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## ABSTRACT

The Climate Crisis is one of the most prominent issues for society today. In the United States, local governments, at the city and state level, have been documented to be powerful forces determining environmental policy and the centers of the greatest impact. Theory suggests that it is the business elite, in cooperation with the political elite, which determine the outcome of local environmental policy and its enforcement. However, some have pointed out the importance of stakeholders, citizens and consumers, as being influential in local environmental policy creation. I examine three models to determine which factors are of the greatest influence in determining which cities adopt environmental policy and which do not. Included are the investment model, prevalence of manufacturing employment should deter environmental policy, the homogeneity model, greater homogeneity of culture will increase likelihood of environmental policy, and the citizens' characteristics model, those characteristics that individuals can migrate with will have the greatest effect. This paper examines the relationship of these models with the likelihood of a city to agree with the United States Mayor Climate Protection Agreement, a city-level version of the Kyoto Protocol, and finds statistically significant relationships for homogeneity, political culture, educational attainment and median income. Results suggest that business investment has no relationship with adoption of environmental policy and that citizen characteristics have a greater effect than theorized.

[http://depts.washington.edu/chid/intersections\\_Winter\\_2009/Phaedra\\_Boyle\\_Cities\\_as\\_Forces\\_in\\_Policy.pdf](http://depts.washington.edu/chid/intersections_Winter_2009/Phaedra_Boyle_Cities_as_Forces_in_Policy.pdf)

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## Examination of United States Cities as Forces in Environmental Policy

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The Climate Crisis is a societal issue of the utmost impact. Environmental science has shown evidence that signs of a turning point in global warming are now happening in our lifetime including unprecedented glacier melt, rapid species extinction, and global-wide temperature increase unlike anything we've seen in our history (Harvey 2006; Moran 2007; Steffen, Anderson and Tyson 2003; Rahmstorf, Cazenave, Church, Hansen, Keeling, Parker and Somerville 2007).<sup>2</sup> A heightened sense of urgency has permeated our economics, our lifestyles, and our laws. The methods and policies by which we react to this critical time are of growing interest in sociological and political literature. Although investigation in environmental policy is generally conducted on the global and national level, evidence suggests that an analysis in the United States is best conducted at the urban level. In this paper, I test three models that might explain why some cities adopt a particular environmental policy while most do not. These models include the investment model, the citizen's characteristics model, and the homogeneity model. I examine whether homogeneity or wealth have the greatest influence on adoption of environmental policy at the urban level in the United States. I also examine whether it is individual citizen or metropolitan characteristics that have the greatest influence on whether cities adopt environmental policies or not.

Examinations of environmental policy are traditionally conducted on the global and federal level. Often the players are federal governments, private interest groups and public advocates. For example, Agnone (2007) finds that protest by individuals in combination with environmental advocacy, is the force that moves the political wheel of environmental policy at the federal level. As in the case of Agnone's analysis, most environmental policy analyses are conducted at the global and national echelon. This is appropriate as environmental issues have global impact and, as van Vliet (1992) suggests, they can only be solved at the global level. However, there is a growing body of literature that suggests that urban environmental policy development is most relevant for capitalistic societies, especially for environmental issues, either because of economic control and development or because of the localized nature of the issues themselves.

A dominant genre of policy study is that of neoliberalism. Generally it is seen as a global and national reorganization of economics, essentially shifting economic control from the public to the private sphere. However, as Peck and Tickell (2002) suggest, it is also an

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<sup>2</sup> For an excellent account of the effects of global warming, see the 2007 ICLEI report.

explanation for current reorganization of economics *and* politics at the urban level. Not only does economic control lay in the private sector but political control, such as manipulation of city zoning laws, is ultimately conducted by the private sector as well. Sociologists, such as Brand (2007) and While, Jonas and Gibbs (2004), take it one step further and relate this shift of economic power specifically to environmental policy at the urban level. In fact, Brand (2007) suggests that policies surrounding environmental issues have allowed neoliberalism to be the method by which mayors can wrest political power from the federal level. He argues that there is stagnation of environmental policies at the federal level while urban environmental policies surprisingly flourish. This is due to cities using indexes of how “green” they are to compete against one another. The more environmentally friendly a city seems to be to the public, the more attractive it is to its current and prospective citizens. Cities are no longer just public centers but they actively market themselves as if they were private corporations vying for the highest tax dollars. He also posits that environmental issues are one specific way that urban politicians are placing political responsibility on individual citizens. Urban governments enthusiastically encourage citizens to perceive the Climate Crisis as a domain of their control and responsibility. Examples of this are cities that fund advertisements for alternative methods of transportation, not through public transit, but bicycles and hybrid vehicles, which require individual investment in time and money. However, this allows for the possibility that environmental policy adoption is not influenced as much by metropolitan characteristics as it is by the distinctiveness of the individuals who live in the city itself, those who are attracted to the city’s environmental policy and those who actively take up the baton of environmental responsibility.

