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THE PRICE OF ALCOHOL,
WIFE ABUSE, AND HUSBAND ABUSE

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ABSTRACT

Alcohol consumption has been frequently linked to family violence. The purpose of this paper is to examine the direct relationship between the price of alcohol, which determines consumption, and violence towards spouses. The data come from the 1985 cross section and the 1985-1987 panel of the National Family Violence Survey. The 1985 data are a nationally representative sample while the panel oversamples violent individuals. Dichotomous indicators of severe violence towards wives and husbands are used. A reduced form violence equation is estimated, and individual-level fixed effects are used to control for unobserved characteristics in the panel. A consistent result that emerges from this paper is that an increase in the pure price of alcohol, as measured by a weighted average of the price of alcohol from beer, wine, and liquor, will serve to reduce severe violence aimed at wives. By contrast, the evidence on the propensity of an increase in the price of alcohol to lower violence towards husbands is mixed. When individual level characteristics are not controlled for, the price is not a predictor of violence towards men. However, once the individual traits are controlled for, a negative relationship between the price and violence emerges.

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I. INTRODUCTION

The problem of violence between spouses has been a characteristic of families for many generations. Only since the 1960s has this problem gained national attention as a serious threat to the health and welfare of women, and only since the late 1970s has the problem of violence against men gained any notoriety. Estimates show that 30 out of every 1,000 females and 43 out of every 1,000 males are victims of severe violence committed by their spouses.¹

Alcohol consumption has commonly been associated with incidents of spousal abuse. In reviews of the literature, Gelles and Cornell (1990) and Leonard (1993) both note that virtually every study of aggression in families shows that alcohol consumption is a strong correlate of violence. In nationally representative samples, alcohol use is frequently found to accompany violence (see Straus et al., 1980, and Kantor and Straus, 1987). Studies of violent families also find a similar association (see Wolfgang, 1958, and Byles, 1978). In fact, Gelles (1974) found in a sample of violent families that drinking accompanied violence in almost half of the families. In samples of battered women, many different studies find that the husbands had frequently been drinking prior to the assault (Walker, 1979, Walker, 1984, and Fagan et al., 1983). For example, Walker (1984) interviewed a sample of 400 self-identified battered women on the drinking habits of male batterers and non-batterers. She finds that 67 percent of male batterers were reported to frequently drink alcohol (as compared to never drinking or occasionally drinking) versus 43 percent of non-batterers. Drinking by the victim is also observed in some studies of violence between spouses, although the percentage of victims reported to have been drinking prior to the attack is often much lower than the percentage of perpetrators who had been drinking (see Collins, 1981, Walker, 1984, and Bard and Zacker, 1974).

In addition to the well established link between alcohol consumption and violence, alcohol consumption has been shown to be negatively related to the price of alcoholic beverages. (See for example Ornstein and Hanssens, 1985, Grossman et al., 1987, and Kenkel, 1993.) Given these two relationships, the purpose of this paper is to examine the direct relationship between the price of alcohol and the incidence of violence. In other words, the purpose of this paper is to answer the question of whether an increase in the price of alcohol will lower violence towards spouses through lower consumption.

II. RELATED STUDIES

There are numerous studies on domestic violence in the literature of sociology, psychology and other disciplines. However, the topic of domestic violence is a relative newcomer to the economics literature. The most closely related studies are those on the effects of alcohol regulation on violence aimed at children by Markowitz and Grossman (1998a and 1998b). Using the 1976 and 1985 National Family Violence Surveys, we show that increasing the beer tax is an effective policy tool in reducing both the probability and frequency of violence towards children.² The former study looks at the 1976 cross section only, while the later study pools the two years of data and controls for state fixed effects over time. Fixed effects are important in determining whether the effects of the state-level alcohol regulation variables in the cross sections are reflecting unobserved state sentiment towards regulation and violence rather than true policy effects.

Other notable economic studies on domestic violence are by Long, et al. (1983), Tauchen, et al. (1991), and Farmer and Tiefenthaler (1997). These papers focus only on wife abuse and model violence as a good which can be bought or avoided with income transfers. One

drawback of these studies is that the models do not allow for the effects of alcohol consumption and the determinates of consumption on violence. The next section presents a simple model of violence which addresses this limitation. A more formal derivation is outlined in Markowitz and Grossman (1998b).

III. ANALYTICAL FRAMEWORK

The studies cited in Section I on the link between alcohol consumption and violence do not posit a causal mechanism from alcohol to violence, rather, they highlight an association. Within this literature, there are a variety of hypotheses of why alcohol and violence are linked. One theory states that there may exist a psychopharmacological relationship in which alcohol can alter behavior by increasing excitability and/or boosting courage. (See Pernanen, 1981 and Fagan, 1993 for a complete discussion.) Under this theory, people may be more likely to commit a violent act when under the influence of alcohol than they would be otherwise. A second theory asserts that people use alcohol as an excuse for aberrant behavior. It is commonly believed that alcohol use may cause people to lose their inhibitions and/or release violent tendencies, and thus users cannot be fully blamed for their actions. In other words, drunkenness may give people an excuse for violence, despite whether or not actual pharmacological effects exist (see Gelles and Cornell, 1990, and Fagan, 1990). Finally, there is the “third factor” theory in which there exists some unknown common cause that results in both drinking and violent behaviors (see Fagan, 1990). These are only a few of a wide variety of possible explanations on the link between alcohol consumption and violence, however, there is no agreement in the literature on the true cause of the association. (See National Research Council, 1993, for more details.)

Given the variety of explanations for the link between alcohol consumption and violence, there are many ways in which one can model a perpetrator’s choice level of violence. Two specific models are presented here. The first encompasses the idea that violence is an unintended

outcome of alcohol consumption, while the second assumes alcohol lowers the costs of violence by creating an excuse for the behavior. Even though the mechanism through which alcohol promotes violence is different, both frameworks presented below result in the same estimating equation and predictions.

The first framework considers violence as a by-product of alcohol consumption. A perpetrator maximizes his or her utility which is a function of alcohol consumption, violence, and other consumption goods, all of which are affected by tastes. Violence is present in the utility function, but is not a choice variable per se. Rather, violence is an expected or unexpected consequence of alcohol consumption. That is, violence is caused by the chemical effects of alcohol consumption and through other factors that account for a person's taste or propensity for violence.³ These taste factors can be socio-economic or demographic factors, or a person's history of family violence.

