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The Effects of Household Socio-demographics on Restaurant Threshold Prices

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The Effects of Household Socio-demographics on Restaurant Threshold Prices

THESIS

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science in the College of Agriculture, Food and Environment at the University of Kentucky

By

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Lexington, Kentucky

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ABSTRACT OF THESIS

THE EFFECTS OF HOUSEHOLD SOCIO-DEMOGRAPHICS ON RESTAURANT THRESHOLD PRICE

This study examines the determinants of a household's threshold price for a restaurant meal cost increase; the level of cost increase that would cause households to either eat in restaurants less frequently or change what they would typically purchase. The design of the study is formulated using a Tobit model to examine the threshold price by differing social, economic and demographic characteristics of households in Kentucky as well as their preferences for restaurant-specific characteristics.

The empirical estimates suggest that households that frequently have dinner at restaurants, households with higher incomes and households that strongly prefer full-service restaurants have a positive threshold price-range; which suggests that such households are more willing to pay an additional cost increase in restaurant meals. Conversely, households that always notice taxes before paying their checks, households close to retirement-age, and households that do not strongly prefer local-food restaurants have negative threshold price-range and are consequently less willing to pay an additional cost increase in restaurant meals.

KEYWORDS: Food-away-from-home, Restaurant Tax, Socio-demographics, Threshold price, Tobit Analysis.

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Table of Contents

List of Tables

List of Figures

Chapter 1

Introduction

Taxing tourism is a cogent alternative for governments facing budgetary constraints and pressures to minimize reliance on a variety of taxes since tourism taxes can correct for market failure while generating revenue (Gooroochurn & Sinclair 2005). Tourism taxes are generally levied on any establishment engaged in the business of providing recreational services, food and/ or lodging to transient guests with the aim or revitalizing the tourism infrastructure of a city or state. Not all restaurants are engaged in tourism, though restaurant taxes may form a relative proportion of tourism tax.

The debate about restaurant taxes in particular is complex, and prior studies have shed light on only some of the relevant issues. Restaurant taxes affect both the distribution of income among residents of a city or state as well as between locals and tourists. Like most cases, if not set at optimal welfare maximizing levels, restaurant and food taxes can be inefficient and inequitable. It is largely suggestive in the literature that taxes should comply with the principles of equity and efficiency, with the ability-to-pay principle positing that each individual should contribute in line with his/her ability to pay (Mustgrave 1959; Gooroochurn 2003; Gooroochurn & Sinclair 2005). However, some studies have found some variations of food taxes to be regressive (Drewnowski and Darmon, 2005; Leicester and Windmeijer, 2004; Smed, Jenson and Denver, 2007).

For the principles of equity and efficiency to hold in restaurant taxation, households with a higher ability to pay are expected to contribute more than households with a lower ability to pay. Regardless, lower income households may be contributing more as a

percentage of their incomes to the tax revenue generated than higher income households. Moreover, the income group with the largest demand may well be tendering the most to the accrued restaurant tax revenue. This follows from economic theory which suggests that the greater the proportion of demand by an income segment in total demand, the higher their contribution to the total restaurant tax revenue generated. Thus the income group with the greatest concentration within a region would invariably register the lion's share of tax revenue generated.

The questions of the optimal size of the tax and the specific foods on which it should be levied (e.g. some or all restaurant meals, high fat-, high sugar- and salt-content meals, high-calorific desserts and/or carbonated beverages) remain a source of debate (Finkelstein et al., 2010). Economic theory stipulates that an increase in the unit price of a normal good could effectively induce a change in the consumption pattern of the agent; a reduction in the consumption of the good. Thus we would expect that an increase in the tax/price of restaurant meals would culminate in a decrease in demand of restaurant meals. However, the households' oblivion or awareness of the existence or adoption of an additional levied tax may cause them to demand the same quantity or even more especially if the additional tax is discretionary and relatively minute.

Jacobson and Brownwell (2000) observe mixed opinions in the literature about the feasibility of a steep tax and thus suggest that even small taxes on widely consumed foods can generate substantial revenue. Similarly, Andreyeva et al. (2010) suggest that the power of small taxes/price changes applied to broad-based widely consumed foods and foods most responsive to price changes (e.g. restaurant meals) have effects that accumulate across a population and thus can also raise substantial revenues. The results

of the said authors indicate that small taxes could reduce consumption by a considerable amount. On the other hand Finkelstein, Zhen, Nonnemaker and Todd (2010) explore large (20% and 40%) tax increases and yet find modest effects on foods expenditures; less than $30 per households per year on average. Finkelstein et al. suggest that large taxes have more potential to influence consumption outcomes especially for middle-income households and could also generate higher revenues.

A number of studies have provided estimates price elasticity of demand for different types of FAFH (Richards and Mancino, 2011) while others have examined the effects of taxes on food consumption habits and outcomes (Cast et al., 2005, Powell et al., 2009). The underlying objective of this study is to examine the threshold-price (TP); the % increase in cost of restaurant meals that would cause consumers to alter their purchasing/expenditure behavior. With the aid of survey data, the study examines percentage increases in cost of meals that would cause different socio-demographic households to either eat in restaurants less frequently or change what they typically purchase in restaurants.

Background Study on Restaurant Meal Tax

Restaurant Food Expenditure Patterns

The literature indicates that price is a significant determinant of food choices and restaurant choice and frequency. Data from experimental studies show that, second only to taste, food price is one of the most influential factors in determining food choice (Glanz et al., 1998, French, 2003) thus food price manipulations are increasingly being

considered as economic strategies and incentives for influencing food choices that consumers make (Popkin, Duffey and Gordon-Larsen, 2011; Powell, 2009). Persons facing stricter economic constraints will preferentially select lower-cost energy-dense diets rather than abandon their usual eating habits, thus strategies for influencing meal choice ought to take food preferences and the usual eating habits into account (Drewnowski and Darmon, 2005).

Data from the USDA Continuing Survey of Food Intakes by Individuals show that 56% of US adults report eating away from home on any given day; of these, about 33% ate at a fast food outlet. The number of restaurants and eating establishments has more than tripled over the past couple of decades with a continued increase in demand for them and a simultaneous downward trend in per capita expenditures for food at home (FAH) as a portion of per capita personal consumption expenditures (McCracken and Brandt, 1987). In the early 1970s, about 20% of the household food dollar was spent on food away from home. By 1995, an estimated 40% of the US household food dollar was spent on food away from home (Putnam and Allshouse, 1996). The proportion of expenditures spent on food-away-from-home (FAFH) has vastly increased, as the consumption of purchased meals away from home has become more frequent relative to food consumed at home (Lee and Brown, 1986).

Tax Targeting; At-Risk Populations

Socio-demographic data have the benefit of being accessible, less ambiguous, and less expensive to gather; however, the variables are of limited value unless they are clearly and explicitly related to important consumer behavioral attributes such as

expenditure/consumption behavior or demand, thus facilitating the decision and implementation of specific economic and marketing strategies (Cai, 1998). The changes in household composition and shifts in the population have been accompanied by changing consumer spending behaviors (Jacobs & Shipp, 1990; Kotler, 1995).

Rising food prices cause low-income consumers to change their demand far more than high-income consumers (Jones, 1997). The average American spends less than $8.00/d on food and beverages, with low-income families spending as little as $25 per person per week (Putnam et al., 2002). Opponents of targeted tax are often concerned about the extent to which the tax disproportionately affects lower-income households (Finkelstein et al, 2010). There are mixed opinions on the feasibility and desirability of a steep tax whereas a small tax may be more feasible and still could generate significant revenues for "quality of life expenditures" that support tourism, recreation and economic development.

The proportion of a household budget allocated to all food tends to decline with increasing income. Thus taxes on food and food items may be regressive since they have a higher impact on low-income households than the affluent. In a related study, the very poorest 2% of the population were found to spend seven times more of their total income on a food tax than the rich; the middle class would pay around 0.25% (a quarter) of their total income on the food tax; while the richest would pay less than 0.1% of their income on the food tax (Liecester and Windmeijer, 2004). This is however the case for UK and might be subtly different for the US. All in all tax and price increases have a more subtle effect on the purchasing behavior of the wealthier and most educated than on other socio-demographic groups (Smed et al., 2007).

Proposed Uses of Restaurant Tax

Restaurant taxes have been considered as a strategy for generating substantial revenue as well as promoting tourism. The actual implementation of any tax requires specific criteria as one cannot simply instruct retailers and restaurateurs to tax the least purchased food items while excluding the more highly demanded foods and vice versa (Cash and Lacanilao, 2007). Thus specific guidelines as to what categories of food will be included and which will not be affected must be developed (Cash et al., 2007).

The sales tax for most jurisdictions goes into a general fund. In some cases however, the sales or other specifically applied food tax revenues are apportioned for diverse special projects. Rhode Island initially earmarked a portion of its sales tax revenue for environmental management and litter control; Virginia uses a portion of its sales tax and other specifically applied food taxes for litter control and recycling distributors based on total sales of fund; West Virginia uses its soft-drink-tax revenues to support its medical, dental, and nursing schools; Tennessee uses a portion of its special-food-tax revenues to help clean up highways; while Washington pursues violence prevention and drug enforcement with its soft-drinks tax (Jacobson and Brownell, 2000).

In the state of Kentucky specifically, where this research is focused on, the KY League of Cities (KLC) suggests that for any allowable jurisdiction imposing a restaurant tax, the money set aside for tourism promotion will lead to more visitations and therefore more revenue for businesses. The bill recommends that up to 75% of the tax may be used for quality of life expenditures that support tourism, recreation, and economic development with a minimum of 25% going to the local tourist and convention commissions.

Current State & Local Restaurant Taxes

Kentucky's cities are divided into six classes based on their population. Enacted legislation in July 1992, KRS 91A.400, in the Commonwealth of Kentucky allowed 4th and 5th class cities to levy a tax on restaurant meal purchases with all funds authorized to be turned over to the tourist & convention commission in the city. The tax levied was not to exceed 3% of retail sales of restaurants operating with the cities' jurisdiction. The tax levied on 4th and 5th cities affected 54% of the cities in Kentucky. For that matter the tax did not affect the largest 8% of Kentucky's cities which are classified as 1st and 2nd class cities. Thus cities like Louisville and Lexington, which are 1st and 2nd class cities respectively, did not fall within the tax net of the legislation.

In recent years however, the State Legislature has proposed an amendment to KRS 91A.400 to extend the restaurant tax reach not only to 4th and 5th class cities but all cities in Kentucky irrespective of its size. The Bill would allow all cities, urban-county governments, consolidated local governments, unified local governments, and charter county governments to charge a restaurant tax. A tax of up to 3% would be imposed on the meals people eat in a restaurant or the carryout orders people pick up, on top of the 6% current state sales tax. The proposal is part of the Kentucky League of Cities 2014 Legislative Agenda as a way to get additional revenue for cities (Kentucky Legislature, 2014).

The proposed restaurant tax is gaining momentum in the state legislature, but the bill has yet to be pre-filed. Kentucky Restaurant Association is opposed to the plan and believes consumers should be as well, since most local restaurant owners are most likely to pass

that cost on to their consumers. According to one restaurant owner “the bottom line is that the 3 percent is going to affect each family another $150 a year, and again, change some people's decisions to go out and eat" (WDRB News, 2014).

Summary

Research on the effect of taxes on restaurant food choices have raised a number of questions - including the optimal size of the tax and the level of tax that alters food choice and food expenditure behavior - which have not thoroughly been addressed. The emphasis of this study is on analyzing and estimating the effects of restaurant cost increases on restaurant meal choice and frequency among households in Kentucky while controlling for the different socio-demographic characteristics and restaurant preferences of the households. The understanding and assessment of the tax effects on consumer behavior is both critical and relevant for local and state government bodies, independent restaurants, chain restaurants, restaurant representative bodies and tourism services/industry in making and implementing important legislative and strategic business/marketing decisions for all stakeholders at hand.

The study is organized into the following chapters. Chapter 2 addresses the motivation, objective and problem statement of the study; Chapter 3 focuses on a review of the literature; Chapter 4 draws out a conceptual model of the study; Chapter 5 looks at the data and methodology used in the study; Chapter 6 breaks down the results and findings of the study; and Chapter 7 gives a discussion on the overview of the implications of the study and makes suggestions on future research.

