RELIGION AND ANIMAL WELFARE: EVIDENCE FROM VOTING DATA+

Julio Videras*
Department of Economics
Hamilton College

Abstract: In November 2002, Florida residents voted on a ballot proposal limiting farming practices that are deemed cruel to pigs. Using county level data, models of support for the proposal are estimated, paying particular attention to the influence of religion. Although the rate of adherents to Catholicism and evangelical denominations are statistically and economically relevant to explain support for the ban, political preferences and socio-economic factors are more important in terms of substantive significance than religious affiliation.

JEL classification: D72, Q18
Keywords: Voting, Animal Welfare, Religion.

+ Comments by two anonymous referees and the editor helped to improve the paper significantly; the author is responsible for all remaining errors.
*Tel: +315-859-4528; fax: +315-859-4477.
E-mail address: jvideras@hamilton.edu (J. Videras)

1. **Introduction**

Social scientists have become increasingly interested in the role of religiosity in economic and political decision-making. Recent work by Landes (1999), Inglehart and Baker (2000), and Gusio, Sapienza, and Zingales (2003), for example, examine the empirical relationships between the intensity of religious beliefs and economic performance. Barro and McCleary (2003) and McCleary and Barro (2003) use a panel of countries to explore the influence of various measures of religious intensity on economic growth and find that more intense religious beliefs have a positive effect on growth but that the effect of church attendance is negative.

Although religious beliefs inform our attitude towards the natural world and our relationship with animals, few analyses have provided evidence of the influence of religion in decision-making regarding environmental and animal welfare policies. In the area of environmental valuation, research has concentrated on the impact of morality on willingness to trade off environmental goods. In the context of contingent valuation, Spash (2000) finds that "ethical variables [are] competitive with the standard socio-economic ones in terms of explaining variability in [willingness to pay for an environmental good]." In the political economy literature, Lowry (1998) finds that religious preferences influence the demand for membership in environmental organizations and argues that more research on the effects of religion on environmental policy choices is needed. Regarding the influence of attitudes towards animal rights, Bennett and Blaney (2002) conduct a contingent valuation survey and find that a higher degree of social consensus about the moral standing of farm animals increased willingness to pay to support farm-animal welfare legislation.

So far, there does not seem to have been analyses of the importance of religiosity using voting data. This paper uses voting data at the county level to explore the influence of religion, political preferences, and socioeconomic factors in decision-making. In particular, this paper examines voting on animal welfare in Florida. In 2001, Floridians for Human Farms and other local and national groups began collecting signatures to place a constitutional amendment before voters in the 2002 general elections. The amendment

intended to prohibit gestation crates (also known as sow crates) for pregnant pigs[1]. Breeding sows spend two to four years in these 2-foot by 7-foot crates. Because the crates do not allow the pigs to walk or turn around and interact with other animals (Fraser, Mench, and Millman, 2001), advocates claim that confinement in these small crates traumatizes the pigs. In November 2002, Florida voters banned sow crates by a margin of 55 to 45 percent.

The results indicate that although standard socio-economic factors and political preferences appear to explain a larger proportion of variation in support for the ban than religious affiliation does, religiosity should not be ignored when examining decision-making. Adherence to the most politically and socially conservative religious denominations has a negative impact on support for the ban that is both statistically and substantively significant.

Section 2 briefly discusses the relationship between religious affiliation and attitudes towards animal welfare. Section 3 presents the empirical model. Section 4 presents the results and section 5 concludes.

2. **Religious affiliation and animal welfare**

An area of contention regarding the influence of religion on attitudes towards the environment and animals relates to bible literalism. Singer (2001) and White (1967) have argued that the Judeo-Christian tradition is in part responsible for current environmental problems and general disregard for animal welfare because, in accordance with the biblical story of creation, it presumes that God granted mankind dominion over the natural world. Attfield (1987), however, argues that the Judeo-Christian tradition has been misrepresented and that the bible initiates a tradition of stewardship according to which human beings have a responsibility toward nature that is suited to address modern environmental concerns. Thus, according to Singer and White, affiliation to Christian denominations and Judaism would reduce the degree of support for animal welfare. On the other hand, Attfield's argument implies that affiliation to Christian denominations and Judaism could have a positive influence. One could also expect that, independently of the

[1] Constitutional amendment No. 10: Animal Cruelty Amendment: Limiting Cruel and Inhumane Confinement of Pigs During Pregnancy.

sign of the effect, a greater belief in bible literalism would have a greater impact on attitudes towards animal welfare. Hence, individuals affiliated to denominations that typically stress bible inerrancy and literalism would be expected to have a stronger opinion about animal welfare than individuals affiliated to denominations that allow subjective interpretations of the bible.