A perpetrator will maximize utility subject to a budget constraint where total income is equal to the price of alcohol times the amount of consumption of alcohol plus the total amount spent on other consumption (the price of other consumption is normalized to \$1.00). This maximization will yield demand functions which show that both alcohol consumption and other consumption are functions of the price of alcohol and income. Since violence is a function of alcohol consumption, substituting the demand equation for alcohol into the violence equation gives violence as a function of the price of alcohol, income and tastes.

By the law of downward sloping demand, increasing the price of alcohol will decrease the quantity of alcohol demanded. When the quantity of alcohol decreases, violence will decrease, thus leading to a negative relationship between the price of alcohol and violence.

A second framework is established to account for the costs of violence which can be lowered by alcohol consumption.⁴ A perpetrator maximizes utility which is a function of alcohol consumption, violence, and other consumption, all of which are affected by tastes. Here, all three components of utility are choice variables. The budget constraint faced by the perpetrator equates total income to the price of alcohol times the quantity of alcohol consumed, plus the

price of violence times the amount of violence, plus the total amount spent on other consumption. The price of violence is the expected value of any monetary or non-monetary costs of violence.⁵ If these costs are denoted by C , and the probability of facing the costs is denoted by π , the price of violence is πC . By assumption, an increase in alcohol consumption will lower the price of violence because it lowers π .

Maximizing utility subject to the budget constraint yields demand functions for violence, alcohol and other consumption. The demand function for violence depends on income and the price of violence, which in turn depends on alcohol consumption. Substituting the demand function for alcohol into the violence equation gives a reduced form equation where violence depends on the price of alcohol and income. This reduced form is the same as the one that is derived in the first model, and yields the same prediction that an increase in the price of alcohol will decrease violence. In this framework, however, the mechanism works through a decrease in the price of alcohol which will decrease the price of violence and increase the amount of violence.

IV. DATA

The data come from the 1985 National Family Violence Survey (NFVS) and the 1986 and 1987 follow-ups to the 1985 survey. The 1985 National Family Violence Survey was designed to collect information about violence in the home and has detailed information on how conflicts are resolved. The 1985 data are a nationally representative sample of 4,990 individuals who are either married or cohabiting, are single parents living with children under 18, or are individuals who had been married or cohabiting within the past two years. Only married or currently cohabiting couples are included in the analysis presented here. This reduces the potential sample size to 4,372 individuals. The 1986 and 1987 follow-ups were designed specifically to track information on violence between spouses. Individuals were picked to be in

the follow-up surveys based on their answer to the inter-couple violence questions in the 1985 survey. Specifically, all married or cohabiting individuals who reported any violence between the partners in the past year were chosen to be reinterviewed. A sample of the individuals reporting inter-couple violence not within the past year but sometime before then were also included in the follow-ups. Finally, a sample of individuals who reported no violence were included. The panel used in this study is comprised of 1,541 married or cohabiting individuals, all of whom appear in the initial 1985 survey, have stayed with the same partner and were included in at least one of the follow-ups.⁶ Of the total, 506 individuals appear in only the 1985 and 1986 surveys, 408 are in the 1985 and 1987 surveys only, and 627 are in all three years. Thus, the panel data set contains 3,709 potential observations.⁷

A. Dependent Variables

Measures of domestic violence in the NFVS are collected by use of the “Conflict Tactic Scale” (CTS) developed by Straus (1979). The CTS gathers information on the number of times in the past year a respondent has committed or has been the victim of a violent act. Two dependent variables are constructed; an indicator for whether the husband was violent towards the wife (termed wife abuse), and an indicator for whether the wife was violent towards the husband (termed husband abuse). Both variables are dichotomous indicators which equal 1 if the respondent committed any of the following acts towards their spouse in the past year: kicked, bit or hit with fist; hit or tried to hit with something; beat up the other; choked him or her; threatened with a gun or knife; or had used a gun or knife. About 3 percent of the 1985 sample reported violent towards women and about 4.5 percent of the 1985 sample reported violence towards men

in past year. These percentages are about 4 percent for both men and women in the panel.⁸

Table 1 shows the means for these variables in the various years of the panel.

Note that the survey is only given to one member of each household. The respondent can be either male or female, and is asked about both violence committed by him or her and violence aimed at him or her. Therefore, the indicator for wife abuse, for example, can be shown with responses from both husbands and wives (perpetrators and victims), or can be shown as the response of only the wives (the potential victim). Eliminating responses from the perpetrator reduces the sample size by about half. Specifically, fifty-six percent of the respondents are females.

In both the 1985 cross section and the panel, women report being victims at greater rates than men report victimizing the women. The proportion of violence towards women as reported by women is about 0.05 in both the cross section and the panel, but is 0.01 and 0.04, respectively, for violence aimed at women as reported by men. In addition, women in the panel report victimizing men more than men report being victims, but there is no statistically significant difference in men victimization rates in the 1985 cross section.

B. Reliability of the Data

One criticism of the National Family Violence Survey focuses on the reliability of the respondents' answers to the occurrence of violence. The survey seeks to gain information about sensitive and possibly deviant types of behavior that often arouses antagonism, high refusal rates and distorted answers from the respondents, thereby bringing into question the reliability of the results. The principal investigators of the survey discuss this criticism at length. (See Straus and Gelles, 1990 for complete discussion of this issue.) First, they claim that the antagonistic aspects

are minimized by presenting the questions in the context of resolving family conflicts. The question on conflicts between spouses begins with resolution tactics such as “discuss the issue calmly” which are generally viewed as positive methods of dealing with problems. The scale gradually increases to questions about more socially unacceptable behavior. Through this method of getting to the violence questions, the respondent has first been given a chance to give the “socially correct” answers and is less apprehensive about discussing incidence of violence.

Currently, the CTS seems to be the best available technique for collecting truthful information on domestic violence and has been used in over 200 studies to date (see Straus and Gelles, 1990). Nevertheless, because of the potential for underreporting violence, the dependent variables are considered to be conservative estimates of violence. This poses no problem for the conclusions since so long as the measurement error in the dependent variable is random, measurement error only serves to raise the standard errors leaving the coefficients as unbiased estimators. However, if for example, drinkers systematically underreport violence, then the coefficient on the price of alcohol will be biased towards zero.