Chapter 2

Problem Statement

Legislation has been proposed in Kentucky that would authorize city legislative bodies to impose a tax on restaurant meals of no more than 3%, regardless of the size of the city. The bill has gained attention and interest from Kentucky Travel Industry Association (KTIA), the Kentucky Restaurant Association (KRA), and local tourism and restaurant organizations and associations. The KRA believes restaurant demand is sensitive to economic fluctuations - may cause significant falls in revenues as consumers react to price increase - and thus oppose the tax. The KTIA is split on the matter while the Kentucky League of Cities, an organization that represents the interests of city governments, supports the tax. Extensive research has been published on the effects of food price changes on demand for food and beverages yet substantial gaps exist in the research base. To gain a comprehensive understanding of consumer food choice behavior, the existing gaps as to the level of tax that elicits changes in the expenditure and choice behaviors of households must be filled. Current data on the effects of income distribution - with regards to assessments of differences in responsiveness to food prices according to age, education, culture or ethnicity - are limited (Andreyeva et al. 2010). The underlying purpose of this study is to examine how cost increases in restaurant meals affect demand for food-away-from-home in Kentucky by socio-demographic characteristics and restaurant preferences of the population.

Motivation and Objective

Food prices are already heavily affected, in much of the world by existing taxes, trade restrictions, transportation policy, energy taxes, food assistance programs, environmental

policies and other interventions (Cash et al., 2007). Each consumer makes food choices so as to maximize the direct utility associated with food consumption. Consumption takes place until the marginal utility (reduced hunger, satisfaction or enjoyment) of one additional unit of food is greater or equal to the marginal cost. The marginal utility, although positive, diminishes as more food is consumed (Drewnowski et al., 2005). Philipson et al. (2004) note that "individuals make food choices in the context of limited time and income available in the presence of competing goods with the objective of attaining multiple outcomes", only one of which is satisfaction.

It is imperative to note that there is still no consensus on whether taxes have a true causal effect on the choice of restaurants and the meals they offer. There is accumulating evidence, contrary to the full optimization assumption, that suggests that agents are inattentive to information and thus have delayed initial response (DellaVigna and Pollet 2009). Thus the main objective of the study is to tease out the price thresholds within which different households would or would not change their purchasing and consumption behavior at restaurants, following cost increases in restaurant meals.

Research Questions

In this study we focus solely on restaurant meals in our bid to forecast tax effects. The research question seeks to analyze how restaurant taxes affect demand for food-away-from-home (FAFH) among different social, economic and demographic households in Kentucky. To put the research questions in perspective I define threshold price as the percentage increase in the cost of restaurant meals that would cause consumers to eat less frequently at the restaurant or change what they would typically purchase.

The sub-questions underlying the analysis of tax threshold price on socio-demographic characteristics of households in Kentucky are as follows:

1: Is the threshold price of restaurant food more price/cost sensitive for low income earners than for high income households and across consumers as a whole?

2: Are younger people more responsive to restaurant tax than older/retired (60+) consumers? (Do elderly households have lower economic status as determined by income and expenditure- effects of the aging population on restaurant food purchases and consumption?)

3: Are consumer households who notice all restaurant taxes charged more likely to have a higher threshold price?

4: Is the preference for local foods independent of price/tax increases and the threshold price of households?

In essence the research questions look at how four main socio-demographic and restaurant characteristics - income, age, awareness of restaurant taxes and preference for local foods - influence restaurant threshold price of households.

Chapter 3

Review of the Literature

This literature review is organized into sections. The first section reviews empirical evidence supporting the theories of tax/price increases in relation to socio-demographic characteristics of households. The second section focuses on demand for food segmented by income groups. The third section reviews restaurant expenditure patterns of senior households. The fourth section explores price premiums for local foods and the fifth section addresses the sensitivity of restaurant and meal choice to price/tax increases.

Observed links between price/tax, socioeconomic groups and restaurant choice, and restaurant spending

The impact of price/tax instruments has generally been found to be stronger for lower social classes than in other groups of the population (Smed et al., 2007). The literature suggests that education increases the likelihood of FAFH decision (Ham et al., 1998) and has a positive effect on expenditures on FAFH (Abdel-Ghany & Sharpe, 1997; Ham et al., 2003; 2004; Mihalopoulos & Demoussis, 2001; Soberon-Ferrer & Dardis, 1991). Smed et al. (2007) find that younger age-groups decrease their demand for food on which saturated fats are taxed than older age-groups. Although there is no clear evidence that household size affects the of threshold price, previous studies have found household size to contribute positively to the level of expenditure of FAFH (Hiemstra & Kim, 1995; Nayga & Capps, 1992; Yen, 1993).

Based on the theories of consumer behavior and household production, Cai (1998) applies a Tobit modeling procedure to investigate the relationship between vacation food

expenditures and household socio-demographic characteristics. He used a sample size of 3,176 observations obtained from the interview data of the 1992-1993 Consumer Expenditure Survey conducted by the U.S. Bureau of Labor Statistics (BLS). He found that aside from residency, all the examined household characteristics contribute to the explanation of vacation food expenditure. When the total marginal effects of the variables were standardized and ranked it became clear that the change in food spending amount is most affected by employment status, followed by education, seasonality, occupation, ethnicity, housing tenure, marital status, age, presence of two or more earners, earned income and unearned income. The number of children in the household had the least (and negative) effect.

In a related study, Brown and Lee (1986) use a switching regression technique, for examining food expenditures at and away from home. The authors use data from the USDA's Nationwide Food Consumption Survey for the statistical analysis. The estimated income as a result of the probit model indicates that the higher a household's income the more likely they are to eat away from home. Their regional dummy indicates that households located in suburban areas are more likely to eat away from home than those in rural areas or central cities. Households with an employed female head, a more educated female head, whites, the presence of males between 4-26 and females between 4-50 years old increase the likelihood that the household will eat away from home.

Using logit analysis, Nayga and Capps (1992) investigate the decision to eat FAFH, by estimating a model in which the likelihood of eating away from home is a function of a set of predetermined socioeconomic and demographic variables. Approximately 73% of the individuals in their sample were correctly classified as either consuming or not

consuming FAFH using the logit specification. The authors found no statistical significance between the likelihood that males or females eat FAFH. They also found that individuals who are employed compared to the unemployed are more likely to eat FAFH. On the other hand, blacks and Hispanics compared to whites, food-stamp recipients, individuals on special diets and larger household are less likely to eat FAFH. Their results show that the likelihood of consuming FAFH decreases with age but increases with income. They also find that the probability of consuming FAFH is higher on weekends than on weekdays.

French, Harnack and Jeffery (2000) examine demographic, behavioral and dietary correlates of the frequency of fast food restaurant use in a community-based sample of 891 adult women. Their results showed that 21% of the sample reported eating three or more fast food restaurant meals per week, with the frequency of fast food restaurant use being higher among younger women, those with lower income, non-White ethnicity, greater body weight, lower dietary restraint, fewer low-fat eating behaviors, and greater television viewing. Over a three year intervention trial period, increases in frequency of fast food restaurant use were associated with increases in body weight, total energy intake, percentage fat intake and with decreases in physical activity, dietary restraint and low-fat eating behaviors. However, the intake of several other foods, including fruits and vegetables, did not differ by frequency of fast food restaurant use.

Gordon-Larsen, Guilkey, and Popkin (2011) use negative binomial regression models and nationally representative, longitudinal data to examine how community-level food price variation was associated with individual-level fast food intake by race/ethnicity and income. They found relatively stronger statistical association between food prices and

fast food intake for males than females and significantly lower intake for non-whites relative to whites. In particular, in the group with the strongest associations (black males), a 20% increase in price of soda was associated with a decrease of a 0.25 visits to a fast food restaurant per week. Furthermore, there was a relatively greater inverse change in individual-level fast food intake with income, such that bigger changes in individual-level fast food intake were seen at low income level, with greatest association in blacks. Thus increases in community-level prices of fast food were associated with reductions in individual-level fast food consumption and reduction of approximately one-quarter visits to a fast food restaurant per week.

The analysis of the impact of food taxes on the quality of meals is studied by Smd et al. (2007), who use price elasticities calculated from parameters estimated in econometric demand system models of food demand for five social classes and seven age groups. Weekly household panel data from Consumer-scan, spanning the period from January 1997 to December 2000 (approximately 2000 households) were used for the analysis. The authors operate their tax instruments on two different levels; taxes/subsidies levied directly on food commodities and taxes/subsidies that are levied on the nutrients contained in foods are analyzed. The resulting change in demand for each socio-demographic group is then predicted from the price elasticities calculated from the food-demand models. The results suggest that food demand choices are independent of prices for the group with the highest income, while the lower social classes have the largest demand/expenditure decreases in the advent of the imposed taxes. Also expenditure decreases were mostly found in household below 50 years of age reflecting the

willingness to adjust food demand in the short term for relatively younger households compared to aging households.

Demand for food segmented by income

In the United States, where visible changes have occurred in income distribution, commodity demand projections and tax strategies should be based on individual income strata rather than on average estimates of price and income elasticities (Park et al., 1996). Previous studies show that household income significantly and positively influences FAFH participation and expenditure (Ham et al., 2003&2004; Hiemstra & Kim, 1995; Jensen & Yen, 1996; Nayga & Capps, 1992; Nayga, 1996; Yen, 1993). Lower-income households may respond differently to changes in price (tax) than higher-income households, just as it is reasonable to expect different levels of subsistence expenditure for groups segmented by income (Park, Holcomb, Raper & Capps, 1996).

Park et al (1996) use data from the 1987-88 Nationwide Consumption Survey (NFCS) which provided detailed records on the money value, quality and type of foods purchased by the household over a one-week period. They use 12 aggregate commodity groups including FAFH as one of the commodity groups. Park et al. partitioned the data into two income classes. The basis for their segmentation was the 1987-88 poverty guidelines developed by the US Department of Health and Human Services (DHHS) and adapted from poverty thresholds published by the Bureau of Census. Partitioning the data resulted in the creation of a first poverty status group of 782 households with an average annual before-tax income of $6,850 and a second non-poverty status group with 3,087 households with an average annual after-tax income of $33,244, indicating that one-fifth

of the sample households were eligible for government food aid. They find expenditure elasticity for FAFH to be positive and greater than one for both groups, but the income elasticity of FAFH is positive and greater than one only for the poverty status group. Thus they conclude that FAFH is a luxury good for poverty status group but a normal good for the non-poverty status group. Overall their poverty status group was more responsive to changes in income than the non-poverty group.

Finkelstein et al, 2010 investigate the differential impact of targeted beverage taxes on higher- and lower-income households. They use data from Nielsen Homescan panel, which includes a national sample of households that scan and transmit their store-bought food and beverages weekly for a 12-month period. They use multivariate regression models to predict the effects of 20% and 40% price increases by estimating the association between changes in monthly beverage prices and changes in kilocalories purchased. The first part of their 2-part model estimates a logistic regression on the probability of positive purchases in a given month as a function of average monthly prices in the market for each beverage category and other covariates; while the second part estimates a regression of the same prices and covariates on log-kilocalories (per person per day) for households with positive purchases. The tax simulations were piloted by raising the relevant prices faced by each household either by 20% or 40% and using the model coefficients to estimate reductions in kilocalories purchased as a result of the tax. They then used the predictions from the tax simulations to estimate per capita and aggregate tax revenue by income quartile resulting from each tax strategy. Their results showed that a 20% and 40% tax on all sugar-sweetened beverages would reduce per capita purchases by an average of 10 and 17.1 kilocalories respectively. Middle-income

households had the largest estimated reductions in kilocalories as a result of the tax while the lowest and highest income quartiles were not statistically different from 0. A 20% tax raised $1.5 billion per year in revenue while a 40% tax generated annual revenue of $2.5 billion. Lower-income households purchase more sugar-sweetened beverages than higher-income households but since they make purchases at a lower average price (e.g. make purchases in lower ta nbxed/less affluent neighborhoods) and are more sensitive to prices their share of the tax was less than that of higher income households. For a 40% tax imposed, lowest income households would pay 20%, middle income households would pay 25%, whilst the highest income households would pay 30% of the tax.

FAFH expenditure of senior households

The proportion of elderly/retires in America's population has been increasing; it was 11.3% in 1980, 12.6% in 1990 and 14% in 2010; while its estimated that by 2050 a fourth of America's population will be over 65 (Abdel-Ghany & Sharpe, 1997). The definition of senior consumers vary by researcher; some consider 55 years and older as a senior group (Fleischer & Pizam, 2002; Hong et al., 1999) while others view those 65 and older as seniors (Abdel-Ghany & Sharpe, 1997). The literature generally concurs that retirees spend less on food-away-from-home (Blisard and Baylock, 1994; Chen and Cho, 1982; Ketkar and Cho 1982).

