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Drivers of Resident Support for Animal Care Oriented Ballot Initiatives

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Recent high profile incidents and public debates in the United States have highlighted the increasing interest residents have regarding animal rearing and handling practices. This paper examines resident support for national legislation that mirrors Proposition 2, which in November 2008 passed in California. Results suggest perceptions regarding animal welfare information accuracy of livestock industry and consumer groups are particularly influential determinants of voting behavior and demand. The analysis also suggests residents may not fully appreciate price or tax implications when supporting additional animal welfare legislation. Implications for livestock industry and policy makers are provided along with suggestions for additional research.

Key Words: animal handling and welfare, ballot initiatives, information accuracy, legislation, Proposition 2, voting behavior, willingness to pay

JEL Classifications: Q18, Q13, Q11

U.S. residents are increasingly concerned with practices used in producing their food, demanding increased transparency and more information on production practices employed through their support of related ballot initiatives and new legislation in multiple states. The highest profile example is the passing of Proposition 2 in California on November 3, 2008. Proposition 2 prohibits California livestock producers from the “confinement of farm animals in a manner that does not allow them to turn around freely, lie down, stand up, and fully extend their limbs” (California Secretary of State, 2008). The particular species and production segments discussed in

Proposition 2 were calves raised for veal, egg-laying hens, and gestating sows/gilts. Similarly, ballot initiatives were previously passed in Florida and Arizona imposing similar restrictions on the use of gestation stalls by swine producers (Videras, 2006). Moreover, Oregon, Colorado, Maine, and Michigan have adopted related boundaries on livestock production practices via state legislation, rather than ballot initiatives. Most recently, residents in Ohio have voted to create the Ohio Livestock Care Standards Board, which is charged with establishing statewide livestock care standards (Ohio Secretary of State, 2009).

There are several key aspects of these state-by-state events that raise important policy and economic implication issues. First, it is noteworthy that the timeline of implementation varies across the states in question. For instance, Proposition 2 in California provides about 6 years for adjustment while the legislation adopted in Michigan provides producers with over 10 years to adjust their practices.

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Second, these passed ballot initiatives and adopted pieces of state legislation vary with respect to the species in question. This patchwork of adjustments across the country leads to a range of developing (at least short-run) comparative advantage disparities across states. For instance, at the time of this writing, pork producers in Iowa are free to use gestation stalls while producers in Michigan and California will legally have to remove existing gestation stalls by 2019 and 2015, respectively. If national markets for hogs and pork do not differentiate based on gestation housing practices, these changes create regional cost differences and hence profit advantages for some producers.

One can envision a political push in the near future to “level the playing field” by imposing national legislation that establishes common animal welfare standards for all livestock producers of a particular species. Precedent exists for national animal welfare legislation. For instance, the Humane Society of the United States (HSUS) has been a vocal supporter of federal legislation permanently banning the slaughter of horses (HSUS, 2009).

A relevant question to assess is whether animal welfare legislation has support nationally. The only known analysis of animal welfare legislation voting behavior of U.S. residents is provided by Tonsor, Wolf, and Olynk (2009). The authors found wide support for legislation banning use of gestation stalls. Results suggested supporting votes largely originate from latent perceptions residents hold regarding farm size, food safety, and corporate ownership associations with use of gestation stalls.

We are unaware of existing research on the broader set of production practices of recent focus (calves raised for veal, egg-laying hens, and pregnant pigs) in ballot initiatives and state legislation. Hence, the main objective of this paper is to examine how U.S. residents vary in their response to national legislation similar to California’s Proposition 2. Given the growing diversity of information sources available to residents, a second objective is to examine the impact of resident perceptions of animal welfare information accuracy from different sources (Mazzocchi et al., 2008).

Methods

To evaluate resident support for national regulation similar to Proposition 2 that passed in California we collected consumer-level data about perceptions, preferences, and voting behavior via a national survey of U.S. consumers. In our survey, respondents were asked: “*Suppose the next time you go to vote, there is a referendum on the ballot. If the referendum passes, law will require farmers nationally to confine calves raised for veal, egg-laying hens, and pregnant pigs only in ways that allow these animals to lie down, stand up, fully extend their limbs, and turn around freely. Please answer as if you were actually voting on a real referendum. Would you vote (circle answer) FOR or AGAINST the referendum?*”

The verbiage of this question intentionally mimicked that of Proposition 2, focusing on the same species and production practices with the notable difference of involving farmers nationally rather than solely in California. Because of the binary nature of response to this question, we estimate standard probit models to identify the resident characteristics associated with support (Greene, 2003).