A related criticism is how well the NFVS reflects the reported national incidence of violence aimed at spouses. Most of the data used in studies of domestic violence rely on small samples of battered women, or studies where the participants identify themselves as being violent. However, a few nationally representative samples do present estimates of rates of violence. Using the CTS, the 1976 National Family Violence Survey reports violence rates similar to those in the 1985 survey--about 4 percent of women are victims of severe violence as are about 5 percent of men. The Violence Against Women Survey (VAWS) is a random sample of 12,300 women across Canada. Information on violence is gathered using a modified version of the Conflict Tactic Scale. The “high severity” index in the VAWS is comparable to the abuse

indicator utilized in this paper since it includes the acts of kicking, biting, beating, choking, threatening to use or using a knife or gun, and sexual assault. The percentage of married women in this sample who were abused is 0.035, which is very similar to the wife abuse figure in the NFVS cited above. Violence towards men are not reported in the VAWS. Finally, the British 1994 CTS Domestic Violence Survey uses a modified version of the Conflict Tactic Scale in a sample of 1,978 men and women in Great Britain. In a current relationship, about 3 percent of women and 6 percent of men reported being punched or kicked; had an object thrown at them or were hit with an object; or were stuck with a sharp object.

Other nationally representative samples in the U.S. show much lower rates of violence. The National Crime Victimization Survey (NCVS) conducted by the Bureau of Justice Statistics reports information on violence by intimates (spouses, ex-spouses or boy/girlfriends). The rates from the NCVS are much lower than the domestic violence studies because the victim must perceive the violence as a crime in order for the violent act to be counted in the survey. Violence in the NCVS is defined as aggravated or simple assault. The average rate of violence by intimates from 1992-1993 is 0.76 percent for women and 0.13 percent for men. Similarly, in a 1995-1996 survey of 8,000 men and 8,000 women, the National Violence Against Women (NVAW) survey found that only 1.3 percent of women and 0.9 percent of men were victims of physical assault. As with the NCVS, the victims in this survey do not have to be married or living with someone, and the perpetrator can be a current or former spouse, a date, or a boyfriend or girlfriend.

C. Independent Variables

i. Alcohol Control Variables

The price of alcohol is a composite price of one ounce of pure alcohol. This price is a weighted average of the price of pure alcohol from beer, liquor, and wine. The weights are the percentage of total pure alcohol consumption accounted for by each of the three types of beverages in 1985. Each person is assigned a price based in the state in which they live.

Prices for beer, wine and liquor come from the *Inter-City Cost of Living Index*, published quarterly by the American Chamber of Commerce Researchers Association (ACCRA) for anywhere from 220 to 260 cities. Each quarterly city-level alcoholic beverage price is deflated by the CPI for the U.S. as a whole (1982-1984=1) and by the ACCRA city-specific cost of living index. A state-level quarterly price is computed as a population weighted average of the price from each city within a state. The 1985 NFVS was conducted in June, 1985 so the annual price is taken as a simple average of the price that existed in the first two quarters of 1985 and the last two quarters of 1984. The follow-ups were both conducted during the third quarter of the survey year so the annual prices for 1986 and 1987 are taken as simple averages of the price that existed in the first three quarters of the survey year and the fourth quarter of the preceding year.

Average annual prices are converted into pure alcohol prices based on the percentage of alcohol in each beverage. The liquor price is the price of Seagram's 7 Crown Whiskey which is 40 percent alcohol. The wine price is given for bottle of Paul Masson Chablis, which is 10.5 percent alcohol, and the beer price is for a six-pack of Budweiser or Schlitz which are 4.5 percent alcohol. The average pure prices for each beverage are then weighted by consumption to form the composite price.

Most of the variation in alcoholic beverage prices across states arise from variations in taxes. The beer tax and the composite price are positively correlated ($r=0.49$), and regressions on the 1985 cross section which utilize the beer tax give similar results to those presented here.

Models were also tested which include only the prices of beer, wine, or liquor separately, and again, results are very similar to those presented here.

There is substantial variation in the composite price of alcohol across states. Table 1 shows the means and standard deviations of the alcohol price and the other alcohol control variables. For example, the average composite alcohol price in 1985 across the forty-nine states in the sample plus the District of Columbia is \$0.76 with a standard deviation of \$0.07.⁹ In 1985, California has the lowest price of \$0.60, and Alabama has the highest price of \$0.91. In general, prices are highest in the southern states and lowest in the midwest. Even though there is a downward trend in the real price from 1985 to 1987, there tends to be less variation in the price of alcohol over time. Twenty of the fifty states in the sample had price changes of over \$0.03 between 1985 and 1987, with an average decrease of about \$0.08 for those twenty states.

Retail availability of alcohol factors into the full price of alcohol faced by individuals. To capture the availability effects, two measures are employed in some models. First, the percentage of each state's population living in counties dry for beer in each of the survey years is included. These data come from the *Brewers' Almanac* (1996). With larger percentages of populations living in dry counties, travel time to obtain alcohol increases, adding to the full price of alcohol. In addition, this measure serves to capture some of the unobserved state sentiment towards drinking which may be reflected in the drinking habits of the state's residents. Secondly, the number of retail outlets per 1,000 population that are licensed to sell alcoholic beverages for on-premise or off-premise consumption is included. These data come from *Jobson's Liquor Handbook*, (various years).

ii. Individual Characteristics

Literature on domestic violence provides insight into the personal characteristics that lead to a predisposition towards violence. (See Gelles and Cornell, 1990, for profiles of domestic abusers and their victims.) People who were abused by their parents or saw their parents fight a lot, for example, are more likely to be violent. In order to proxy for these two factors, dichotomous indicators are included to represent whether or not the respondent's parents used physical punishment on the respondent and if the respondent's parents hit or threw things at each other during the respondent's teenage years.

Socio-economic and demographic characteristics may also play a role in determining an individual's propensity towards violence. Three indicators of the respondent's race are included; black, not Hispanic; Hispanic; and other race. The omitted category is white, not Hispanic. Also included in the models are household income, an indicator for whether the wife was pregnant or had a child in the last 12 months, the number of children under age 17 in the home in 1985, the respondent's age, gender and a measure of the respondent's level of stress. The question measuring stress asks how often the respondent felt nervous or stressed in the past year, with answers ranging from never to very often. Educational attainment and employment status are included for both the husband and the wife. Dummies indicating the religion of the wife are included. The husband's religion is excluded because it is highly correlated with the wife's religion. Finally, age squared, income squared, and education squared were added to allow for nonlinear effects of these variables.

