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Consumer Expenditures and the Faith Factor

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Abstract

This study examines the relationship between religious giving (an accessible behavioral indicant of religious commitment or religiosity) and expenditure patterns in the United States. Using a lognormal double-hurdle model adjusted for heteroscedasticity to estimate both the likelihood of participating in a purchase and the amount of a participant's expenditures provides evidence of significant differences from the impact of religious giving on expenditure categories predicted by scripture. These include spending in moderation on housing and managing risk with insurance and healthy living (lower tobacco and alcohol consumption). Region was also found to delineate differences in the impact of religiosity on expenditure patterns. Results of this study support the hypothesis that religious givers are indeed making conscious expenditure allocation choices requiring a rational choice and that many of those choices are consistent with Judeo-Christian or biblical principles.

People of faith, the religious right, and the spiritual awakening in the United States have all received significant attention in the media in the new millennium (Oxford Analytica 2009). The influence of people of faith in the political arena, in charitable giving, and in the broader marketplace continues to garner attention in the United States (Brooks 2004). Over 75 percent of Americans profess that they are Christian (Central Intelligence Agency 2007), and Christians are generally well educated, affluent, and influential and exhibit tremendous buying power (*Christian Post* 2014). Furthermore, Christian megachurches have been expanding. According to a report by the Hartford Institute, 90 percent of megachurches are growing, and the average increase in attendance is around 50 percent (Thumma and Bird 2008). David Kinnaman, president of the Barna Group, observed recently

> There appears to be a significant opportunity for enterprises that understand and value faith to express their faith consciousness through their business practices—not simply as a marketing gimmick, but as an authentic part of their content, their mix of products and services, their branding, and their corporate culture (Barna Group 2011a).

Given the size of this segment of the U.S. population and the potential impact of Christians in the marketplace, the influence of their faith on their spending is of considerable interest to policymakers, nonprofit organizations, and academics across various social science disciplines. Iannaccone (2010: 2) notes that "the heart of the Christian approach is a comprehensive way of life shaped by biblical principles and spiritual values." Research is needed to fully understand the impact of faith or religiosity on marketplace behavior.

The theory of reasoned action (and subsequently the theory of planned behavior) delineates the impact that one's beliefs and attitudes can have on one's behavior (Ajzen and Fishbein 1980). Given the countless applications of this theory in the social sciences, it is reasonable to assume that religious beliefs should have a significant impact on a believer's behavior, including patterns of giving, purchase, and consumption (Ajzen 1991; Brooks 2004; Iannaccone 1998; 2010). Mokhlis (2009: 75) suggests that "[r]eligion, by its very nature seeks to influence believers' conduct as a sign of reverence or faith." Delener (1990) and Lindridge (2005) recognize religiosity as one of the most important cultural influences on consumer behavior, and Delener (1990: 27) hypothesizes that "a person's religious orientation may influence buying behavior across a broad spectrum of product classes." If widely communicated and espoused, the core beliefs and tenets of a particular faith ought to translate into patterns of behavior. Iannaccone (2010: 7) goes so far as to say, "Indeed, I would strongly discount any model of beliefs, norms or values that has not proved relevant to religion."

Because Christianity has such a large following in the United States, we use this religion as the primary focus for this study of the influence of religion on expenditure patterns. Given that Christians view the Bible as the primary source of instruction for living (Beed and Beed 1999), this article references scripture in the *Holy Bible* (1984) to determine the core beliefs of Christianity. Scripture throughout the Bible offers instruction for living and provides clear and accessible examples of a believer's fundamental basis for living. Therefore these beliefs based in scripture are accessible examples of the potential influence of faith on marketplace behavior. It seems rational that such a significant behavioral influence ought to be evident in the expenditure patterns of Christian households; however, empirical research has not addressed this. Although the impact of religion on behavior has been argued for over a century (Weber, 1930 [1905]), we do not know whether there is empirical evidence of the impact of scripture on the expenditure patterns of contemporary religious households. The primary research question of this study is: Do the expenditure patterns of religious givers reflect fundamental Judeo-Christian beliefs? Specifically, this study examines the relationship between religious giving (an accessible, robust behavioral indicant of religious commitment or religiosity) and expenditure patterns in the United States. This research provides a broad-spectrum descriptive, empirical check on a predicted pattern of spending across a comprehensive set of product/service categories for a significant sample of U.S. consumers (2,431 households in Consumer Expenditure Survey panel data). The results of this study provide a critical building block in exploring the impact of religiosity on marketplace behavior.

LITERATURE REVIEW AND THE RESEARCH QUESTION

Studies of religion and religiosity are somewhat sparse in the social sciences literature, and religiosity is frequently ignored in behavioral research exploring marketplace behavior (Cleveland and Chang 2009; Cleveland, Laroche, and Hallab 2013; Iannacone 1998, 2010; Lindridge 2005). While many people use the terms *religion* and *religiosity* synonymously, they are two distinct constructs. *Religion* refers to a specific faith or doctrine, such as Christianity or Islam, while *religiosity* represents a continuum of commitment that is "the focus of religion in directing a person's life in accordance with religious role expectations" (Cleveland, Laroche, and Hallab 2013).

Given the importance of religion to cultures globally, the literature on the influence of religion on marketplace behavior is somewhat limited (Essoo and Dibb 2004; Sood and Nasu 1995). Although there have been multiple calls for more research in this area (Cutler 1991; Iannacone 2010; Shachar et al. 2011; Vitell, Paolillo, and Singh 2005), much remains to be done. Hirschman (1983) proposed three possible reasons for the neglect of this general topic area, which remain

relevant today: (1) Researchers are unaware of the link between religion and consumer behavior, (2) religion is a taboo subject, and (3) religion may be overlooked because it is pervasive. However, Hirschman, Ruvio, and Touzani (2011) note that researchers are now "paying increased attention to consumer behaviors in various religious communities."

Social scientists across disciplines have studied the influence of religiosity on a variety of specific behaviors. In line with the theory of reasoned action and the theory of planned behavior (Ajzen 1991; Ajzen and Fishbein 1980), Weaver and Agle (2002) suggest that religiosity has an impact on both attitudes and behavior, including consumption. Vitell, Paolillo, and Singh (2005) conclude that religiosity is an important construct not only for marketers but also for scholars in management, sociology, and theology, and they call for more interdisciplinary research on religiosity and its impact on behavior.

The research that has been completed on the influence of religious affiliation or religiosity on purchase behavior has covered a range of behaviors (Essoo and Dibb 2004; Hirschman 1981, 1983; Schiffman and Kanuk 1991). However, most studies have focused on a particular purchase episode or product/service category rather than on a pattern of expenditures. For example, Essoo and Dibb (2004) found evidence of the influence of religious affiliation (Hindu, Muslim, or Catholic) on shopping behavior in the purchase of a television. Evidence of the impact of religiosity on a larger pattern of spending is not as well documented. Assadi (2003: 11) concludes that consumers' choices are generally influenced by their religious environments and suggests that "a next step should be involved to measure effectively the importance of religious codes on consumer behavior." The present research seeks to address this void.

