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**Regulatory Capture and Support for and Opposition to Controversial Food System Policy
Issues: An Exploratory Analysis**

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Introduction

Sugar sweetened beverage (SSB) taxes, labeling of foods containing genetically modified (GM) ingredients, and providing work permits to undocumented farm workers are three current and hotly debated food policy initiatives across the United States that have direct implications for consumer behavior and commerce. In Vermont, the issue of GM labeling has been debated, and a labeling law passed in 2014. Several states are watching the Vermont debate carefully or have already passed legislation with a trigger clause. A SSB excise tax is also under consideration in Vermont, and is currently in the legislature for the second time in three years. The issue of migrant dairy labor in Vermont first surfaced in 2006 and remains a debated issue – the question of the best approach to staffing Vermont dairy farms is yet to be resolved (Baker, 2012). All of these policy issues are controversial both within and beyond Vermont. Analysis of data in a single state can serve as baseline information for others as these and additional controversial food system policy options are being considered across the U.S.

This study explores the question of whether people who support or oppose new food system policy options can be grouped based on common factors describing their beliefs and behaviors or whether each policy initiative must be considered individually. In so doing, it provides a basis upon which to begin to answer the question of how and which information reaches the populace and whether the economics of regulatory capture can explain current trends in consumer attitudes, consumption choice and voting behavior the food policy arena.

Background

SSB taxes are a structural public health approach that aim to influence health behaviors (Lieberman, Golden, and Earp, 2013). In 2013, SSB excise taxes were under consideration in nine U.S. states and one city (Rudd Center for Food Policy and Obesity, 2014). Excise tax legislation specific to SSBs has passed in only one U.S. city, Berkeley, California (O'Connor, 2014). There is clear support from many in the public health community who believe an excise tax is one of several policy options that will encourage consumers to decrease their calorie intake, and raise revenues to be used for health promotion (Brownell et al., 2009; Brownell and Frieden, 2009; Faulkner et al., 2011). Proposals to add an excise tax to SSBs have met with opposition from political leaders and special interest groups, including the beverage industry

(American Beverage Association, 2012a, b; Capitol Hill Research Center, 2009; Johnson, 2011; Kelly, 2012; Rogers, 2012). It has not been possible to “produce the right evidence in the right place at the right time” and policy makers have been unwilling as of yet to adopt “health in all policies” approaches in their legislative efforts (Fouse, 2013, p. 1). National media has tended to provide anti-tax messaging with a focus on the negative economic consequences of taxation (Niederdeppe et al., 2013).

Labeling of GM foods, meanwhile, is an equally controversial topic with an expansive empirical literature largely centered in the field of risk communication (Hadfield and Thomson, 1998; Kolodinsky, 2007; Weldon and Laycock, 2009; Frewer et al., 2013). From a consumer perspective the genetic attributes of GM foods are not readily distinguishable from their non-GM counterparts (Caswell and Mojduszka, 1996; Kolodinsky, 2007). This ambiguity fosters a low degree of individual control among consumers due to information asymmetry (Weldon and Laycock, 2009). In theory GM labeling rules serve to reestablish this individual control over consumption (Caswell and Mojduszka, 1996; Kolodinsky, 2007) and incentivize GM producers to respond to consumer demands, including demands for accurate and comprehensive information about the foods they purchase and consume (Hadfield and Thomson, 1998). Increasing consumer control and incentivizing accurate risk communication allows the marketplace to more efficiently allocate resources (Hadfield and Thomson, 1998; Kolodinsky, 2007). However, opponents of labeling have asserted that in the current U.S. context providing more information about GM foods is needless and potentially destructive. Some claim that providing more information about GM crops now may actually limit consumer choice in the long run because consumers may be led to believe that biotechnology is “bad.” (Browning, 1993; Carter and Gruère, 2003; Costanigro and Lusk, 2014). One aspect of this concern is related to the concept of substantial equivalents. If two products are substantially the same, so the argument goes, a negative label (e.g., GM-free) or a positive label (e.g., contains GM) could imply that the presence a GM ingredient is harmful (Smith, 2000), or that the absence of a GM ingredient makes the product better (McClure, 2001).¹ Opponents therefore assert consumer options could decrease if retailers eliminate GM foods because of perceived consumer aversion (Carter and Gruère, 2003), and also that food costs could rise due to labeling, monitoring, and/or