Although Singer, White, and Attfield focus on the importance of the bible, religious affiliation also affects social, economic, and political worldviews. Religious conservatism is generally thought to be related to economic conservatism. For example, Pyle (1993) finds that although the relationship between religious and economic conservatism varies across denominations within the Conservative Protestant family, evangelicals\fundamentalists show less support for government economic assistance policies. It is then important to control for socio-economic and political factors that may also explain support for measures that intend to improve animal welfare.

3. The empirical model

Let V_i be the fraction of votes in favor of the ban in county *i*, that is,

$$V_i = \text{Votes in favor}_i / (\text{Votes in favor}_i + \text{Votes against}_i).$$

It is customary in analyses of voting data to define the dependent variable as the log-odds ratio: $\ln(V_i/1\text{-}V_i)$. A higher odds ratio ($V_i/1\text{-}V_i$) indicates greater support for the ban and an odds ratio equal to one indicates a split decision. Under suitable conditions, least squares regression results on the log-odds ratio can be interpreted as the parameter estimates of a representative voter (Dubin, Kiewiet, and Noussair, 1992; Kahn and Matsusaka, 1997).

Four religious variables measuring a county's rate of adherents per 1,000 residents for each of the following denominations are considered: Catholicism, mainline Protestant, evangelical Protestant, and Judaism. The coefficients are expected to be negative if adherence to the Judeo-Christian tradition reduces support for animal welfare and statistically and economically significant if religious beliefs add explanatory power after controlling for political preferences and other socio-economic factors. It is also hypothesized that the coefficient of the evangelical variable will be of greater magnitude than the coefficients of the other religious variables if bible literalism guides support for

the ban. Although not all evangelicals believe on bible literalism[2], adherence to the scriptures is stronger than among mainline Protestants, Jews, and Catholics.

Political preferences are captured by the percentage of votes for Clinton/Gore in the 1996 elections[3]. It is hypothesized that individuals who are more accepting of government intervention are more likely to favor the ban than conservative voters who tend to oppose the measure if they believe it interferes with private businesses or impinges on farmers' rights.

Median household income per county is included as explanatory variable to control for the influence of class on support for the ban. Median age by county is included to control for cohort effects. The percent of female population is included as a regressor to test the hypothesis that women care about animal welfare more than men do.

Other socio-economic factors can influence the decision to vote in favor of or against the proposal. The percentage of the county's labor force employed in the agricultural sector is included to control for the fact that the Florida Farm Bureau was an active opponent to the ban and workers in the agricultural sector may fear future consequences of limiting agricultural practices. Agricultural workers may also be more sympathetic towards the farmers affected by the ban. The coefficient of this variable is expected to be negative.

Individuals living in rural areas may fear the economic consequences of preempting intensive farming or, as in the case of agricultural workers, be more sympathetic towards the farmers affected by the ban. In both cases the coefficient of the variable measuring the percentage of residents living in rural areas would be negative. On the other hand, rural residents might have voted in favor of the ban in order to avoid present or future nuisance related to intensive hog farms such as pollution from manure and pesticides. This effect would be larger in counties where intensive farming would affect negatively property values. To control for this possibility, an interaction term

[2] Caro (2003) indicates that 54 percent of self-identified evangelicals on the General Social Survey are biblical literalists.

[3] Data on 1996 elections are used rather than votes on 2000 because of the controversy surrounding the 2000 election results in Florida.

between percentage of residents living in rural areas and median housing value is included.

Finally, the influence of animal welfare organizations is also considered. Revenue per capita of local organizations that provide animal protection and deal with animal cruelty cases is included. The coefficient is expected to be positive indicating that in counties where these groups are more capable of informing the public support for the ban is higher. This variable can be influenced by beliefs that may also affect the decision to vote in favor of or against the ban. If the variable is correlated with the error term in the equation modeling support for the ban then ordinary least squares estimates are inconsistent. Instrumental variables regression provides consistent estimates. To control for the possible endogeneity of revenues of animal protection organizations, it is necessary to define a vector of variables that contains at least one factor correlated with revenues that does not have a direct effect on support for the ban (Wooldridge, 2002). The instrument chosen is density. In more dense areas demand for the service of animal protection groups is likely to be higher than in low density areas[4]. Table 1 presents summary statistics for the 67 Florida counties.