The Conceptualization and Operationalization of Religiosity

Although religiosity and its influence on consumer behavior has been a topic of attention among behavioral scientists for some time, religiosity remains a fluid and diverse term in the academic literature. Religiosity represents a continuum of commitment that directs one's life through religious expectations (Cleveland, Laroche, and Hallab 2013). Further, Allport and Ross (1967: 434) differentiate intrinsic religiousness from extrinsic religiousness: "the extrinsically motivated person uses his religion whereas the intrinsically motivated lives his religion." McDaniel and Burnett (1990) defined religion as a belief in God accompanied by a commitment to follow principles set forth by God. Many authors have measured religious commitment versus religious affiliation as essentially the operationalization of intrinsic versus extrinsic religiosity or religiousness. Religious commitment is characterized as cognitive or behavioral commitment to religious beliefs (McDaniel and Burnett 1990). Donahue (1985) found that intrinsic religiousness

correlated more highly than extrinsic religiousness with religious commitment. Given this, the operationalization of religiosity should focus on intrinsic religiousness and religious commitment.

The variety of religiosity measures that are applied in research has been problematic. For example, some studies have used proxies for religiosity, such as church attendance or religious affiliation (e.g., Brooks 2004; Shachar et al. 2011). Both of these proxy measures have limitations and are inherently extrinsically motivated. The motivation to attend church can be social (to be seen) or even financial (to network). In a study of shopping orientation, Mokhlis (2009) found that religious affiliation did not have any effect on shopping orientation. Religiosity scales are also self-reported and are therefore prone to social desirability bias.

Studies of the impact of faith on behavior in the marketplace must focus on indicants of religious commitment and intrinsic motivation. This study uses religious giving expenditures (as a percentage of income) as a measure of religiosity that reflects religious commitment by using expenditure data across four calendar quarters. Actual religious giving expenditures over four quarters provide a stronger alternative to internal, self-report measures that examine only a single moment in time. Such a pattern of giving (e.g., tithing) is likely to reflect an intrinsic commitment. Furthermore, expenditures make intrinsic motivation explicit. Individuals who donate their money over a period of time to religious organizations are "putting their money where their heart is."

Religiosity on Consumer Expenditures Patterns

No studies to date have examined the influence of religious affiliation, commitment, or religiosity on purchase or expenditure patterns across a broad set of product/service categories. In this study, using Consumer Expenditure Survey (CEX) data (Bureau of Labor Statistics 2009), we identify charitable contributions to religion as a behavioral indicant of religiosity or religious commitment, that is, essentially as an intrinsic religious commitment in themselves. While CEX data do not include any measure of self-reported religiosity or even affiliation, actual religious contributions or expenditures offer a rigorous indicant of religiosity with significant face validity. To the extent to which religious contributions reflect one's commitment to faith and following core belief systems, such as tithing, they should correlate significantly with an intrinsic religious commitment. This study examines the relationship between religious giving relative to level of income (as a surrogate for religiosity) and a set of expenditure categories that are hypothesized to be influenced by biblical principles. Although a weakness of CEX data is the lack of measurement of any internal states that would reflect religiosity or even church affiliation, a significant contribution of this study is the use of this

extant behavioral evidence of religious commitment in actual religious giving expenditures as an alternative but robust religiosity measure.

Region and Literal Interpretation of Scripture

Although CEX data do not provide any measure of religious affiliation, region of the country can be used to help identify possible differences among religious groups that dominate each region. As reported by the Pew Research Center (Pew Forum on Religion & Public Life 2008: 69–70),

> Each region of the United States displays a distinctive pattern of religious affiliation. For example, the Northeast has more Catholics (37%) and the fewest number of people affiliated with evangelical Protestant churches (13%), than any other region in the U.S. . . . Among Southerners, by contrast, [over one in three] (37%) are members of evangelical churches and more than one-in-ten (11%) are affiliated with a historically black church. Of all the regions, the South has the smallest concentration of Catholics (16%) and the unaffiliated population (13%). The West has the largest proportion of people unaffiliated with any particular religion (21%). . . . The West has the smallest number of people affiliated with mainline Protestant churches (15%) and the greatest proportion of Mormons (6%). Of the four regions, the Midwest most closely resembles the overall religious makeup of the general population. About a quarter (26%) of Midwesterners are members of an evangelical Protestant church, about one-in-five (22%) are members of a mainline Protestant church, nearly a quarter (24%) are Catholic and 16% are unaffiliated.

In addition, the Pew Research Religion & Public Life Project (2013) solicited opinions about an individual's literal interpretation of scripture, and the following summary of distinct categories emerged:

> *South*: Evangelical, historically black church affiliation; strongest support for scripture as the Word of God; nearly all states at 70 percent agree or more.
>
> *Midwest*: Diverse among mainline Protestant, Catholic, evangelical churches; relatively strong support for scripture as the Word of God; all states agree at 60 percent or higher.
>
> *West*: Protestant, Mormon, and most religiously unaffiliated; mild support for scripture as the Word of God; all states agree at 50 percent or higher agree, and over one third agree at above 60.
>
> *Northeast*: Predominantly Catholic and largest Jewish population; least support for scripture as the Word of God; all but one state agree at below 60 percent, and more than half agree at below 50 percent.

Given the lack of religious affiliation available in the CEX data, differences in expenditure patterns by region may provide insight into the household expenditure behavior of different groups of religious belief/affiliation.

The Research Question

The primary research question of this study is: Do the expenditure patterns of religious givers reflect fundamental Judeo-Christian beliefs? This study examines the relationship between religious giving (one accessible behavioral indicant of religious commitment or religiosity) and expenditure patterns in the United States. Although this study was limited to the expenditure categories available in CEX data, an important contribution is the use of actual religious contributions, which offers a robust indicant of religiosity with significant face validity; that is, one typically does not continually hand over a significant proportion of one's income for something that one does not believe in or highly value. Table 1 offers representative scripture verses that provide behavioral guidance to Christians based on their fundamental beliefs. Table 1 also includes expenditure categories represented in CEX data. This list is certainly not exhaustive but provides clear and accessible examples of the hypothesized influence of faith on consumer behavior. Furthermore, the product/service expenditure categories represented in Table 1 are both comprehensive and representative of behavior that is frequently referenced in Judeo-Christian teachings. Given the potentially significant behavioral influence of scripture on the lives of Christians, the impact of these beliefs ought to be evident in household expenditure patterns.

A secondary question addressed in this study is: Does religiosity differ in its impact on expenditure patterns by different religious beliefs as operationalized by region of the country (primarily among U.S. Christian groups)? For example, does religiosity have less impact on alcohol consumption for some religious groups (regions) than for others? And are ideals such as avoiding debt or ensuring family security less of a concern for some groups no matter the level of religiosity? Although CEX data do not provide religious affiliation, the impact of religiosity can be examined by region to help identify possible differences among religious groups that dominate each region. While different regional impacts on expenditure patterns may certainly exist, this study concentrates on identifying whether the impact from the religiosity measure differs by region. Although these differences, if they exist, cannot be directly tied to a specific religious affiliation or doctrine, they will provide insight into the distinctive patterns of religious groups as described by the Pew Research Center (Pew Forum on Religion & Public Life 2008; Pew Research Religion & Public Life Project 2013) and household expenditure behavior.

