

## Predicting abandoned housing: does the operational definition of abandonment matter?

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“Abandonment” is a term that has no agreed-upon definition in the housing literature. As a result, different measures of housing abandonment have been used by researchers and practitioners. However, it is not clear whether the various measures capture the same construct. Therefore, the purpose of this study is to test whether three operational definitions of housing abandonment (tax delinquency as a proxy for abandonment, abandonment as identified by foot survey, and abandonment defined as “other vacant” by the census bureau) produce different results when used in prediction models. The study finds that the statistically significant predictors vary substantially from model to model. This finding is important to researchers and policy-makers since it indicates that proxies of housing abandonment are likely not equivalent, and that it may be necessary to conduct foot surveys in order to capture the intended construct.

**Keywords:** abandonment; housing; vacancy; blight

### Introduction

Housing abandonment is not consistently defined in the literature (Bassett, Schweitzer, & Panken, 2006; Cohen, 2001; Hillier, Culhane, Smith, & Tomlin, 2003). As Wachsmuth (2008) noted, “There are nearly as many definitions of abandonment as there are municipal governments tracking the issue and scholars writing about it” (p. 4). The shifting *operational* definitions of abandonment are particularly problematic from a generalizability standpoint. Without a shared definition – or evidence that different operational definitions measure the same construct – we, as a research community, cannot feel confident that we are addressing the same issue, despite claiming to study “abandonment.”

Table 1 illustrates the different operational definitions that have been used in major studies of housing abandonment conducted in the United States over the past 40 years. From the table, it is clear that definitions vary and have not become more consistent over time. However, common themes can be found. Some studies conceptualize abandonment as a process, others as an end state. The most consistent operational definition is that of tax delinquency or tax foreclosure, a so called “classical methodology” used in the literature dating back to the 1970s (Wilson et al., 1994). Nonetheless, a tax delinquent house may not be vacant or abandoned in the sense that it is an “eyesore” in the community. As a result, other studies have used measures that capture the physical state of the property as determined by foot or windshield surveys. Houses that look

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Table 1. Operational definitions used in US studies of abandonment.

Study and year	Operational definition	Geographic focus
Accordino and Johnson (2000)	A building or lot that has been vacant for two years or more as identified by city officials	Nationwide
Arsen (1992)*	In rem properties (properties in which the city was engaged in a tax default foreclosure)	New York, NY
Bartelt and Lawson (1982)	Not defined	New York, NY
Bassett et al. (2006)*	Structures identified as being “Other Vacant” by the US Census Bureau, structures that appear on the Environmental Block Assessment (a physical survey done by local university students), and structures that are tax delinquent or state-owned	Flint, MI
Bender (1979)	A property where the title was forfeited and the structure demolished	Chicago, IL
Cohen (2001)	Not operationally defined. Uses Keenan et al. (1999) to define an abandoned house as a chronically vacant and uninhabitable unit whose owner is taking no active steps to bring it back into the housing market	Baltimore, MD
Fraas and Lutter (1996)	Uses the operational definitions of White (1986) and Arsen (1992)	New York, NY
Greenbaum (1993)	An abandoned house is one that remained vacant for two or more successive years	Kansas City, KA
Hillier et al. (2003)*	A property declared to be imminently dangerous	Philadelphia, PA
Keenan, Lowe, and Spencer (1999)	No operational definition is given. Abandonment is defined as the process by which residential units in either the public or private sectors become detached from the housing market	Nationwide (also includes the UK)
Leavitt and Saegert (1988)	A city-owned property acquired through tax foreclosure	New York, NY
Lieb, Merel, Perlin, and Sadoff (1974)	No operational definition is given. Abandonment is defined as that point at which the owner decides to give up any remaining interests (either de jure or de facto) that he may still possess in the building itself	Nationwide (examples from Chicago, IL)
Mallach (2006)	A property whose owner has stopped carrying out at least one of the significant responsibilities of property ownership, as a result of which the property is vacant or likely to become vacant	Nationwide
Marcuse (1985)	A property where the owner is willing to surrender title to it without compensation because of the absence of effective demand for its continued use or reuse	Nationwide (examples from New York, NY)
Mardock (1998)*	A structure that is boarded and vacant	Minneapolis, MN
Metzger (2000)	No operational definition is given. Describes how others characterize abandonment	Nationwide
Morckel (2013)*	A property identified as being abandoned by city officials or other stakeholders	Columbus, OH and Youngstown, OH

