Beyond Aesthetics:

How Billboards Affect Economic Prosperity

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Introduction

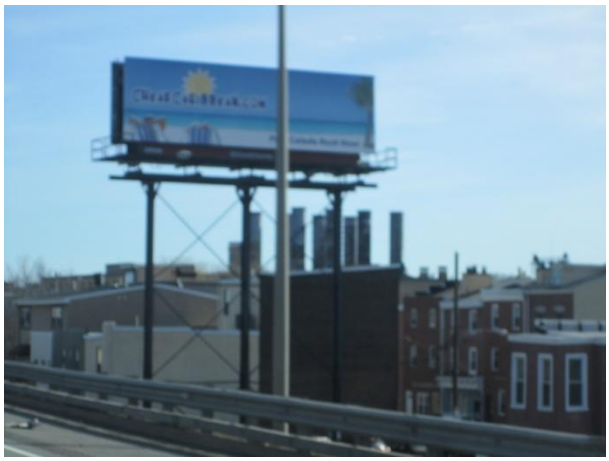
This paper seeks to answer the question of how billboards affect the economic prosperity of their surrounding areas. By combining US Census data, local home price data, and zoning code data with geographic information system (GIS) and statistical analysis tools, one can examine the complex interplay between billboards and economic prosperity. After a brief examination of the history of billboards and billboard regulation and a review of the available literature, this paper will analyze three fundamental questions:

1. What impact do billboards have on real estate prices in the City of Philadelphia?
2. What impact do billboards have on home value within census tracts in the City of Philadelphia?
3. What impact do billboard regulations have on median income, poverty rates, and vacancy rates in different cities in the United States?

Philadelphia was selected for this research for several reasons. It is large enough to make a careful examination of the interplay between billboards and real estate prices. Further, it has elements of both weak and strong market cities in that it has an affluent residential downtown area with significant purchasing power[1], but as a whole the city has a lower median income compared to the national average.[2] Lastly, Philadelphia has a zoning code that caps billboards and attempts to decrease their number through attrition, but it also has a history of allowing billboard companies to bypass the restrictions within the zoning code.[3]

[1] $74,317 household income according to the Center City District's November 2010 retail report.
[2] US median household income is $51,425 according to US Census 2005-9 estimates, Philadelphia median household income is $36,669.
[3] The passage of Bill 100720 creates a signage district in Center City.

In short, Philadelphia presents a good case study for this analysis as it embodies the different arguments and tools of the debate while containing both strong and weak market characteristics. Additionally, because of research conducted at the University of Pennsylvania, the locations of all billboards are known, thus allowing much of the spatial analysis to occur.



Literature Review

A review of available literature reveals a dearth of information on the economic impact of outdoor advertising billboards on the surrounding community. A number of articles have focused on the economic benefit to businesses, and one study examined how billboards affect the values of the property on which they reside, but we found no studies that examined how billboards affect the surrounding area. Further, we found no studies that have been conducted which examine the relationship between billboard controls and the economic condition of cities within the United States.

The argument against outdoor advertising which appears most often focuses on billboards' adverse visual and aesthetic impact on the surrounding community. Harvey K. Flad, emeritus professor of geography at Vassar College, comments on the "visual pollution"

created by billboards[4] and how they "desecrate the landscape."[5] Similarly, Charles R. Taylor, professor of marketing and Weih Chang of Villanova University describe how the public and law makers responded to the growth of outdoor advertising with legislation designed to curtail it.[6]

An article in the *Journal of Law and Politics* made the comment that "…the American public has consistently found outdoor advertising to be intrusive, ugly, crassly commercial, and a taint on nature. The story of billboards in America is thus characterized by an ongoing struggle between an expanding industry and a resistant public."[7]

The arguments against billboards traditionally have followed this aesthetic narrative with varying degrees of success in terms of restricting the proliferation of billboards. In its assessment of its billboard regulations, the City of San Jose notes that "Signs play a significant role in the visual environment of a city in that they are prominent structures that are typically, and deliberately, highly visible in the public realm. Billboards are more prominent than most other signs due to their size and height."[8] Flad goes further in stating that "they [billboards] actively seek the eye and tend to dominate the visual field."[9]