Gonzalez (2005) also proposes that urban environmental policy formation is a direct result of private investment coordinating with political elites. He argues that urban environmental policy adoption has always been more relevant than federal, especially in the United States. The first cities flourished and grew under the directives of private business owners and developers. When environmental issues arise, due to growing density, manufacturing and growing automobile use, those most fiscally invested are the first to move towards protection of their assets. This may mean stalwart opposition to new or a stricter environmental policy if such restrictions pose great costs, as is the case for manufacturing.

In contrast, Moran (2007) suggests that urban and state reaction to environmental policy is an occurrence of locality. In other words, those present at the sites of pollution are the most apt to take action. Investment in this sense is directly related to living and communing in the location of the pollution, not business investment. An example of this is in Chattanooga, Tennessee. In 1968 Chattanooga was determined by the Federal Government to have the most polluted air of any U.S. city. Over the past thirty years the community has made combined efforts to clean up not only the air, but water and soil pollution as well. There are now “greenways”, bike and running paths that connect all peripheries of the city to the center. Also, the city has invested in a fleet of 110 hybrid-electric buses that provide transportation for at least one million people, according to local estimates (Porter 2007). Environmental advocacy through citizens,

local business owners, and city government, made it possible to change the fate of this incredibly polluted city.

Moran (2007) also attributes higher levels of action to greater homogeneity of culture and ethnicity within the community. The more alike the citizens of a community are to each other the easier it is for them to agree on which policies are important to implement. This is especially relevant in his examples of cities in South America that must rally against international business that profit greatly from indiscriminately harvesting local resources at the community's environmental detriment. Homogeneity may not play the same role in United States cities where development and industry have a longer history.

#### Cities as Centers for Environmental Policy

**I**n the United States, burgeoning cities like Chicago, St. Louis, Pittsburgh, Cincinnati, Birmingham and New York, were the first to feel the environmental impact created through contaminated water and air. Gonzalez (2005) and Moran (2007) agree that cities like these were spurred into action because of pollution from increased use of coal and enormous population growth at the turn of the century. Later, Los Angeles experienced smog levels that reached unhealthy proportions by 1943. Air pollution caused vomiting, nausea, respiratory problems and death (CEPA 2008). Originally it was called a gas attack and was thought to be the fault of one butadiene plant. Further investigation placed responsibility on uncontrolled emissions from several industrial manufacturing plants and the majority of the pollution responsibility on the growing use of the automobile. Los Angeles joined the ranks of other polluted cities in establishing its own emissions policies (CEPA 2008; Gonzalez 2005).

In 1947, California Governor Earl Warren created the first state-wide policy for air pollution in the United States, the Air Pollution Control Act. The Federal Government followed with the 1955 Federal Air Pollution Control Act that provided research and technical assistance to the states, but no regulation or enforcement. That same year California amended its own Act to require enforceable controls on air pollution. The local smog issues were such that Los Angeles police were authorized to assist the State Department of Public Health with any enforcement necessary. Enforcement and regulation for air quality arrived from the Federal Government in the forms of the Federal Air Quality Act of 1967 and amendments to the Federal Clean Air Act in 1970, as well as the creation of the Environmental Protection Agency (EPA). The new Federal Air Quality Act of 1967 is seen as the first national basic standard, twenty years after the first state-wide policy was enacted.

The most recent Federal Clean Air Act of 1990 was also a reaction to stricter California emissions standards (Gonzalez 2005). In 1989 the states of New York, New Jersey and the region of New England decided to adopt California emissions standards. Later that year, California raised the bar even further. This would have formed a three-tiered

standard of emissions laws in the United States, the strictest two enacted by California in 1955 and 1989, and the least strict enacted in 1970 by the Federal Government. This would have created difficulty for the automobile industry and especially for the oil industry. It also would have undermined Federal authority in the realm of environmental standards, creating political and legal confusion. To avoid this ambiguity, the Federal Government created the Clean Air Act of 1990. This Act is especially relevant to the oil industry. It requires that “clean” gasoline, with oxygenated additives that reduce smog, be provided for the eight most polluted cities in the United States (Los Angeles, Houston, New York, Baltimore, Chicago, Milwaukee, Philadelphia, and San Diego) as well as most of Connecticut, but that the oil industry can determine how to provide and produce that fuel (Gonzalez 2005). At present, several states including Connecticut, New Hampshire, New Jersey, New York, and California are working together to reduce green house gas emissions produced via cars by 30 percent by 2016. This standard is stricter than Federal limits and endorsed by at least sixteen states (Broder and Barringer 2007).