*(Continued)*

Table 1. (Continued).

Study and year	Operational definition	Geographic focus
Morgan (1980)	A response of yes to the question “Are there any vandalized or abandoned buildings or any buildings with boarded-up windows or doors on the respondent’s block on either side of the street?” or an indication that abandoned buildings or other empty buildings are a problem in the respondent’s neighborhood	Nationwide
O’Flaherty (1990)	Not defined	Nationwide
Reiss (1996)	No clear operational definition is given. However, it is clear that the author classifies some <i>occupied</i> properties as abandoned, as well as all city-owned properties	New York, NY
Scafidi, Schill, Wachter, and Culhane (1998)*	A property vested by the city (presumably, a property where the lien-to-value ratio is greater than one)	New York, NY
Sternlieb, Burchell, Hughes, and James (1974)*	A building that is either vacant or standing or has been removed for reasons of public hazard, with no replacement forthcoming	Newark, NJ
Van Allsburg (1974)	A building which is vacant and for which the titleholder has no immediate plans for use or reuse	Detroit, MI
Wallace and Wallace (1990)	Not defined	New York, NY
White (1986)*	A property in tax arrears for 18 months to 3 years	New York, NY
Wilson, Margulis, and Ketchum (1994)	A property that has been tax delinquent for a long period of (unspecified) time	Cleveland, OH

\*Studies that use regression models to predict abandoned housing.

abandoned to the evaluator are thus defined as abandoned, regardless of their financial status. Studies that view abandonment as an end-state tend to rely on physical measures.

Likewise, the purpose of this study is to determine whether the results obtained from prediction models of housing abandonment significantly differ based on the operational definition of the dependent variable (i.e. abandonment). The topic of prediction was selected due to its importance and relative popularity in the literature. Being able to predict and identify abandoned properties aids in decision-making, especially in legacy cities where there are not enough resources to meet myriad needs. It is difficult for cities to be strategic about community development initiatives if they lack basic information on phenomena (like abandoned houses) that have well-known, negative effects on neighborhoods. Likewise, cities like Cleveland and Philadelphia have undertaken efforts to create neighborhood information systems that contain up-to-date property and demographic data (Center on Urban Poverty and Community Development, 2014; Hillier et al., 2003; Krouk, Pitkin, & Richman, 2000). To better improve planning efforts, the city of Detroit is currently conducting an inventory of its entire property stock, which includes an estimated 60,000–70,000 blighted homes (Aguilar, 2013).

But any maps or models that identify abandoned properties are only as good as the data and processes used to create them. It is, therefore, important to know whether abandonment has been properly defined before creating these tools. Hence, this study will compare the results of three operational definitions of housing abandonment – tax

delinquent houses (a process measure), houses that have been identified as abandoned via foot survey by city code enforcement officials (an end-state measure), and houses that have been identified by the US Census Bureau as “other vacant.” “Other vacant” is a measure of vacant, year-round housing units that are not for rent or sale or vacant awaiting occupancy (Bassett et al., 2006; Kresin, 2013). This measure is included since it is easy for local officials to obtain. If “other vacant” produces similar results to the physical foot survey, for example, then it may not be necessary for city officials to spend resources on labor-intensive foot surveys of properties. However, it is important to note that the “other vacant” category does not include units that are unfit for habitation or units that are to be demolished (Kresin, 2013). Whether the absence of this information produces significantly different results in the prediction models will be determined.