From their first appearance in the late 19th Century through today, billboards have met resistance on aesthetic grounds. However, the arguments against billboards often did not discuss their impact on the surrounding area. Some anti-billboard writers do discuss the economic impact of billboards but do not find the argument compelling. For example Flad comments that "…they [billboards] also do not perform an effective function. They simply encourage consumption."[10] Other researchers such as Taylor and Chang, in referencing a previous study, note that "…billboards had critics long before the turn of the century. While public opinion and legislation managed to curb some of the most blatant abuses, outdoor advertising was such a valuable and economical

medium for many advertisers that it was difficult to control (Wood 1958)."[11] They further comment that "the [billboard] industry was quick to point out that billposting had a positive effect on the economy, both by helping landowners better utilize their property and by

[4] Flad, Harvey K, "Country Clutter: Visual Pollution and the Rural Roadscape," *Annals of the American Academy of Political and Social Science*, 533: September 1997, pp. 124-125.
[5] Ibid, p. 123.
[6] Taylor, Charles R. and Weih Chang, "The History of Outdoor Advertising Regulation in the United States," *Journal of Macromarketing,* 15(47): 1995, pp. 48.
[7] "Note: Judging the Aesthetics of Billboards," *Journal of Law and Politics*, 23: 2007, pp. 173.
[8] "Billboards on Private Property & Off-Site Advertising on City Property: An Assessment of City of San Jose Sign Ordinance Regulations," City of San Jose, p. 7.
[9] Flad, p. 124.
[10] Flad, p. 123.
[11] Taylor and Chang, p. 50.

creating positive publicity for products and services."[12]

Despite the number of articles arguing for and against billboards on aesthetic, constitutional, and economic grounds, we are not aware of any studies that have been conducted which examine how billboards impact the area adjacent to them. Nor have any studies of which we are aware been conducted which examine whether billboard restrictions in different cities impact economic prosperity. A study conducted by Lilley III, DeFranco, and Buffalo of iMapData, Inc. entitled "The Outdoor Advertising Market and its Impact on Tampa Property Values" examined how billboards impacted the value of property in Tampa, Florida.[13] However, the study only examined the value of the property on which the billboards were located and determined that their presence elevated the property value. This is not an unexpected conclusion as the billboards represent income to the property owner. However the study did not attempt to assess whether those same billboards had any impact on the property values in the surrounding area.

In their paper "Ghettoizing Outdoor Advertising: Disadvantage and Ad Panel Density in Black Neighborhoods", Kwate and Lee examined how the quantity of outdoor advertising varies between neighborhoods which are predominantly black and predominantly white.[14] Their research showed that "black neighborhoods have more total billboards…than white neighborhoods"[15], however "income level was not significantly related to ad density after controlling for vacant lots."[16] More directly related to the discussion of billboards and economic prosperity, they concluded that "…the visual disorder caused by a high density of outdoor ads may reproduce inequality by marking neighborhoods as 'the ghetto' and reducing assessed value by residents and business owners."[17]

One reason for the paucity of studies on the issues of the economic impact of billboards on the surrounding area could be the difficulty in the valuation of open space. In their article "The Economic Value of Open Space," Fausold and Lilleholm comment:

Like all natural ecosystems, open space provides a variety of functions that satisfy human needs. However, attempting to assign monetary values to these functions presents several challenges. First, open space typically provides several functions simultaneously. Second, different types

[12] Ibid, p. 53.
[13] Lilley III, William, Laurence J. DeFranco, and Clarence W. Buffalo, "The Outdoor Advertising Market and its Impact on Tampa Property Values,"iMap Data Inc. July 24, 2001.

[14] Kwate, Naa Oyo A. and Tammy H. Lee, "Ghettoizing Outdoor Advertising: Disadvantage and Ad Panel Density in Black Neighborhoods," *Journal of Urban Health: Bulletin of the New York Academy of Medicine*. 84(1): 2006.
[15] Ibid, p. 21.
[16] Ibid p. 27.
[17] Ibid, p. 29.

of value are measured by different methodologies and expressed in different units. Converting to a standard unit (such as dollars) involves subjective judgments and is not always feasible. Third, values are often not additive, and "double counting" is an ever-present problem. Finally, some would argue that it is morally wrong to try to value something that is by definition invaluable.