¹ Recent empirical findings contradict this claim, however. Costanigro and Lusk (2014) find no support for the claim that the presence of a GM label changes consumer attitudes towards GM crops. However they do find that the choice of label has significant implications for consumers’ willingness to pay to *avoid* GM food.

food reformulation necessary to remove GM ingredients. Proponents of labeling meanwhile emphasize a number of consumer rights issues, including consumers' right to know what is in their food (Streiffer and Rubel, 2003), equity issues related to small scale agriculture versus the industrial model (Marion and Willis, 1990), "interference" in the natural order of things (Fallert et al., 1987; Marion et al. 1989; Marion and Willis, 1990; Douthitt, 1991), fairness about who derives the benefits from purchase of GM foods (agribusiness or consumers) (Busch, 1992), and values concerning food and its social significance (Busch, 1992; Thompson, 1997; Kolodinsky and Conner, 1998). The issues related to labeling of GM in the marketplace have not changed substantially since the discussion began in the late 1990s. In the absence of any labeling policy, both pro- and anti-GM interests have used the media to advocate their positions regarding GM risk and information provision (Hellsten, 2003; Reynolds, 2004; Silk, Weiner, and Parrott, 2005; Plumer, 2012; Harmon and Pollack, 2012).

Finally, debates surrounding migrant labor (primarily from Latin America) are a recurring theme in U.S. politics, with some states such as Arizona attracting international attention for their aggressive anti-migrant worker policies. Vermont, as a northeastern state far from the U.S.-Mexican border, has been a relative latecomer to these national migrant labor debates, with recent discussions surrounding the roles of migrants as year-round laborers on Vermont dairy farms. Dairy farming is both the primary agricultural sector in the state as well as an icon of the state's agrarian self-image. Maintaining a working landscape is part of the state's overall economic development strategy as well as a primary objective in many local land use plans. A great challenge for Vermont in recent decades has been the loss of dairy farms in the face of competition from much larger dairies in the western U.S., while a shortage of low-wage farm labor has been a chronic problem facing milk producers in the state. While many farming activities in the state, particularly apples and vegetables, can address seasonal labor shortages through the use of the H2A guest worker program, the year-round nature of dairy farming has prohibited these farmers from legal access to migrant labor (U.S. Citizenship and Immigration Services, n.d.). As a northern border state, federal law enforcement has a strong presence, particularly in the northern two-thirds of Vermont, where federal agents have repeatedly raided farms and limited migrants' ability to access health care. While Vermont is quite homogeneous demographically, its culture of engagement led it down a very different path than other states also experiencing the arrival of Latino immigrants. Soon after migrants arrived in Vermont,

social activists established non-profits that advocated for the rights of these workers. This has led to both policy initiatives that has increased the rights of these workers, while also at times antagonized farmers (Baker, 2013). Opponents of immigration reform often point to the idea that providing work permits to illegal immigrants will take jobs away from Americans and further burden the tax system. Proponents argue that undocumented workers fill a job niche not currently filled by citizens and will decrease discrimination and lack of access to services including health care (Rathke, 2012; Gomez, 2013; Wolcott-MacCausland, 2014).