## Methods

To test the differences in prediction models, three simultaneous regression models were run on a 2011 data-set of abandonment for the city of Columbus, Ohio. Columbus was selected for several reasons. First, it is located in a state with a number of cities facing abandoned property problems (Community Research Partners & ReBuild Ohio, 2008). Although Columbus’ population is growing as a whole, the portions of the city within the 1950 boundary face population losses and accompanying challenges comparable to other cities in Ohio (The Columbus and Franklin County Consortium, 2009). Second, since Columbus has such a variety of neighborhoods in terms of age, population stability, and abandonment, this variation allows for better prediction models. Lastly, Columbus was selected due to data availability concerns. Many cities facing an abandoned housing problem have not had the resources to conduct frequent or reliable property-by-property surveys of abandonment. Columbus code enforcement officials annually conduct a city-wide, abandoned property survey. The city uses the information from the surveys to target federal funds and to determine which properties the land bank should acquire and subsequently rehabilitate, mothball, or demolish.

The set of predictors used in the model are consistent with those used in Morckel (2013). They include population change, the percentage of properties below the city-wide median property value, the percentage of properties not sold the year prior, the percentage of properties that were set fire to the year prior, the percentage of properties demolished the year prior, the percentage of properties rated as being in poor condition by city officials, the percentage of properties built prior to 1945, the percentage of residents over age 25 without a high school degree, the percentage of residents who are unemployed, the percentage of residents who are in poverty, the percentage of residents who identify as African-American alone or in combination, and the percentage of mortgage foreclosures the year prior. Morckel (2013) provides an extensive review of these predictors of abandonment; therefore, it is unnecessary to repeat that review here. A succinct explanation for why these variables are included in this study can be found in Appendix 1.

The dependent variable is the percentage of housing units in a given neighborhood that are abandoned, with abandonment operationally defined in the three different ways, as previously described. For data collection purposes, it was necessary to define a neighborhood as a census block group, with 382 City of Columbus block groups included in this study. This focus on the neighborhood (not property) is consistent with previous studies. As Arsen (1992) noted,

Housing abandonment is, above all, a neighborhood phenomenon. This is so not only in the obvious sense that abandonment is locationally concentrated, but, as Sternlieb et al. (1974) report, neighborhood conditions are likely to weigh more heavily than a particular building's physical conditions in an owner's abandonment decision. (p. 366)

After running the regression models, the results were compared. They were evaluated on the basis of whether the  $R^2$  statistics were similar, and if the order of predictors by strength was the same in all three models. Such findings would lend support to the notion that (1) the three operational definitions are measuring the same construct, and (2) that it does not matter which operational definition a community uses in its prediction models.

### Findings

Simultaneous regression determines the extent to which a set of variables predict an outcome and the relative importance of the various predictors. The  $R^2$  statistic from each regression model indicates the proportion of variation in abandonment that is explained by the 12 independent variables. For abandonment operationally defined as the percentage of tax delinquent units,  $R^2$  was .753 ( $p < .001$ ), meaning that 75.3% of the variation in abandonment between neighborhoods is explained by the 12 predictors entered in the equation. For abandonment operationally defined as units identified via foot survey by code enforcement officials,  $R^2$  was .756 ( $p < .001$ ). For abandonment operationally defined as "other vacant" by the census bureau,  $R^2$  was .482 ( $p < .001$ ).

To determine the relative importance of individual predictors, standardized regression coefficients were examined. Table 2 provides a comparison of results by model. The strength of predictors varies substantially from model to model. Despite the similar  $R^2$  values obtained for the tax delinquency and foot survey models, the statistically significant predictors differ. For the tax delinquency model, the statistically significant predictors, in order of importance, (i.e. strength) are the percentage of properties below the

Table 2. Comparison of standardized coefficients across simultaneous regression models that use different operational definitions of abandonment for Columbus, Ohio.

