VOTING ON ANIMAL RIGHTS

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Abstract

This paper examines the determinants of support for animal rights. In November 2002, Florida residents voted on a ballot proposal limiting farming practices that are deemed cruel to pigs. Using county level data, equations for voter turnout and support for the proposal are estimated. The results indicate that counties where animal protection groups have more leverage are more likely to vote in favor of the ban. It is also found that support for the ban is higher in counties where a larger proportion of residents vote Democrat and lower in counties where a larger proportion of residents adhere to Christian denominations.

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1. Introduction

Although the ethical and political aspects of the rights of animals have been the objects of increasing debate, little is known about the influence of socioeconomic factors on the support for the animal liberation movement. In the economic literature the only published empirical studies of farm animal welfare are those by Bennett and Larson (1996) and Bennett and Blaney (2002) who utilize the method of contingent valuation to examine willingness to pay to support animal welfare legislation.

Florida residents have been the first in the United States to vote on a measure that limits farming practices to avoid animal cruelty. In November 2002, voters in Florida passed a constitutional amendment that bans the use of gestation crates for pregnant pigs. Advocates argue that the crates do not allow pigs to turn around and cause physical and emotional damage.

Apparently, banning sow crates does not generate any direct benefit on those who vote in favor of the amendment other than the satisfaction of doing the right thing. However, gathering relevant information about the issue and voting are costly activities. Basic economic principles of utility maximization imply that individuals with higher opportunity costs would be less likely to vote in favor of the amendment. On the other hand, informed individuals may decide to participate in the political process and vote because they have access to the arguments in favor of and against the ban. In this respect, interest groups play a fundamental role in providing information and influencing public opinion. Other important determinants in the decision to support the rights of animals are political preferences and religious attitudes that influence our views about the appropriate level of regulation and inform our attitudes towards animals.

Indirect costs and benefits of the measure should not be ignored. Banning sow crates preempts intensive hog-growing. Livestock producers, even if not directly affected, may view these measures as limiting future economic opportunities or impinging on fundamental rights and oppose them. On the other hand, residents in rural areas where intensive farms could be located may favor the measures if they want to prevent nuisances associated with intensive farming.

This paper uses county level data to study the determinants of support for the ban in Florida. The influence of interests groups, indirect benefits and costs, and subjective beliefs is tested. The results suggest that counties where animal protection groups have more leverage are more likely to vote in favor of the anti-cruelty measure. Political preferences seem to matter: support for the ban was larger in counties where a larger proportion of residents voted for Clinton in the elections of 1996. Religious beliefs are also found to be a determinant of support for the ban: support for the ban is lower in counties with a larger percentage of residents who adhere to Christian denominations.

The challenge that the animal liberation movement faces is how to advance its agenda. Using force to release animals from laboratories or farms may fortify opposition to the movement. Some advocates believe that the legislative process may not be an adequate path because of political and economic interests and that the constitutional amendment process, in which citizens place an initiative in the ballot, is the best way to advance animal rights (Singer [2001], Unti and Rowan [2001]). A combination of institutional, cultural, political, and socioeconomic factors determines the likelihood that the animal liberation movement can use proposals in ballots to shape public policy. This research focuses on the socioeconomic determinants of the support for the movement. A deeper understanding of these determinants is important for the debate on animal rights and for our knowledge of how liberation movements can affect public policy through citizen-based initiatives.

Section 2 briefly describes the history and aftermath of the citizen-based initiative in Florida. Section 3 discusses the model and Section 4 presents descriptive statistics and data sources. Section 5 presents the results. Section 6 concludes.

2. Constitutional Amendment 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.

Activists gathered almost 700,000 signatures, well above the 489,000 required by Florida law to include the amendment in the ballot. In November 2002, Florida voters banned sow crates by a margin of 55 to 45 percent.

Only two hog growers were affected, in Dade City (Miami-Dade County) and Grand Ridge (Walton County). Although the measure allowed six years to stop using gestation crates, growers decided to go out of the market shortly after the elections because of actual losses, competition at the national level, and the cost of conversion.