[TABLE 1 AROUND HERE]

Note that although 55 percent of all Florida voters voted in favor of the ban, Table 1 shows the average percent votes computed at the county level. Forty-one percent of Florida residents live in rural areas; residents are on average almost 40 years old; and around 43 percent voted for Clinton/Gore in 1996. Regarding religious affiliation, more residents adhere to Evangelical denominations than to any other denomination. 1999 data on employment, percentage of residents living in rural areas, median household income, median housing value, and percent of population who is female come from the 2000 Census. Data on revenues of nonprofit organizations that provide for animal protection and welfare are derived from the National Center for Charitable Statistics. 2000 data on

[4] Although density is likely to be correlated with voter turnout, its correlation with concern for animal welfare and support for the ban is less evident. A Hausman test was performed to test the null hypothesis that ordinary least square estimates are consistent. The p-value of the test was .083, indicating that there is weak evidence to reject the null hypothesis that the difference between OLS and instrumental variable regression estimates are not systematic.

rates of adherence were made available by The American Religion Data Archive and originally published in *Religious Congregations and Memberships in the United States 2000*. Data on amendment results and percentage vote for Clinton in the presidential elections of 1996 come from the Florida Department of State, Division of Elections.

4. Results

Table 2 presents results from instrumental variables regression models (where the instrumented variable is revenues per capita of animal welfare groups). Despite few observations, the models fit the data well. The values of the F-statistics are large and statistically significant (p-value less than .0001) and the values of the adjusted R-squared indicate that the model without religious variables explains almost 78 percent of the variation in the dependent variable while the full model explains almost 86 percent of the variability. Although the results suggest that economic factors, political preferences, and religious affiliation all influence support for the ban, political preference and socio-economic factors have the largest impact.

[TABLE 2 AROUND HERE]

A county's percentage of residents living in rural areas has a negative and statistically significant impact on support for the ban. This result may be due to the fact that rural residents fear the economic consequences of regulation that limits farming practices or rural residents are more sympathetic towards affected farmers[5]. However, the estimate of the interaction term between this variable and a county's median housing value is positive and statistically significant implying that the negative marginal effect of the proportion of residents living in rural areas decreases in counties with higher housing values. This finding suggests that these residents could have voted in favor of the ban to prevent a potential reduction in property values due to nuisance related to intensive hog farms such as pollution from manure and pesticides. Although it is also possible that this finding is due to a positive effect of wealth on concern for animal welfare, the inclusion of median household income already controls for the correlation between wealth and support for the ban. The estimate is such that a 10 percent increase in a county's

[5] It is also possible that the effect is due to the different involvement with animals in rural areas compared to urban areas where animals are generally kept as pets.

proportion of residents living in rural areas reduces the odds ratio by 3.6 percentage points, almost a 4 percent reduction of the mean odds ratio. A 10 percent increase in the interaction term between residents in rural areas and median housing value increases the odds ratio by almost 2.5 percentage points, about a 2.7 percent reduction of the mean odds ratio.

Revenues per capita of animal protection organizations have a positive effect as expected but the estimate is statistically insignificant in the first specification and has a p-value of .102 in the second specification. Median household income is also statistically insignificant. The coefficients of percentage of female residents are positive in the two specifications but statistically significant only when the religious variables are included. The change is probably due to multicollinearity. Multicollinearity can also explain the change of sign and magnitude for the median age coefficients. Caro (2002) finds that class, sex and age are correlated with religious affiliation. Under an alternative estimation strategy, income, education, age, and residence in rural areas are run on religious affiliation. When the residuals of religious affiliation are included in place of the rates of adherents, the coefficients of median age and female residents are positive and statistically significant. Other coefficients are qualitative and quantitative similar and the value of the adjusted R-square is almost identical. The present model is preferred because these residuals have no obvious economic interpretation.

A county's percentage vote for Clinton/Gore in the 1996 elections has a positive and statistically significant influence. This result can be due to the fact that residents who are liberals support government intervention more than conservative voters. The estimate for this variable in the full specification is such that a 10 percent increase in vote for Clinton/Gore raises the odds ratio by 5.7 percent, a 6.2 percent increase in the mean of the odds ratio.