At a minimum, they say, open space will always possess intangible values that are above and beyond any calculation of monetary values.[18] They do mention that "the most direct measure of the economic value of open space is its real estate market value"[19] which suggests that the market value of the real estate could be a useful proxy for evaluating whether billboards impact adjacent home values. A study examining home value and proximity to cell phone antenna towers demonstrated the effectiveness of using this approach to analyze home values in relation to the homes' distance from a tower.[20]

Using a similar methodology in evaluating billboards could provide useful indicators of the true economic benefits and costs to a community of such billboards in order to determine whether relevant regulation might be appropriate. An examination of billboard controls between cities could also provide useful information in order for cities to make informed decisions as to which regulations (if any) to apply in order to provide the most benefit to their city.

Findings

Analytical Overview[21]

This paper attempts to determine how billboards affect economic prosperity. Economic prosperity is a broad concept, and the paper analyzes several characteristics that can be easily measured and captured: median income, poverty rate, vacancy rate, and home values. For the city of Philadelphia, this data is publicly available through the US Census, the University of Pennsylvania's Cartographic Modeling Lab, and the City's Recorder of Deeds Office. Using ArcGIS and SPSS software, this paper marshals the data to answer the general question of how billboards affect economic prosperity.

Question 1: What impact do billboards have on real estate prices in the City of Philadelphia?

[18] Fausold, Charles J. and Robert J. Lilieholm, "The Economic Value of Open Space," *Landlines*, 8(5): September 1996, p. 2

[19] Ibid, p. 3

[20] Bond, Sandy, "The Effect of Distance to Cell Phone Towers on House Prices in Florida," *Appraisal Journal*, Fall 2007

[21] This section presents a brief examination of the analysis which follows. For a more thorough review of the methodological considerations, please examine Appendix XX.

In Philadelphia, there is a statistically significant correlation between real estate value (as measured by sales price) and proximity to billboards. Using 2010 sale price data, and taking into account adjacent amenities such as libraries and parks, residential real estate within 500 feet of a billboard is $30,826 less valuable (p=.035) at the time of purchase, according to the statistical model shown in Table 1 below, and further described in Appendix A. According to the model, the amount of livable area is the most important factor in determining the price of a property. For each additional SQ FT of livable area, there is an $89.34 increase in price. Similarly, properties located within 1,000 ft. of amenities (such as Bike Paths, Libraries, and Parks) are associated with a higher price. Properties purchased within 500 ft. of billboards have a decrease in sale price of $30,826 and the correlation is statistically significant (p ≤ .05).

Statistical Model for the Price of Properties within 500 ft. of a Billboard

Model[22]		Unstandardized Coefficients		Standardized Coefficients		
		B[25]	Std. Error[26]	Beta[27]	t[23]	Sig.[24]
1	(Constant)	-4936882.57	315905.74		-15.628	.000
	Livable Area	89.34	.46	.820	195.084	.000
	Bike Path 1000 Ft	82254.61	11494.54	.030	7.156	.000
	Library 1000 Ft	120130.59	17703.46	.029	6.786	.000
	Park 1000 Ft	102946.99	11027.36	.040	9.336	.000
	Year Built	2510.88	162.52	.065	15.450	.000
	Billboard 500 Ft	-30825.85	14634.00	-.009	-2.106	.035

a. Dependent Variable: Sales Price

Table 1

[22] Multiple variables were tested in different combinations, most of which were found not to be statistically significant. This model includes only statistically significant variables (p < .05).
[23] A measure of how well the variable fits the model.
[24] Denotes whether the variable is statistically significant. Numbers less than .05 are statistically significant.
[25] The unstandardized coefficient indicates the strength of a relationship between an independent variable (e.g. Livable Area) and a dependent variable (e.g. Sales Price). Results are expressed as a change in the dependent variable per unit change of the independent variable. i.e., for each additional square foot of Livable Area, a property increase in value $89.40.
[26] Standard error of the independent variable
[27] The Standardized Coefficient or beta weight is the relative strength of each independent variable in the regression equation. The larger the absolute value of the beta weight, the larger the influence of the independent variable.

Question 2: What impact do billboards have on home values within census tracts in the city of Philadelphia?