To assess the demand residents may hold for this legislation we followed common contingent valuation methods and used a one-and-one-half bound dichotomous choice framework (Lusk and Fox, 2002; Cooper, Hanemann, and Signorello, 2002). Since the animal welfare debate contains both private and public good components (Norwood and Lusk, 2009), we were interested in examining demand by considering price, tax, and both price and tax impacts. It was unknown how residents associate similar legislation with price and/or tax implications. Therefore participants indicating support (*FOR*) in the initial question were randomly provided one of three different follow-up questions:

1st Follow-up (Tax Version):

Suppose you were told that the referendum, if it passes, would result in a **Y%** increase (**Y** ranged randomly across respondents from

1 to 100) in **YOUR** federal income taxes. Would you then change your vote to “**AGAINST?**”

- Yes, I would change my vote to “**AGAINST**” the referendum
- No, I would maintain my vote “**FOR**” the referendum

2nd Follow-up (Price Version):

Suppose you were told that the referendum, if it passes, would result in a **Z%** increase (Z ranged randomly across respondents from 1 to 100) in veal, egg, and pork prices **YOU** would face at grocery stores. Would you then change your vote to “**AGAINST?**”

- Yes, I would change my vote to “**AGAINST**” the referendum
- No, I would maintain my vote “**FOR**” the referendum

can be constructed from responses to these questions, from which a likelihood function can be estimated and consumer willingness to pay (WTP) identified following typical dichotomous choice procedures (Lusk and Fox, 2002; Cooper, Hanemann, and Signorello, 2002). If a respondent indicated they were against the referendum in the first question, their WTP = 0 ($k = 1$). If a respondent initially indicated they were *FOR* the referendum, but against it if prices and/or taxes would increase, their WTP falls in the range of $[0, X]$ ($k = 2$) where X generically represents the price and/or tax increase presented to the respondent. Finally, if a respondent indicated they were *FOR* the referendum in both questions, their WTP falls in the range of $[X, \infty]$ ($k = 3$).

The log-likelihood function optimized is:

$$(1) \quad LL = \sum \left\{ \begin{array}{l} I_{k=1} \ln \Psi(\delta + \lambda' z_i) + I_{k=2} [\ln \Psi(\delta + \lambda' z_i + \alpha X_i) - \ln \Psi(\delta + \lambda' z_i)] \\ + I_{k=3} [1 - \ln \Psi(\delta + \lambda' z_i + \alpha X_i)] \end{array} \right\}$$

3rd Follow-up (Tax & Price Version):

Suppose you were told that the referendum, if it passes, would result in a **Y%** increase (Y ranged randomly across respondents from 1 to 100) in **YOUR** federal income taxes and a **Z%** increase (Z ranged randomly across respondents from 1 to 100) in veal, egg, and pork prices **YOU** would face at grocery stores. Would you then change your vote to “**AGAINST?**”

- Yes, I would change my vote to “**AGAINST**” the referendum
- No, I would maintain my vote “**FOR**” the referendum

In the absence of more information on the potential price or tax ramifications of this referendum passing, we followed prior one-and-one-half bound applications and allowed for price and tax increases to randomly range from 1 to 100% (e.g., Tonsor and Shupp, 2009). Three intervals

where I_k is an indicator function (equal to 1 if $k = 1$; 0 otherwise), $\Psi(\cdot)$ is specified as the standard logistic distribution, δ is an intercept coefficient, z_i is a vector of explanatory variables for respondent i , λ is a conformable coefficient vector, X_i is the price and/or tax increase value faced by respondent i , α is the model’s coefficient capturing sensitivity to price and/or tax increases. Upon estimation, mean willingness to pay can be identified from the model (Kimenju and Groote, 2008). Our use of three different follow-up questions allows us to examine whether our inferences differ when consumers were presented tax, price, or both tax and price increases. That is, we estimate a model defined generally by Equation (1) separately for each of the three follow-up treatments.