Cities are also making political moves towards stricter environmental policy. In 2005, two separate meetings of mayors took place concerned with environmental policy. The United Nations World Environment Day Conference in San Francisco involved over fifty mayors from around the globe concerned with methods to reduce pollution impact in their cities. One week later, the United States Conference of Mayors convened in Chicago where 166 mayors agreed to sign a city-level version of the Kyoto Protocol, the Climate Protection Agreement, wherein they pledge to reduce emissions 7% below 1990 levels (Grzeskowiak 2005, Cochran 2007). As of May, 2008, 853 mayors have signed this pledge. This is approximately one third of all United States cities (U.S. Census 2008; Globalis 2007). In the United States, local government is the level where environmental policy has been created and continues to be at the forefront of all new policy conception and enforcement.

#### Dependent Variable of Environmental Action

**I**n one analyses of city-level environmental policy, Portney (2003) considers thirty-four indicators of sustainability seriousness over twenty-four cities. These indicators include land use policies, transportation plans and style of governance. In an effort to typify what cities were more likely to succeed under these indicators he chooses independent variables such as percentage of lone commuters, use of public transportation, total government spending on the environment, and education level. Portney (2003) finds only three independent variables that are strongly positively correlated with greater support for environmental policy: location on the West Coast, median age, and percentage of high school graduates. Some independent variables are negative correlates: percent below eighteen years of age, percent African American, poverty rate and percentage of workforce in manufacturing. Independent variables that seem to have no relationship included median family income, average unemployment rate, median house value, government spending (environmental, per capita, and total),

percent Hispanic, percent over 65 years old, percent employed in service sector, percent lone commuters, percent commuters using public transportation, and percent Democrat. In a multivariate regression the only independent variables that strongly associate with sustainability are median age and percentage employed in manufacturing. The younger the population and the greater the percentage of the population working in manufacturing, the less likely that city will take sustainability seriously. This study strongly suggests that prevalence of manufacturing in the area is related to environmental policy. Portney (2003) utilizes a dependent variable that is difficult to define, sustainability, and it may be that his limited sample is unable to pick up the nuances he was looking for in regards to his other independent variables.

There are some indexes of environmental advocacy at the city level. Portney (2003) cites the "Green Metro Index" from the World Resources Institute in 1993. However, efforts on my part to research this index have been fruitless. There is no evidence that a "Green Metro Index" exists in the World Resources Institute catalogue. There are ratings that have been developed for the popular magazine, National Geographic, by the Yale School of Forestry, which gauge the environmental friendliness of all U.S. cities over 100,000 in population (total of 251 cities) and resulting in the "Green Guide" of 2005 and 2006. The "Green Guide" provides summary information for its top ten cities, but does not provide details of how the cities are scored; therefore some other data source is necessary.

A single indicator is available that proves useful for a large sample of United States cities. As mentioned previously, in 2005, The United Conference of Mayors endorsed the Climate Protection Agreement, a pact that can be signed by mayors that agree to reduce emissions to seven percent below 1990 levels in their cities, the same standards set out by the Kyoto Protocol (Cochran 2007). 740 mayors had signed that agreement as of December, 2007 and by February, 2008 there were 780 cities. While it could be said that pledging to the Climate Protection Agreement is no guarantee of instatement of widespread environmental policies, a 2007 survey suggests otherwise.

In April and May of 2007, 134 cities responded to a U.S. Conference of Mayors Climate Protection Center survey that meant to explore and summarize the actions that each city was taking to enact and enforce environmental policy. A majority of the cities surveyed changed their government transportation to alternative vehicles (either bio-diesel or electric), use renewable energy as the main source of power for their cities, and are using energy-efficient lighting in all of their public installments and buildings. Over 75 percent of the cities surveyed are using various techniques to encourage or require the private sector to construct energy-efficient and sustainable building techniques (Cochran 2007). These results imply that reducing emissions, as well as other environmental advocacy, are taken quite seriously by the cities that have pledged to the Climate Protection Agreement. Analysis of factors that these cities have in common provides a better understanding of why some cities enact environmental policies while most do not.

### Modeling Environmental Policy Action

In his examination of emissions policies in the United States, Gonzalez (2005) suggests that investment is the most relevant factor for environmental policy in a capitalist society. This theory posits that business elites behave in a combined effort. As Gonzalez puts it, they act as “a coherent social political unit or class” (2005: 27). Beilere and Konisky’s (2000) Great Lakes policy study supports this supposition. They examine how policy makers engage local citizens. They find that the citizens who are involved in the policy-making process are not representative of their communities. Instead, they are business elites comprising a minute percentage of the population. Those that agree on particular policies are able to push their agenda through. In this account, wealthy, business-owning individuals influence the political arena.