Table 1: Selected Behavioral Instruction in Scripture and Related CEX Variables[a]

Representative Scripture Passage	Behavioral Category	CEX Variable
I Corinthians 6:19–20: Christians are instructed that their body is the temple of the Holy Spirit and that each believer should "honor God with your body."	*Wellness:* Many people would interpret this to mean that a believer should take care of his or her physical body. We might predict that this would mean less consumption of alcohol and tobacco, eating more nutritious foods, more use of exercise equipment, etc.	Alcohol, tobacco
Romans 13:8: "Let no debt remain outstanding except the continuing debt to love one another . . . ."	*Financial Responsibility:* Many would interpret this to mean that believers should have less debt. We might predict that this would mean less credit debt, a smaller house, less borrowing, more savings, etc.	Total finance charges, major credit card, finance charge, mortgage interest, vehicle finance charge, property tax, housing
I Timothy 5:8: "If anyone does not provide for his relatives, and especially for his immediate family, he has denied the faith . . . ."	*Family Responsibility:* This would indicate that a believer should be looking out for the welfare of his or her family. We might predict that this would lead to more use of insurance, more medical or dental checkups, etc.	Health care, health insurance, life insurance, child support/ alimony
Titus 2:3–5: The Bible instructs women to love their husbands and children and to be busy at home.	*Children and the Home:* This may be interpreted as an increased focus on children and home. We might predict more purchase of cooking supplies or utensils, small appliances, children's items, etc.	Baby sitting/day care, small appliances
I Peter 3:3–4: The Bible tells women that their beauty should come not from outward adornment such as elaborate hairstyles, the wearing of gold jewelry or fine clothes but rather from "the unfading beauty of a gentle and quiet spirit."	*Adornment:* This may indicate less use of these things by believers. We might expect less use of hair salons, less purchase of jewelry, lower apparel expenditures, etc.	Watches and jewelry, apparel
I Colossians 3:1–2: The Bible tells believers to "set their minds on things above, not on earthly things."	*Free Time:* This would have an impact on how believers might spend their free time. We might expect this to mean more time spent in doing spiritually related things and less time (and expenditures) spent on entertainment activities.	Entertainment, TVs, DVRs, radios, etc.

[a] Scripture passages are from the *Holy Bible: New International Version* (1984).

METHODS

To analyze the impact of a household's degree of commitment to religious organizations on its expenditure behavior toward various consumer goods and services, we developed an expenditure model based on neoclassical consumer demand theory. For this study, household expenditure on selected necessity and luxury goods and services associated with the scripture cited in Table 1 is determined by the household's available economic resources as well as tastes and preferences of decision makers in the household. In the utility maximization process, each household is considered rational in that the most preferred consumption bundle is determined within the household's constrained budget (Bryant 1990). Using a measure of household income to represent the resource constraints and using certain attributes of the household to represent different tastes and preferences at a given life stage of the household, we can represent the general expenditure function as

$$EX_{ik} = f(NE_i, INC_i, HS_i, REL_i, AGE_i, MS_i, \varepsilon_{ik}) \quad (1)$$

where

EX_{ik} = household i's amount of expenditure on good or service k
NE_i = number of earners in household i
INC_i = measure of household i's income
HS_i = measure of household i's size
REL_i = measure of household i's "religiosity" level
AGE_i = a measure representing household i's "maturity"
MS_i = measure of marital status for household i
ε_{ik} = random error for household i when estimating expenditure on good or service k

While directional impacts as well as magnitude of the impacts from each of the explanatory variables will vary by expenditure item, the primary emphasis of this study is to examine the specific impacts from the *REL* variable. With *REL* as a proxy for the household head and/or spouse's (if married) level of commitment to the family's religious faith, we performed an analysis of how such a commitment influences expenditures on specific goods or services while controlling for number of earners, number of children (both contributing to a family size effect), income, age of the head of the household, and marital status. Letting *REL* represent the amount of religious giving as a percentage of a household's total income measure, we base the primary analysis for this study on the assumption that increasing financial contributions as a percentage of income is associated with an

increase in a household's commitment to the family's religious faith. Because religious giving is a relatively private action, this measure is a significantly better representation of religiosity over the more open act of church attendance, which can easily be influenced by family and peers or extrinsic motives. In addition, many individuals may be restricted from attending a religious service because of health or transportation issues, but this would not restrict them from giving part of their income to a religious organization.

Although a very small percentage of the U.S. population actually tithe (give 10 percent of one's income) to religious organizations (Barna Group 2011b), this study is based on the argument that, regardless of income level, people who try to reach a level of giving close to the tithe (10 percent) level will be more likely to follow other teachings supported by their religious faith. Since a large majority of the U.S. households contributing to religious organizations identify with the Christian faith (Central Intelligence Agency 2007), our hypotheses and subsequent tests of the "level of religious commitment" variable in the expenditure models are based on selected passages from the New Testament. Many of the biblical passages that we used for this study reflect tenets similar to those of other major religions in the United States, such as the Jewish and Muslim faiths, or at least are not in direct contradiction with their general beliefs.

For some goods and services, a household's expenditure amount would not be expected to increase steadily and continually as the age of the head of the household increases. To account for a potential nonlinear or curvilinear relationship between age and expenditure amount and to allow for an examination of how specific age groups (in part representing different household life stages) differ in expenditure behavior, we incorporated dummy (indicator) variables for "household head less than 40 years old" and "household head 60 years old or greater" to represent the explanatory variable *AGE*. Individual tests of significance for the age dummy variable parameter estimates will provide insight into expenditure differences from the base (omitted) category, "household head 40–59 years old." The marital status variable, *MS*, is included in the model as a dummy variable to identify households in which the head of the household is married from households in which the head of the household is not married. Size of household (*HS*) is often a determining factor in expenditure amounts on certain goods and services. The variables "number of children" (*LT18*) and "number of earners" (*NE*) in the household together are used as a proxy for household size and will provide greater insight into effects of the differing life stage on consumption behavior.[1]

[1] One could argue that household size could also be a partial indicant of religious affiliation, since some denominations teach against the use of birth control devices and medicines and/or abortion. The Pew Forum on Religion & Public Life (2008) found that the religious groups that were most likely to have three or more children were Mormon (21 percent), Muslim (15 percent), religious unaffiliated (12 percent), and Catholic (11 percent). To incorporate the possibility that household

A final adjustment of the general expenditure function involves the income and religious giving variables. The permanent income hypothesis developed by Friedman (1957) suggests that consumers spend on the basis of their expected or perceived income and that permanent consumption is proportional to permanent income. Because of the diversity in the sources of income among households (e.g., work, pensions, interest and dividends, Social Security benefits), a household's perceived income based on revenue inflow is difficult to measure accurately. For example, expenditures by younger households are aided by borrowing from lending agencies and are often based on the household members' expectations of a certain future income flow Expenditures by older households may be aided by use of their savings when annual income flow is expected to be minimal. For some items, expenditure amounts might not differ substantially even though the actual reported before-tax (or after-tax) household income differs greatly. For this reason, we replaced the total household income variable (*INC*) in this study by the household's total annual expenditure to represent that household's total annual perceived income (*PINC*). In addition, greater volatility from using strictly an inflow measure of income could lead to misrepresentation of the amount of religious giving as a percentage of income (*REL*) variable. Again, on the basis of the permanent income hypothesis argument, we compute *REL* as the amount of religious giving as a percent of total annual household expenditures.