	Tax delinquency			Foot survey			Other vacant		
	$\beta$	<i>t</i>	Sig.	$\beta$	<i>t</i>	Sig.	$\beta$	<i>t</i>	Sig.
Mortgage foreclosures	.023	.697	.486	.101	3.103	.002	.059	1.239	.216
Arsons	-.015	-.529	.597	.099	3.484	.001	.051	1.228	.220
Demolitions	.024	-.712	.477	.120	3.561	<.001	.031	.634	.526
Property condition	.284	6.576	<.001	.360	8.383	<.001	.267	4.269	<.001
Property age	.146	4.317	<.001	.154	4.907	<.001	.158	3.471	.001
Property values	.366	8.548	<.001	.160	3.757	<.001	.028	.456	.648
Property sales	-.033	-.764	.445	-.181	-4.271	<.001	-.101	-1.630	.104
Population change	.017	.588	.557	.033	1.128	.260	.026	.625	.532
Education	.027	.821	.412	.001	.016	.987	.155	3.246	.001
Unemployment	.032	.718	.473	-.062	-1.396	.164	-.057	-.874	.383
African-American	.303	8.464	<.001	.091	2.562	.001	.210	4.046	<.001
Poverty	.041	1.024	.307	.112	2.808	.005	.182	3.143	.002

Notes:  $N = 382$  neighborhoods (defined as block groups).

Italic values indicate statistical significance at the .05 level. Abandonment data are from 2011. Data for the independent variables are from 2010.

city-wide median property value ( $\beta = .366, p < .001$ ), the percentage of residents who are African-American ( $\beta = .303, p < .001$ ), the percentage of properties in poor condition ( $\beta = .284, p < .001$ ), and the percentage of properties built prior to 1945 ( $\beta = .146, p < .001$ ). For the foot survey measure of abandonment, the statistically significant predictors, in order of importance, are the percentage of properties in poor condition ( $\beta = .360, p < .001$ ), the percentage of properties not sold the year prior ( $\beta = -.181, p < .001$ ), the percentage of properties below the city-wide median property value ( $\beta = .160, p < .001$ ), the percentage of properties built prior to 1945 ( $\beta = .154, p < .001$ ), the percentage of properties that have been demolished ( $\beta = .120, p < .001$ ), the percentage of residents that are in poverty ( $\beta = .112, p = .005$ ), the percentage of mortgage foreclosures ( $\beta = .101, p = .002$ ), the percentage of arsons ( $\beta = .099, p = .001$ ), and the percentage of residents who are African-American ( $\beta = .091, p = .001$ ). Measuring abandonment using the census definition of “other vacant” produces different results. In order of importance, the predictors of “other vacant” are the percentage of properties in poor condition ( $\beta = .267, p < .001$ ), the percentage of residents who are African-American ( $\beta = .210, p < .001$ ), the percentage of residents who are in poverty ( $\beta = .182, p = .002$ ), the percentage of properties built prior to 1945 ( $\beta = .158, p = .001$ ), and the percentage of residents who do not have a high school degree ( $\beta = .155, p = .001$ ).

Since the models had a number of non-statistically significant predictors, the models were rerun with only the statistically significant predictors included. Creating parsimonious models is important to reduce the data collection efforts necessary to create prediction models of abandoned housing. The parsimonious tax delinquency model had an  $R^2$  of .747; all of the remaining predictors were statistically significant ( $p < .05$  for all). The parsimonious foot survey model had an  $R^2$  of .753; all of the remaining predictors were statistically significant ( $p < .05$  for all). The parsimonious “other vacant” model had an  $R^2$  of .465; all of the remaining predictors were statistically significant ( $p < .05$  for all). Thus, removing the non-statistically significant predictors from the models resulted in little change in the amount of variance explained. See Appendix 2 for more information on coefficients and confidence intervals.