All three of the above examples of controversial food system policy initiatives have led to lively debates in the State of Vermont, accompanied by the proliferation of competing narratives surrounding the benefits and harms of each policy proposal. In each case – the SSB tax debate, the GM labeling debate, and the undocumented worker permit debate – “information” has been provided to the public and legislators from a variety of sources, including activists, lobbyists, academics, journalists, and citizens. Yet, there are questions as to the veracity of the information, and regardless of the source (with the possible exception of much of the refereed literature), there is some “spin” put on the information in order to persuade a given constituency toward support or opposition of a given policy. In such contexts of severe information asymmetry citizens may respond in different ways – in some cases relying upon trusted information sources (such as official government departments (Roe and Teisl, 2007) – or in other cases relying upon relatively simpler heuristics drawing upon preexisting values to filter and interpret the cacophony of new information being provided.

Psychology, Politics, or Economics?

What type of model can be used to examine citizen support for controversial food system policies? The criteria on which people base their decisions about supporting a particular policy, and the arguments put forth by opposition to the same policies, provide some evidence that consumers face an information gap that is filled by messages from both pro- and anti- policy factions. Bo (2006) reviews the regulatory capture literature and explains economic models that have been developed to explain a host of ways that special interest groups intervene in government regulation. Many of the models are relevant to the situation of controversial food system policy issues, from the exchange of favors and the revolving door of industry and

government, to donations for votes and asymmetric information. This paper focuses on information asymmetry.

Recent work in other food and nutrition arenas has highlighted instances where industry or other policy advocates have gone to extreme ends to alter the public's perception of products or policies, including disseminating favorable messages to the news media or via well-financed advertising campaigns, or by funding "friendly" scientific research in support of one side or another of a policy debate. When successful, the result of success aggressive information-based manipulation of policy debates has been dubbed "deep capture" (Smith and Tasnadi, 2014).

Smith and Tasnadi (2014) develop an economic model to describe why governments and industry might engage in practices of deep capture in the obesity debate. There are analogous observations in the case of controversial food system policy issues:

1. Policies will either be enacted or not;
2. There are sufficient rewards for organizations who do not support the policy to make "deep capture" profitable;
3. Citizens have imperfect information and cannot determine the actual "quality" of the policy outcome. Because none of the policies included in this paper have actually been implemented, there is no information on actual outcome. No one knows the actual "quality" of the policy outcome a priori (See Smith and Tasnadi, 2014; p 535).

The results of the model, in simple terms, are as follows: Given that there are search costs incurred by citizens in making a decision between supporting a policy versus not supporting it, a citizen will choose the policy with the highest perceived "quality." In the controversial food system policy case, he or she will choose the policy that will result in safer food, stable employment, better health, and/or employment, highlighted as being important to consumers in our three policy examples above. In the presence of information-seeking citizens willing to incur varying degrees of search costs, clearly, organizations both pro-and anti-legislation will strive to communicate that their policy is the one that meets the quality expectations of citizens. Both sides will thus invest in messages that communicate "quality" characteristics (whether there is empirical evidence supporting claims or not). Ultimately citizens will make a decision to support a policy, oppose a policy, or abstain from the debate based on a combination of their own predispositions, combined with any new "quality" information they receive – and their

evaluation of the credibility of that quality information (in part a function of citizen's willingness to incur further search costs to verify quality claims).

To test how information asymmetries may be influencing citizen support or opposition to a policy we would ideally wish to have empirical evidence on the true “quality” of a policy. Unfortunately, we do not know with certainty the actual quality of any of the policy initiatives discussed thus far. In the case of a SSB tax, simulation study results generally support the potential for health benefits and revenue generation from such a tax (Andreyeva et al., 2011), but the only existing US SSB tax has yet to be empirically evaluated in Berkeley, CA (although there is some evidence that a similar law passed in Mexico has decreased expenditures on sugary drinks by ten percent (Bonilla-Chachin, 2014; Boseley, 2014)).² In the case of GM labeling, there is no U.S. evidence of consumer behavior change or economic impacts associated with GM labels, although there is evidence that labeling policies are leading to substantial shifts in consumer behavior and food industry practices in other countries. In the case of migrant worker policy, we have little evidence as to the impact of migrant dairy laborers on U.S. employment, as the U.S. continues to debate immigration reform on a variety of levels (White House, 2014; Nowrasteh, 2014). Therefore organizations on both sides of any one of these policy issues may be what Smith and Tasnadi (2014) refer to as “the low quality producer” – but in the absence of conclusive evidence organizations on both sides of the debate have the potential to gain by convincing citizens that their policy position is of higher quality than it might actually be.