Finally, for this study, expenditures are measured as total annual household expenditure on a consumer good or service *k*. The expenditure-household characteristic relationship for each good or service to be estimated for this study becomes

$$EX_{i,k} = \beta_0 + \beta_1(NE) + \beta_2(PINC) + \beta_3(LT18) + \beta_4(REL) + \beta_5(A\_LT40) + \beta_6(A\_GE60) + \beta_7(MS) + \varepsilon_{i,k} \quad (2)$$

where, in summary, the specific measures chosen for this study to represent the original expenditure function are as follows:

EX_{ik} = household *i*'s amount of annual expenditure on good or service *k*

NE_i = number of individuals working and earning income in household *i*

$PINC_i$ = total annual household expenditures as a measure of household *i*'s permanent or perceived income

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size and religiosity are interrelated, we initially incorporated an interaction term between number of children and religious giving as a percentage of income into the model, but results did not support the interaction term's inclusion and are therefore not part of the model development for this study.

$LT18_i$ = number of children who are less than 18 years old in household *i*

REL_i = percentage of household *i*'s income that was contributed to religious organizations over a one-year period

A_LT40 = 1 if household head is less than 40 years old; 0 otherwise

A_GE60 = 1 if household head is 60 years old or greater; 0 otherwise

MS = 1 if household head is married; 0 otherwise

ε_{ik} = random error for household *i* when estimating expenditure on good or service *k*

Generally, income would be expected to have a positive impact on expenditure amount for most goods and services, since most of them would be considered "normal" goods (or services). However, most of the life stage type household characteristic variables would be expected to differ more often in their directional impacts on household expenditure. For example, the presence of an increase in the number of children may lead to greater babysitting/day care expenditures but to less alcohol consumption and expenditure, ceteris paribus. Because of the differing directional impacts that are likely to exist as various goods and services are examined, we perform a more conservative two-tailed individual test of significance on each of the variable parameters at both the 0.05 and 0.10 levels of significance.

For each good or service studied, a portion of the households will have no expenditures. Ordinary least squares (OLS) estimates yields biased and inconsistent results when, as in these cases, a truncated dependent expenditure variable is involved (Amemiya 1973; Tobin 1958). To account for this estimation problem, we used a double-hurdle estimation procedure developed by Cragg (1971) that will provide both the impact on the likelihood that a household will purchase the good or service and the impact on the amount of expenditures for that good or service by those who did make expenditures. As was reported by Burke (2009), a limitation to the tobit model is that the same underlying process is used to determine the probability that an event occurs (e.g., a household decides to make a purchase) that also determines the actual amount (the household's purchase amount) if the event does occur. Cragg's more flexible option allows the effects to be estimated by differing methods through the incorporation of a probit model in the first stage and a truncated regression model in the second stage. Burke (2009: 584) indicates that "tobit is nested in craggit, making the latter a popular choice among 'two-tier' models." Cragg's double-hurdle model has been used extensively in predicting the likelihood of participation and, if participation exists, the purchase intensity for various goods and services, including charitable giving and other household

expenditure items (James and Sharpe 2007; Showers et al. 2011; Yen and Su 1995).

Also, the possibility of interdependence among the multiple expenditure equations would suggest a relationship among the error terms and the need for a seemingly unrelated regression (SUR) procedure to obtain efficient estimates. However, when the right-hand-side variables are the same in each equation (as is the case for the expenditure equations for this study), there is no advantage to incorporating SUR, since the regression results will be identical (Kmenta 1971). For each expenditure item studied, the first-stage probit model of the Cragg double-hurdle process represented by equation (2) is estimated as

$$z_{i,k} = \alpha_0 + \alpha_1(NE) + \alpha_2(PINC) + \alpha_3(LT18) + \alpha_4(REL) + \alpha_5(A\_LT40) + \alpha_6(A\_GE60) + \alpha_7(MS) + \varepsilon_{i,k} \tag{3}$$

where an observed dependent variable, $EX'_{i,k}$, equals 1 if the household purchases the good or service (i.e., $EX_{i,k} > 0$) and 0 if the household does not purchase the good or service (i.e., $EX_{i,k} = 0$). The estimated value, $\hat{z}_{i,k} = X\hat{\alpha}$, from equation (3) is a standard normal value where its cumulative distribution, $\Phi(\hat{z}_{i,k})$, represents $P(EX'_{i,k} = 1 \mid X)$ or $P(EX_{i,k} > 0 \mid X)$. The first-stage probit model allows for the estimation of the likelihood that a household will make an expenditure on a good or service *k*, given specific values of the explanatory variables.

As part of the second stage of the double-hurdle procedure, a truncated regression is used to estimate equation (2) for only observations in which $EX_{i,k}$ is greater than zero. Under the assumption of a normal distribution, following Greene (2008) and Amemiya (1985), and given a censored point at zero, the expected value of a household's expenditure on good or service *k* given *X* and given the household is a consumer of *k* is estimated as

$$E(EX_{i,k} \mid EX^*_{i,k} > 0, X_i) = X_i\beta + \sigma_\tau \frac{\phi\left(X_i\beta / \sigma_\tau\right)}{\Phi\left(X_i\beta / \sigma_\tau\right)} \tag{4}$$

The terms $\phi(X_i\beta/\sigma_\tau)$ and $\Phi(X_i\beta/\sigma_\tau)$ are the probability density function and cumulative distribution of $X_i\beta/\sigma_\tau$, respectively, and σ_τ is the standard error of the truncated regression. The $E(EX_{i,k} \mid EX^*_{i,k} > 0, X_i)$ is the conditional mean of $EX_{i,k}$, since it represents the expected value for only households that currently make an expenditure on good or service *k*. Together, the probit and truncated regression estimations can be used to estimate the unconditional mean or the expected expenditure on good or service *k* for all households, given certain values of the explanatory variables ($\underline{X}_i$) as

$$E(EX_{i,k} \left| \underline{X}_i \right.) = P(EX_{i,k} > 0) * E(EX_{i,k} \left| EX^*_{i,k} > 0 \right.) \quad (5)$$

Marginal effects and elasticities can then be determined from the combination of the two stages. Because of the numerous goods and services that we examine in this study, we limit computed marginal effects and elasticities to the income (*PINC*) and amount of religious giving as a percent of income (*REL*) explanatory variables. Also, we identify the directional relationship of all statistically significant variables for each good and service examined.

THE DATA

The data used for this study were obtained from the interview portion of the 2007 Consumer Expenditure Survey (Bureau of Labor Statistics 2009). The 2007 data were from the latest year to represent fairly stable economic conditions for U.S. households before the economic downturn and financial collapse in 2008 and are assumed to be fairly representative for examining household consumption behavior. The Bureau of Labor Statistics' interviews are conducted quarterly with around 5,000 households. In each quarter, a portion of the households interviewed in the previous quarter drop out; therefore we included only households interviewed in four consecutive quarters in the analysis. After we identified these households, data representing an entire year of expenditures and religious giving from 2,431 households were obtained and used in this study.