Examination of environmental policy in United States must consider the role of businesses within the location of policy adoption. Type of business is highly relevant. History has shown that industrial manufacturing contributes greatly to pollution (Gonzalez 2005). In contrast other types of business, such as the service industry, are minor contributors. For this reason, manufacturing businesses might be required to bear the brunt of cost if environmental policy becomes stricter. A high level of manufacturing businesses in an area may contribute to laxer environmental policies than in other areas. However, it is important to note that high density of manufacturing in an area may lead to an environmental state that requires political action. As Gonzalez (2005) and Moran (2007) agree, environmental policy was first created due to intense pollution experienced by those United States cities that had the most industry and population.

A community’s approach to pollution issues may depend on more than what businesses are present. As Moran (2007) points out that:

After all, human agency takes place within an environmental and social matrix, and individuals are members of social groups with distinct shared economic, social, cultural, and political interests. Thus...we must balance this attention with a concern for how agents share similar values and make similar decisions that have cumulative impacts (2007:13).

In other words, how a community perceives its relationship with the environment may also hinge on how closely that community shares similar ideals. For example, some religious affiliations consider themselves keepers of “God’s world” and strive to improve environmental conditions (Barak 2003; Moran 2007). It is possible that religious affiliation allows likeness of ideals, ties one closer to the community and to the local environmental issues that affect it. Moran (2007) suggests homogeneity, of religion, ethnicity or otherwise, may be a factor in determining how a culture approaches the environment. Similarity of culture, ethnicity or race can help a community come to a consensus. Once a community decides that a policy is necessary, like ideals act as a

facilitator towards adoption of the policy. Therefore, if other factors, such as socio-economic status, make adoption of environmental policy more likely, homogeneity can act as a catalyst towards the action of that adoption.

Finally, Brand (2007) proposes that the private and political elite are utilizing environmental concerns to restructure not only economics at the urban level but environmental responsibility as well. Private business advertises new products that consumers should buy to protect the environment and public policy makers suggest that individual responsibility for transportation and property ownership are the best ways to protect the environment. This view puts the individual citizens of cities at the forefront of environmental policy, even if it suggests that these citizens are being coerced by the business and political elite.

I propose three separate models for prediction of environmental policy adoption. The first is based in the business elite theory and the history of manufacturing industry influence in environmental policy which I call the investment model. It also subscribes to the assumption that the metropolitan characteristics are more important than the characteristics of individual citizens since metropolitan characteristics are more likely to be closely related to type of prevalent industry. High levels of manufacturing employment indicate high levels of manufacturing business owner investment in a given city. High levels of such investment will influence environmental policy in one of two ways: either as a hindrance, since manufacturing industry would have to make costly accommodations in the face of new environmental protection, or as a facilitator, since sites of greatest pollution prove to be sites that necessarily need environmental protection. The characteristics of the given city of business investment will relate to whether the industry is established there or not. Such characteristics include wealth and density. Cities with more wealth and a larger workforce are more likely to have higher levels of manufacturing.

Individual citizens' characteristics are considered independently in the citizens' characteristics model. Citizens can and will emigrate from one city to the next and take their individual distinctiveness with them. An influx of particular types of citizens (i.e. wealthy or educated citizens) could create the urban area or it could be caused by the areas attractiveness to these particular people. Therefore, citizen characteristics, such as education and political preference are considered separately in this analysis. I suggest that higher individual education levels and conservative political preferences will effect environmental policy adoption inversely; higher education levels associate with higher environmental policy adoption and conservative political preferences are the opposite. Discussion of association between variables of the first two models is in the results section, since cities and their citizens are linked to each other in this analysis.

Finally, a third model addresses homogeneity of the citizenry make-up of each city in the homogeneity model. Essentially, these are the characteristics of individuals in contrast to one another in an urban area. This model suggests that greater diversity will



result in less likelihood of new environmental policies. Within a city diversity can occur in many ways. I address diversity of ethnicity, religiosity and age and how they influence environmental policy adoption.

#### Data and Variables

*Data Collection:* Data is drawn from several sources including the United States Mayors Climate Protection Center, the United States Census of 2000, CNN Presidential Votes 2000 and 2004, The Association of Religion Data Archives, and the City-County Data Book of 2000. Cities are defined as a gathered population of 20,000 or more people in a defined area. Data is available for 1035 cases on both the independent and dependent variables and are used in this analysis.

*Dependent Variable:* The dependent variable, whether or not a city was likely to advocate environmental policy, is determined by a list available through the U.S. Mayors Conference as of February, 2008. At that time 780 cities had pledged to reduce greenhouse gas emissions to seven percent below 1990 levels. Of the 780 cities on the list, 376 have available data. An additional 658 cities that did not sign onto the Climate Protection Agreement are also analyzed. This is coded as a dummy variable; “not pledged” is 0 and “pledged” is 1.

*Independent Variables:* Variables of analysis in the investment model are proportion of manufacturing employment within each city, median income of the city per one thousand dollars, percent unemployed, and population per square foot. These variables are all accrued from City-County Data Book of 2000.