In some models, the respondent's gender is included to act as an indicator of whether the respondent was the victim or the perpetrator. For example, when wife abuse is the dependent variable and gender is equal to one, the respondent is female thus indicating that the victim is

answering the question. When gender is equal to zero, the respondent is male indicating that the perpetrator is answering the question.

Any observations with missing values are dropped from the regressions. If an individual in the panel has missing values for one year, but not other years, only the observations from the incomplete years are excluded. Deleting the incomplete observations results in the loss of about 15 percent of the cross section and about 8 percent of the panel. Observations with missing values on income in the panel are not necessarily excluded if some information on income is available. That is, individuals in the panel with missing observations on income were assigned a value if income was reported in at least one of the years in the panel (132 observations). The procedure for filling in these missing values differs slightly for two cases: The first case is if a respondent is represented in all three years, and income is available for two of the three years. The missing income is assigned based on the rate of growth between the years with values. The second case is if a respondent is in only two years of the panel and has one missing year for income, or if the respondent is in all three years, but has two missing values for income. An average rate of growth for income over the known observations in the whole sample was applied to the individual's missing values. Any individuals with all years of missing income were deleted from the sample.

V. ESTIMATION

Tables 2-5 show estimates of the reduced form violence equation. In each table, all models show the effects of the price of alcohol and the household and individual characteristics on the probability of abuse. An alternative model is shown in each table which adds to the first model two other regulatory variables, the number of outlets licensed to sell alcohol and the

percentage of the state's population living in counties that are dry for beer. All equations are estimated by linear probability models.¹⁰ Even though there is oversampling of violent respondents in the panel, weights are not used because the distribution of violent people in the panel is very similar to the distribution of violent people in the cross section. Nevertheless, weighted regressions were tested, but the results were very similar to the unweighted regressions.

There are a few potential problems with the two models presented. Specifically, the first specification is prone to omitted variable bias if the availability measures are predictors of violence. However, including all the relevant control variables may lead to the problems of multicollinearity. This problem may arise because states which have high anti-drinking sentiment may impose both higher taxes on alcohol and more restrictions on availability.

Another potential problem is that many of the individual characteristics may be correlated with the error term in the violence equations. That is, there may be some unmeasured factor that affects the outcomes of both the propensity to commit violence and the individual characteristics. The characteristics most likely to be endogenous are the measure of stress, pregnancy, the number of children at home, education, income, occupation, employment status, and religion. The coefficients on these potentially endogenous variables are likely to be biased if not instrumented for. However, including these variables will not bias the coefficients on the state-level regulatory variables (the variables of interest in this paper) so long as the individual and state-level variables are not correlated. Models were tested that exclude the above mentioned variables from the cross sections. The results are not shown, and the coefficients on the price and availability measures are unaffected by the exclusion of the potentially problematic individual characteristics.

Tables 2 and 3 show the effects of the composite price of alcohol on the probability of wife abuse and husband abuse, respectively, in the full 1985 cross section. The first two columns include both male and female respondents while the second two columns include only the victim as the respondent. Tables 4 and 5 show the results of the panel of respondents. The first two columns of each table show the results of the price of alcohol on the probability of abuse using the full set of independent variables. The third and fourth columns use a limited set of independent variables—only those that vary across time. These variables are the same set of variables used in fixed effects models in columns five and six. A larger sample is used in the limited specification of columns 3 and 4 than in the full specification (columns 1 and 2) because of missing values on some of the time-invariant variables. Regressions were run on the limited specification using the smaller sample from columns 1 and 2, but the results were no different.

Columns 5 and 6 of Tables 3 and 4 utilize the panel nature of the data to include individual-level fixed effects. Fixed effects serve as a control for any unobserved individual characteristics that may be correlated with some of right hand side variables. Unobserved personality traits can be correlated with the state-specific price or regulatory variables if the price reflects state sentiment towards alcohol and the individual shares the same sentiment towards alcohol as the rest of the state. Including state-level fixed effects would serve the same purpose in that the inclusion of state dummies would account for unmeasured state sentiment towards drinking and violence that may be shared by the individual.¹¹ Individual-level fixed effects have the added advantage of controlling for personality traits that may be correlated with all of the included variables. For example, individual fixed effects may help separating out the effects of income, labor force and other time-varying variables from effects due to personality. The fixed effects models are estimated by transforming variables into deviations from person-specific

means. All time-invariant variables are dropped from the regressions. This technique is equivalent to adding dummy variables for every individual.

One problem with the data is that the price of alcohol is measured with error for several reasons. First, the price data pertain to the state the respondent lives in rather than a city or county price. Random measurement error in an independent variable biases its coefficient and t-ratio towards zero. Thus, the price coefficients and associated t-ratios are conservative lower-bound estimates. Secondly, there may be some measurement error built in to the alcohol regulatory variables in the 1986 and 1987 waves of the survey because the survey data does not contain information on whether or not the respondent moved during follow-ups. The problem can be especially serious in the fixed effects models because the downward bias in regression coefficients and t-ratios due to measurement error in regressors are exacerbated (see Griliches and Hausman, 1986). In matching the prices to the individuals, it is simply assumed that the individual has not moved. This may not be a bad assumption because the survey methodology was to attempt to contact respondents through the phone number as given in the 1985 survey. Unless a new phone number was provided, it is likely that an individual who moved was excluded from the survey. In addition, a move within the same state would not change the alcohol regulatory variables assigned to the individual.

VI. RESULTS

Table 2 shows the effectiveness of an increase in the price of alcohol in reducing the probability of wife abuse in the 1985 cross-section. The coefficient on the price is negative and significant in all models.¹² This result holds for the regressions that include all respondents regardless of gender as well as the regressions that include only female respondents. The

magnitude of the coefficient on the price is similar in all models in Table 2, and indicate that a one percent increase in the price of alcohol will reduce the probability of wife abuse by a range of 3.1 to 3.5 percent. Elasticities are calculated by multiplying the coefficients by the ratio of the average price to the proportion of spouses reported to have been victimized in the relevant sample.

The availability measures are not statistically significant predictors of the probability of violence. In addition, the coefficients on the percent dry (in column 4), and the number of outlets licensed to sell alcohol (in columns 2 and 4), do not display the anticipated signs.