EMPIRICAL ANALYSIS AND RESULTS

Table 2 provides descriptive statistics for the variables used in the analytical study. Means, medians, and standard deviations are provided for the 2,431 households, along with proportions for categorical variables. In addition, means or proportions are provided for the "only households that gave to religious organizations" portion of the data. A majority of the households studied (56 percent) did not give to any religious organization. Mean total expenditures for households that gave to religious organizations were $55,787, while the mean total expenditures for all households were over $6,000 lower at $49,579. Means for number of children, number of earners, and percentage of total expenditures (or permanent income) to religious organizations for all households were 0.67 children, 1.37 earners, and 1.35 percent of total expenditures, respectively. The mean and median percentages of total expenditures to religious organizations were 3.06 percent and 1.4 percent, respectively, for the households that actually contributed. In contrast, if the amount given to religious organizations is measured as a percentage of after-tax income, the distribution has a greater positive skewness, with a mean of 3.8 percent and a median of 1.2 percent, providing support for using the

permanent income proxy of total expenditures. This was also true for total expenditures versus after-tax income, for which the higher mean to lower median differences were around $8,000 and $19,000, respectively.

Table 2: Descriptive Statistics of Household Characteristics[a]

	All Households (*N* = 2,431)		**Gave to Religious Organization (*N* = 1,072)**	
Characteristic	**Mean**	**Standard Deviation**	**Median**	**Mean**
Number of earners	1.37	1.01	1.00	1.39
Total household expenditures (permanent income)[b]	$49,578.50	$39,922.19	$41,007.30	$55,797.38
Number of children	0.67	1.08	0.00	0.72
Percent of income[b] to religious organizations	1.35%	3.13%	0.00	3.06%
	Proportion			**Proportion**
Household head < 40 years old	0.255			0.205
Household head 60 years old or older	0.316			0.372
Household head 40–59 years old	0.428			0.423
Married	0.573			0.669

[a] "Household head 40–59 years old" is the base age category for the regressions. All the other variables were included in the probit and OLS regressions.
[b] Total expenditures are used to better reflect a household's percentage of permanent or perceived income to religious organizations.

While the minimum and maximum values for all the household characteristics presented in Table 2 indicate that a wide variety of households and their life stages are represented, frequencies of the age categories also support this. Nearly 43 percent of the households have household heads aged 40 to 59 years, while 31.6 percent are 60 years old or more and 25.5 percent are younger than 40 years old. Further evaluation of the age proportions found consistency with past findings (Kinnaman and Lyons 2007), in which the less than 40 years old head of household group was less likely to contribute to religious organizations. Nearly 65

percent of the households in this age group did not contribute to a religious organization, which was almost 9 percent higher than the 40- to 60-year-old group and 17 percent higher than the over-60 age group. Finally, 57 percent of all households in the study represented married households, while 67 percent of those who gave to religion were married.

Analytical Results

To correct for right-skewed nonnormal errors that were found to exist in the truncated regression models, a lognormal hurdle model, also suggested by Cragg (1971), was used. Equation (2) was therefore estimated by using $\ln(EX_{i,k})$ as the dependent variable. In addition, slightly better goodness-of-fit measures were found when the explanatory variable income (*PINC*) was logged for the estimated probit and the truncated regression equations. Given the limited range of the household characteristic variables and the fact that *REL* was measured in percent, no other explanatory variables were logged. In addition, a log-likelihood test of the errors found a heteroscedastic error variance influence by the income variable. To correct for the heteroscedastic errors for each good or service examined, both the probit and truncated regression models incorporate a weighted estimation approach using $1/[\ln(PINC_i)]^2$ as the weight. Finally, a Hausman (1978) specification test was performed to determine whether a simultaneity bias might exist, but tests showed no evidence of the endogeneity of either the *PINC* or *REL* variable in each of the expenditure equations. Letting $y_{i,k} = \ln(EX^*_{i,k})$ and given a lognormal distribution truncated at zero, we find the conditional estimation (i.e., expenditure amount for households already purchasing k) for good or service k to be

$$E(EX_{i,k} \mid EX^*_{i,k} > 0, X_i) = E(\exp[y_{i,k}]) = \exp\left(X_i\beta + \sigma_r^2/2\right) \quad (6)$$

The estimation from equation (6) is used to estimate conditional marginal effects and elasticities and is substituted into equation (5) to estimate subsequent unconditional expected values, marginal effects, and elasticities.

Because of the numerous expenditure items for this study along with the fact that there are two estimated equations for each item, rather than providing coefficient estimates, Tables 3 and 4 provide directional impacts only for explanatory variables that were found to be significant at the 0.05 and 0.10 levels (using two-tailed individual tests) for the first-stage estimated probit equations and the second-stage OLS estimated equations. While we considered interaction terms between region and the religiosity measure for incorporation into the models that were used to estimate expenditure impacts on all U.S. households, clarity and multicollinearity concerns dictated that each expenditure model be estimated separately by region. This provided a better representation of the differences in the

impact from religiosity that existed among regions as a surrogate for affiliation/belief. Regional religiosity impact results are provided in Table 5.

All U.S. Households

The signs from the probit estimations provided in Table 3 indicate which explanatory variables (listed in the columns) had a significant impact on the probability that a household will purchase a good or service (listed in the rows). Positive signs indicate that an increase in that household characteristic also increases the likelihood the household will make expenditures toward a good or service during the year, ceteris paribus. Conversely, a negative sign indicates that an increase in the explanatory variable will decrease the likelihood of making an expenditure on the good or service. For the model and functional form used in this study, we found that an increase in the percentage of income given to religious organizations increases the likelihood that a household would have expenditures on jewelry, property tax, health care, apparel, life insurance, and small appliances. Also, keeping all other explanatory variables constant, we found that an increase in *REL* decreases the probability that a household has mortgage or vehicle interest payments and decreases the probability of expenditures on babysitting/day care, alcohol, and tobacco (with mortgage interest, vehicle interest, and babysitting/day care significant at the 0.10 level).

Table 3: Directional[a] Impacts of Significant[b] Explanatory Variables and Goodness-of-Fit Values for the Estimated Probit (First Stage of Double Hurdle) Expenditure Equations (*N* = 2,431)

Good/Service	No. of Earners	Permanent Income	No. of Children	Percent Increase to Religion	Age < 40	Age ≥ 60	Married	McFadden Adjusted R^2
Jewelry and watches		+		+*				0.0967
Total finance charges	+	+	−			−		0.0641
Major credit card finance charge	+	+	−*			−		0.0750
Mortgage interest	+	+		−*	−	−		0.2367

Vehicle finance charge	+	+	−	−*	+	−		0.1376
Property taxes paid		+		+	−	+	+	0.1930
Entertainment		+	−			−		0.2466
Babysitting and day care		+	+	−*	+	−		0.2840
Alcohol		+	−	−	+	−		0.1720
Health care	−*	+		+	−	+		0.1757
Housing	No observations with $0 expenditures reported on housing							N.A.
Apparel		+	+	+				0.1414
Child support and alimony		+	−		−	−		0.1283
TVs, radios, DVRs, etc.		+				−	−	0.1771
Life insurance	+	+		+	−		+	0.1008
Tobacco	+	−		−		−	−*	0.0362
Health insurance		+	−		−	+		0.1152
Small appliances		+		+		+		0.0717

N.A. means "not applicable."

[a] A plus or minus sign represents an increase or decrease, respectively, in the likelihood of purchasing the good or service for an increase in the explanatory variable found to be significant in that model.