Although “quality” cannot be empirically established in these controversial food policies, the deliberate use of information asymmetry by policy advocates has already been documented in the Vermont context, most prominently in the GM labeling debate where arguments are often emotional or uninformative in nature (Irwin and Wynne, 1996; Kolodinsky, 2007; Pechan et al., 2011; Weldon & Laycock, 2009), and where the public forum has proven susceptible to excessive influence by one side (Irwin and Wynne, 1996; Wynne, 2001; Pechan et al., 2011; Weldon and Laycock, 2009). The degree to which such information manipulation seeking to influence citizen support or opposition to food policies has also characterized SSB tax debates and farm migrant worker debates in the State has yet to be empirically explored, although it is noteworthy that more dollars have been spent by those who oppose the passage of the three controversial food system policies in this paper than on many other Vermont policy debates,

² Jou and Techakehakij (2012).

perhaps because such organizations represent the status quo and, may suffer more of an economic loss if new policy measures are passed.

Major donations to the opposition of SSB policies include the American Beverage Association, major soft drink corporations, The American Grocer's Association, and a newer group, Americans Against Food Taxes. The group communicates that it is a coalition of "responsible individuals, financially-strapped families, [and] small and large businesses" but its 400-plus membership list includes corporations such as Burger King Corporation, Coca Cola, Pepsico and Domino's Pizza says the Center for Public Integrity and CSPI (Spolar and Eaton, 2009; Center for Science in the Public Interest, 2012).

In the case of GM labeling regulation, major funding by the Grocery Manufacturer's Association of America has prominently shaped the policy debates surrounding labeling since the first proposed GM labels in Vermont (for milk containing rBGH). There is also evidence of a "revolving door of regulation", with Michael R. Taylor serving as FDA's deputy commissioner for policy when the rBGH labelling guidelines were written. Taylor was formerly a Monsanto lawyer. And, Margaret Miller, a Monsanto researcher, was hired by the FDA to draft a report on the safety of rBGH (The Center for Media and Democracy, n.d.).

In the case of migrant labor, major donations against reform have come from the private prison lobby – to whom financial harm will ensue if undocumented workers obtain work permits and no longer violate the law. For example, Corrections Corp of America donated \$881,898 in campaign contributions opposing migrant labor reform in 2013 (Mann, 2013).

While the model outlined by Smith and Tasnadi (2014) focuses on search costs and quality, it is important to note that not only is the pursuit of information an endogenous variable, citizen preferences - as signaled by their support for or opposition to food system policies – are also endogenously determined. We estimate both level of information received and information influence on preferences for our three controversial food system policies in the State of Vermont.

Modeling Support/Opposition for Controversial Food System Policies

To investigate whether support for three controversial food policy initiatives are tied to consumer perceptions about the "quality" of each policy formed through information search, we used data collected by the Center for Rural Studies at the University of Vermont as part of the 2014 Vermonter Poll. The survey was conducted between the hours of 9:00 a.m. and 9:00 p.m.

beginning on March 10, 2014 and ending on March 25, 2014. The telephone polling was conducted using computer-aided telephone interviewing (CATI). A random sample for the poll was drawn from a list of Vermont telephone numbers, which is updated quarterly and included listed and unlisted telephone numbers. Cellular phone numbers were not included in the sampling frame. Only Vermont residents over the age of eighteen were interviewed. We utilized 447 surveys with complete responses on all questions used in this analysis. Based on a group of this size, the results have a margin of error of plus or minus 5 percent with a confidence interval of 95 percent.