Some of the individual and family characteristics are significant predictors of violence. The interpretation of some of the coefficients in the full sample (columns 1 and 2) is not straightforward in that the age, race, the measure of stress, and the indicators of a history of violence all refer to the respondent who can be either the husband or the wife. For age and race it is likely that the spouses are close in age and share the same race so the interpretation of these variables is not problematic. With this caveat in mind, the results indicate that older people are less likely to be abused or to abuse, while those who are more stressed, experienced a family history of violence, or are black are more likely be victims or be violent toward the wife. With the exception of being black, similar results hold in the sample of female respondents (columns 3 and 4). Here, the interpretation of the coefficients on the variables is straightforward in that older women are less likely to be abused, whereas women with more stress in their lives or those who have a history of parental violence are more likely to be abused.

As shown in Table 3, violence by women directed at their husbands is not sensitive to changes in the price of alcohol. The coefficients are always negative, but are not significant at conventional levels. The only alcohol regulatory variable which may have an effect on violence

is the number of outlets. The coefficients on this variable in columns 2 and 4 are negative and significant, yet the negative sign is contrary to what is expected a priori. A negative sign indicates that more licensed outlets would reduce violence. In the full sample, stress, the respondent's parents fight, being black or Hispanic, and part-time employment by the wife (versus full time employment) all increase the probability of violence at at least the 10 percent level. Having more children living at home, and being older reduce the probability of violence towards the husband. In the sample of male respondents only, being black or part-time employment by the wife increases violence, and having more children or the wife being Protestant reduces violence.

Table 4 utilizes the panel to examine the effects of the price of alcohol on the probability of violence towards females. Column 1 includes the price of alcohol and the individual characteristics, column 2 adds the availability measures, and columns 3 and 4 limit the set of independent variable to those which vary over time. Since the results from the 1985 cross section indicate that there is little difference in the results of the alcohol control variables whether or not the sample is limited to female respondents, only models which include the full sample are shown. The coefficients in the first four columns of Table 4 all show that the price of alcohol is negatively related to the probability of wife abuse. However, this result is only statistically significant when the availability measures are excluded. These models may suffer from multicollinearity in that the other state-level variables may be correlated with the price. The price elasticities are -1.67 , -1.40 , -1.95 and -1.44 for columns 1 through 4, respectively.

The results of the other alcohol control variables and the individual characteristics in columns 1 and 2 of Table 4 are very similar to those in the 1985 cross-section. The coefficients on percent dry and number of outlets are statistically insignificant, but this time, display the

anticipated signs. As for the individual characteristics, age, stress, history of violence, black, Hispanic, and number of children at home all effect the probability of wife abuse.

Columns 5 and 6 of Table 4 display the results of the fixed effects estimation. Again, the coefficients on the price are negative and statistically significant. This result indicates that even after controlling for the unmeasured individual traits, increases in the price of alcohol serve to reduce the probability of violence towards wives. Although not unexpected, a second finding of the fixed effect estimation is that almost none of the individual characteristics are significant predictors of violence. The one exception is that husbands who are not in the labor force are more likely to abuse their wives. The majority of husbands who are not working in this sample are retirees, but this classification can also include students, home makers, and disabled individuals.

The result for violence towards males in the panel as shown in the first four columns of Table 5 is similar to that of the 1985 cross-section. The results show that the price of alcohol has no statistically significant relationship with the probability of husband abuse. In fact, the coefficients on the price are only negative in one of the four specifications (see column 3). However, unlike the 1985 results, increases in the percentage of a state's population living in dry counties may decrease violence towards men. This result is significant at the 10 percent level in column 1 and at the 5 percent level in the limited specification in column 4.

As for the individual characteristics that determine whether a husband is abused or not, family history of violence increases the probability of abuse, as does stress, black, Hispanic, and the wife identifying herself with no religion. Age and higher levels of income reduce abuse. The result for income holds at the 10 percent level in columns 1 and 2, and at the 5 percent level in

columns 3 and 4. Income and income squared are also jointly significant. This last result is interesting because in this data, income is not a predictor of wife abuse.

Finally, columns 5 and 6 of Table 5 show the results of the fixed effect estimation of the reduced form violence equation. Surprisingly, the price of alcohol is both a negative and statistically significant predictor of violence at the 10 percent level. The availability measures in column 6 display the anticipated sign, but are not statistically significant. None of the individual characteristics are predictors of violence in the fixed effects models, with the exception of age and income and income squared, which are jointly significant.

VII. DISCUSSION

A consistent result that emerges from this paper is that increases in the pure price of alcohol, as measured by a weighted average of the price of alcohol from beer, wine, and liquor, will serve to reduce severe violence aimed at wives. Severe violence includes the acts of kicking, biting or hitting with a fist; hitting or trying to hit with something; beating up the other; choking him or her; or threatening to use or using a gun or knife. One caution to note is that while increasing the price of alcohol (through tax increases) would lower violence aimed at women, any policy decisions must weight the cost of raising the price versus the benefits of the reduction in violence. Raising the price would serve to penalize people who consume alcohol but who are not violent.

By contrast to violence against women, the evidence on the propensity of increases in the price of alcohol to lower violence towards husbands is mixed. When individual level characteristics are not controlled for, the coefficients on price of alcohol are not statistically different from zero, and hence, cannot be considered as predictors of violence towards men. However, once the individual traits are controlled for, a negative and statistically significant relationship emerges. It would be premature to draw firm conclusions on the propensity of

increases in the price alcohol to reduce violence aimed at men solely from the fixed effects models. However, one possible explanation for this result is that the unobserved individual traits are correlated with the females' (the perpetrators) attitudes towards drinking, which in turn are reflected by the state-level price of alcohol. Once this correlation is accounted for in the fixed effects models, the negative relationship between the price of alcohol and violence appears. It is clear that further research is needed on this issue.

Secondary findings from this paper show no relationship between the availability of alcohol and the probability of violence towards women. There may be some reduction in violence aimed at men from increases in the percentage of dry counties in a state, however, this finding does not hold across all specifications. The individual character traits which generally serve to increase violence at either spouse are stress, family history of violence, and being black, while violence decreases with age.

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FOOTNOTES

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¹ Estimates from 1985 National Family Violence Survey.

² The beer tax is used in these studies because prices of beer are not available in 1976.

³ In the violence equation, what are described as taste parameters are technically efficiency parameters. However, in the reduced form the two are indistinguishable from each other.

⁴ In the case of domestic violence it is reasonable to assume that alcohol consumption will lower the costs of violence since victims or witnesses often excuse aberrant behavior as the fault of alcohol consumption and thus choose not to report their loved ones to authorities. By contrast, in other types of situations alcohol consumption may raise the costs of violence. For example, a violent criminal who is drunk may be less careful than the calculating violent criminal who tries to protect himself or herself from being caught.