Adel-Ghany and Sharpe use data on 2,810 elderly households drawn from the Bureau of Labor Statistics 1990 Consumer Expenditure Survey to conduct a Multivariate Tobit analysis. Instead of treating the elderly as a homogenous group they examine spending pattern differences between households with a reference person aged 65-74 (young-old) and aged 75 and above (old-old). They test whether there are differences in spending

patterns between the two age groups while controlling for the influence of selected socio-demographic variables and then examine the influence of the select socio-demographic variables on the significantly different expenditure categories. Total expenditures were higher for the younger group, at $21,333, compared to $15,985 for the older group. They find significant differences in spending patterns between the two groups of households for ten expenditure categories including expenditures on food-at-home and food-away-from-home. Expenditures on food away from home were significantly higher for elderly households whose reference person had completed high school compared to households where the reference person did not have a high school degree. The older households whose reference had some college education spent significantly more on both food at home and food away from home compared to their counterparts without a high school degree. Urban west elderly residents spent significantly more than elderly rural residents on food at home.

In general, higher levels of education were significantly associated with relatively larger numbers of expenditure categories than lower levels of education. They found that expenditures by households in either age group varied positively with household size for food at home. Young-old unmarried male-headed households spent relatively more on FAFH and significantly less on FAH. From the Tobit model they obtained the marginal propensities (the change in expenditure on a specific category given a change in total expenditures) to spend for all cases which included cases above the limit as well for cases at the limit. The young-old age household had higher marginal propensities to spend both on food at home and food away from home compared to the old-old age group.

Taking the analysis of the food choices and consumption pattern of senior households further, Jang et al. (2007) investigate the association of demographic and socioeconomic variables with food away from home expenditures among senior households. They examine the two stage nature of the FAFH decision using Heckman's double hurdle approach. The first step was a probit regression to estimate the probability of FAFH participation; the decision as to whether to consume FAFH or not. The second step was to predict FAFH expenditure; the decision how much to spend on FAFH using a truncated regression with the inverse mills ratio for correcting sample selection bias. They use data obtained from the fourth-quarter interview component of the Consumer Expenditure Survey, compiled by the US Bureau of Labor Statistics, which provides a continuous and comprehensive flow of information about consumer expenditure patterns of US households. Their results indicate that socio-demographic characteristics are more useful in understanding the FAFH participation decision of senior households, whilst financial resources, availability and access to restaurants are better predictors of FAFH expenditures. They find that average senior households may control their overall FAFH budget more due to their reduced discretionary income. They however find that even though graduate-educated seniors were less likely to dine out, they tended to spend significantly more on FAFH once the FAFH decision was made. Also senior households that spend more on FAH spent more on FAFH as well demonstrating that FAH may represent food quality and not a substitute good. Thus the senior households who pay attention to food quality at home will be significantly more interested in consuming quality FAFH as well.

Local Foods and Tax Choke Premiums

Local foods are broadly identified according to dimensions of place and space. The attributes of local foods include place of origin, uniqueness of the product and physical access (driving distance) to the product within a geographic location. These attributes reinforce the perceived benefits and desire for freshness, quality, knowledge of the product source and support for the local economy among other factors. Consumers may indicate the level of price or taxes on local foods that would cause them change their consumption pattern, but in a real-world situation their actual purchasing behavior may diverge from their originally stated expenditure behavior. Ortiz (2010) analyzes the actual price premiums that consumers are willing to pay for menu's featuring local products in a restaurant setting and evaluates the extent of commitment the consumers have towards paying the price premiums. The findings suggest higher marginal monetary contributions to the restaurant selling local menu offerings at a premium price.

Similarly, Sharma and Strohben (2006) analyze the economic impacts of using local foods in restaurants. They compute the total costs of using local foods in restaurant operation and compare with the operational costs of other national vendors. Food costs per pound purchased were averagely lower for local foods ($3.80) as compared to national vendors ($4.30). Given various menu choices at three price options, 41% of all participants chose the local food item on the menu while a fourth agreed to pay a price premium of $2 (36% above average prices). Out of all the participants 45% chose the menu without any price premium, while 31% chose the menu option with a premium of $1 (18% higher than regular average prices). Their findings suggest that consumers are

more willing to support premium prices for local foods, when made aware of local menu offerings and given the choice to do so. In other words, local foods can be priced higher.

Is the choice of restaurants and restaurant meals price/tax sensitive?

Are food demand choices independent of prices/taxes? A study by Andreyeva, Long and Brownwell (2010) reviewing 160 studies on the price elasticity of demand for 16 major food and beverage categories, revealed that food away from home was the most responsive to price changes thus suggesting larger relative changes in consumer purchases. Demand for food is relatively inelastic yet the effects of a small tax/price change on foods that are very responsive to such changes accumulate across a population (Andreyeva et al). Low-income households exhibit more substitution within commodity aggregates than households with higher incomes as price elasticities for all goods are lower for the upper social classes and some price elasticities are even non-significant (Smed et al., 2007).

When price of restaurant meals increase, either by legislative proposed tax or increased restaurant costs, consumers may either consume more of restaurant meals (while consuming less of some other good), may consume the same amount as they previously did or they may consume less. The overall total effect would depend on whether the income effect or substitution effect is stronger. The consumers may either substitute one restaurant for the other or one meal for the other (cheaper or untaxed meals). How much consumption would change would also be dependent on the tax level and the consumer's awareness of it.

Summary

While previous work gives little insight into the level of taxes that causes consumers to change their consumption pattern at restaurants, it indicates a relationship between consumer's socio-demographic characteristics, restaurant consumption/expenditure pattern as well as the economic impact. This paper builds on the previous literature. Using a Tobit model we analyze the level of tax that would cause consumers to eat less frequently at restaurants or change the meal that they would typically consume; we examine the socio-demographic characteristics and restaurant preference of the restaurants consumers mostly affected by the tax.

Chapter 4

Conceptual model

Demand for a market good or services can be derived as a function of household variables such as household income, value of time as a measure of the household's opportunity cost, and other household characteristics (Lancaster, 1966, 1971). This section discusses the concept of threshold price. The conceptual model for this study is a theoretical framework representing the quantitative relationship between our dependent variable of threshold price and the relevant behavioral and socio-demographic variables. The model serves two main functions: first, a simplification and abstraction from our observed data and second, selection of data based on economic theory.

Introduction

The basic theorem underlying the concept of demand asserts that when the price/cost of a good or service (restaurant meals in our case) increases, the rational consumer would demand a lesser quantity of the said good or service. In essence the amount of the commodity that the consumer is willing to purchase at a certain price falls in response to the price/cost increase. This reflects the inverse relationship between price and quantity demanded of goods and services. Demand however remains unaffected (constant).

I hypothesize that for every unit increase in the cost of restaurant meals, there is not an exact, corresponding decrease in quantity demanded of restaurant meals. However, beyond the consumer's threshold price for the restaurant meal, then the consumer's quantity demanded of restaurant meals ultimately falls.

Key Concepts

There is a psychological component to consumers' perception of prices. *Threshold price* in economic literature refers to the fixing of prices to draw a consumer up to a certain threshold. I theorize that for a unit increase in the cost of restaurant meals, the level of satisfaction of the consumer may restrict his/her quantity demanded from falling. Thus for the purposes of our study we redefine the threshold price point as the point beyond which a cost increase in restaurant meals that would cause a consumer to eat less frequently at the restaurant or change the meal that they would typically purchase. Thus it relates cost increases to changes in consumer behavior and consumption.

Economics, marketing and advertising analysts note that consumers have "dead-zones" within which they don't discriminate between higher and lower price points. We subsequently refer to *threshold price-range* as the range within which in the event of a price increase in the cost of a restaurant meal, the expenditure behavior of the consumer would not change. In essence this captures the minute region where the consumers demand for the restaurant meal is relatively inelastic. Thus if the consumer is within the threshold price-range and the cost of restaurant meals increase, the consumer would continue to consume the same quantity as previously demanded. However, when the consumer moves to the end of the threshold price-range, he/she reaches the threshold price, above which expenditure behavior is subject to change.

Theoretical Model

By the law of demand, a price increase leads to a fall in quantity demanded (Krugman and Wells, 2005). Consumers generally respond to price increases by reducing the quantity demanded of a commodity, good or service. They either decrease their quantity

demanded by a small amount or by a large amount. The degree of responsiveness of quantity demanded to changes in price is referred to as price elasticity of demand (Krugman and Wells, 2005). This number measures, for instance, by how much a household would reduce their quantity demanded for restaurant meals if the cost of restaurant meals increases. Pauwels, Srinivasan and Franses (2007) assess the impact of price thresholds on price elasticities.

The price elasticity of demand numerically values the percent change in quantity demanded as a result of this price change along the demand curve (Krugman and Wells, 2005). A sufficient condition for the existence of Threshold price is that the consumer demand curve has points of inelasticity along it (the demand curve). More negative values signify higher price sensitivity and thus a less willingness to pay for tax, price or meal cost increases. Conversely, positive values signify a less price sensitivity and thus a higher likelihood of paying for restaurant tax, price or meal cost increases.

Figure 4.1 shows a hypothetical restaurant scenario where prices increase from P_0 to P_1 and then to P_2. Points A', B' and C' reflect inelastic points along the consumers threshold range.

We show this proposition with the aid of the diagram below:

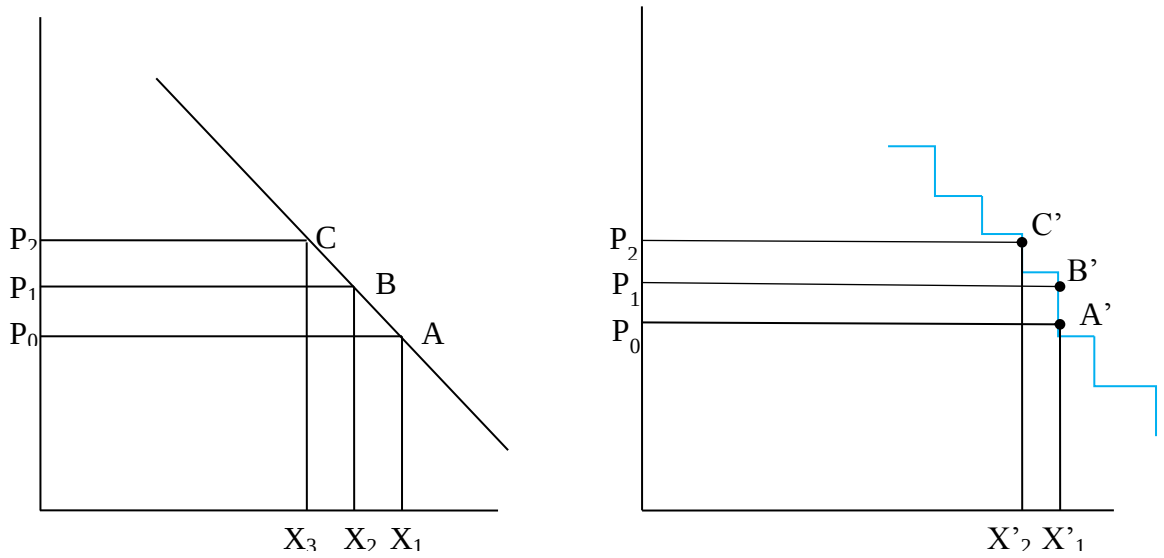

Figure 4.1 Conventional and Modified Demand Schedule

The first diagram in Figure 4.1 above is the conventional demand curve, which reflects prices on the y-axis and corresponding quantities demanded on the x-axis. The second diagram in Figure 4.1 provides/proposes a slightly modified version with slight step-like irregular kinks along the demand schedule to emphasize the concept of threshold price. When restaurant prices increase from P_0 to P_1, conventional demand predicts that quantity demand for restaurant meals would fall from X_1 to X_2. However in the modified demand curve, if the consumer is within his/her threshold price-range (vertical portion of the demand curve) quantity demanded may not fall in response to price increases. At point A' and B', demand remains at X'_1 when prices increase from P_0 to P_1. Thus in the modified demand schedule, demand for restaurant meals remains elastic at X'_1 after the hypothetical cost increase in restaurant meals. However, an increase in price to P_2 goes beyond the threshold price to point C' and the consumer reduces quantity demanded to

X_2. Thus beyond the threshold price consumers alter their expenditure behavior there-by demanding less of restaurant meals or changing what they would typically purchase.