Variables of interest in the citizen’s characteristics model are proportion of the population, twenty-five or older, who have obtained at least a bachelor degree and the proportion of citizens who voted for Bush in 2000. This data is available through the 2000 U.S. Census and CNN Presidential Votes 2000 and 2004 respectively. (Please note that 2000 Florida data is unavailable. 2004 data is used in its place and is presumed to reflect the same political culture of 2000.)

Variables in the homogeneity model are entropy scores calculated from the proportions of racial (White, Black, Asian, Native, Other or Two Races; unfortunately Hispanic is included in the White and Black categories), religious (Mainline, Evangelical, Catholic, Orthodox and Other; note that Jewish and Muslim affiliation is included in the Other category by this survey), and age (0 to 17 years of age, 18 to 44, 45 to 64, and 65 and older) categories represented in each city. Age and race data is available through the City-County Data Book of 2000 and religious data is found in The Association of Religion Data Archives (ARDA), as collected by the Association of Statisticians of American Religious Bodies (2000).

Homogeneity of each city is measured using proportions of race, proportions of age categories and proportions of religious affiliation. These proportions are transformed into an entropy score for each category using the following formula:

$$E = \sum (\Pi) \ln(1/\Pi)$$

Where  $\Pi$  is the proportion of each race, age or religious affiliation within the city depending on the score being calculated. This formula is also used by Iceland (2000) in his examination of segregation in relation to the diversity of a given metropolitan area. He adopts this method from Massey and Denton (1988). The greater the entropy score, the higher the diversity within the area being measured. A maximum score is the natural log of the number of categories being used. In this case, a maximum entropy score for race is  $\ln 6$  or 1.792, a maximum entropy score for religious affiliation is  $\ln 5$  or 1.609 and a maximum entropy score for age is  $\ln 4$  or 1.386. Scores nearing maximum levels are signs of greater diversity within the city of interest.

Descriptive statistics (minimum, maximum, mean and standard deviation) and correlations for all variables of interest are carried out. Analysis requires binary logistic regression since the dependent variable is binary in nature.

#### Results

All tests are two-tailed with an alpha level of .05. Initial correlations calculated between each independent variable and the dependent variable of Climate Protection Agreement adoption (CPA adoption) find that all variables are related except for the proportion of manufacturing employment and median income. The proportion of popular vote for Bush, level of unemployment as well as entropy scores for age, are all found to be negatively correlated with CPA adoption ( $r = -.183, -.088, -.067$ ;  $p$ -values = .000, .005, and .031 respectively). Density, entropy scores for race and religion and the proportion that have bachelor's degrees are all positively correlated with CPA adoption ( $r = .078, .097, .161, .192$ ;  $p$ -values = .012, .002, .000, .000 respectively).

The variables of the investment model pose interesting relationships. The proportion of manufacturing employment has a negative relationship with median income and density. It has a positive relationship with unemployment. In general, the cities most likely to have the highest proportions of manufacturing employment will also have lower median incomes, higher levels of unemployment, and are based in cities with a sprawling infrastructure. Most importantly is the relationship that these variables have with CPA agreement. In this initial analysis, density has a positive association while unemployment has a negative one. Manufacturing employment and median income appear to have negative and positive relationships, respectively, that are not significant. At this initial stage, the investment model is not supported.

Table 1. Descriptive Statistics

	N	Minimum	Maximum	Mean	Standard Deviation
CPA Agreement	1060	0	1	.37	.483
Density	1060	11.3	51606.2	3909.241	3801.0192
Diversity of Race	1060	.097	1.501	.67253	.286086
Diversity of Age	1060	.675	1.383	1.27770	.073850
Diversity of Religion By County	1060	.120	1.560	1.05060	.184067
Proportion Employed By Manufacturing	1060	.000	2.034	.13023	.149633
Proportion With Bachelor Degree	1060	.02	.41	.1675	.07625
Proportion Who Voted For Bush by County	1035	.09	.82	.4741	.12088
Percent Unemployed	1060	.0	19.4	4.073	2.2904
Median Income Per \$1,000	1060	15.882	139.895	43.61435	15.288172
Valid N (listwise)	1035				

Table 3. Regression Analysis of Investment Model

Step 1 (a)	B	S.E	Wald.	df	Sig.	Exp(B)	95% C.I. for Exp (B)	
							Lower	Upper
Proportion Empl. By Man.	.077	.439	.031	1	.861	.926	.391	2.190
Median Income Per 1,000	.007	.005	2.169	1	.141	.993	.983	1.002
Percent Unemployed	.138	.038	13.164	1	.000	.871	.809	.939
Population Per Mile <sup>2</sup>	.000	.000	10.224	1	.001	1.000	1.000	1.000
Constant	.112	.331	.114	1	.736	1.118		