⁵ Monetary costs of violence can be legal fees, fines or lost wages from prison sentences. These costs would only be incurred if the perpetrator is caught. Non-monetary costs can include the dissolution of the relationship or loss of respect by the victim, family members or friends.

⁶ Couples who were together during the 1985 survey are not required to stay together to be included in the follow-ups. However, the 80 respondents whose initial relationship ended are excluded from the analysis presented here for two reasons. First, the violence questions refers to violence in the last 12 months the couple was together. Thus, a respondent without a new partner may give the same answer in two different survey years. Secondly, no information is given for when any new relationships may have began making it difficult to merge the appropriate price in with the individual data.

⁷ This total includes observations for which there are missing values. See Section IV.C.ii for treatment of missing values.

⁸ Comparisons of the rates of violence by men and women may be inappropriate because the rates do not contain any information about the number of times violence occurred in the past year or the potential for harm.

⁹ Hawaii is not included because alcoholic beverage prices for Hawaii are not available.

¹⁰ Logit models were tested, but results are very similar. Linear probability models corrected for heteroskedasticity were also tested, but the standard errors remain unchanged.

¹¹ Models were tested that include state-level fixed effects. For both males and females, the magnitude of the coefficients on the price of alcohol are very similar to those resulting from individual-level fixed effects with a significance level of 10 percent.

¹² Unless otherwise mentioned, statistical significance refers to a two-tailed test at the 5 percent level.

Table 1
Means and Standard Deviations

		Mean	Standard Deviation
1985 Cross Section N=3,705	Wife abuse	0.030	0.17
	Husband abuse	0.045	0.21
	Price of alcohol	0.770	0.07
	Percent dry	4.815	8.98
	Number of Outlets	1.142	0.57
Panel—all years N=3,590	Wife abuse	0.044	0.21
	Husband abuse	0.047	0.21
	Price of alcohol	0.759	0.07
	Percent dry	5.130	9.37
	Number of Outlets	1.130	0.54
Panel—1985 N=1,503	Wife abuse	0.034	0.18
	Husband abuse	0.051	0.22
	Price of alcohol	0.768	0.07
	Percent dry	5.135	8.87
	Number of Outlets	1.160	0.55
Panel—1986 N=1,089	Wife abuse	0.045	0.21
	Husband abuse	0.041	0.20
	Price of alcohol	0.758	0.07
	Percent dry	4.966	9.66
	Number of Outlets	1.120	0.54
Panel—1987 N=998	Wife abuse	0.059	0.24
	Husband abuse	0.045	0.21
	Price of alcohol	0.746	0.08
	Percent dry	5.302	9.78
	Number of Outlets	1.098	0.52

Table 2
Wife Abuse, 1985 Cross Section

	Full sample (1)	Full sample (2)	Females only (3)	Females only (4)
Price	-0.127 (-3.24)	-0.136 (-3.23)	-0.172 (-2.79)	-0.181 (-2.71)
Percent dry		-0.00002 (-0.05)		0.0002 (0.31)
Number of outlets		-0.005 (-0.92)		-0.001 (-0.10)
Gender	0.026 (4.56)	0.026 (4.53)		
Age	-0.006 (-4.35)	-0.006 (-4.35)	-0.009 (-4.43)	-0.009 (-4.41)
Age squared	0.00005 (3.19)	0.00005 (3.19)	0.0001 (3.31)	0.0001 (3.30)
Pregnant	0.002 (0.13)	0.002 (0.15)	-0.0001 (-0.01)	-0.0001 (-0.00)
Income	-0.001 (-1.41)	-0.001 (-1.42)	-0.001 (-0.94)	-0.001 (-0.94)
Income squared	0.014 (1.04)	0.014 (1.05)	0.015 (0.71)	0.015 (0.72)
Part time work, husband	-0.002 (-0.15)	-0.002 (-0.14)	0.021 (0.80)	0.021 (0.81)
Part time work, wife	0.001 (0.08)	0.001 (0.14)	0.004 (0.28)	0.004 (0.31)
Unemployed, husband	-0.017 (-1.03)	-0.017 (-1.01)	-0.009 (-0.33)	-0.009 (-0.33)
Unemployed, wife	0.001 (0.05)	0.001 (0.06)	-0.006 (-0.30)	-0.005 (-0.29)
Not employed, husband	0.002 (0.19)	0.002 (0.18)	0.002 (0.10)	0.002 (0.11)
Not employed, wife	0.002 (0.29)	0.002 (0.32)	0.001 (0.08)	0.001 (0.09)
Stressed	0.013 (4.94)	0.013 (4.95)	0.020 (4.84)	0.020 (4.84)
Parents hit	0.014 (2.46)	0.014 (2.44)	0.019 (2.09)	0.019 (2.09)
Parents fight	0.030 (3.53)	0.030 (3.54)	0.041 (2.94)	0.041 (2.94)
Black	0.028 (2.20)	0.028 (2.17)	0.025 (1.17)	0.024 (1.15)
Hispanic	0.013 (0.81)	0.011 (0.73)	-0.014 (-0.56)	-0.014 (-0.56)
Other race	-0.004 (-0.33)	-0.004 (-0.36)	-0.005 (-0.24)	-0.005 (-0.25)
Education, husband	-0.001 (-0.23)	-0.001 (-0.20)	-0.007 (-0.71)	-0.007 (-0.69)
Education squared, husband	-0.00002 (-0.07)	-0.00003 (-0.11)	0.0001 (0.29)	0.0001 (0.28)

Table 2 (continued)

Education, wife	0.006 (0.86)	0.005 (0.84)	0.006 (0.54)	0.007 (0.56)
Education squared, wife	-0.0002 (-0.74)	-0.0002 (-0.71)	-0.0001 (-0.32)	-0.0002 (-0.34)
Children at home	-0.003 (-1.14)	-0.003 (-1.15)	-0.005 (-1.29)	-0.005 (-1.29)
Protestant, wife	-0.002 (-0.09)	-0.001 (-0.07)	-0.002 (-0.07)	-0.003 (-0.08)
Catholic, wife	-0.003 (-0.16)	-0.001 (-0.07)	-0.004 (-0.13)	-0.004 (-0.12)
No religion, wife	-0.002 (-0.10)	-0.002 (-0.08)	0.002 (0.05)	0.002 (0.05)
Jewish, wife	0.011 (0.40)	0.013 (0.47)	0.020 (0.46)	0.021 (0.46)
N	3,705	3,705	2,081	2,081
R-squared	0.05	0.05	0.06	0.06
F-statistic	6.65	6.23	4.90	4.56