An analysis of Philadelphia census tracts and various economic prosperity indicators such as median income, percentage of vacant parcels, and population decrease do not reveal a correlation between billboards and economic prosperity. However, the analysis reveals a correlation between billboard density and home value. Billboards negatively impact home values. For each additional billboard in a census tract, there is a $947 decrease in home value. Considering that the mean number of billboards in a census tract is 4.8, the resulting decrease in value is $4,546 per house for homes in such districts when compared to the price of

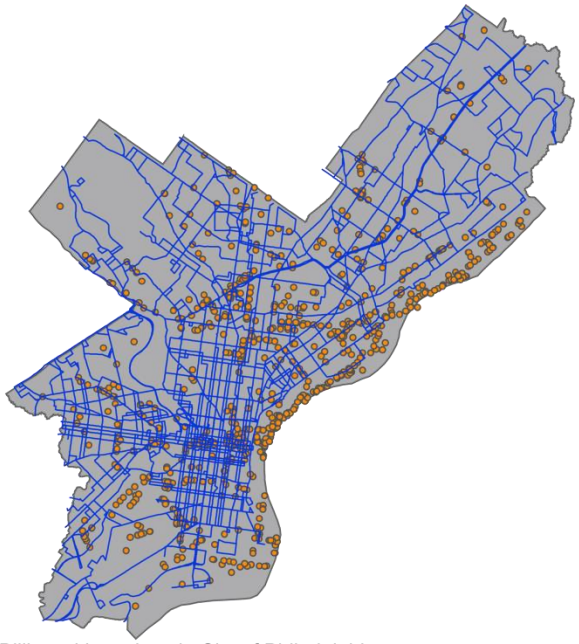
an equivalent home in a census tract without billboards.

Each additional billboard further degrades home value, but the reason behind the depression in home values is a nuanced one. Of course, billboards tend to be located along commercial corridors, yet our analysis shows that it is not the presence of the commercial corridor itself which has a negative impact on home values. Indeed when the variable "Percent of commercial properties" was included in the regression model, it was found to be not statistically significant. Thus, in this analysis, it is the billboard itself that has a depressing effect on the whole of the census tract. What this analysis cannot tell us is what characteristics of the billboard contribute to this problem. Is it the pole, the billboard itself, the lights upon it, or the commercialization of the viewscape[28] of local residents? It is likely that it is all, or some combination, of these factors that leads to this impact, but such analysis is beyond the scope of this paper.

Question 3: What impact do billboard regulations have on median income, poverty rates, and vacancy rates in different cities in the United States?

The sign codes of 20 cities listed to the right in Table 2 were condensed into a series of yes or no questions indicating the presence of a regulation or restriction pertaining to billboards. After all of the cities' answers were tabulated, a cluster analysis was undertaken which divided the cities into those having higher restriction (labeled "strict" in the following charts) and those having fewer restrictions (labeled "not strict" in the following charts).

These cities were divided into strict and not strict, and added as a variable to a chart listing median income, vacancy rates, and poverty rates. The medians of these rates were compared for strict and not-strict cities as seen below in Figures 1, 2, and 3.



Billboard Locations in City of Philadelphia

Table 2

Philadelphia	Jacksonville
Indianapolis	San Francisco
Youngstown	Austin
Tampa bay	Columbus
Houston	Fort Worth
Phoenix	Charlotte
San Antonio	Detroit
Chicago	El Paso
San Diego	Memphis
San Jose	Baltimore

[28] Lise Burcher in the case study "Urban Character and Viewscape Assessment " Isocarp Congress 2005 define viewscape as "a visual connection that occurs between a person and the spatial arrangement of urban and landscape features."

Median Income

The mean of the median income for strict control cities is higher than that for not-strict cities.

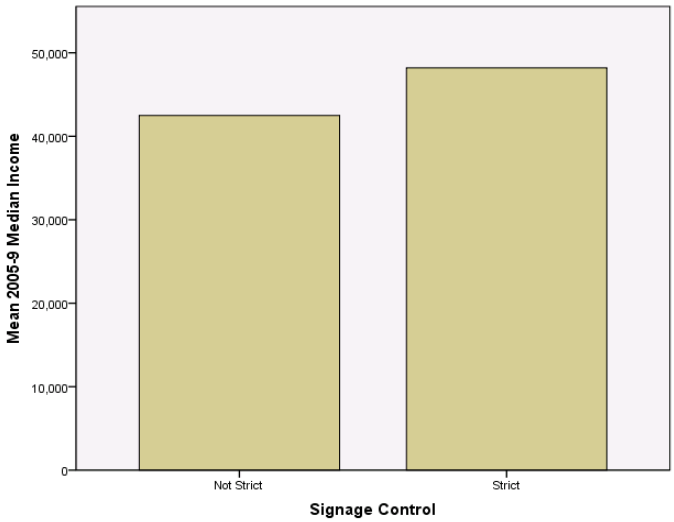


Figure 1 Billboard Control

Poverty Rate

The mean poverty rate for cities with stricter sign controls is lower than for cities without strict sign controls.