Data

This study uses detailed survey data obtained in October and November of 2008 from 2,001

U.S. residents resulting in a national sample consistent with U.S. demographics.¹ The survey was designed primarily to obtain data on perceptions, current knowledge, and preferences with particular attention to animal welfare and handling issues. The survey was reviewed by pork industry representatives and animal science faculty, updated to reflect suggestions, and pretested in a related project. The survey was revised and then administered to U.S. households online with participants recruited from a large opt-in panel (Louviere et al., 2008). Participants were recruited by Survey Sampling International to be representative of the U.S. population.

Table 1 presents summary statistics of selected demographic and consumption characteristics. As in Loureiro, McCluskey, and Mittelhammer (2002), female respondents outnumbered male respondents because our survey targeted the principal grocery or food purchaser in the household. The representative respondent was about 53 years old and had a household income of about \$55,000. Approximately one-third of respondents had earned a college degree.

Table 2 provides a summary of participant responses to our core questions regarding support for the described animal welfare legislation. When initially asked, 69.6% indicated they would vote for the presented referendum. This level of support is similar to the Proposition 2 vote in California (63%). When a follow-up question directly referenced tax and/or price implications, many participants removed their support. In particular, 52%, 39%, and 52% of those supporting the referendum in the initial question, reversed their position and opposed the referendum when presented with tax, price, or both tax and price increases, respectively.

¹ We utilized four different information treatments (Base, Industry, Consumer Group, Industry and Consumer Group) to examine the impact of receiving different sets of animal welfare information. We estimated separate models for each treatment and results were found to be insensitive to the information treatment received (Louviere, Hensher, and Swait, 2000). We failed to reject the hypothesis that we can poll observations across consumers receiving the alternative information statements.

Table 1. Summary Statistics for Select Measures

Variable	Description	Mean
<i>Female</i>	1 if female; 0 if male	0.710 (0.454)
<i>Age</i>	Age of consumer (years)	52.666 (13.469)
<i>Income</i>	Annual household income (in thousands)	55.647 (39.348)
<i>College</i>	1 = Earned a college degree; 0 otherwise	0.308 (0.462)
<i>Kids</i>	Number of children in household	0.462 (1.007)
<i>Pork</i>	Number of meals consumed in a typical week in household	2.215 (2.309)
<i>Eggs</i>	Number of meals consumed in a typical week in household	3.007 (2.767)
<i>Milk</i>	Number of gallons consumed in a typical week in household	0.957 (0.863)

Note: Values presented are means; standard deviations are in parentheses.

This change between initial and subsequent support when presented implications regarding taxes and/or prices is more carefully evaluated below with estimated contingent valuation models.

Understanding preferences for additional animal handling regulation requires insights into an array of perceptions U.S. residents hold (Tonsor, Wolf, and Olynk, 2009). Accordingly, our survey included several carefully designed 7-point Likert scales selected to assess perceptions regarding accuracy of animal welfare information provided by alternative sources.² To succinctly incorporate this information in our analysis, a factor analysis using principal component analysis with varimax rotation of responses to these questions was conducted.³ The individual

² Individual summary statistics for these questions are not presented here, but are available upon request.

³ We suggest interested readers see Anderson and Gerbing, 1988; Boxall and Adamowicz, 2002; Hair et al., 1995; and Pennings and Garcia, 2001 for additional details on factor analysis techniques.

Table 2. Summary Statistics on Voting Responses

	Tax Version (n = 668)	Price Version (n = 666)	Tax & Price Version (n = 667)
1 if No	0.310 (0.463)	0.314 (0.464)	0.289 (0.454)
1 if Yes/No	0.358 (0.480)	0.266 (0.442)	0.367 (0.482)
1 if Yes/Yes	0.332 (0.471)	0.420 (0.494)	0.343 (0.475)

Note: Values presented are means; standard deviations are in parentheses.

entities evaluated and corresponding summary statistics are listed in Table 3. Based on Eigen values and factor loadings we selected three factors that explain over 80% of response variation and provide a conceptually appealing framework regarding how the individual indicators load onto each factor.

Factors were labeled based upon magnitudes of the individual question loadings. We refer to the first information accuracy factor as *Factor 1: Industry* because questions regarding accuracy of egg, poultry, pork, cattle, and milk producer groups loaded highly. The second factor was labeled *Factor 2: Government and University* since associations between governmental agencies and university scientists/researchers and information accuracy loaded highly. The third factor was named *Factor 3: Consumer Groups* as highly loading indicators were related to HSUS and People for the Ethical Treatment of Animals (PETA) information accuracy. As in Boxall and Adamowicz (2002), scores for the three factors were identified for each respondent and included as explanatory variables in our dichotomous choice model.