Factors That Affect or Predict Threshold price

The desire to use restaurant services may be motivated by several reasons including family celebrations, leisure, business and the ease of not having to cook (Pedraja and Yague, 2001). Restaurant characteristics have been found to affect meal duration and spending (Kimes and Robson, 2004). Pauwels et al. (2007) examine category and brand characteristics that might influence the presence, nature and size of price thresholds and price elasticity differences. This section highlights the factors that affect the threshold price or threshold range of consumers. We broadly categorize the exogenous factors that affect, influence and predict the threshold price of consumers' restaurant meals into household socio-demographic characteristics and preference for specific restaurant characteristics. These characteristics make the threshold range wider or narrower.

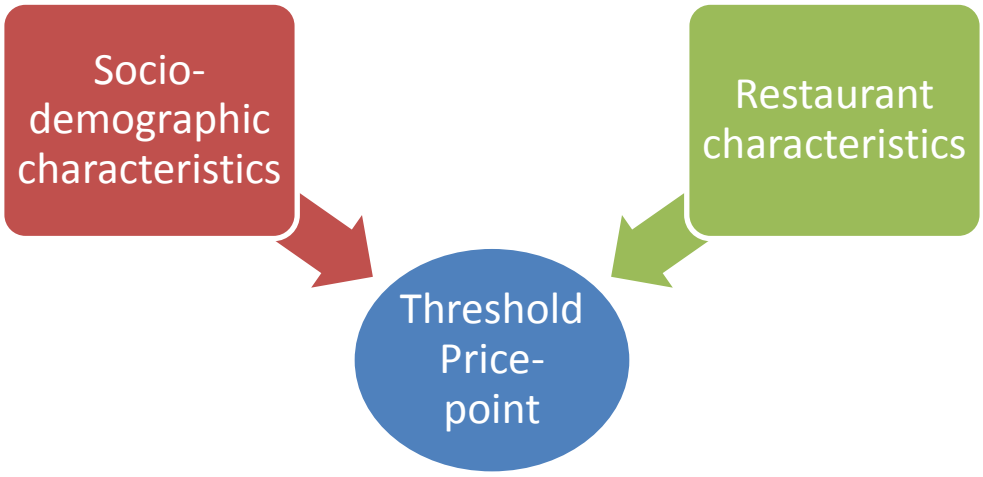

Figure 4.2 Factors Affecting Threshold Prices

The household socio-demographic characteristics that influence threshold price include consumers' income, education, gender, marital status, county of residence, rural or urban location and number of persons in the household. The restaurant characteristics that affect consumers' threshold price include chain restaurants over independent restaurants, full-service over fast-casual service, quality of food and service, local food, menu variety and portion sizes offered at the restaurant.

Figure 4.3 Characteristics Influencing Threshold Price

The interaction of different socio-demographic characteristics and preferences of restaurant characteristics for the consumer culminates in varying threshold prices and demand schedules for each consumer.

Summary

The contribution of this study to the literature is that it applies the concept of threshold price to restaurant taxes. The study explores the cost increase of restaurant meals that would cause consumers to patronize less of the restaurant meals or change what they would usually consume. I term/call this the consumer's threshold price. The introduction of a restaurant tax may reduce present, near term and even future threshold price and consumption.

Chapter 5

Research Methodology

Data Description, Subjects and Procedure

The study relies on a survey[1] designed to elicit changes in the demand pattern of consumers' dining in restaurants in relation to changes in the cost of restaurant meals. The survey was conducted online and administered to adult consumers living within the counties of Kentucky. The target population was Kentucky adults over 18 years of age, estimated to be 3,315,996 in 2012 (US Census Bureau).

The survey contained sections on consumer eating patterns/habits; frequency of eating in restaurants and the average cost per meal. On a scale of 0 to 60 respondents were asked to select by how much the cost of restaurant meals would have to increase before they would eat in a restaurant less frequently or change what they typically purchase in restaurants. The respondents were also presented with two scenarios in which they were allowed to specify their preference for chain restaurants over independent restaurants; fast-casual/quick-service; quality of service and food; local variety of foods and portion sizes served when there was no change in cost of restaurant meals compared to a 3% increase. This section was designed to elicit the change of behavior between regular demand and an associated increase in restaurant taxes. Socio-demographic characteristics were also collected in the final section of the survey.

[1] See Han J. (2013) for details of the survey.

The response rate of the survey was 22%. Out of all respondents 1,252 respondents fully completed the entire survey. The survey population was 37% male and 63% female. In general, higher income households were represented more in the survey response than other income groups in the population.

Measures

The following measures were self-reported by each respondent.

Behavioral Variables

Typically eat in restaurants. This is a dummy variable which captures whether the respondent typically eats in a restaurant at least once a month or not. As a precursor, this question sets the stage for the subsequent questions in the survey. Of the 1,162 sampled respondents being used for this study, all affirmed that they eat in a restaurant at least once a month.

Frequency of eating in restaurants variable captures the number of times the respondent eats in a restaurant per month. On a scale of 0 to 20 respondents were asked to indicate how many times, on average, that they eat breakfast, lunch and/or dinner per month in restaurants.

Cost per meal is a variable which captures the average cost of a typical meal. Respondents were given ranges and asked to indicate their average cost of breakfast, lunch and dinner at restaurants.

Higher neighborhood tax is a binary variable indicative of whether the respondent would opt for restaurants in lower tax communities. Respondents were asked ‘if tax rates on

restaurant meals in one community were 3% to 5% higher than in a neighboring community, would this cause you to choose restaurants in communities with lower taxes if the same restaurant option were available in those communities?' 47% respondents said they would choose restaurants in communities with lower taxes and 53% said otherwise.

The *price* variable is a dummy which indicates whether or not price is an important factor to the respondent for when choosing a restaurant. Of the sampled respondents 20% said price is the most important factor for selecting a restaurant while 80% said price is not the most important factor for them in restaurant selection.

Check tax. This variable captures whether the respondent notices all taxes charged when paying a restaurant check. 51% of the sample responded saying they notice all taxes charged when paying the check, with 49% saying they do not notice all taxes charged.

Economic outlook is a dummy for whether respondent believes overall economic outlook is improving or not. 56% of the respondents believe that overall economic outlook is improving.

Tax vote is a variable indicating whether the respondent would vote for adding a restaurant tax. Respondents were asked if they would vote for adding a tax on restaurant meals in their city it the tax revenue was used for promoting tourism or operating an arena. Out the sampled respondents, 21% said they would vote in favor of the restaurant tax if it would facilitate the promotion of tourism within their city while 79% said they wouldn't vote for such a tax.

Preference for chain restaurants is a variable that captures the respondent's inclination towards chain restaurants over independent restaurants. On a 5-point likert scale,

respondents indicated how strongly they preferred chain restaurants. Out of the sampled respondents 26% strongly disagreed, 32% disagreed, 30% were neutral, 10% agreed while 1.5% strongly agreed to the question of preference of chain restaurants over independent restaurants.

Table 5-1 Preference for Chain Restaurants over Independent Restaurants

Prefer chain restaurant	*Freq.*	*Percent*	*Cum.*
Strongly disagree	*297*	*25.56*	*25.56*
Disagree	*375*	*32.27*	*57.83*
Neutral	*352*	*30.29*	*88.12*
Agree	*121*	*10.41*	*98.54*
Strongly agree	*17*	*1.46*	*100*
Total	*1,162*	*100*	

The variable '*prefer full service'* indicates the respondent's preference for full-service restaurants over fast-casual or quick service restaurants. The 5-point likert scale captured respondent's level of preference for full service restaurants. Out of the sampled respondents 1.2% strongly disagreed, 11% disagreed, 30% were neutral, 38% agreed while 20% strongly agreed to the question of preference of full-service restaurants over fast-casual and/or quick-service restaurants.

Table 5-2 Preference for Full-service Restaurants over Quick-service Restaurants

Prefer full service	*Freq.*	*Percent*	*Cum.*
Strongly disagree	*14*	*1.2*	*1.2*
Disagree	*131*	*11.27*	*12.48*
Neutral	*349*	*30.03*	*42.51*
Agree	*441*	*37.95*	*80.46*
Strongly agree	*227*	*19.54*	*100*
Total	*1,162*	*100*	

'Prefer local foods' is a variable that expresses respondents' penchant for restaurants that use local foods in their menu offerings. Respondent preferences were recorded on a 5-

point likert scale. Out of the sampled households who responded to this section 2% strongly disagreed, 4% disagreed, 31% were neutral, 39% agreed while 23% strongly agreed to the question of preference of restaurants that use local foods in their menu offerings.

Table 5-3 Preference for Local Food on Menu Offerings

Prefer local foods menu	*Freq.*	*Percent*	*Cum.*
Strongly disagree	*23*	*1.98*	*1.98*
Disagree	*45*	*3.87*	*5.85*
Neutral	*364*	*31.33*	*37.18*
Agree	*457*	*39.33*	*76.51*
Strongly agree	*273*	*23.49*	*100*
Total	*1,162*	*100*	

Socio-demographic Variables

The demographic variables reported included respondent's *age*[2] in years presented in ranges. The age ranges used for the analysis are 18-30, 31-40, 41-50, 51-60 and above 60. This study regards those households that are headed by someone older than 60 years as senior households. In our sample 16 % fall within the 18-30 age range, 20% between the 31-40 age range, 23% in the 41-50 age range, 29% within the 51-60 age range and 13% as senior households.

[2] Age and age-squared generally captures the curvilinear nature of the influence of age in a model, however we use age ranges in our analysis to enable comparison of different age groups in response to taxes.

Table 5-4 Distribution of Age Group

Age range	*Freq.*	*Percent*	*Cum.*
18 - 30	*184*	*15.83*	*15.83*
31-40	*230*	*19.79*	*35.63*
41-50	*267*	*22.98*	*58.61*
51-60	*335*	*28.83*	*87.44*
60+	*146*	*12.56*	*100*
Total	*1,162*	*100*	

The highest level of *education* completed was also provided in categories. Of the sampled respondents 0.2% had 'less than high school degree', 9 % had a 'high school degree/GED equivalent', 12% had a '2-year college degree', 25% had a '4-year college degree' and 54% had a 'graduate/professional degree'.

Table 5-5 Distribution of Highest Level of Education Completed

Education	*Freq.*	*Percent*	*Cum.*
< High school degree	*2*	*0.17*	*0.17*
High school/GED equivalent	*100*	*8.61*	*8.78*
2-year college degree	*142*	*12.22*	*21*
4-year college degree	*294*	*25.3*	*46.3*
Graduate/professional degree	*624*	*53.7*	*100*
Total	*1,162*	*100*	

The *income bracket* of respondents' combined annual household income were also gathered and recoded into quintiles to facilitate the analysis. We recode the original 15 income brackets into five categories: under $20,000 as low income; $20,000-49,999 as middle-low income; $50,000-99,999 as middle income; $100,000-149,999 as middle-high income; and $150,000 plus as high income brackets. Of the respondents, 4% fell into the low income bracket, 17% in the middle-low income bracket, 40% in the middle

income bracket, 25% in the middle-high income bracket and 14% in the high income bracket.

Table 5-6 Distribution of Income Group

Income Group	*Freq.*	*Percent*	*Cum.*
Low income	*45*	*3.87*	*3.87*
Middle-low	*194*	*16.7*	*20.57*
Middle income	*463*	*39.85*	*60.41*
Middle-high	*292*	*25.13*	*85.54*
High income	*168*	*14.46*	*100*
Total	*1,162*	*100*	

Household size[3]. The respondents were asked to indicate the number of persons in their household. 17% of the respondents had single-member households, 41% had 2-member households, 18% had households comprising 3 members, 16% had 4-member households, while 8% of the respondents had more households comprised of 5 or more members.

Table 5-7 Distribution of Household Size

Household no.	*Freq.*	*Percent*	*Cum.*
1	*203*	*17.47*	*17.47*
2	*476*	*40.96*	*58.43*
3	*205*	*17.64*	*76.08*
4	*187*	*16.09*	*92.17*
5 or more	*91*	*7.83*	*100*
Total	*1,162*	*100*	

[3] We use number of persons to capture the size of food demand of each household. Lee and Brown (1986) include the square of household size in their model to capture the effects of economies of scale in food consumption.

City Size is a locational categorical variable that was derived from the zip codes provided by the respondents. We recode Kentucky's six city categories into large and small city sizes. 70% of the respondents were from large cities that have a population of more than 20,000. The remaining 30% were from relatively smaller cities with population sizes less than 19,000.

Table 5-8 Distribution of City Classes

City size (population)	*Freq.*	*Percent*	*Cum.*
20,000+	*820*	*70.57*	*70.57*
8,000-19,999	*115*	*9.9*	*80.46*
3,000-7,999	*178*	*15.32*	*95.78*
1000-2,999	*28*	*2.41*	*98.19*
<999	*21*	*1.81*	*100*
Total	*1,162*	*100*	

The respondents' zip-codes were subsequently pooled together to obtain county-defined regions. Some of the counties had few responses - from less than five respondents - which may be unrepresentative of the said counties, thus the counties were further grouped into area development districts. The figure below displays the average threshold price for respondents represented in each of Kentucky's Area Development District (ADD).