[b] Likelihood ratio tests found all probit models to be significant at the 0.01 level. Because of differing expectations across the expenditure equations, individual variable significance is based on a two-tailed test at the 0.05 and 0.10 levels. Significance at the 0.05 level is identified with a plus or minus sign; significance at the 0.10 level is identified with an asterisk beside the plus or minus sign.

The income variable's impact on the likelihood of a household expenditure was significant for all expenditure items studied and was found to have a positive impact on all goods and services except tobacco. That is, an increase in a household's perceived income was associated with a decrease in the likelihood of a household purchasing tobacco products, while an increase in income increased the probability of making expenditures toward all the other goods and services

studied here. The remaining explanatory variables had greater variation in terms of the directional impact on expenditure items. An increase in the number of earners, for example, increases the likelihood that a household would carry finance charges and a mortgage and purchase life insurance and tobacco but decreases the likelihood of having health care expenditures. An increase in the number of children is associated with a decreased likelihood of carrying finance charges along with less expenditure on entertainment, alcohol, and health insurance. The same increase in number of children, however, increases the likelihood of expenditures on babysitting/day care as well as on apparel, ceteris paribus. The "household head 60 years old or greater" category tended to have a lower likelihood of having expenditures for many of the goods and services studied in comparison to the "household head 40–59 years old" category. Households with heads age 60 years or older had a greater likelihood only of expenditure for property taxes, health care, health insurance and small appliances than households with heads 40–59-years old, while the probability of having any expenditure at all was significantly lower for all other goods and services studied except jewelry and apparel.

When all else is kept constant, the percentage of income given to religious organizations appears to affect the likelihood of having expenditures on several goods and services. As that percentage increases, households are more likely to spend on jewelry, property tax, apparel, life insurance, and small appliances but less likely to carry a mortgage or a vehicle finance charge and to make expenditures toward babysitting/day care, alcohol, and tobacco. While the probit findings for jewelry and apparel expenditures tend to contradict guidance from scripture, many of the significant relationships found for *REL* support the hypothesis that the more religiously committed households generally heed the messages in the Bible verses described in Table 1.

Directional impacts found for significant variables from the truncated lognormal regressions are shown in Table 4. Here, a plus or minus sign indicates

Table 4: Directional[a] Impacts of Significant[b] Explanatory Variables, Goodness-of-Fit Values, and Sample Sizes[c] for the Estimated OLS (Second Stage of Double Hurdle) Expenditure Equations

	No. of Earners	Permanent Income	No. of Children	Percent Increase to Religion	Age < 40	Age ≥ 60	Married	Adjusted R^2	N
Jewelry and watches		+	−	−				0.1825	1,145
Total finance charges		+				−		0.0446	594

Major credit card finance charge		+						0.0196	520
Mortgage interest		+	+*		+		−	0.2431	1,229
Vehicle finance charge		+						0.0693	873
Property taxes paid	−	+		−				0.2873	1,783
Entertainment	−	+		−			−*	0.4485	2,354
Babysitting and day care	+*	+			+		−	0.1545	286
Alcohol		+	−	−				0.1479	1,377
Health care	−	+		+	−	+	+	0.2704	2,202
Housing	−	+	+	−	+	−	−	0.7263	2,431
Apparel		+	+			−	−	0.4675	2,233
Child support and alimony		+				−		0.0689	190
TVs, radios, DVRs, etc.		+		−*				0.1905	2260
Life insurance		+		+	−	+*	+	0.1622	1032
Tobacco	+			−				0.0327	680
Health insurance	−	+	+	+*	−	+	+	0.2041	1788
Small appliances		+						0.1191	1139

[a] A plus or minus sign represents an increase or decrease, respectively, in the amount purchased of the good or service by participating households for an increase in the explanatory variable found to be significant in that model.

[b] *F*-tests found all models to be significant at the 0.01 level except the major credit card finance charge model, which was significant at the 0.05 level. Because of differing expectations across the expenditure equations, individual variable significance is based on a two-tailed test at the 0.05 and 0.10 levels. Significance at the 0.05 level is identified with a plus or minus sign; significance at the 0.10 level is identified with an asterisk beside the plus or minus sign.

[c] Sample size for OLS estimations represents only the number of households, out of the total 2,431 observed households, that participate in one or more purchases of that good or service during the year.

that an increase in the explanatory variable is associated with an increase or decrease, respectively, in the amount of expenditure a household makes toward that good or service. An increase in a household's dollar amount given to religious organizations as a percentage of income was found to have a positive impact on the household's health care expenditures as well as on expenditures on both life insurance and health insurance, ceteris paribus. Negative impacts were found for expenditures on jewelry and watches; property tax; entertainment; alcohol; housing (including such items as mortgage principle, rent, maintenance and utilities); tobacco; and televisions, radios, and DVD players, etc. (TV, etc. and health insurance were significant at the 0.10 level). In all cases in which *REL* was significant, the directional impact was consistent with the scripture outlined earlier. The negative impact on the amount of expenditure toward jewelry and watches is supported in I Peter 3; that on expenditure for property taxes and housing is supported in Romans 13; that on expenditure for entertainment and televisions, etc. is supported in Colossians 3; and that on expenditure for alcohol and tobacco is supported in Corinthians 6. Also, the significant positive impact from *REL* on health care expenditures is supported by Corinthians 6, and that on life and health insurance expenditures is supported by I Timothy 5. It should be noted that the impacts from *REL* are not income driven. A bivariate analysis found only a 0.094 correlation coefficient between *PINC* and *REL*. Also, when the *REL* variable was disaggregated into a nongiving category and four giving categories, the lowest giving category of 0.01–1 percent had the largest mean and median household incomes. Further investigation was also performed on property tax and housing expenditures to control for region of the country. Consistent with the total population, *REL* was found to affect housing expenditure negatively for all regions (*p*-values < 0.01) except the Northeast (*p*-value = 0.125). If households from the Midwest and South—where home values are, on average, the lowest in the nation (U.S. Census Bureau, 2001)—are removed from the sample, the impact from *REL* on property taxes and housing expenditures is still consistent with the original findings.

An analysis of the other explanatory variables found that income positively affects all the expenditure items studied except tobacco expenditures. The coefficient for tobacco was negative but not significant. Like the probit results, the other explanatory variables were found to have differing impacts, depending on the expenditure item. Married households, for example, had significantly higher expenditures on health care, life insurance, and health insurance but lower average expenditures on mortgage interest, entertainment, babysitting/day care, housing, and apparel. Also, as the number of children increases, households spend less on jewelry and alcohol while, not surprisingly, spending more on mortgage interest, housing, apparel, and health insurance.

Regional Differences

To identify possible differences in expenditure behavior by religious affiliation and beliefs, each expenditure equation was estimated for households located in one of four specified regions: Northeast, South, Midwest and West. Based on a recent national survey of individuals (Pew Forum on Religion & Public Life 2008; Pew Research Religion & Public Life Project 2013), the following list summarizes affiliation and belief by region:

> *South*: Evangelical, historically Black church affiliation. Strongest support for scripture as the Word of God. Nearly all states agreed at 70 percent or more.
>
> *Midwest*: Diverse among mainline Protestant, Catholic, Evangelical churches. Relatively strong support for scripture as the Word of God. All states agree at 60 percent or more.
>
> *West*: Protestant, Mormon, and most religiously unaffiliated. Mild support for scripture as the Word of God. All states agree at 50 percent or more, and over one-third agree at above 60 percent.
>
> *Northeast*: Predominantly Catholic and largest Jewish population. Least support for scripture as the Word of God. All but one state agree at below 60 percent, and more than half agree at below 50 percent.