Results

To assess support for the presented national animal welfare legislation, we estimated probit models (Greene, 2003). Table 4 reports coefficients, marginal effects (for discrete variables), and elasticities (for continuous variables) of two models: *Model 1* only included “observable” participant characteristics while

Model 2 also incorporated three latent perception variables regarding animal welfare information accuracy from different sources. While standard likelihood ratio tests reject *Model 1* in favor of *Model 2*, we present both models to reflect the forecasting ability of voter support when only observable information is available and to highlight the important role information accuracy perceptions may have in voting.

When only socio-demographic and consumption variables were considered (*Model 1*), the results suggest females, those with college degrees, and households with higher incomes were more likely to support the evaluated legislation while families with more kids or consuming more pork are less likely. In particular, women and those with college educations were 5.6% and 4.9%, respectively, more likely to vote for the legislation. Conversely, 100% increases in the number of kids and meals containing pork made respondents 1.7% and 3.5%, respectively, less likely to be supportive.

When latent perceptions regarding animal welfare information accuracy were incorporated in the analysis (*Model 2*), inferences regarding income, household size, and pork consumption impacts largely held. However, the impacts of gender and education were no longer significant when perceptions of information accuracy are controlled for. This model suggests that individuals viewing the livestock industry and consumer groups to provide accurate animal welfare information were less and more, respectively, likely to support the legislation. In particular, a 100% increase in perceived accuracy of livestock industry was associated with a 6.3% decrease in support. Conversely, a 100% increase in perceived accuracy of consumer groups was associated with a 9.8% increase in support. These information accuracy elasticity estimates were larger than any of the examined socio-demographic or consumption impacts and document the importance of conveying accurate information to U.S. residents on animal welfare information.

To evaluate demand for the evaluated animal welfare legislation we estimated one-and-one-half bound dichotomous choice models

Table 3. Factor Analysis of Information Accuracy Perceptions

Source	Factor 1: Industry	Factor 2: Government and University	Factor 3: Consumer Groups
National Cattlemen's Beef Association	0.883	0.213	0.078
National Pork Producers Council	0.880	0.258	0.107
National Milk Producers Federation	0.878	0.250	0.180
United Egg Producers	0.868	0.255	0.158
U.S. Poultry & Egg Association	0.864	0.272	0.169
State Governmental Agencies	0.329	0.877	0.138
Federal Governmental Agencies	0.324	0.874	0.126
University Scientists/Researchers	0.243	0.491	0.474
People for the Ethical Treatment of Animals (PETA)	0.086	0.065	0.844
The Humane Society of the United States	0.149	0.157	0.841
Eigenvalue	5.623	1.447	0.956
Variance Explained	0.5623	0.1447	0.0956

Notes: All questions assessed the accuracy of animal welfare information provided by each source and were asked using 7 point Likert scales ranging from "Very Inaccurate" to "Very Accurate." Values shown are factor loadings. The three factors explain 80.26% of the total variance across individual questions.

following Equation (1) in NLOGIT (Greene, 2008). Table 5 reports results of three models specific to the variant of follow-up questions used. In all three models, perceptions regarding animal welfare information accuracy were significant. Individuals perceiving industry groups to provide accurate animal welfare information were less WTP for the legislation. Conversely, respondents perceiving that consumer groups provide accurate animal welfare information were more WTP for additional legislation. This suggests that perceived *relative* information accuracy from livestock industries and consumer groups is an important determinant of support.

In two of the three models, demand was found to be higher for females and higher income households and lower for households with more kids. This suggests these "observable" socio-economic characteristics may be viable traits to consider in forecasts of demand for related animal welfare legislation. More broadly, our finding of only select socio-economic variables being significant is consistent with related research and the struggles of vested parties in identifying and persuading individuals to support their respective causes (Carlsson, Frykblom, and Lagerkvist, 2007; Nilsson, Foster, and Lusk, 2006).