Opponents of the measure, lead by Florida Farm Bureau, claimed that, besides being an efficient way to increase hog production, the crates protect sows from diseases, pests, and predators and avoid fighting for food and water. Opponents also stressed their opinion that issues regarding animal rights ought to be discussed through the legislative process and not through the constitutional amendment process. In their view, activists were using the accommodating amendment process granted by Florida to advance a national agenda. Because sow crates are typical of intensive hog-rearing, the banning eliminates the possibility that intensive farms would locate in Florida. As Florida media have documented, proponents of the ban acknowledged that keeping hog farms out of Florida and advance the animal liberation movement's agenda were also objectives of their campaign (Allison, 2002).

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

3. The model

The model consists of three equations estimating (1) the percentage of votes in favor of the amendment proposal, (2) voter turnout, and (3) leverage of animal welfare groups. It is necessary to estimate equations for the last two variables because they enter the support for the ban equation and are potentially correlated with the equation's error term.

The ban decision

Let V_i be the fraction of votes in favor of the ban in county *i*. As it is customary in analyses of voting data,[2] the dependent variable is the log-odds ratio: $\ln(V_i/1\text{-}V_i)$.

The decision to vote in favor of or against the ban may depend on immediate and future benefits and costs. The percentage of a county's labor force employed in the agricultural sector (*AGRC*) 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. The coefficient of this variable is expected to be negative.

The percentage of residents living in rural areas (*RURAL*) would have a positive effect if residents voted in favor of the ban in order to avoid present or future nuisance related to intensive hog farms. It may also be possible that residents fear the economic consequences of preempting intensive farming in which case the coefficient would be negative.

The leverage of animal rights advocates is measured by revenue per capita of local organizations that provide animal protection and deal with animal cruelty cases (*APG*). The coefficient is expected to be positive indicating that counties where these groups are more capable of informing and influencing the public are more likely to favor the ban.

Political preferences are captured by educational attainment (*EDUC*), measured by the percentage of residents 25 years old or older with a college degree, and the

[2] Kahn and Matsusaka (1997) and Dubin *et al*. (1992), for example, utilize the log-odds specification and provide a rationale for it.

percentage of votes for Clinton/Gore in the 1996 elections[3] (*DEMOCRAT*). It is hypothesized that conservative voters would tend to oppose the measure if they see it as interfering with private businesses or impinging on farmers' rights while individuals who are more accepting of government intervention are more likely to favor the measure.

Religious beliefs inform our relationship with animals. According to Judeo-Christian theology, God granted human beings sovereignty over Nature. Although the killing of animals is then justified, there are no imperatives in the Judeo-Christian tradition to ignore animal suffering[4]. However, to the extent that the amendment is associated with the animal liberation movement and its ultimate goals, it is hypothesized that counties with a larger Jewish and Christian population are less likely to support the measure. The county's rates of adherents (per 1,000 population) to Jewish and Christian denominations (*JEWISH* and *CHRISTIAN*) are included to control for religious beliefs[5]. The coefficients attached to these variables are expected to be negative.

Finally, a key question for the animal liberation movement is the effect of voter turnout (*Turnout*) on the movement's prospects. If there is wide support for animal rights then a larger voter turnout will be positively associated with the log-odds ratio. On the other hand, residents may have voted in the general elections for reasons completely unrelated to the amendment and their vote on this proposal cast with no information about sow crates. In this case, voter turnout will not be associated with the log-odds ratio.

The equation to be estimated is:

$$\ln\left(\frac{V_i}{1-V_i}\right) = \alpha_0 + \alpha_1 Turnout_i + \alpha_2 AGRC_i + \alpha_3 APG_i + \alpha_4 DEMOCRAT_i + \alpha_5 EDUC_i + \alpha_6 JEWISH_i + \alpha_7 CHRISTIAN_i + \varepsilon_{i1}.$$

The error term is likely to include omitted variables that are important to a voter's decision, such as moral stance in the issue of animal rights and other subjective beliefs that the religious and political variables may not fully capture. At the aggregate level

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

[4] In fact, some authors interpret God's mandate as a directive to act responsibly towards the natural world. See, for example, Attfield (1983).