Table 4. Regression Analysis of Citizen's Characteristic Model

Step 1 (a)	B	S.E	Wald.	df	Sig.	Exp(B)	95% C.I. for Exp (B)	
							Lower	Upper
Prop w/Bachelor Degree	5.243	.872	36.186	1	.000	189.303	34.293	1044.976
Prop Who Voted Bush	-3.250	.564	33.159	1	.000	.039	.013	1.117
Constant	.066	.304	.047	1	.828	1.068		

Table 2. Correlations

	CPA Agreement	Density	Diversity of Race	Diversity of Age	Diversity of Religion by County	Proportion Employed by Manufacturing	Proportion With Bachelor Degree	Proportion Who Voted for Bush by County	Percent Unemployed	Median Income Per \$1,000
CPA Agreement	1 Pearson Correlation Sig. (2-tailed)									
Density	.078 Pearson Correlation Sig. (2-tailed)	1								
Diversity of Race	.097 Pearson Correlation Sig. (2-tailed)	.312 .000	1							
Diversity of Age	-.067 Pearson Correlation Sig. (2-tailed)	-.146 .000	-.245 .000	1						
Diversity of Religion by County	.161 Pearson Correlation Sig. (2-tailed)	-.117 .000	-.095 .002	-.060 .054	1					
Proportion Employed by Manufacturing	-.016 Pearson Correlation Sig. (2-tailed)	-.089 .004	.000 .999	.082 .008	-.116 .000	1				
Proportion With Bachelor Degree	.192 Pearson Correlation Sig. (2-tailed)	-.107 .001	-.232 .000	-.203 .000	.172 .000	-.120 .000	1			
Proportion Who Voted for Bush by County	-.183 Pearson Correlation Sig. (2-tailed)	-.407 .000	-.177 .000	-.052 .094	-.027 .383	.075 .016	-.012 .701	1		
Percent Unemployed	-.088 Pearson Correlation Sig. (2-tailed)	.150 .000	.304 .000	.050 .110	-.170 .000	.067 .032	-.599 .000	-.011 .733	1	
Median Income Per \$1,000	.016 Pearson Correlation Sig. (2-tailed)	.006 .856	-.118 .000	.088 .005	.108 .001	-.100 .001	.674 .000	-.208 .000	-.507 .000	1

a. Listwise N=1035

Table 5. Regression Analysis of Homogeneity Model

Step 1 (a)	B	S.E	Wald.	df	Sig.	Exp(B)	95% C.I. for Exp (B)	
							Lower	Upper
Diversity of Race	.691	.236	8.560	1	.003	1.996	1.256	3.173
Diversity of Age	-.904	.896	1.017	1	.313	.405	.070	2.347
Diversity of Religion	1.770	.383	21.365	1	.000	5.872	2.772	12.438
Constant	-1.728	1.311	1.737	1	.188	.178		

Table 6. Regression Analysis of Investment and Citizen's Characteristics Model

Step 1 (a)	B	S.E	Wald.	df	Sig.	Exp(B)	95% C.I. for Exp (B)	
							Lower	Upper
Prop Empl by Man	.389	.454	.734	1	.392	1.475	.606	3.591
Median Inc. Per 1,000	-.045	.007	43.333	1	.000	.956	.944	.969
Percent Unemployed	-.021	.041	.254	1	.614	.980	.904	1.062
Population per Mile <sup>2</sup>	.000	.000	.979	1	.322	1.000	1.000	1.000
Prop w/Bachelor Deg	11.386	1.437	62.763	1	.000	88091.9	5267.07	1,473,340.39
Prop Who Voted Bush	-4.322	.662	42.571	1	.000	.013	.004	.049
Constant	1.426	.544	6.873	1	.009	4.161		

Table 7. Regression Analysis of all Variables

Step 1 (a)	B	S.E	Wald.	df	Sig.	Exp(B)	95% C.I. for Exp (B)	
							Lower	Upper
Prop Empl by Man	.599	.465	1.661	1	.197	1.821	.732	4.528
Median Inc Per 1,000	-.054	.008	50.901	1	.000	.948	.934	.962
Percent Unemployed	-.041	.043	.895	1	.344	.960	.882	1.045
Population Per Mile <sup>2</sup>	.000	.000	.991	1	.319	1.000	1.000	1.000
Prop w/Bachelor Deg	13.484	1.633	68.179	1	.000	717,911.87	29,243.19	17,624,530.7
Prop Who Voted Bush	-4.023	.685	34.526	1	.000	.018	.005	.068
Diversity of Race	1.400	.293	22.891	1	.000	4.056	2.285	7.197
Diversity of Age	3.331	1.122	8.821	1	.003	27.963	3.104	251.894
Diversity of Religion	2.055	.442	21.654	1	.000	7.804	3.285	18.541
Constant	-6.034	1.739	12.039	1	.001	.002		

Variables in the citizens' characteristics model exhibit a positive correlation for proportion with a bachelor degree and negative correlation for proportion who voted for Bush with CPA adoption. These relationships support this model. The relationship they exhibit with each other is negative but is not significant.