Table 5 also provides mean WTP estimates implied by the three alternative models. Research has shown that consumers may respond differently if real money is on the line than in the hypothetical nature of the survey questions underlying our analysis (Fox et al., 1998). Nonetheless, the hypothetical nature of this project was equivalent in all three demand assessments. When consumers were presented only with tax implications (*Tax Model*) our results suggest a mean WTP of 25.56% higher taxes for the examined legislation. When consumers were presented only with price implications (*Price Model*) our results suggest a mean WTP of 36.36% higher food prices for the examined legislation. Conversely, when both tax and price implications are provided in the survey, mean WTP estimates were 15.09% higher taxes and -2.81% higher prices.

The notably lower point estimates when both tax and price implications were explicitly incorporated in the presented survey questions suggests that respondents may discount, or possibly even ignore, tax and/or price impacts in assessing the presented survey questions. For instance, when only prices were discussed a positive WTP (statistically different from zero) was estimated yet when both tax and price implications were considered, consumers

Table 4. Probit Model Estimates of Resident Voting on “National Proposition 2” Legislation

Variable	Model 1			Model 2		
	Coefficients	Marginal Effect	Elasticity	Coefficients	Marginal Effect	Elasticity
<i>Constant</i>	0.468** (0.161)			0.463** (0.164)		
<i>Female</i>	0.157** (0.066)	0.056		0.086 (0.069)	0.030	
<i>Age</i>	-0.002 (0.002)		-0.063	-0.002 (0.002)		-0.052
<i>Income</i>	0.002** (0.001)		0.058	0.003** (0.001)		0.070
<i>College</i>	0.143** (0.070)	0.049		0.113 (0.072)	0.038	
<i>Kids</i>	-0.074** (0.032)		-0.017	-0.057* (0.033)		-0.013
<i>Pork</i>	-0.032** (0.013)		-0.035	-0.027** (0.013)		-0.028
<i>Eggs</i>	0.008 (0.011)		0.012	0.008 (0.011)		0.012
<i>Milk</i>	-0.012 (0.037)		-0.006	0.015 (0.038)		0.007
<i>Information Accuracy: Industry</i>	NA			-0.182** (0.032)		-0.063
<i>Information Accuracy: Government/University</i>	NA			0.031 (0.031)		0.011
<i>Information Accuracy: Consumer Group</i>	NA			0.285** (0.032)		0.098
Log-likelihood	-1212.462			-1156.126		

Note: Standard errors are presented in parentheses.

Each variable is defined in Tables 1 or 3. Income was divided by \$1,000 to facilitate model convergence.

*, ** denote coefficient estimates statistically significant at the 0.10 and 0.05 level, respectively.

were found unwilling to pay any price premiums (*WTP_Price* is not different from zero).

This has implications for animal welfare discussions and more broadly applied research on similar subjects involving both private and public good aspects. This finding may suggest that resident voters in recent ballot initiatives have discounted or even ignored tax and/or price implications of their votes. If this is true, individuals supporting these ballot initiatives can be expected to express concern with heightened prices, elevated taxes, and/or reallocation of tax revenues that may follow imposition of the new legislation. More generally,

our findings of demand differences when both price and tax implications are presented suggests that future research on issues involving both public and private good aspects need to consider adopting a similar split-sample approach to evaluate equivalent effects.

Conclusions and Implications

This paper provides the first known examination of how U.S. residents vary in their response to national legislation very similar to the Proposition 2 ballot initiative, which passed in California in November 2008. Particular