[5] When the variable *CHRISTIAN* is broken down into Catholic, mainline Protestant, and Evangelical Protestant, the results are qualitatively similar and the adherents to evangelicalism, who consider the Bible as authoritative and without error, appear to be the most strongly opposed to the ban (in the statistical significance sense).

these variables are unobservable, probably also influence voter turnout and support to animal protection groups, and hence, are likely to be correlated with the error term. If the regressors are correlated with the error term then OLS estimates will be inconsistent. Two-stage and three-stage least square methods can be used to obtain consistent estimates. Estimation issues are discussed in more detail below.

Voter turnout

Estimating voter turnout is important for two reasons. First, individuals who vote, either in favor of or against the ban, do not constitute a random sample of county residents. That is, voter turnout is an endogenous variable.

Secondly, as explained above, a key question is whether the Animal Liberation movement would successfully mobilize citizens to express their opinions in referenda in order to advance its agenda through constitutional change.

There are various theories of voter turnout.[6] It is not the goal of this paper to test all existing theories but to explore the relationship between the decision to participate in the political process and the support for animal rights. Therefore, the focus is on how incentives to acquire information and express moral duties influence voter turnout.

It is generally acknowledged that the lower the probability that a single vote would affect the outcome of the election, the lower the voter turnout. The county population (*POP*) is included to control for this effect. The coefficient is expected to be negative.

The theory of expressive voting predicts that advocates of animal rights as well as individuals affected by the measure will vote to express their opinions (Dhillon and Peralta, 2002). The group-base theory of voting predicts that these individuals are more likely to coordinate their decisions and vote having social welfare rather than private welfare in mind (Dhillon and Peralta, 2002). To test these hypotheses, revenue per capita of animal protection groups and the percentage of labor force employed in the agricultural sector are included. Their coefficients are expected to be positive.

Traditionally, median age and educational achievement are included in analyses of voter turnout to control for the sense of civic duty. The coefficients are expected to be

[6] See Dhillon and Peralta (2002) for an explanation and comparison of prevalent theories of voter turnout.

positive. Median household income controls for opportunity costs. Finally, it has been hypothesized that employees in the public sector are more likely to vote (Corey and Garand, 2002). The percentage of labor force employed in public administration (*PUBLIC*) is included to control for this possibility.

Therefore, the equation is:

$$Turnout_i = \beta_0 + \beta_1 POP_i + \beta_2 AGRC_i + \beta_3 APG_i + \beta_4 AGE_i + \beta_5 MHI_i + \beta_6 EDUC_i + \beta_7 PUBLIC_i + \varepsilon_{i2}.$$

Support for animal protection groups

An important explanatory variable in the voter turnout and ban decision equations is the influence that organizations that offer protection for animals can exert. At the aggregate level, this variable is likely influenced by beliefs and moral stance on the problem of animal rights that may also affect voter turnout and support for the ban.

Ability to contribute to these organizations as well as preferences are thought to be important determinants of support for interest groups (Rothenberg [1992], Lowry [1998]). Median housing income captures ability to pay while median age controls for preferences. The coefficients of these two variables are expected to be positive. Lowry (1998) also found that religion is an important determinant of support for environmental organizations. The county's rates of adherents (per 1,000 population) to Christian and Jewish denominations are included to control for religious beliefs. To the extent that individuals associate animal welfare organizations with the animal liberation movement, the impact of this variable is expected to be negative. Demand for animal protection may also be likely in cities if there are more cases of abandoned animals and instances of animal cruelty. To control for this factor, the percentage of residents living in urban areas (*URBAN*) is included in the model. The coefficient of this variable is expected to be positive.