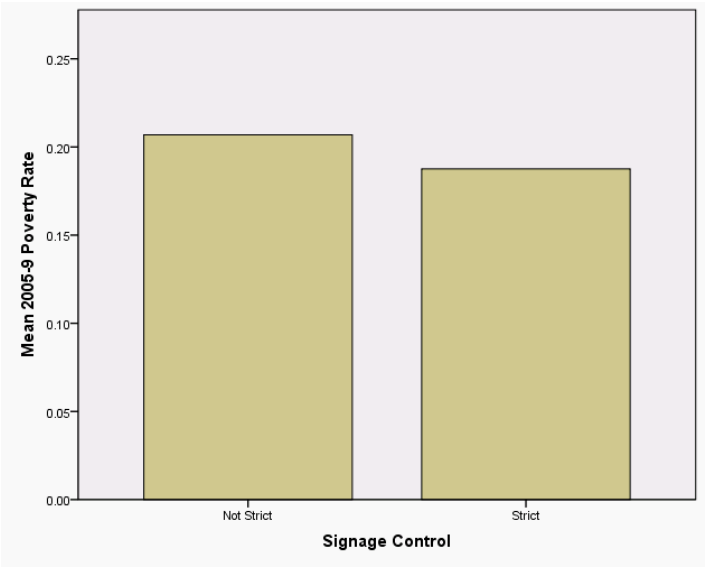


Figure 2 Billboard Control

Home Vacancy Rates

The mean home vacancy rate is lower for strict sign control cities.

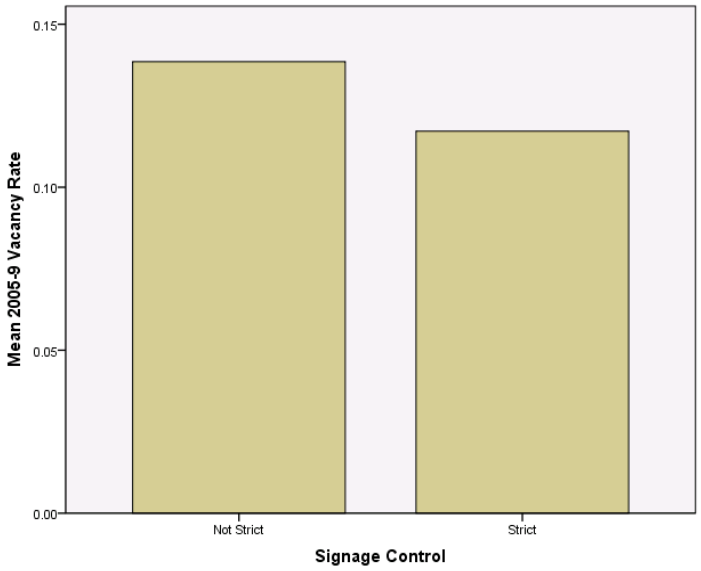


Figure 3 Billboard Control

Conclusion

This paper provides an approach and findings in an attempt to quantify the effects of billboards on real estate values in Philadelphia, and multiple measures of prosperity in 20 cities across the United States. Across these multiple measures, billboards were found to have negative financial and economic impacts. In Philadelphia, there is a statistically significant correlation between real estate value (as measured by sales price) and proximity to billboards. Properties located within 500 ft. of a billboard have a decreased real estate value of $30,826. Additionally, homes located further than 500 ft. but within a census tract/community where billboards are present experience a decrease of $947 for every billboard in that census tract. Income for strict sign control cities is higher than that for not-strict cities. Furthermore, the home vacancy and poverty rates for strict control cities are lower. Having strict sign controls does not negatively impact the economic prosperity of a city.

About the Author:

Jonathan Snyder is an urban planner from Philadelphia, Pennsylvania. He is a graduate of the University of Pennsylvania, with a Master in City Planning degree and a concentration in Community and Economic Development. He has worked to reform the process for obtaining accessory sign permits in Philadelphia. His research was generously support by a grant from the Samuel S. Fels Fund.