These distinct differences among the four regions of the United States are used to provide some insight into how religiosity differs in its impact on expenditures, perhaps according to an individual's different view of scripture. Table 5 provides directional impact signs for the religiosity measure (religious contributions as a percentage of income) when significant for each expenditure item and for both the probit and OLS regressions (using the more conservative two-tailed test and at the 0.05 level of significance) by region. The results reflect the religiosity measure's impact on the expenditure item keeping the household demographics and income measure in equations (2) and (3) constant.

In contrast to other regions, for Southern households, the religiosity measure was positively associated with the likelihood of paying property tax (i.e., be a homeowner), purchasing health care, and purchasing life insurance. Also, in contrast to all the other regions, when income is kept constant, households in the South spent less property tax as religiosity increased and spent more on health insurance if purchased. While property tax rates differ across states, the Southern states, except for Texas, had a standard deviation in property tax rate that was half that of all other states (computed from Tax Foundation 2010), lending some support for Southern households with the higher religiosity measure showing less concern about home value, ceteris paribus. Consistent with at least two other regions, households in the South were less likely to purchase alcohol (along with the Midwest and West) or tobacco products (in comparison to all regions) as the

religiosity measure increased. In addition, in the South, if expenditures were made on alcohol, tobacco, housing, or small appliances, these expenditures tended to be lower for households with the higher religiosity measure. This was also true of all regions for alcohol, the Midwest for tobacco products, the Midwest and West for housing, and the Northeast for small appliances.

Table 5: Directional[a] Impact of a Significant[b] Religiosity Variable for the Probit and OLS Regressions by Region

	Percent of Permanent Income to Religion							
	South (*N* = 870)		**Midwest (*N* = 467)**		**West (*N* = 543)**		**Northeast (*N* = 534)**	
	Probit	**OLS**	**Probit**	**OLS**	**Probit**	**OLS**	**Probit**	**OLS**
Jewelry and watches				−				
Total finance charges								
Major credit card finance charge							−	
Mortgage interest								
Vehicle finance charge			−					
Property taxes paid	+	−						
Entertainment								
Babysitting and day care						−		
Alcohol	−	−	−	−	−			−
Health care	+					+		
Housing		−		−		−		
Apparel			+					
Child support and alimony								
TVs, radios, DVRs, etc.								
Life insurance	+			+				
Tobacco	−	−	−	−	−		−	
Health insurance		+			+			
Small appliances		−				+		−

[a] For the probit models, a plus or minus sign represents an increase or decrease, respectively in the likelihood of purchasing the good or service for an increase in a household's religiosity level if significant in that model. For the OLS models, a plus or minus sign represents an increase or decrease, respectively, in the amount purchased of the good or service by participating households for an increase in religiosity level if significant in that model.

[b] Religiosity variable significance is based on a two-tailed test at the 0.05 level of significance.

For the OLS regressions, the significance of the religiosity measure, when all households were included, often appears to be driven by the South and/or the Midwest. This was true for negative impacts on expenditures for jewelry, property taxes paid, alcohol, housing, and tobacco and for a positive impact on expenditures for health insurance. Also, the South was the only region in which the impact on amount of expenditures for property tax and health care was consistent, and the Midwest was the only region in which the impact on amount of expenditures for jewelry and watches and life insurance was consistent. In both regions, the church affiliations are considered more conservative or more in line with scripture than is the case in the West or Northeast, even among mainline Protestants. At the same time, the largely Catholic and Jewish Northeast region was the only region to show a likelihood of having finance charges or mortgage interest as percentage of income contributed to religion increases. Compared with the Midwest population, the Northeast was also found to have a lower likelihood of having vehicle finance charges as religiosity increases, when all else is kept constant. The Northeast was the only region that did not show a lower likelihood of purchasing alcohol as religiosity increases. While the financial findings indicate behavior supportive of the Romans 13 teachings, highly religious households in the Northeast were not found to exhibit behavior that was consistent with the I Corinthians 6 "wellness" scripture.

The West, by contrast, while showing less likelihood of purchasing alcohol as religiosity increases, as in the South and Midwest, was the only region not to show a decrease in alcohol expenditures if the household chose to purchase alcohol. Both these findings concerning the Northeast and the South and alcohol expenditures could support the suggestion of a less literal interpretation of biblical teachings in those regions. Even for tobacco, it was found that the likelihood of purchasing decreases as religiosity increases in every region, but if a household in the West does purchase tobacco products, religiosity does not appear to affect the amount spent on the item. In contrast to all other regions but consistent with the hypotheses concerning both family responsibility and children and the home, households in the West increased expenditures on health care and small appliances as the religiosity measure increased, when household demographics and income were kept constant. This could be reflective of the Mormon population that is located predominantly in Utah and Idaho. Finally, in terms of the number of times the religiosity measure was significant for either the probit or OLS regressions, the region identified by the Pew Religion & Public Life Project (2013) as having the least support for scripture as the Word of God (the Northeast) had the lowest number of "religiosity significance" (4), followed by the West (7), then the Midwest (9), with the South having the most (11).

Marginal Effects and Elasticities

We computed conditional and unconditional income elasticities for all households on the goods and services studied. In estimating each expenditure item's Engel's curve, where an elasticity of greater than 1 represents a luxury good or service, we found that for households currently purchasing the good or service, the luxury items are jewelry and watches, entertainment, babysitting/day care, and apparel. Including both purchasers and nonpurchasers of a good or service, a 1 percent increase in income corresponds to a greater than 1 percent increase in expenditures for these same goods and services as well as mortgage interest (1.43 percent), vehicle finance charges (1.16 percent), property taxed paid (1.13 percent), alcohol (1.41 percent), and child support and alimony (1.68 percent). Only tobacco had very near zero elasticity, with a conditional (purchasers only) income elasticity of 0.07 percent and an unconditional (all households) income elasticity of −0.06 percent.

Table 6 provides marginal impacts and elasticities for each of the expenditure items with respect to percentage of income to religion for only the items in which *REL* was significant in the first-stage probit results, the second-stage OLS regression results, or both. Since a 1 unit (1 percent) change in *REL* is rather substantial for most households, the marginal impact calculations are based on a somewhat more realistic 0.5 percent increase in *REL*. The probability of a household either starting to purchase or no longer purchasing a good or service when *REL* increases by 0.5 percent is less than 0.01 in all cases except for alcohol (−0.0112) and tobacco (−0.013). For households that are already making purchases of the good or service, the greatest dollar change in expenditures (i.e., conditional marginal effect) were found for housing (−$128), tobacco (−$54), property taxes (−$52), mortgage interest (−$44), and babysitting/day care (−$42). The largest positive conditional marginal impacts were for health care ($29), health insurance ($15), and life insurance ($11). The unconditional marginal effects provided in Table 6 represent overall changes in expenditure, due to changes in the likelihood of a household making expenditures, as well as changes in the amount of a household's expenditures. Conditional elasticities for a good or service with respect to *REL* are also provided in Table 6. A 1 percent increase in *REL* from the overall average of 1.35 percent was found to decrease alcohol expenditures by 0.15 percent and to decrease tobacco expenditures by 0.13 percent. With the likelihood of purchasing these goods being less at higher levels of *REL*, the unconditional elasticities for alcohol and tobacco rise to a 0.19 percent and 0.27 percent decrease, respectively. Also, the unconditional elasticity of babysitting/day care expenditures doubles to a 0.14 percent decrease as *REL* increases by 1 percent.