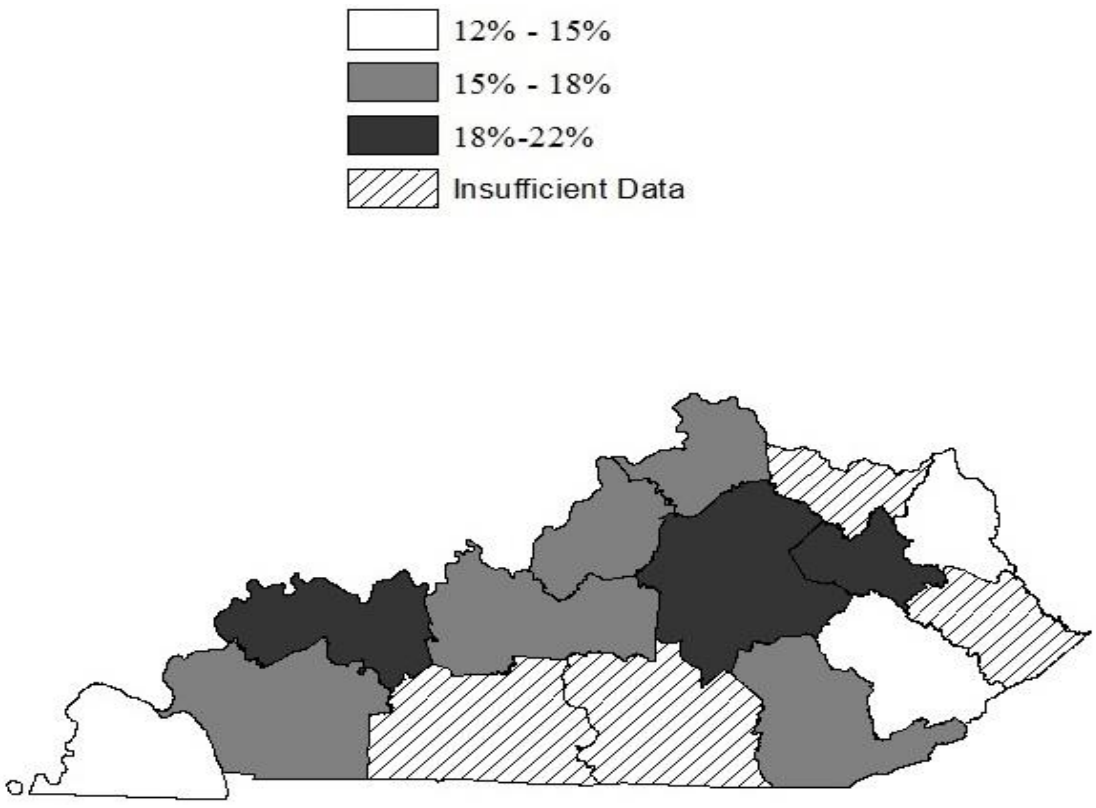

Figure 5.1 Area Development Districts in Kentucky by Threshold Prices

Threshold price. The threshold price was estimated with the question 'by how much would the total cost of restaurant meals have to increase before you eat less frequently at restaurants or change what you typically purchase in a restaurant?' Respondents were shown a scale from 0 to 60% and asked to indicate the percentage increase in cost that would lead them to change their restaurant food purchasing habits. The percentage of respondents that reported a 3% tax threshold price or less was 6%. The remainder of the population reporting between 4-10% tax level was 27%; 35% of the respondents selected a tax level between 11-20%; 22% respondents opted for tax levels between 21-30%; 4% of the respondents chose a tax level between 31-40%; 3% respondents selected a tax level from 41-50%; and 2% of the respondents were willing to select a tax level of 51-60%.

Table 5-9 Distribution of Threshold Price

Threshold price (%)	*Freq.*	*Percent*	*Cum.*
0-3	*71*	*6.11*	*6.11*
4-10	*315*	*27.11*	*33.22*
11-20	*406*	*34.94*	*68.16*
21-30	*259*	*22.29*	*90.45*
31-40	*46*	*3.96*	*94.41*
41-50	*39*	*3.36*	*97.76*
51-60	*26*	*2.24*	*100*
Total	*1,162*	*100*	

Figure 5.2 below graphs a histogram of the distribution of the threshold price points for households in Kentucky. The observations are slightly skewed to the left, with an average threshold price point of 17%. Most of the threshold price point observations were clustered at regular intervals of 5, 10, 15, 20 and 25. This presupposes that households prefer to report the practicality of working with regular multiples of numbers rather than an arbitrary value, to reflect/rank their selection of threshold price point. The censoring of the observations at 0 and 60 also inform the empirical model to be used for the analysis.

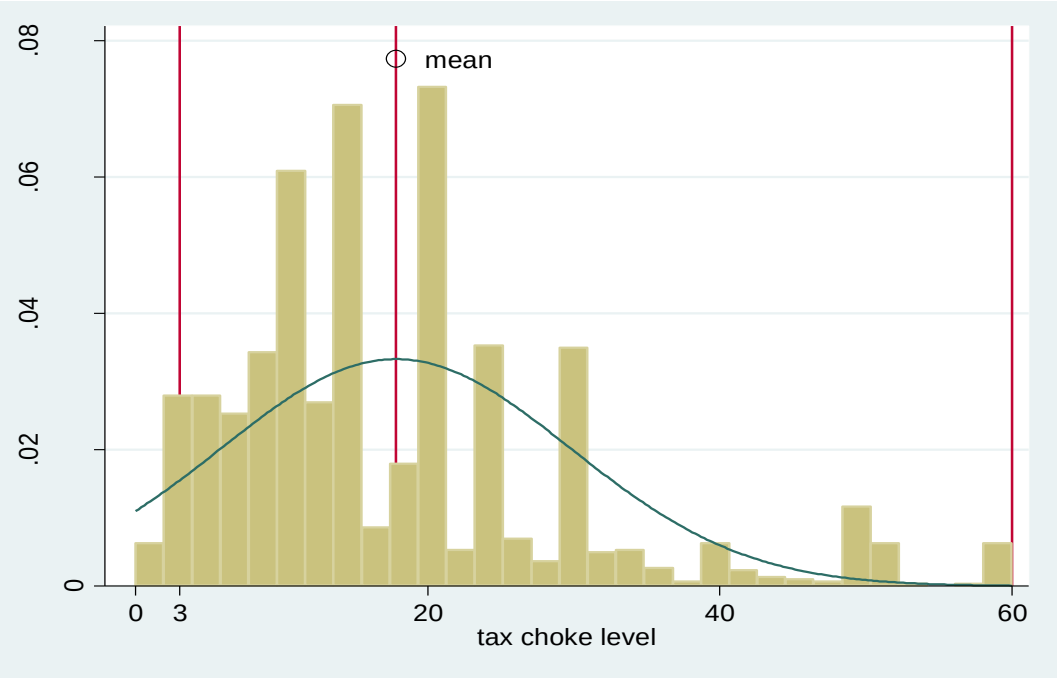

Figure 5.2 Distribution of TPP with Normal Density Curve Imposed

Specification of Tobit Model

The analysis of restaurant tax on meals and how it affects demand for restaurants and restaurant meals by different socio-demographic households raises important issues. Of the sampled respondents 6% indicated a threshold price of 3% or less. Cumulatively, 33%, 68% and 90% of the respondents selected a threshold price of 10%, 20% and 30% respectively. Moreover 0.4% of the respondents selected a threshold price of 0. Excluding the zero/non-positive observations of the threshold price may result in a deficiency of the estimation procedure also known as omitted variable bias (this would have been more pertinent if a larger percentage of observations in the data was clustered at zero). It can be argued that the resultant estimation is a truncated model and inferences are made only for the subpopulation known to have positive threshold prices but the sample may no longer probabilistic, as it should be according to the sampling procedure

for the survey (Cai, 1998). Furthermore, excluding the households reporting zero threshold price is tantamount to the assumption that these households and those represented by them will not be in the food consumption market or will not purchase meals at restaurants.

The statistical technique generally applied in analyzing the relationship between household expenditures and characteristics is the Classical Linear Regression (CLR). Using Ordinary Least Squares (OLS) to estimate the model may result in biased and inconsistent estimators because of some missing or zero observations in the survey response. The OLS regression treats the upper and lower limits as the actual values thus when the variable is censored the coefficients from the analysis will not necessarily approach the "true" population parameters as the sample size increases.

This study employs the use of a Tobit model, also called a censored regression model, devised by Tobin (1958) for econometric analysis. Tobit analysis is a theoretically preferred technique as it allows the inclusion of zero-value observations. According to McCracken and Brandt (1987) and McDonald and Moffitt (1980), the Tobit technique not only calls for the inclusion of all observations, which increases estimation efficiency, but it also allows estimation of both the quantity responses of households actively making restaurant purchases and the quantity responses resulting from changes in the household probability of not making any restaurant purchases at all. In other words, the total marginal effects of a household's characteristics on its threshold price can be decomposed into two meaningful components: (a) quantity effects conditional to positive threshold prices (conditional effects) and (b) quantity effects solely resulting from the

probability that the household moves from zero/no threshold price to positive threshold price (market participation effects).

The Tobit model assumes that the dependent variable has a number of its values clustered at a limiting value, usually zero and it uses all observations both those at the limit and those above the limit to estimate a regression line. It is designed to estimate linear relationships between variables when there is either left- (censoring from below) or right-censoring (censoring from above) in the dependent variable. Censoring from above takes place when cases with a value at or above some threshold, all take on the value of that threshold, so that the true value might be equal to the threshold, but it might also be higher. In the case of censoring from below, values those that fall at or below some threshold are censored. Thus for a censored Y, we observe all the X but know the true value of Y for a restricted range of observations.

The Tobit model is a combination of two models, the probit model which determines whether $y=0$ or $y>0$ and a truncated regression model for $y>0$. The coefficients from Tobit estimation can be used to determine both changes in the probability of being above the limit and changes in the value of the dependent variable if it is already above the limit (McDonald and Moffitt, 1980). The Tobit analysis assumes that the likelihood of the FAFH decision and the level of FAFH expenditures are determined by the same set of explanatory variables.

Specifically, we will use the Tobit model to examine if a particular characteristic explains threshold price variations when the others are controlled. We can thus estimate an

econometric model with a left-censoring at zero threshold price and a right censoring at 60%.

The stochastic model underlying Tobit may be expressed as follows:

$$y_t = X_t\beta + \mu_t \quad \text{if } X_t\beta + \mu_t > 0$$
$$= 0 \quad \text{if } X_t\beta + \mu_t \leq 0,$$
$$t = 1, 2, \ldots, N,$$

where N is the number of observations,
y_t *is the dependent variable,*
X_t *is a vector of independent variables,*
β *is a vector of unknown coefficients and*
μ_t *is an independently distributed error term assumed to be normal with zero mean and constant variance* σ^2

The Tobit model has a censored normal distribution which includes a conditional continuous part as well as a discrete part. The primary dependent variable of our analysis, TP (threshold price), is defined as how much the total cost of restaurant meals would have to increase before respondents eat less frequently at restaurants or change what they typically purchase in a restaurant. We estimate the empirical model of the threshold price as a function of income, average cost/expenditure at a restaurant, frequency of restaurant visits and other demographic factors.