We first generated an index based on the sum of responses to three questions related to support/opposition to three controversial food system policy issues: labeling of food products that contain GM ingredients, a \$0.01 per ounce SSB excise tax, and providing three-year/year-round work permits for currently undocumented dairy farm workers. Because respondents rated their support/opposition for each policy on a 5 point Likert scale ranging from strongly oppose = 1 to strongly support = 5, the summated scale ranged from 5 to 15. Descriptive statistics are shown in Table 1.

Table 1. Descriptive Statistics

Variable	Definition	Percent/Mean
Income	<25,000	11.2
	25,001-50,000	25.8
	50,001-75,000	20.2
	75,001-100,000	17.3
	>\$100,000	25.5
Age	Age in years	59 (14.1) ^a
College	1= Bachelor's or higher	64.8
Kids	1= have children in household	26.7
Political Affiliation	Political Party	41.2
	Independent	26.4
	Democratic Party	14.3
	Republican Party	4.6
Residence	Progressive Party	13.4
	Rural	59.9
	Suburban	22.6
Housing	Urban	17.6
	1= Own	87.9
Gender	1=female	51.9
Index	5-15 scale of support or opposition for food system policies	12.0(2.56) ^a

N=447; ^a Mean and standard deviation reported

Second, we used cluster analysis to develop a typology of consumers identifying statistically significant consumer types based on several attitudinal and information-seeking behaviors. There is evidence that prior beliefs are useful in defining distinct voter types for targeting education and marketing efforts (as recently reviewed by Visschers et al., 2013), and there are differences in typologies based on both attitudinal and demographic characteristics (Pew, 2011). Variables used in the cluster analysis in this paper included trust in public health information; willingness to pay to clean up the environment; use of internet search engines; use of the internet to find information on local food and farms; use of internet to find information on the local community; opinions related to each of the controversial food system policies: safety of food when produced humanely, using organic methods, and produced locally; whether the respondent has spoken to a farmer during the past two years; respondent opinion as to whether undocumented workers take jobs away from Americans; and whether a respondent does their grocery shopping in an adjacent state that does not charge sales tax.

These eleven variables were entered into a two-step clustering algorithm using SPSS version 21. To determine the number of clusters, the first stage used Swartz's Bayesian Information Criterion to find the initial number of clusters. The BIC is computed as

$$BIC(J) = -2J \sum_{j=1}^J \xi_j + mJ \log(N)$$

where

$$mJ = J \left\{ 2KA + KB \sum_{k=1}^K (LK - 1) \right\}$$

The ratio of change in BIC at each successive merging relative to the first merging determines the initial estimate. In the second stage, the initial estimate was refined by finding the largest relative increase in distance between the two closest clusters in each hierarchical clustering stage (IBM, 2012). We then used bivariate analyses (t-tests and chi-square) to determine whether there are associations between citizen type and the index of support/opposition for the policies.

Finally, we used a two-stage least squares model to estimate support/opposition for controversial food system policies (as measured by the summative index) as a function of key demographic variables including income, business ownership, gender, age, education, presence

of children in the household and political affiliation, while also controlling for the endogenously determined citizen type. We then conclude with a series of ordered probit regression models testing the impacts of these same covariates on the specific individual policies – SSB taxation, GM labeling, and worker permits for undocumented dairy laborers – as a function of these same covariates.

Results

As shown in Table 2, there are significant differences between respondent types (Type 1 versus Type 2) on each belief/behavior included in the cluster analysis, with the exception of trust in public health information for which no significant differences were evident. While in this sample the support/opposition index is skewed toward the support end of the scale (with final scores ranging from 5-15 with 5 being strongly opposed and 15 being strongly supportive), there are s Type 2 respondents on average were 2 points higher than Type 1 respondents on the policy support index (indicating stronger support for the three food policies under study). Type 2 citizens also use the internet more to search for information on food and farms and their community. They are less supportive of GM technologies and believe that local, humanely produced and organic food is safer than commercial alternatives. Fewer of these respondents believe that undocumented workers take jobs away from Americans and more have spoken to a farmer in the past two years. Finally, Type 2 respondents report being more willing to pay for environmental protection and fewer report leaving the state to save money on purchases (i.e., to avoid paying Vermont sales tax).