Table 6: Impact from a Unit and Percentage Change in *REL*, a Household's Percent of Income[a] to Religious Organizations on Expenditure Items When *REL* Is Significant in Probit and/or OLS Regressions

	A 0.5% Increase in Percent of Income to Religion (Average *REL* from 1.35 to 1.85)			A 1% Increase in the Average Percent of Income to Religion (Average *REL* from 1.35 to 1.3635)	
		Unit Change		Elasticity	
Expenditure Item	Probability *EX* > $0	(Conditional)	(Unconditional)	(Conditional)	(Unconditional)
Jewelry and watches	0.0032	−3.80	−0.79	−0.05	−0.02
Mortgage interest	−0.0028	−43.98	−49.60	−0.02	−0.03
Vehicle finance charge	−0.0030	−2.92	−3.72	−0.01	−0.03
Property taxes paid	0.0030	−51.66	−37.51	−0.05	−0.04
Entertainment	0.0000	−19.21	−19.24	−0.02	−0.02
Babysitting and day care	−0.0023	−42.47	−7.81	−0.07	−0.14
Alcohol	−0.0112	−27.56	−23.95	−0.15	−0.19
Health care	0.0035	29.27	41.51	0.02	0.03
Housing	—	−127.97	−127.97	−0.02	−0.02
TVs, radios, DVRs, etc.	0.0014	−1.38	0.62	0.00	0.00
Apparel	0.0006	−7.60	−6.63	−0.02	−0.01
Life insurance	0.0064	10.98	11.27	0.03	0.07
Tobacco	−0.0130	−53.84	−27.50	−0.13	−0.27
Health insurance	0.0028	15.33	18.12	0.02	0.03
Small appliances	0.0038	0.58	0.75	0.01	0.03

[a] Income is measured as total expenditure to better reflect a household's permanent or perceived income.

CONCLUSIONS AND IMPLICATIONS

Our results confirm that expenditure patterns for several goods and services in the United States generally reflect one's religious beliefs, but we also observed some interesting contradictory findings. To the extent to which we can draw conclusions about the tendencies of "strong" givers relative to "weaker" or nongivers from the analysis of CEX data expenditure patterns, we confirm hypothesized

relationships regarding several discretionary expenditure categories from a Judeo-Christian perspective.

Specifically, these results suggest that households that exhibit a stronger commitment to their faith (as measured through a greater percentage of their income given to religion) demonstrate a pattern of expenditures that is consistent with basic Judeo-Christian biblical beliefs, such as (1) good stewardship and spending in moderation (lower probability of mortgage interest and vehicle finance charges, greater probability of expenditure on property taxes, indicating greater likelihood of home ownership, but lower property tax expenditure and housing expenditures, on average, indicating some moderation in selection of home in terms of either extravagance or location); (2) managing risk (greater probability and expenditure on life insurance and greater expenditure on health insurance); (3) healthy living (lower probability of consumption as well as lower spending on tobacco and alcohol and greater probability and expenditure on health care); and (4) focus on home and family (lower probability of expenditures on babysitting and day care and a greater likelihood of expenditures on small appliances for home cooking, etc.).

The results also show differences by region in how expenditure patterns are demonstrated. The regions with the most conservative interpretation of scripture, the South and Midwest, were the regions that were most affected by the household's religiosity measure. The region with the most liberal interpretation of scripture, the Northeast, was by far the least affected by religiosity in terms of expenditure behavior.

Households that give a greater percentage of their income to religion exhibit some expenditure patterns that are similar to the patterns of the rest of the population, including nongivers. Their expenditures are difficult to reconcile with Judeo-Christian biblical beliefs, such as (1) a greater likelihood of spending on apparel and jewelry and no differences found concerning the impact on the amount spent on apparel (though a higher percentage given to religion does lead to a lower amount of jewelry expenditures for households that do purchase jewelry); (2) no differences in the probability of expenditure on child support and alimony (suggesting similar marriage failings); and (3) no differences in the probability of making interest payments on major credit cards (indicating similar behavior with managing the carryover of monthly credit card charges).

In terms of elasticity, tobacco, alcohol, and babysitting/day care expenditures are most notably affected by a 1 percent change in a household's percentage of income given to religious organizations, all having a negative elasticity of 0.14 or greater. In terms of dollar impacts, the greatest negative marginal impact on expenditures from a change in *REL* were found for housing, tobacco, property taxes, mortgage interest and babysitting/day care, while the greatest positive marginal impact was found for healthcare, health insurance and life insurance.

While the finding of lower expenditures (and income) for households that give a larger proportion of their income to religion is consistent with the findings of past studies, it is important to recognize that expenditure decisions are not simply an opportunity cost issue with the religiosity measure (i.e., it may be argued that if a household gives more to religion, then it naturally has less income to spend on other items, ceteris paribus). The findings reveal that giving to religious organizations as a percentage of income did not decrease the likelihood or amount of expenditures on credit card (except the in the Northeast) and total finance charges or child support and alimony expenditures. In addition, the expenditure amount on apparel was not affected. However, religiosity was positively related to insurance and health care purchases.

These findings lend support to the hypothesis that religious givers are indeed making conscious expenditure allocation choices requiring a rational choice and that many, though not all, of those choices exemplify behavior that is consistent with Judeo-Christian biblical beliefs. The findings also support the hypothesis that the purchasing behavior for certain goods and services is closely aligned with the interaction of the religiosity measure and the level of belief in scripture as the Word of God (to the extent measured by regional differences).

LIMITATIONS AND FUTURE RESEARCH

A limitation of this study is the lack of data on church affiliation or motive for religious giving or any internal state. Contributions to religion were used here as a surrogate for intrinsic religious commitment as well as religious affiliation. Although CEX data do not include any descriptive identifiers on church affiliation or self-report of internal states, future research should not only provide specific religious affiliation descriptors, but also directly measure (rather than assume on the basis of behavioral data) the intrinsic motives of individual givers to provide more precise explanation for this set of behaviors across segments.

The product/service categories in this study were limited. Numerous scripture references remain to be explored, such as those that relate to stewardship of natural resources and media consumption. This study was limited by the expenditure categories that were collected in CEX data; future research should identify a comprehensive set of purchase or consumption behaviors that are hypothesized to be influenced by Judeo-Christian biblical beliefs.

This study used religious giving as a percentage of income as a measure of religiosity. While this is an extant demonstration of religious commitment, much work is needed to measure religiosity in a way that not only is parsimonious but also has face validity for the various religious sectors in the global marketplace. For example, work is needed to focus measurement on the core belief systems driving marketplace behavior in Judeo-Christian cultures. The many and varied

religiosity measures, which include both intrinsic and extrinsic operationalization, suffer from a lack of focus on core belief systems. Work is needed to isolate such beliefs and structure measurement around them for each religious segment.

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