Table 3
Husband Abuse, 1985 Cross Section

	Full sample (1)	Full sample (2)	Males only (3)	Males only (4)
Price	-0.055 (-1.15)	-0.079 (-1.53)	-0.028 (-0.37)	-0.075 (-0.91)
Percent dry		-0.0001 (-0.34)		-0.0002 (-0.33)
Number of outlets		-0.015 (-2.27)		-0.029 (-2.81)
Gender	-0.009 (-1.32)	-0.010 (-1.37)		
Age	-0.008 (-4.82)	-0.008 (-4.83)	-0.002 (-0.96)	-0.003 (-1.02)
Age squared	0.0001 (3.35)	0.0001 (3.36)	0.00001 (0.23)	0.00001 (0.27)
Pregnant	0.016 (0.85)	0.017 (0.92)	0.011 (0.39)	0.011 (0.41)
Income	0.0001 (0.11)	0.0001 (0.07)	-0.001 (-0.75)	-0.001 (-0.81)
Income squared	-0.005 (-0.33)	-0.005 (-0.29)	0.020 (0.78)	0.022 (0.85)
Part time work, husband	-0.003 (-0.18)	-0.003 (-0.14)	0.010 (0.36)	0.013 (0.50)
Part time work, wife	0.018 (1.71)	0.020 (1.83)	0.030 (1.69)	0.034 (1.93)
Unemployed, husband	-0.003 (-0.14)	-0.002 (-0.09)	0.010 (0.35)	0.013 (0.44)
Unemployed, wife	0.001 (0.10)	0.002 (0.12)	-0.007 (-0.31)	-0.008 (-0.37)
Not employed, husband	0.004 (0.34)	0.004 (0.31)	0.015 (0.74)	0.015 (0.73)
Not employed, wife	0.004 (0.53)	0.005 (0.62)	0.006 (0.49)	0.008 (0.64)
Stressed	0.010 (3.03)	0.010 (3.04)	0.005 (1.03)	0.006 (1.09)
Parents hit	0.007 (0.94)	0.006 (0.90)	0.012 (1.09)	0.011 (1.01)
Parents fight	0.040 (3.81)	0.040 (3.85)	0.023 (1.44)	0.023 (1.43)
Black	0.064 (4.07)	0.063 (4.03)	0.046 (1.94)	0.046 (1.92)
Hispanic	0.034 (1.80)	0.031 (1.60)	0.050 (1.59)	0.042 (1.32)
Other race	0.021 (1.40)	0.020 (1.33)	0.028 (1.33)	0.029 (1.36)
Education, husband	0.003 (0.45)	0.004 (0.52)	0.007 (0.62)	0.008 (0.68)
Education squared, husband	-0.0002 (-0.62)	-0.0002 (-0.71)	-0.0003 (-0.66)	-0.0004 (-0.77)

Table 3 (continued)

Education, wife	0.0004 (0.06)	0.0001 (0.02)	0.010 (0.90)	0.010 (0.87)
Education squared, wife	-0.00001 (-0.03)	0.00001 (0.03)	-0.0005 (-1.04)	-0.0004 (-0.96)
Children at home	-0.009 (-2.71)	-0.009 (-2.75)	-0.010 (-2.07)	-0.010 (-2.08)
Protestant, wife	-0.029 (-1.23)	-0.027 (-1.15)	-0.062 (-1.75)	-0.060 (-1.70)
Catholic, wife	-0.010 (-0.40)	-0.004 (-0.16)	-0.036 (-0.98)	-0.026 (-0.72)
No religion, wife	-0.017 (-0.62)	-0.015 (-0.57)	-0.064 (-1.58)	-0.063 (-1.57)
Jewish, wife	-0.018 (-0.55)	-0.013 (-0.39)	-0.081 (-1.58)	-0.074 (-1.46)
N	3,706	3,706	1,624	1,624
R-squared	0.05	0.05	0.03	0.04
F-statistic	6.51	6.25	2.06	2.20

Table 4
Wife Abuse, Panel

	Full Model (1)	Full Model (2)	Limited Model (3)	Limited Model (4)	Fixed Effects (5)	Fixed Effects (6)
Price	-0.094 (-1.92)	-0.079 (-1.52)	-0.110 (-2.36)	-0.081 (-1.64)	-0.251 (-2.40)	-0.244 (-2.31)
Percent dry		-0.0003 (-0.66)		-0.0003 (-0.76)		0.003 (0.56)
Number of outlets		0.004 (0.53)		0.010 (1.47)		-0.021 (-0.46)
Gender	0.005 (0.67)	0.005 (0.70)	-0.001 (-0.10)	0.0002 (-0.03)		
Age	-0.007 (-3.59)	-0.007 (-3.61)	-0.006 (-3.57)	-0.006 (-3.61)	-0.013 (-0.51)	-0.014 (-0.55)
Age squared	0.0001 (2.63)	0.0001 (2.66)	0.00004 (2.31)	0.00004 (2.36)	0.0001 (0.38)	0.0001 (0.40)
Pregnant	0.006 (0.40)	0.006 (0.39)	0.002 (0.15)	0.002 (0.11)	0.016 (0.80)	0.017 (0.82)
Income	-0.001 (-0.78)	-0.001 (-0.77)	-0.002 (-1.65)	-0.002 (-1.67)	-0.003 (-1.14)	-0.003 (-1.14)
Income squared	0.012 (0.60)	0.012 (0.59)	0.024 (1.31)	0.024 (1.31)	0.054 (1.48)	0.054 (1.49)
Part time work, husband	-0.014 (-0.65)	-0.013 (-0.62)	-0.015 (-0.73)	-0.015 (-0.72)	0.012 (0.39)	0.012 (0.39)
Part time work, wife	0.007 (0.71)	0.007 (0.68)	0.007 (0.67)	0.006 (0.60)	-0.007 (-0.42)	-0.008 (-0.43)
Unemployed, husband	-0.009 (-0.40)	-0.009 (-0.38)	-0.012 (-0.55)	-0.012 (-0.54)	0.011 (0.37)	0.011 (0.37)
Unemployed, wife	0.008 (0.45)	0.007 (0.42)	0.039 (2.27)	0.037 (2.18)	0.002 (0.09)	0.002 (0.09)
Not employed, husband	0.014 (1.10)	0.014 (1.09)	0.022 (1.78)	0.022 (1.76)	0.048 (2.01)	0.048 (2.02)
Not employed, wife	0.009 (1.00)	0.008 (0.97)	0.010 (1.23)	0.009 (1.15)	-0.010 (-0.61)	-0.010 (-0.61)
Stressed	0.012 (3.65)	0.012 (3.65)	0.014 (4.45)	0.014 (4.47)	0.004 (0.71)	0.004 (0.72)
1986	0.009 (1.13)	0.010 (1.16)				
1987	0.024 (2.79)	0.025 (2.86)	0.019 (2.47)	0.020 (2.60)	0.029 (3.41)	0.028 (3.17)
Parents hit	0.022 (3.00)	0.022 (2.99)				
Parents fight	0.018 (1.67)	0.017 (1.63)				
Black	0.052 (3.15)	0.053 (3.17)				
Hispanic	0.037 (1.79)	0.038 (1.81)				