Table 5. Estimates of Consumer Demand for “National Proposition 2” Legislation

Variable Name	Tax Model (n = 668)	Price Model (n = 666)	Tax & Price Model (n = 667)
<i>Constant</i>	0.089 (0.388)	1.025** (0.423)	1.184** (0.435)
<i>Female</i>	0.299* (0.175)	0.162 (0.177)	0.288* (0.177)
<i>Age</i>	0.002 (0.006)	-0.008 (0.006)	0.010 (0.006)
<i>College</i>	0.170 (0.184)	-0.044 (0.174)	0.161 (0.184)
<i>Income</i>	0.004** (0.002)	0.006** (0.002)	0.001 (0.002)
<i>Kids</i>	-0.134* (0.076)	0.010 (0.100)	-0.161** (0.076)
<i>Pork</i>	0.045 (0.035)	-0.102** (0.035)	-0.024 (0.031)
<i>Eggs</i>	0.005 (0.033)	0.020 (0.027)	0.002 (0.029)
<i>Milk</i>	0.048 (0.092)	-0.042 (0.098)	0.060 (0.096)
<i>Information Accuracy: Industry</i>	-0.356** (0.081)	-0.163** (0.075)	-0.433** (0.078)
<i>Information Accuracy: Government/University</i>	-0.028 (0.075)	-0.002 (0.073)	-0.021 (0.079)
<i>Information Accuracy: Consumer Group</i>	0.563** (0.078)	0.477** (0.078)	0.385** (0.079)
<i>Tax</i>	-0.030** (0.002)	NA NA	-0.018** (0.002)
<i>Price</i>	NA NA	-0.022** (0.001)	-0.012** (0.002)
Mean WTP_Tax (%)	25.564		15.085
95% Confidence Interval (%)	[20.414, 30.530]		[3.770, 24.425]
Mean WTP_Price (%)		36.364	-2.810
95% Confidence Interval (%)		[29.562, 43.330]	[-29.361, 13.790]
Log-likelihood	731.8327	701.8508	714.6671

Note: Standard errors are presented in parentheses. Each variable is defined in Tables 1 or 3. Income was divided by \$1,000 to facilitate model convergence. All WTP point estimates are calculated at covariate means. WTP_Tax and WTP_Price are calculated at mean price and tax levels, respectively in the *Tax & Price Model*. WTP confidence intervals were calculated using 10,000 Krinsky-Robb bootstrapping simulations.

*, ** denote coefficient estimates statistically significant at the 0.10 and 0.05 level, respectively.

attention was paid to the impact of diverse perceptions individuals hold regarding animal welfare information accuracy of different sources.

The analysis suggests households with higher incomes, less kids, and consuming less pork are more likely to vote in favor of

a national version of Proposition 2. Moreover, residents perceiving livestock industry groups to provide accurate animal welfare information are less likely to support legislation while those believing consumer groups provide accurate animal welfare information are more supportive. The significant impacts of perceived

information accuracy by different sources are particularly noteworthy in a contentious issue such as animal welfare. All vested parties, from producers who may resist additional regulation to consumer activist groups who may actively call for change, can leverage this finding as evidencing a need to invest in building and maintaining the trust of individuals.

Similar inferences are drawn when examining the willingness of residents to pay for the evaluated legislation. However, the levels of estimated demand are found to be particularly sensitive to whether tax and/or price implications of the legislation are explicitly incorporated in the analysis. This suggests resident voters in recent ballot initiatives may have discounted or even ignored tax and/or price implications of their votes. If this was the case, individuals supporting these ballot initiatives are expected to express notable concern when heightened prices, elevated taxes, and/or reallocations of tax revenues occur following imposition of the new legislation.

This analysis provides valuable insights into the characteristics of the U.S. population that may be more or less willing to accept higher income taxes and/or prices to support national legislation similar to California's Proposition 2. It is also important to clearly note the difference between voting behavior and binding consumer demand. In particular, consider the distinction between influential voting behavior in an environment perceived to be costless and willingness to personally pay for additional animal welfare regulation. All U.S. residents, regardless of income tax situations, have equal right and ability to vote on referendums while legislation on animal welfare and handling (at least in the context of our analysis) at least partly funded by tax revenues has differing implications for residents depending on their tax-paying status. An increase in governmental oversight of animal welfare practices would require either an increase in taxes or a reallocation of public funds from another current use. Conversely, voluntary or industry surveillance increases would likely be funded by price increases born only by directly effected consumers of impacted products (e.g., via new labeling and marketing schemes).

The substantial difference between "costless voting" and "voting with personal implications" should carefully be noted in future evaluations of animal welfare legislation that to-date has typically been initiated by public ballot and referendum initiatives. In particular, future research should consider the understanding of residents who support ballot initiatives on subsequent tax and price situations. To the extent that passed ballot initiatives require public enforcement (i.e., fines and imprisonment for noncompliance, surveillance to identify noncompliance) and increased production costs, there are both tax and price implications to be considered. Future work could examine sensitivity of referendum support to alternative wording that varies in the direct and indirect reference to costs imposed on residents. Moreover, additional research could focus on dissecting the support of "consumers" and "tax payers" from "non-consumers" and "non-tax payers" as this has implications for the extent to which free-riding exists in animal welfare legislative adjustments.

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