There are also several demographic variables correlated with citizen type. Simple bivariate analyses show there more females ($t=1.90$) and college educated ($t=3.56$) people in Type 2, and fewer Republicans ($t=3.90$). The average Type 2 respondent was slightly younger than the average Type 1 respondent (57 versus 61 years; $t=2.73$). There are more respondents who indicate they search for information about genetic engineering in Type 2($t=5.24$).

Multivariate analyses reveal similar patterns: table 3 presents the results of a logit model predicting citizen type (Type 2 versus Type 1) membership as a function of these same demographic variables. Overall women, younger respondents, college-educated respondents and respondents who actively search for information about GM foods are more likely to be in Type 2. Older individuals and Republicans are more likely to be classified in Type 1.

Table 2. Descriptive Statistics for Citizen Typology Inputs (N=447)

	Variable label	All	Type 1	Type 2	T-Test	SD ALL	SD 1	SD 2
<i>Cluster analysis inputs</i>								
SupportIndex	Index of support for controversial food system policies	12	11	13	7.48***	2.56	2.7	2.10
InternetS	How often do you use a search engine	1.55	1.21	1.93	6.98***	1.14	0.59	1.48
FoodFarmS	How often do you search for food and farm information	4.04	3.56	4.58	10.56***	1.18	0.89	1.20
CommunityS	How often do you search for information about your community	3.00	2.54	3.57	8.14***	1.46	0.08	0.10
Humane	Is certified humane safer (animals)	4.18	3.78	4.55	9.32***	0.96	1.02	0.74
Organic	Is certified organic safer	4.00	3.55	4.55	13.79***	0.91	0.85	0.68
Local	Is local food safer	4.18	3.79	4.54	10.89***	0.82	0.78	0.06
Trust	Do you trust information from health agencies (Dept. of Health)	3.42	3.13	3.68	0.75	0.9	0.94	0.78
GMTech	How supportive of you of GM technology in food production	3.68	3.34	3.99	7.29***	1.00	0.95	0.94
JobsAway	Undocumented workers take jobs away from Vermonters	3.69	3.46	3.92	4.34***	1.15	1.18	1.00
SpokeFarmer	In the last two years have you spoken to a farmer	0.65	0.63	0.68	1.1*	0.65	0.48	0.47
WTPEnviro	Are you willing to pay to clean up the environment	0.14	0.07	0.21	4.39***	0.35	0.25	0.21
Shopout	Do you grocery shop out of state to save money	0.09	0.16	0.02	5.06***	0.28	0.36	0.16
<i>Demographic covariates</i>								
Rural	1= resides in rural area	.60	0.63	0.57	1.45	0.49	0.49	0.48
Gender	1=female	0.52	0.47	0.56	1.90**	0.50	0.49	0.49
College	1=Bachelor's Degree	0.65	0.56	0.72	3.56***	0.48	0.03	0.03
Kids	1= has children in HH	0.27	0.24	0.29	1.2	0.44	0.03	0.03
Home Owner	1= home owner	0.88	0.89	0.86	0.83	0.33	0.31	0.34
Republican	1= registered republican	0.13	0.17	0.06	3.90***	0.25	0.38	0.23
LabelReader	1= searches for information on gm	0.21	0.13	0.32	5.24***	0.21	0.47	0.33
Age		59	61	57	2.73***	14.1	0.90	0.93

*p < 0.10, **p<0.05, ***p<0.01

Table 3. Predictions of Typology Group (N=447)