The equation is:

$$APG_i = \gamma_0 + \gamma_1 MHI_i + \gamma_2 AGE_i + \gamma_3 URBAN_i + \gamma_4 JEWISH_i + \gamma_5 CHRISTIAN_i + \varepsilon_{i3}.$$

The variable that proxies support for animal protection groups is the revenue per capita of local organizations. Because there are 27 counties (40 percent of the observations) without these organizations, a tobit model rather than OLS is estimated

since OLS estimation of censored variables in general provides inconsistent estimators. Robust standard errors are calculated to correct for heteroscedasticity and the predicted values are then included in the log-odds ratio and voter turnout equations.

Estimation issues

The model is:

$$\ln\left(\frac{V_i}{1-V_i}\right) = \alpha_0 + \alpha_1 Turnout_i + \alpha_2 AGRC_i + \alpha_3 \hat{APG}_i + \alpha_4 DEMOCRAT_i + \alpha_5 EDUC_i + \alpha_6 JEWISH_i + \alpha_7 CHRISTIAN_i + \varepsilon_{i1}.$$

$$Turnout_i = \beta_0 + \beta_1 POP_i + \beta_2 AGRC_i + \beta_3 \hat{APG}_i + \beta_4 AGE_i + \beta_5 MHI_i + \beta_6 EDUC_i + \beta_7 PUBLIC_i + \varepsilon_{i2},$$

where $\hat{APG}_i$ is the predicted value that results from estimating

$$APG_i = \gamma_0 + \gamma_1 MHI_i + \gamma_2 AGE_i + \gamma_3 URBAN_i + \gamma_4 JEWISH_i + \gamma_5 CHRISTIAN_i + \varepsilon_{i3}.$$

The model can be estimated using two-stage and three-stage least squares. The two-stage least squares method provides consistent estimates. The three-stage least squares method uses an estimate for the covariance matrix of the disturbances to improve efficiency. If the estimate of the covariance matrix does not add information then two-stage and three-stage least squares methods are identical. However, if one equation in the system is misspecified then three-stage least squares will provide inconsistent estimates.

The fact that the log-odds ratio and voter turnout are averages of individual votes can create heteroscedasticity problems because the averages of counties with larger population are more precise than those of counties less populated. In this case, the variance of the error terms varies inversely with county population. To correct this problem, weighted models are estimated where the weights are the square root of the county population[7]. In this manner, counties with larger populations are given more import. However, if the error terms are not independent of the regressors then weighted estimation is, in general, inconsistent. Results from weighted and unweighted models are presented. Results from unweighted estimation are preferred since the original motivation

[7] This formulation assumes that the variance is proportional to the county population.

of using two-stage or three-stage least squares is the problem of omitted variables, meaning that regressors and error terms are likely to be correlated.

4. Data sources

Table 1 presents summary statistics. 1999 data on population, median household income, educational attainment, median age, employment, and race 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 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*. The variable *CHRISTIAN* includes adherents to Catholic, mainline Protestant and Evangelical Protestant denominations. Data on voter turnout, amendment results, and percentage vote for Clinton in the presidential elections of 1996 come from the Florida Department of State, Division of Elections.

5. Results

Although there are 67 observations and, consequently, a relatively small number of independent variables, the models are overall strongly significant as indicated by the likelihood ratio statistic and F statistics.

Table 2 presents results from tobit model with robust standard errors. Predicted values from this specification are used in the log-odds and voter turnout equations. The likelihood ratio statistic indicates that the null hypothesis that the five independent variables are jointly insignificant can be rejected at the 1 percent level.

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

Variables		***Mean***	***Standard Deviation***	***Maximum***	***Minimum***
Votes in favor of the ban (%) (Log-odds ratio)	$\ln(V_i/1\text{-}V_i)$	46.12 (-.162)	9.51 (.395)	65.83 (.656)	24.73 (-1.113)
Voter Turnout (%)	*Turnout*	56.00	5.57	70.60	41.80
Support for Animal Protection groups ($ revenues per capita)	*APG*	2.26	3.48	20.61	0
Median household income ($1,000)	*MHI*	35.30	6.25	50.10	25.64
Population (10,000)	*POP*	23.85	39.65	225.34	.702
Median age	*AGE*	39.62	5.53	54.3	29
Bachelor degree (% population 25+)	*EDUC*	16.73	8.08	41.7	6.8
Adherents to Christian denominations (adherents per 1,000 population)	*CHRISTIAN*	297.98	77.09	574.18	159.18
Adherents to Jewish denomination (adherents per 1,000 population)	*JEWISH*	9.52	25.07	147.63	0
Employment in agriculture (%)	*AGRC*	4.79	6.00	29.4	.2
Employment in public administration (%)	*PUBLIC*	8.54	5.03	27.4	3.1
Residents in rural areas (%)	*RURAL*	41.12	32.64	100	.1
Residents in urban areas (%)	*URBAN*	58.88	32.64	99.89	0
Vote for Clinton/Gore in presidential elections1996 (%)	*DEMOCRAT*	43.19	7.68	66.27	25.80