Of interest is the relationship between variables of the investment and citizens' characteristics models. Proportion of manufacturing employment is negatively associated with bachelor degree attainment and positively associated with voting for Bush. The strongest relationship is that of median income and bachelor degree attainment. In general, attainment of a bachelor degree allows for greater income. The significant positive relationship exhibited supports this supposition. This analysis also reveals that bachelor degree attainment is related to lower likelihood of unemployment.

Independent variables for the homogeneity model all exhibit significant relationships with the dependent variable. The more diverse the racial and religious make-up of a given city the more likely that city will pledge to the CPA. However, the greater variety in the age structure the less likely they will pledge to the CPA. Greater diversity, in respect to race and religion, appears to run against this model's predictions.

A logistic regression analysis is run for each model. In the case of the investment model, all relationships seem to reflect their separate correlations with the dependent variable; Percent unemployment is negatively related ( $r = -.138$ ,  $p\text{-value} = .000$ ), density is positively related (although weaker;  $r = .000$ ,  $p\text{-value} = .001$ ) and manufacturing employment, as well as median income, are not significantly related. Of interest however, is that the relationship of median income becomes negative when other variables in this model are held constant.

For the citizens' characteristics model, the regression analysis does not change their respective relationships with CPA adoption. However, both variables have stronger relationships when the other is held constant.

In the case of the homogeneity model, all of the relationships are similar to their correlations but greater diversity of age appears to have no significant relationship when other measures of diversity are controlled for, suggesting that this is either not a good measure of diversity or that religion and race are more prominent and suggestive of diversity in general.

Next I analyze the possible influence that the investment model, representing the cities in which the manufacturing investment occurs, may have on the citizens' characteristics model, representing the citizens that can and will emigrate, taking their preferences and characteristics with them. When combining all six variables of interest (proportion manufacturing employment, median income, percent unemployed, density, bachelor

degree attainment, proportion who voted for Bush) the relationship between bachelor degree attainment and CPA adoption becomes incredibly strong ( $B = 11.386$ ,  $p\text{-value} = .000$ ). Individual educational attainment of a bachelor degree is the strongest indicator of whether a city will sign onto the CPA. Also of great interest is the emergence of a significant and negative influence of median income on CPA adoption ( $B = -.045$ ,  $p\text{-value} = .000$ ). These are intriguing results since median income and bachelor degree attainment are positively correlated with each other but are inversely related to CPA adoption. This analysis proposes that the cities that are most likely to sign onto the CPA are those that have large proportions of citizens with bachelor degrees and lower levels of income relative to other cities. Further implications of these findings will be discussed in the conclusion. Also of note, the proportion who vote for Bush remains negative and significant even when controlling for bachelor degree attainment, income and other factors ( $B = -4.322$ ,  $p\text{-value} = .000$ ).

Finally I analyze all variables together. Of the nine variables median income, proportion with bachelor degrees, proportion who voted for Bush and all three types of entropy scores are significantly related to CPA adoption. Median income and proportion who voted for Bush have a negative influence ( $B = -.054$ ,  $p\text{-value} = .000$  and  $B = -4.023$ ,  $p\text{-value} = .000$ ). Proportion with bachelor degrees, and all three entropy scores for race, age and religion have positive influences, ( $B = 13.484$ ,  $p\text{-value} = .000$ ;  $B = 1.400$ ,  $p\text{-value} = .000$ ;  $B = 3.331$ ,  $p\text{-value} = .003$ ;  $B = 2.055$ ,  $p\text{-value} = .000$ ). Of the predictors of CPA adoption, greater proportion of citizens who have attained bachelor degrees is the strongest. Controlling for all other variables of analysis increases the strength of this relationship. Also of interest is the emergence of greater diversity of age as a positive, significant predictor of CPA adoption.

This final analysis supports the citizens' characteristics model. The strongest relationships of all of the variables are those that individual citizens can take with them if they choose to emigrate; that is cities with citizens that are highly educated and less likely to vote for Bush (and perhaps for the republican party in general) are the cities that will adopt the CPA.

Characteristics inherent to a given city and that influence investment are generally not related with the exception of median income. Controlling for all other factors, the median income of a city is negatively associated CPA adoption. This analysis falls short of supporting the investment model. In regards to the homogeneity model, results support the idea that diversity, not homogeneity, facilitates adoption of the CPA. All relationships are positive and fairly strong.