Outcome is: Type 2 Member (0/1)	B	S.E.	Marginal Effect
Constant	0.803	1.20	
Female	0.494**	.206	0.109**
Age	-0.017*	.009	-0.004*
College Degree	0.426*	.219	0.095*
Low Income	-0.351	.365	-0.077
High Income	0.163	.256	0.036
Children in HH	-0.121	.278	-0.027
Home Owner	-0.224	.346	-0.049
Rural	-0.285	.209	-0.063
Republican	-0.897***	.333	-0.197***
Actively Seeks GM Labels	1.151***	.263	0.253***

*p < 0.10, **p<0.05, ***p<0.01

Table 4 presents results of a two-stage least squares model predicting support for controversial food policies while treating citizen type (cluster) as endogenously determined. Membership in the second cluster (Type 2) increases the overall support/opposition index (maximum value of 15) by 1.5 points.

Table 4. Predicted Support/Opposition Index Score (2SLS, n=447)

	Index (15-point scale)			
	B	Std. Err.	Z	p-value
Constant	10.948***	1.128	9.71	0.000
Type 2 (Cluster)	1.54257***	0.552	2.8	0.005
College Degree	0.43463	0.317	1.37	0.171
Children in HH	-0.05306	0.309	-0.17	0.864
Republican	-0.74414	0.453	-1.64	0.101
Age	0.00896	0.011	0.82	0.412
Low Income	-0.30502	0.410	-0.74	0.457
High Income	-0.41555	0.289	-1.44	0.151
Business Owner	0.45885	0.388	1.18	0.237
Female	0.20859	0.288	0.72	0.469
Rural	0.42855	0.272	1.58	0.115
Unemployed	-0.29589	0.200	-1.48	0.138

*p < 0.10, **p<0.05, ***p<0.01

Table 5. Support/Opposition for Specific Food Policies (2-stage ordered logit, n=447)

	GM Labeling (5-point scale)		SSB Taxes (5-point scale)		Work Permits (5-point scale)		Index (15-point scale)	
	<i>B</i>	<i>Std. Error</i>	<i>B</i>	<i>Std. Error</i>	<i>B</i>	<i>Std. Error</i>	<i>B</i>	<i>Std. Error</i>
Constant	3.365***	0.516	0.261	0.473	0.901	0.682	10.948***	1.128
Type 2 (Cluster)	0.096	0.154	0.425***	0.144	0.165	0.215	1.543***	.552
College Degree	0.257**	0.130	0.206*	0.124	0.316*	0.177	0.435	.317
Children in HH	-0.569***	0.151	0.247*	0.142	-0.038	0.203	-0.053	.309
Republican	-0.399**	0.181	-0.392**	0.180	-0.288	0.239	-0.744	.453
Age	-0.016***	0.005	0.005	0.005	0.009	0.007	0.009	.011
Low Income	0.244	0.203	-0.102	0.189	-0.436*	0.250	0.305	.410
High Income	-0.048	0.140	-0.179	0.132	-0.074	0.196	-0.416	.289
Business Owner	0.273	0.186	0.086	0.176	-0.055	0.263	0.459	.388
Female	0.373***	0.122	0.088	0.115	0.068	0.168	0.209	.288
Rural	0.076	0.125	0.187	0.120	0.039	0.176	0.429	.272
Unemployed	-0.060	0.096	-0.135	0.092	-0.091	0.131	-0.296	.200
u_1	0.786***	0.109	0.330***	0.040	0.145***	0.041		
u_2	1.552***	0.076	0.603***	0.049	-	-		
u_3	2.650***	0.081	1.216***	0.065	-	-		
AIC	949.5		1345.7		413.7			

*p < 0.10, **p < 0.05, ***p < 0.01; The work permit statement was reported on a 3 point scale.

As shown in Table 5, when the three controversial food system policies are examined individually (ordered probit model, maximum outcome variable value of 5), Type 2 group membership remains strongly and significantly positively associated with support for SSB tax policy. There is no significant relationship between Type 2 group membership and support for GM labeling or providing work permits to undocumented dairy workers. Rather, citizen support or opposition to these policies appears to be largely demographically determined. Support for GM labeling is most prominent among respondents with a college degree and female respondents, while older respondents, Republican respondents, and respondents with children are less supportive of labeling. Work permits appears to be more related to only two demographic characteristics: having a college degree (increasing support for work permits) or being from a low-income household (decreasing support for work permits). When all three controversial food system policies are treated as a single index (2SLS OLS regression), only Type 2 group membership is significantly associated with support for all policies.