Table 2: Results from Tobit Model

Dependent variable: ***APG*** (Revenue per capita of animal welfare organizations)			
Independent variables	Coefficient	Robust Standard Errors	z-statistic
AGE	.290[a]	.096	3.04
MHI	.192[b]	.084	2.29
URBAN	.091[a]	.033	2.75
JEWISH	-.009	.013	-.75
CHRISTIAN	.013	.009	1.39
Intercept	-27.135[a]	8.301	-3.27
Likelihood ratio statistic	135.93		
(p-value)	(< .001)		

[a] Significant at the 1 percent level. [b] Significant at the 5 percent level.

As expected, in counties with more residents living in urban areas and demand for animal protection is likely higher, animal protection organizations have large per capita revenues. The coefficient is statistically significant at the 1 percent level. Ability to pay and age are also statistically significant. The coefficient of *MHI* indicates that every additional $1,000 in median household income increase per capita revenues by almost 20 cents. An increase of one year in median age increases revenues per capita by 29 cents. The coefficient estimates of the religious affiliation variables are statistically insignificant.

The estimates of three-stage least squares are up to 40 percent smaller than those of two-stage least squares. Given this noticeable difference for most variables and the fact that there are no gains in efficiency from estimating three-stage least squares, consistent coefficient estimates from two-stage least squares are shown and discussed. Regarding the use of weights, unweighted standard errors are in fact smaller than weighted standard errors in both equations. Therefore, the discussion is centered on results from unweighted two-stage least squares.

Table 3 presents results from two-stage least squares for the voter turnout equation. Age and educational attainment are positive and statistically significant indicating that older and more educated individuals are more likely to vote probably because of a sense of civic duty. The coefficients are such that one year increment in a

county's median age increases voter turnout around half of a percentage point and a 10 percent increase in a county's proportion of residents with a college degree increases voter turnout a 2.7 percent. Employees in public administration are also found more likely to vote: a 10 percent increase in a county's labor force employed in public administration increases voter turnout by a 4.6 percent. Median household income is positive and statistically insignificant.

Two unexpected results are the coefficient estimates of *AGRC* and *APG*. These are negative and statistically significant at the 6 and 10 percent level respectively in the unweighted regression. Counties with a larger percentage of the labor forced employed in the agricultural sectors have a smaller voter turnout. Likewise, residents in counties in which animal protection groups have more leverage are also less likely to vote. Active campaigning might have created a false sense of confidence in the outcome of the elections and discouraged voting. Alternatively, these variables could capture preferences of residents who, irrespectively of their involvement in the issue, decided not to vote for reasons unrelated to the ban.

Table 4 shows results for the log-odds equation. Voter turnout is found to reduce support for the ban in the unweighted regression although the coefficient estimate is statistically significant only at the 10 percent level. This finding suggests that support for the ban decreases as a larger percentage of residents vote, probably because they do so without sufficient information about the issue that the amendment considers.

As expected, the leverage of animal protection organizations has a positive and statistically significant influence in the log-odds equation. However, a county's percentage of residents living in rural areas and percentage of the labor force employed in the agricultural sector do not influence the support for the amendment.

Educational attainment has a positive effect: the larger the percentage of individuals (25 years old or older) with a college degree the greater the support for banning sow crates. Counties where a larger proportion of residents voted for Clinton/Gore in the 1996 elections are more likely to vote in favor of the ban.