## Discussion and conclusion

### *Does the operational definition matter?*

The operational definition of abandonment matters in prediction models. While this study cannot determine for certain whether the three operational definitions measure the same construct, what is evident is that the results of prediction models vary significantly depending on the operational definition used to measure abandonment. Thus, the results would at least suggest that the different operational definitions do not measure the same thing, contrary to popular belief. Likewise, local officials and researchers need to be clear on what they consider to be abandonment before creating prediction models. If, for example, local officials consider “eyesores” (say, properties that are vacant and open to the elements) to be abandoned properties, then, given the results of this study, it is probably not appropriate to create prediction models of housing abandonment that use tax delinquency as a proxy for abandonment. Such a model might predict tax delinquency, but not abandonment in the way communities envision it. Similarly, use of the census bureau definition of “other vacant” is probably inappropriate, seeing that the predictors of “other vacant” are different from those of a foot survey that would capture “eyesores” – again, assuming that eyesores are the intended construct.

Notably, all three of the models performed well, considering that the  $R^2$ s were all high; however, the amount of variation explained by the “other vacant” model was significantly lower than that of the other two (.482 compared to .753 and .756). As a result, using “other vacant” as a proxy for abandonment may not be ideal. Rather than rely on census data, which are easy to obtain, it may be necessary for communities to conduct more labor-intensive foot surveys to create strong models.

Nonetheless, there were some commonalities amongst the models. The percentage of properties in poor condition, the percentage of properties built prior to 1945, and the percentage of African-American residents were statistically significant predictors of housing abandonment in all three models. These results are consistent with previous research including studies on housing filtering, which speculate that the worst housing filters down to the poorest residents; and if there is an over-supply of housing, the least desirable housing becomes vacant and abandoned (Bier, 2001).

Studies have shown that abandoned buildings tend to be more physically distressed than non-abandoned buildings (Scafidi et al. 1998); and the condition of neighboring properties influences the decision to abandon one’s own property (Sternlieb et al., 1974). As properties age, their physical condition deteriorates, especially if owners do not conduct regular maintenance. Older properties can also be more expensive to maintain (Clark & Herrin, 1997). As a result, they may be more prone to physical abandonment than newer properties since the expected return on investment might not justify the costs. Additionally, older properties that are not upgraded over time may become obsolete. If there is an over-supply of housing on the market, the lack of amenities should make finding buyers or tenants more difficult (Bishop, Bartlett, & Lautz, 2007).

The influence of race in prediction models of abandonment is also well established. Race is thought to be a major factor in neighborhood change and the abandonment of housing (Bassett et al., 2006). As segregation rises, the prevalence of boarded-up housing increases (Massey & Denton, 1993). Additionally, abandonment occurs at higher rates in neighborhoods experiencing an influx of African-American households (Sternlieb et al., 1974), and in African-American neighborhoods experiencing rapid population loss (Price-Spratlen & Guest, 2002). Furthermore, a high percentage of African-American residents significantly reduces the likelihood of whites buying a house in a neighborhood (Emerson, Chai, & Yancey, 2001).

Despite these consistencies with existing abandonment research, some new findings emerged. First, mortgage foreclosures were only statistically significant predictors of housing abandonment in the foot survey model. Mortgage foreclosures have received significant attention in the literature, in part, because of the detrimental effects that foreclosures presumably have on neighborhoods, such as vacancy and abandonment (Immergluck & Smith, 2006; Mallach, 2010; Schilling, 2009). If one believes that all three measures of abandonment capture the construct of abandonment, then it is curious that mortgage foreclosures only predict abandonment in one of the three models – the foot survey. There are a few potential explanations for this finding. Perhaps mortgage foreclosures do not predict or cause abandonment as some researchers and practitioners have thought, or (probably more likely) perhaps the foot survey is the only measure that captures the intended construct.