Discussion

In complex policy debates in which substantial information asymmetries exist between policy advocates and the voting public, interest groups frequently resort to aggressive information-creation and information-dissemination campaigns to win over citizens. Citizens, meanwhile, must rely on a combination of trusted new information and pre-existing value systems and decision-making heuristics to navigate such controversial and complicated debates. There is already evidence to support the notion that consumers will have similar attitudes about related policy questions - support for GM labeling, for example, has been associated with support for many other consumer issues related to food production in general, including local, low-input, and organic agriculture, as well as with more general concerns for animal welfare, trust and community relationships, and fair labor practices (Devos et al., 2007; Thompson et al., 2008; Martinez et al., 2010; Kolodinsky, 2012). There is also evidence that the way consumers process information, and the information that matters most in policy debates, varies across contexts: Frewer et al. (2013) review global trends in support for GM foods and find risk perceptions to be of greatest importance in shaping the GM debate in Europe, while moral concerns surrounding the use of GM technology are lowest in Europe and highest in North America and Asia. Meanwhile new research by Zhang et al. (2015) using structural equation modeling (SEM) suggests that in major Chinese cities consumers' objective knowledge about genetically modified foods is a greater determinant of pro-GM policy support than preexisting subjective attitudes.

This study has provided some preliminary support for the hypothesis that food system policies can be grouped and that support for such policies are related to statistically distinguishable groups of people as defined by their self-reported beliefs and behaviors. Such beliefs and behaviors are tied to the knowledge that people have about a particular issue. We empirically estimated two typology groups, with group membership clearly linked to support for or opposition to current controversial food system policy issues. In so doing we add to the understanding of how consumers may process new information in complex and high-profile policy debates, and which topics might be considered by consumers as related (e.g., support for GM labels and support for SSB taxation), versus distinct and separate (e.g., farm labor and immigration policy).

The degree to which information translates into policy support and related behavior change is very difficult to isolate – for example, as Weaver and Fink (2003) note, although there

is strong evidence that the provision of sugar information on food labels in the U.S. was associated with decreasing consumption of sugars by label-readers over the past two decades, it is difficult to ascertain to what degree this effect is due to the provision of the information versus to the information-seeking behavior (and underlying motivations, e.g., reduced sugar intake, weight loss, etc.) of the label-reading consumers. Recent research further suggests the receipt of new information not only influences consumer attitudes and behaviors, but can actually alter the consumers' experience with the product – with some groups of consumers significantly more likely to report that a food labeled “organic” tastes better than a food without the organic label, even under experimental conditions where the two food products are one and the same (Lee et al., 2013). Combined with the fact that different consumers more inclined to trust different sources of information (Roe and Teisl, 2007), such findings suggest the ultimate impacts of information asymmetry in food policy debates remains a wide open area for further study.

Limitations and Next Steps

A major assumption of this exploration has been that beliefs of respondents were formed, at least in part, by information received from the media, government, and other sources, including academic literature. But owing the vast and increasing diversity of information sources available to consumers, particularly in a modern digital and social media context (Kuttschreuter et al., 2014), it is extraordinarily difficult to disentangle the effects of any single information source on consumer attitudes and behavior. In the next iteration of this research, we will directly tie evidence on media messages to citizen support/opposition to controversial food system policy initiatives over time, using longitudinal data on local newspaper and new coverage alongside repeated survey rounds measuring consumer attitudes towards food policy initiatives. The addition of actual data on how the three policy issues described here have been depicted in the media over time will provide both quantitative and qualitative variables to be included in our estimation of citizen typologies.

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