The religious variables account for 7.76 percent of the variation in the support for the ban of sow crates. The null hypothesis that, taken as a whole, religious affiliations are statistically insignificant can be rejected at the .01 percent level (F-statistic is equal to 8.63). The coefficient of the rate of adherents to Catholicism is positive and statistically significant at the 1.9 percent level. A 10 percent increase in the rate of adherents to Catholicism increases the odds ratio by 1.04 percent. Evangelicalism is strongly

significant (p-value less than .001). The estimate is such that a 10 percent increase in the rate of adherents to Evangelicalism reduces the odds ratio by 2.02 percent – the effect of evangelicalism is the opposite and almost doubles the effect of Catholicism. Because evangelicalism emphasizes bible literalism more than Judaism, Catholicism, and mainline protestant denominations do, the result suggests that adherence to the bible may have reduced the support for animal rights in Florida. However, religious conservatism is related to economic conservatism (Pyle, 1993). To the extent that the political preferences and socio-economic factors included in the model do not fully capture relevant attitudes, the negative association between evangelicalism and support for animal welfare might be due in part to social and economic conservative worldviews proper of evangelicals.

An exercise that can provide more insight into the substantive impact of the estimates of political preferences and religious affiliation is to examine how changes in these variables could have reversed the decision to pass the ban at the county level. A 10 percent increase in the rate of adherents to Evangelicalism and a simultaneous 10 percent decrease in the rate of adherents to Catholicism reduce the odds ratio by 3.06 percentage points (around 3.3 percent of the mean odds ratio) – a joint effect that is substantively larger than the effect of the interaction term between proportion of residents in rural areas and a county's median housing value and close to the effect of residents in rural areas. Everything else equal, the joint effect of a 10 percent increase in evangelicals and a 10 percent decrease in Catholics is large enough that it could have reversed the result of the ban in two counties[6]. A 10 percent increase in the rate of adherents to Evangelicalism, a simultaneous 10 percent decrease in the rate of adherents to Catholicism, plus a 10 percent decrease in vote for Clinton/Gore decrease the odds ratio by 8.76 percentage points (about 9.52 percent of mean odds ratio). This joint effect of political preferences and religious affiliation is large enough to reverse the result from passing the ban to defeating the proposal in nine counties[7]. Given that sow crates were banned by a state-wide 10 percent margin and that in only 26 counties 50 percent or more of the voters supported the ban, the magnitudes of the effects appear relevant and suggest that animal

[6] Brevard and Martin counties.

[7] In addition to Brevard and Martin counties: Collier, Gadsden, Lee, Manatee, Sarasota, St. Johns, and Volusia counties.

welfare initiatives are likely to fail in those communities that are predominantly rural (and across rural communities where housing values are low), politically conservative, and where fewer residents adhere to Catholicism and more residents adhere to evangelical denominations.

5. Summary and conclusions

Social scientists have become increasingly interested in examining the influence of religiosity in political and economic phenomena (Landes [1999], Inglehart and Baker [2000], Barro and McCleary [2003], Gusio, Sapienza, and Zingales [2003], McCleary and Barro [2003]). This paper has used county-level voting data to explore the impact of religious affiliation in direct decision-making, in particular, in a ballot proposal limiting farming practices in Florida. The results suggest that the proportion of votes in favor of the ban was lower in rural counties and that more rural residents voted in favor of the ban where median housing values are higher, presumably to prevent a reduction in property values due to environmental problems associated with intensive hog farms. Counties with a larger percentage of adherents to Catholicism and where the population voted for Democrat candidates were more likely to support the proposal while in counties where a larger percentage of residents adhere to evangelicalism the support was lower. These findings suggest that a combination of cultural, political, and socio-economic factors determines the likelihood that social movements such as the animal rights movement can use proposals in ballots to shape public policy. Although factors traditionally considered by social scientists such as area of residence, economic status, gender, and political preferences appear to explain a larger proportion of variation in support for the ban than religious affiliation does, the findings also indicate that religiosity should not be ignored when examining decision-making. Adherence to the most politically and socially conservative religious denominations has a negative impact on support for the ban that is both statistically and substantively significant: the results indicate that, everything else equal, the joint effect of political preferences and religious affiliation in some counties can be large enough to reverse the result from passing the ban to defeating the proposal.

Future research could usefully analyze the role of religion in decision-making by examining voting patterns in referenda, particularly in ballot proposals such as the ban on gay marriage that are likely to generate intense debate centered around religious beliefs and moral values. The findings of this paper suggest that political preferences and affiliation to politically and socially conservative religious denominations can be decisive for the final outcome.

References

Attfield, Robin, 1983: The Ethics of Environmental Concern, Columbia University Press, New York.

Barro, Robert J., and McCleary, Rachel M., 2003: "Religion and economic growth." Working Paper, Harvard University.

Bennett, Richard and Blaney, Ralph, 2002: "Social consensus, moral intensity and willingness to pay to address a farm animal welfare issue." Journal of Economic Psychology 23, 501-520.

Caro, Thaddeus, 2002: "Fundamentalism as a class culture." Sociology of Religion 63(3), 335-360.