Second, population change was not a statistically significant predictor of abandonment in any of the models. This finding is in contrast to studies that hold that the root cause of large-scale abandonment is population loss (Mahoning Valley Organizing Collaborative, 2011; Mallach & Brachman, 2010). Research has shown that US cities experiencing large population declines tend to have higher rates of abandoned housing

(Cohen, 2001). Based on simple supply and demand, if there are not enough people in a neighborhood or community to occupy the available housing, then some units must become vacant (Mallach, 2010; Mallach & Brachman, 2010). Perhaps the population outcome in this study was different from previous studies since many of Columbus' neighborhoods are growing at a significant rate.

### **Limitations**

Although this study examined the differences in prediction models that result from different operational definitions of housing abandonment, it is important to note that the models created herein are not based on a longitudinal data-set and are, therefore, limited in their ability to forecast abandonment. It is not known how far in advance various predictors of abandonment occur. For example, do poor property conditions predict abandonment one year in advance of abandonment (as presumed in this study), five years in advance, or some other time frame? There are also limitations in the use of the "other vacant" definition. "Other vacant" is only available at the block group level every 10 years; therefore, if a community desires to use the measure between decennial censuses, it would have to rely on American Community Survey estimates, which are only available at the tract level.

This study does not answer all of the questions that may arise from the seemingly elusive definition of "abandonment." Is abandonment a construct like intelligence or love that cannot be readily observed in one way but should be measured and captured in many different ways? Or is abandonment a physical state (not a construct) that can be easily observed by driving past a property? Perhaps these questions point to the challenge of having abandonment be both a verb and a noun. This author suspects that the process of housing abandonment is more difficult to capture than the end-state. If what is most important to communities is the end-state (an "eyesore" in a neighborhood, as I have been calling it), then more communities need to attempt to conduct frequent, house-by-house surveys of abandonment. Similarly, if the "eyesores" are most important to communities, researchers may need to use physical, end-state measures of abandonment in their studies as well, instead of the "classical" operational definitions like tax delinquency and tax foreclosures. As Wachsmuth (2008) noted, "The way abandonment is defined is thus of immediate practical as well as theoretical concern, since the choice of definition will structure the kinds of interventions considered by government, community groups, and other social actors" (p. 4).

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**Appendix 1. Independent variables included in the regression models**

Variable	Measurement (for year 2010)	Why it is included (from Morckel, 2013)
Mortgage foreclosures	% of properties in foreclosure	Mallach (2010) found that speculation and subprime lending triggered abandonment in otherwise reviving areas of Cleveland and Detroit. Immergluck and Smith (2006) found that foreclosures harm neighborhoods through the triggering of extended vacancies and abandoned buildings
Arsons	% of houses that were set fire to	In weak housing markets, some property owners may collect the insurance money and leave the property abandoned (Van Allsburg, 1974). Arsoned properties might also predict neighborhood abandonment by reducing demand for nearby housing
Demolitions	% of properties demolished	Distressed neighborhoods will likely have more demolitions and a correspondingly high number of abandoned properties. Properties that are vacant and in poor condition are the ones most typically demolished in places losing population (Cohen, 2001)
Property condition	% of properties that code enforcement officials rated as being in poor condition	Abandoned buildings tend to be more physically distressed than non-abandoned buildings (Scafidi, Schill, Wachter & Culhane, 1998). The condition of neighboring properties influences the decision to abandon one's own property (Sternlieb et al., 1974)
Property age	% of properties built prior to 1945	Older properties can be more expensive to maintain (Clark & Herrin, 1997). As a result, they may be more prone to physical abandonment than newer properties since the expected return on investment might not justify the costs
Property values	% of properties below the city-wide median property value, as assessed by the county auditor	Decreases in value over time signal neighborhood decline (Aalbers, 2006). Property values may also reflect the degree of investment and maintenance in the property (McDonald, 2011), which may influence the probability of abandonment
Property sales	% of properties that were not sold or transferred	Low sales relative to other neighborhoods may indicate that the neighborhood is not attractive to prospective homebuyers (Berkovec &