## Conclusion and Discussion

Theory suggests that type of prevalent business is directly related to environmental policy adoption. This appears to not be the case. In both the correlation analysis as well as the logistic regression analysis, manufacturing employment had no significant relationship to CPA adoption. This suggests that manufacturing investment and employment has no effect on the future of environmental policy within a city. This may be due to the nature of the dependent variable, adoption of the CPA. A city's pledge to the CPA does not require any certain activity on the part of the manufacturing industry. In fact, most cities have made public domain changes after pledging to the CPA, but only encourage, not oblige, participation by the private sector. Also, the nature of environmental advocacy and private business is changing. There are accounts of businesses in Europe that have jumped onto the carbon-cutting "bandwagon" because they have been forced by policy. But even in the United States, "where carbon cuts are voluntary, many companies are signing on anyway, either in anticipation of future controls or to keep increasingly ecoconscious customers at the tills" (Vencat 2006:2). Supporting environmental awareness can now be seen as a good investment and marketing practice. Other types of business may have a relationship, such as the service, retail and wholesale industries. Future examinations of environmental policy may want to explore these industries rather than manufacturing alone. Certainly, there is a wealth of learning to be had in the new and changing nature of economics in relation to environmental issues and policy.

In contrast, the more diverse the populace, in respect to race, age and religion, the more likely that city will pledge to the CPA. A political explanation may be that mayors of more diverse cities must include environmental policy action in their platforms in order to capture a more diverse voting population. Also, homogenous cultures can more readily have unscripted codes of conduct. It is possible that new environmental policies are not interesting to these communities because they have societal norms in place that deal with what they consider to be environmental issues. Although conservatism is suggested by this proposition, only diversity of race negatively related to voting for Bush in 2000 significantly. Homogeneity of age and religion did not have significant relationships.

Greater adoption of environmental policies in relation to greater diversity could also be part of a greater umbrella of public health programs. In a 2007 survey of 134 cities taking part in the CPA, it was found that 90 percent of the cities sampled considered green house gas reduction to be part of greater concerns towards general health (Cochran 2007). Literature shows that cities with greater minority populations also experience the greatest health, housing and pollution issues (Alexandre 1992; van Vliet, 1992). Perhaps the cities with the greatest diversity also have the greatest need for environmental policy and health care reform. Rather than pollution alone being a catalyst, as Moran (2007) and Gonzalez (2005) both suggest, general health and well-



being of the city and its citizens is also of importance. Policy creators may not necessarily utilize these policies for immediate environmental concerns but for health reasons. That was the case for Los Angeles when it first adopted emissions policies (CEPA 2007). The first restrictive and enforceable policies were put in place because of sickness and death due to emissions. It seems that one facilitator for environmental policy adoption is some level of direct threat to community health.

The indicator of greatest strength is the proportion of citizens that have college degrees. The more educated the citizenry the more likely they will be favorable to environmental policy adoption. Higher education institutions have often influenced their graduates. However, there is no current literature that delineates how much higher education influences the environmental concerns of its alumni, although education and environmental analysts agree that education is a priority of environmental advocates and is presumed to have an effect on environmental concern (Lawrence 1995; Lima 2003). Greater investigation into this area, the relationship between higher attainment of education and environmental advocacy, is clearly warranted.

The relationship between CPA adoption, bachelor degree attainment, and median income is of great interest. As expected, greater proportions of citizens with bachelor degrees is associated with higher median income of the city in which they live. However, in relation to environmental policy, cities with higher proportions of bachelor degrees and lower median incomes are the most likely to adopt environmental policies. It is important to note that the median income of a city is an entirely relative measure. It does not take as much wealth to have a good standard of living in one city as it does in another. For example, Manhattan Beach, California, in southwest Los Angeles, has a median income of \$100,750. Someone with an income that can sustain themselves in Bloomington, Indiana (median income of \$25,377) could not sustain themselves in Manhattan Beach. Therefore the influence of income on environmental policy is also relative from one city to another. However, one would expect that higher proportions of citizens with bachelor degrees would determine which cities have higher median incomes. There are many examples of cities that dispute this assumption. For example, Ithaca is a small town in upstate New York that has a median income of \$21,441 and 26% of the population has a bachelor degree. They are also proponents of the CPA. Other cities similar to this are Eugene, Oregon, San Luis Obispo, California, and Greenville, North Carolina. Incomes may not be high but educational levels are far beyond average.

It seems that the density and wealth of a community have as little to with creation of environmental policy as does the height of manufacturing industry within a metropolitan area. The political culture, religious and racial diversity, and greater range of age structure and, most certainly, the level of educational attainment of the citizens in these cities, all effect adoption of environmental policy far greater than theorists imagined. Individual characteristics of citizens are the force behind a city's adoption of

environmental policy. Whether it is the city that is catering to the citizens or the citizens catering to the city is beyond the scope of this paper but the power of the individual, as a stakeholder or consumer, must be considered relevant in the face of these findings. Whether this policy will make a difference in our current Climate Crisis is yet to be seen.

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