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Appendix

In order to conduct an analysis of billboards and economic prosperity, three questions were considered:

1. What impact do billboards have on real estate prices in the City of Philadelphia?
2. What impact do billboards have on home values within census tracts in the City of Philadelphia?
3. What impact do billboard regulations have on median income, poverty rates, and vacancy rates in different cities in the United States?

These questions get to the heart of the issue on economic prosperity incorporating home values, real estate prices, median income, poverty, and vacancy rates. These variables create a portrait of the economic status of a neighborhood. In order to answer these questions, a number of analyses were undertaken using the available information from the University of Pennsylvania's Cartographic Modeling Lab, the United States Census, and the Philadelphia Office of Property Assessment. Information about billboard locations was obtained from a Geographic Information System (GIS) map supplied by Prof. Amy Hillier of the University of Pennsylvania, School of Design.

Question 1: What impact do billboards have on real estate prices in the City of Philadelphia?

In order to answer this question we obtained data from the Philadelphia Office of Property Assessment and geocoded the housing sale data for the year 2010 into a GIS shapefile using ArcMap from ESRI. We chose 2010 data because it was the most recent. Further, using multiple years exposes the data to the vagaries of the market. By only using one year, we can limit the market price fluctuations and also eliminated the need to convert price data into constant 2011 dollars. We combined this point data with the billboard locations provided by Prof. Amy Hillier and calculated distance from 2010 property sales to billboards and used that as a variable in our statistical model.

OPA data included home values, however home values are not uniformly updated in Philadelphia and can prove to be unreliable. Likewise information on the number of bathrooms, bedrooms, fireplaces, pools, and exterior condition are not available for every house. Sales price, lot size, and livable area are present for every sale. We did not use data for sales with less than 100 square feet (SF) of livable area as those properties could be vacant lots or in poor condition. Similarly, we did not include properties whose sale prices were under $500. Many times properties will sell between relatives for $1 and this skews the data as these properties can have significant value even though that price does not reflect it. After eliminating real estate under $500 and under 100 SF, we tried many variable combinations to derive a statistical model that explains property value including: neighborhood characteristics (census tract population 1990, 2000, 2010, and percent changes in population; median income; licenses and inspection violations; fires; arsons; and percent owner-occupied), real estate characteristics (lot size, livable area, and age), distance to amenities (parks, libraries, and schools); and distance to billboards. Using different combinations of variables, the statistical model which best explains the sales price is as follows:

Model Summary

Model	R	R Square[29]	Adjusted R Square	Std. Error of the Estimate
1	.826[a]	.683	.683	675184.969

a. Predictors: (Constant), Billboard 500 Ft, Livable Area, Park 1000 Ft, Library 1000 Ft, Year Built, Bike Path 1000 Ft

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-4936882.574	315905.74		-15.628	.000
	Livable Area	89.34	.46	.820	195.084	.000
	Bike Path 1000 Ft	82254.61	11494.54	.030	7.156	.000
	Library 1000 Ft	120130.56	17703.46	.029	6.786	.000
	Park 1000 Ft	102946.99	11027.36	.040	9.336	.000
	Year Built	2510.88	162.52	.065	15.450	.000
	Billboard 500 Ft	-30825.85	14634.00	-.009	-2.106	.035

a. Dependent Variable: Sales Price

Question 2: What impact do billboards have on home values within census tracts in the City of Philadelphia?

Another way of examining how billboards impact economic prosperity is to examine how they affect home values. Combining census tract data, along with Cartographic Modeling lab data, and billboard information allowed us to build a statistical model that effectively explains median home values in census tracts.

[29] The R Square is a measure of how well the statistical model explains predicts the dependent variable; it varies between 0 and 1. The R square of .683 means that 68.3% of the property value can be explained by the independent variables.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.920[a]	.847	.841	45651.456

a. Predictors: (Constant), % Hispanic 2005-9, % Asian 2005-9, Billboards per Tract, % Fed/State Owned 2007, Median Home Sale Price 2006, % Population Change, % PHA Owned 2007, % Water Shut-off 2007, % College Degree 2005-9, Median Home Value 2000, % African American 2005-9, % L&I Vilations 2005