*(Continued)*

*(Continued).*

Variable	Measurement (for year 2010)	Why it is included (from Morckel, 2013)
Population change	% change in population for the neighborhood between 2000 and 2010 (rescaled from 0 to 100)	Goodman, 1996). Low demand is associated with abandonment A decrease in population indicates low to no demand relative to supply (Mallach, 2006). Abandonment at the neighborhood level is associated with population loss (Hollander, 2010)
Education	% of residents 25 years old or older without a high school degree	While few studies have examined the connections between education and abandonment – possibly because the connection is only an indirect one, through income – it is included in this study because education is an accepted measure of socioeconomic status (Mueller & Parcel, 1981). Life-cycle theory purports that abandonment is the product of socioeconomic change (Aalbers, 2006; Downs, 1973; Metzger, 2000; Wachsmuth, 2008)
Unemployment	% of persons unemployed in the neighborhood	A job loss could cause owners to abandon a property because they cannot afford the mortgage or cannot afford to physically maintain it. Research has found that abandonment relates to higher unemployment (Bassett et al., 2006; Community Research Partners & ReBuild Ohio, 2008; Sternlieb et al., 1974)
African American	% of residents who identify as black (alone or in combination)	Race is thought to be a major factor in neighborhood change and the abandonment of housing (Bassett et al., 2006). As segregation rises, the prevalence of boarded-up housing increases (Massey & Denton, 1993). Additionally, abandonment occurs at higher rates in neighborhoods experiencing an influx of African-American households (Sternlieb et al., 1974), and in African-American neighborhoods experiencing rapid population loss (Price-Spratlen & Guest, 2002)
Poverty	% of residents who are in poverty	Landlords in high poverty areas cannot charge enough rent to cover maintenance costs and property taxes because their tenants are poor; therefore, they abandon their houses as they become less profitable (Mallach, 2006; Van Allsburg, 1974). Notably, Margulis (1998) found that poverty more so than race contributes to housing deterioration

**Appendix 2. Reduced regression models: comparison of different operational definitions of abandonment for Columbus, Ohio**

Operational definition	Independent variable	Unstandardized coefficients		Standardized coefficients		Sig.	95% confidence interval for <i>B</i>	
		<i>B</i>	Std. error	$\beta$	<i>t</i>		Lower bound	Upper bound
Tax delinquent $R^2 = .747$	Property condition	2.020	.598	.299	9.032	<.001	1.580	2.459
	Property age	.041	.008	.145	5.058	<.001	.025	.057
	Property value	.105	.009	.407	11.267	<.001	.086	.123
	African Americans	.093	.010	.311	9.656	<.001	.074	.112
Foot survey $R^2 = .753$	Foreclosures	.471	.139	.109	3.390	.001	.198	.745
	Arsons	1.184	.365	.091	3.242	.001	.466	1.902
	Demolitions	2.155	.600	.121	3.592	<.001	.975	3.335
	Property condition	1.577	.182	.367	8.647	<.001	1.218	1.936
	Property age	.028	.005	.157	5.148	<.001	.017	.039
	Property value	.026	.007	.157	3.764	<.001	.012	.039
	Property sales	-.270	.069	-.159	-3.931	<.001	-.404	-.135
	African Americans	.014	.006	.074	2.160	.031	.001	.027
Other vacant $R^2 = .465$	Poverty	.017	.008	.061	2.099	.037	.001	.033
	Property condition	2.373	.271	.389	8.748	<.001	1.840	2.907
	Property age	.041	.011	.160	3.661	<.001	.019	.062
	Education	.116	.033	.157	3.552	<.001	.052	.180
	African Americans	.057	.011	.212	4.486	<.001	.035	.080
	Poverty	.054	.018	.135	2.982	.003	.018	.089

Notes:  $N = 382$  Neighborhoods (defined as block groups).

Abandonment data are from 2011. Data for the independent variables are from 2010.