In regard to the effect of religious beliefs, a county's percentage of residents who adhere to Christian denominations has a negative and strongly statistically significant influence on the support for the ban. A county's percentage of residents who adhere to

Jewish denomination has also a negative impact but the estimate is not statistically significant at any of the conventional levels[8].

Regarding the magnitude of the effects, setting the statistically significant variables equal to their mean values it is found that a 10 percent increase in voter turnout reduces the proportion of votes in support of the ban by a 5 percent. For each dollar increase in per capita revenues of animal protection groups, support for the ban increases by almost a 2 percent. The variable capturing political preferences has the strongest effect on the degree of support for the ban: a 10 percent increase in votes for Clinton/Gore in 1996 increases votes in favor of the ban by a 6.25 percent. A 10 percent increase in the percentage of a county's population 25 years old or older with a college degree increases support for the ban by a 3.25 percent. The rate of adherents to Christian denominations, although statistically significant at the 1 percent level, has a weaker influence: a 10 percent increase reduces votes in favor of the ban by a half percentage point.

6. Summary

Floridians have been the first in the U.S. to vote on a ballot proposal that limits farming practices that are deemed cruel to pigs. Advocates of the animal liberation movement and opponents acknowledge that Florida will probably not be the last state in which such animal cruelty measures are placed before voters. This paper intends to shed light on the determinants of support for the amendment in Florida.

Voter turnout is lower in counties where more residents have invested interests, either moral or monetary, in the issue. This finding should be a cause of concern for both sides of the debate and inform their strategies. Successful campaigns and a representative outcome, in favor of or against animal rights, must mobilize affected citizens and provide sufficient incentives for them to vote in elections.

Regarding the actual support for the ballot proposal protecting pigs, counties where animal protection groups have more leverage are more likely to vote in favor of

[8] Lowry (1998) finds that religion is an important determinant of membership in environmental groups. Specifically, states with a larger percent of Christians and Jews have lower membership rates for groups that advocate preservation and favor government intervention.

the anti-cruelty measure. Political preferences and religious beliefs seem to matter. Support for the ban on sow crates was larger in counties where a larger proportion of residents voted Clinton in the 1996 presidential elections. A county's percentage of residents who adhere to Christian denominations has a negative and statistically significant impact although the magnitude of the effect is weak.

Table 3: Results from Two-Stage Least Square

Dependent Variable: ***Turnout***	Unweighted Regression	Weighted Regression
	Coefficient (Standard Error)	Coefficient (Standard Error)
POP	-.009	-.019[c]
	(.016)	(.010)
AGRC	-.213[c]	-.153
	(.113)	(.128)
APG	-.509[c]	-.075
	(.307)	(.342)
AGE	.575[a]	.394[a]
	(.152)	(.150)
MHI	.224	.009
	(.161)	(.159)
EDUC	.269[b]	.268[b]
	(.109)	(.106)
PUBLIC	.461[a]	.416[b]
	(.154)	(.179)
Intercept	18.230[c]	33.298[a]
	(10.381)	(10.203)
F-statistic	7.68	5.58
(p-value)	(<.001)	(<.005)

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

Table 4: Results from Two-Stage Least Squares

Dependent Variable: ***Log-odds ratio***	Unweighted Regression	Weighted Regression
	Coefficient (Standard Error)	Coefficient (Standard Error)
Turnout	-.022[c]	-.011
	(.013)	(.016)
AGRC	-.006	-.007
	(.006)	(.006)
RURAL	.004	-.003
	(.004)	(.004)
APG	.079[a]	.041
	(.022)	(.026)
DEMOCRAT	.025[a]	.021[a]
	(.004)	(.005)
EDUC	.013[b]	.002
	(.006)	(.007)
JEWISH	-.001	-.0003
	(.001)	(.002)
CHRISTIAN	-.002[a]	-.001[a]
	(.0003)	(.0004)
Intercept	.107	.052
	(.557)	(.656)
F-statistic	31.98	32.41
(p-value)	(<.001)	(<.001)

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

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