Dubin, Jeffrey A., Kiewiet, D. Roderick, and Noussair, Charles, 1992: "Voting on growth control measures: Preferences and strategies." Economics and Politics, 4(2): 191-213.

Fraser, David, Joy Mench, and Millman, Suzanne, 2001: "Farm animals and their welfare in 2000," in: Salem, Deborah L., Rowan, Andrew H. (EDS.), Humane Society Press, Washington, DC.

Guiso, Luigi, Sapienza, Paola, and Zingales, Luigi, 2003: "People's opium? Religion and economic attitudes." Journal of Monetary Economics, 50: 225-282.

Inglehart, R. and Baker, W. E., 2000: "Modernization, cultural change, and the persistence of traditional values." American Sociological Review, February: 19-51.

Kahn, Matthew E., and Matsusaka, John G., 1997: "Demand for environmental goods: Evidence from voting patterns on California initiatives." Journal of Law and Economics, XL: 137-173.

Landes, D.S., 1999: The Wealth and Poverty of Nations: Why Some Are So Rich and Some So Poor, New York, Norton.

Lowry, Robert C., 1998: "Religion and the demand for membership in environmental citizen groups." Public Choice, 94: 223-240.

McCleary, Rachel M., and Barro, Robert J., 2003: "Religion and political economy in an international panel." Working Paper, Harvard University.

Pyle, Ralph E., 1993: "Faith and commitment to the poor: Theological orientation and support for government assistance measures." Sociology of Religion 54(4): 385-401.

Singer, Peter, 2001: Writings on an Ethical Life, The Ecco Press.

Spash, Clive L., 2000: "Ecosystems, contingent valuation and ethics: the case of wetland re-creation." Ecological Economics, 34, 195-215.

White, Lynn, 1967: "The historical roots of our ecological crisis," Science 155: 1203-1207.

Wooldridge, Jeffrey M., 2002: Econometric Analysis of Cross Section and Panel Data, 2nd ed., The MIT Press.

Table 1: Descriptive Statistics (Number of Counties: 67)

Variables	***Mean***	***Standard Deviation***
Votes in favor of the ban (V_i)	.46	.095
Odds ratio (V_i /(1- V_i))	.92	.36
Residents in rural areas (%)	41.12	32.64
Employment in agriculture (%)	4.79	6.00
Revenue of animal protection groups ($ per capita)	2.26	3.48
Median household income ($1,000)	35.30	6.25
Median housing value (property-owned) ($1,000)	80.66	26.66
Female (%)	49.06	3.45
Median age	39.62	5.52
Density (people per square mile)	287.43	486.90
Vote for Clinton/Gore in presidential elections 1996 (%)	43.19	7.68
Adherents to Catholicism (adherents per 1,000 population)	94.00	83.54
Adherents to Evangelical denominations (adherents per 1,000 population)	156.06	103.40
Adherents to Judaism (adherents per 1,000 population)	9.52	25.07
Adherents to mainline Protestant denominations (adherents per 1,000 population)	47.92	18.91

Table 2: Results from Instrumental Variable Regression: Dependent Variable is Log-odds Ratio

	A	*B*
	Coefficient (Std. Error)	Coefficient (Std. Error)
Socio-economic factors		
Employment in agriculture (%)	.0019 (.0048)	-.0006 (.0040)
Residents in rural areas (%)	-.0127[a] (.0036)	-.008[b] (.003)
*Residents in rural areas*Median Housing Value*	.000096[b] (.000045)	.00009[b] (.00005)
Revenues of Animal Protection groups ($ per capita)	.049 (.035)	.047 (.028)
Female	.012 (.009)	.016[b] (.008)
Median Age	.010[b] (.004)	-.003 (.004)
Median household income ($1,000)	.0019 (.0071)	-.0068 (.0067)
Political preference		
Vote for Clinton/Gore in 1996 elections (%)	.021[a] (.003)	.013[a] (.0036)
Religious affiliation		
Judaism (adherents per 1,000)		-.000007 (.0011)
Catholicism (adherents per 1,000)		.001[b] (.0004)
Mainline Protestant (adherents per 1,000)		-.0012 (.0011)
Evangelical (adherents per 1,000)		-.0013[a] (.0003)
Constant	-1.942[a] (.622)	-.925[c] (.561)
F-Test (p-value)	30.67 (<.0001)	34.22 (<.0001)
Adjusted R-squared	.7787	.8563
Counties	67	67

[a] Significant at the 1 % level. [b] Significant at the 5 % level. [c] Significant at the 10 % level.