Table 4 (continued)

Other race	-0.003 (-0.19)	-0.003 (-0.20)				
Education, husband	-0.013 (-1.55)	-0.014 (-1.59)				
Education squared, husband	0.0004 (1.30)	0.0004 (1.34)				
Education, wife	0.006 (0.71)	0.006 (0.69)				
Education squared, wife	-0.0002 (-0.66)	-0.0002 (-0.64)				
Children at home	0.008 (2.35)	0.008 (2.37)				
Protestant, wife	-0.027 (-1.01)	-0.027 (-1.00)				
Catholic, wife	-0.021 (-0.77)	-0.023 (-0.82)				
No religion, wife	-0.011 (-0.36)	-0.012 (-0.38)				
Jewish, wife	-0.017 (-0.45)	-0.018 (-0.48)				
N	3,340	3,340	3,590	3,590	3,590	3,590
R-squared	0.04	0.04	0.03	0.03	0.02	0.02
F-statistic	4.76	4.49	7.47	6.78	2.81	2.48

Table 5
Husband Abuse, Panel

	Full Model (1)	Full Model (2)	Limited Model (3)	Limited Model (4)	Fixed Effects (5)	Fixed Effects (6)
Price	0.003 (0.06)	0.004 (0.07)	-0.015 (-0.31)	0.002 (0.05)	-0.174 (-1.63)	-0.187 (-1.75)
Percent dry		-0.001 (-1.73)		-0.001 (-2.15)		-0.007 (-1.27)
Number of outlets		-0.015 (-2.02)		-0.008 (-1.21)		0.037 (0.80)
Gender	0.008 (1.05)	0.007 (0.92)	0.005 (0.65)	0.004 (0.55)		
Age	-0.004 (-1.91)	-0.004 (-1.96)	-0.003 (-1.57)	-0.003 (-1.58)	-0.078 (-3.11)	-0.076 (-3.00)
Age squared	0.00002 (1.12)	0.00002 (1.17)	0.00001 (0.58)	0.00001 (0.59)	0.001 (2.19)	0.001 (2.14)
Pregnant	0.022 (1.38)	0.022 (1.40)	0.021 (1.39)	0.021 (1.37)	0.020 (0.95)	0.019 (0.91)
Income	-0.002 (-1.68)	-0.002 (-1.74)	-0.003 (-2.55)	-0.003 (-2.62)	-0.004 (-1.58)	-0.004 (-1.57)
Income squared	0.028 (1.39)	0.029 (1.44)	0.041 (2.17)	0.042 (2.21)	0.030 (0.80)	0.029 (0.78)
Part time work, husband	-0.003 (-0.14)	-0.002 (-0.08)	0.007 (0.34)	0.009 (0.41)	-0.003 (-0.10)	-0.003 (-0.09)
Part time work, wife	-0.003 (-0.30)	-0.003 (-0.28)	-0.009 (-0.84)	-0.009 (-0.88)	-0.003 (-0.19)	-0.003 (-0.15)
Unemployed, husband	-0.018 (-0.78)	-0.017 (-0.72)	0.001 (0.05)	0.002 (0.11)	-0.027 (-0.91)	-0.027 (-0.92)
Unemployed, wife	0.011 (0.60)	0.013 (0.68)	0.022 (1.24)	0.022 (1.27)	0.029 (1.20)	0.028 (1.19)
Not employed, husband	-0.004 (-0.31)	-0.005 (-0.37)	0.005 (0.37)	0.004 (0.32)	0.001 (0.03)	0.0002 (0.01)
Not employed, wife	0.009 (1.02)	0.009 (1.03)	0.006 (0.71)	0.006 (0.69)	0.012 (0.71)	0.012 (0.70)
Stressed	0.011 (3.38)	0.011 (3.28)	0.011 (3.21)	0.010 (3.15)	0.003 (0.65)	0.003 (0.63)
1986	-0.015 (-1.73)	-0.016 (-1.81)				
1987	-0.009 (-1.00)	-0.009 (-1.07)	-0.001 (-0.15)	-0.001 (-0.12)	0.001 (0.15)	0.003 (0.34)
Parents hit	0.015 (1.98)	0.015 (1.99)				
Parents fight	0.017 (1.58)	0.018 (1.63)				
Black	0.058 (3.40)	0.058 (3.39)				

Table 4 (continued)

Hispanic	0.053 (2.48)	0.048 (2.26)				
Other race	-0.011 (-0.78)	-0.010 (-0.68)				
Education, husband	-0.0001 (-0.01)	0.0002 (0.02)				
Education squared, husband	-0.00001 (-0.04)	-0.00003 (-0.11)				
Education, wife	-0.003 (-0.30)	-0.004 (-0.38)				
Education squared, wife	0.0001 (0.41)	0.0002 (0.50)				
Children at home	0.001 (0.42)	0.001 (0.44)				
Protestant, wife	0.027 (0.96)	0.029 (1.03)				
Catholic, wife	0.031 (1.11)	0.036 (1.27)				
No religion, wife	0.062 (1.97)	0.061 (1.97)				
Jewish, wife	0.033 (0.86)	0.036 (0.96)				
N	3,341	3,341	3,591	3,591	3,591	3,591
R-squared	0.03	0.03	0.02	0.02	0.02	0.02
F-statistic	3.57	3.53	4.95	4.68	2.30	2.12