Empirical Model:

$$\begin{aligned} TPP = {} & \alpha_1 + \alpha_2 income + \alpha_3 age + \alpha_4 education + \alpha_5 household + \alpha_6 gender \\ & + \alpha_7 higherNeighborhoodTax + \alpha_8 priceImprotant + \alpha_9 costMeal \\ & + \alpha_{10} typEat + \alpha_{11} freqBreakfast + \alpha_{12} freqLunch \\ & + \alpha_{13} freqDinner + \alpha_{14} checkTax + \alpha_{15} voteTax \\ & + \alpha_{16} economicOutlook + \alpha_{17} cityClass \\ & + \alpha_{18} prefChainRestaurant + \alpha_{19} prefFullService \\ & + \alpha_{20} prefLocalfood + \varepsilon \end{aligned}$$

where $Income_i$ is the combined household's annual income, Age_i is age category of the respondent, $Education_i$ is the highest level of education completed of the respondent, $Household_i$, is the number of people in the respondents household, $Gender_i$ is a dummy variable reflecting the gender of the respondent, $NeighborhoodTax_i$ is a binary variable indicative of whether the respondent would opt for restaurants in lower tax communities, $PriceImportant_i$ is a dummy variable capturing whether price is an important factor for choosing a restaurant, $CostMeal_i$ is the average cost of a typical restaurant breakfast, lunch or dinner meal, $TypEat_i$ is a dummy which captures whether the respondent typically eats in a restaurant at least once a month, $FreqBreakfast_i$ is the number of times the respondent eats breakfast in a restaurant per month, $FreqLunch_i$ reflects how often the respondent eats lunch at a restaurant each month, $FreqDinner_i$ captures the frequency of dinner at a restaurant per month, $CheckTax_i$ is whether the respondent notices all taxes charged when paying the restaurant check, $VoteTax_i$ is whether the respondent would vote for adding a restaurant tax if the revenue is used for promoting tourism, $EconomicOutlook_i$ is a dummy for whether respondent believes economic outlook is improving, $CitySize_i$ is categorical variable indicating the class of city of the respondent's location, $ChainRestaurant_i$ is a categorical variable that indicates how strongly the respondent prefers chain restaurants over independent restaurants, $FullService_i$ is a categorical variable that captures how strongly the respondent prefers full-service restaurants to fast-casual/quick-service restaurants, $LocalFood_i$ is a categorical variable that specifies how strongly the respondent prefers restaurants that use local foods in their menu offerings.

Marginal Effects of the Tobit Model

The marginal effects are computed for the latent dependent variable, the expected value of the dependent variable conditional on being uncensored, the unconditional expected value of the dependent variable, and the probability of being uncensored. Following Cong (2000), where *a* is the lower censored limit and *b* is the upper censored limit, we rewrite the Tobit model as:

$$y_i^* = \begin{cases} y_i, & if\ a < y_i < b \\ a, & if\ y_i \leq a \\ b, & if\ y_i \geq b \end{cases}$$

The four forms of marginal effects are:

1. The β coefficients themselves which are the changes in the mean of the latent dependent variable: $\beta = \partial E(y_i)/\partial x_i$
2. The changes in the unconditional expected value of the observed dependent variable: $\partial E(y_i^*)/\partial x_i$
3. The changes in the conditional expected value of the dependent variable: $\partial E(y_i^*) \mid a < y_i^* < b)/\partial x_i$
4. The changes in the probability of being uncensored: $\partial P(a < y_i^* < b)/\partial x_i$

In lieu with McDolald and Moffitt (1980), given the expectation of y* as

E(y) = P(y* > 0) E(y* | y* > 0),*

the effect of a change in the jth continuous variable of X on E(y*) can be expressed as:

$\partial E(y^*)/\partial x_j = P(y^* > 0)\, \partial E(y^*) \mid y^* > 0) / \partial x_j + E(y^* \mid y^* > 0)\, \partial P(y^* > 0)/\partial x_j$

The coefficients of the Tobit regression may be interpreted as the effect on the household's threshold price as a result of variations in socio-demographic variables and preferences restaurant characteristics.

Chapter 6

Empirical Results & Discussion

This chapter highlights the results of our empirical model and subsequently delves into a discussion of the results. Table 6.1 below lists the behavioral and socio-demographic variables with their forms and a prior expected signs. Table 6.2 also gives the descriptive statistics of the variables used for the analysis.

Table 6-1 Variable forms and their expected signs

Variable	*Form*	*Expected/Hypothesized Sign*
Threshold price	*Continuous*	*N/A*
Income Group	*Categorical*	+
Income	*Continuous*	+
Age (age group)	*Categorical*	-
Education	*Categorical*	+
Household number	*Categorical*	-
Gender_male	*Binary*	+
Higher_neighbourhood_tax	*Binary*	-
Price_important	*Binary*	-
Cost_meal	*Continuous*	-
Freq_breakfast	*Categorical*	-
Freq_lunch	*Categorical*	+
Freq_dinner	*Categorical*	+
Check_tax	*Binary*	-
Vote_tax	*Binary*	+
Economic_outlook	*Binary*	+
City_class	*Categorical*	+
Pref_chain_restaurant	*Categorical*	-
Pref_full_service	*Categorical*	+
Pref_local_food	*Categorical*	+

Table 6-2 Descriptive Statistics of Variables

Variable	*Obs*	*Mean*	*Std. Dev.*	*Min*	*Max*
Threshold price	*1162*	*17.76*	*11.77*	*0*	*60*
freq_breakfast	*1,162*	*1.89*	*2.92*	*0*	*20*
freq_lunch	*1162*	*5.89*	*5.16*	*0*	*20*
freq_dinner	*1162*	*6.38*	*4.20*	*0*	*20*
avg_price_meal	*1162*	*13.80*	*7.11*	*3*	*48*
higher_neighborhood_tax	*1162*	*0.47*	*0.50*	*0*	*1*
price_important	*1162*	*0.20*	*0.40*	*0*	*1*
check_tax	*1162*	*0.51*	*0.50*	*0*	*1*
economic_outlook	*1162*	*0.56*	*0.50*	*0*	*1*
Vote	*1162*	*0.21*	*0.40*	*0*	*1*
Gender	*1162*	*0.37*	*0.48*	*0*	*1*
household_number	*1162*	*2.56*	*1.18*	*1*	*5*
age_group	*1162*	*3.02*	*1.27*	*1*	*5*
income_group	*1162*	*3.30*	*1.03*	*1*	*5*
Education	*1162*	*4.24*	*0.98*	*1*	*5*
Citysize	*1162*	*1.55*	*0.96*	*1*	*5*
pref_chain_restaurant	*1162*	*2.30*	*1.01*	*1*	*5*
pref_full_service	*1162*	*3.63*	*0.96*	*1*	*5*
pref_local_food	*1162*	*3.78*	*0.91*	*1*	*5*

Statistical Analysis/ Modeling Procedure

All analyses are done using Stata software. The likelihood ratio test statistic is used to test for the overall significance of the set of variables included in the varying forms of the modeling procedures. The results are tested to ascertain if they are statistically and economically significantly different from zero using the alpha-level tests. Robust standard errors are used to correct for possible autocorrelation or heteroskedasticity in the model specification.

Results of the OLS and Tobit Models

The results of the OLS and Tobit models are shown in Table 6.3 below. The chi-squared value of 158, 157.9 and 159 with a corresponding p-value of 0.0000 indicates that the variations of our Tobit models are a suitable fit for the analysis of socio-demographic characteristics and restaurant preferences of households in Kentucky. The ancillary statistic "/sigma" is analogous to the square root of the residual variance in OLS regression. The output provides a summary of the number of left-censored, uncensored and right-censored values of the Tobit estimations. The first Tobit model has 5 left-censored observations, 1148 uncensored observations and 9 right-censored observations. The second Tobit model, which has a left (from below) censoring, has 5 left-censored observations and 1157 uncensored observations. The third Tobit model in our result table has 1153 uncensored observations and 9 right censored observations.

The coefficient estimates of the Tobit models are very similar to that of the OLS model, however we focus on the Tobit model with both a left and right censoring. This is because we know the true value of our dependent variable (threshold price) for a restricted range of observations (0 to 60). The coefficient for frequency of dinner is statistically significant at the 0.05 alpha level. It indicates that, ceteris paribus, for each additional time that a household eats dinner in a restaurant, the threshold price of that household increases by 0.2%. The parameter estimate for higher neighborhood tax is statistically significant at the 1% alpha level. All else equal, compared to households that did not have the option and/or would not eat at the same restaurant in neighboring communities operating with 3-5% lower tax rates, for households that had the option and

would go to such lower-rate restaurants, on average, we expect their threshold price to be lower by 3%.

The variable for average cost of meal was statistically significant at the 10% alpha level. Ceteris paribus, households that purchase restaurant meals at a higher average cost have a 0.1% higher threshold price than households who purchase meals at a lower average cost. The coefficient estimate for the variable check-tax was significantly at the 1% alpha level. Holding all things constant, on average, households who always notice all the taxes charged when paying a restaurant check have a 2% lower tax threshold price than households who do not notice the taxes charged. The parameter estimate for vote was statistically significant at the 5% alpha level. This suggests that households that are willing to pay for an additional tax on restaurant meals if the tax would be used in promoting tourism have 2% higher threshold price, compared to households that would not vote for such a tax.

The parameter estimate for the age category 51-60 was statistically significant at the 10% alpha level. All other things being equal, on average, compared to households aged between 18-30, households close to retirement age (51-60) have 2% lower threshold price. The coefficients for the low-middle and middle income households was statistically significant at the 10% alpha level, that for the middle-high income group was statistically significant at the 5% alpha level, while the coefficient for the high income households was significant at the 1% alpha level. Ceteris paribus, on average, compared to low income households, low-middle income households, middle income households, middle-high income households and high income households have 3%, 3%, 4% and 8% higher threshold prices, respectively.

The variables for 2-year college and graduate/professional degree were statistically significant and positive at the 10% significant level. The coefficients indicate that, ceteris paribus, compared to a household with a high school diploma, a household with some 2-year college degree and a household with a graduate or professional degree have a 2% higher threshold price. There's no statistical indication of whether having less than a high school diploma or having a 4-year college degree compared to a high school diploma increases or decreases the households' threshold price.

The variable for class of city was not statistically significant. This implies that, all things equal, compared to households in 1st and 2nd (the largest) class cities, households in 3rd, 4th, 5th and 6th sized cities do not have a higher or lower threshold price points. In other words, all things being equal, households that live in larger sized cities do not have a higher or lower threshold price, compared to households that live in smaller-sized cities. This presupposes that the city within which a household lives, whether rural or urban, has no effect on their threshold price.

The variable representing households that strongly prefer full service over fast-casual/quick-service restaurants has a statistically significant threshold price at the 10% alpha level. Compared to households that are neutral about preferences for full-services over quick-service restaurants, households that strongly prefer full-service restaurants have a 2% higher threshold price. Conversely, households that do not strongly prefer full-service restaurants, compared to neutral households, have a 4% lower threshold price. This variable is statistically significant at the 0.05 alpha level.

In our model, the variable capturing households that do prefer restaurants that serve local food was statistically significant at the 5% level. This indicates that households that strongly prefer restaurants that offer local foods, compared to neutral households, have a 2% lower threshold price. However, the variable measuring no strong preference for restaurants that serve local foods was statistically significant at the 5% alpha level. Households that do not strongly prefer restaurants that serve local foods have a 5% lower threshold price, compared to households that are neutral about restaurants that serve local foods.

The number of individuals per household, economic outlook of households, and the importance of price did not have any statistically significant effect on the threshold price. It was expected that because it costs more to feed a larger household and thus to cut costs, one additional person per household may negatively influence threshold price, but this was not reflected in the analysis. Some levels of education and the gender of main respondent in the household were also not statistically significant. Neither is there any statistical significance on the preference of chain restaurants over independent restaurant.