b. Dependent Variable: Median Home Value 2005-9

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	82868.258	9755.310		8.495	.000
	Billboards per Tract	-947.24	402.706	-.055	-2.352	.019
	% L&I Vilations 2005	85701.29	25769.992	.124	3.326	.001
	% PHA Owned 2007	-400493.10	144587.829	-.090	-2.770	.006
	Median Home Sale Price 2006	.138	.026	.178	5.369	.000
	% Water Shut-off 2007	-505543.69	153061.067	-.118	-3.303	.001
	% College Degree 2005-9	252775.73	18920.030	.442	13.360	.000
	Median Home Value 2000	.29	.044	.214	6.458	.000
	% Fed/State Owned 2007	1175955.48	261486.584	.109	4.497	.000
	% Population Change	53297.14	14705.008	.084	3.624	.000
	% African American 2005-9	-47591.10	11333.477	-.153	-4.199	.000
	% Asian 2005-9	-111195.66	36243.755	-.072	-3.068	.002
	% Hispanic 2005-9	-55228.04	18919.073	-.078	-2.919	.004

a. Dependent Variable: Median Home Value 2005-9

Question 3: What impact do billboard regulations have on median income, poverty rates, and vacancy rates in different cities in the United States?

This last question looks beyond Philadelphia and required the assistance of a legal intern. We examined the zoning codes of different cities across the United States. We converted the answers to these regulatory questions into yes/no answers which we then input into SPSS Statistical software (see the table below). We used cluster analysis to divide the cities into two clusters: those which regulate strictly and those which do not regulate strictly. Using this as an independent variable we added in economic information for each city and graphed the results. The graphing function allowed us to compare the

median of the median incomes of strict control cities and not-strict control cities. We then employed this method to evaluate the median of the poverty rates and the vacancy rates between the two classifications of cities. The following column headings refer specifically to sign regulations; i.e. "Distance Between Signs" means: does the city require a certain distance between billboards.

City	Distance from Prohibited Areas	Distance from Highways	Distance Between Signs	Distance from Residential	Regulate Flashing Signs	Regulate Animated	Regulate Revolving
Philadelphia	Yes	No	Yes	Yes	No	No	Yes
Indianapolis	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Youngstown	Yes	No	Yes	Yes	Yes	Yes	Yes
Tampa bay	Yes	Yes	Yes	Yes	No	Yes	Yes
Houston	No	No	Yes	Yes	No	No	No
Phoenix	Yes	No	Yes	Yes	No	Yes	No
San Antonio	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Chicago	Yes	Yes	Yes	Yes	Yes	No	No
San Diego	Yes	Yes	Yes	Yes	Yes	Yes	Yes
San Jose	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Jacksonville	Yes	Yes	Yes	Yes	Yes	Yes	Yes
San Francisco	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Austin	Yes	No	No	No	Yes	No	No
Columbus	Yes	No	Yes	Yes	No	No	Yes
Fort Worth	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Charlotte	Yes	No	Yes	Yes	Yes	Yes	Yes
Detroit	Yes	Yes	Yes	Yes	No	Yes	No
El Paso	Yes	No	Yes	Yes	Yes	Yes	Yes
Memphis	No	No	Yes	Yes	No	Yes	Yes
Baltimore	No	No	Yes	No	No	Yes	Yes

City	Regulate Changeable Message	Regulate Lighting	Regulate Landscaping	Regulate Maintenance	Regulate Traffic	Ban Off-Premise Signage	Ban Electronic Billboard	Regulate Size
Philadelphia	No	Yes	No	No	No	No	No	No
Indianapolis	Yes	Yes	No	No	Yes	No	No	Yes
Youngstown	Yes	Yes	Yes	Yes	Yes	No	No	Yes
Tampa bay	Yes	Yes	Yes	No	Yes	Yes	No	Yes
Houston	No	Yes	No	Yes	Yes	Yes	Yes	Yes
Phoenix	No	Yes	Yes	No	Yes	No	No	Yes
San Antonio	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Chicago	Yes	Yes	No	No	Yes	No	No	Yes
San Diego	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
San Jose	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Jacksonville	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
San Francisco	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Austin	no	Yes	No	No	Yes	Yes	Yes	Yes
Columbus	Yes	Yes	No	No	No	No	No	Yes
Fort Worth	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Charlotte	Yes	Yes	No	No	Yes	No	No	Yes
Detroit	Yes	Yes	Yes	No	No	No	No	Yes
El Paso	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Memphis	No	Yes	No	Yes	Yes	No	No	Yes
Baltimore	No	No	No	No	Yes	Yes	Yes	No

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