The preference of Vietnamese customers in fresh (warm) meat that has been barrier for export meat and the growing shortfall in Vietnam's domestic supply of meat has resulted opportunities and threats for foreign exporters.

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