Table 6-3 Results of OLS Regression and Censored Tobit models for TPP

VARIABLES	*OLS*	*Tobit1*	*Tobit2 (Left-censored)*	*Tobit3 (Right-cen sored)*
Frequency of breakfast	0.140	0.134	0.133	0.141
	(0.140)	(0.141)	(0.140)	(0.138)
Frequency of lunch	-0.0941	-0.0980	-0.0955	-0.0966
	(0.0792)	(0.0786)	(0.0780)	(0.0785)
Frequency of dinner	0.233**	0.239**	0.236**	0.236**
	(0.0981)	(0.0984)	(0.0967)	(0.0981)
Avg. cost of meal	0.107*	0.106*	0.105*	0.108*
	(0.0575)	(0.0579)	(0.0573)	(0.0571)
Higher neighborhood tax	-2.632***	-2.683***	-2.653***	-2.662***
	(0.698)	(0.692)	(0.688)	(0.690)

Table 6-3 (continued) Results of OLS Regression and Censored Tobit models for TPP

VARIABLES	*OLS*	*Tobit1*	*Tobit2 (Left-censored)*	*Tobit3 (Right-cen sored)*
Price important	-1.144	-1.144	-1.161	-1.127
	(0.841)	(0.838)	(0.830)	(0.835)
Check tax	-1.883***	-1.863***	-1.872***	-1.874***
	(0.711)	(0.706)	(0.701)	(0.704)
Economic outlook	0.995	0.984	0.987	0.992
	(0.731)	(0.727)	(0.721)	(0.726)
Vote	1.998**	2.055**	2.018**	2.034**
	(0.888)	(0.885)	(0.874)	(0.884)
Gender	-0.0691	-0.0488	-0.0506	-0.0676
	(0.720)	(0.715)	(0.710)	(0.713)
2 person household	-0.229	-0.278	-0.252	-0.255
	(1.067)	(1.060)	(1.050)	(1.059)
3 person household	0.0420	0.00210	0.0451	-0.000769
	(1.232)	(1.223)	(1.212)	(1.222)
4 person household	0.322	0.297	0.340	0.279
	(1.351)	(1.340)	(1.329)	(1.338)
5-or-more person household	-0.896	-0.928	-0.861	-0.964
	(1.489)	(1.474)	(1.466)	(1.472)
Aged 31-40	-1.269	-1.266	-1.277	-1.258
	(1.245)	(1.235)	(1.227)	(1.232)
Aged 41-50	-0.910	-0.892	-0.915	-0.887
	(1.295)	(1.285)	(1.274)	(1.283)
Aged 51-60	-2.097*	-2.108*	-2.106*	-2.099*
	(1.195)	(1.184)	(1.176)	(1.183)
Aged 60+	-0.564	-0.593	-0.572	-0.585
	(1.464)	(1.452)	(1.444)	(1.446)
Low-middle	3.007*	3.055*	3.019*	3.043*
	(1.597)	(1.578)	(1.572)	(1.576)
Middle income	2.805*	2.827*	2.808*	2.823*
	(1.616)	(1.595)	(1.591)	(1.593)
Middle-high	3.753**	3.763**	3.733**	3.782**
	(1.790)	(1.766)	(1.761)	(1.764)
High income	8.130***	8.176***	8.073***	8.232***
	(2.048)	(2.039)	(2.023)	(2.030)

NB: Standard errors in parentheses

****, **, * significant at the 1%, 5% and 10% levels respectively*

Table 6-3(continued) Results of OLS Regression and Censored Tobit models for TPP

VARIABLES	*OLS*	*Tobit1*	*Tobit2 (Left-censored)*	*Tobit3 (Right-cen sored)*
Less than a high school degree	4.535	4.466	4.440	4.561
	(4.620)	(4.563)	(4.562)	(4.543)
2-year college degree	2.317*	2.302*	2.287*	2.333*
	(1.405)	(1.391)	(1.386)	(1.386)
4-year college degree	1.959	1.941	1.938	1.962*
	(1.207)	(1.191)	(1.188)	(1.190)
Graduate/professional degree	2.169*	2.167* (1.111)	2.155*	2.182**
	(1.127)		(1.109)	(1.111)
City size	-0.853	-0.896	-0.890	-0.859
	(0.731)	(0.727)	(0.724)	(0.722)
Not_strongly_pref_chain_rest	0.237	0.226	0.234	0.230
	(0.984)	(0.977)	(0.972)	(0.973)
Not_pref_chain_rest	0.235	0.206	0.225	0.216
	(0.816)	(0.808)	(0.805)	(0.805)
Pref_chain_rest	1.641	1.663	1.665	1.638
	(1.306)	(1.296)	(1.285)	(1.294)
Strongly_pref_chain_rest	-1.183	-1.133	-1.106	-1.211
	(2.049)	(2.027)	(2.017)	(2.024)
Not_strongly_ pref_fullservice	-4.524*	-4.484**	-4.449*	-4.560**
	(2.316)	(2.278)	(2.272)	(2.282)
Not_pref_fullservice	-0.393	-0.411	-0.409	-0.395
	(1.088)	(1.084)	(1.075)	(1.078)
Pref_fullservice	0.630	0.638	0.658	0.610
	(0.803)	(0.796)	(0.791)	(0.794)
Strongly_pref_fullservice	2.000*	2.025*	2.010*	2.014*
	(1.079)	(1.080)	(1.067)	(1.074)
Not_strongly__pref_localfoods	-4.304**	-4.587**	-4.558**	-4.330**
	(1.791)	(1.871)	(1.865)	(1.765)
Not_pref_localfoods	-0.611	-0.645	-0.607	-0.649
	(1.929)	(1.899)	(1.897)	(1.898)
Pref_localfoods	-0.831	-0.838	-0.822	-0.848
	(0.826)	(0.820)	(0.814)	(0.817)
Strongly_pref_localfoods	-2.317**	-2.354**	-2.336**	-2.336**
	(0.989)	(0.989)	(0.980)	(0.981)
Constant	12.53***	12.59***	12.58***	12.54***
	(2.102)	(2.082)	(2.072)	(2.076)
R-squared/ sigma	0.125	11.12***	11.04***	11.08***
		(0.315)	(0.299)	(0.312)
Observations	1,162	1,162	1,162	1,162

Discussion

The effect of the frequency of meals on the choice of threshold price was broken down into breakfast, lunch and dinner frequency effects. The results of the Tobit model suggest that frequency of dinner has a significant and positive effect on the choice level of tax choke of households. For each additional time that a household visits a restaurant for dinner, the threshold price of that household increases by 0.2%. This implies that given two households with the same socio-demographic characteristics, if the first household visits a restaurant for dinner five times more than the second household then the first household would have a threshold price 1% higher than the first household. The frequency of breakfast and lunch in our model did not have any statistically significant effects on the threshold prices of households. Interestingly however the frequency of breakfast had a positive coefficient while the frequency of lunch had a negative coefficient in the model.

In our Tobit model the effect of price on a household's threshold price was aggregated from the price of breakfast, price of lunch and price of dinner. The average price of a meal was statistically and positively significant in our model. It presupposes that for every extra dollar that a household pays for the price of a meal that household has a 0.1% higher threshold price. In other words a household that is willing to pay $5 extra dollars for a meal has a 0.5% higher threshold price, on average.

Consistent with theory and a priori expectation the variable for higher neighborhood tax was statistically significant and negative. Compared to households that live in communities with higher tax rates who would not choose restaurants in communities that

with lower tax rates if the same restaurant option were available in those communities, households that would opt for restaurants in lower tax rate communities have a 2% lower threshold price. This suggests that all else equal, a household living in a community in Kentucky that would not opt for the same kind of restaurant in a neighborhood with lower tax rates has a 2% higher threshold price than a household that would take advantage of that option and thus the aforementioned household is more willing to pay for tax/cost increases in restaurant meals.

In our model price was not significantly reflected as the most important factor that households take into consideration when choosing a restaurant to have a meal. The parameter estimate for price, though not statistically significant from zero, shows that households who consider price as the most important factor for choosing restaurants may have a 1% lower threshold price than households who do not consider price as the most important factor for selecting a restaurant.

All things equal, compared to households who do not notice taxes when paying their restaurant check, those households that always notice all taxes charged when paying a restaurant check have a lower threshold price of about 2%. This is consistent with our expectations and suggests that households who make a conscious effort to observe the taxes that are levied on their restaurant meals are less willing to pay higher tax rates. On the other hand, households that seldom or never check the taxes that are levied on their restaurant meals have a higher threshold price either because they do not mind paying higher tax rates or they are not even aware of taxes imposed or of the tax increases.

The economic outlook of households in our model had no significant effect on the level of thresh price of the households sampled. However, if the variable were significant it would imply that compared to households who do not believe that the overall economic outlook is improving, households who believe that the economic outlook is improving have a 1% higher threshold price. Thus households with a positive economic outlook would be more willing to pay tax/cost increases in restaurant meals while households with a negative economic outlook would be less willing to pay cost increases in restaurant meals. Hence if a household that initially has a negative economic outlook were to assess the economy, observes growth in the various sectors of the economy and develop a positive outlook in the process, the threshold price of that household may increase.

The coefficient estimate for "vote" was statistically and positively significant. It suggests that households that would vote for a restaurant tax if the proceeds were earmarked to be used to support tourism have 2% higher threshold price, compared to households that wouldn't vote for the tax. This clearly indicates that households that are willing to vote for a restaurant tax promoting tourism or operating an arena are also more inclined to pay for such restaurant meal cost increases, since such households have a higher threshold price. On other hand, households that are not willing to vote for a tax no matter what cause the generated revenue will be put towards, have a lower threshold price than households that are more willing to vote for a tax for a cause.

In our model, the parameter estimates for gender and household number were not statistically different from zero. Nonetheless, male primary respondents may have a

lower threshold price compared to female primary respondents which may suggest that female primary respondents may be more willing to pay for restaurant tax increases, if the variable were significant. Compared to single-households, households with three or four members have a positive threshold price and hence may be more willing to pay for tax increases on their restaurant meals. On the other hand households with 5 or more persons, compared to single-person households, have a negative threshold price and may thus be less willing to pay for tax increases.

We find that some of the parameter estimates for the age ranges were statistically significant whilst others were not. Our results show that compared to households aged less than 30 years old, all the other older age groups have negative (lower) threshold prices. This implies that the households that are less than 30 years old have the highest threshold prices and are the most willing to pay restaurant tax increases. Households aged between 51 and 60 years have the lowest threshold price; they have a 2% lower threshold price compared to households that are less than 30 years old. This may be because this age group of households is closer to retirement and are saving towards their retirement plans/benefits and consequently are less willing to pay tax increases on the meals they eat at restaurants. It could also imply that elderly households would prefer to eat more at home than at restaurants. Our results suggest that households that are older than 60 and/or at retirement do not have a threshold price significantly different from zero though although they have a negative threshold price compared to households less than 30 years of age.

In line with theory and a priori expectations, when compared to the lowest income group, households in the high income range have the highest threshold price. In comparison to the lowest income quintile, the low-middle income group has a 3 higher threshold price, the middle income group also has a 3% higher threshold price, the middle-high income group has a 4% higher threshold price and the high income group has an 8% higher threshold price. All equal, high income households have the highest disposable income and thus generally do not consider eating out as a luxury, thus their food choice behavior would not be affected much by the additional restaurant tax. Households within the high-income range are the most willing to pay a tax increase on their restaurant meals and they would therefore contribute most to the tax revenue generated. This may eliminate the potential regressive nature of taxes and render the restaurant tax progressive.

We find some of the parameter estimates for education in our model to be statistically different from zero. It suggests that households that have some 2-year degree or a professional degree have a 2% higher threshold price compared to households that have a high school certificate or a GED equivalent. The other coefficients though not statistically significant, indicate that households with less than a high school degree (or equivalent) may have the highest threshold price. In other words, it would appear that households with the least level of education are most willing to pay for the meal tax. This could be because such households may eat out at restaurants more than they eat at home or they spend more on restaurant food than other essentials compared to households with higher levels of education. The households with higher levels of education may be more willing to spend on higher education, bigger homes or more expensive vacations for their families than they are willing to spend on restaurant taxes. A good proportion of

households who have some 2-year degree or professional degree could currently be students and thus compared to a greater proportion of working households with less than a high school degree, the students have a lower disposable income and hence would be less willing to spend on increases in taxes on restaurant meals. We can infer and justifiably argue that if a household without a high school diploma attains or earns a diploma, their threshold price may fall.

In our model, the coefficients for city class and preference for chain food restaurants were not statistically significant. Nevertheless, the coefficients indicate that compared to households that live in large cities, households who live in smaller cities may have lower threshold prices. With regards to preference for chain restaurants, households that have a strong preference for chain restaurants have lower threshold price compared to households who are neutral.

Households that have a strong preference for full service restaurants over causal/quick-service have a 2% higher threshold price compared to households that are neutral about full-service restaurants. It presupposes that households with a strong preference for restaurants have an affinity for being waited upon, being served full-course meals and getting satisfactory service. This probably makes their restaurant visits more pleasurable and hence they would be willing to pay more for worthwhile services. Thus the households with strong preference for full-service restaurants are more willing to pay for increases in restaurant taxes. On the other hand, households that do not strongly prefer full-service restaurants have a 4% lower threshold price compared to households that are neutral.

The variables for households who do and not have strong preference for restaurants that use local foods in their menu offerings were statistically significant. This suggests that compared to neutral households, households who do not strongly prefer restaurants that use local foods in the menu offerings have a 4% lower threshold price. Households that do not strongly prefer local food restaurants may be more open to other restaurant options. More restaurant options give the households more flexibility with their restaurant choices. The freedom to opt for other restaurants may be a contributing factor to their lower threshold prices and may make such households less willing to pay for restaurant tax increases. Quite unexpected, households who strongly prefer local food restaurants have a 2% lower threshold price compared to neutral households. This may be so because households that have a strong preference for local foods may already be paying a price premium for their meals. Thus they may not be as willing to pay for any further cost increases in their restaurant meals. As a result households that are neutral to local food restaurants may have the highest threshold price and may be more willing to pay for restaurant meal cost increases.

Case Study

Households makes purchases at restaurants out of total disposable income, thus they cannot spend more than their total household income. In the event of an increase in the cost of their restaurant meals, the household might reduce food expenditures to defray costs, leave expenditures unchanged or increase expenditures to be able to afford the same amount of utility as before. The objective of this section is to investigate which segment of the population would be most affected by a cost increase in restaurant meals and to recommend whether or not to impose a cost increase and how to segment it.

If a cost increase is imposed, who would reduce their consumption and by how much? For the purposes of this study, I examine the general case of a 5 percent cost increase in restaurant meals. I choose a 5% increase because it's not lower than the legislature-proposed increase in restaurant taxes and it is high enough to make room/allow for contingencies. The data may not tell us by how much households would change their restaurant expenditures when a cost increase is imposed but it tells us who would, say low-income households.

Demographics - who can/cannot afford a 5% tax and where do they live? To ascertain who would be able to afford a 5% cost increase in their restaurant meals I use 2012 estimates of county-level data from Census Bureau to estimate threshold price. I rerun the initial regression with continuous variables in place of the categorical variables for age, income, education and household size.

$$TP = \alpha_1 + \alpha_2 demographics + \alpha_3 restaurant\ characteristics + \varepsilon$$

Using the coefficient estimates I plug the average values into the regression equation. I hypothesize that if the TP is lower than 5% then the tax should not be imposed. If however the TP is greater than 5% then the tax can be imposed in that county/city. The base line value of the TP regression was 13.09. Depending of the unique characteristics of a county/city this value may rise or fall as an indication of its willingness to pay for a cost increase in restaurant meals.

Oldham County is considered one of the wealthiest counties in Kentucky and has the city of La Grange as its county seat. According to the 2012 census estimates, Oldham County

has a 53% male population, an average of 2.9 persons per household, an average age of 39 years, $83,164 median income and an average of 20years of schooling. The city of La Grange, with a population of 8,231 (2012 estimates) and is ranked as a 4^{th} size city. Plugging these demographics into the regression, the TP value for the city of Lagrange was estimated to be 15.6. Hence all things equal, the city of La Grange would be willing to pay for a cost increase of up to 16% in their restaurant meals. Thus a meal tax in this city may be imposed without any significant change is the purchasing behavior of the households.

Subsequently I consider the case of a less populous, less wealthy county. Owsley County is the least wealthy and second-least populous county in Kentucky and has the city of Booneville as its county seat. According to 2012 Census Bureau estimates, Owsley County has a 52% male population, an average of 2.8 persons per household, average age of 44 years, $19,624 median income and an average of 16 years of schooling. Now Booneville, ranked as a 6^{th} size- city has a population of 80 (2012 estimates). With these demographic values, the TP for Booneville was estimated to be 11.6. Thus all things equal, Boonville would be willing to pay for a cost increase of up to 12% in their restaurant meals.

In general, urban cities are likely to be more willing to bear a higher cost increase in their restaurant meals compared to rural cities. Among all the demographic variables, the median income was the most significant determinant of the city's TP. Nonetheless all the counties within the Common wealth of Kentucky would be able to impose a 3%

restaurant tax without a considerable change in restaurant frequency and meal purchasing behavior of its residents.

Chapter 7

Summary & Conclusion

The purpose of this study was to examine the level of tax that would cause Kentuckians to either eat in restaurants less frequently or change what they typically purchase in restaurants. The study was designed to investigate if there were significant relationships between socio-demographic characteristics of households in Kentucky and the threshold price of restaurant meals and also to determine the marginal effects of the significant variables. Additionally we investigate whether restaurant characteristics (e.g. chain restaurants or local food restaurants) also influence the threshold prices of households. The objective was achieved using empirical Tobit models for the analysis augmented with survey data.

Summary of Methodology

The data for the study was obtained from an online survey of households in Kentucky. The respondents responded to various questions concerning their restaurant meal consumption behavior including their frequency of restaurant visits and meal consumption, average amount spent per meal and the level of increase in the total cost of their "usual" restaurant meal that would cause them to eat less frequently in restaurants or change what they would typically purchase. The respondents were also asked to rank their preferences for specific restaurant attributes in two different scenarios involving no tax or a 3% tax. Other socio-demographic characteristics including age, income level and gender were captured in the survey.

A Tobit model was applied to the survey data to analyze the choice of level of tax that would influence households of different socio-demographic characteristics in Kentucky to eat less frequently at restaurants or change what they would typically purchase. The Tobit model enables the inclusion of both zero and non-zero responses of threshold price in the analysis, increasing the efficiency of the estimation procedure. The Tobit model is censored at zero from below since respondents cannot choose negative threshold prices and censored at sixty from above in regards to the survey question which restricted the respondents from selecting a threshold price above sixty even if they had a threshold price greater than sixty, though not likely. The marginal effects of the Tobit model indicate the effects of household socio-demographic characteristics and restaurant preferences on the threshold price.

Summary of Findings

Based on the tax choke model specification, our results reveal stimulating insights about the socio-demographic characteristics as well as restaurant preferences and food choices that affect the level of tax that would cause households in Kentucky to eat less frequently at restaurants or change what they would typically purchase. We find that for every additional dinner that a household has at a restaurant, the household's threshold price increases by 0.2%. Households that live in higher tax rate communities and would travel to restaurants in lower tax rate communities have a 3% lower threshold price compared to households that would not travel to eat in the lower tax rate communities. The threshold price for households that would vote for a restaurant tax if proceeds were used for tourism is 2% higher than households that would not vote for the tax. Households who

notice all taxes when paying their restaurant bills have 2% lower threshold price than household who tend not to observe the taxes.

In comparison to households aged less than 30 years, households between the ages of 51-60 have 2.9% lower threshold prices. Compared to low income households, low-middle and middle income households have a 3% higher threshold price, middle-high income households have a 4% higher threshold price and high income households have an 8% higher threshold price. With reference to households that have less than a high school diploma, households that have obtained a 2-year degree or a graduate degree have a 2% lower threshold price. Households that strongly prefer full-service restaurants have a 2% higher tax Threshold price than households that are neutral. Households that do not strongly prefer restaurants that use local foods in their menu offerings have a 5% lower threshold price than households that are neutral to local foods.

Policy Implications/Recommendations

The findings have several potential implications for stakeholders: consumers, restaurant owners, tourism boards and the legislature alike. To effectively meet the needs of Kentucky's growing population, government policymakers, restaurant business owners, marketing experts, and hospitality and tourism planners must be informed about the consumption and/or spending patterns of consumers in response to the restaurant tax of increases. Differing socio-demographic characteristics and fragmented market segments of the population may result in differing expenditure and consumption patterns between the young and old, more and less educated, the more and less rich and even males and females.

Cross comparisons of the different socio-demographic profiles would allow legislation/marketing to target segments that contribute most to the bottom line. For example households within the highest income bracket ($150,000 and above) have the highest threshold prices, and thus their food choice/ meal consumption behavior is likely to remain the same irrespective of whether a tax is levied or not. On the other hand households that are headed by retirees or individuals close to retirement are negatively affected by the tax and thus such households would be less willing to pay the tax and adjust their consumption patterns accordingly. Thus tax/price promotions would yield a more profitable outcome if they focus specifically on households headed by retirees for example. The proportion of elderly in the population will continue to increase as the baby boom generation advances in age. Expenditure patterns on FAFH by the elderly is noteworthy for business owners, designers of food related programs, policies, goods and services to effectively meet the needs of the elderly while taking full advantage of their purchasing patterns.

Household income was found to be a significant and positive factor accounting for positive variations of threshold prices. Higher income levels and/or an increase in income levels increases the level at which an individual will change his/her choice of restaurant or meal. The results conform to theoretical expectations. As spelled out by Cai (1998), decomposing market into current and potential markets is significant for research practice since by focusing narrowly on existing consumer base, there's the possibility of forgoing a potentially more profitable market segment. High income households do not consider eating in restaurants as a luxury and wouldn't change their meal selection based solely on small percentage increase in restaurant tax. These households tend to frequent sit-down

restaurants more often than they would fast-food joints. Because of their higher disposable incomes, high-income households are least likely to change their purchasing behavior as a result of even fairly large sales tax on restaurant meals. Thus the tax poses no direct cost (or benefit) to high income households. On the other hand the results show that lower-income households are the most likely to change their purchasing behavior in efforts to evade/circumvent the tax.

Households' interests in consuming local foods have increased over the years with marketing trends proliferating 'local' brands and menus. We infer from our model that households who least strongly prefer restaurants that include local foods on menu offerings are least likely to be willing to pay for even small restaurant tax increases. Thus promotion of menu items with local branding or identification of where the ingredients were grown may not appeal to this segment of the population. Such households may not be willing to pay a premium for restaurant meals even if they know that the food items are from local sources.

Caveats

This analysis has a number of limitations. First of all, the survey was self-administered, which may have led to under- or over-reporting. The responses and ratings by the survey respondents were self-generated and self-reported, and as such, the observations may or may not be representative of their true characteristics or opinions. Secondly, since the sample group for this research was obtained from individuals with publically available email addresses, primarily college and university websites throughout Kentucky, the sample may be skewed towards the characteristics, views and opinions of more

professors and persons closely associated with academic institutions. Thirdly, the mental behavior of the respondents is unobservable and may not be entirely responsive to any cues afforded by the survey instrument. Last but not least, the social, economic and demographic characteristics of the sample are neither representative of the commonwealth of Kentucky nor of the United States thus our results deduced from our sample may not apply to the United States as a whole.

Future Studies

In subsequent studies, other econometric techniques can be exploited to validate the consistency of the findings and extended to include other relevant variables that associate consumers' tax behavior to income ranges and other socio-demographic variables. Further studies can evaluate a time series analysis and track the changes in respondent restaurant patronizing behavior with respect to taxes over time.

A subsequent survey could elicit expenditures responses on restaurant meals for scenarios before and after the potential tax instrument. An analysis on expenditure patterns could provide information about how much varying income groups spend on FAFH before and after tax; the post-tax increase in food expenditure per person per week. Also the welfare loss to consumers and restaurant owners as well as the percent increase/decrease in potential revenue for the state could be analyzed.

Future studies could explore the possibility of a 3% tax being low enough to leave restaurant choice and meal selection behavior unchanged and high enough to generate

substantial revenue. Of the revenue generated, the percent accumulated from each of the income tiers of consumers' expenditure/purchases could also be inferred.

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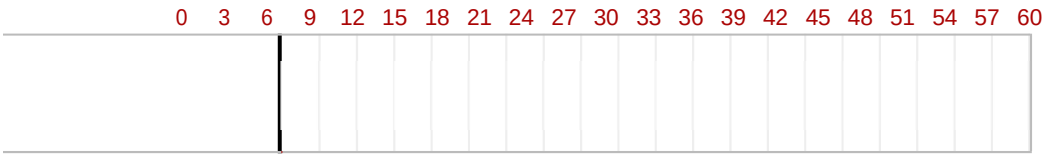
Appendix

Key survey question used for thesis:

> By how much would the total cost of restaurant meals have to increase before you would eat in restaurants less frequently or change what you typically purchase in restaurants?

Click the line to indicate the percentage increase in cost that would lead you to eat in restaurants less frequently or change what you typically purchase in restaurants.

(For more than 60%, select 60.)



VITA

GEORGETTE OWUSU-AMANKWAH

PROFILE: I am a versatile, purpose driven, development oriented, and energetic young woman. Discipline, honesty and commitment, are my principles. I enjoy learning and I work well under pressure, with or without supervision.

EDUCATIONAL BACKGROUND

Year	Qualification	Institution
2012-2014	Expected M.S. Agricultural. Economics	University of Kentucky, USA
2006-2010	B.A Economics/Statistics	University of Ghana, Legon
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Research

Master's Thesis: "The Effects of Socio-demographic Characteristics on Restaurant Threshold Prices in Kentucky. August 2014. University of Kentucky.

Undergraduate Thesis: "Cost-Benefit Analysis of Plastics Recycling in Accra, Ghana". May 2010. University of Ghana, Legon.

Research Interests: Development economics (global and rural), behavioral economics, child and maternal issues, food security (food price volatility).

WORKING EXPERIENCE

Research Assistant	**CEDIK (Community & Economic Development Initiative of Kentucky)**	August 2012 – Date
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Customer Service	**Ghana Commercial Bank (GCB)**	June 2009-August 2009
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SUMMARY OF INTERESTS, SKILLS AND EXPERIENCE

Knowledge in SAS, STATA, ArcGIS, SPSS, IFS and Microsoft Office. Good analytical and communication skills; working with the less privileged in deprived areas; office management, filing and general administration.

Hobbies: Reading, travelling, creative thinking (in projects and games)

References available upon request